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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: CONGRESS

ALTERNATE NAMES:

- CONGRESS MINE, PATENTED 878
- FRACTION, PATENTED 883
- NIAGARA
- NIAGRA
- GOLDEN KEY
- HERSKOWITZ PROPERTY
- QUEEN OF THE HILLS
- OHAHA
- PLANET MIER
- JAQUAYS
- B AND M
- PATENTED CLAIMS MS 2888 & 3523

YAVAPAI COUNTY MILS NUMBER: 440C

LOCATION: TOWNSHIP 10 N RANGE 6 W SECTION 23 QUARTER N2  
 LATITUDE: N 34DEG 12MIN 05SEC LONGITUDE: W 112DEG 50MIN 54SEC  
 TOPO MAP NAME: CONGRESS - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

- GOLD
- SILVER
- COPPER SULFIDE
- FELDSPAR

BIBLIOGRAPHY:

- ADMMR CONGRESS MINE FILE
- ADMMR CONGRESS COLVO FILE
- ADMMR NIAGARA MINE & MILL FILE
- ADMMR GOLDEN KEY FILE
- REPORT OF THE GOVERNOR OF AZ 1899 P 54-56
- WILSON, E.D. ETAL. AZ LODE GOLM MINES AZBM
- METZGER, O.H. GOLD MINING & MILLING IN THE
- WICKENBURG AREA USBM IC 6991 1938 P 45

CONTINUED ON NEXT PAGE

3/16/53

Type of uranium ore in  
Congress Mine

Liebigite  
Ca 2 U(CO3) 4 10 H2O

Crystal System:  
Orthorhombic.

Habit:

Crystals equal or short prismatic (001) usually indistinct with rounded edges. Commonly as granular scaly aggregates and thin crusts; also botryoidal.

Physical properties:

Color; Light, vivid, yellowish green.  
Fluorescence; Light green, strong.  
Luster; Vitreous, slightly pearly on cleavage.  
Hardness;  $2\frac{1}{2}$  - 3  
Specific gravity; 2.41

Optical properties:

Orientation	n	Pleochroism	
X-a	1.497	Nearly colorless	Biaxial negative
Y	1.502	Pale yellowish green	2V 40 Deg.
Z	1.539	" "	R <sub>V</sub> moderate

Analysis:

Qualitative spectrographic analysis of material from  
Pumpkin Buttes:

Major	U	Ca
Minor	-	-
Trace	Al	Fe Mg Mn Si

Occurrence and Associated Minerals:

Secondary coating at Pumpkin Buttes. Noted by De'Arcy George (1949) at Lusk, Wyoming, perhaps as alteration product of uranophane.

Identification:

Effervescences in HCL and soluble in water. Optical properties.  
( Be careful to distinguish from bayleite. )

W. A. Murray  
145 W. Center St  
Wickenburg, Arizona  
Phone 157

E. A. Colburn, Jr.  
P. O. Box 152  
WICKENEURG, ARIZONA

September 1, 1955

Mr. W. A. Murray,  
Washington,  
D. C.

Dear Mr. Murray:

In order that you may have the basic facts about the Congress Mine, Congress, Yavapai County, Arizona, without too much detailed data ordinarily included in a mine report I am, below, more or less abbreviating the salient points regarding the property.

There are 14 patented claims and 9 unpatented claims in the property, all located in a block about two and one half (2½) miles by good level road from Congress Junction which is a station on the Santa Fe Railroad. It is also on paved Highway 89 and paved State Highway 70. The claims are on the flat desert, and on the Late Creek Mountains in the Martinez Mining District. This is one of the most advantageous situations for a mining property in the west.

Past authenticated production has been close to \$8,000,000.00 mostly in gold with some silver and the production was had prior to 1910 when the price of gold was at \$20.00 per ounce. From old letters and papers it is apparent that the production in tons ran around 700,000 at least that was what was run through the mills. Recovery ran 94.33% from 1894 to 1910. Gross value of the ore was \$13.01 with gold at \$20.67 and silver at \$0.60. Present value would be over \$20.00 per ton.

Development consists of several shafts and many levels run at the interval of around 75 ft. as measured on the vein.

These levels consist of many miles, perhaps 20 or over.

CONGRESS VEIN WORKINGS

Shaft No. 1	1,000 ft. deep
" " 2	1,700 " "
" " 3	4,000 " "
Kingman Shaft No. 4	1,900 " "
" " 5	2,050 " "
" " 6	1,800 " "
Queen of the Hills Winze	600 " "

The cross vein worked from both No. 1 shaft above the 650 ft. level and No. 2 Shaft below that level with a winze extending from the 650 ft. level to the 1,000 ft. level. Queen of the Hills vein (probably a displaced segment of the Cross Vein) had three tunnels; top, middle, and lower, the latter one going clear through the hill.

There is ample dump room for both mine waste and mill tailings, possibly about 100 acres of flat land, some of which is now occupied by tailing, but not filled by any means. There are several mill sites on the property.

Some water is available from Martinez Creek about 6,600 ft. from the main workings and now connected by pump and pipe line. Electric line already in at the pump which could be extended to the mine, or power could be brought in from the south where the distance is somewhat greater but the terrain better. There is plenty of water in the old mine workings to keep a good sized mill in operation if the water is taken care of by filtering etc.

Proposed mill capacity to start with would be about 100 tons per 24 hours, to be located at or near No.1 Shaft, which would be the main production opening for the Congress vein. The flow sheet would depend upon future work in the development of the uranium ore body but would probably include gravity and flotation concentration for uranium and the cyanidation of tailings for gold and silver. Sorting and washing arrangements in the crushing plant would provide sources of waste for the mine dumps and shipping grade ore to be sent to outside mills or smelters for final recovery.

The cost of such a plant would be in the neighborhood of \$150,000.00. This would include cost of power line (if any) and other extras incident to the mill. The power company has told me that they would bring in a high tension line without cost if we had a commercial load. The ideal power hookup, in my judgment, would be to buy power for the steady loads as milling etc., and make with Diesel engines the fluctuation loads as developed by hoists, compressors, etc. which run only a portion of the 24 hours, but this would necessitate the purchase of engines and generators and the employment of extra labor. However, I believe that it would pay in the long run as it would keep the peak power demand quite low and thus avoid excessive power costs. Synchronous motors on any large horse power drives would also be an aid here as well as keeping up the power factor.

On a basis of producing about 100 tons per day, the No.3 Shaft would have to be equipped with a double drum hoist and a four or five drill compressor. This would run about \$10,000.00. For No. 5 Shaft and Queen of the Hills tunnel, separate equipment would have to be furnished as the openings are at considerable distance apart. These two together would run about the same as the figure quoted above.

Underground supplies and equipment would include skips, cars, track and pipe and some timber, although there is several thousand dollars worth of good mine timber available in No.3 Shaft. Also would need rock drill, hose, slusher hoists etc. Total of around \$25,000.00 depending on the scale of operations.

The tonnage of the uranium ore is not especially well known just at the present time, but from indications, samplings and experience with conditions in the mine, I would judge that there should be available about 30,000 tons in and adjacent to No.3 Shaft. I would indicate an area 150 ft. long, 800 ft. high and 3 ft. wide extending from the 200 ft. level to the 1,000 ft. level and pitching at an approximate angle of 30 Deg. west. This area has been developed by the shaft and the 650 and 1,000 ft levels, and is not directly in contact with the old gold stopes. Then there is the showing all the way down No.2 Shaft from the tunnel level to the 650 ft. level which is in the hanging wall of the old gold stope which is now filled with ore. It is my judgment that the combined mineral content over the entire width of the dyke in the area where the footwall area was mined for gold will make pay ore if properly mined and milled. However, such an operation would have to be on a good tonnage basis. This would run the tonnage figure to around 3,000,000 tons. There are certain areas in the dyke where the gold stringers, which are more nearly vertical than the dyke, are closer together and which form pay ore for the whole dyke and the uranium ore as shown in No.3 Shaft seems to follow very closely the fracturing and shattering of the dyke, sometimes being nearly from dyke wall to wall. This condition may well obtain in No.2 Shaft in the hanging wall of the old stopes. In the Queen of the Hills lower tunnel we have a gold ore body which is developed between that level and the middle tunnel above which should contain 30,000 tons of ore of mill grade. This gold quartz is associated with some pretty good spots of uranium ore which occurs both in the foot wall and the hanging in some gouge slips and fault fissures. Everywhere the uranium ore seems to be associated with post gold faulting and is largely localized in said fault gouge and in fault shattered rock regardless of whether it is dyke rock or vein material associated with granite. On straight gold ore contained in the old filled stopes, disregarding any uranium content, I would estimate at least 400,000 tons of an average grade of over \$11.00 per ton as shown by my samplings. This would be net tonnage to be milled after screening and sorting.

The surface showing of uranium is quite small due to the solubility of that mineral and the almost endless combinations it makes in nature with other metals and bases. But it does extend from the so-called break just west of the No.1 Shaft on the Congress vein westerly to and beyond the No.2 Shaft. On the tunnel level or 200 ft. level, where the tunnel passes behind the above shaft, the background count is quite high. This is not due to radon gas for there is a very heavy movement of air at this point and any concentration of gas would be swept out to surface as the

- 4 -

air is moving rapidly in that direction. Here the low grade mass extends from foot to hanging wall of the dyke, a distance of about 20 ft. No work has been done here or elsewhere to limit the ore body. The ore was followed down No.2 Shaft to the 650 ft. level by the AEC engineer and several samples taken. No.2 Shaft being sunk in the dyke or on the foot wall of it and in direct contact with the old gold stopes which have been filled with low grade ore shows a general average of about 0.15 % U3O8 all the way down. The uranium is confined to hanging wall of the dyke and occupies the fault plane which extends downward from the granite for about a couple of feet. Where ever the dyke is crushed the uranium ore follows into these fine seams contained in the dyke and mineralizes them. On the tunnel level west of No.2 Shaft the bottom of the drift shows up well on the Sieger counter and this would seem possibly to be the upward extension of the uranium ore in Shaft No.3 farther west, as explained above.

The Queen of the Hills vein, also as explained above, is entirely in the granite country rock and has no dyke with it. However, we find good grade uranium ore in direct contact with the quartz gold ore, not that the quartz is radio active, but the gauge on either side of the quartz is. There has been considerable movement horizontally along this vein to account for this gauge.

Farther north where this vein crossed the Bellick dyke, which is more or less parallel to the Congress dyke, and very much like it otherwise, the situation is again quite active in the line of uranium. The background count is so high at this point, which is the situation of the Queen of the Hills 600 ft. vein, that one is practically unable to get a reading on the counter without getting out of the tunnel and waiting for a couple of hours before the counter comes back to normal. Then only can a reading be had on material collected in the tunnel. No chemical assay tests for uranium have been made here.

It seems to me that the above showings in uranium is well worth the time, effort and money to be expended thereon. The uranium mineral contained in the Congress ores has been classified as LEIBICITE, a high grade mineral of unique occurrence. This classification came from the Naval Gun Factory Laboratory in Washington and should be authentic.

Now as to the tonnage of gold ores exposed in the workings. Reports show that the mine has produced over 700,000 tons of ore and that tonnage has been run through the mill. There is at least an equal tonnage left in the old stopes which have been sampled several times at about \$11.60 per ton in the minus one inch size which would mean sorting some of the waste out and thus reducing the tonnage to about 400,000 tons. This is an enormous backlog for a small milling plant and constitutes only a portion of the ore available for milling. The cross vein near to the No. 1 Shaft

should produce ore without sorting of around \$14.00 per ton. Samples were taken in a tunnel close to the surface at \$12.00 and on the same vein at the 650 ft. level at \$16.00 per ton. Many samples have been taken in various places showing \$14.00 to \$18.00 per ton even in large mill runs and, of course, some have been taken of a lower grade of from \$4.50 up to \$10.00 all in broken ore. There is quite a tonnage available in the old stopes of the Niagara vein and one quite large body of unbroken ore therein that shows assays of \$28.00 and \$31.00 at 350 ft. depth. This was discovered when caving from the hanging wall disclosed it to view, about 10 ft. in width and at least 100 ft. long.

Perhaps the most interesting thing from a high grade standpoint is the ore body at the bottom of No. 5 Shaft on the Niagara vein. This vein lies to the south of the Congress and is in the granite formation on all upper levels and dips more steeply than the other veins or about 30 to 40 degrees. The ore was wider but not quite so good as that contained in the Congress vein and it contains some free gold and some heavy pyritic ore as well. As it reaches the lower level it comes in contact with a basic dyke quite similar to that accompanying the Congress vein and flattened off on it making a fine long, high grade ore body on the contact. The dyke comes in from the foot wall and carries the vein along with it making a virgin mine from that point downward of good high grade ore of an equal to that contained in the Congress vein in early days. It could even be shipped to the smelter at a fine profit, but would be much more profitable if milled locally along with the lower grade ores.

There are no maps covering the territory stoped above this area except one drawn many years later from reports of development work and shipping and milling data of the ore. This map shows with in dashed lines an area with the following caption "Large stope, position and boundary indefinite, records show 140,000 tons taken from No. 5 Shaft since 1903, probably from this general area." This shaft was closed in 1910.

The ore in this shoot should be from 500 ft. to 700 ft. in length and should extend down ward indefinitely, as the Congress mine has never been bottomed and is at a very much greater depth. Also some of the ore in the easterly section of the Niagara vein has been cut off by what is known as the "East Fault". This, to date, has not been solved, but from recent disclosures it would seem that it should be readily figured out, as I have been able to determine the horizontal thrust and have figured the vertical component at about 150 ft. This would throw the lost segment that much nearer the surface.

Another vein of great promise is the New Strike Vein north of, and up the hill from, the Congress vein. It is exposed at

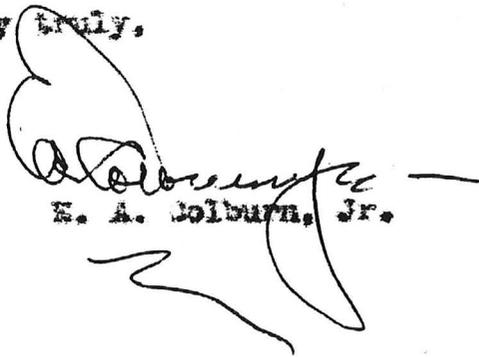
several points on surface and has produced one shipment that I know about of \$51.00 per ton. The vein is rather narrow, about 18", but is high grade and contains considerable specimen rock showing free gold.

There are several parallel veins in the Congress workings which show high grade ore that has not been stoped, notably on the 650 ft. level, now inaccessible where a vein in the hanging rock wall having a width of about a foot shows \$75 rock over a stoped length of around 100 ft. It wouldn't take too much work to get at this ore whenever the mine is opened. I personally saw this ore more than 20 years ago, in fact I have seen most of the ore I have written about except that in the bottom of the No. 5 Shaft and that data is from a letter from the former manager who believed this deposit to be the best in the mine.

Cost of mining should be held down to \$4.00 per ton and if only recovering ore from the fills, quite a little less than that figure. On a basis of breaking the whole width of the dyke I believe that it can be done for \$3.00 per ton. Milling will run about \$4.50 per ton, not taking into account the marketing expense of the uranium concentrate, which is not known to me at this writing.

Cost of mining and cleanup together with the initial machinery expense fund would run about \$150,000.00. Cost of milling building as was given above \$150,000.00. And there should be a working capital of about \$50,000.00, at least, to tide over until the mill would come into production. It is apparent that these figures could be modified down ward if it were necessary to limit working places and equipment for lack of capital, but with the scheme as outlined above the results would come quicker and more surely.

Very truly,



E. A. Solburn, Jr.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM  
REGION IV

DMEA-2364, E. A. Colburn, Jr., Congress Mine (Tungsten)

Date Creek Mining District

Yavapai County, Arizona

J. N. Faick, Geologist  
U. S. Geological Survey

L. L. Farnham, Mining Engineer  
U. S. Bureau of Mines

March 1952

7085

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By J. N. Faick <sup>1/</sup> and L. L. Farnham <sup>2/</sup>

Early in 1952, E. A. Calburn, Jr., the present owner of the old and well known Congress gold mine, applied to the Defense Minerals Exploration Administration for an exploration loan amounting to \$32,471.40. The application was docketed as DMEA-2364. The amount requested was to be used for the rehabilitation and sampling of certain portions of the old mine workings that had been reported to contain tungsten. The property was examined and sampled by the field team during the week of March 3, 1952.

Since its discovery in the early nineties the Congress mine has produced about \$8,000,000 in gold and silver. The presence of tungsten in the Congress vein was not known or suspected until it was claimed to have been detected during the summer of 1951. At that time several haphazard selected samples, taken from the mine dumps, were reported to have a tungsten content that ranged from a few hundredths of one percent to a maximum of 0.43 percent  $WO_3$ .

The samples taken by the field team in different parts of the mine all failed to show the presence of tungsten by spectroscopic tests. It is presumed that faulty analytical methods were employed by the applicant's analyst and that in reality the Congress vein does not contain perceptible amounts of tungsten. Therefore, it is recommended that the application for the loan be denied.

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<sup>1/</sup> Geologist, U. S. Geological Survey  
<sup>2/</sup> Mining Engineer, U. S. Bureau of Mines

**CONGRESS MINE  
(E. A. COLUMB, JR.)  
YAVAPAI COUNTY, ARIZONA  
DEEA 234**

**TUNGSTEN**

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**ILLUSTRATIONS**

Fig. 1 Location Map	See Engineering Report
Fig. 2 Underground Workings of Congress Mine	" " "

## INTRODUCTION

An application for Government assistance in exploring for tungsten in the Congress gold mine, Yavapai County, Arizona, has been filed with the Defense Minerals Exploration Administration as District 2784. The application was made by Mr. L. A. Colburn, Box 253, Congress, Arizona, owner of the mineral rights of the Congress mine, and was received in the Tucson, Arizona office February 15, 1952. The mine was examined March 4 and 5, 1952 for the Defense Minerals Exploration Administration by L. L. Fanning, U. S. Bureau of Mines, and J. E. Field, U. S. Geological Survey, who were accompanied by the applicant.

### GENERAL OCCURRENCE

The Congress mine, located 3 miles northwest of Congress Junction, has been described in some detail in two nearly identical publications, both of which include brief descriptions of the geology. The mine is at an altitude of 2400 feet at the base of the eastern end of the Late Creek Mountains. This portion of the range consists essentially of coarse-grained biotite granite intruded by epidite, pegmatite and greisens dikes. The latter are important to this discussion because these biotite dikes are frequently closely associated with the gold ores of the district and are claimed by the applicant to contain appreciable amounts of tungsten. These dikes are of very fine-grained, dense, greenish-black rock and in appearance look somewhat like slightly altered basalt, but may be hornblende or amphibolites. For the purpose of this report they will be referred to as greisens.

---

W. Stanton, N. F., Ore Possibilities at the Congress Mine; Eng. and Min. Jour., Vol. 122, No. 30, pp. 769-772, Nov. 13, 1926.

Wilson, E. D., Oronitrogen, S. B., and Butler, O. H., Arizona Lode Gold Mines and Gold Mining; Univ. Ariz., Ariz. Bur. Mines Bull. 137, pp. 69-73, 1934.

The Congress mine (Fig. 2) property contains several gold-quartz veins of which the Congress, Niagara, and Queen of the Hills have been of particular economic importance, and have been developed by many miles of underground workings. About 700,000 tons of ore valued at \$8,000,000 have been produced from these veins. The veins occur within fault fissures which strike generally westward and dip northward. The Congress vein strikes N. 60° - 80° W. and dips 20 to 25 degrees northward and occurs as a fissure filling in granite.

The vein filling consists of massive, grayish-white quartz together with irregular masses, bands, and disseminations of fine-grained pyrite. Galena is rare, no other common sulfides were observed. Very little free gold has been reported and this element occurs in very fine microscopic grains disseminated in the quartz vein in well defined shoots. Iron and manganese stains are apparent on rock in the dumps. Scattered erratically on the walls of the mine and on the rock of the dumps are thin films of white amorphous silica, probably hyalite, that fluoresce bright yellowish green under the ultraviolet light.

In the hanging wall of the Congress vein, and occupying the same fracture zone in the granite, a prominent greenstone dike, ranging from about 5 to 15 feet in thickness, is nearly everywhere present. In detail the structure along this composite vein-dike zone is complex and several periods of deformation, with movements parallel to the vein-dike structure, are indicated. The granite country rock and greenstone dike have been sheared, crumpled and broken in local areas where deformation has been strongest. Vein quartz has filled fractures and partially replaced the dike and granite, and in some areas this process has resulted in the formation of ore in the dike

and in the hanging wall of the dike; however, the main vein is confined to the footwall of the dike.

The principal ore shoot, now mined out, pitched to the north-west in the plane of the vein and closely coincided with the intersection of the Congress vein with a steep westerly dipping cross-vein known as the Granite vein. Both veins were mineralized near the intersection but the main ore shoot was confined to the Congress vein (Fig. 2) and had a strike length of about 1800 feet on the 650 level, the plane of maximum width. The ore shoot decreased in size with depth but was mined without interruption to 2800 foot level on the plane of the vein, and a small shoot was mined about the 3750 foot level. The average thickness of vein was about 30 inches.

#### REPORTED OCCURRENCE OF TUNGSTEN

Although the Congress mine has been thoroughly exploited for gold ore, the occurrence of tungsten has not been reported prior to the application. No tungsten minerals such as scheelite, wolframite or hutchinsonite were recognized by the field examiners from the Defense Mineral Exploration Administration. It is claimed by the applicant that tungsten in small amounts occurs widely distributed in the greenstone dike in the hanging wall of the main Congress vein. The applicant reports that samples of greenstone dike taken from surface exposures and old mine dumps average 0.173 percent tungsten and that mill tailings from early operations contain 0.015 percent tungsten. The basis of this claim lies in several samples collected and analyzed by the applicant's son-in-law who works in the assay office of the Bagdad Copper Corporation, Bagdad, Arizona.

Assays provided by the applicant are as follows:

<u>Description</u>	<u>Percent Tungsten</u>
Queen, Middle Tunnel, Quartz	0.025
Congress dike on surface	0.08
Mill tailings	0.045
Dike on McKinley Tunnel dump	0.38
Dike on McKinley Tunnel dump	0.33
Dike, No. 2 dump	0.43
Mill tailing	0.13
Congress dike surface	0.20
Dike from No. 3 dump	0.29
Yellow rock No. 3 dump (stained quartz)	0.075
Congress dike surface	0.145
Congress dike surface	0.075
Congress dike surface	0.125

By classifying the above samples into 3 groups according to the nature of the material and taking numerical averages of each, the average analysis is as follows:

Quartz vein material	.050 percent tungsten
Mill tailings	.087 " "
Greenstone dike	.23 " "

To verify the presence of tungsten and determine the nature of its occurrence eleven carefully selected samples were taken by the examiners. The locations of these are shown on the map of the Congress mine, Fig. 2, and are fully described in the engineering section of this report. The samples were carefully prepared and mineralogical and spectroscopic examinations were made by Lester G. Evans, Petrographer, U. S. Bureau of Mines, Tucson, Arizona, who reports that absolutely no tungsten could be found in the samples. As tungsten could not be detected with the spectroscope, further analyses were not made.

It appears probable that the tungsten reported by the applicant represents either an error in analysis or salting of the samples during preparation. None was detected by this examination.

### **CONCLUSIONS AND RECOMMENDATIONS**

No tungsten could be found in the Congress vein or in the hanging wall dikes as claimed by the applicant. Examination of eleven samples by means of the spectroscope revealed that there was absolutely no tungsten present, therefore quantitative analyses were not made. Because of the absence of tungsten, or other strategic and critical ores of value to the defense program, it is recommended that the application be denied.



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
DEFENSE MINERALS EXPLORATION ADMINISTRATION  
WASHINGTON 25, D. C.

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WPC

DEC 17 1955

DEC 1955

Division of  
Defense Minerals

Mr. W. A. Murray  
P. O. Box 152  
Wickenburg, Arizona

Re: Docket No. DMEA-3963 (Uranium)  
Congress Mine  
Yavapai County, Arizona

Dear Mr. Murray:

Reference is made to your application for Government aid in an exploration project covering the Congress mine.

Projects approved by the Defense Minerals Exploration Administration must, in its judgment, show definite promise of yielding materials of acceptable grade in quantities that will significantly improve the mineral supply position for the National Defense Program.

Although some uranium mineralization was noted to occur in the amorphous silica films which cover portions of the vein material and other rocks in the mine and on surface dumps, a careful study of all our information indicates to us that the probability of disclosing minable uranium ore reserves by driving additional exploratory openings than presently exist on your property is not sufficiently promising to justify Government participation. We regret to advise you that, under these circumstances, your application for exploration assistance is denied.

We wish to thank you for your interest in the Defense Minerals Program and for bringing your property to our attention.

Sincerely yours,

W. C. M.

Administrator

U. S. BUREAU OF MINES  
WEST EXPERIMENT STATION  
DEC 23 1955  
TUCSON, ARIZONA

W. Murphy/gla  
12-13-55

cc to: Adm.'s Reading File  
Operating Committee  
Docket

Messrs. JECrawford, Rm. 3641  
THKillsgard, Rm. 5224  
JCHsted, Rm. 3210, GSA  
Code 700

Mr. Murphy  
DSEA Field Team, Region III (2)

✓ Storms  
Faick

November 30, 1955

**224 New Customers**  
**Denver 2, Colorado**

*W. H.*

**Memorandum**

**To: Secretary to the Operating Committee, BREA**

**From: Field Team, Region III**

**Subject: Joint Report of Examination, Docket BREA 3963 (Uranium),  
W. A. Murray, Congress Mine, Yavapai County, Arizona**

Enclosed are the original and three copies of the Joint Report of Examination on the subject docket. The field examiners found only trace amounts of uranium in the Congress Mine and were unable to locate areas in which greater concentrations might exist.

They recommend that the application be denied, and we concur in this recommendation.

E. N. Harshman -

**E. N. Harshman**  
**Acting Executive Officer, BREA**  
**Field Team, Region III**

**Enclosures**

**ENC:ab**

**cc: Sec. Op. Comm. (4)**  
**Docket 3963**  
**Mining Div.**  
**Harshman**  
**Storrs** ✓  
**Faick**  
**Thurlo-AEC**  
**Chron.**

Bak 4097  
Tucson 5, Ariz.

November 21, 1955

Memorandum

To : Executive Officer, DMEA Field Team, Region III  
Denver, Colorado

From : J. N. Faick, Geologist, U. S. Geological Survey and  
T. M. Romalo, Mining Engineer, U. S. Bureau of Mines

Through : W. R. Storms, Tucson, Arizona and  
E. N. Harshman, Denver, Colo. *WRF*

Subject : Memorandum Report of Examination for Uranium in the  
Congress Mine, Yavapai County, Arizona, DMEA-3963.

INTRODUCTION

On August 29, 1955 the Defense Minerals Exploration Administration received an application for exploration for uranium ores in the Congress mine, Yavapai County, Ariz. This is a large, well known gold mine which operated continuously from 1894 to 1910, and a small part of the mine, old dumps and tailing subsequently were worked. The mine has a recorded production of 692,000 tons of ore which yielded 338,477 ounces of gold and 345,596 ounces of silver, valued at \$7,650,000. These precious metals were obtained from a large quartz vein and subsidiary veins in granite that probably do not contain appreciable amounts of any other metals. Extensive mine workings extend to a depth of 3,900 feet on a slope of about 25 degrees north. The mine was worked through several inclined shafts. Shaft No. 1 is inaccessible, shaft No. 2 is in poor condition because it was burned out by fire, and shaft No. 3 is accessible to water level, which is slightly below the 1,000-foot level. Many of the tunnels and drifts are open, but nearly all of the stopes are inaccessible.

CC W. M. Traver (Orig. & 10)  
J. N. Faick  
DMEA-3963  
BF

Faick-Romalo:frj

116-23

The mine first was examined for the Defense Minerals Exploration Administration under docket DMEA-2364 on March 4, and 5, 1952 by L. L. Farnham, mining engineer, U. S. Bureau of Mines and J. N. Faick, geologist, U. S. Geological Survey. The examination was made in response to an application from the owner of the property, E. A. Calburn, now of Wickenburg, Arizona, who requested Government aid in exploration for tungsten on the property. The examiners were unable to find tungsten, even in trace amounts, therefore the application was denied.

The present applicant is W. A. Murray, who leases the property from Calburn, and who requested Government aid in exploration for uranium. The examination for uranium was made Nov. 8, 1955 by T. M. Rensle, mining engineer, U. S. Bureau of Mines, and J. N. Faick. These examiners were unable to find uranium except in minute amounts, therefore are recommending that the application be denied.

As the property previously had been examined and a regular report submitted, and as the property is not known to contain minerals acceptable to exploration by D.M.E.A., this memorandum report is submitted in lieu of the usual complete report. If additional details, such as history, production, property, etc. are required it is suggested that the report on DMEA-2364, submitted March 1952 by J. N. Faick and L. L. Farnham, be consulted. The report which follows is believed to be adequate for the purpose for which it is intended, i.e., to provide adequate data to show that the application for exploration for uranium should be denied.

#### GEOLOGY

At the Congress mine there are several fissure veins, containing gold and silver in massive white quartz. The veins are closely associated in space with prominent basic dikes. As shown on a composite plan of the workings, figure 2, extensive stoping has been done on the Congress vein, and a small stop is shown on a vein which crops out on the Bellick claim. The Congress vein strikes west-northwesterly and dips about 25 degrees north and the other vein strikes northeasterly and dips about 25 degrees north. It was from 30 to 36 inches thick and was very persistent along both strike and dip. A prominent greenstone dike in the hanging wall of the vein is nearly everywhere present. The dike ranges from 5 to 15 feet in thickness. It is composed of a very fine-grained, dense, greenish black rock that may be a lamprophyne or altered basalt. A low angle fault is usually present in the hanging wall of the dike but in many places the fault, or benches of it, cut into or across the dike and vein. In detail the structure along this composite vein-dike zone is complex. Several

periods of deformation, are indicated. Vein quartz has filled fractures and partially replaced the dike and granite and in some areas this process has resulted in the formation of gold ore in the dike and in the granite of the hanging wall.

#### OCCURRENCE AND SIGNIFICANCE OF URANIUM

During the earlier examination for tungsten very thin films of white amorphous silica, probably hyalite, were found scattered erratically on the walls of many of the accessible mine workings and very small amounts of it was found on the dumps. This efflorescent material fluoresces yellowish green under the ultra-violet light, and is very conspicuous in areas of greatest concentration. Associates with this silica, and more-or-less concealed by it are trace amounts of a radioactive mineral, which occurs in tiny specks, seams or films which fluoresces bright green. The two minerals are quite similar in appearance under the ultra violet light, but a close inspection can be distinguished by the brighter appearance of the radioactive mineral. Little or no radio-activity was found except where the bright green fluorescent mineral was found, and this was nearly always associated with the more abundant amorphous silica. In most places these two minerals occurred as thin films on the walls of the drifts, usually on the up dip side of the drift, but in a few places they were found filling tiny fractures. Obviously the minerals are evaporites, which were taken into solution, transported and re-deposited by minute quantities of percolating ground waters. According to data furnished by the applicant the radioactive mineral was identified as liebigite, by the Battelle Memorial Institute.

The greatest radioactivity was obtained from small isolated spots, most of which were localized along the low angle faults and some of which were localized at the contact between the basic dike and the quartz vein. The largest radioactive zone found by the examiners was on the 1,000 level, from 45 to 75 feet east of the No. 3 shaft. In this area films and coatings of radioactive material were found on the up-dip side of the drift. They are exposed along a zone about 20 feet long and about 1 to 11 inches in width. In this same locality at a distance of from 63 to 70 feet east of the No. 3 shaft, the face of the 20-foot inclined raise was coated with similar but somewhat thicker efflorescence. This had the highest radioactivity found by the examiners and was therefore sampled, the results being shown in table I and also on figure 1.

The applicant claimed that many radioactive spots were present in the No. 3 incline but the examiners were unable to detect radioactivity that was significantly greater than background count.

The applicant also claimed that unusual radioactivity existed in the Queen of the Hills tunnel on the Bellick claim, therefore, the accessible part of these workings was examined. The Queen of the Hills lower tunnel was examined from the east portal to the caved and inaccessible stope on the Bellick claim without detecting appreciable evidence of radioactivity. To examine the western part of the lower tunnel the examiners entered the Middle tunnel descended through an inclined raise to the Lower tunnel and examined it carefully as far east as the caved stope. About 75 feet of the shaft under the stope on the Bellick claim was open for inspection. Slight traces of radioactivity were detected in many places along the lower tunnel, but at no place did Geiger counter readings exceed about twice background count, and the radioactive spots were too small to have any significance.

Abnormal radioactivity was detected in the upper part of the shaft on the Bellick claim. Here background readings, taken on the intermediate scale, increased to about 10 m/hr, which is about equal to the maximum found in the most radioactive spots elsewhere in the mine. However, it was noted that the walls of drift, where both vein material and wall rocks were tested did not produce Geiger counter readings that were noticeably higher than the background readings in the shaft. Only trace amounts of the fluorescent radioactive material was found in the shaft and this produced only relatively feeble response on the counter. It was noted that the counter responded slowly to the radioactive background, but after leaving the shaft the counter continued to give abnormally high background readings for about  $1\frac{1}{2}$  hours. The cause of this phenomenon is not known to the examiners. However, it appears most likely to be due to accumulation of radon and its daughter products, as only minute amounts of radioactive materials could be detected in the walls of the shaft.

In connection with this examination we conferred with Messrs. M. L. Reynor and W. E. Ashwill of the Phoenix Sub-Office, Atomic Energy Commission, who kindly supplied us with the analyses of 7 samples collected by Ashwill. We learned from the AEC that their experience was similar to ours, i.e., the uranium mineral is present in "spotty", erratically distributed efflorescent coatings along the walls of the mine workings.

Analyses available are given in Table 1. The first 7 of these analyses were obtained from the AEC. The last sample, taken by Romalo for the DMEA, represents the strongest showing of ore found during the examination. Note that the chemical analyses are somewhat higher than the radiometrics.

TABLE I

<u>Number</u>		<u>eU<sub>3</sub>O<sub>8</sub></u>	<u>CU<sub>3</sub>O<sub>8</sub></u>
A-2973	Shaft #2 Dump-select	0.10	0.14
A-2974	Shaft #2 Select from 250' level at fault	0.10	0.14
A-2976	" " " " 300' "	0.04	0.10
A-2975	Select from #5 shaft dump	0.06	
A-2977	Select from #2 shaft 250' level V drift	0.03	
A-3625	Shaft #3 - 1000' E drift shaft / 40'E, select from S wall	0.43	0.92
A-3624	Shaft #3 - 1000' E drift shaft / 55' E - S wall 1 1/2' vert. chip from lens 1 1/2' x 6' long	0.81	1.60 (contains thorium)
UEBM No.			
12278	Efflorescent coating on face of 20-foot inclined raise, 60 - 73 ft. east of No. 3 shaft, 1000-foot level. Lens 54 inches long (strike length) by average of 15 inches thick.	0.05	0.08

Although the applicant claimed that radioactivity was present in important amounts in several places Mr. Colburn, who accompanied the examiners through the mine workings was unable to show the presence of anything better than indicated by U.S.B.M. sample. At no place did the radioactivity in the walls exceed by more than 3 times the radioactivity of the background, and it was usually of a lesser order of magnitude. Apparently the applicant and the owner of the property ignored the significance of the background count and assumed that all evidence of radioactivity was important to the problem. However, none of the radioactive material found by the examiners was in sufficient quantity to be significant, and there is no evidence that greater amounts might be present elsewhere. In fact the amount of uranium apparently is too small to justify recovery as a by-product of gold mining, which is apparently the intent of Mr. Murray, the present applicant.

## CONCLUSIONS AND RECOMMENDATIONS

As the examiners were unable to find only trace amounts of uranium in the Congress mine, and were unable to locate areas in which greater concentrations might exist, it is recommended that the application be denied. Even if uranium were present in significant amounts it would be difficult to recommend approval for NEA because the mine is fully developed.

*J. H. Faick*  
J. H. Faick, Geologist  
U. S. Geological Survey

*T. M. Ransle*  
T. M. Ransle, Mining Engineer  
U. S. Bureau of Mines

George M. Colvocoresses  
Mining and Metallurgical Engineer  
1102 Luhrs Tower  
Phoenix, Arizona

August 30, 194(?)

Messrs. Colburn, Byron Meyer, Richard Hollman and associates

SUPPLEMENTAL REPORT ON CONGRESS MINE

Gentlemen:

Although my examination of the Congress Mine in 1935, 1942, 1943 and 1944 were made first for the purpose of determining the advisability of treating the tailings and dumps and next with the idea of conducting a large scale operation for the treatment of tailings, dumps, mine fills and low grade ore in place - the results as embodied in my long report of August, 1943, to which I later made some additions, including much information which would be valuable in guiding a small operation treating only high grade ore. In this connection the following supplemental notes are submitted and in order to call particular attention to portions of my report which have a bearing on your present problems, I have side lined certain paragraphs in pencil and also made a number of notes on the margin of the copy which I shall furnish you.

1. The remaining tailings will probably not pay to work, but it will be advisable to investigate the sub-soil where some samples we took in 1943 showed material carrying \$18.00 per ton, but this may since have been removed.
2. As to the dumps while these will not average over \$3.00 per ton, there are some portions which might be worth sorting over and perhaps screening since it is of record that on one occasion 147 tons were sorted from the dump and assayed \$18.55 per ton. Some of my samples from the dumps ran better than \$10.00 per ton but these were averaged with lower grade material.
3. From all sampling it appears that all mine fills down to the 1500' level will average at least \$5.00. Here again are sections which are much richer than the average, but we purposely cast out high grade samples. Some idea of the probable value of each portion of the fill can generally be obtained by visual inspection after washing, as the presence of quartz and sulphides nearly always indicates gold values except in the Queen of the Hills where there is a lot of nearly barren quartz. Before actually preparing to mine any of this material, I suggest that some grub sample be taken from the best looking sections, as I obtained several samples which ran better than \$8.00/ton particularly from Congress near No. 2 shaft on the 925' level.
4. The mine was unwatered in No. shaft to the 1950' level in 1941 and Ramsden told me that he found some very good ore on the 1925' level in No. 3 shaft and extending up to 1700'.

HIGH GRADE ORE

The existence of high grade ore remaining in the old Congress workings has been made the subject of persistent rumors many of which I believe to be unfounded or greatly exaggerated. However, as a matter of record, I think it proper to repeat some of these for what they may be worth. Near the surface, especially in the vicinity of No. 1 shaft, there still remain small sections of pillars and sills of high grade ore some of which has been gouged out by lessers during recent years and shipped to the Hayden smelter after the Congress Corporation shut down their mill. This ore was difficult and expensive to mine and probably had an average value in the order of \$20.00 per ton but was hand sorted until the shipping product became much richer. Profits to the miners seem to have been small since the work was intermittent and had been practically discontinued during the latter part of 1944.

The tonnage of such ore now remaining in this section of the mine must be small and cannot be considered in any estimate although it is quite likely that after regular mining and milling operations are resumed, now lessers may furnish a few hundred tons or more per an . Frank Stone of Prescott who once did some leasing on the mine claims to have climbed up 90' in an incline raise from the 600 to 700' level east of No. 2 shaft and there to have found and sampled a cross vein with a width of 18" to 2' that carried up to 4 oz. of gold. This story was related by who apparently does not know just where this raise is located and in any event it is probably now inaccessible except after some preparatory work. Regarding the Queen of the Hills workings Stanton could give little information since most of this work was done after he was no longer manager of the mine, but it is of record that leasers operated here with some profit during the 1930's and that the mine workings are much more extensive than shown on the map and at one point a winze had been sunk to a depth of 1750'. Samples taken in some of the pillars ran better than \$10.00 per ton and several reliable men stated that a substantial tonnage of similar grade ore remained in sections of the vein which they had examined prior to 1940. It is my opinion that a comparatively small amount of cleaning up would permit the examination of much of these workings which are now inaccessible and I suggest that special attention should be paid to the Queen of the Hills which seems to have been much less thoroughly prospected and developed than other portions of the property and which probably contains the faulted segment of the Congress vein.

#### LOWER GRADE ORE

As to the lower grade ore remaining in various portions of the workings, I can add nothing to the previous statements and those in my report except to mention that Snow confirmed the findings of Colburn, Price and Ramsden to the effect that many samples cut in the vein between the old stopes would run from \$7.00 to over \$10.00 per ton and some of my samples carried \$9.00 although all high grade material was purposely avoided. Stanton and others who were familiar with the old mine mentioned the fact that there had been left in the upper levels of the Niagara vein ore which assayed a shade below the old limit of 0.35 oz. per ton and which could be reached for sampling from No. 5 shaft if a little cleaning up was done in the shaft and drifts. While no accurate estimate of this ore was made, the tonnage was represented as being quite substantial and some portions of it should carry better than 0.4 oz. per ton.

#### Metallurgy

In further reference to the treatment of the higher grade ore to be produced from the small scale operations (about 50 tons per day) it seems that this might best be started through the use of flotation with shipment of concentrates to the smelter. These concentrates and even the flotation tailings could later be cyanidized (with or without roasting) if extra recovery would make this worthwhile.

I have a record of gravity concentrates shipped by the Congress Company to the Humboldt smelter in 1906 which carried 7 oz. to 8oz. in gold and 13 oz. in silver, and I believe that a high recovery of values could be contained on most of the ore by modern flotation alone whereas the installation of cyanide equipment would involve much extra expense and the operation of a small cyanide plant is comparatively costly.

#### CONCLUSION

To sum up the situation I call your attention to the estimate of ore reserves given on page 104 of my long report and especially the possible ore amounting to 200,000 tons with an average value of \$11.00 per ton. Neither the quantity nor grade of this material can be made the subject of an engineering estimate based upon mathematical data but it is based largely on conversations and correspondence with competent engineers who were familiar with

the old workings of the mine and it has been shocked to some extent by my own findings and those of other engineers who assisted me or were associated in our investigations. Of course all cost estimates in the long report must now be substantially revised upward and without attempting to go into details I have figured that the cost of developing, sorting and mining ore will be in the order of \$6.25 per ton in place of \$5.00 and milling, etc. will cost about \$1.75 making a total operating cost of \$8.00 and leaving a profit of \$21.00 per ton on this class of material if an average recovery of \$10.00 can be obtained. The total expected profits from the operation after deducting the repayment of capital which must be invested, may not seem to make the venture particularly attractive, but one must bear in mind the chance (and I think it is a very good one) of finding and mining considerable ore of a much higher grade some of which may well run to a value of \$20.00 per ton as produced in the old operations and considering that all mining is at best a speculative venture, I feel that there is a strong probability that the initial investment will be repaid and a reasonable probability that a very substantial profit may be earned either because of the development of higher grade ore or because of the anticipated increase in the price of gold. Moreover, it should be noted that all of the samples listed in the report were taken without sorting while such sorting, at a comparatively small expense, would have raised the grade of those taken from ore in place and also from portions of the gob from 15% to 30%. In carrying on a small operation you will undoubtedly find it advisable to apply both selective mining and sorting and may thus be able to bring the average value of mill heads to perhaps \$13.00 per ton which would be most desirable.

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The condition of the workings which I visited and sampled some five years ago has doubtless changed somewhat for the worse and before mining and milling is actually started, it will be essential to have made accessible a sufficient number of faces of pay ore to permit the desired daily production. In order to be reasonably sure of producing 50 tons of pay ore or gob I feel that first of all, and before making any large purchases of equipment, it would be your best policy to employ a competent young engineer with a small crew of miners who could work under the direction of Mr. Colburn, clearing out the drifts or stopes where pay ore is known or believed to exist and re-sampling these ore shoots or sections of the gob with proper sorting followed by preparation for the actual extraction of the pay ore. By following this program you should be able to avoid the mistake of going to more than a trivial expense in preparing to develop and mine ore shoots which are not sufficiently rich to pay the working costs.

#### CAPITAL EXPENDITURES

I have refigured the capital expenditures which will probably be involved in this undertaking and assuming that you can purchase the present power plant for \$12,500.00 and obtain good second hand machinery for your other principal items of equipment, I think that the \$80,000.00 which you propose to provide should be sufficient provided you do not attempt to cyanide either the concentrates or tailings from the flotation plant. Should such cyanide treatment prove to be necessary or advisable, I believe that you should arrange to have available an additional \$10,000, or preferably, \$20,000.00 which last figure would raise your total capital investment to \$100,000.00 and serve to provide a certain amount of working capital which is often of great importance.

My conclusions are again made on the assumption that there will be no further advance in the cost of labor or other commodities resulting in serious inflation with a decrease in the value of our currency which would make present estimates entirely worthless as long as the value of gold is fixed at \$35.00 per ounce.

Yours very truly,

(signed) G.M. Colvocoresses

DMEA-2364 E. A. COLBURN, JR., CONGRESS MINE (TUNGSTEN)  
DATE CREEK MINING DISTRICT  
YAVAPAI COUNTY, ARIZONA

**Engineering Report**

By L. L. Farnham  
Mining Engineer  
U. S. Bureau of Mines

March 1952

CONGRESS MINE  
(E. A. O'LEARY, JR.)  
YAVAPAI COUNTY, ARIZONA  
AREA 2364

TUNNEY

Geology

By  
John H. Frick  
Geologist, U. S. Geological Survey

DMEA-2364, E. A. COLBURN, JR., CONGRESS MINE (TUNGSTEN)  
DATE CREEK MINING DISTRICT  
YAVAPAI COUNTY, ARIZONA

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## INTRODUCTION

In February 1952, E. A. Colburn, Jr. applied to the Defense Minerals Exploration Administration for an exploration loan amounting to \$32,471.40. The application was docketed as DMEA-2364. The sum requested was to be used in the rehabilitation and sampling of certain portions of the underground workings of the Congress mine that had been reported to contain appreciable quantities of tungsten. The field team examined the property during the week of March 3, 1952.

## ACKNOWLEDGMENTS

Thanks are extended to E. A. Colburn, Jr. for the help he gave the field team during the examination of the property.

## LOCATION AND PHYSICAL FEATURES

The Congress mine is 3 miles north of the town of Congress Junction, Yavapai County, Ariz. Congress Junction, a station on the Santa Fe railroad, lies between Wickenburg and Prescott on U. S. Highway 89. The mine is reached by driving northward out of Congress Junction over 3 miles of an improved dirt road (fig. 1). The property is located at the southern base and near the eastern end of the Date Creek mountains in an area of moderate relief. The altitude of the principal mine workings is about 3,500 feet above sea level.

## HISTORY AND PRODUCTION

The Congress gold mine was worked almost continuously from 1894 until 1910. The recorded production during this period, resulting from the treatment of some 692,000 tons of ore, was 388,477 ounces of gold

and 345,598 ounces of silver, valued at \$7,650,000. Subsequent to the closing of the mine in 1910, the various attempts to treat the tailings and mine dumps has probably resulted in the recovery of an additional \$500,000 in gold and silver.

The presence of tungsten in the Congress mine was not known nor suspected until it was claimed to have been detected during the summer of 1951. At which time the applicant's son-in-law, who was employed in the laboratory of the Bagdad Copper Co., became interested in tungsten and during visits to the Congress mine collected and analysed different types of rock that were selected from the old mine dumps.

The results of this work, as submitted by the applicant, are as follows:

	<u>Percent WO<sub>3</sub></u>
Queen mid-tunnel quartz-----	0.025
Congress dike on surface-----	0.08
Mill tailings-----	0.045
Dike on tunnel dump-----	0.38
Dike on tunnel dump-----	0.33
Dike on No. 2 shaft dump-----	0.43
Mill tailings-----	0.13
Congress dike on surface-----	0.20
Dike from No. 3 shaft dump-----	0.29
Yellow rock No. 3 dump-----	0.075
Congress dike, surface-----	0.145
Congress dike, surface-----	0.075
Congress dike, surface-----	0.125

#### DESCRIPTION OF THE DEPOSIT

Of the several gold quartz veins formerly mined on the property, the so-called Congress vein was the most persistent and probably the most productive. It was this vein and dike that the applicant

proposed to explore for tungsten. The Congress vein consists of a series of quartz filled fractures occurring in and along an intrusive greenstone dike. The dike and the accompanying quartz ranged from 8 to 15 feet thick, had a westerly strike, and an average dip of 25° northward. Although some ore was found in the central and upper portions of the greenstone, the bulk of the production came from a persistent strand of quartz, averaging about 3 feet thick, that occupied the footwall portion of the dike. The gold was associated with irregular masses and streaks of coarsely crystalline pyrite which was largely confined in an ore shoot that pitched northwesterly in the plane of the vein. This lenticular ore shoot, varying greatly in stope length, was mined from the surface to an inclined depth of over 3,000 feet (fig. 2).

#### SAMPLING

Different portions of the vein outcrop, the mine dumps, and accessible underground openings were observed under ultraviolet light by the Government's examining team but no scheelite was detected, nor were any other non-fluorescent tungsten minerals found on the property.

Nine representative chip samples were taken by the examining team across the greenstone dike and vein quartz in widely separated parts of the underground workings of the Congress vein. Two grab samples also were taken on the dump of No. 2 shaft where the applicant's samples had shown the highest tungsten content. The location

of these 11 samples are shown on the accompanying mine map. The description and spectroscopic results are shown on a separate sheet.

The examining team's samples were crushed and pulverized in the conventional manner. Portions of the resulting pulps were concentrated by panning and this concentrate was tested in a spectroscope in the Southwest Experiment Station of the Bureau of Mines at Tucson. No perceptible quantities of tungsten were present in any of the 11 samples. The difference between the tungsten content of the samples as reported by the applicant and those taken by the examining team probably was due to faulty analytical methods on the part of the applicant's analyst.

#### CONCLUSIONS AND RECOMMENDATIONS

The examining team's samples were representative of such widely separated portions of the Congress dike and vein that had tungsten existed in the mine, it seems reasonable to presume that it would have been present at least in some of the samples. Inasmuch as the spectroscopic tests were negative on all of the samples it appears logical to conclude that appreciable amounts of tungsten do not occur in the Congress vein and dike.

Therefore, it is recommended that the application for the lean be denied.

RESULTS OF THE SAMPLES TAKEN BY THE GOVERNMENT'S EXAMINING TEAM  
AT THE CONGRESS MINE - DMEA-2364

No.	Width	Location	Description	Percent WO <sub>3</sub>
12,601	6.0 ft.	1,000 ft. level - 200 ft. east No. 3 shaft	Dike with quartz stringers	Nil
12,602	8.0 ft.	1,000 ft. level - 310 ft. east No. 3 shaft	Dike with quartz stringers	Nil
12,603	6.0 ft.	1,000 ft. level - 500 ft. east No. 3 shaft	Dike with quartz stringers	Nil
12,604	8.0 ft.	650 ft. level - 350 ft. east No. 3 shaft	Dike with quartz stringers	Nil
12,605	6.5 ft.	650 ft. level - 275 ft. east No. 3 shaft	Dike with quartz stringers	Nil
12,606	4.5 ft.	McKinley Tunnel Level - 25 ft. east No. 2 shaft	Dike with quartz stringers	Nil
12,607	6.0 ft.	McKinley Tunnel Level -110 ft. east No. 2 shaft	Dike with quartz stringers	Nil
12,608	Grab	South central portion of No. 2 shaft dump	Vein quartz only	Nil
12,609	Grab	South Central portion of No. 2 shaft dump	Dike rock only	Nil
12,610	7.5 ft.	250 ft. level - 70 east No. 2 shaft	Dike with quartz stringers	Nil
12,611	2.8 ft.	Pillar No. 2 shaft - below McKinley Tunnel	Quartz vein	Nil

Miss Project

Courtesy Mine Management  
Corporation

10/14/75

AKP

CONGRESS MINE REPORT

BY

G. M. COLVOCORESSES

August 1943

## HISTORY

According to W. F. Staunton the original Congress locations were made by Dennis May who sold the claims in 1887 to "Diamond Joe" Reynolds and Frank Murphy. The new owners operated the property with a 20 stamp mill and Frue Vanners for concentration until 1891 up to which date they had received a net return of about \$592,000.00 from shipments of ore and concentrates. They always made a poor recovery of values since the oxidized ores found near the surface would not amalgamate and the gold in the sulphides was principally associated with marcasite which slimed easily so that tailing losses were high.

After an almost complete shut-down of some three years, work was resumed in 1894 by the Congress Gold Company. Prior to that date a standard gauge railroad (now a branch line of the Santa Fe) had been built to connect Congress Junction with Prescott and Phoenix and this was connected with the mine by a spur 3 miles in length, which has now been removed. The mill had been equipped with 40 stamps and additional vanners. At the mine the #2 shaft then had a depth of 1000' but no stoping had been done below the 650' level. Subsequently the cyanide process was introduced to greatly improve the milling practice. In 1901 another 40 stamps were added and during the next ten years a large part of the original mill tailings were retreated along with newly mined ore. The net returns from the production from 1894 to 1910 was \$7,057,422.75.

The total tonnage of ore shipped or milled from March 1899 to the end of 1911 is recorded as 692,332 tons of which 370,022 tons was mined from the Congress vein with an average recovery of about 0.70 oz. of gold per ton. The Niagara vein supplied 293,215 tons with an average recovery of about 0.415 oz. gold per ton. 20,125 tons was mined from the Queen of the Hills vein, the average recovery is not stated but apparently it was a little less than 0.4 oz. A total of 388,477 oz. of gold and 345,598 oz. of silver were recovered and sold.

It would appear that the total mine production up to the end of 1911 was 692,332 tons of ore including all material shipped or treated in the mill, from which over \$7,650,000 was realized in net payments for the ore, concentrates, and bullion making the average recovered value \$11.81 per ton with gold at \$20.67 per ounce and silver at 60 cents. The over all average assay of the ore may conservatively be estimated to have been 0.64 ounce gold and 1.00 ounce of silver which at the present prices would have had a value of over \$23.00 per ton. This last figure includes the values of gold and silver left in over 600,000 tons tailings from milling operations. In addition to the above totals substantial values were left in the mine fills and ore dumps which will be described in another part of this report.

Between 1910 and 1937 the operations at Congress were principally confined to the retreatment of small portions of the mill tailings and ore dumps and no attempt was made to reopen the mine except by various lessees who mined some of the small pillars left in the upper workings. During these 27 years it is probable that upwards of 50,000 tons of dump rock and mill tailings had been treated by various parties but no type of operations at the Congress Mine appeared to hold a promise of yielding a profit until the price of gold was advanced from \$20.00 to \$35.00 per ounce.

In 1935 the property with the then existing improvements, valued at about \$5,000 was sold for \$26,000 by the Congress Trust (which succeeded the Congress Gold Mining Co.) to Gerald Sherman and Associates who organized the Congress Mining Corporation.

The mine dumps were considered of doubtful value until they were subsequently measured and fairly well sampled on two occasions. Once by the management and once under the direction of Henry G. Carlisle of San Francisco, both samplings indicated 400,000 tons (after allowance for sorting some waste) with an average value of \$3.00 per ton in gold and silver. The condition of the mine, including the stope fills was practically the same as at present, except that many of the workings which were then open for inspection are now caved.

The Congress Mining Corporation in 1937 proceeded to erect a 300 ton-a-day counter-current cyanide mill along with a power plant and accessory equipment. This company operated its mill from June 1st, 1938 to June 14, 1942, during which time it treated a total of 385,505 tons of material of which 276,372 tons came from the tailings pile, 106,629 tons from the dumps, and 2,402 tons represented shipments of ore by leasors working in the Congress Mine or from custom shippers.

The recovered value of 51,576 tons of tailings and 37,915 tons of dump rock treated in 1940 averaged \$2.05 in gold and silver. In 1941, 97,927 tons of tailings and dumps were treated (segregation not given) with a recovered value of \$2.50 per ton. The returns indicate the mill heads averaged respectively \$3.00 and \$3.60 for an average of better than \$3.30 a ton for these two years. These figures check with the monthly mill records for the above periods and it is indicated that the dumps ran higher than the old tailings.

#### PROPERTY LOCATION AND GENERAL CONDITIONS

The holdings of the Congress Mining Corporation in Yavapai County, Arizona, consists of the patented and unpatented lobe mining claims listed below with all dumps, tailings and improvements thereon.

Name	Area In Acres	Recorded In Book of Deeds	Page
Congress X	20.02	30	476
Queen of the Hills X	17.47	30	480
Niagara X	20.66	30	484
Mosouri	5.36	30	488
Why Not	20.66	30	493
Fraction	7.40	33	497
Niagara Mill Site	4.95	33	617
Excelsior	20.66	33	620
Incline X	20.64	41	94
Rich Quartz X	20.65	41	97
Golden Eagle	19.93	41	100
Snowstorm	20.66	41	104
Ohio	20.66	41	107
Old State	20.24	41	110
Golden Thread X	20.66	54	104

## UNPATENTED MINING CLAIMS

<u>Name</u>	<u>Recorded in Book of Mines</u>	<u>Page</u>
Bellick	24	291
Remnant	25	314
Boundary	35	161
Sunnyside	45	499
Highland	45	496
Keystone	50	364
East Extension of Golden Thread	51	156
Martinez	66	591
Ophir	86	341

All claims are located in the Martinez Mining District, Yavapai County, Arizona.

The main workings of the mine are located in a low range of hills known as the Date Creek Mountains, three miles from the Santa Fe Railway station at Congress Junction, Yavapai County, Arizona. The elevation at the tailings mill is 3560' above sea level and the collars of the various shafts are less than 100' higher.

The surface of the claims is rocky and rugged with ridges rising to heights of some 400' above the level of Martinez Creek which drains this area. There is no timber and only scant semi-desert vegetation. The climate, while hot in the summer, is well suited to operations throughout the year with frequent frost and only light snows during the winter months.

The local water supply is deficient for any large scale operations and will be discussed separately in this report.

In normal times ample common labor can be secured from Phoenix (73 miles distant from the mine) and from other cities in the Salt River Valley. Miners, millmen and other classes of skilled workmen can be recruited from various copper camps of the State. The existing living accommodations in and about Congress Junction would serve to house a crew of 50 to 60 men.

Supplies for mining and milling can be delivered to the mine by either railroad or over paved highways by motor truck. Phoenix located 73 miles over paved highway to the south is the mining and industrial supply center of Arizona.

### GEOLOGY AND ORE OCCURRENCE

The country rock forming the Date Creek Range, which lies to the west of the Weaver and Bradshaw Mountains, is mainly granite. Probably of pre-Cambrian age and in some areas with pegmatitic structure. Through this formation in the vicinity of the Congress Mine occur a number of greenstone (diorite) dikes which generally strike in the east-westerly direction and dip from 20-30 degrees to the north. Another series of more recent quartz-porphyry dikes strike north-easterly with nearly vertical dips; these last are believed to be post mineral. The diorite dikes generally carry some iron sulphides with low gold values.

The Congress vein lies along a contact between the granite and one of these dikes which has a width of from five to fifteen feet. The Niagara vein and other smaller veins are formed in fissures in the granite some distance away from the dike contacts. Most of the fissure veins strike in an east-westerly direction and usually dip 20 to 40 degrees to the north.

[ There is much evidence of minor faulting and one major fault cuts off both the Congress and Niagara veins at their east end and beyond this neither one of them has been positively located.

The pay ore in the Congress vein is associated with quartz, iron sulphide and arsenical iron sulphide, also small amounts of copper and zinc sulphides. In the Niagara vein and smaller veins there is some galena and a higher silver content.

Even though most of the Congress system of veins occur in the granite, there is good reason to believe that all of the ore deposition was due to a deep seated intrusive magma from which ascending solutions worked their way upward through fissures which are remarkably persistent and can be traced for long distances. The gold values are not entirely confined to the main veins but impregnate the wall rock, particularly in the case of the Niagara vein. Values also follow tiny stringers of quartz with disseminations of iron sulphides so that much low grade ore had been left in place in the vicinity of the old workings and a large tonnage of such material was used for backfilling in the stopes or hoisted to the surface dumps along with the waste.

Mr. Staunton, who was manager of the Congress Mine during its greatest production period, has made the following comments from which I quote.

"Some have considered that the dike was in reality the Congress vein since the ore occurred in all possible relations to the dike between the foot and hanging walls of granite, but usually the ore was found near the footwall and accompanied by a clay selvage."

An analysis of the greenstone dike which is usually termed diorite, gave the principal constituents as follows:

SiO <sub>2</sub>	=	.52.20%
Al <sub>2</sub> O <sub>3</sub>	=	13.40
Fe O	=	9.75
Mn O	=	1.90
Ca O	=	9.60
Mg O	=	1.16
<u>Total</u>		<u>88.01</u>

Minor faulting is in evidence throughout the mine workings and there has been considerable relative movement of the walls of the Congress vein, resulting in local crumbling of the greenstone. The mine workings terminate to the east against a heavy fault, beyond which the vein has not been definitely located. This fault cuts off both the Congress and Niagara veins.

Although the Congress vein is continuous and well defined for a mile or more to the west of the mine workings and shows both the characteristic quartz and sulphides, the pay ore was practically confined to a shoot in the vein pitching to the northwest and coinciding closely with the intersection of one of the fissure veins in the granite. The granite vein is faulted by the Congress vein so that the intersection is obscure in the mine workings. The portion of the granite vein in the hanging wall of the Congress carried bodies of pay ore.

The Congress pay shoot varied greatly in length on different levels, being longest on the 650' level. Several pinches were met in following the vein down. The most serious being at the 1,700' level, where there was no stoping ground. On the theory that if pay ore existed below that point it would probably be found on the general line of trend of the ore shoot above, a deep prospecting winze was sunk from the 1,700' level - in the vein but with a northwesterly pitch corresponding to the established trend of the pay ore in the upper workings. This winze was sunk 1,000' and bore out fully the theory upon which it was projected. The pay ore coming in again as good as ever after a few hundred feet of lean ground.

The 3,900' level was the deepest point at which any considerable amount of development was done. For several levels above this there had been a gradual pinching of the pay shoot, which became small and irregular, although retaining its mineralogical characteristics and the small amount of sulphides which remained still showing the characteristically high gold content above 7.0 oz. per ton. The conditions were similar to those existing at other horizons in the mine where persistent deeper work had been rewarded by expansion of the ore shoot to normal size.

The history of the Congress Mine, its remarkable persistence probably due to its association with an intrusive dike of profoundly deep origin and the existence of similar parallel veins in both hanging and footwall over a wide belt, suggested a careful study of the whole situation to determine the feasibility of a broadly planned scheme of exploration by means of a vertical shaft so arranged as to cut the Congress vein at greater depth than has been attained. To cut and explore the other similar veins, many of which if not cut by the shaft could be reached by crosscuts.

#### VEIN SYSTEM

The footwall vein in the Niagara which for some distance strikes nearly east and west and then going west turns to about north 25 degrees west. The dip of the Niagara vein is 40 degrees to the north.

The outcrop of the Congress vein is in the hanging wall about 400' to the north of the Niagara vein. The Congress vein does not turn northward as soon and its western section is only 250' to the north-east of the Niagara vein.

The so called dike vein underlies the Niagara but its outcrop is not shown on the map unless it is what is known as the Risto vein which outcrops on the Golden Thread and Blackhawk Claims. The Dike vein was cut by the 1975' level of the #5 shaft and according to Mr. Staunton it had a good width and average value of \$25.00 per ton. It is probable that the ore from this shoot was mined out and I

can find no further mention of this vein except that it was apparently developed from the surface by the Katherine shaft.

In the hanging wall to the north of the Congress vein there are outcrops including the Surprise and the Incline vein. It is probable that the former was termed the Spur vein by Brooks who claims that this vein was cut by #3 shaft at a depth of 2700' where it came into the shaft from the hanging wall.

The cross ledge which branches off to the northeast from the Congress vein near #1 shaft apparently runs through the Queens of the Hills and Bellick claims.

### EXTENT AND CHARACTER OF MINING OPERATIONS

Pay ore was mined from the Congress vein to a depth of 4,000' on an incline of 25 degrees, and from the Niagara vein to a 40 degree incline, depth of 2,000'. The maximum length of the ore shoot in the Congress vein was 1,800' on the 650' level but here the width of the pay ore did not exceed three feet, while in other portions of the mine the width of the ore was sometimes greater with some stopes having widths from five to fifteen feet.

On the 1700' level on the Congress vein the ore pinched out but came in again at a greater depth.

The lowest levels of the mine from 2500' to 4000' had shown a gradual progressive pinching or contraction of the ore shoots in the Congress vein. However, the situation was different in the Niagara vein where it is indicated that more ore should be found if further exploration is carried to a greater depth than the 2000' level which represented the greatest depth to which the Niagara vein was developed.

The shafts are as follows:

On the Congress vein:	#1 Shaft-----1100 feet deep
	#2 Shaft-----1700 feet deep
	#3 Shaft-----4000 feet deep
On the Niagara vein:	#4 Shaft-----1000 feet deep
	#5 Shaft-----2050 feet deep
	#6 Shaft-----1800 feet deep

On the Queen of the Hills vein a shaft was sunk 200 feet below the tunnel level.

The production of ore hoisted from the above shafts is recorded as follows:

<u>Congress vein</u>	<u>Tons</u>	
Shaft #1	117,899	
Shaft #2	122,779	
Shaft #3	63,524	
Total	<u>304,202</u>	Tons with an average recovered value of 0.7 oz. gold

<u>Niagara vein</u>	<u>Tons</u>	
Shaft #4	20,470	
Shaft #5	191,734	
Shaft #6	81,016	
<u>Total</u>	<u>293,220</u>	Tons with an average recovered value of 0.415 oz. gold
<u>Queen of the Hills vein</u>	<u>Tons</u>	
	20,125	Tons value not stated but apparently slightly less than 0.4 oz. gold.
<u>Combined Total</u>	<u>617,547</u>	<u>TONS</u>

### MINING PRACTICE

For information in this regard I am principally indebted to Mr. Staunton who wrote as follows in 1932:

"The method of operation was like this; starting, say at the 1000' level, in the #2 shaft, the ore was stoped out on both sides of the shaft clear to the shaft, leaving no pillars as they were found to give trouble from uneven subsidence of the hanging wall which unavoidably took place when such large areas were taken out. When this stope, on a sloping line, away from the shaft reached 75' upon the vein - another level was started (the 925 in this case). The stope making the level except for a little cutting into the hanging wall. This new level would advance only as fast as the stope from below made it. When the stope above the new 925 level reached the 850 point, another level was started there - and so on. Each stope practically making the next level above it so that ultimately each level would be, say, 75 feet shorter than the one below it. As the vein varied greatly in thickness it was usually necessary to shoot some of the hanging wall and this constituted most of the stope filling together with hanging wall rock broken in the stope themselves. The high grade ore was usually next to the footwall but nearly always there were high grade stringers in all the ground broken. The mineral was very brittle and high grade. Clean mineral going about 8 oz. gold and while attempts were made to keep split lagging brattices between the working face and the filling, a great deal of fine mineral was undoubtedly blasted into the filling and lost. The footwall was frequently rough and though brooms were provided, their use was frequently neglected.

From this you will see that it is highly probable that much fine mineral and some lumps were necessarily shot into the filling besides what resulted from careless cleaning of the footwall. This may easily have been sufficient to give such average value as to make reworking profitable under modern conditions. For instance, the use of drag scrapers and local separation of the

fine and coarse and perhaps some hand sorting - the reject going directly back into the stope and saving hoisting on all but the rough concentrates.

As to the quantity of filling - there should be at least as much as the ore taken out and possibly more, say, 700,000 tons.

The subsidence of the hanging wall has undoubtedly compressed the filling so that some powder will be necessary to loosen it. This should be far less than in the original mining. A certain amount of timber in the way of stulls to support weak hanging walls will be necessary. How much - only trial can tell."

#### PRESENT CONDITION OF MINE WORKING

The Congress shaft #1 is blocked at the portal and according to all accounts practically all of these workings, the oldest in the mine, are now caved and inaccessible. At intervals during the past few years leasers have tried to open up small sections in which it was reported that good ore had been left. They have been successful in finding and mining small blocks of ground assaying from \$10 to \$20 per ton, but only a systematic and expensive reopening of this portion of the mine could give much data as to the present conditions and prospective ore reserves. The old records show that this shaft had a depth on the incline of 1100' and that 227,899 tons of ore were mined.

Along the outcrop of the Congress vein, going east from #1 shaft toward the Queen of the Hills and west toward #2 shaft some good ore has been left near the surface between "gopher holes" and trenches put down by leasers in recent years. It is presumed only a shallow surface sill of ore was left above the old stopes.

On the 650' level a long drift was started to connect the workings from #1 shaft with those in the Queen of the Hills section. The old miners who worked in this area claim that this drift followed some excellent ore (0.5 oz.) for a long distance and also cross cut some promising veins that were never mined. It is probable that their recollection of values is exaggerated for Mr. Staunton was too good a miner to pass up ore such as this. It is highly probable that one of these lost veins could make ore today.

The Congress number two shaft was partially reconditioned some time during the 20's and again by the Congress Mining Corporation who used it to pump out the stored water in the mine. The shaft which is on an incline of about 25 degrees is now open down to the 1150' level at which point the water now stands. At one time during 1939 or 1940 number two shaft was dewatered to the 1925' level.

On the 1075' level caves blocked both the east and west drifts a short distance from the shaft. On the 1000' level low grade ore was observed in the stope fills for several hundred feet east and west of the shaft. On the 925' level at a point 300' west of the shaft a sample cut of 3 feet assayed 0.26 oz. gold (\$9.10 per ton). This sample was cut in a lengthy section of unmined vein material. The 1000' level connects with the #3 shaft to the west but several caves block travel through it at the present time.

From the 925' level up, the drifts are nearly all caved except for the 800' level which can be entered for a short distance to the east and here the stopes are large and well filled with gob which looks like fairly good ore. Above the 800' level the drifts are caved but in several places dry walls were observed that would do credit to any mason.

Congress #2 shaft was sunk to a depth of 1700' and connected to number three shaft on the 1000, 1150 and 1700 foot levels and again by a winze from the 1700' level to the 2525' level. The tonnage hoisted through number two shaft was 122,779.

Shaft #3 was the last working shaft on the Congress vein and is 8 feet high and 12 feet wide on an incline of 25 degrees to a depth of 4000'. It follows down a long-well defined hanging wall on which the gouge seems to merge into the Congress vein at depth. This shaft is blocked by a cave at the 1100' level, but above that it is in good condition and could be placed in operating condition without too great expense. It is well timbered with Oregon Pine and most of the timber is in good condition.

The 1000' level was not driven to the west but going east it is passable for over 500 feet. Here the vein follows the dike which is sometimes included in the vein and sometime lies on the footwall or hanging wall. The vein itself shows quartz and sulphides and from the small amount of stoping that was done - this section must have been off the ore shoot or low grade material.

The 650' level extends only a short distance west, but to the east there is 500' of open drift. At 500' east the vein is narrow and mixed with wall rock and a sample from four feet of vein material assayed only 0.03 so it is obvious the old operators recognized this as waste.

Should the mine be reopened for recovery of the low grade ore and stope fills it would be logical to use number three shaft as the main haulage shaft for the Congress and use #2 shaft as a second entrance. Although I believe no one has been below the 2000' level in this mine for over 30 years (1940), it is probable that most of the workings with their walls of hard granite would still be found in fairly good condition. The tonnage hoisted through #3 shaft was 63,524 of which most came from below the 1700' level.

The shafts along the Niagara vein are all in granite and the inclines are about 40 degrees which is steeper than the 20 degree dip of the Congress vein.

The #4 Niagara shaft is caved solid at the collar, but the workings are connected to those from #3 shaft on the 1400' level on the Congress. The number four Niagara shaft was sunk to 1000' and produced 20,470 tons of ore.

There are three number five shafts; "New #5", "Old #5", and "Oldest #5". The "New #5" is opened out around the collar by what appears to have been a small glory hole. The reason for which is not clear. One can get down about 200' on the rather steep incline and here it is blocked by a cave. None of the drifts on either side of this shaft can be entered although the long west drift on the 150' level which was used for haulage to the mill might be opened without too much work

as I noticed that a strong current of air passes through it.

The vein is well defined in this shaft and mostly quartz with a little sulphide. To the eye it looks to contain good ore with a width of 3' to 5' and is sometimes pretty well frozen on the granite. It is reported that there is still a lot of stoping ground left near the shaft aside from the pillars which will probably run 0.3 to 0.4 oz. No great expense would be involved in reconditioning this shaft - or cleaning out the caved ground mentioned, although there is likely to be other barriers at greater depths.

Old #5 shaft was entered from an adit since some work was recently done here by leasors who mined a little \$15.00 ore. In this shaft it was passable to the 700' level but was caved towards the main #5 shaft. Only small sections of the Niagara vein could be examined but the true width appeared to be 3' to 6', often fingering out in quartz stringers into the granite walls.

The oldest #5 shaft is caved solid at the collar.

The new or main #5 shaft was sunk to a depth of 2050' on a 40 degree incline. It is the only shaft needing reconditioning in the event the Niagara vein is mined. The tonnage hoisted through the main number five shaft was 181,734 and the remaining tonnage of stope fills should be proportionately large.

Number six shaft is caved at the collar but on one of the lower levels, thought to be the 400' level, there is a drift into the MacDonald (Golden Key) mine workings which was opened a few years ago when that mine was pumped out. The ore and stope fills in this west end of the Niagara vein could best be recovered through a crosscut haulage drift driven from the footwall of the Congress vein at some point near the #3 shaft.

The number six shaft was sunk to 1800 feet on a 40 degree incline and the tonnage hoisted through this shaft was 81,016. According to Mr. Staunton the ore was cut off by a fault at the west ends of the stope but the displacement is not too great for sections of ore have been found to the west on the adjoining property.

The main tunnel in the Queen of the Hills workings is caved at the portal and entrance to the workings can be made through an upper tunnel probably on a faulted eastward extension of the Congress vein. The shaft and stopes from the lower level are now inaccessible and the small stopes on the upper levels which were open produced some \$20.00 ore.

In this section of the mine the general opinion is that there is a large tonnage of new ore that could be mined to advantage in addition to reclaiming to stope fills. The main shaft of Queen of the Hills was sunk to 200' below the lower tunnel level and produced 20,125 tons.

There are a number of other shafts and adits on the property, all of which are more or less caved.

## OLD MILL TAILINGS

According to the records of the Congress Mining Company there were sent to the dump during its period of operation (from 1895 to 1911), a total of 617,542 tons of mill tailings. Of these, 66448 tons were run out directly from the tables and vanners which followed the stamp and had an average assay of cyanide 0.25 oz. gold per ton. The balance 551,094 tons, were milled in the plants and the average assay was 0.063 oz. gold per ton.

It would appear that in 1911 the tailings dump contained 607,342 tons containing 44,786.122 oz. gold. The silver content of the tailings from recent assays was about 0.4 oz. per ton so on this basis the dump would contain 247,016.8 oz. of silver.

The average assay of gold or 0.063 oz. and silver of 0.4 oz. is equivalent to a gross value of \$2.56 a ton at present metal prices.

During 1937 to 1942 approximately 450,000 tons of the old tailings were remilled in a cyanide plant and about 150,000 tons of the original tailings remain to be retreated.

## THE MINE DUMPS

Dumps of low grade ore and waste rock were made by the old company near the collars of each of the seven principal working shafts. During recent years some of the best of this material has been sorted or screened and treated by various parties.

In 1938 the management of the Congress Corporation became convinced that some dump rock should be mixed with the mill tailings to improve recovery and increase the tonnage treated in their mill. Since this plan involved considerable expense for crushing and other equipment - a comprehensive sampling of the dumps was made for the first time by the company. In carrying out this procedure numerous pits were dug in the sides of the dumps from which ore ton samples were taken and these were carefully crushed and quartered down for assay. In a few cases representative lots of from 20 to 50 tons were sent directly to the mill as check samples. The detailed results of this work will be noted in connection with the individual dumps, but the general result was an estimation that over 400,000 tons of dump were available with an average assay of \$3.84 in gold per ton.

To further check this estimate, the company employed Henry G. Carlisle, Consulting Engineer of San Francisco. He repeated the previous procedure by digging smaller pits in other portions of the dumps and taking smaller samples which averaged only 100 pounds each.

Carlisle's report confirmed the company's estimate of tonnage but reduced the average grade to slightly less than \$3.00 per ton. This is about the average value I obtained in a number of smaller check samples taken sometime later.

The physical character of the dumps and the great variation in the size of fragments composing them makes it very difficult to hand or pit sample them with

any degree of accuracy. Therefore, I consider that the best and most reliable source of their value is obtained from the mill records of the Congress Corporation which treated 106,629 tons of dump rock from 1939 to 1942. While assays of the dump rock were not properly segregated from those of the tailings indications are that the average value of the dump rock treated was well in excess of \$3.00 after sorting out from 10 to 15% waste rock.

In estimating the remaining tonnage, which is very difficult due to the irregular contour of the surface, it is estimated that 250,000 tons of dump material remains for retreatment.

Details of the dumps are as follows:

#### DUMP #1 (Congress Vein)

Originally this was a very large dump extending west and northeast from #1 shaft and divided into at least four sections. Three of which have been largely reclaimed so that only irregular fragments now remain from which some 6,000 tons of rock might be taken. These sections were largely worked by the Wymans and Jay Burns, and they are reputed to have assayed \$6.00 or better per ton.

The main section located in a gulch was worked by the Congress Corporation and the upper portion was scrapped off with a bulldozer into a trap which is still in fair shape. My calculations indicate that about 12,000 tons should still be reclaimed and this figure is confirmed by Ramsden. Carlisle's sampling averaged \$3.00 per ton for 21 samples. Liddell took 20 samples which averaged \$3.72 gold and 0.02 oz. silver.

The Congress Corporation appears to have milled approximately 50,000 tons of rock from this dump which is reported to have averaged over \$3.00 per ton.

From all the above and considering that the remnants of the smaller sections of the dumps are doubtless higher grade than the main section, it would seem safe to estimate that in #1 dump there are still 18000 tons that will average after sorting close to \$3.50 per ton - plus 10¢ silver.

#### DUMP #2 (Congress Vein)

This was a very large hillside dump with a maximum height of over 80 feet. A portion of which were screened out and treated by the Wymans and Jay Burns. The total tonnage taken from the original dump has probably been 40,000 but the Congress Corporation milled no rock from here except for a test lot of 50 tons which is reported to have run slightly higher than the average of their samples. Calculations of the remaining tonnage place this at 90,000 tons of sorted ore. The road to the dump is good and reclaiming should be easy.

The average grade as first determined from 28 samples taken by Liddell was \$3.76. When Carlisle checked this with 22 samples, his average was only \$2.84 which checked closely with my own grade samples. Adding the value of the silver the gross value should be very close to \$3.00. The haul to the mill is about 600 yards.

### DUMP #3 (Congress Vein)

Dump #3 was reclaimed to some extent by Burns and the Congress Corporation merely treated some of his screenings which had been left near by and which are said to have carried \$7.00 per ton. The contour of the dump is very irregular and in calculating the tonnage I have been conservative in placing it at 80,000 tons.

Liddell's average of 30 samples was \$3.45 and Carlisle apparently did not sample this dump so that we do not have as much data as in the other cases. My own grab sampling of this dump was done twice and the average results were only \$2.28 and \$2.00 but I carefully noted the pits which had been made by Liddell and his results should have been much more accurate than mine. Moreover it is hardly likely that Jay Burns would have treated so much rock from this dump when all of the dumps were still intact unless he had found it to be at least equally as rich as the others.

Many of the fragments in my samples were barren granite and diorite, some of which would normally be sorted out on a picking belt and I think that I am conservative in estimating the average value at \$2.50 per ton. Reclaiming this dump will be comparatively inexpensive but the rock will have to be trucked around the point of a hill to the mill site - a total distance of about 800 yards.

### DUMPE #4 (Niagara Vein)

The #4 dump is small and locally is supposed to be rich, but Liddell's 19 samples averaged only \$3.50 and my samples assayed somewhat lower. None of this rock was milled by the Congress corporation.

The length of the dump is 186' with axis N. 15° E. but at the top it is in places - only 6' wide and elsewhere the surface rocks project up thru it so that the tonnage is very difficult to figure. An estimate of 5000 is conservative. Some portions of this dump would be hard to reclaim, unless they could be sluiced down the very steep hill. The haul to the mill is about 800 yards.

### DUMP #5 (Niagara Vein)

The dump originally contained over 100,000 tons and since I am reliably informed that the surface beneath it is a gulch, I accept the estimate of the remaining tonnage made by Rockwood and Ramsden as 50,000 ton of sorted ore. Like Dump #2 the present contour is most irregular.

The average of 10 samples taken by Liddell was \$3.97 while the 19 samples taken by Carlisle averaged \$2.80, and my grab samples averaged \$2.60. 40,000 tons of rock was drawn from here as was from #1 Dump at the time that they closed down.

I have found records which showed that much of the material milled from here assayed \$4.20 per ton and Rockwood and Ramsden are both very positive in estimating that the average grade was over \$4.00 and that the remaining rock should be equally good. However, these statements do not seem to check with the general mill records. However, in all probability it is of somewhat higher grade

than #2 and #3, I think it safer to figure the average at \$3.50.

The upper part of the dump was mined with a power shovel which loaded the rock directly into trucks while the lower portion on the south side was scraped by a bulldozer to a trap which is now in poor condition. The haul to the mill is about 500 yards.

#### DUMP #6 (Niagara Vein)

The larger portion of this material was piled on the Rose Quartz and Los Senate Claims which do not belong to the Congress Company. The greater part of the rock that was on the Why Not Claim of the Congress Company was reclaimed with a drag line and treated by the Congress Company to the extent of about 4,000 tons. It does not appear that more than 2,000 tons remain to be taken from the Congress ground, although probably 8,000 to 10,000 tons are still left on the adjoining property. The average grade of recent shipments made by Findley to the Hayden Smelter was \$7.80 per ton. I was told that the material taken out by the Congress Company was not so good, but averaged over \$5.00 per ton which is the value that I place upon the remainder which I did not sample on this occasion although I had done so some years ago. The haul to the mill is about 1000 yards.

#### QUEEN OF THE HILLS DUMP

Five samples taken by Liddell averaged \$2.10, but Carlisle's lot of 11 samples averaged \$5.07 which does not check unless they represented two different dumps as there were originally 3 or 4 of them. My samples from the largest of the remaining dumps ran \$4.20, and I have estimated the grade at \$4.00.

My estimate of tonnage in the Queens Dumps is 5,000 which will be rather expensive to reclaim. The Congress Mill appears to have treated about 12,000 tons concerning the grade of which I could obtain no details except that according to Ramsden, it was richer than the average. The haul to the mill is over 1200 yards.

Concerning all of the dumps it may be said that appearances indicate that the material is largely a mixture of quartz and pegmatite, both of which doubtless carry good value. Granite and diorite which look to be practically barren except as they are enriched by little veinlets or seams of quartz and sulphide that are scattered through many of the fragments.

The value of the dumps is therefore largely dependent on the relative percentage of waste rock to low grade ore and this varies in each of the dumps and in different portions of the same dump so that sampling is very difficult and it seems to me quite remarkable that the pit samples taken by Carlisle and Liddell should have been so closely checked and generally improved upon by the mill runs which constituted by far the most accurate sampling.

A summary of my estimate of the most essential data concerning the dumps is shown in the following summary:

SUMMARY OF DATA REGARDING CONGRESS DUMPS

<u>DUMP</u>	<u>Estimated Gross Tonnage 1937</u>	<u>Average Grade of Pit Samples</u>		<u>Record of Rock Milled by Congress Corp.**</u>	
		<u>Liddell</u>	<u>Carlisle</u>	<u>Approx. Tonnage</u>	<u>Value Per Ton</u>
#1	75,000	\$ 3.72	\$ 3.11	50,000	\$ 3.00+
#2	105,000	\$ 3.76	\$ 2.84	None	
#3	100,000	\$ 3.45		None	
#4	5,000	\$ 3.45		None	
#5	100,000	\$ 3.97	\$ 2.80	40,500	\$ 3.50+
#6	7,000	\$ -0-		4,000	\$ 5.00+
Queen of the Hills	20,000	\$ 2.10	\$ 5.07	12,000	\$ 4.00
	<u>412,000</u>	<u>\$ 3.84</u>		<u>106,500</u>	<u>\$ 3.00+</u>

\*\* Allowance of 20 per cent for material to be sorted out.

<u>DUMP</u>	<u>Estimate 1943 Remaining Tonnage</u>	<u>Approximate Grade of Sorted Rock</u>
#1	18,000	\$ 3.50
#2	90,000	\$ 3.00
#3	80,000	\$ 2.50
#4	5,000	\$ 3.00
#5	50,000	\$ 3.50
#6	2,000	\$ 5.00
Queen of the Hills	5,000	\$ 4.00
	<u>250,000</u>	<u>\$ 3.00</u>

MINE FILLS (GOB)

From Mr. Staunton's description of the method of mining given on previous pages of this report, the reasons for the existence of so large a tonnage of gob and for a logical assumption that it has a high value will be evident.

The pay streak in both the Congress and Niagara veins usually were three feet wide but in order to permit economical mining -- the stopes were intentionally broken to approximately double that width and at times, due to the brittle character of the hanging wall, the width was even considerably greater.

Insofar as can be learned from the records and from personal examination of the accessible workings of the mine, all of the stopes were back filled and this back filling is still in place. It may be that below the water level much of this gob will be compressed and re-cemented as Mr. Staunton suggests. This is not the case

in any of the stopes which I was able to inspect for in most stopes the gob still would flow freely when moved.

The maps of the underground workings give a general idea of the extent of the filled stopes in which my very rough calculations confirm Mr. Staunton's estimate of about 700,000 tons. It is not possible at present to determine whether all of this material could be economically reclaimed.

Since 1934 various engineers, including Mr. Colburn and Mr. Ramsden have taken many samples more or less at random and these, they have told me, averaged well over \$5.00 per ton.

In 1939, Carlisle took 7 samples on an unidentified level of number 2 shaft (Congress vein) the poorest of which ran \$1.40 while the highest ran \$8.56; the average being \$4.05. From the 1000' level in number two shaft, six gob samples were taken and varied from \$21.10 to \$10.03 and averaged \$6.49 per ton.

Seventeen samples taken from the gob in stopes on the Niagara vein assayed \$1.51 to \$9.45 and averaged \$4.96 per ton.

One sample taken from gob in the Queen of the Hills workings assayed \$7.35 per ton.

I think it fair to say that present indications point to an average value of \$5.00 per ton, particularly when it is considered that the highest grade material is in the fines which were left on the floor where it was not likely to be included in any of the samples.

From samples taken to date all of the gob s can be considered probable ore and could be recovered cheaply by the use of slushers and scrapers. Some underground sorting would seem to be advantageous while the final cleaning of the floors of the stopes on which the high grade fines have concentrated might possibly be accomplished by sluicing as is done in hydraulic pits.

With the mine reopened and equipped for operation it seems that \$1.00 per ton would be a very liberal estimate of the average cost of reclaiming this gob material and placing it in the mill. Its character is very similar to that of the sump rock and it would appear that treatment by flotation and cyanide should recover 85 percent of the gold and silver values. A very substantial amount of profit is indicated to be represented in the old mine fills.

#### PILLARS, SILLS AND LOW GRADE ORES

Except in the immediate vicinity of the shafts and main levels, it is unlikely that any substantial pillars or sills of high grade (\$20.00) ore remains in any part of the old workings and while small portions of these may be recovered when drawing out the gob, it does not appear that enough tonnage would be recovered to warrant the estimation of this tonnage.

The situation in respect to low grade ore is very different for in previous operations - every effort was made to keep up the average grade of production and with the gold price at \$20.00 per oz., no vein material containing less than 0.35 oz. gold per ton was intentionally mined.

According to the statement of previous operators, particularly Mr. Staunton, there was a very large but undetermined quantity of low grade ore partially opened up in many places of the mine, especially at the ends of the higher grade ore shoots. It was never developed and no measurements or sampling were done. To quote Mr. Staunton in substance:

"Just as soon as the grade of the vein fell to \$7.00 (0.35 oz.) we dropped the stope and went elsewhere or, if we had to go through it we left the below \$7.00 material in place."

That several remaining sections of the vein did contain such low grade is undoubtedly a fact, and this has repeatedly been emphasized by Mr. Staunton - although he had always refused to make any estimate of tonnage or average grade.

During my recent examination of the accessible workings of the mine, I noted many sections of the vein adjoining the filled stopes where ore was left, had similar appearance to that which was left in the pillars. The only difference was that the ore left contained less sulphides and was therefore undoubtedly lower grade. Elsewhere the character of the vein was different, being deficient in quartz and still less sulphides and this material from samples taken would indicate that it would not be ore classed as ore even at the present gold price.

In the upper levels, leasers, working during the past few years have mined and are still mining ore assaying from \$10.00 to \$20.00 per ton. In many of these workings it appeared to me that a considerable tonnage could still be mined if it were possible to obtain a profit on \$7.00 ore.

Messrs. Colburn and John Price have told me that they have taken many samples of vein material which assayed better than \$10.00 per ton. Percy Ramsden claims to have taken some 300 samples of ore remaining in the Congress vein between #2 and #3 shafts from the 1000' level to the 1925' level and these samples averaged better than \$8.00 per ton.

The above material to which I refer is sufficiently developed to be classed as positive ore or at least highly probable. Unfortunately it has never been systematically sampled or measured. Such a program is not now possible as the mine is flooded to the 1100' level. However, some resampling of the low grade ore for a moderate expense and in my opinion, should be well worth while.

As to any estimate of tonnage and value, this can be at best, merely a guess. However, from what I have been able to see and learn from others, who were familiar with the old workings and from the study of the maps, I think that it is a very conservative estimate and a strong probability that there remains 200,000 tons of \$8.00 ore to be mined within the limits of the old workings.

Fortunately any work done to determine the character and value of the gobs and low grade ore would also throw a great deal of light on the possibilities of finding entirely new ore bodies.

this value (my sample from the Congress Vein on the 925' level ran 0.26 oz.) and while no data is available to permit an estimate of the tonnage or value, I am confident that the tonnage of \$8.00 ore will exceed 150,000, but here again, much further investigation is required.

#### POSSIBLE ASSETS NOW INDICATED

##### New ore to be developed by additional exploration.

Both Staunton and Brooks who will also be quoted at length in my report, express very firm opinions that new ore will be found and indicate locations where it should be sought. Such was also the opinion of Colburn, and my own work has left a similar impression.

If the theory of vein structure advanced by Brooks should prove to be correct some 450,000 tons should remain in the unworked sections of the Congress and Spur Veins.

Staunton, Colburn and others were impressed with the probability of finding ore east of the main fault especially in the Queen of the Hills Section, and my opinion of this area is also very favorable.

No careful study of the geology and ore structure outside of the main workings appears to have been made in the past and the result of such a procedure after the old workings have been made more accessible, might be very important and lead to discovery of new ore some of which might be comparable to the old production in value while I feel that there is every chance that at least 200,000 tons of \$10.00 ore would be found in the extensions of the shoots.

## NEW ORE POSSIBILITIES

Obviously the management of the Congress Mine did not intentionally overlook any likely ore prospects in the 20 years they actively operated - nor did they close down until they were convinced that continuance of operations would no longer be profitable. Almost from the very start the mine was well financed and managed by able men who adopted the most improved methods of mining and milling. However, it does not appear that at any time did they give a great deal of attention to economic geology, nor did they ever employ a geologist of recognized standing to survey the mine and possibly suggest new areas for exploration.

Mr. Staunton and his successor, Mr. Meade Goodloe, were unquestionably the most skillful and efficient mine managers of their time but work was guided by experience and intuition, rather than scientific theory. In following down the ore shoots in the two main veins, their problem was relatively simple but they left, unsolved, the faults at both ends of those veins between them they may -- as Mr. Staunton readily admits, have overlooked a number of blocks of ore dislocated by many minor faults.

As to the numerous off shoots of cross-veins and which in aggregate produced a large tonnage including some of the highest grade ore, it seems that these were usually developed by following only the most promising of the many stringers of quartz which branched from the main vein into the hanging wall. Some of these cross-veins proved to be barren but Mr. Staunton has told me that he now thought that they should have followed a large number of these cross-veins.

Messrs. Brooks and Colburn were also much impressed with the possibilities of further exploration in the hanging wall and such is my own opinion although it is obviously very difficult to draw any conclusions at present when so much of the underground workings cannot be examined and the outcrops of the veins are often covered with buildings or surface dumps.

Mr. Staunton has particularly recommended that exploration should be conducted at a greater depth below #1 shaft on the Congress vein and near the 1700' and 2500' levels from #2 shaft. He well remembers a large body of low grade ore was left in this area. This is the area mentioned as being sampled by Mr. Ramsden.

Mr. Staunton does not believe any large new ore body in or near the Congress vein will be found below the 3000' level as this area was very thoroughly explored with disappointing results. He does think however, that additional ore may well be found on the upper levels of the Congress vein. His theory was that the Congress vein was mineralized from a quartz cross-vein from which solutions followed along the fissure formed by the intrusive dike where chemical conditions were favorable for the deposition of metals.

In regard to the possibilities of further discoveries of ore in depth on the Niagara vein, Mr. Staunton is more optimistic and regarding the general problem of future exploration has written as follows:

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"Underlying the Niagara vein, which strikes east-west and dips about 40 degrees there is a greenstone dike with a slightly different strike and with a dip of 25 degrees. This dike is almost identical in character with the Congress dike which carried the ore in the mine. The Niagara vein intersected this dike at about the 1975' level in the extreme easterly part of the mine close to the big fault. The dike was heavily mineralized at the intersection and the ore in the dike was the same character and grade as in the Congress vein. This high grade ore extended east to the big fault - where it was cut off. To the west, the work was first confined to the dike, but as the distance from the intersection increased, the grade became lower. Crosscuts were then run into the hanging wall of the Niagara vein and thereafter all work to the west was done on the Niagara vein. The line of the dike and the Niagara vein intersection runs downward to the northwest.

The #5 Niagara shaft is an incline on the vein and its course happens to coincide closely with the course of the dike and the Niagara vein intersection. It seems highly probable that a new line of high grade stopes can be opened by sinking the #5 - Niagara shaft below its present depth of 2050 feet. The 1900' level is connected to the Niagara #4 shaft, located 700 feet to the west. This would provide good ventilation. Sinking of this character is comparatively cheap as it amounts to little more than running a drift on an incline. The little water encountered may be readily bailed.

On the surface, about 200 feet west of the Congress #1 shaft, a vein entirely in the granite and locally known as the "cross-vein" intersects the Congress dike vein and the position of the Congress ore shoot roughly corresponds with the line of intersection of these two veins. The part of the "cross-vein" in the hanging wall of the Congress vein had considerable stoping ground, the footwall section had less ore. The "cross-vein" ore pinched out or was lost as it approached the big fault. In other sections of the mine in this area heavy bodies of high grade ore were cut off cleanly by the fault.

It was thought at one time that we had found the measurements of the throw of this fault on the 650' level. The east drift on the "cross-vein" encountered the fault and after going through about 40 feet of fault breccia, a vein, looking like the Congress vein was found. However, the vein at this point did not make ore.

The existence of the big fault and the fact that in several cases good ore was cleanly cut off by it - naturally suggests that ore of comparable size should be found to the east of the fault. Work done with that in view was not successful as it was not carried far enough.

My recollection is that on the 3125' and the 3200' levels and perhaps the 2750' level in the #3 shaft, something was found east of the fault that looked like the Congress vein. If this is true it would indicate a much less throw on the fault than on the surface."

In 1917 the Congress Mine was examined by Edward W. Brooks, a geologist, from Los Angeles. He concluded that the veins were what were termed the "pegmatite type" and the gold was almost entirely associated with arsenical pyrites. He considered that the mine was worked out (at the old price of gold) down to the limits of the workings, with one very important exception. Mr. Brooks stated that the length of both the Congress and Niagara veins was 3500 feet within the property lines which probably represented their extreme limit of the pay ore but he refers to an upper - or spur vein which had a length of 1500 feet within the property. He also states that all ore shoots pitch to the north in all veins.

Brooks then went on to recommend that future development should be undertaken from the #3 Congress shaft and concentrated on the exploration of the Congress vein below the 1250' level and work should be done on the spur vein from the surface down to the 2700' level where it intersected the Congress vein. As no work was done on the spur vein - he reasoned that the spur vein was still virgin ground and that a similar condition should maintain below the 2700' level in the Congress vein. His recommendations were based on the belief that the vein encountered in #3 shaft at the 2700' level must have been the Spur vein and not the Congress vein because it came into the shaft from the hanging wall. Brooks calculated the unworked sections of these two veins should contain some 300,000 tons (allowing an average width of 3 feet) and that this ore should have an average value of 0.6 oz. gold per ton. This is based on a diamond drill hole which cut the vein.

In event the mine is reopened and pumped out to the 2700' level this matter should be carefully reconsidered and in the meantime some further inspection should be made of the surface outcrops of the spur vein.

Mr. Staunton further adds that across the Bellick and Queen of the Hills claim and extending over the MacDonald claims - to the west, there is a wide mineralized dike which is reported to carry gold values of 0.1 oz. and better along the surface. If these values can be substantiated a very large tonnage of ore susceptible to cheap mining could be developed.

Insofar as records show no systematic diamond drilling was ever done on the property and from recent analysis of the property - the lack of diamond drilling could very well be the reason many new ore bodies are left to be found.

#### CONCLUSION AND RECOMMENDATIONS

Considering the risks which are involved in any mining enterprise the expected profit from the treatment of the tailings and dumps, classed as positive ore would be insufficient to make the venture attractive. However, in this case it

serves to eliminate nearly all the risk excepting that which depends on the price of gold. Retreatment of the tailings and dumps should insure the return of initial investments even if all further investigation and exploration should be entirely disappointing.

In the category of "probable ore" I have placed the mine fills and a certain amount of low grade ore left by former operators. The tonnage and grade of both these classes of materials has been fully discussed in the body of this report and more accurate information can only be obtained by further investigation.

Should these investigations confirm the existing indications the additional quantity of ore which could be classed as positive or highly probable should amount to from 800,000 to 1,000,000 tons with an average grade of about \$6.00 per ton. A large percentage of this material would consist of broken ore in the form of mine fills and mining costs would be relatively low. Immediately after the above confirmation of the ore values and tonnages in the gobs and low grade areas, plans should be drawn up for the construction of a mill of at least 500 tons daily capacity.

The possibilities noted in the above paragraph make this venture attractive and while the future possibilities of the mine are still too nebulous to justify any figures, I think that there are reasons for believing that upwards of 500,000 tons of additional ore may be developed. Should the grade of the additional ore be only \$11.00 per ton or one half as good as the ore that was mined in the past, a net profit of over \$3.50 per ton should be easily earned from its exploitation.

If the property is to be acquired at all, it should be done in the very near future even though this will involve some risk in respect to the economic position of gold after the close of the war.

In attempting to fairly evaluate both the favorable and unfavorable facts of the Congress Mine I have reached a firm conclusion that this presents an exceptionally favorable mining venture. On that basis I strongly recommend that the property be acquired and that plans be made to resume mining and milling as soon as conditions will permit.

Very truly yours,

G. M. Colvocoresses

copy

GEORGE M. COLVOCORESSES  
MINING AND METALLURGICAL ENGINEER  
1102 Luhrs Tower  
Phoenix, Arizona

July 6, 1943

PRELIMINARY SUMMARY OF RESULTS OF CONGRESS MINE  
INVESTIGATION

Mr. E. D. Morton  
Eagle-Ficher Mining Company  
P. O. Box 1268  
Tucson, Arizona

Dear Sir:

This work was undertaken at your request in May and has been carried on intermittently since that time.

Believing that you may now wish to have a record of its progress to date I have prepared the following preliminary report giving data which will be amplified and supported later, but meantime may prove of interest in determining your future policy and program.

FINANCIAL AND LEGAL STATUS

The Congress Mine is owned by the Congress Mining Corporation, organized under the laws of Arizona with authorized capital of 500 shares of no par value stock of which Nathaniel Holmes II owns 375 shares. This company still holds title to the Congress Group of 19 patented and 12 unpatented mining claims, (about 450 acres) with all improvements, but the control of same is now in the hands of C. M. Rockwood, Receiver appointed by the Federal District Court who is represented locally by Robert Rae of Phoenix.

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A mortgage on the real property and a chattel mortgage on equipment are both held by the Reconstruction Finance Corporation to secure a loan and have been foreclosed by an action in the Federal District Court. A sale of the property to satisfy the judgment may be ordered at any time, but Rockwood and his Attorney are anxious to postpone such a sale in the hope that a settlement can be arranged. Advances on account of this loan were made from July 1937 to May 1938 when the final principal was \$140,000 bearing interest at the rate of 6% per annum. Since then \$70,000 of this principal has been repaid, but since the accrued interest now amounts to \$15,000 the total claim of the R.F.C. is about \$85,000 plus some legal expenses which should aggregate less than \$1,000. The Receiver has at present some \$6,000 in the bank but he is meeting the carrying charges which must amount to over \$500.00 per month.

The Congress Mining Corporation owes Holmes about \$30,000 secured only by promissory notes and in so far as I can learn it has no other corporate debts.

Should the property be sold thru the foreclosure proceeding, the Corporation will have a period of six months in which to redeem and it is presumed that Holmes is financially able to effect this redemption, but apparently unwilling to do so. He is reported to be a man of very peculiar character and has no knowledge or experience in mining or metallurgical matters and is personally very bitter against Rockwood and the R.F.C.

HISTORY AND GENERAL DESCRIPTION

The Congress Mine was developed by six main shafts the deepest of which (#3) was sunk 4000' on the incline and altogether there are said to be some 20 miles of underground workings, which are now under water from the 1200' level.

There are two principal veins, the Congress and the Niagara, nearly parallel and some 300' apart both striking in an easterly - westerly direction and dipping about 25° to the north or northeast. The width of the Congress vein which lies on the contact with the granite and a diorite dike varied from 3 to 5', and of the Niagara Vein, a fissure in granite, from 4 to 8' the length of the pay shoots along their strike never exceeded 650'. The walls of both veins were well mineralized and since the stopes were usually broken 5 to 12 ft. wide, lower grade material which would have pulled down the average grade of the vein-ore was either backfilled in the stopes or hoisted to the dumps along with the waste that was broken in the barren sections of the vein and in openings in the country rock.

The old Congress Mining Company operated from March 1891 to the end of 1911 during which period they mined and milled or shipped 692,332 tons of ore from which 388,477 oz. of gold and 345,598 oz. of silver were recovered in bullion. The production from the Congress Vein is given as 370,022 tons with average recovered value of 0.70 oz. per ton and the production from the Niagara Vein is given as 293,220 tons with recovered average 0.415 oz. per ton. The balance came from

the Queen of the Hills, or other veins. The average values recovered from the total output figures (a) 0.561 oz. gold and 0.5 oz. silver. Considering the values which were left in the tailings or otherwise lost in treatment it is safe to say that the average content of this ore as mined was 0.64 oz. gold and 1.00 oz. silver equivalent to a value of over \$23.00 per ton at present prices of metals.

#### RECENT OPERATIONS

In 1935 the property with the then existing improvements was sold for \$26,000 to Gerald Sherman and Associates who organized the Congress Mining Corporation.

At that time the equipment on the property had a very trivial value. The mill tailings had been carefully surveyed and sampled on several occasions and were conservatively estimated to represent 426,200 tons with an average assay of 0.07 oz. gold and 0.3 oz. of silver (gross value \$2.65) per ton.

The mine dumps which were subsequently measured and fairly well sampled on two occasions, - once by the management and once under the direction of Henry G. Carlisle of San Francisco, - represented 400,000 tons (after allowance for sorting some waste) with an average value of \$3.00 per ton in gold and silver. The condition of the Mine, including the fills, was practically the same as at present, except that many of the workings which were then open for inspection are now caved.

Subsequent operations of the mill in treating nearly two thirds of the old tailings and over one quarter of the dump rock (representing from 15 to 60% of each of the five principal dumps) has indicated that both of these estimates of value were conservative and that the

assay value of the remaining tailings can safely be placed at \$2.70 per ton with a reasonable assumption that the remaining dumps, after sorting out about 20%, will average at least \$3.00 per ton.

The new company proceeded to erect some new buildings, and a 300 ton counter-current cyanide mill with power plant and accessory equipment. This Company operated its mill from June 1st, 1938 to June 14, 1942, during which period it treated a total of 385,503 tons of material of which 276,372 came from the tailings pile, 106,629 from the mine dumps, and 2,402 from shipments of ore by leasers working in the Congress Mine or from custom shippers.

The total capital investment made by the Congress Mining Corporation, including the \$170,000 borrowed from the R.F.C. and Holmes, and operating profits which were reinvested in equipment, etc. is stated by Rae to have been in excess of \$250,000. It is my opinion that a substantial portion of the money was wasted, but it would thus appear that the total profits of the operation must have exceeded \$150,000 of which \$70,000 was used to reduce the principal of the R.F.C. Loan and over \$80,000 reinvested as above.

Apparently Rae does not have any complete record of the gold and silver content or the value of the production, although he has promised to try to calculate this for me at a later date. No segregation of the mill head assays from the tailings and dumps was made on the Congress books, but I have checked over a great many partial records of results mainly during 1940 - 1941 and from a careful study and analyses of these I mention the following

The recovered value of 51576 tons of tailings and 37,913 tons of dump rock treated in 1940 averaged \$2.03 in gold and silver. In 1941, 97,927 tons of tailings and dumps were treated (segregation not given) with a recovered value of \$2.60 per ton. Taking the average gold recovery as 67% and silver recovery as 50% these returns indicate that the mill heads averaged respectively \$3.00 and \$3.60 or say better than \$3.30 for these two years. These figures check fairly well with the monthly mill records which were fairly complete for this period, and from which I have also concluded, - from data which is not so means complete, - that the average grade of the tailings and dumps, which varying widely during different months was on the whole fairly uniform with some advantage in favor of the dumps.

This record is particularly interesting when compared with the previous estimates of value which I have quoted above. Since it does not seem possible that the operators could have effected any selection of the better grade material in reclaiming the tailings and the same is true to a lesser extent in respect to the dumps, I believe that one is fully justified in assuming that the mill record is by far the most accurate measure of the average value of this material and in now estimating the remaining one third of the original tailings at \$2.70 and the remaining dumps at \$3.00.

The incomplete records further indicate that an average recovery of 67% of value was made in the mill and which would represent about \$2.30 per ton from the 383,000 tons treated, and an operating profit of \$150,000 would average a little less than 40¢ per ton and indicating that the total costs were around \$1.90 per ton although I was told

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verbally by Rockwood that the costs including interest and all overhead expenses were "between \$1.25 and \$1.50 per ton", which appears to be a contradiction. The profit for the year 1941 was given as \$50,000 and from the definite figures for tonnage and returns for that year it seems that the total cost of treating the 97,927 tons was just a shade over \$2.00 per ton. For 1940 it was stated that "a smaller profit was made", but the costs must have been somewhat less, or there would have been no profit at all.

As to the segregation of operating costs Rae has informed me that no proper system of cost accounting was ever practiced and if this is a fact I doubt if much information could now be secured even if we should obtain access to all of the books and records, - which might require an order from the Court, - and get an expert accountant to work over them.

On one occasion Liddell informed me that the cost of reclaiming the tailings and loading them into the bin at the mill was 12¢ per ton, and Rae says that he thinks this item of cost was about the same for the dumps. Apparently all costs of milling were lumped together and it has been impossible for me to so far obtain any <sup>separate</sup> figure on milling or on general expense which last included interest and New York Office, etc.

In any event I am very certain that the operating profit would have been much greater except for (1) inefficient management with much dissension among officials, (2) interference and delays caused by Government supervision and red tape and (3) use of a lot of worn out equipment purchased second-hand and causing much lost time with heavy

expense for repairs, and reducing the normal capacity of the mill from 9,000 to less than 8,000 tons per month. It is my definite opinion that the operating costs should not have exceeded \$1.20 on the tailings, and \$1.30 on the dumps with efficient management and first class equipment, and that the recovery of values could also have been improved.

#### PRESENT ASSETS

The land included in the claims is worthless for anything but mining and most of the structures could not be moved away with advantage, so that the salvage value of the Company assets is limited to the equipment in the power plant and a ~~sale-of-the~~ mill and the accessory equipment including the pumps at Martinez Well with pipe line to the mill, a certain amount of material in the warehouse, and any cash that may remain in the treasury.

An inventory of the equipment and supplies has not yet been given me, but I have noted that the condition of the principal units is good and I believe that its present resale value would be at least \$40,000 while Rockwood states that he is quite certain of obtaining \$50,000. It appears that much of the equipment and warehouse stock should be promptly sold in order to reduce carrying charges and prevent deterioration over an indefinite period.

When operations are resumed electric power can best be obtained from the Arizona Power Company whose line at the Alvarado Mine is only four miles distant from the Congress Mill. Since Colorado River power will /then be available the rates are sure to be much lower than any which have been offered in the past.

The value of all of the other assets must be largely dependent upon future conditions particularly the relation of the price of gold to labor and commodities, but on the all important assumption that this relation should return to approximately the 1941 ratio, I will list the Reasonably Evaluated Assets as follows:

(1) Remaining Mill tailings 150,000 tons with average gross value of \$2.70 per ton from the treatment of which I estimate that a working profit of \$105,000 (\$0.70 per ton) should be earned, assuming a 70% recovery of value and a cost of \$1.20 per ton.

(2) Remaining dumps with aggregate tonnage of 250,000 (allowing for sorting out 20% of waste) and average grade \$3.00 per ton from which a profit of \$250,000 should be derived assuming a recovery of 85% of value through addition of a flotation plant and working cost of \$1.55 per ton.

My estimates of tonnage were derived from very rough Brunton and tape surveys of the dumps whose shape is now extremely irregular and the figure must be considered very approximate, but is believed to be conservative. The estimate of the tonnage in the tailings pile should be very accurate.

#### PROBABLE ASSETS

Fills or gob in the old workings of the mine, the tonnage of which were estimated by Mr. Staunton who managed the operation at 700,000.

Carlisle partially sampled some of these gobs and obtained an average value on excess of \$5.00 in the stopes on the Congress Vein,

and in stopes on the Niagara Vein, and in small stopes in the Queen of the Hills.

Colburn made an investigation of the fills down to the 1400' level and estimated that these should be 500,000 tons which would average better than \$7.00.

My sample of gob from the Queen of the Hills gob ran 0.21 oz. (\$7.35) which is probably higher than the average.

I believe that the tonnage figure given by Staunton is approximately correct and I have checked this as far as possible by reference to the Mine Maps, which are not complete.

I have assumed that the average value of all of the gobs will be in the order of \$5.00 per ton, but this figure is based on very inadequate data and should be checked by further examination.

Ore left in place during the old operations either as pillars or because it was too low grade to mine under the then existing conditions.

In this connection the statement of Staunton (which will be <sup>complete</sup> included in my/report) indicates that there are still excellent possibilities of mining, especially from the Niagara Vein, a lot of developed ore which will average better than 0.25 oz. per ton, and could now be mined and treated with profit, since no ore with lower value than 0.35 oz. was intentionally broken during the old operation.

I personally observed, both on the surface and in portions of the old workings, sections of the vein which I am confident will exceed

As to other mines in this vicinity the Sullivan contains some 50,000 tons of gob and developed ore which should average better than \$8.00 per ton and a much larger quantity of similar material is likely to be developed.

The Herskowitz and Findley (McDonell) are both small and pockety, the chances of finding pay ore left in the Alvorado and Yarnell are problematical and all other showings can merely be classed as prospects.

#### METALLURGY

Except through more efficient practice there is probably but little chance of economically improving the recovery from the remaining tailings and the character of the rock in the dumps is such that not much over 70% of the gold is likely to be recovered by cyanide. Tests by combined flotation and cyanide resulted in a recovery of 88.6% gold from the five principal dumps as compared to 68.8% when the same samples were treated by cyanide. Similar results were obtained on samples of freshly mined ore, as well as from local custom ore shipments. The improved recovery was especially noted in treating ore from the Niagara Vein dumps where in some cases as much as 92% of the gold was extracted by the combined method.

The addition of a flotation plant is a matter which merits careful study, and in my judgment is likely to prove well worth while and to permit an average recovery of 85% of the gold in all of the remaining material except the old mill tailings with only a small addition to the cost of milling.

CAPITAL EXPENDITURE

Aside from the purchase price of the property (which I believe could be made on a royalty basis) additions and replacements to the present plant costing not more than \$40,000 would in my opinion serve to permit the resumption of the reclaiming and treatment of the remaining tailings and dumps at a rate of about 300 tons per day. A rearrangement of this plant to operate by the modified Chapman process would obviously involve a considerable outlay, the extent of which I am not at present in a position to estimate.

If a flotation plant is to be installed some \$40,000 should be allotted for this purpose.

To obtain an adequate water supply with pumping plant and pipe line from either the Mendotte, Santa Fe or old Congress (Billingsley) Wells will involve an expense of some \$25,000 and \$15,000 should be provided for miscellaneous equipment, making an investment in the order of \$120,000.

If we assume for purposes of calculation that the purchase price would be \$100,000, the total investment would be \$220,000, and the total estimated profits from treating the dumps and tailings is figured at \$355,000 to which the salvage value of the present and new equipment might add \$65,000, and treatment of custom material some \$50,000 making a gross return of \$470,000, or a net return of \$250,000 after repayment of capital investment.

Definite advice in respect to the reopening of the mine and recovering the fills and remaining ore can not be given at present,

but this is the only phase of the project which would make it appear really attractive and information so far obtained seems to favor the continuance of an investigation which might justify such a procedure combined with an increase in the capacity of the treatment plant to a capacity of at least 500 tons per day.

To reopen the principal workings of the old mine would involve the cleaning out and some retimbering of the #2, #3, and #5 shafts (which are in surprisingly good condition down to the water level) and the purchase and installation of mining and hoisting equipment. A very rough guess of the capital required to accomplish all these objects would be \$300,000, but it might serve to permit the earning of an additional profit of over \$1,000,000 from the mine fills and lower grade ore left in place and it would be a necessary preliminary to the exploration, development and treatment of any additional pay ore which might exist on the property.

#### SCHEDULE OF PROSPECTIVE OPERATING COSTS AND RETURNS

On the vital assumption that the future price of gold in relation to costs of production is believed likely to again approximate the pre-war ratio, I have prepared the attached tentative estimates which, while obviously subject to substantial revision, attempt to cover the more essential aspects of the project as they now appear and in my judgment warrant the continuance of the investigation and negotiation for the acquisition of the property.

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With milling conducted on a basis of 500 tons per day these operations involving the assured and probable ore would require about eight years to complete and return the invested capital with interest plus a profit in the order of \$1,000,000 less taxes on income.

All working and construction costs are figured much higher than in 1936.

#### CONCLUSION

To best sum up the future possibilities of the mine I feel that I can quote from a letter which I have recently received from Mr. Staunton who knows far more about the property than anyone else and whose opinion is respected by all who know him.

"My feeling about the Congress mine is something like this, - that it is impossible to determine the existence of any considerable amount of ore of a definite value without the expenditure of money for re-opening to permit examination and sampling, and that the wisdom of such expenditure will depend upon weighing such general evidence as exists in the way of history, study of geological conditions and giving considerable weight to the probability that other large ore lenses will be discovered by systematic further exploration in ground that has proved already so productive. In other words, that it is a very good mining gamble, - much better in fact than many in which we see money being risked."

Aside from this possibility there is assurance of the existence of the bog and pillars in the mine and the probability that their

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average value will be in line with my estimates. We have a pretty positive basis for estimating the approximate tonnage and value of the mill tailings and mine dumps on the surface. The main element of uncertainty in respect to all of these assets lies in the course of future economic development, a matter on which one can only form a purely speculative opinion.

Yours very truly,

s/ G. M. Colvocoresses

ESTIMATE OF COSTS AND RETURNSFROMTAILINGS, DUMPS AND ORES AT CONGRESS MINE..

<u>Class of Material</u>	<u>Tons</u>	<u>Gross Value Per Ton</u>	<u>Recovered Value Per Ton</u>	<u>Total Working Costs Per Ton</u>	<u>Operating Profits</u>
<u>A. Reasonably Assured</u>					
Remaining Mill Tailings	150,000	\$2.70	\$ 1.90	\$ 1.20	\$ 105,000
Remaining Mine Dumps	250,000	3.00	2.55	1.55	250,000
Treatment Custom Ore	50,000				50,000
Salvage value present and New Equipment					65,000
<u>B. Probable</u>					
Mine Fills	700,000	5.00	4.25	3.25	700,000
Pillars & low grade ore	150,000	8.00	6.80	4.80	300,000
Additional custom ore	50,000				50,000
Salvage value additional equipment					50,000
Total of above	1,350,000				1,570,000
<u>C. Indicated as Possible</u>					
New Ore in Congress Mine	200,000	) \$10.00 or better			
to	500,000	)			
Additional Custom Ore	100,000	)			
to	300,000	) To be milled with profit of \$1.00 per ton			

NOTE All estimates of cost and profit dependent upon relative value of gold.

Total capital expenditure required to treat material classed under A and B or under A, B, and C at rate of 500 tons per day is figured at \$520,000 assuming the cost of the property to be about \$100,000.

G.M.C.