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ASSESSMENT OF THE MINERAL POTENTIAL

MINE WORKINGS TYPE & ENVIRONMENTAL HAZARDS,

& RECOMMENDATIONS FOR MINE CLOSURES

& HAZARD MITIGATION

FOR THE

GENESIS REAL ESTATE & DEVELOPMENT, INC.

EXCHANGE PROPOSAL

PATENTED MINING CLAIM BLOCK

Washington Camp-Duquesne Mining District
Patagonia Mountains, Santa Cruz County, AZ

August 15, 1991

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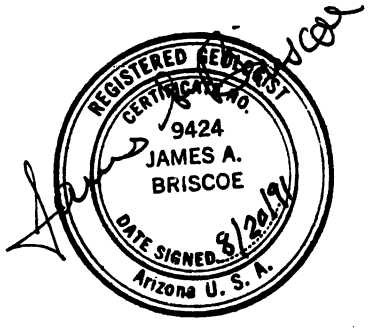

ASSESSMENT OF THE MINERAL POTENTIAL, MINE WORKINGS TYPE & ENVIRONMENTAL HAZARDS, & RECOMMENDATIONS FOR MINE CLOSURES & HAZARD MITIGATION FOR THE GENESIS REAL ESTATE & DEVELOPMENT, INC. EXCHANGE PROPOSAL PATENTED MINING CLAIM BLOCK

Washington Camp-Duquesne Mining District,
Patagonia Mountains, Santa Cruz County, AZ
August 15, 1991

SUMMARY

The Subject Property, currently under consideration for a land exchange with the USDA Forest Service, consists of 75 patented mining claims, with a total net area of 984.97 acres. The property is surrounded on all sides (except where bounded by 9 patented claims owned by others) by the Coronado National Forest. The property has a history which dates back to the time of the Jesuits, in the late 1600's, and has been the site of sporadic, but generally continuous, mining prospecting activity, up to the current time. It is surrounded by other historic sites of particular interest to modern-day tourists, and it lies in the headwaters of the Santa Cruz River. The climate and vegetation types are characteristic of the southeastern Arizona Basin and Range Oak Woodland terrain. Elevation ranges from 5,000 feet to 7,000 feet. Rainfall is approximately 16 inches to 25 inches per year. Snow occurs sporadically during the winter months. The land is an outstanding animal habitat, with an animal population characteristic of the Oak Woodland environment.

Geologically, the terrain is diverse. It consists primarily of upper-Paleozoic limestones, overlain by Triassic-Jurassic rhyolitic welded tuff volcanics, which are intruded by the batholithic Patagonia granodiorite and associated igneous dikes and sills. The sedimentary and volcanic rocks have been folded into a complex anticlinal feature that has been intimately faulted and mineralized. Mineralization is characteristic of the Arizona porphyry copper province, and small, sub-economic disseminated porphyry copper alteration zones are peripheral to the Subject Property. Mineralizing solutions associated with the intrusive rocks and their associated porphyry copper hydrothermal alteration zones, have altered the southern portion of the sedimentary block to skarn, while the northern portion of the block has, in general, been less intensely affected. Some breccia pipes previously apparently mis-identified, have been located by this current study. Copper, lead, zinc and silver mineralization, with subordinate amounts of gold and perhaps molybdenum, are present within the Subject Property. Approximately 1 million tons of relatively high-grade ore in discontinuous pods was drilled out during the late 1960's and early 1970's. In spite of literally thousands of surface occurrences of colorful green copper oxides associated with skarn alteration, mineralization has been too erratically distributed to form economically viable ore bodies. This erraticness of mineralization was recognized by prominent consulting geologists, and reported on as early as 1916, and again in 1936, 1950, and the 1970's. Yet, fruitless exploration continued.

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The writer is of the opinion that while some minimal potential may exist, the size and continuity of potential ore bodies are not attractive under current mineral economics and technology.

Because of the incomplete silication of all of the limestone, oxidation of copper minerals associated with pods of skarn, resulted in surface or near-surface precipitation of flashy green copper oxides. This attracted fruitless prospecting and mining activities over the last 200+ years. The result has been a pockmarking of the Subject Properties by some 416 mine workings, most of which are shallow trenches, pits, prospect shafts and adits. The majority of this activity took place in the late 1800's and early 1900's, pretty much terminating with the Great Depression in 1929. Some of the mine workings, as indicated by patent paper dates, and the maturity of timber on the mine dumps, have not been touched in almost 100 years. Many of these workings have caved or been filled by erosion and are no longer dangerous; 214 (51%) of the 416 are in this category. Another 103 (25%) are dangerous but can easily be bulldozed closed. Seventy-one workings (17%) are somewhat dangerous but are in terrain too steep or heavily timbered to bulldoze. These should be fenced off with barbwire. Twenty-three workings (6%) are very dangerous and cannot be practically bulldozed closed, but need to be securely fenced off using cyclone (chain link) fencing. Five mine shafts, or 1% of the total, should be closed off and made inaccessible by using a steel and chain link mine closure, manufactured by the State of Maine Mining Company in Tombstone, Arizona. This type of closure would allow future access if necessary, access to water by pumping, or animal ingress and egress.

Tailings lying on the San Antonio and Great Republic mining claims, and associated with the Duquesne Shaft mill, operated from 1940 to circa 1950 by the Callahan Zinc-Lead Mining Company, are thought not to represent any environmental hazard. Acid from oxidizing sulfides within the tailings is immediately neutralized by calcium carbonate, and metal ions are tied up in immobile carbonate minerals. A lower impoundment dam which has been breached by erosion should be reconstructed to prevent migration of tailings by stream wash.

Though small adobe smelters have been historically reported in the Duquesne area, this study did not locate any smelter slag. Most smelting was done off the Subject Property. Some was done on the Doco claim, which lies central to Washington Camp, but not part of the Subject Property. Ore from the Subject Property was smelted at numerous locations throughout the southwest. Also, some ore was milled in custom mills distant from the Subject Property.

Environmental contamination on the Subject Property appears to be restricted to four places where stationary gasoline or diesel engines were located, and engine oil saturated soil under and around the engine mountings. There is an apparent underground fuel tank near the Bonanza Shaft at Duquesne should be excavated, and removed, and soil beneath it tested for fuel leakage.

No pre-Columbian artifacts, habitations or cultural evidence were found during this study.

The Subject Property is an important mineral collecting locality.

CONCLUSIONS

Though the Subject Property has numerous mine openings, these are almost entirely small, and all can be mitigated at relatively low cost and effort. Environmental contamination by motor oil is minimal and can easily be mitigated. Existing mine tailings, because of the carbonate gangue rock is non-acid generating, and does not present an environmental hazard. The exchange proponent is willing to remediate all hazards by appropriate measures.

The Subject Property is attractive to the public and tourists because of its historic aspects, the ghost towns of Duquesne and Washington Camp, the old mining activity, and mineral collecting opportunities. While this study was underway, the writer had incidental contact with tourists from Tucson, Arizona, Richardson, Texas, and Czechoslovakia. Mineral potential is minimal and not attractive to mining companies under current economic and technological conditions.

RECOMMENDATIONS

Mine Workings

Mine workings should be closed by a combination of bulldozing, barbwire fencing, cyclone (chain-link) fencing, and use of custom fabricated steel mine closing structures. Details for each mine opening are found in the computer spread sheet data base, Appendix 3.

Oil Soaked Ground

This ground should be picked up and disposed of in an approved site.

Fuel Tank at Bonanza Shaft, Duquesne

This fuel tank requires excavation and removal, and testing for fuel leakage in underlying soil.

Duquesne Shaft Area Tailings Pond

Pick up and dispose of trash dump. Re-build lower tailings impoundment using a graded limestone dam designed to pass water slowly, but entrain tailings. Repair gully wash in upper ponds using limestone rock. Add humic material to encourage re-growth of vegetation which is already encroaching on the tails.

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ANIMAL LIFE

The Subject Property is good habitat for a variety of animals. These include white-tailed deer, which were seen almost daily during the field work done in the months of June and July. One of these encounters is documented on video tape. The residents of Washington Camp spotted a mountain lion in Washington Gulch in June of 1991. In the general area, deer hunter John Elias of Nogales, spotted a jaguar in the fall of 1962. Sonoita Creek, in the vicinity of the town of Patagonia, which lies only 11 miles north, has become a bird watchers paradise because of the numerous variety of birds which make their appearance there. Bats use some of the mine openings for habitat. Where their presence was identified or suspected, the writer's remediation suggestions include allowance for bat ingress and egress. Both antelope jack rabbits and cottontails are prolific in the area. Though no sightings were made, bobcats, skunks, coati's and coyotes should be present on the Subject Property.

HISTORY

The first European explorers into what is now Arizona were the Spanish Jesuit missionaries, who in 1687 explored the Santa Cruz River valleys and portions of the Gila and San Pedro valleys (Schrader, Frank C., 1915). The Fray Marcos de Niza Monument commerating his entry into what is now Arizona, lies about 2 miles southeast of the Subject Property at Lochiel. Their discovery of fertile valleys and mineral wealth lead to the establishment on the Santa Cruz River of the missions of Tumacacori, Santiago, San Cayetano, and San Xavier del Bac, near Tucson. The Jesuit fathers were the pioneer miners of the country, and conducted mining operations with a "considerable force of men, mostly impressed Indians" that they must have operated on a considerable scale, as indicated by the extent of the workings and slag dumps still seen near the mission ruins. They named the old Salero Mine (some 18 miles north of the Washington Camp-Duquesne area) and other mines in the Santa Rita region (Schrader, p. 21). The discovery of the Planches de Plata District, about 20 miles southwest of Nogales, celebrated for its great production and large nuggets or masses of native silver, the largest of which is said to have weighed 2,700 pounds, was discovered in 1736, and caused great excitement and a stampede to this region of northern Mexico (Schrader, p. 21). After the Gadsden Purchase in 1853, which ceded ownership from Mexico to the United States of the area south of the Gila River and including the Washington Camp-Duquesne area, substantial development in the Patagonia Mountains began. The completion of the Southern Pacific Transcontinental Railroad through Tucson in 1879 provided immigration and communication with the outside world. Lower grade ores could be worked, giving further impetus to mining activity. In about 1883, the Benson-Nogales branch of the Southern Pacific Railroad, passing through Patagonia, added further impetus to development of mining in the Patagonia Mountains (Schrader, p. 24). At this time, the crude adobe smelters which were reported to be present at the Jarilla Mine, southwest of Patagonia, and at Duquesne (Schrader, p. 23), were supplanted by more modern smelting plants at Patagonia, Nogales and Bisbee.

By 1875, the earliest patents were issued for mining claims in the Duquesne area at the Belmont and Belmont Millsite, patented by the San Antonio Mining Company. It is worthy of note here

that the Belmont claim is 3,000 feet long, which is twice the normal length. The Mining Law of 1872 requires lode mining claims to be a maximum of 1,500 feet in length and 600 feet in width.

A nice synopsis of the mining history of the Washington Camp-Duquesne area was prepared by JABA, Inc. Librarian, Robert J. Macer, for this report, and is included as Attachment 6. It is interesting to note that Washington Camp was promoted, explored, and/or operated by a variety of notable mining and industrial men prominent around the turn of the century. Among these were Mr. George Westinghouse of the Westinghouse Electrical Company, who purchased some of the claims in 1889, and apparently sold them in 1891. The Westinghouse Company was again active in the district from 1906 through 1920. For details, see Macer's summary. Westinghouse was noted for installing electric lights and indoor plumbing at Duquesne - a rarity for the day. The Westinghouse home is still mostly in tact at the Duquesne townsite. In 1896 the Washington Mine was optioned by Senator W. A. Clark of Montana, a mover and shaker and mine developer, who was active in the Butte, Montana district, as well as being instrumental in the development of the Jerome mining camp in central Arizona. In 1899, the Pride of the West Mine was sold to C. R. Wifley of Denver, the inventor and developer of the Wifley concentrating tables, which are used up to the present time for gravity concentration of sulfide and other heavy minerals.

During the Great Depression, spanning the years 1921 to 1939, the Washington Camp-Duquesne area was pretty much dormant, like most mining camps throughout North America. World War II and the resulting need of metals for the war effort resulted in the Callahan Zinc-Lead Company, consolidating most of the claims in the District. They constructed a 150 ton per day floatation mill, and processed approximately 153 thousand tons of ore, the tailings from which occupy the tailings pond south of the Duquesne Shaft on the San Antonio and Great Republic claims. They reportedly closed down in mid-1944, though some ASARCO reports suggest activity by the Callahan Company through the late 1950's. There has been no significant mining activity in the district since Callahan closed down.

In 1966, the J. R. Simplot Company of Idaho optioned 77 patented claims and 35 unpatented claims of which the Subject Property was a part. Later, the J. R. Simplot Company entered into a joint venture on the property with the Rosario Exploration Company. In his June, 1974 report, geologist and project manager, Joe P. Wise describes additional production from the district not located by Macer, but reportedly from "the Arizona State Mine Reports, USGS publications, and individual reports", showing production from the district between 1940 and 1944 of 116,050 tons, 1945 and 1950 of 37,386 tons, and from 1951 through 1957 of 41,681 tons. Obviously, some of the shafts were still in operating condition at the later dates, though production was small. The average grade for the years 1940 to 1950 was approximately 1.5% copper, 3% lead, 4 ounces of silver, and 8% zinc. During Rosario's involvement in the Duquesne District, Wise reports a total of 38,540 feet of surface and underground drilling, approximately 1,400 feet of underground drifting, and 150 feet of shaft sinking. He reports that most of this activity took place in the Indiana Mine. As a result of this exploration, Wise calculates a total probable tonnage and grade of 1.1 million short tons at an average grade of 2.61 ounces per ton silver, 1.26% lead, 2.06% copper and 4.6% zinc. All of this would come from underground mining and mine and flotation

plants with a through put of 300, 500 and 750 tons per day were considered (Wise, 1974). This type of reserve is not attractive to mining companies under current economic and technological circumstances, and were apparently not attractive to the Simplot-Rosario joint venture, as nothing was done about installing the projected mine, and the claims were returned to the owners.

GEOLOGY

Norman E. Lehman, who made a detailed geologic study of the Washington Camp area as the subject of his University of Arizona, doctoral dissertation, published in 1978, is the best reference for the geologic details of the Washington Camp-Duquesne Mining District, and is the source for the major portion of the geologic detail included herein. His surface topographic and geologic map, Figure 4 (Attachments 5, 9, and 15), was used as the base for this report's compilation of property and mine workings location. It is included in this report as both a colored geologic map (Attachment 9), a colored property map (Attachment 5) showing the Subject Property, and a Mine Workings Remediation map (Attachment 15). Also included are Lehman's geologic cross-sections (his Figure 9, as two sheets - Attachment 10-1 and 10-2), his Figure 12, showing the Distribution of Metamorphic Facies (Attachment 11), and his Figure 12, colored to show interpretive geology (Attchment 12), and Figures 31, 32, 33, and 34 (on one sheet - Attachment 13), which show metal ratios and the various mines. These maps are Attachments to this report. The reader is also referred to a USGS geologic map of the Patagonia Mountains (the Nogales and Lochiel quadrangles), by Frank S. Simons, 1974, a copy of the Subject Property portion of which is included with this report as Attachment 8.

For the purposes of this report, a brief summary is presented below:

Rock Types

Sedimentary Rocks

It is assumed that Precambrian metamorphic and granitic rocks, generally referred to as the Precambrian basement rocks, lie below the lowest Paleozoic rocks, which lie unconformably on the Precambrian basement. However, these rocks are nowhere exposed in the Subject Property.

The oldest exposed rocks are the Paleozoic limestones which comprise the majority of the outcrop area within the Subject Property, and have formed a reactive host rock to mineralizing solutions with resultant development of calc-silicate skarn alteration, with which the base metal, copper-lead-zinc, ore bodies are associated. It is assumed that the lower Paleozoic formations are present at depth, but the oldest sediments exposed are of Pennsylvanian age. The Pennsylvanian exposures include the Horquilla limestone, the Earp formation, and the Colina limestone. On top of the Pennsylvanian is the Permian, including the Epitaph dolomite, the Sherrer quartzite, and the Concha limestone.

The composition of these Paleozoic rocks, in large part, dictate whether the alteration of them results in development of marble, garnet skarn, or hornfels. In fact, certain formations may be better host rocks for mineralization than others. However, this is a rather complex topic and beyond the scope of this report.

Jurassic Volcanics

Overlying the Permian Naco Formation (Concha limestone), on a low-angle unconformity, are Triassic-Jurassic volcanic rocks. These are, for the most part, extrusive rhyolites, latites and trachytes. Some flows occur, however most of the units are tuffs, and welded tuffs probably predominate. Lehman has broken the Triassic-Jurassic volcanics into eight identifiable and mappable units, but these details are also beyond the scope of this report. Intruding into and probably in part conduits for the upper sequence of tuffs, are andesitic to rhyolitic dikes and sills.

These layered volcanics lie roughly parallel to the Paleozoic sedimentary units, and have been folded with them, forming an envelope on the east, west and south flanks of the Paleozoic block. As they are not chemically favorable for deposition of base metals, mineralization in the volcanics has been unimportant.

Intrusives

After the extrusion of the Triassic-Jurassic volcanics, there was a series of intrusive events.

The earliest of these was the intrusion of porphyritic andesites, diorite plugs and sills, and intrusive diorite breccia, which Lehman suggests occurred at the Cretaceous-Tertiary boundary.

The next intrusive event was somewhat more acidic in nature, and started with the Washington Camp porphyritic granodiorite identified by Lehman. It was followed by the intrusion of alaskaite and granite dikes and sills. This was followed by granodiorite dikes and sills, and then the intrusion of the batholithic Patagonia granodiorite, which stretches 8.7 miles from the Mexican border to approximately 2 miles north of Soldier Basin (near the north end of the Patagonia Mountains), and forms the core of the Patagonia Mountains (Simons, 1974). Lehman shows these granodioritic units as Tertiary, while Simons shows them as mid-Tertiary. They are probably Laramide in age, $\pm$65 m.y. (million years) old. All of the granodioritic units, including the Washington Camp porphyritic granodiorite, are probably associated with, and are apophyses of, the Patagonia granodiorite batholith. The Laramide hydrothermal solutions that have been a source for porphyry copper and precious metal mineralization within the Patagonia Mountain range and of course the source for mineralization within the Washington Camp-Duquesne Mining District, are associated with this batholithic body and its precursers.

Cover Rocks

A long period of erosion lasting from the $\pm$65 m.y. Laramide event up to the present time,

exposed bedrock in the Subject Property. Erosional material from this long period of denudation includes an older cemented and tilted gravel sequence which fills the San Rafael Valley. This material was tilted after its deposition, by late-Tertiary basin and range extensional faulting. Recent soil and alluvium, which is un-cemented and not tilted, is found in basins and valleys within and adjacent to the Subject Property.

Structure

Folding

The major structural feature within the Washington Camp-Duquesne area is the Washington Camp anticline, in which Paleozoic and overlying Triassic-Jurassic volcanics are flexed into a north-trending asymmetric to isoclinal fold, which plunges 30^0 to 50^0 to the north. The smaller Pluto anticline, which lies southeast of Washington Camp, parallels the larger Washington Camp anticline. As a result of this plunging fold, younger Paleozoics are exposed to the north, while older Paleozoics are exposed to the south. Older units are exposed by erosion in the central part of the anticline. Drag folds along the trend of the anticline localize skarn mineralization. This structural control by drag folding is similar to other sediment-hosted mineral deposits throughout the world, with a good close example being the Tombstone Mining District, some 45 line miles to the northeast.

Faulting

Premineral north-trending normal and reverse faults form fault vein-mineral zones, the largest of which are, from east to west, the Bonanza, California, Pride, and Kansas-Lime Peak vein zones. They parallel the axis of the Washington Camp anticline, and are in places, bedding plane faults in which mineralization forms along bedding planes. The next youngest structural event were east-trending high-angle normal and reverse faults. These postdate intrusion and mineralization. Later, east-trending, low-angle, normal faults formed. The latest faulting event was high-angle, east-trending normal and reverse faults that displaced all rock units in the district.

Northeast-trending fracture zones which carry disseminated mineralization, mapped by Simons (1974), around the western periphery of the Subject Property, and are typical of the southeastern Arizona porphyry copper province, are for the most part not seen in the Subject Property.

Mineral Production

Production from the time of the Jesuits through approximately 1872, is completely unknown. From historical comparison to other mines productive during that period, we can surmise that it was a very small tonnage of high-grade, hand-sorted material, probably packed to smelters in sacks on the backs of burros.

Joe P. Wise, Manager for the Rosario-Simplot joint venture, in his final report (June, 1974),

compiled from his sources of "Arizona State Mine Reports, USGS publications and individual reports", shows a total of 391,617 tons mined between 1872 and 1957. The average grade of ore for this period is not known. The Callahan Zinc-Lead Company produced 153,436 tons from 1940 through 1950, which averaged 3.58 ounces per ton silver, 2.66% lead, 1.5% copper, and 8.3% zinc. A gold assay from unpublished ASARCO reports on this type of ore showed a gold content of 0.015 ounces per ton, which is probably typical. Thus, using current prices of approximately $4 per ounce silver, $400 per ounce gold, $0.33 per pound lead, $1.10 per pound copper, and $0.60 zinc, the average value per ton of this production at current prices was $176. The gross value of that production was $27 million. Extrapolating that average grade to the entire production (probably safe since the grade in the earlier years was probably higher), at current prices, the gross metal value of the production at the Washington Camp District, from 1872 to 1957, was approximately $68 million. The calculated production of each metal is as follows: 5,900 ounces of gold, 1.4 million ounces of silver, 11.8 million pounds of copper, 21 million pounds of lead, and 65 million pounds of zinc. In terms of volume of material, the Washington Camp-Duquesne District is a zinc-lead-copper-silver-gold district. In terms of value, based on today's prices, it is a zinc-copper-lead-silver-gold district. From a technical point of view, it is a porphyry copper environment, calc-silicate-skarn replacement-type deposit, with metal content typical for that type of mineralization. Absent from this list of metals is molybdenum, which is also characteristic of the porphyry copper environment. However, molybdenum is present in the surrounding alteration pods in the Patagonia granodiorite at the Line Boy, Benton, and Santo Nino mines.

Future Potential

The exploration program by the J. R. Simplot Company, and later the Rosario-Simplot joint venture, spanned a period from approximately 1966 through 1974, some eight years. They appear to have concentrated their efforts in the north part of the district, in the area of the Indiana and Holland Shafts and Maine Tunnel on the Maine, Indiana, Kansas and New York claims. A substantial amount of underground drilling, shaft sinking and drifting was done, and, in fact, it appears that they renamed the Indiana Shaft the Simplot Mine. It appears to the writer that this effort was in part misguided by a poor understanding of the porphyry copper, calc-silicate skarn environment, which persisted to the last part of the program. A more productive concentration of effort in the southern part of the property in the Belmont, Silver Bill, Empire, San Antonio area where skarn development was intense, might have seen better results. Further, it appears that porphyry copper alteration in igneous rocks at Burnt Knob, and the Pocahontas and Washington Camp granodiorite-sericite-tourmaline breccia area, were pretty much ignored until the last. There is no mention of the alteration zone on the Joe Wheeler, Lead King, Winnebago Chief and Ivanhoe claims. An interesting breccia dike occurrence on the Manzanita and San Antonio-Great Republic claims was unrecognized or tested, nor was the silicified breccia mass 1,500 feet southeast of Duquesne on the Big Crop claim tested. The high-grade, but pod-like and difficult to explore for mineralization in the Indiana Shaft area appeared to be too enticing to pass up until the last. Although Wise recommended exploration targets at Burnt Knob, the skarn zones in the Empire-Silver Bill area and the Pocahontas claim area (in his 1974 report), it is not clear whether any work on these was done after his final report of June, 1974.

In that report, Wise reports reserves which apparently are a combination of Proven, Possible, and Inferred, with most of the Proven ore in the Indiana Shaft, and most of the Inferred ore in the Empire area, for a total of 1,114,451 tons, averaging 2.61 ounces of silver, 1.26% lead, 2.06% copper, and 4.57% zinc. Assuming the 0.015 ounce per ton gold content to be valid for these ores also, the total value of this material per ton at present prices would be $124.92. The gross metal value, not considering recovery percentages, would be $139 million. Unfortunately, this mineralization occurs in erratic, high-grade ore shoots, which are difficult and expensive to explore for and mine. Metallurgical recovery has historically been difficult in the Washington Camp-Duquesne area, and metallurgical tests on the Simplot-Rosario ore reserve material suggest it would be a somewhat difficult ore to separate by floatation. This type of erratic pod-like mineralization is not attractive to mining companies under current economic and technical conditions.

Simplot-Rosario Exploration Targets Within the Subject Property

IP surveys by Mining Geophysical Surveys, Inc. were conducted in the southern portion of the Subject Property. An IP anomaly lying between the Silver Bill and the Estella and Louise Shafts, measuring 1,200 feet by 2,500 feet, was identified. The target depth was between 400 feet and 500 feet, and Wise (1974) states that one hole in the area (P-29) showed 159 feet of 0.62% copper (probably as chalcopyrite replacing skarn), but no silver, lead or zinc assays were available. This is an area of 3 million square feet, and using a tonnage factor of 12 cubic feet per ton, 3 million tons would be generated for each 12 feet in depth, or if one assumed that mineralization were distributed evenly over a 159 foot thickness (a very unlikely event), then 40 million tons of 0.62% copper would be present. It isn't known whether drilling to test this anomaly took place.

Wise also mentions the Burnt Knob area, which lies just off of the Subject Property, due west and almost contiguous with the Klondike claim. There he states "similar to Pocahontas and indicates great potential... alteration is pervasive and leached outcrops well developed... and one drill hole (RDH 54)... encountered 10 feet of good mineralization" - no grade given.

Evaluation of Future Potential of the Subject Property Based on Current Work

Area of Massive Skarn at the South End of the Paleozoic Block

The completion of Lehman's dissertation and excellent geologic mapping, postdates Wise's 1974 final report by some four years. It must be assumed that only part of the data from Lehman (whose dissertation work was supported by the J. R. Simplot Company) was only partially available to Wise. With Lehman's excellent map available, it is obvious that skarn development in the south part of the property is very extensive. Unfortunately, good base metal mineralization is not uniformly associated with skarn development. However, the more uniform, disseminated, higher tonnage ore bodies of the South Belmont mine-Silver Bill area are within skarn. Furthermore, this area appears to the writer similar to mineralization in the same host rocks at Silver Bell, Arizona, and the Mission and Twin Buttes mines, Pima Mining District, south of Tucson. Furthermore, it

is likely that better hosts for disseminated skarn mineralization would be found in the lower Paleozoics at greater depth in this area. There is some chance, however, that the lower Paleozoics do not exist, their position being occupied by the intrusive Patagonia granodiorite pluton.

If the assumption is made that the blocks of skarn in the south end of the district form potential hosts for disseminated base metal mineralization, then the following potential tonnages could be calculated. In the Empire mine area, a block 1,100 feet by 800 feet exists. In the South Belmont area, a block 400 feet by 350 feet exists. In the North Belmont Shaft area, a block 700 feet by 250 feet exists. These blocks total approximately 1.2 million square feet, and would generate (using a tonnage factor of 12 cubic feet per ton) 1.2 million tons for every 12 feet in depth, or 12 million tons to a depth of 120 feet, or 24 million tons to 240 feet. However, if Lehman is right, and there is a large apophyses of granodiorite in the vicinity of shaft #271 or the center of the Empire skarn zone (see Figure 4 and Figure 9, cross section E E', Attchments 9 and 10-1), then there is a much more narrow envelope of skarn mineralization around the intrusive body. This envelope of skarn, which is approximately 200 feet on either side of the intrusive with a length of 700 feet, could be mined to perhaps 400 feet before a prohibitive stripping ratio was attained. This would yield about 10 million tons in the Empire area, 1/2 million tons in the North Belmont area, and 3.5 million tons in the South Belmont area, for a total of 14 million tons. An assumed 0.6% average copper grade with perhaps recoverable amounts of lead, zinc, silver and gold, might be projected. Construction of a floatation mill to process the ore would be required.

It is the writer's opinion that this relatively small, potentially erratic block of hypothetical skarn mineralization which would require a large capital outlay for a complex floatation mill, is not an attractive target for mining companies under current economic and technological conditions.

The Joe Wheeler Alteration Zone

The Joe Wheeler alteration zone is a quartz-sericite zone in the Patagonia granodiorite. It is located on the southwestern corner of the Joe Wheeler claim and the northwestern corner of the Lead King claim on the Subject Property, and on the northeastern part of the Winnebago Chief claim, and the southeastern portion of the Ivanhoe claim, neither of which is part of the Subject Property. This alteration zone is shown on Lehman's geologic map (Figure 4, Attachment 9), but is not discussed in his text, nor is it mentioned in Joe Wise's 1974 report. It is also shown as an area of bleached, altered rock on Simons' 1974 map (Attachment 8). There are no mine workings on the portion of the Joe Wheeler alteration zone, which lies within the Subject Property, though there are four shafts on the Ivanhoe claim and two shafts on the Winnebago Chief claim, which lie either within it or perhaps related to it. Because of the lack of shafts within Subject Property, the writer did not walk over the alteration zone. However, judging from Lehman's map, which depicts it as the same type of alteration as present in the Burnt Knob area, which the writer did visit, and which contains a breccia pipe that was overlooked by Lehman and Wise, and because it is similar in size and map characteristics to the Benton and Line Boy mine as mapped by Simons (1974), the writer concludes that it is a siliceous quartz-sericite, porphyry copper-type alteration zone, perhaps containing a central breccia pipe that is holding up the hilltop that it occupies.

The diameter of the alteration zone is approximately 700 feet, yielding a permissible zone for disseminated and possibly enriched chalcocite copper ore of about 390,000 square feet. Using a tonnage factor of 12.5 cubic feet per ton, there could be potential for between 3.9 million tons and 7.8 million tons of disseminated, low-grade ore, if there were an enriched chalcocite blanket respectively 125 feet to 250 feet thick. Unfortunately, such a relatively thick chalcocite blanket for such a small alteration zone is unlikely. Utah International (now BHP Minerals, Inc.) drilled the Benton and Line Boy mines, which are similar in size and character, in the early 1970's. They were encouraged enough to drill the Benton to a depth of 4,000 feet, though they were obviously looking for better mineralization at depth, not a near-surface chalcocite blanket. The portion of the Joe Wheeler zone on the Subject Property, represents the northeast 1/3 of the above described hypothetical mineral body, or approximately 1.3 million tons to 2.6 million tons of hypothetical ore. It is the writer's opinion that the zone is too small and the mineralization not strong enough to form a minable thickness of chalcocite enriched ore.

The Breccia Pipe on the Manzanita, San Antonio and Great Republic Claims

Lehman (Figure 4, Attachment 9) mapped a unit called "vb" (for volcanic breccia) which trends northeasterly along the Bonanza fault, and lies on the Manzanita, Great Republic and San Antonio claims. He describes this as a volcanic breccia, apparently suggesting some sort of surficial volcanic flow breccia, as near as this writer can tell. Examination during the field work for this report showed the breccia, where examined, to be composed of matrix supported pebble-to-cobble-size fragments of quartzite which are well rounded. The matrix is quartz grains and smaller quartzite fragments. This writer's interpretation is that it is a fluidized breccia dike, the fluidization caused by up-streaming hydrothermal solutions. The breccia does not have capping indicative of disseminated sulfides nor copper at depth, however, it could change with depth or have precious metal associated with it. It appears to be on strike with the bold outcropping quartzite breccia plug (also thought to be a fluidized breccia pipe by the writer) which lies 1,500 feet southeast of Duquesne, on the Big Crop claim.

Potential for High Purity Silica Production

Silica, where of sufficient purity, is an industrial mineral useful for smelter flux, glass manufacturing, or sand blasting. Silica in the form of euhedral to subhedral quartz veins which fill post-mineral or late-mineral fractures in skarn alteration, is prevalent throughout the Washington Camp-Duquesne area. This silica forms outstanding quartz crystal specimens in places, and the Holland incline in particular is noted as perhaps the best location in the United States for Japanese Twin quartz crystals. This same quartz forms large bodies on the Belmont and Lead King claims, in which quartz crystals as large as 2 feet long and 6 or more inches in diameter are visible. The bodies themselves are large enough to form a potential high-purity silica resource. Potential volume for two of the largest bodies are described below.

In the northeast half of the Lead King claim, almost centered on the location of mine shaft #237 (Attachment 9), is perhaps the largest quartz body in the district. It measures approximately 200 feet by 300 feet, yielding a surface area of 60,000 square feet. Using a tonnage factor of 12.5 cubic feet per ton, this body would generate 600,000 tons of high-purity silica to a depth of 125 feet, or 1.2 million tons to a depth of 250 feet, assuming the side walls are vertical. Because this body lies on a ridge, the stripping ratio would be relatively low. An essentially contiguous body which lies in the southwest portion of the Belmont claim just southeast of mine shaft #238, is approximately 250 feet long and 150 feet wide, yielding a surface area of approximately 38,000 square feet. Using the same tonnage factor, it would develop 380,000 tons to 125 feet or 760,000 tons to a depth of 250 feet. Together these bodies, assuming they don't pinch with depth, would generate approximately 2 million tons to a depth of 250 feet. This silica, though no assays are available, is probably better than 98% pure SiO_2.

Another area where high-purity quartz might be available is what this writer suspects to be a silicified breccia pipe which lies 1,500 feet southeast of Duquesne. The northern lobe of this body is actually cut by the Duquesne-Lochiel Road. Its approximate dimensions are 200 feet by 300 feet, though this has not been carefully measured. It is thus approximately the same size as the body on the Lead King claim, and would probably generate about 1.2 million tons to a depth of 250 feet, although the stripping ratio would be greater. This body is apparently somewhat different in origin than the other two, and may be of a lower purity quartz. It may also contain precious metals.

As described above, and considering those three bodies of high-purity quartz, there appears to be potential for approximately 3.4 million tons available. Similar smaller bodies are scattered around the southern end of the district, so ultimate potential might be in the 4 million ton range.

Copper smelters at Hayden, San Manuel, Morenci, El Paso, Animas, Globe-Miami, and perhaps elsewhere, are paying in the range of $7.50 to $10.00 per ton for crushed, high silica rock, F.O.B. the smelter. Any precious metal content, beyond a certain level, would be paid in addition to the base amount. Thus, this silica material would have to be mined, crushed and screened to specification, trucked to a rail head, the nearest being at Nogales over rough roads, and shipped by rail to the user. The selling price for glass sand or sand blasting silica is not known. Unfortunately, trucking costs and rail freight would probably eat up any profitability from the sale of the processed quartz.

Mineral Collecting-Rock Hounding Opportunities

The Washington Camp-Duquesne Mining District is a collecting locality well known to both the amateur rock hound and the more serious professional mineral collector. Since the ground is private property with posted no trespassing signs, this activity is somewhat secretive, but fresh surface pits and scratching over a wide area identified during the field work phase of this investigation, attest to the vigor with which collecting is pursued in the area. Mr. Carl Sandberg, long time owner of the claims, comments that people from all over the United States come to

collect minerals on the Subject Property (personal communication, June, 1991).

The area is particularly famous for its quartz crystals. As described in Mineralogy of Arizona, (Anthony, J.W., Williams, S.A., and Bideaux, R.A., 1977, p. 164), quartz crystals occur in the Holland mine "as slender, tapering crystals up to 12 inches long, occasionally forming Japanese Twins... This is probably the finest United States locality for Twins after the Japanese law". They also describe quartz "as amethyst in pegmatite near Duquesne". They further state quartz occurring at "Belmont and Lead King properties as a body 100 feet wide containing crystals up to 2 feet long". It is assumed that "the Holland Mine" refers to the Holland Incline on the Holland claim (#31), not the Holland Shaft which is located on the Indiana claim (#34).

Garnets, which grow in the skarn zones, in subhedral to almost euhedral form, as much as 2 inches or more across, are also sought after. These are particularly prevalent in skarn zones on the south end of the Empire claim, but are present throughout the south end of the district and sporadically throughout the north end of the district.

Coarse biotite crystals as an alteration product along a vein zone were the subject of collectors digging activities on a prospect just above the old power house on the east side of the Golden Gate claim at Washington Camp. Crystals up to 2 inches across were present.

Copper oxide minerals, primarily the colorful green malachite and blue azurite, are scattered throughout the district, and enthusiastically dug for and collected.

In one of the open stopes on the Silver Bill claim, empty carbide cans and packing paper along with rejected samples showed that collectors were after underground occurrences of aurichalcite.

Opportunities for collecting other calcium silicate alteration minerals, such as wollastonite, epidote and diopside and hedenbergite are also available.

Specimens of base metal sulfides including chalcopyrite, pyrite, and some galena and sphalerite are available on many of the mine dumps throughout the district.

MINE HAZARDS AND REMEDIATION

The geologic and alteration history of the Washington Camp-Duquesne Mining District has had a strong influence on the number and type of mine workings and thus mine hazards present within the Subject Property. As previously stated, the district is characteristic of calc-silicate-skarn replacement deposits associated with porphyry copper alteration zones. Only in the southern part of the district are bodies of massively recrystallized calc-silicate-skarn zones, in which all of the lime carbonate has been replaced and altered to skarn, and then been mineralized with relatively disseminated base metal sulfides. Where skarn is massive and all carbonate is removed, leaching of base metal sulfides from the surface and deposition of base metals as secondary accumulations at depth has occurred. Every where else in the district, and even within the southern, more

TO: Randy Moore
FROM: Nick Barr
DATE: October 6, 1993
SUBJECT: Quarterly Report - September, 1993

SUMMARY

COPPER GENERATIVE:

Ord Mountain, San Bernadino County, CA - Following purchase of drilling data it was determined that depth of oxidation was shallow and that this drilling had tested areas of cover considered most prospective with negative results. Further work is not planned.

Washington Camp-Duquesne Mining District, Santa Cruz County, AZ - Study of extensive past exploration data focused on the potential for both oxide copper and high-grade gold, silver, lead, zinc skarn-type mineralization. It was concluded that depth of oxidation is very shallow and high-grade sulfide mineralization is too erratically distributed to be economic.

Penny and Squabble Prospects, Pinal County, AZ - Chrysocolla mineralization hosted in structures within broad areas of hematitic tectonic breccias was evaluated during the month. The system was found to be too narrow and discontinuous to warrant additional work.

Piedmont Mine, Yavapai County, AZ - Results of additional core logging on this property returned negative results. No further work is planned.

Anan Property, Lincoln County, NM - Field evaluation of this prospective copper-gold porphyry target identified interesting exposures of intensely acid leached, silicified breccia. Limited drilling data and one shallow prospect suggest significant oxide copper mineralization at shallow depth. Interesting geophysical anomalies are also in evidence. Study of this property is continuing. A preliminary feasibility study of mining in this district has been initiated.

GOLD GENERATIVE:

Iron Blossom Mountain, Eureka County, NV - Attempts to trace the source of silt values up to 30 ppb and rock chips up to 222 ppb Au

continued. Grid soils and detailed float sampling will test the area during October.

304 - COPPER GENERATIVE

Ord Mountain, San Bernadino County, CA - Significant widths of vein controlled chrysocolla and lesser malachite mineralization locally in evidence in a structural zone measuring 600 feet wide and 7000 feet long initially suggested the potential for an oxide copper resource of 30 to 35 million tons with grades exceeding .5% Cu. The best exploration potential was considered to be at the projected intersection of structures in broad areas of pediment cover. Summary reports by previous workers indicated previous drilling activity had tested only a fraction of the system.

Further evaluation of the property in September included purchase of drill logs and sections from a 17,000 foot core drilling program in 1980-81 which had focused on molybdenum mineralization. Study of this data found oxide copper mineralization to be narrow and lacking continuity. Depth of oxidation did not appear to exceed 150 feet. Most significant was the realization that this drilling activity had tested much more of the system than previously believed, including several previously defined pediment covered target areas. This assessment led to a decision to terminate interest in the property.

Washington Camp-Duquesne Mining District, Patagonia Mountains, Santa Cruz County, AZ - Initial interest in this property was in response to the advertised sale of 985 acres of patented land. The area has seen a long history of extensive exploration for gold, silver, lead, zinc and copper dating back to the 1600's. Cambior's interest focused on investigation of reports of widespread surface exposures of oxide copper mineralization. Evaluation of this property was restricted to the study of several reports and extensive drilling data dating back to the early 1900's.

Skarn-type mineralization is hosted by Paleozoic carbonate rocks and occurs as poddy high-grade zones of chalcopyrite, pyrite, sphalerite and galena along the steeply dipping limbs of an eroded anti-cline structure. Evidence of disseminated-type sulfide mineralization is mostly lacking. In close proximity to the carbonate rocks and the source of mineralizing fluids are the Patagonia granodiorite batholith and numerous intermediate composition dikes and sills. Faulting is complex and appears to have been a major factor in offsetting ore zones. Estimates of production from the district suggest approximately 400,000 tons of hand sorted ore mined between 1872 and 1940. Further production up to 1957 yielded another 150,000 tons at grades of 3.5 oz Ag, 2.6% Pb, 1.5% Cu and 8.3% Zn with trace Au.

Close evaluation of exploration data suggests mineralization lacked continuity. Efforts to combine numerous small, high-grade

operations was never successful. The potential for any significant oxide copper mineralization appears low as the depth of oxidation most often does not exceed several feet. Further work on this property is not anticipated.

Penny and Squabble Prospects, Silver Bell Mining District, Pinal County, AZ - Ninety-six contiguous lode claims located at the south end of the Silver Bell Mining District host surface cuts and several shafts exposing chrysocolla mineralization. Evaluation of this property during September identified generally extensive exposures of hematitic breccias composed of chloritic and siliceous schists and conspicuous red mudstones. These breccias are interpreted as being tectonically formed and lie adjacent to bluff forming, mostly fresh carbonates. The widespread hematitic coloration of the breccias and breccia matrix appears related to the mixing of the schistose clasts with the iron-rich mudstones.

Oxide copper mineralization is exposed in several high angle discontinuous structures measuring from 5 to locally 25 feet in width and over strike lengths of 500 to 800 feet. Three shafts from 100 to 200 feet in depth expose two widely separated structures and appear to have produced small quantities of chrysocolla mineralization grading from 1 to 3% Cu. Mineralization may be related to an underlying quartz monzonite intrusive which is restricted to one isolated exposure on the property.

Due to the restricted nature of mineralization, the exploration potential of this property is considered low. Additional work is not planned.

Piedmont Mine, Yavapai County, AZ - Additional evaluation of this property in September included logging of one 150' angle core hole reported to have tested the best zone of mineralization on the property. This work was a continuation of efforts to determine the validity of a drill intercept reported to have returned 300 feet of .6% Cu.

Results of this core logging show oxide copper mineralization confined to one 20-foot wide vein selvage zone grading .1 to .4% Cu. The remainder of the core lacks any notable mineralization. Reports of significant oxide copper mineralization are considered untrustworthy and further work is not warranted.

Anan Property, Nogal-Bonito Mining District, Lincoln County, NM - This property, presented to Cambior as a prospective Cu-Au porphyry target lies within the north trending Lincoln County porphyry belt. The district has produced 1.1 million ounces of Au and reports present resources of 1.6 million ounces. The Great Western deposit, 4.9 km southwest of the Anan has a 190,000 ounce reserve hosted by an epithermal breccia system.

The Anan property consists of 19 claims in steep, pine covered terrain underlain by a Tertiary age syenite stock bounded by andesite and trachyte. Hydrothermal alteration is extensive on the

CAMBIOR

TO: Nick Barr NO. OF PAGES: 3

FROM: Randy Moore

DATE:

SUBJECT:

MESSAGE:

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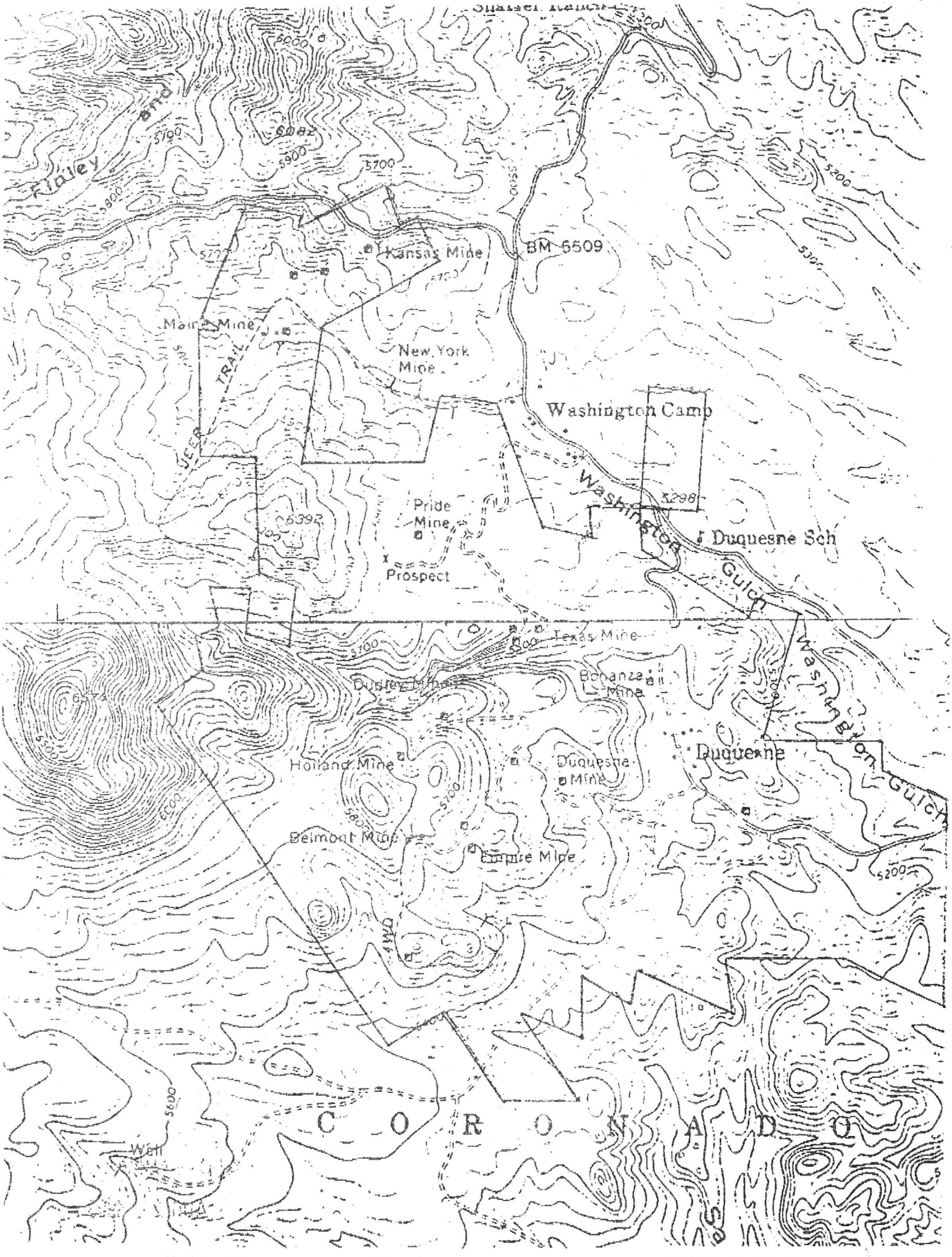

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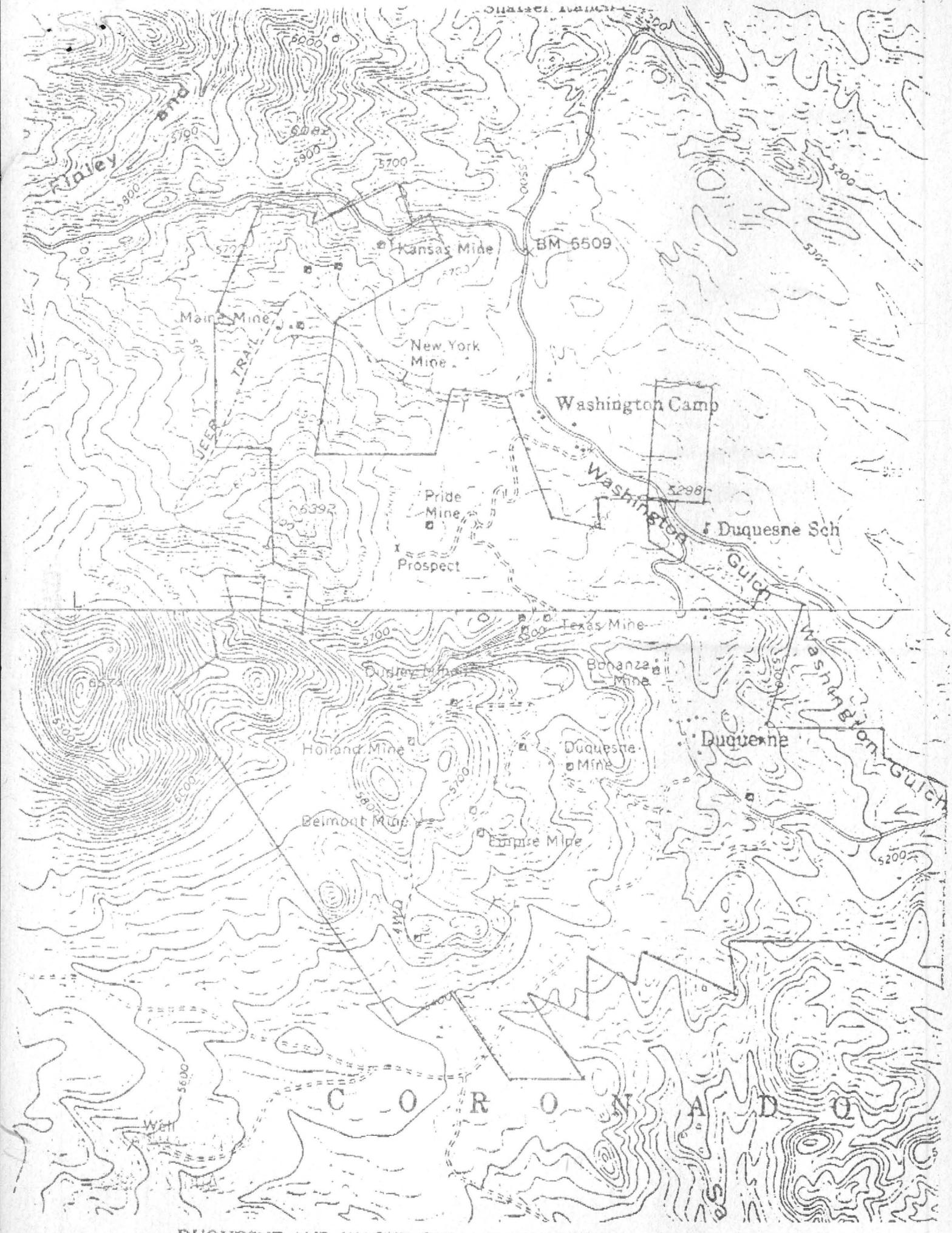

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