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# NUCLEAR DYNAMICS

P. O. BOX 20766

PHOENIX, ARIZONA 85036  
2871 SKY HARBOR BLVD.

602 / 267-0581

November 3, 1975

Mr. Henry G. Grundstedt  
Capital Research Company  
611 West Sixth Street  
Los Angeles, California 90017

Dear Hank:

I am returning the stuff on the Oatman gold mine that we talked about last Friday.

Thank you very much for your interest in these things.

Sincerely yours,



Francis X. Cannaday  
Manager, Base & Precious Metals

FXC:sem  
Enclosures

CAPITAL RESEARCH COMPANY

611 WEST SIXTH STREET  
LOS ANGELES, CALIF. 90017

6/12/75

Dear Frank,

Here is some material a neighbor of mine gave me to look at. Seems everyone has a gold mine. Anyway according to him it is available. It may be of interest to you, (or at least your library). I told him I would show it to you. If you're interested fine, if not that's fine too.

When through send the stuff back so I can return it.

RECEIVED  
NUCLEAR DYNAMICS, INC.

Best regards,  
Frank

JUN 13 1975

REPORT ON THE  
PROPERTY  
OF  
TRIUMPH GOLD MINES, INC.  
OATMAN, ARIZONA.  
BY  
EDWARD F. CRUSKIE  
MINING ENGINEER

June 1, 1948

## INTRODUCTION

The Triumph Gold Mines, Inc., of Oatman, Arizona was incorporated July 23, 1946, under the laws of the State of Arizona, to prospect and develop the original group of four Triumph claims in Section 21, Township 19 North, Range 20 West G. & S.R. meridian, Mohave County, Arizona. These claims are located in the Oatman portion of the San Francisco Mining District, about two and one-half miles southwest of the town of Oatman.

In September 1947 the Triumph Company acquired by purchase the White Chief property of five claims, located in Section 26 & 27, one and one-half miles south of Oatman, Arizona. The development work done here on the 200 foot level by the former operators had sufficed to disclose the presence of an ore body of promising tonnage and excellent grade. All criteria pointed to the possibility that further development would block out ore bodies that would be profitable to mine, and, in addition would be more immediately accessible with limited finances and at present day operating costs.

In addition to these two main groups the Triumph Company has acquired by purchase and location the intervening area of ground, and now has a total of 25 claims in a contiguous group, comprising approximately 450 acres of mining ground.

## LOCATION AND ACCESSIBILITY:

The Oatman district, in which the holdings of the Triumph Gold Mines, Inc., are seated, is also called the San Francisco Mining District. It includes the Vivian, Gold Road, and Boundary Cone localities, covering an area of about 10 miles length by seven miles width on the western slopes of the southern portion of the Black Mountains, in western Mohave County, Arizona.

The lode claims of the company extend from the Vivian district on the west two miles southeasterly to what may be designated as the northern portion of the Boundary Cone district.

By road, Oatman, the principal town of the area, lies four miles northeast from the west end of the claims, and two miles northeast from the easterly or White Chief end of the claim group. Oatman is 29 miles, via U. S. Highway 66, from Kingman, the county seat, population 4,200. Kingman is located on the Santa Fe Railway, and has good rail, air, and highway connections interstate and intrastate.

From Oatman and U. S. Highway 66, good secondary roads give access to various mining properties, and to the operating plants of the Triumph Company.

DISTRICT HISTORY AND PRODUCTION:

During the early sixties, soldiers from Camp Mohave, at the Colorado River, carried on prospecting in this region. In 1863 or 1864, John Moss is reported to have taken \$240,000.00 worth of gold from a pocket in the Moss vein. The Hardy, Leland and Gold Dust veins were found soon afterwards, but the prominent outcrops of the Tom Reed and Gold Road veins remained untested for many years. The town of Silver City grew up at a watering place on Silver Creek about one mile south of the Moss lode, and a small mill was established at Hardyville, on the Colorado River. After the 1866 outbreak of the Hualpai Indians, the district was practically abandoned for several years.

A revival in activity took place in 1900 when rich ore was found in the Gold Road vein. In 1901, the Gold Road Company sank the Tom Reed and Ben Harrison shafts to a depth of 100 feet. The Leonora mill, at Hardyville, operated during part of 1901 and 1902 on ore from the Moss and Hardy veins. During 1903 and 1904, the Mohave Gold Mining Company did considerable work on the Leland property. The Blue Ridge Gold Mines Company produced ore from the Tom Reed vein during part of 1904-1905. In 1906, the Tom Reed Gold Mines Company purchased the mine, developed high-grade ore, and, in 1908 started production which continued through 1931. The Gold Road mine produced intermittently through 1931. The town of Oatman was started about 1912.

During 1915 and 1916, a \$6,000,000.00 ore body was developed in the United Eastern Mine. This ore shoot did not outcrop, and its discovery prompted scores of mining ventures in the district. The advent of World War I with the usual war-born emphasis on industrial production, and inflated costs, hindered in most of these cases the additional financing necessary to explore a property after shaft-sinking is completed.

In 1916, the Big Jim Mining Company found an important ore body on their Big Jim claim, immediately northeast of the Gray Eagle and the Black Eagle claims of the Tom Reed Company. Further work indicated that the Tom Reed or Gray Eagle vein is the upper, down-faulted portion of the Big Jim vein. The displacement, principally along the Mallery fault, amounts to about 400 feet. In 1917, the United Eastern Company purchased the Big Jim ground, but two years later the Tom Reed Company brought suit to establish its apex claim to the Big Jim vein. The courts, however, decided against the Tom Reed Company, saying that the amount of horizontal displacement could not be proven.

In 1924, the United Eastern ore body became exhausted and after considerable diamond-drill prospecting the mine was closed.

## DISTRICT HISTORY AND PRODUCTION: (cont)

With the increase in the price of gold from \$20.67 to \$35.00 an ounce in 1933 a revival in gold-mining activities took place in the Oatman district, and production and exploration activity continued up to the start of World War II. The largest producers, The Tom Reed, Katherine, Vivian and Gold Road had a combined cyanide mill capacity of approximately 1,000 tons of ore per day. In addition to milling their own mine ores, The Tom Reed, Vivian, Katherine, and the Producers at Chloride, cyanided and treated custom ores from not only the district, but the entire county and portions of Nevada.

The total production of gold and silver recorded to the San Francisco Mining District by the Arizona Bureau of Mines, Bulletin 140 (1936), is \$34,675,000.00 in gold and \$550,000.00 in silver.

With the increase in the gold price in 1933, considerable additional production was made. Data on this production, believed to be correct, and compiled by J. Carlton Bray, Mining Engineer, list the following for the period 1933-1942.

Tom Reed Mine.....	\$ 3,860,000
Katherine.....	3,136,000
Gold Road.....	1,760,000
Producers (Pilgrim).....	972,000
Vivian.....	540,000
Telluride.....	198,000

HISTORY OF TRIUMPH PROPERTIES:

Triumph Group: The original four claim holding of the Triumph Company, namely, the claims designated Triumph 1-2-3-4, constitute the major part of the property held some 30 years ago by the Gilt Edge Mining Company. This company, on what is now the Triumph I claim, sank a vertical shaft in the footwall to a depth which, after unwatering, is found to be 320 feet instead of a reported 200 feet. On the 100 foot level there is found to be a crosscut north, driven 240 feet. The presumed objective of this work was the cutting into and exploration of the vein now called the "North Vein". This crosscut fell short of its objective in distance required.

The 200 foot level has a 91 foot crosscut southwest from the shaft. This crosscut, it is calculated, requires an additional 130 feet to cut the southward dipping Vivian vein from the footwall side. There seems to be no doubt that the primary purpose in sinking this shaft in the first place was to attain this objective.

No other lateral work off this shaft is found. The shaft has been repaired to the bottom and is now in safe and operating condition.

HISTORY OF TRIUMPH PROPERTIES: (cont)

On the Triumph 4 claim at the east end of the original group there is found to be about 400 feet of shallow tunnel work performed about 30 years ago. The area is difficult of access, on steep slopes. No records are available concerning the ore that apparently was hauled from here by burro teams, and present remaining vein exposures are marginal in grade.

White Chief Group: The White Chief group now consists of six claims designated White Chief 1-2-3, Ethel Morgan, Ethel Morgan 1 and Bullion Fraction.

The presently used White Chief shaft was first sunk to a depth of 100 feet in 1916, and a small amount of crosscutting done westward off this level without finding commercial ore. At the time of this work there were six adjoining active companies, all of which were either sinking or doing development work. Of these, the Boundary Cone and Orion properties were working in ore zones.

After a period of shut down, sinking was resumed on the White Chief shaft in 1926 to a depth of 190 feet, and a second level was established at the 183 foot depth. At this level a crosscut was driven northwest a distance of 40 feet, penetrating through the Golden Beauty vein, as it is now designated. No drifting was done on this vein, and the levels and shaft stood under water till about December 1946, the water standing within 70 feet of the collar.

In December 1946 a partnership called the White Chief Development Company obtained a lease on the White Chief property, unwatered the shaft and levels, and started development work. A crosscut was driven nearly due west a distance of 80 feet. This crosscut cut through two pronounced fissure veins, but, at the point of intersection with the crosscut, the grade of the vein filling is not commercial, averaging \$2.00 to \$3.00 per ton. Drifting was then started northward on the Golden Beauty vein, and it became immediately apparent that this is the main ore channel of the area. For the distance of 120 feet that the drifting was carried on, the vein averages from three to five feet in width, with hanging wall margins indefinite, and the grade of the ore ranging from \$10.00 per ton to \$55.00 per ton over these widths.

The Triumph Company purchased the White Chief property from the White Chief Development Company in September 1947. The light prospecting headframe over the shaft was replaced by a heavy duty frame, some repair was made in the shaft, a change room built, and dumping arrangements, and surface layout, were improved. The drift north was resumed and driven an additional 150 feet, where a faulted zone was encountered, with values in the vein for the last forty feet ranging from \$2.00 to \$6.00 per ton.

## HISTORY OF TRIUMPH PROPERTIES (cont)

White Chief group (cont). It seems apparent that the foot-wall in this area warrants crosscutting, but it was deemed more expedient to forego this recourse temporarily and to drift southward first. In the area plus 120 to plus 200 of this north drift unusual high grade ore was encountered, with the hanging wall margins of the drift assaying as high as \$256.00 per ton over three foot width. Much of this ore shows coarse free gold in hand specimens.

The drift south on the Golden Beauty vein is advanced 65 feet. It is in commercial grade ore all the way, with the exception of a turn out portion of the drift, which was turned deliberately into the hanging wall zone, to leave at least a 15 foot pillar as the southwest wall of the shaft and manway at the station. The vein exposures of this south drift are averaging from two to four feet in width with face samples averaging from \$8.00 to \$56.00 per ton.

The present face at the 65 foot work shows an interesting vein structure with the Golden Beauty vein being crossed by an easterly dip slip with northerly dip. Vein filling is showing in the plane of the dip slip. Further work must be done here to determine whether this dip slip is the vein designated as the "C" vein, and to determine the relationships between the two fractures.

Blue Knob Group: The Blue Knob Group of the Triumph Company lies one and one-half miles south of the main Triumph shaft, and one and one-half miles southwest of the White Chief shaft. It comprises the claims known as Philfind, Philfind I, Philfind II, Tyray II and Tyray IV. As a group, they are situated in the southern half of section 28, T. 19 N., R 20 W. In order to have company assessment work apply for a group, these were linked to the Triumph group by location of the claims Good Luck I, and Good Luck II, and, on the east end of the Blue Knob, by location of the claims Alpha and Rita.

The work done on these claims is insufficient to prove notable structural continuity of any of the vein exposures, and, in addition, the greater portion of the area involved is mantled with erosional debris and gravels. Their merit lies chiefly in that they are situated so as to intercept the regional trend of the fracture systems striking from adjoining and nearby mines, some of which had had notable production.

## GEOLOGY OF THE OATMAN DISTRICT:

The underlying rock forming the basement of the Oatman district is a highly-sheared granitic complex of pre-Cambrian age. Isolated patches of it are found in the western foothill portions at lower elevations, but in the northern portion of the district exposures of this complex are extensive.

GEOLOGY OF THE OATMAN DISTRICT:(cont) There the producing mines, as the Katherine, Frisco, Tyro, Sheeptrail, were found in this basement formation.

Resting upon this granitic basement formation is an extensive series of Tertiary volcanic flows, agglomerates, and tuffs, which show considerable variety in composition and texture. These flows and associated tuffs are of such diverse types as olivine basalt at the basic end of the series and rhyolites at the acid end. Between the extremes are various intermediate types.

The best available evidence suggests that the Black mountains are a fault block tilted to the east. As the major fractures of the Oatman District dip to the east at steep angles, and as these faults are of the normal type, the crest of the range would be depressed relative to the western portion of the district.

Intrusive into this thick series of flows are several prominent Tertiary intrusives of acid composition. In the vicinity of Mount Hardy these are exposed over an area of several square miles, and they have been designated as the Moss porphyry, a quartz monzonite, and the Times Porphyry, a soda granite porphyry.

Several prominent plugs and numerous dykes of rhyolite porphyry cut through the granitic complex and the superimposed lavas, and commercial ore deposition appears to be intimately related to these minor intrusives.

#### ECONOMIC GEOLOGY OF THE OATMAN DISTRICT:

As outlined by exploratory effort to date, commercial ore deposition in the Oatman district, as well as in the northern portion, or Katherine district, is most prominent in the granitic complex, and in the lowermost flows of the Oatman lava section. These lava members have been designated as follows, beginning from older to younger. Alcyone Trachyte, Esperanza Trachyte, Oatman Andesite, Gold Road Latite. The earliest developments in depth in the district were made on veins exposed in the latter two members of the lava section and production from these is therefore heaviest. As stated by Ransome and Lausen, however, the wall rocks here suffer little or no replacement, and there is no reason why ore shoots should not be found in any of the igneous rocks that occur in these districts.

Mineralization has been connected with faulting, the veins occupying fissures or fractures in the enclosing rocks. Certain features of the occurrence of the vein filling in these fractures are important. Study has shown that there is a rhythmic alternation of quartz and calcite deposition in these fractures. In each vein, deposition begins with quartz and closes with calcite. Five stages have been recognized, each of which has its distinctive type of quartz, and they can usually, although not always, be recognized from each other. The calcite shows no such distinctive features.

ECONOMIC GEOLOGY OF THE OATMAN DISTRICT:(cont)

The first stage of quartz filling which falls into commercial ore range is that called the third. It has a fine grained banded texture, variable color, and ranges in values per ton from \$1.20 to \$8.00, with the gold to silver ratio being two to three. This quartz is common in the Gold Road vein system only.

The next, or fourth stage quartz, is fine grained, pale green to yellow in color, and often shows casts of platy calcite. Range of values per ton is \$4.00 to \$20.00, with the ratio of gold to silver being 1 to 2. This quartz is abundant only in ore shoots.

The final, or fifth stage quartz, is fine to medium grained, usually banded, pale to deep honey yellow in color. Range of values per ton is \$20.00 and upward. Ratio of gold to silver is four to one. This stage also is abundant only in ore shoots.

The feldspar, adularia, is a common constituent of the higher grade ore, and, in such ore, it is invariably associated with the yellow quartz. It usually occurs as white bands between layers of quartz, but in some specimens, plates of adularia and grains of quartz are intergrown. Gold is frequently found as an aggregate of grains in such intergrowths and thin plates of gold were found in adularia.

In the northwestern part of the Oatman District fluorite, gypsum, and kaolin, are commonly found in the veins. At the Moss mine free gold in the form of stout wires and plates was found enclosed in segregations of fluorite in the veins.

Pyrolusite, hematite and limonite, are quite common in the oxidized ores of the district. Porous quartz which contains an abundance of hematite frequently also carries small flakes and wires of free gold. Pyrite is rarely found in the veins, although it is quite common in the wall rock adjoining the veins. Traces of marcasite, lead, molybdenum, and copper are occasionally found in these veins.

VEIN STRUCTURES OF THE OATMAN DISTRICT:

Vein structures in the district vary from a simple tabular body of quartz and calcite with well defined walls, to lodes which consist of a large number of stringers or veins variable in width and separated from each other by barren rock. Small ramifying stringers may be found branching from the main vein into the wall rock. Frozen contacts are common, of one or both walls.

Usually ore shoots in the veins of the district are enclosed by pronounced alteration haloes of wall rock. Propylitic alteration and softening are most common. Concomitant with this is a general darkening of the rock due to oxidation and hydration. Where the wall rocks are of more acid type this alteration often becomes one of silicification and pyritization.

### VEIN STRUCTURES OF THE OATMAN DISTRICT: (cont)

These epithermal ore shoots of the Oatman district are lenticular in plan, as shown in development and stoping operations of the mines of the district. Unlike the lens-like ore bodies in many other districts, the ore bodies of this district are characterized by an impressive continuity in pitch length and breadth, as well as in thickness.

Strike faulting in and along the veins of the district is common. These faults, reopening a fissure zone filled with early stage, and usually low grade vein filling, serve as the ore channels for the later commercial ore surges. Where they at times leave a vein in drifting or stoping operations, there is a tendency on the part of operators to follow the vein, which all too frequently diminishes in values, and the strike fault linking with a minor dip slip into a parallel lens in the wall is overlooked. Frequent crosscutting and geologic control are required in the proper exploitation of these ore deposits.

### ORE DEPOSITS OF THE TRIUMPH PROPERTY:

#### Triumph Group:

On the original Triumph group of four claims, the chief vein, toward the exploration of which the present effort is projected, is the Vivian vein. The Vivian mine is developed by three shafts, drifts, and tunnel to a depth of 270 feet. It was actively worked 40 years ago, and has a production estimated at \$300,000 in gold and silver.

The Triumph shaft is located approximately 750 feet easterly across the Vivian wash from the portal of the Vivian tunnel. The line of cropping of the Vivian vein from the portal of the tunnel to the Triumph shaft collar is largely covered by wash gravel and sand. However, the chloritized, pyritic andesite on the Triumph dump is of the same nature as in the Vivian mine workings, and there appears to be no reason why the Vivian vein should not be found in the Triumph property. At the 200 foot level of the Triumph shaft there is found to be a 91 foot crosscut southwest. Driving this crosscut an additional 130 feet should cut the Vivian vein from the footwall side.

The Vivian vein, as worked on the Vivian property years ago, is a strong vein, over half a mile long. It strikes north 75 degrees west, and dips 82 degrees south. The average width is three feet, and it consists of considerable fourth stage commercial quartz, with crystalline dark calcite and earlier stage quartz. The gold in the Vivian vein varies from fine to coarse colors, and in the early days of production values up to \$9,500 per ton were reported.

### Triumph Group (cont):

The "North Vein" on the original Triumph group is approximately parallel to the Vivian vein. Shallow surface work on this vein shows it to be a promising fracture as to width and continuity, and, values obtained justify exploration of this vein at depth. The intervening area between the Triumph shaft and this "North Vein" is a well stringered zone and should be crosscut on several levels.

On the claims of the company that lie between the original Triumph group of four claims, and the White Chief group of six claims, little development work has been done to date. Most of the area involved is covered with detrital material and gravels. The most promising showing is at the discovery of the Tyray II claim. Here a 25 foot shaft discloses a northerly striking, wide, fractured zone, in gray Alcyone trachyte. A width of three feet along the hanging wall margin assays up to \$3.00 per ton in gold.

### White Chief Group:

The most significant and main development conducted by the Triumph Company is on the White Chief, where drifting south on the Golden Beauty vein is in progress on the 200 foot level.

As shown on the White Chief map, four veins are outlined on the property near the shaft area. These veins are seated in the Alcyone Trachyte, and in the Oatman Andesite flows of the Oatman lava section. With the exception of the "C" vein, the prevailing strike is northeasterly. This trend is significant, showing parallelism with a pronounced rhyolite dike system to the west extending from the Boundary Cone rhyolite plug to the Elephant Tooth plug. This rhyolite dike system strikes into the Tom Reed vein system on the north at a locus where heavily producing ore bodies were found.

The "Gloryhole" Vein was the first vein of this group in which ore was found, and it was this discovery which led to the sinking of the shaft in 1916. The site of the discovery is a pit 15 feet deep, with perhaps an additional 10 feet of depth obscured by caving ground. It is reported that the ore was a narrow tale seam of very high value. Sampling of present available exposures here fails to confirm the presence of high grade ore. In as much, however, as the fracture zone here has an impressive width, underground exploration of this vein is also warranted.

The "B" vein and the "C" vein, as exposed in surface cuts, are sheeted zones in the Alcyone Trachyte. Their content of vein filling at the surface horizon is meager, but, in as much as these zones will intersect the Golden Beauty vein, their possible influence on ore localization cannot be denied.

White Chief Group (cont)

The "Golden Beauty" vein is a fault fissure vein, with the Alcyone Trachyte forming the footwall, and the Oatman Andesite the hanging wall. Pronounced strike faulting is evidenced in the vein zone and as shown by available slickensides the faulting is normal. The vein filling is chiefly quartz and rock breccia. Dark calcite is occasionally found. The quartz varies from coarse, glassy, copper stained, to fine drusy crystals lining small vug holes and areas of corrosion in the rock breccia. The broken ore is darkened by pulverent manganese oxide. Adularia is commonly found associated with this drusy quartz. The gold found in this late stage quartz shows up as clusters of small grains. In the high grade portion of the north drift the Golden Beauty vein is a stringer lode from four to eight feet wide with no definite hanging wall exposed. The ore is an extremely hard quartz carrying small inclusions of rock breccia. It shows copper stain, and varies from banded chalcedonic quartz to finely crystalline drusy quartz. Some of the quartz itself has a greenish tint but usually it is colorless. This quartz shows considerable well crystallized hematite. The gold occurs chiefly with this hematite as inclusions of small wires and foils of the metal.

The ore shoot as outlined to date by drifting on the Golden Beauty vein on the 200 foot level is 250 feet in length. It is undoubtedly a primary ore of commercial grade in itself. Repeated slight fault movement in and along this vein zone has enhanced the value of the ore by giving access to oxidizing solutions, which have apparently dissolved and leached away considerable of the calcite gangue in the vein, and made it porous and friable as a whole. Under similar favorable conditions in the productive veins of the district, this process has been found to have a dual result. Not only a negative enrichment by dissolving away of valueless constituents, as outlined above, but an accretion of value mechanically, by downward washing of grains and foils of gold freed from friable associated hematite at upper horizons of the vein zone. This is in a measure analogous to cave deposits in limestone, and requires an open channel with vigorous circulation of meteoric waters.

BUILDINGS, EQUIPMENT, MATERIALS:

The assets of the corporation, in addition to the above described mining claims, consist of the following:

White Chief Shaft:

1-42' 8x8 Timber headframe, A type	\$1,000.00
1-25 h.p. Fairbanks Morse gas hoist	2,000.00
1-15x25 Hoist House	1,000.00
1-10x14 Change Room	200.00
1-Chicago Pneumatic, No. 8800, diesel air compressor, 315 cu. ft.	5,608.00
1-Sullivan 210 cu. ft. air compressor 10x10	400.00
1-Air receiver	150.00
1-Cameron No. 3 pump	400.00
2-Piston pumps	300.00

White Chief Shaft (cont):

1-Water storage tank	\$ 250.00
7-Jackhammers	1,600.00
1-Drifter	515.00
1-Stoper	475.00
2-Mine Cars	200.00
1-1942 Chevrolet Truck	1,025.00
12,000'-8x8 mine timber	960.00
4,000'-3"xl2" mine timber	300.00
6,000'-2"xl2" mine timber	750.00
600'-2" pipe	120.00
300'-1" pipe	42.00
2500'-3/4" pipe	250.00
200'-1/2" pipe	16.00
400'-8" vent tube	314.00
3,000 lbs. 12# mine rail	200.00
800'- shaft hanging rod stock 3/4"	95.00
Miscellaneous Tools and Fittings	1,000.00
Welding Outfit	150.00
White Chief Shaft - Total	\$19,350.00

Triumph Shaft

1-42 Ft. Headframe, A-type, constructed of 8x8 timbers	\$ 1,000.00
1-25 hp. Fairbanks Morse gas hoist	2,000.00
1-25x20 Hoist house	1,250.00
1-25x20 Blacksmith shop	1,000.00
1-Shower and Change room	300.00
1-Powder magazine, 6x10	100.00
1-18,000 gallon, steel water storage tank	1,000.00
2-1,000 gallon supply tanks	300.00
Milling equipment, gravity concentrators	8,000.00
Miscellaneous Tools, Fittings, and Equipment	1,496.00

Triumph Shaft - Total \$16,446.00

White Chief Shaft Total 19,350.00

Total Assets, Triumph and White Chief Shafts \$35,796.00

ORE RESERVES:

On the basis of the development work, or drifting, that has opened up a length of 250 feet of the Golden Beauty vein on the 200 foot level of the White Chief operation of the Triumph Company, and, bearing in mind the geologic criteria and history of similar productive veins of the district, when at a similar stage of development, I am making an estimate of ore reserves as follows:

Ore in sight 12,500 tons @ \$22.00 per ton-gross value \$275,000  
Possible Ore 41,200 tons @ \$15.00 per ton-gross value \$618,000

RECOMMENDATIONS AND CONCLUSION:

The White Chief operation of the Triumph Company has opened up the most significant discovery of a virgin ore body found in the Oatman district in nearly 30 years. The operation has reached a point where the development program should be expanded, and moderate milling facilities provided for the property. The company has an opportunity to purchase for \$30,000 a used 100 ton per day capacity mill, and should do so. If, while further development work is going on, the mine operation should fail to supply the capacity of this mill at any time, custom milling of ores from the district should balance the temporary deficiency.

The following mine development program is recommended:

- (1) The placing of the Triumph shaft operation on a standby basis, and concentration of all effort on development of the White Chief mine.
- (2) The raising out of a well-timbered, two compartment vertical shaft, from a point in the north drift 250 feet from the present operating shaft. This raising operation can be done concurrently with drifting southward on the Golden Beauty vein, and other lateral exploration and development of the 200 foot level.
- (3) Sinking of the newly raised shaft 125 feet, and cutting out stations for lateral work north and south on the Golden Beauty ore shoot already opened on the 200 level.
- (4) Bringing in electric power to the property by erection of approximately a quarter mile power line to link with the public utility main line.
- (5) Installation of 75 h.p. electric hoist at the collar of the new shaft, and erection of permanent surface plant here.
- (6) Retimbering of shaft in present use, leaving present surface plant as is, so as to have an auxiliary operating shaft and escapeway.
- (7) Purchase and erection of used cyanide mill of 100 ton per day capacity near the collar site of the new shaft.

The development program outlined above is required to place this mine on a production basis. I am of the opinion that the completion of this development program will insure the productive future of the mine, and pay dividends to all participants in this unusually meritorious venture.

Respectfully submitted,

*Edward F. Cruskie*

Edward F. Cruskie  
Mining Engineer  
Oatman, Arizona  
June 1, 1948



