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PART 15 of 16

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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

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REPORT ON CONGRESS MINE

AND

TAILINGS DUMP

YAVAPAI COUNTY, ARIZONA

The Congress Mine and tailings dump were examined by W. A. Leddell and Gerald Sherman for the Congress Mine Corporation, of 100 Broadway, New York, beginning on June 14, and continuing through the months of July and August, 1935.

From measurements, sampling, and milling tests on the tailings, the following results are calculated:

CONGRESS TAILINGS

QUANTITY			
White Tailings	120,000 Tons		
Brown Tailings	280,000 Tons		
	400,000 Tons		
WHITE TAILINGS			
Gold 0.0735 ozs. per ton $2.53 @ 85%		$2.15	
Silver 0.045 ozs. per ton .34 @ 75%		0.25	
		$2.40	
Operating Cost per Ton		.836	
		$1.564	
OPERATING PROFIT 120,000 Tons @ $1.564			$187,500
BROWN TAILINGS			
Gold 0.525 ozs. per ton $1.81 @ 70%		$1.26	
Silver 0.33 ozs. per ton .25 @ 65%		0.16	
		$1.42	
Operating Cost per Ton		.836	
		$0.584	
OPERATING PROFIT 280,000 Tons @ 0.584			163,500
			$351,000
MILL AND PLANT CONSTRUCTION	$92,320		
WATER SUPPLY	15,000		
ENGINEERING	5,300		
CONTINGENCIES	7,380		
WORKING CAPITAL	20,000		140,000
			$211,000

The Congress Mine was owned by the Murphy Estate and managed by T. J. Byrne, Attorney, of Prescott, Arizona, as Trustee.

The property is situated in the Martinez Mining district, Yavapai County, Arizona, about 3½ miles north of Congress Junction on the A.T. & S.F. Railway. It is reached by a good road on a slightly ascending grade from Congress Junction. The property consists of 15 patented and 9 unpatented claims.

Patented Claims

Fraction	Niagara Mill-Site
Why Not	Ohio
Mosouri	Rich Quartz
Niagara	Golden Eagle
Congress	Incline
Queen of the Hills	Old State
Excelcior	Snow Storm
Golden Thread	

Unpatented Claims

Bellick	Highland
Remnant	Keystone
Boundary	East Extension of Golden Thread
Sunnyside	Martinez
Ophir	

The Congress Mine was located in 1887, or shortly before. Active production covered the years 1889 to 1891 and 1894 to 1910, since when it has been practically or entirely idle. During these periods it produced in gold and silver sold, $7,649,497, which was taken from 692,332 tons of ore. The recovered value per ton was approximately $11.60, having a gross value of $13.00, which would now be worth in gold and silver contained, about $22.00 per ton

PRODUCTION FROM CONGRESS MINE by W. F. STAUNTON

Production	692,332 Tons
Gold	388,477 Ozs.
Silver	345,598 Ozs.

Value	Gold	$20.67	$8,029,900
	Silver	0.60	204,560
			$8,234,460
Value per ton	Gold	$11.60	
	Silver	.19	
		$11.79	
	Tailings	1.20	
	Gross Value per Ton	$12.99	
Value	Gold	$35.00	$13,597,000
	Silver	0.75	259,000
			$13,856,000
Value per ton Gold		$19.63	
		.37	
		$20.00	
Tailings (Sampled)		1.95	
		$21.95	

These figures were taken from an article by W. F. Staunton, published in the Engineering and Mining Journal of November 13, 1926. Mr. Staunton is a mining engineer, who was Superintendent and Manager of the operations during 1894 to 1910.

The tangible assets of the Congress property consist of the tailings milled during the productive period and now situated in a pile about 1000 ft. long, 300 ft. wide, and of varying thickness up to 37 ft. on the Excelcior and Golden Eagle, with a small extension at a higher level on the Incline Claim.

Attention had been drawn to this tailings dump by a report of The Merrill Company, dated December 31, 1915, in which its quantity and value in gold and silver is estimated with the plant required for its treatment and operating costs, and a statement of probable profits, to be obtained at $20.67 Gold.

This report was investigated, and it was found that the sampling was done by Frank H. Ricker, still of The Merrill Company organization, and Jack Moulton. The final summary and estimate was made by M. H. Kuryla, now Vice-President and General Manager of the United States Smelting and Refining Company of Pachuca, Mexico. The quantity of tailings was estimated at 505,000 tons and the gold at $1.46 per ton ($20.67) and silver at 21¢ per ton. A recovery of about 67% was expected, by regrinding and cyaniding. Under those conditions and at the prevailing price of gold, the project was not attractive, and The Merrill Company allowed it to drop. When the price of gold reached $35.00 per oz., the estimated gross value of the tailings rose to $2.78 per ton, with a much greater increase in the margin of profit.

The Merrill sampling was carefully done with 75 holes drilled and an equal number of cyanide tests, and the data on which the estimates were made were no doubt correct. The recovery by cyaniding was low, but no particular obstacle appeared which might prevent the successful treatment of the tailings. With a greater value, finer grinding and longer agitation would be permissible if it yielded a higher gold recovery.

Several attempts have since been made to treat the tailings, of which only one was successful. Otto Ellerman, now Manager of Perez & Company, Assayers and Metallurgical Engineers of Los Angeles, Calif., then associated with a Mr. Curran and acting for an investor, designed, built, and operated a cyanide plant which treated 10,000 tons of tailings and produced a little less than $12,000 in gold and silver (at $20.67 gold) on which a profit was made. For lack of capital required to pay for the plant already constructed, and provide a better screen and pump, the operation had to be abandoned.

Another attempt was made to treat the tailings under the direction of J. T. Shimmin, who remodelled and enlarged the Sunshine mill at Kellogg, Idaho, in the winter of 1934 and 1935, and is now associated with the Buchans Mining Company, Buchans, New Foundland. The tailings were sluiced down by water to the plant, but it was discovered that appreciable quantities of the gold were water soluble which were lost in transit. These losses made the operation of the plant unprofitable, and again lack of capital prevented further action.

In 1933, the Congress Gold Inc. obtained a lease on the property to treat the tailings, and later to sort out and treat ore from the mine waste dump. Both operations failed, because of a shortage of equipment which prevented sufficiently fine grinding and time for agitation in solution, when treating the desired tonnage, and a lack of capital to correct it. This operation was followed by a lease and option to the Illinois Mining Corporation, which operated on similar lines, and relinquished their option in the latter part of 1934. In February 1935, an option was given to N. C. Clark, an attorney of Phoenix, Arizona, under which an examination was made by Wasserman & Company, of 40 Wall Street. Their results were not satisfactory to them and they returned the option. It was then given to Gerald Sherman for the Congress Mining Corporation.

It is estimated from survey and drilling records obtained in the examination of June, July, and August, that there are altogether more than 400,000 tons of the tailings. For details of the estimates, reference is made to a plan of drill hole locations and cross sections from surveys at 50 ft. intervals from end to end of the dump, and records of the drill holes, sampling, and calculations based on them.

The tailings first made, were roasted before cyaniding, but in later years, it was found that roasting was not economically necessary and the remainder of the ore was cyanided, raw. The dump, therefore, consists of roasted tailings of a light-brownish color, below, and unroasted tailings which were deposited on top of them, of clean white sand.

Drill sampling showed that there is a difference in the value of the two classes and of their metallurgical characteristics. The white sands carry 0.0735 ozs. of gold per ton, which yielded 85% by cyaniding and the roasted tailings * was noted in all drill holes and separate samples were taken from each class of material.

The roasted tailings do not contain as much gold as indicated by the Merrill Company sampling. The difference was probably caused by the migration of water soluble gold downward into the subsoil during the 20 years since the Merrill sampling was done.

In proportion to the investment, the profits were not particularly attractive and the option was released to Clark. A reduction in the purchase price and the possibility of obtaining a loan from the R.F.C. changed the situation and in January the property was purchased for $17,500.

The above estimate of tonnage and gold and silver content, on page 1, is based on the drilling of 49 holes, 3 vertical channels, and 2 shallow pits. The total feet drilled was 1320. In a number of cases the holes were repeats of those already drilled to check possible errors of sampling. The working data for the estimate is attached, as listed below:

Plan of the dump, showing its outline, and the location of drill holes.

Sections across the dump at intervals of 50 feet used in the calculation of tonnage and value.

List of drill holes and sample returns.

Reconcilement of holes redrilled for checking, or to obtain more material for milling tests.

Average assay value for white and roasted tailings by sections.

Comparison of average assays from drill holes and sectional averages, etc.

Calculation of tonnage and value.

Calculation of weight per cubic foot.

The tailings were moist within a foot or two of the surface and with one or two exceptions, stood without caving when drilled to the original surface.

After putting in a short collar pipe to reach the moist sands, the material in the hole was taken out by "drop" bits, consisting of short length of 2 or 2½ in. pipe with the inside bevelled to a sharp outside edge at the bottom. They were about 2 ft. long and suspended by a bail from a half-inch rope. By raising the bit 2 or 3 ft. and dropping it, by its own weight to the bottom, some of the tailings were wedged up into the tapered bottom of the bit for an inch or so. A sample of moist tailings was thus picked up, lifted out and shaken into a sample sack by striking the pipe. In deep holes, a tripod and light pulley were used.

A few holes were blocked by striking timbers on the way down.

The white sands and roasted tailings were sampled separately, making two samples for each hole. In some cases the white and brown sections were split into an upper and a lower portion, to discover if there is any enrichment near the bottom. In one or two instances this was found to be the case as in the two pits, #32, and #43, which were dug into the subsoil. On the whole, there was no consistent difference between the upper and lower portions either of the unroasted or roasted tailings, but there are still possibilities of encountering pockets of richer material from which the soluble gold could not drain away.

There are probably 15,000 to 20,000 tons of tailings retreated by former operators and discharged on the flat below the old dump, which average about 0.074 ozs. per ton. They contain not only re-treated tailings but tailings from quantities of ore sorted out from the mine dump by the Congress Gold operations and raised to an expected value of $4.00 to $6.00 per ton. This probably accounts for the high samples and may indicate the occurrence of a few thousand tons of tailings on which good profits can be made, but the sampling and measurements are not sufficiently complete to include these piles in the estimate.

Composite samples were made up of each class of ore independently to be sent for testing to John G. Graham, Professor of Mining and Metallurgy at the Texas College of Mines, at El Paso, Texas. Other duplicate lots were sent to the American Cyanamid Company of New York, and a few to the R. A. Perez Company, of 120 North Main Street, Los Angeles, where they were tested under the direction of Otto Ellerman, Manager.

The milling tests were made under the supervision of W. A. Leddell, Metallurgical and Mechanical Engineer, Mills Building, of El Paso, Texas.

The report of Mr. Leddell on the tests with a flow sheet of a mill and estimates for its construction, are attached with accompanying reports by Graham and the American Cyanamid Company.

Mr. Leddell's results are incorporated in the estimate of operating expense and profits, which appear on page 1.

The original water supply was from a well on Martinez Creek about one mile east of the mine which is now equipped with a pump, and may be used for a mill and domestic supply up to its normal flow. While the Congress was in active production, there was not enough water in Martinez Creek to supply the stamp mill and a community of some hundreds of people. In order to make good the deficiency, wells were sunk on Date Creek about six miles to the north and water pumped over the divide between Date and Martinez Creeks, from which it flowed by gravity to the tanks at the Martinez Creek well and was pumped from there to storage tanks at the mine.

With 15 to 20 men and an economical use of water in milling, it may be possible to operate with the Martinez Creek water. In case this is insufficient, easements for wells and rights of way have been obtained from holders of agricultural and homestead claims on Date Creek, and application has been made for a water right from that creek for a quantity up to 30,000 gals. per day. A pipe line is planned, which would be about seven miles in length following a course indicated on the attached U. S. topographical map.

The Congress Mine:

Most of the information on the Congress Mine was obtained from an article in the Engineering and Mining Journal and letters, by W. F. Staunton, of which copies are attached.

Ore was mined from two veins, the Congress and the Niagara. They both outcrop in the foothills of the Date Creek Mountains, and dip under a minor projecting ridge. Both lie in an area of Granite, probably a part of a similar formation on the west slope of the Bradshaw Mountains.

It is contained in and runs through a greenstone trap dyke about 15 ft. in width, which strikes northwest and southeast and dips at about 25 degrees into the hill to the north. The ore is more often fo·· .d on the foot wall but may appear in any part of the dyke. The ore shoot follows in a general way, the intersection of the dyke with a fissure vein in the granite.

The Niagara vein cuts through the granite, strikes more nearly east and west and dips about forty degrees to the north, thus departing from the Congress vein in depth and toward the west. This vein does not accompany a dyke, but it is believed that an intersection with a flat greenstone dyke, striking more to the northwest which cuts it on a line, dipping in a northwesterly direction, has had some influence on the ore shoot found adjacent to it.

The coincidence of both ore shoots being apparently associated with the intersections of veins with dykes, and the occurrence of more or less ore in both formations near the intersections may lead to the discovery of other ore shoots.

Both veins were productive, the Niagara ore probably wider, but the Congress somewhat richer.

The two veins were developed and operated through several inclined shafts, which followed tham down. The Congress shafts are No. 1, 1100 ft.; No. 2, 1700 ft.; and No. 3, 4000 ft. deep. The Niagara shafts are No. 5, 2050 ft.; No. 4, 1000 ft.; and No. 6, 1800 ft. deep. There are some shallow older shafts on the Niagara vein east of No. 5 Shaft toward the eastern fault which cuts off the vein in that direction, and there are also shallow workings on the Queen of the Hills and Bellick claims. Records indicate that the Queen of the Hills produced about 20,000 tons of ore.

All shafts are caved and the underground workings connecting with them are practically inaccessible, except the Congress No. 2 3 Shaft, open to the water level at about the 1300 Level, and the Niagara No. 5 for 300 ft. By climbing over waste piles caused by broken lagging, some of the level drifts can be followed for severl hundred feet from the

Congress No. 2 Shaft. The Niagara No. 5 Shaft, blocked below 300 ft. is connected with some of the shallower workings toward the eastern fault.

The ore is found in two main shoots, one in the Congress and one in the Niagara vein. The Congress ore shoot appears to have been uniformly good and to have been mined out completely. There is, therefore, practically no ore in place that can be inspected without cleaning out the drifts, for access to the stope faces.

The Congress vein being flat, the ore was broken separately so far as possible and only enough rock to make room for stoping, and to fill the workings and thus support the roof. In this process, fragments of the vein quartz which is friable, were thrown back into the gob and lost. The hanging wall in some cases, carried mineralized stringers that could be mined. During the period of production, material containing less than $7.00 did not pay to mine. It
0.35 oz.
is assumed, therefore, that some high grade ore lost in the process of stoping and the reject of some lean ore which was brought by sorting up to a workable average, and some of the weakly mineralized hanging wall stringers, were left in the fill.

This idea is supported by the letter from W. F. Staunton on the subject, dated October 27, 1933.

In order to check this theory 21 samples were taken from the stope fill on various levels from the No. 2 Congress Shaft, as indicated on the underground map of the Congress vein. They were obtained by cutting the lagging, drawing out the fill and rejecting material that would be sorted out by hand, and using the remainder to represent the fine material that might be profitable, extracted for milling.

$20.00 Au 0.28
The average of all samples of fines was $5.65 per ton. 4 samples
0.58
averaged $11.57 per ton. 4 additional samples were taken from points

0.23
near them which averaged $4.68 per ton.

In the 850 West, 1250 West, 1300 West drifts, the samples
0.52 0.52 0.38
yielded $10.35, $10.38 per ton and $7.59, respectively, per ton, at current metal prices.

It is concluded that there are areas accessible from the Congress No. 2 Shaft with slight expense, that can be worked, by roughly sorting out the coarse waste and shovelling or scraping fine material to the level below, the coarse material being packed behind and retained by occasional timbers to support the roof, and the fines sent to the mill. The operation can be best handled by contract, paying for the tonnage and value of the fine material hoisted.

In order to prove out such areas, more extensive sampling would be required, followed by taking out and hoisting all the fill from certain promising sections of the stopes, having a width on the strike of 15 to 20 ft., from one level to the next. On the surface, it would be screened and weighed to obtain the value and quantity that could probably be recovered, per unit of area.

Because of the increase in the value of gold, the edges of the stopes where mining stopped may carry sections that would now pay to take out. The stope boundaries are indicated in the map of the Congress vein, by red and blue lines.

A section of the vein is accessible between the second and third levels west of the No. 2 Shaft. Sampling there over 170 ft. indicates the occurrence of a shorter section that would pay to mine now. This may be assumed to yield as follows:

40 ft.	23"	$10.14 per ton
50 ft.	22"	9.40 per ton
80 ft.	21 "	8.30 per ton

Some ore there is accessible and can be mined at any time if there were a mill available for its treatment, although there is probably little of it at this spot.

It was reported that the ore shoot above the 1700 Level and mined through No. 2 Shaft, produced the best ore mined. The east and west stope boundaries of this block, have an aggregate length on the vein of at least 3000 ft. It is very likely that ore extensions will be found east or west from those lines some one or two of which may extend for considerable distances and produce important quantities of ore.

While cleaning out the old stopes and exposing the faces pointing out into new ground, enough information may be obtained on which to base more extended explorations.

It would cost little to repair the Congress shaft and lay track to the water level. As the mine made so little water that it was taken out by bailing, the water level could be lowered to the 1700 Level at small expense.

The Niagara vein was rather lower in grade than the Congress. It is Staunton's opinion that it is likely to produce marginal ore from the untouched vein, made profitable by the increase in gold price, than the Congress, but its development would cost considerably more and work on it would be postponed until more information can be collected on its possibilities.

No value is set on the mine, but conditions are believed to be favorable for development.

Within the past few weeks, applications have been made to us for leases on the Queen of the Hills and earlier, to open the Niagara No. 6 Shaft. This might provide a foothold for further work.

No other development work in the mine is desirable until the dump operation has been well established. In the case that ore from the fills or from fresh faces can be produced, it would be necessary to provide a fine crushing plant to feed the grinding mill before the ore could be treated by cyaniding.

Plans:

During construction, pumping tests would be made on the Martinez well and the construction of the pipe line and wells at Date Creek would not be started until it has been proved to be necessary.

The details of mill design will be completed and construction begun as quickly as possible.

Tests of the Martinez well will be made and it will probably be necessary to lay a pipe line and put in a small semi-automatic gasolene-driven pump at Date Creek.

Since the white sands lie above the roasted tailings, it is proposed to treat them first in order to liquidate the cost of the plant as rapidly as possible.

When production is well established, attention will be directed to the mine.

Gerald Sherman.

March 17, 1936

CONGRESS MINE

OPERATING SCHEDULE

PLANT DESIGN AND ERECTION		6 Months
TAILINGS TREATMENT:		
	75,000 Tons White Tailings 25,000 Tons Brown Tailings	12 Months
TREATMENT:		
	25,000 Tons White Tailings 25,000 Tons Brown Tailings	6 Months
TREATMENT:		
	20,000 Tons White Tailings 230,000 Tons Brown Tailings	30 Months
	$4\frac{1}{2}$ Years	54 Months

SUMMARY OF CONGRESS DRILL HOLES IN TAILINGS DUMP

JUNE - AUGUST 27, 1935

Hole No.	White Feet	White Assay	Red Feet	Red Assay	Total Feet	Total Assay
1	20.0	0.07	15.0	0.046	35.0	0.059
2	26.75	0.07	11.25	0.046	38.0	0.063
3	8.0	0.07	28.0	0.046	36.0	0.051
4	15.0	0.07	10.0	0.046	25.0	0.06
5	16.0	Lost	.	.	.	.
6	.	.	10.5	0.046	10.5	0.046
7	.	.	12.0	0.05	12.0	0.05
8	.	.	5.0	0.05	5.0	0.05
9	.	.	5.0	0.05	5.0	0.05
10	.	.	13.0	0.05	13.0	0.05
11	.	.	9.0	0.05	9.0	0.05
12	.	.	13.0	0.05	13.0	0.05
13	.	.	8.5 12.0 8.5	0.06 0.02 0.04	29.0	0.038
14	12.0	0.07	Caved		12.0	0.07
15	10.0 8.0	0.08 0.11	6.0	0.06	24.0	0.085
16	.	.	20.0	0.06	20.0	0.06
17	5.5	0.10	19.5 7.0	0.07 0.07	32.0	0.076
18	.	.	9.0	0.06	9.0	0.06

SUMMARY OF CONGRESS DRILL HOLES

(continued)

Hole No.	White Feet	White Assay	Red Feet	Red Assay	Total Feet	Total Assay
19	.	.	33.7	0.06	33.7	0.06
20	31.5	0.05	.	.	31.5	0.05
21	.	.	24.5	0.04	24.5	0.04
22	9.4 14.6	0.07) 0.07) (a)	9.5	0.05	33.5	0.064
23	16.0	0.10	16.75	0.08	32.75	0.089
24	3.5	0.07	19.0	0.04	22.5	0.044
25	.	.	17.0 12.5	0.05) 0.04)	29.5	0.045
26	.	.	9.6	0.04	9.6	0.04
27	.	.	8.5	0.04	8.5	0.04
29	.	.	8.0 12.1 10.4 1.4	0.06) 0.06) 0.04) 0.065)	31.9	0.054
30	16.9	0.065	15.6	0.045	32.5	0.055
31	.	.	29.4	0.04	29.4	0.04
35	20.7 5.2	0.07) 0.12) (b)	8.2 3.5	) 0.045)	37.6	.
36	28.5	0.07	6.4	0.065	34.9	0.069
37	34.6	0.065	0.7	0.09	35.3	0.065
38	33.0	0.075	.	.	33.0	0.075
39	Lost	.	.	.	.	.
39a	3.6	0.09	21.6 1.1	0.055) 0.06)	26.3	0.06
46	.	.	14.5	0.075	14.5	0.075
51	31.7	0.08	.	.	31.7	0.08
52	.	.	25.0	0.04	25.0	0.04
61	.	.	29.2	0.06	29.2	0.06

Note (a) - Assay 0.23
(b) - Assayed 0.17 - use 0.12 for estimate

SUMMARY OF CONGRESS DRILL HOLES

(continued)

Hole No.	White Feet	White Assay	Red Feet	Red Assay	Total Feet	Total Assay
1a	0		28.2	0.05	28.2	0.05
3a	8.2	0.08	24.3	0.055	32.5	0.061
13a	3.5	0.065	23.5	0.05	27.0	0.052
16a	0		33.8	0.05	33.8	0.05
17a	8.2	0.06	20.2	0.05	28.4	0.052
62	16.0	0.09	21.2	0.04	37.2	0.062
63	12.0	0.055	24.0	0.07	36.0	0.065
64	19.0	0.09	14.5	0.08	33.5	0.086
65	0		27.1	0.055	27.1	0.055
66	0		28.7	0.07	28.7	0.07

<u>Not used in estimates</u>

PITS

Pit No.			Depth	Perez	Goeglein
32 (a)	Bottom sand	9.3' to 10.3'	1.0	0.095	0.12
	Subsoil	10.3' to 10.9'	0.6	0.08	0.12
	Subsoil	10.9' to 11.9'	1.0	0.0	0.08
43			9.8	0.07	0.08
			1.0	0.095	0.10
			1.0	0.10	0.11

Note (a) - Sampled for bottom sands and subsoil only

VERTICAL CHANNELS

Channel No.	White		Red		Total	
	Feet	Assay	Feet	Assay	Feet	Assay
1	9.0	0.16	13.0	0.06	22.0	0.10
2	•	•	14.0	0.03	14.0	0.03
3	•	•	15.0	0.05	15.0	0.05
4	•	•	20.0	0.06	20.0	0.06
		Average		0.051	71.0	0.064

CONGRESS ~~VEIN~~ Tailings

HOLES DRILLED

49 Holes	1227.0 ft.
3 Vertical Channels	71.0
2 Pits	21.7
6 Holes in re-treated tailings	32.0
	1351.7 ft.

Nine shallow holes were drilled with an auger to locate the bottom of the tailings without sampling.

#40 ✓
#44 ✓
#45 ✓
#46 ✓
#47 ✓
#48 ✓
#50 ✓
#58 ✓
#59 ✓

RECONCILEMENT OF REDRILLED HOLES

Hole No.	White Feet	White Assay	Red Feet	Red Assay	Total Feet	Total Assay
1	20.0	0.07	15.0	0.046	35.0	0.059
1a	.	.	28.2	0.05	28.2	0.05
Used in Estimate						
	10.0	0.07	25.0	0.048	35.0	0.055
3	8.0	0.07	28.0	0.046	36.0	0.051
3a	8.2	0.08	24.3	0.055	32.5	0.061
Used in Estimate						
	8.0	0.075	28.0	0.050	36.0	0.56
13	.	.	29.0	0.038	29.0	0.038
	.	.	31.9	0.054	31.9	0.054
13a	3.5	0.065	23.5	0.05	27.0	0.052
Used in Estimate						
	3.5	0.065	28.4	0.047	31.9	0.047
16	.	.	20.0	0.06	20.0	0.06
16a	.	.	33.8	0.05	33.8	0.05
Used in Estimate						
	.	.	33.8	0.054	33.8	0.054
17	5.5	0.10	26.5	0.07	32.0	0.076
17a	8.2	0.06	20.2	0.05	28.4	0.052
Used in Estimate						
	6.8	0.076	25.2	0.061	32.0	0.064

RECONCILEMENT OF REDRILLED HOLES

(continued)

Hole No.	White Feet	White Assay	Red Feet	Red Assay	Total Feet	Total Assay
21	.	.	24.5	0.02*	24.5	0.02
52	.	.	25.0	0.04	25.0	0.04
Used in Estimate						
	.	.	25.0	0.04	25.0	0.04

* Assay of duplicate sample ran 0.04

Hole No.	White Feet	White Assay	Red Feet	Red Assay	Total Feet	Total Assay
14	12.0	0.07	.	.	12.0	0.07
62	16.0	0.09	21.2	0.04	37.2	0.061
Used in Estimate						
	16.0	0.081	21.2	0.04	37.2	0.063

CONGRESS TAILINGS DUMP

DRILL HOLES AND SAMPLING ON CROSS SECTIONS FOR ESTIMATES

Cross Section	Drill Hole	White Tailings		Brown Tailings	
0+50	24	3.5 ft.	0.07 ozs.	19.0 ft.	0.04 ozs.
1	30	16.9	0.065	15.6	0.045
	64 (½)	9.5	0.09	7.2	0.08
Average		26.4	0.074	22.8	0.056
1+50	23	16.0	0.10	16.75	0.08
	64 (½)	9.5	0.09	7.2	0.08
Average		25.5	0.096	23.95	0.08
2	4	15.0	0.07	10.0	0.046
	22	24.0	0.07	9.5	0.05
	13) 29) 13a) (½)	1.8	0.065	14.2	0.047
Average		40.8	0.07	33.7	0.047
2+50	13) 29) 13a) (½)	1.8	0.065	14.2	0.047
	35	25.9	0.08	8.2	0.045
	18 (½)	.	.	4.5	0.06
Average		27.7	0.078	27.4	0.047
3	21) 52)	.	.	25.0	0.04
	63 (½)	6.0	0.055	12.0	0.07
	18 (½)	.	.	4.5	0.06
	43 Pit				
Average		6.0	0.055	41.5	0.051

CONGRESS TAILINGS DUMP

Cross Section	Drill Hole	White Tailings		Brown Tailings	
3+50	31	.	.	29.4 ft.	0.04 ozs.
	16) 16a)	.	.	33.8	0.054
	63 (½)	6.0 ft.	0.055 ozs.	12.0	0.07
	43 Pit				
Average		6.0	0.055	75.2	0.051
4	7	.	.	12.0	0.05
	19	.	.	33.7	0.06
Average		.	.	45.7	0.0575
4+50	1) 1a)	10.0	0.070	25.0	0.048
	15 (½)	9.0	0.093	3.0	0.06
	26 (½)	.	.	4.8	0.04
Average		19.0	0.081	32.8	0.048
5.	20	31.5	0.05	.	.
	26 (½)	.	.	4.8	0.04
	15 (½)	9.0	0.093	3.0	0.06
Average		40.5	0.060	7.8	0.048
5+50	14) 62)	16.0	0.081	21.2	0.040
	8 (½)	.	.	2.5	0.050
	9 (½)	.	.	2.5	0.050
Average		16.0	0.081	26.2	0.042
6	36	28.5	0.07	6.4	0.065
	9 (½)	.	.	2.5	0.05
	8 (½)	.	.	2.5	0.05
	27 (½)	.	.	4.2	0.04
Average		28.5	0.07	15.6	0.0534

CONGRESS TAILINGS DUMP

Cross Section	Drill Hole	White Tailings		Brown Tailings	
6+50	2	26.8 ft.	0.07 ozs.	11.2 ft.	0.046 ozs.
	17) 17a)	6.8	0.076	25.2	0.061
	27 (½)	.	.	4.2	0.04
Average		33.6	0.071	40.6	0.545
7	37	34.6	0.065	0.7	0.09
	10 (½)	.	.	6.5	0.05
Average		34.6	0.065	7.2	0.054
7+50	51	31.7	0.08	.	.
	3) 3a)	8.0	0.075	28.0	0.050
	10 (½)	.	.	6.5	0.050
Average		39.7	0.078	34.5	0.050
8	38	33.0	0.075	.	.
	61	.	.	29.2	0.06
Average		33.0	0.075	29.2	0.06
8+50	39) 39a)	3.6	0.09	22.7	0.0552
9	12	.	.	13.0	0.05
	65	.	.	27.1	0.055
	11 (½)	.	.	4.5	0.05
Average		.	.	44.6	0.053
9+50	1 (½)	.	.	4.5	0.05

CONGRESS TAILINGS

Estimate of Quantity and Value

White Tailings			120,000 Tons
Brown Tailings	Main Dump	255,000 Tons	
	Upper Dump	25,000 Tons	280,000 Tons
			✓ 400,000 Tons

Retreated Tailings

East Dump	10,000 Tons	0.07 ozs.	
West Dump	5,000 Tons	0.06 ozs.	15,000 Tons
			415,000 Tons

White Tailings

Average all drill holes	421 ft.	0.0735 ozs. Gold
Weighted Average by sections		.0739

Brown Tailings

Average all drill holes	806 ft.	0.0527 ozs.
Weighted Average by sections		.0527

Mill Test Heads

			Gold		Silver	
White Tailings #1	69.75 ft.	0.08 Graham		0.47	
		0.07 Diehl	0.0697 ozs		0.485 oz[illegible]
		0.059 Am.Cyan.		0.50	
#2	66.9 ft.	0.083 Graham		0.5	
		.08 Perez		0.5	0.50 oz[illegible]
		.0692 Am.Cyan		0.51	
Brown Tailings #1	74.75 ft.	0.045 Graham		0.43	
		0.04 Diehl	0.0463 ozs		0.43 oz[illegible]
		0.054 Am.Cyan.		0.43	
#2	189.7 ft.	0.050 Graham		0.40	
		0.045 Perez	0.0493	0.40	0.41 oz[illegible]
		0.053 Am.Cyan.		0.44	

RETREATED TAILINGS

By Burns and others

East Dump Rough Estimate - 19,000 tons

	Depth	Goeglein	Diehl
Auger Sample		0.10 ozs gold	
Pits			
A	7.5'		0.14 ozs gold
B	7.5'		0.05 ozs gold
C	6.2'		0.06 ozs gold

West Dump Rough Estimate - 7,000 tons

	Depth	Goeglein	Diehl
Auger Sample		0.08 ozs gold	
Pits			
D	8.0'		0.06 ozs gold
E	2.8'		0.07 ozs gold

WEIGHT OF TAILINGS

Weight of Brown Tailings in Place -

Cut hole in sand in place 18" x 18" x 15.59 equals 2.92 cu. ft.

Weight wet equals 326#

Weight dry equals 286#

40# Moisture

Wet sand contains 12.26% moisture.

$\frac{286\#}{292}$ Equals 97.9# per cu. ft. in place.

20.5 cu. ft. per ton

Weight of White Tailings in Place -

White sand was tested separately and weighed approximately 97# per cu. ft. in place.

Metal containers were filled with white tailings and weighed against the same filled with water.

Brown tailings checked August 9th, made 102.06# per cubic foot.

CONGRESS MINE

Total Tailings March 11, 1936

Cross Section	Square Feet	Square Feet	Tons
0	1594	797	1992
0+50	4451	3022	7555
1	5895	5173	12932
1+50	8171	7033	17582
2	11509	9840	24600
2+50	9792	10650	26625
3	10906	10349	25872
3+50	10894	10900	27250
4	8271	9582	23955
4+50	8632	8452	21130
5	7398	8015	20037
5+50	5985	6692	16730
6	8050	7018	17545
6+50	7819	7934	19835
7	7940	7880	19700
7+50	9634	8787	21968
8	10858	10246	25615
8+50	7008	8933	22332
9	5714	5360	13400
9+50	2286	3000	7500
10	150807	1143	2857
		150806 Sq. Ft.	377012 Tons

Average Area of Cross Section x 50 ft. ÷ 20 = Area x 2.5 = Tons

CONGRESS TAILINGS

Calculation of Tonnage

White Tailings

Cross Section	Sq. Ft.	Tons
0		
0+50	2179	5188
1	3158	7518
1+50	4266	10157
2	5267	12541
2+50	4049	9641
3	1709	4212
3+50	746	1776
4	421	1002
4+50	2112	5029
5	4266	10157
5+50	3935	9369
6	3136	7467
6+50	3075	7322
7	3483	8283
7+50	4199	9998
8	4520	10762
		120,422 Tons

Average areas x 50 ft. ÷ 21 = Area x 2.381 = Tons

CONGRESS TAILINGS

White Tailings Average Gold Content

Cross Section	Gold	Area in Sq. In.	Product
0	0.07 ozs.	2.550	17850
0+50	0.07	4.411	30877
1	0.074	5.694	42136
1+50	0.096	7.956	76378
2	0.07	8.897	62279
2+50	0.078	4.056	31637
3	0.055	1.604	8822
3+50	0.055	.781	4296
4	0.06	.566	3396
4+50	0.081	6.191	50147
5	0.06	7.459	44754
5+50	0.081	5.133	41577
6	0.07	4.903	34321
6+50	0.071	4.936	35046
7	0.065	6.209	40358
7+50	0.078	7.229	56386
8	0.075	7.234	54255
		85.811 Sq. In.	634,515

Average Gold 0.0739 ozs. per ton

CONGRESS MINE

BROWN TAILINGS

Cross Section	Total Tons	White	Brown
0	1992		1992
0+50	7555	5188	2367
1	12932	7518	5414
1+50	17582	10157	7425
2	24600	12541	12059
2+50	26625	9641	16984
3	25872	4212	21660
3+50	27250	1776	25474
4	23955	1002	22953
4+50	21130	5029	16101
5	20037	10157	9880
5+50	16730	9369	7361
6	17745	7467	10278
6+50	19835	7322	12513
7	19700	8283	11417
7+50	21968	9998	11970
8	25615	10762	14853
8+50	22332	0	22332
9	13400	0	13400
9+50	7500	0	7500
10	2857	0	2857
	377, 012 Tons	120 422 Tons	256,590 Tons
		Upper Dump	23,000
		Roasted Tailings	279,590

CONGRESS TAILINGS

Brown Tailings

Average Gold Content

Cross Section	Gold	Square Feet
0		0
0+50	0.0400 ozs.	1694
1	0.0560	2336
1+50	0.0800	3199
2	0.0470	5948
2+50	0.0470	7256
3	0.0510	9904
3+50	0.0510	10406
4	0.0575	7917
4+50	0.0480	4763
5	0.0480	2736
5+50	0.0420	2777
6	0.0534	4986
6+50	0.0550	4734
7	0.0540	4059
7+50	0.0500	5116
8	0.0600	6337
8+50	0.0552	7008
9	0.0530	3714
9+50	0.0500	2286
10		97176

Average 0.0527 ozs.

CONGRESS MINE

UPPER DUMP ON INCLINE CLAIM

BROWN TAILINGS

Hole	Depth	Gold
# 6	10.5 ft.	0.046 ozs. *
#25	29.5	0.045
#66	28.7	0.07
	Average	0.055 ozs.

The upper dump was estimated in 1918 to contain 34,000 tons of roasted tailings. In this estimate the whole dump contained 9,275,000 cu. ft. although 6 out of the 11 holes did not reach bottom. The upper dump was estimated at 850,000 cu. ft.

For this report, the dump is assumed at 460,000 cu. ft. but at 20 cu. ft. per ton instead of 25.

* Struck timber and was abandoned.

CONGRESS VEIN

Gob Samples #2 Shaft

Location and Level		No.*	1st Series	2nd Series	Average
850 West	141 From Station	1	$16.29		
	153 " "	2		$4.48	$10.38
1100 West	312 From Station	3	$ 5.52		
	334 " "	4		$2.76	$ 4.14
1225 West	213 From Station	5	$13.11		
	66 " "	6		$7.60	$10.35
1300 West	20 From Station	7	$11.38		
	50 " "	8		$3.80	$ 7.59
	Averages		$11.57	$4.68	

Total Average - $8.11 0.232 oz

Above samples were taken from the best of the stoped area.

When the first samples proved to be valuable, the second series was taken from points somewhere near the first samples on the same levels.

Samples were taken by cutting the lagging, throwing back the coarse rock and sampling the finer fill left behind. It is difficult to get a correct proportion of coarse and fine material.

It is evident that material now having a value was left, or sorted out and thrown into the fill. There must be good and poor areas.

The fill can be tested by drawing out a narrow stope from level to level, hoisting both coarse and fine, screening out the coarse on the surface and sampling the finer portion. This will give the value and proportion of the fine material and indicate the cost of extraction.

*Sample Number

OTHER SAMPLES #2 SHAFT

Sample No.	Level & Location	Value
1	300 West	$5.17
2	300 West	$3.45
3	550 East	$2.10
4	650 East	$9.10
5	700 West	$6.55
6	700 West	$7.00
7	700 East	$4.20
8	750 West	$0.69
9	750 East	$3.50
10	750 West	$5.60
11	800 West	$1.40
12	1050 West	$4.14
13	1050 West	$1.40
	Average	$4.17 per ton
	8 Samples - Average	$8.11 per ton
	Total 21 Samples - Average	$5.65 per ton

CONGRESS VEIN

Shaft #2 — 200 to 300 Level West

Ore Face in Stope

Sample No.	Width Sampled	Gold	Value
25	14"	.44	$15.40
26	6"	.02	.70
27	16"	.10	3.50
28	32"	.02	.70
29	60"	.10	3.50
30	60"	.04	1.40
31	27"	.26	9.10
32	5"	.08	2.80
33	24"	.10	3.50
34	29"	.34	11.90
35	24"	.20	7.00
36	18"	.34	11.90
37	22"	.28	9.80
38	18"	.16	5.60
39	27"	.08	2.80
40	31"	.06	2.10
41	16"	.06	2.10

40 ft. 23" $10.14 (samples 34–37)

50 ft. 22" $9.40 (samples 34–38)

80 ft. 21" $8.30 (samples 31–38)

170 ft. sampled at 10 foot intervals

CONGRESS MINE

PATENTED CLAIMS

Claim	Mineral Survey Number	
Queen of the Hills	879	
Congress	878	
Fraction	883	
Niagara	880	
Mosouri	881	
Why Not	882	
Incline	1173	
Golden Thread	1352	
Golden Eagle	1191	
Excelcior	921	
Rich Quartz	1192	
Ohio	1190	
Old State	1189	To cover well
Snow Storm	1188	
Niagara Mill-Site	880	Covers well on Martinez Creek

CONGRESS MINE

UNPATENTED CLAIMS

CLAIM	DATE OF LOCATION	RECORD BOOK OF LOCATION NOTICE	PAGES
Bellick	September 6, 1887	24	291
Remnant	March 12, 1888	25	314
Boundary	February 1, 1893	35	161
Sunnyside	February 20, 1897	45	499
Highland	February 20, 1897	45	496
Keystone	January 4, 1899	50	364
East Extension of Golden Thread	March 8, 1899	51	156
Martinez	February 4, 1903	66	591
Ophir	November 30, 1913	36	341

PRODUCTION FROM CONGRESS MINE by W. F. STAUNTON

Production		692,332 Tons	
Gold		388,477 Ozs.	
Silver		345,598 Ozs.	
Value	Gold	$20.67	$8,029,900
	Silver	0.60	204,560
			$8,234,460
Value per ton	Gold	$11.60	
	Silver	.19	
		$11.79	
	Tailings	1.20	
	Gross Value per Ton	$12.99	
Value	Gold	$35.00	$13,597,000
	Silver	0.75	259,000
			$13,856,000
Value per ton Gold		$19.63	
		.37	
		$20.00	
Tailings (Sampled)		1.95	
		$21.95	

@ 80.00 au — 31,078,160
2.00 ag — 691,196
1973 — #31,769,356

CO.. RES MINE - PAST AND PRE: ..

PREPARED BY MATT CHRISTIAN - 1989

LOCATION

The Congress Mine lies in the southeastern part of Yavapai County in Central Arizona. The actual workings are situated three miles from the Town of Congress in a low range of hills along the southeastern edge of the Date Creek Mountains at an elevation of 3,400 feet above sea level.

GEOLOGY

The Congress Mining District and surrounding Date Creek Mountains are comprised of almost entirely of Precambrian granite. The granitic rocks range in composition from coarse-grained granite to granodiorite and contain swarms of pegmatite dikes comprising 10 to 15% of the rock unit. Through this formation, in the vicinity of the Congress Mine, occur a number of greenstone diabase dikes which generally strike in an easterly-westerly direction and dip to the north from 20 to 30 degrees. The two important structures in the area in which mining takes place are the Congress and Niagara Veins.

CONGRESS VEIN

The Congress Vein dips to the north at 23 degrees and lies along a contact between the granite and one of the many greenstone dikes known as the Congress Dike. The location and strength of quartz veining in the Congress Vein was controlled by premineral movement that broke and shattered the greenstone and granite providing open spaces for gold bearing quartz pyrite deposition. The premineral displacement between the hanging and footwalls of the Congress Dike was probably small, but sufficient to provide enough fracturing to act as a favorable conduit for the circulation of hydrothermal fluids.

NIAGARA VEIN

On surface, 250 feet south of the Congress Vein, the Niagara outcrop parallels the Congress outcrop. However, the Niagara Vein dips at a steeper angle of 45 degrees. Thus the deeper the veins penetrate from surface the farther apart they diverge from each other. Niagara Vein is a mineralized fault cutting the Precambrian granitic rock. Unlike the Congress Vein the Niagara Vein does not follow a greenstone dike.

HISTORY

The original Congress locations were made and named by Dennis May who sold the claims in 1887 to Mississippi Gambler "Diamond Joe" Reynolds and railroad tycoon Frank Murphy. The new owners operated the property with a 20 stamp mill and frue vanners for concentration until 1891. During the period recovery was poor. The oxidized ore found near the surface would not amalgamate. Also the gold in the sulfides were primarily associated with marcasite, which slimmed easily hence values were lost in the tails. Net return for the operation from 1887 to 1891 was $592,000 from the sale of concentrates and shipping ores. Mining tonnage for the period is estimated at 70,000 tons.

After "Diamond Joe's" death in 1891, the property stood idle for three years. During this period Frank Murphy and E. B. Gage of Tombstone were instrumental in bringing the Sante Fe railroad through the area to connect Congress Junction with Prescott and Phoenix. When production resumed in 1894 by the Congress Gold Company the mine enjoyed the convenience of railroad service through the construction of a three mile spur connecting the mine with Congress Junction.

The Congress Gold Company upgraded the mill with 40 stamps and additional vanners. Milling practices were greatly improved with the introduction of the cyanide leach process. By 1897, 425 men were employed at the mine.

In 1901 the mill was enlarged from 40 to 80 stamps. The water supply from the Martinez well was insufficient to meet the large mill's requirements. The Congress Gold Company then purchased the O'Neil Ranch on Date Creek and sank a shallow well from which water was pumped through a four inch spiral riveted pipeline eight miles in length to the Martinez well.

Production ore hoisted from 1894 to 1910 was 621,000 tons. Of which 308,000 tons were mined from the Congress Vein, 293,000 tons from the Niagara Vein, and 20,000 tons were extracted from the Queen of the Hills. Average recovered grade from 1894 to 1910 was .57 OPT gold and .5 OPT silver. Total production for the period is estimated at 357,000 ounces of gold and 322,000 ounces of silver. Net returns during the period was recorded at over seven million dollars with gold at $20.67/ounce and silver at 60¢/ounce. (Calculated current value is in the range of 144 million dollars.)

By 1910 workings extended to 4,000 feet in the #2 shaft of the Congress Vein and 2,000 feet deep in the #5 shaft of the Niagara Vein. With production coming from these depths ventilation problems and increased mining costs caused profits to suffer and the mine was closed.

Between 1910 and 1937 operations at Congress were confined to retreatment of tailings and processing of leftover ore dumps. No attempt was made to reopen the mine except for various leasers who made attempts to mine small pillars of ore that were left in the upper workings. During these 27 years, it is estimated that 50,000 tons of material were processed. An occasional short term profit was made from time to time, but no type of operations at the Congress appeared to hold promise of yielding an adequate profit until the price of gold advanced from $20.00/ounce to $35.00/ounce.

In 1935 the Congress Trust, which succeeded the Congress Gold Company, sold the operation to Gerald Sherman and Associates who organized the Congress Mining Corporation. The property, with existing improvements that did not exceed $5,000, sold for $26,000.

The mine dumps were considered doubtful in value until they were measured and heavily sampled. Results indicated 400,000 tons of dump material with an average grade of .086 OPT. Mill tailings on the property were also estimated at 426,000 tons at .07 OPT.

The Congress Mining Corporation proceeded to erect some new buildings and a 300 TPD counter current cyanide mill with power plant. The company operated the mill from June 1, 1938 to June 14, 1942. During this period 385,000 tons of material were treated. The breakdown of this material consisted of 276,000 tons from the tailings pile, confirm drill hole data. In 1987 Echo Bay acquired the remaining interest in the property.

Results from the metallurgical testing of the bulk sample proved that the high silica ore (which averages 75% silica) would be suitable as flux material. Late in 1987 Echo Bay made the decision to bring the Congress Mine into production by March 1988. The raw ore would be shipped as flux to Playas, New Mexico. By shipping ore as flux the property would not require the capital funds for a mill and production could begin immediately.

The mine operated for a year. However, due to the drop in gold prices, a shipping cost at $28 per ton, and smelter return recovery based at 85%, the project was breaking even.

During the year of production mining methods were changed considerably. The original bulk sample was mined as a shrink stope. This method proved labor intensive due to the fact that ore needed to be slushed out of the 45 degree stope with ground being supported as stope was drawn.

The next method tried was a highly mechanized cut and fill mining with small hydraulic jumbos. Due to the erratic pinching and swelling of the vein, confinement of the jumbo in the 45 degree stope led to poor productivity and dilution of ore. Split shooting of ore and waste in stope rounds were initiated to help dilution, but this highly mechanized method turned into an afternoon of handmucking for the highly mechanized miner.

107,000 tons from mine dumps, and 2,000 tons of shipment ore from custom shippers. Mill heads averaged .094 OPT with recovery estimated at 67 percent.

The property saw very little activity after 1942 and ownership changed hands several times until Mr. D. W. Jaquays consolidated much of the present holdings in the late 50's. Mr. Jaquays began a small scale exploration program through widely spaced drill holes and some exploration drifting. Around 1980 with gold prices on the rise, Mr. Jaquays initiated a heap leach operation using the dump material that was still available. This operation was marginally successful even at the very high gold prices of the period.

In April of 1982 Magic Circle Oil acquired the property from Jaquays for Magic Circle stock. The heap leach operation was soon terminated due to lower gold prices. Magic Circle then undertook an exploration drilling program consisting of 100 holes that resulted in the discovery of a significant new ore shoot on the Niagara Vein.

In 1983 Magic Circle decided to try and find a joint venture partner to finance development of the new orebody because of their lack of experience in mining and the drop in oil revenues.

In 1984 Echo Bay Minerals earned 51% interest in the Congress Mine and commenced a surface core drilling program to expand the drill-indicated reserves identified by Magic Circle. The 30 hole program proved successful and Echo Bay continued its evaluation by driving 2,300 feet of ramp to collect a 4,000 ton bulk sample and to

In July of 1988 the jumbos were parked and jacklegs were brought in along with the end-slice method. This method, in which eight foot vertical slices are taken by drilling a series of eight foot horizontal holes, proved successful. When the horizontal holes are blasted muck is easily picked up on the sublevel with no ore hang-up on the 45 degree footwall. Dilution in non existent. This method in conjunction with an aggressive bonus program provided productivity of 30 tons per manshift in the stopes.

Due to the size of the operation Echo Bay sold the mine to Malartic Hygrade of Toronto, Canada. The Congress Mine is the first U.S. acquisition for Malartic which operates the Orion Mine, and joint ventures the Camflo Mine with Barrick Minerals. Both mines are located in Val d'Or, Quebec.

A 350 ton per day carbon in pulp mill is currently being constructed with production planned for in May of 1990.

GEOLOGY AND MINERALIZATION

OF THE

CONGRESS MINE (file)

Prepared for the Arizona Geological Society
AGS Spring Field Trip
April 20, 1985

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LOCATION

The Congress Mine lies in the southeastern part of Yavapai County, central Arizona. The property occupies parts of Sections 10, 11, 14, 15, 22, 23, and 24 in T.10N, R.6W and Section 18, T.10N, R.5W.

It is situated along the southeastern edge of the Date Creek Mountains at an elevation of 3,400 feet above sea level.

HISTORY AND PAST PRODUCTION

The original Congress claims were located in 1887. A 20-stamp mill was constructed to process the ore and was operated until 1891, at which time a three-year shutdown occurred.

Work resumed in 1894 by the Congress Gold Company, which now enjoyed the convenience of a rail spur off the then recently-completed Phoenix to Prescott line. The mill was expanded to 40 stamps. At this time the No. 2 Congress shaft was 1000-feet deep with stoping restricted to above the 650 level.

The mine operated continuously from 1894 to 1911. During this period the cyanide process was introduced to greatly improve recoveries and another 40 stamps were added. The total official tonnage shipped or milled during this period is recorded as 692,332 tons, of which 370,022 tons were mined from the Congress vein with an average recovery of about 0.70 opt Au, 293,215 tons with an average recovery of about 0.415 opt Au from the Niagara vein, and 20,125 tons at 0.40 opt Au from the Queen of the Hills vein. A total of 388,477 oz. of Au and 345,598 oz. Ag were recovered. In addition to the above totals, substantial values were left in the mine fills and ore dumps.

From 1911 to 1935 operations at Congress were principally confined to retreatment of small portions of the mill tailings and ore dumps and robbing pillars. An estimated 50,000 tons of dump and tailings were treated.

A 300 TPD counter-current cyanide mill along with a power plant was erected in 1937. From 1938 to 1942, 385,505 tons of material (276,372 tons from tailings, 106,629 tons from dumps) were treated. The mill head averaged 0.094 opt Au with a recovery rate of about 69%.

The property saw very little production from 1942 to the present. Around 1980, with the gold price rise, a heap leach operation of crushed dump rocks operated for several years.

LOCAL GEOLOGY

LITHOLOGY

The Congress Mining District and surrounding Date Creek Mountains are comprised almost entirely of Early Proterozoic granitic intrusive rocks belonging to the 1320 m.y. to 1460 m.y. central Arizona batholith. The granitic rocks range in composition from coarse-grained granite to granodiorite and contain swarms of coeval pegmatite and aplite dikes comprising 10 to 15% of the rock unit. The granite also contains numerous house-size inclusions of partially digested metasediments (gneiss, biotite schist and quartzite). A few small lenses and dike-like amphibolite bodies of probably early Proterozoic age also cut the granite.

The Proterozoic granitic rocks have been intruded by four types of younger dikes that are, from oldest to youngest: east-west trending "greenstone" diabase dikes; northwest trending andesite porphyry dikes; northeast trending latite porphyry dikes; and northeast trending rhyolite dikes (previously termed alaskite).

Previous workers in the district have considered the greenstone dikes and gold mineralization Tertiary in age. However, a Late Proterozoic age (1080 m.y. to 1180 m.y.) has not been ruled out for the dikes or mineralization. The andesite, latite and rhyolite dikes are all post-mineralization.

STRUCTURE

Foliation in Precambrian igneous rocks is indistinct and variable, but an east-west strike and northerly dip appear to be the most common attitude observed in the area. Older metasedimentary inclusions in the granite have a N35°W foliation, coincident with the regional grain of the area.

There are at least six recognized periods of fault movement in the Congress area. From oldest to youngest, they are:

1. Minor pre-mineral thrusting from the north in Precambrian granite dipping 20° to 25° north (Congress Vein);
2. Pre-mineral west-northwest faults, dipping 40° to 45° north, (Niagara Vein);
3. Minor post-mineral movement on west-northwest thrust faults;
4. Cenozoic normal faults, striking N20°W to N30°W;
5. Cenozoic normal faults, striking N30°E to N50°E;
6. Basin and Range faulting striking N0°W to N20°W.

The minor east-west trending, north dipping thrust faults appear to be the oldest of the six main periods of faulting and are probably Late Proterozoic or Early Tertiary in age. Thrusting appears the simplest explanation for these shallow dipping greenstones. The amount of displacement on the thrusts is not known, but is probably small.

GOLD MINERALIZATION

The Congress Mining District has produced a minimum of 388,000 ounces of gold from relatively high-grade ore shoots in hypogene auriferous quartz veins. The district ranks second in primary gold production in Arizona. Essentially all of the district's gold production has come from two vein systems: The Congress and Niagara veins.

CONGRESS VEIN

The location of the Congress ore shoot was controlled by the intersection of the Congress greenstone dike with the Cross vein. This line of intersection accounts for the northerly rake of mineralization along which stoping was conducted nearly continuously down to the 3100 level and exploration with minor production to the 3900 level. The orebody obtained a maximum width of 1300 feet on the 650 level. Ore widths varied in the shoot from 3 to 7 feet.

The location and strength of quartz veining in the Congress vein was controlled by pre-mineral movement that broke and shattered the greenstone and granite providing open spaces for auriferous quartz-pyrite deposition. The pre-mineral displacement between the hanging and footwalls of the Congress dike was probably small, but sufficient to provide enough fracturing to act as a favorable conduit for the circulation of hydrothermal fluids. There is no reported change in vein mineralogy between the surface and the deepest mine workings, excluding surface oxidation.

NIAGARA VEIN

The Niagara vein strikes west-northwest, dips 41° north, and is located about 250 feet south of the Congress vein. The Niagara vein is a mineralized fault cutting Precambrian granitic rocks. Unlike the Congress vein, which it parallels in outcrop, the Niagara vein does not follow a greenstone dike and has the steeper dip, characteristic of most of the quartz veins in granite. The Niagara vein has been mined in four different areas along a strike length of 4000 feet.

The character of the Niagara vein ranges from a narrow zone of broken and hydrothermally altered granite with a little disseminated pyrite, to massive quartz vein material up to 14 feet thick with sharp wallrock contacts. In Niagara ore zones, the quartz vein averages 3 to 5 feet in thickness, usually with an additional 3 to 5 feet of altered granite wallrock containing a large proportion of quartz stringers and veinlets. The quartz stringer zone commonly constitutes ore grade material. The mineralogy of the Niagara vein material is similar to the Congress vein and consists of quartz, carbonate, pyrite, galena, chalcopyrite, hemitite, gold and silver. The galena and silver content is higher and the average gold grade is lower than in the Congress vein.

STRUCTURAL ORE CONTROLS

Pre-ore faulting and secondary permeability within the vein hosting structures appear to be the most significant structural controls on mineralization. Portions of the east-west trending greenstone dikes and east-west trending 40° north dipping faults were open to circulating hydrothermal solutions during the mineralizing period. Undulations and dialations in the walls of mineralized structures also appear to have increased secondary permeability and consequently, mineralization.

CHEMICAL CONTROLS

Wallrock chemistry does not appear to be as important a factor in controlling mineralization as structure. The higher mafic content of the greenstone dikes may in part account for the higher overall grade of the Congress vein ore. It has been noted in drill cores from the Niagara vein that pegmatitic wallrocks are generally less favorable for good ore (pyrite) deposition than granite wallrocks, and that a higher mafic content of the granite (granodiorite) generally corresponds to higher gold content.

VEIN MINERALOGY

The auriferous quartz veins are composed predominantly of vein quartz along with variable, but generally minor, amounts of carbonates. Pyrite, galena, and chalcopyrite are the only sulfides megascopically identifiable. Molybdenite has been tentatively identified in trace amounts. Reddish-brown hemitite is locally abundant as an oxidation product of pyrite. Gold probably occurs as micron-sized particles in pyrite.

NEW NIAGARA OREBODY

OREBODY CHARACTERISTICS

The Niagara orebody appears to be a classic fissue quartz vein deposit. The vein structure stikes N45°W and dips at about 41° to the northeast. The main ore shoot is oblique to the strike and dip of the structure, trending east-west. Several subsidiary shoots deviate from the main shoot.

Mineralization and Alteration

Mineralization in the new Niagara orebody is similar to areas previously mined in the Niagara structure. Mineralization in the orebody occurs in two basic styles, with the one common denominator observed in all mineralization being the presence of quartz and pyrite. High grade (+1 opt Au) mineralization will contain 10 to 25% sulfides over two feet. The higher grade mineralization usually occurs as a discreet vein of massive quartz from 1 to 14 feet thick with minor amounts of sulfides. The second style of mineralization has been termed the quartz stringer zone. The quartz stringer zone consists of 20 to 70% quartz veinlets flooding altered wallrock. The zone is generally lower grade to barren and usually envelopes the main quartz vein both on the foot and hanging walls.

As no definitive alteration analysis has been conducted on the core, the breakdown of alteration types is tentative, based only on visual identification. Alteration associated with mineralization appears to be relatively simple. Chloritic/propylitic and argillic alteration are the most common alteration types. The chloritic alteration assemblage consists of chlorite + quartz + pyrite that grades into propylitic alteration with the addition of epidote. Both the chloritic and propylitic alteration assemblages, which are closely associated, may contain carbonate, clay, K-feldspar, magnetite, biotite, sericite, and fluorite in minor amounts.

The chloritic/propylitic assemblage extends anywhere from a few inches to 50 feet away from the vein, with the average being less than 15 feet. The width of alteration is largely dependent on the degree of structural preparation. Alteration intensity decreases away from the vein. The alteration zone is widespread at the base of the main ore shoot and becomes much more narrow updip from the shoot and upper parts of the shoot itself.

Argillic alteration does not appear to be associated with mineralization, but with post-ore structures. The argillic alteration is very pale green to white in color and is closely restricted to structures.

CONGRESS (+)

CONGRESS MINE PROJECT

RESULTS OF THE 1984 EXPLORATION PROGRAM

PREPARED FOR ECHO BAY EXPLORATION INC.

by

CHRISTOPHER E. HERALD

MICHAEL RUSS

KEITH BELL

MAY 1985

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INTRODUCTION

Echo Bay Exploration Inc. entered into an agreement with Magic Circle Energy Corporation to acquire 51 percent of the Congress property in Yavapai County, Arizona, in June, 1984. As part of this agreement, Echo Bay committed to spend $250,000 on exploration and development before January 31, 1985, to complete their Phase I obligations.

An exploration program was initiated in the middle of July, 1984, and consisted primarily of rotary-hammer and diamond drilling designed to test the downdip and lateral extensions of the previously discovered New Niagara Vein ore shoot. Thirty drill holes totalling 25,714.5 feet of rotary-hammer and 3,660.5 feet of core were completed by mid-January, 1985.

Geologic mapping on a scale of 1 inch to 200 feet and geochemical sampling were conducted over a six square mile area. Results of the drilling and mapping are presented in this report.

LOCATION, ACCESS AND PHYSIOGRAPHY

The Congress property lies in the southeastern part of Yavapai County, central Arizona (Figure 1). The property occupies parts of Sections 10, 11, 14, 15, 22, 23, and 24 in T.10N, R.6W and Section 18, T.10N, R.5W, G. & S.R. B. & M., Arizona (Plate 1). The deposit lies in the western part of Section 14.

CONGRESS GOLD MINE LOCATION MAP: ARIZONA

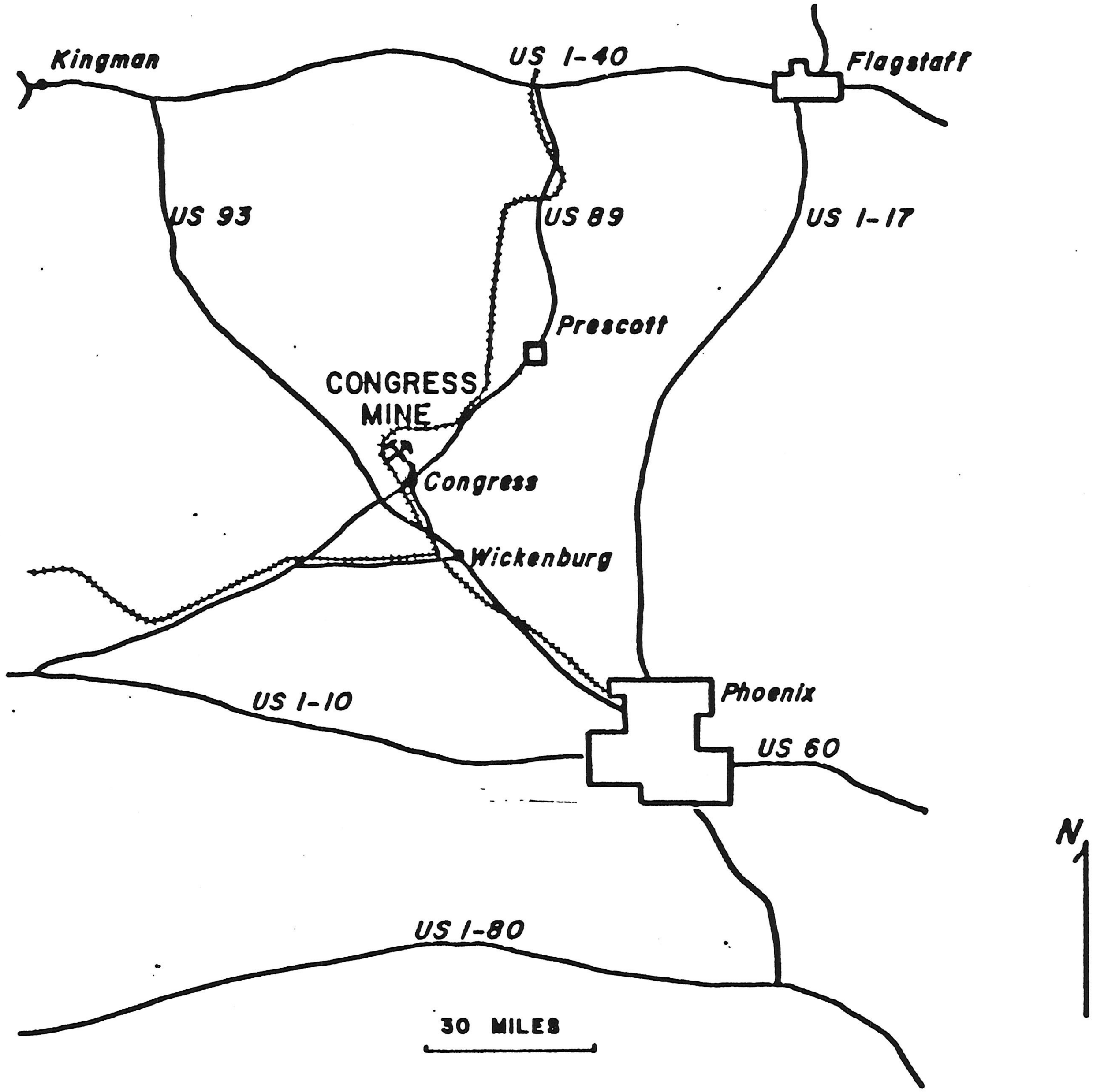

FIGURE 1: Congress mine location map.

Access to the property is excellent. The present townsite of Congress lies three miles south of the deposit via pavement and improved gravel roads. Wickenberg lies 23 miles south via U.S. Hwy. 89; Phoenix 63 miles southeast via U.S. Hwy. 89 and 60; and Prescott 46 miles northeast via U.S. Hwy. 89. A spur of the Santa Fe Railroad crosses the property with a siding at Congress.

The property is situated along the southeastern edge of the Date Creek Mountains at an elevation of 3,400 feet above sea level. Topography ranges from flat to rugged with a maximum relief of 600 feet. The shallowest part of the deposit lies in a fairly wide flat valley immediately west of a north-south trending ridge that rises 500 feet above the valley floor.

Situated in central Arizona, the climate supports Sonoran desert-type vegetation consisting of a wide variety of cacti and desert shrubs. The climate is excellent from October to May with temperatures ranging from 65° to 90° (F). The summer months from June to September are hot, ranging from 90° to 110° (F). Soil development is poor with excellent rock exposure on slopes and thin alluvium cover in the valleys ranging from 0 to 30 feet thick.

Seasonal run-off supports ephemeral streams, however, the limited watershed of approximately one square mile in the valley where the deposit occurs makes it unlikely that major flash flooding would occur. Good quality, relatively shallow aquifers are indicated in the valley by the presence of five water wells and the intersection of water in many of the drill holes. Water production from existing wells averages 55 gpm.

LAND

The Congress property consists of approximately 2,558 acres irregularly distributed over a northwesterly trending area four miles long and two miles wide (Plate 1). The property consists of 131 fully owned unpatented claims, 10 unpatented claims in which a 50 percent interest is owned, five leased unpatented claims that will be dropped in 1985, 14 mill site claims, five fully owned patented claims, and 14 patented claims in which only the surface rights are owned (Plate 1).

HISTORY AND PAST PRODUCTION

The original Congress claims were located by Dennis May, who sold the claims to "Diamond Joe" Reynolds and Frank Murphy in 1887. A 20-stamp mill with Frue Vanners was constructed to process the ore and was operated until 1891, at which time a three-year shutdown occurred.

Work resumed in 1894 by the Congress Gold Company, which now enjoyed the convenience of a rail spur off the then recently-completed Phoenix to Prescott line. The mill was expanded to 40 stamps with additional Vanners. At this time the No. 2 Congress shaft was 1000 feet deep with stoping restricted to above the 650 level.

The mine operated continuously from 1894 to 1911. During this period the cyanide process was introduced to greatly improve recoveries and another 40 stamps were added. The total official tonnage shipped or milled during this period is recorded as 692,332 tons, of which 370,022 tons were mined from the Congress vein with an average recovery of about 0.70 opt Au, 293,215 tons with an average recovery of about 0.415 opt Au from the Niagara vein, and 20,125 tons at 0.40 opt Au from the Queen of the Hills vein. A total of 388,477 oz. of Au and 345,598 oz. Ag were recovered. In addition to the above totals, substantial values were left in the mine fills and ore dumps.

Production from the major shafts on the two veins was as follows:

	Shaft	Depth	Production
Congress Vein	#1	1100'	117,899
	2	1700'	122,779
	3	4000'	63,524
Total			304,202
Niagara Vein	4	1000'	20,470
	5	2050'	191,734
	6	1800'	81,016
Total			293,220

From 1911 to 1935 operations at Congress were principally confined to retreatment of small portions of the mill tailings and ore dumps and robbing pillars. An estimated 50,000 tons of dump and tailings were treated.

In 1935 the property was sold by Congress Trust to Congress Mining Corporation for $26,000. The mine dumps were considered of doubtful value until their subsequent measurement indicated 400,000 tons at 0.085 opt Au. The Congress Mining Corporation erected a 300 TPD counter-current cyanide mill along with a power plant in 1937. From 1938 to 1942, 385,505 tons of material (276,372 tons from tailings, 106,629 tons from dumps) were treated. The mill head averaged 0.094 opt Au with a recovery rate of about 69 percent.

The property saw very little production from 1942 to the present. Ownership changed hands several times before Mr. D. W. Jaquays consolidated much of the present holdings. Mr. Jaquays drilled several widely-spaced holes and did some exploration drifting. Around 1980, with the gold price rise, Mr. Jaquays initiated a heap leach operation of crushed dump rocks. This operation was only marginally successful even at the then high gold price. Magic Circle Energy Corporation acquired the property from Jaquays in April, 1982, for $2.4 million in stock. The heap leach operation was soon terminated due to lower gold prices and reduced recoveries. Magic Circle then undertook an exploration drilling program that resulted in the discovery of a significant new ore shoot on the Niagara vein. Over 100 holes were drilled with total project costs of $2.2 million. In 1983 Magic Circle decided to try to find a joint venture partner to finance development of the new orebody because of their lack of experience in mining and the drop in oil revenue.

GEOLOGY

REGIONAL SETTING

The Congress Mining District is located on the southwest flank of the northwest trending central Arizona Proterozoic belt and on the north border of the Mohave block of the Basin and Range Province. The Proterozoic belt consists of older (1700 - 1800 m.y.) metavolcanic and metasedimentary rocks (Yavapai Series) intruded by a 1320 - 1460 m.y. granite - granodiorite batholite. The entire area was flooded by diabase sills during a major thermal event that occurred from 1080 to 1180 m.y.

The rocks in the Congress area and much of the Date Creek Mountains form a small portion of the granite to granodiorite batholithic intrusion (Plate II). The nearest significant exposures of older metavolcanic - metasedimentary Proterozoic rocks (Yavapai Series) occur six miles east of Congress as inliers of mafic to intermediate lavas and tuffs, undifferentiated coarse- to find-grained sediments and exhalites with minor volcanoclastics. These inliers coalesce into northeast trending belts becoming more voluminous to the north near Jerome.

Paleozoic and Mesozoic rocks are absent in the Congress area due to uplift and erosion, and nondeposition. Emplacement and deposition of a wide variety of flows and intrusives characterized the Cenozoic in central Arizona. The oldest rocks (Laramide?) in the region include andesite flows, tuff and agglomerate in the Wickenburg Mountains 10 miles southeast of Congress. Mid-Tertiary (?) andesite tuffs and agglomerate are exposed in Peeples Valley 10 miles northeast of Congress and in the western Date Creek Mountains 10 miles to the west. The most voluminous igneous rocks are Quaternary basalt flows that originated 38 miles north of Congress and occur as outliers and cones in the general area.

In addition to the larger igneous bodies just discussed, there are numerous small dikes and sills of variable composition that cut the Precambrian units. These include east-west trending greenstone (diabase) dikes, northwest trending andesite porphyry dikes and northeast trending rhyolite and latite porphyry dikes. The older greenstone (basaltic) dikes generally have shallow northerly dips in contrast to the other types with high angle dips. Some of the greenstone dikes in the Congress Mine area may belong to the 1080 to 1180 m.y. intrusive event rather than the Cenozoic age.

Quaternary alluvium and sediment gravels cover large portions of the valleys surrounding the Date Creek and Weaver Mountains. Much of the Quaternary cover developed as a result of Basin and Range faulting in the Late Tertiary.

LOCAL GEOLOGY

Lithology

The Congress Mining District and surrounding Date Creek Mountains are composed almost entirely of Early Proterozoic granitic intrusive rocks (see Plate II) belonging to the 1320 m.y. to 1460 m.y. central Arizona batholith. The granitic rocks range in composition from coarse-grained granite to granodiorite and contain swarms of coeval pegmatite and aplite dikes comprising 10 to 15% of the rock unit. The granite also contains numerous house-size inclusions of partially digested metasediments (gneiss, biotite schist and quartzite). A few small lenses and dike-like amphibolite bodies of probably early Proterozoic age also cut the granite.

The Proterozoic granitic rocks have been intruded by four types of younger dikes that are, from oldest to youngest: east-west trending "greenstone" (basaltic) dikes (previously referred to as diabase); northwest trending andesite porphyry dikes; northeast trending latite porphyry dikes; and northeast trending rhyolite dikes (previously termed alaskite). The relative ages were established by cross-cutting relationships. The rock names are tentative, based on field observations. No thin sections were studied in this phase of the project.

"Greenstone" (Basaltic) Dikes: Five persistent east-west trending, north dipping greenstone (basaltic) dikes have been mapped in the Congress District. Due to their close association with gold mineralization, they have been named from north to south: North Dike (Last Chance and Gold Wave Workings); Surprise/Bellick Dike; Congress Dike; Bistro Dike; and South Dike (Sullivan workings). All five of the greenstone dikes have parallel west-northwest strikes, dip 20° to 25° north, average 9 to 20 feet in thickness, and exhibit post-emplacement shearing. The fresh, unweathered greenstone is typically very fine-grained, dark green to almost black, with sparse to abundant narrow quartz and carbonate stringers and 1 to 3% fine euhedral pyrite. The chemical composition of one greenstone speciman collected from the Congress Dike is as follows:

SiO_2 = 52.20%	Al_2O_3 = 13.4%	FeO = 9.75%
MnO = 1.90%	CaO = 9.60%	MgO = 1.16%

Previous workers in the district have considered the greenstone dikes and gold mineralization Tertiary in age. However, a Late Proterozoic age (1080 m.y. to 1180 m.y.) has not been ruled out for the dikes or mineralization.

Andesite Porphyry Dikes: The numerous andesite porphyry dikes in the Congress District average 10 to 20 feet in thickness, trend N20° to N30° west and have steep dips. The andesite porphyry is fine-grained, dark bluish-gray, hard, fresh, and contains feldspar and hornblende phenocrysts. The andesite porphyry dikes are more numerous on the west side of the district. They cut greenstone dikes and quartz veins and have no mineralization associated with them.

Latite (?) Porphyry Dikes: The latite porphyry dikes are less numerous than the andesite porphyry dikes. They strike N30° to N50° east (like the rhyolite dikes), generally dip steeply west, and average 4 to 10 feet in thickness. They are light brown to gray, soft, friable, vesicular, with feldspar and hornblende phenocrysts. In portions of the district latite porphyry has been injected along and occupies the same structures as the rhyolite. In some cases individual dikes change composition from rhyolite to latite porphyry, suggesting that the two may be contemporaneous. The latite porphyry clearly cuts all but the rhyolite dikes. There is no gold mineralization associated with the latite porphyry.

Rhyolite Dikes: The rhyolite dikes are the youngest intrusive rocks in the district. They average 2 to 4 feet in thickness, strike N30° to N50° east, generally dip steeply west, and exhibit strong flow banding and laminations parallel to the dike walls. The rhyolite is very fine-grained, very light greenish-gray to almost white to occasionally pinkish gray and varies from hard and siliceous to soft and friable. Rhyolite outcrops characteristically weather into narrow white laminated ridges 6 inches to 2 feet high. There is no gold mineralization associated with the rhyolite dikes.

Structure

Foliation in Precambrian igneous rocks is indistinct and variable, but an east-west strike and northerly dip appear to be the most common attitude observed in the area. Older metasedimentary inclusions in the granite have a N35°W foliation, coincident with the regional grain of the area.

There are at least six recognized periods of fault movement in the Congress area. From oldest to youngest, they are:

1. Minor pre-mineral thrusting from the north in Precambrian granite dipping 20° to 25° north,
2. Pre-mineral west-northwest faults, dipping 40° to 45° north,
3. Minor post-mineral movement on west-northwest thrust faults,
4. Cenozoic normal faults, striking N20°W to N30°W,
5. Cenozoic normal faults, striking N30°E to N50°E,
6. Basin and Range faulting striking N0°W to N20°W.

The minor east-west trending, north dipping thrust faults appear to be the oldest of the six main periods of faulting and are probably Late Proterozoic or Early Tertiary in age. These faults, which dip 20° to 25° to the north, were later intruded by the greenstone dikes. The evidence for this faulting is the greenstone dikes themselves, which must have been injected along the pre-existing structures. Thrusting appears the simplest explanation for these shallow dipping greenstones. The amount of displacement on the thrusts is not known, but is probably small.

The second period of faulting is represented by the pre-mineral west-northwest striking faults that dip 40° to 45° north (Niagara Vein) and are now largely mineralized by quartz veins. Examples of this period of faulting are the Niagara quartz vein and the other minor quartz veins with similar strike and dip. This period of faulting may be contemporaneous with the west-northwest greenstone thrust faults.

The third period of faulting is represented by the post-mineral movement along the greenstone dikes. The intense shearing and boudinage structures developed along portions of the greenstone dikes indicate that post dike movement has also occurred.

The fourth period of faulting is represented by the N20°W to N30°W minor displacement normal faults along which the andesite porphyry dikes were intruded.

The fifth period of faulting is represented by the N30° to

N50° minor displacement normal faults that were later intruded by the rhyolite and latite porphyry dikes. Where these dike-faults (white dikes) were encountered in the Congress Mine workings, they vertically displace the quartz veins by 20 to 40 feet.

The most recent period of faulting in the Congress District is Basin and Range normal faulting. The Basin and Range faults strike due north to N20°W, forming a series of north trending horsts and grabens. Maximum apparent vertical displacements are on the order of several hundred feet. The most significant Basin and Range faults are the West Fault (Plate 5) and East Fault (Plates 4 and 6). The apparent vertical displacement on both of these faults is 230 feet. The apparent vertical displacements were determined by measuring the offset in the greenstone dikes on opposite sides of the faults assuming an average dip of 23° on the dikes.

GOLD MINERALIZATION

The Congress Mining District has produced a minimum of 388,000 ounces of gold from relatively high-grade ore shoot in hypogene auriferous quartz veins. The District ranks second in primary gold production in Arizona. Essentially all of the district's gold production has come from two vein systems: the Congress and Niagara veins.

CONGRESS VEIN

The term Congress vein has been applied rather loosely to include mineralization within quartz veining that follows the Congress greenstone dike and within a quartz vein that diverges from the greenstone dike into the hanging wall granite, called the Cross vein (Plate 2). This mineralization occurs in nearly one continuous ore shoot that produced 304,202 tons at a recovered grade of 0.70 opt gold. The Congress greenstone dike strikes west-northwest and dips at 20 to 25° to the northeast. The Cross vein strikes slightly oblique to the Congress dike in a more east-west trend and dips 30°N.

The location of the Congress ore shoot was controlled by the intersection of the Congress greenstone dike with the Cross vein. This line of intersection accounts for the northerly rake of mineralization along which stoping was conducted nearly continuously down to the 3100 level and exploration with minor production to the 3900 level. The orebody obtained a maximum width of 1300 feet on the 650 level. Ore widths varied in the shoot from 3 to 7 feet. Below the 3050 level mineralization diminished in grade and thickness.

The location and strength of quartz veining in the Congress vein was controlled by pre-mineral movement that broke and shattered the greenstone and granite providing open spaces for auriferous quartz-pyrite deposition. The pre-mineral displacement between the hanging and footwalls of the Congress dike was probably small, but sufficient to provide enough fracturing to act as a favorable conduit for the circulation of hydrothermal fluids. There is no reported change in vein mineralogy between the surface and the deepest mine workings, excluding surface oxidation. Vein mineralogy is discussed in detail in the Vein Mineralogy section.

Four episodes of post-mineral faulting and two periods of post-mineral dike intrusion have cut the Congress vein mineralization. These episodes are minor southward thrusting in the plane of the greenstone dikes resulting in shearing, crushing, and local boudinage structures in the Congress vein; northwest trending minor normal faults intruded by andesite porphyry, northeast trending normal faults later intruded by rhyolite and latite porphyry dikes that offset the Congress vein by 20 to 40 feet; and north trending, normal Basin and Range faults. One of the Basin and Range faults, the East Fault, cuts off a portion of the east edge of the Congress vein mineralization.

NIAGARA VEIN

The Niagara vein strikes west-northwest, dips 41° north, and is located about 250 feet south of the Congress vein (Plate 2). The Niagara vein is a mineralized fault cutting Pre-cambrian granitic rocks. Unlike the Congress vein, which it parallels in outcrop, the Niagara vein does not follow a greenstone dike and has the steeper dip, characteristic of most of the quartz veins in granite. The Niagara vein has been mined in four different areas along a strike length of 4000 feet. From east to west they are the old No. 5 shaft area, the No. 5 shaft area, the No. 4 shaft area, and the No. 6 shaft area. Together they have produced 293,220 tons of ore with an average recovery grade of 0.415 opt gold.

The character of the Niagara vein ranges from a narrow zone of broken and hydrothermally altered granite with a little disseminated pyrite, to massive quartz vein material up to 14 feet thick with sharp wallrock contacts. In Niagara ore zones, the quartz vein averages 3 to 5 feet in thickness, usually with an additional 3 to 5 feet of altered granite wallrock containing a large proportion of quartz stringers and veinlets. The quartz stringer zone commonly constitutes ore grade material. The mineralogy of the Niagara vein material is similar to the Congress vein and consists of quartz, carbonate, pyrite, galena, chalcopyrite, hemitite, gold and silver (see Vein Mineralogy section). The galena and silver content is higher and the average gold grade is lower than in the Congress vein.

The Niagara vein intersects and cuts the underlying Bistro greenstone dike at depth. This intersection was a locus for high-grade mineralization in the No. 5 shaft area. The

Niagara vein structure is faulted both to the east and west by late Tertiary normal faults. These faults, named the East Fault and West Fault, both have an apparent vertical displacement of approximately 230 feet and are down-dropped to the west. These faults bound the currently known 4000 foot long productive zone of the Niagara vein. The orebody in the old No. 5 shaft area is cut off by the East Fault. The upthrown vein segment east of the East Fault was recently discovered (1981) by drilling conducted by Magic Circle. The westward continuation of the Niagara vein west of the West Fault has not been tested. The ore grade mineralization in the Echo Bay/Magic Circle orebody terminates before reaching the West Fault offset, however, the Niagara structure probably continues west of the West Fault.

ADDITIONAL VEINS AND PRODUCTION

The Queen of the Hills vein that produced 20,000 tons of approximately 0.40 opt Au is probably the continuation of the Cross vein east of the East Fault. This vein can be followed eastward until it intersects and terminates against the Surprise/Bellick greenstone dike (Plate 2 and 6). The intersection between the quartz vein and the footwall of the Surprise/Bellick dike was the location of mineralization and stoping. The footwall vein mineralization apparently diminishes eastward and the Surprise/Bellick dike is cut off by a large Basin and Range fault further east.

Numerous pits, adits, and shallow incline shafts have explored the eastward continuation of the Congress greenstone dike and the Niagara vein east of the East Fault (Plates 4 and 6). Some good grade vein material was found on the dumps in this portion of the Congress dike, but the vein appears to be discontinuous and narrow. Similarly, the eastward continuation of the Niagara vein is narrow and sporatic. Both of these structures are cut and upthrown by the East Fault a short distance downdip from their outcrop. The Congress dike intersects the East Fault on the ridge to the east of the main Congress working and can be followed east almost to the railroad tracks before it is offset by a fault and is covered by alluvium. No mineralization was observed in the Congress vein east of the ridge.

On the South Greenstone dike, which outcrops south of the Bistro dike, a small amount of gold ore was produced from the Sullivan Mine (Plate 4). The workings consisted of an incline shaft on the South dike and stoping on a narrow ore shoot. The amount of stoping was small and the quartz vein is narrow. The South dike is badly segmented by numerous north trending normal faults and is covered by alluvium for most of its length.

On the North Greenstone dike a small quantity of gold ore was stoped from the Last Chance workings on top of the ridge north of the Congress Mine (Plate 9). Mine workings consist of a 1200 foot inclined shaft sunk on the footwall quartz vein, connecting at the bottom to a 1940 foot long haulage level. Underground mapping and sampling by Magic Circle indicate that the vein pinches out at approximately 500 feet.

Several thousand feet west of the Last Chance workings along the North dike are the Gold Wave workings (Plate 8), consisting of three or four caved incline shafts on a 2 to 3 foot thick footwall quartz vein outcrop. Production from the Gold Wave is unrecorded. A very small quantity of ore was shipped from the surface workings in the 1930's. Just west of the Gold Wave workings, the North dike is cut by a north trending fault that downdrops the dike and displaces its outcrop southward. This southerly displaced segment was explored by three inclined shafts (caved) on a narrow footwall vein. Production, if any, from these shafts is not recorded. West of the downdropped segment, the outcrop of the North dike shifts back to the north and continues its east-west strike to the west edge of the mapped area. This segment of the North dike is prospected by several pits, trenches, and two caved incline shafts. Only a few pieces of quartz float were observed on the dumps.

Approximately 100 feet south of the North dike is a parallel east-west trending quartz vein in granite (Plate 5). The vein dips 40° north, and continues beyond the west edge of the mapped area. This vein is fairly persistent for 500 feet and averages 12" to 24" thick with good pyrite and moderate gold values.

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On the Surprise/Bellick dike there are a few pits and shallow inclined shafts along the portion between the East and West Faults. However, almost no vein quartz occurs in this segment. This is in contrast to the Congress dike to the south. West of the West Fault the Surprise/Bellick dike is downdropped and broken into faulted segments. Very little vein quartz is associated with the dike in this area.

The Congress dike can be followed northwest from the collar of the No. 3 shaft to the West Fault, where it is offset and lost beneath alluvium. This segment of the dike has been explored by several inclined shafts and shows only minor, spotty quartz veining.

STRUCTURAL ORE CONTROLS

Pre-ore faulting and secondary permeability within the vein hosting structures appear to be the most significant structural controls on mineralization. Portions of the east-west trending greenstone dikes and east-west trending 40° north dipping faults were open to circulating hydrothermal solutions during the mineralizing episode. The intersections of minor faults and fractures with the main vein structures (i.e. the Cross vein) appear to be favorable loci for strong mineralization. Undulations and dialations in the walls of minerlized structures also appear to have increased secondary permeability and consequently, mineralization.

CHEMICAL CONTROLS

Wallrock chemistry does not appear to be as important a factor in controlling mineralization as structure. The higher mafic content of the greenstone dikes may in part account for the higher overall grade of the Congress vein ore. It has been noted in drill cores from the Niagara vein that pegmatitic wallrocks are generally less favorable for good ore (pyrite) deposition than granite wallrocks, and that a higher mafic content of the granite (granodiorite) generally corresponds to higher gold content. Due to the lack of any fluid inclusion studies on vein material from the Congress vein, little can be said concerning the temperature and chemistry of the mineralizing solutions.

VEIN MINERALOGY

The auriferous quartz veins are composed predominantly of vein quartz along with variable, but generally minor, amounts of carbonates. Pyrite, galena, and chalcopyrite are the only sulfides megascopically identifiable. Molybdenite has been tentatively identified in trace amounts. Reddish-brown hemitite is locally abundant as an oxidation product of pyrite.

The exact mode of occurrence of gold in the Congress ores is unknown. Visible gold, even in high-grade ore, is extremely rare. Visible gold was not found in core, outcrop, or dumps during the course of the program. The recoverability of approximately 90% of the assay gold values in the ore from pyrite concentrates strongly suggests that the gold occurs as microscopic (micron size) particles disseminated in pyrite. This assumption should be tested by polished sections and/or microprobe analysis. The apparent gold-pyrite association is further supported by field observations that gold grades correlate closely with the pyrite content of the quartz vein, but not with the galena or chalcopyrite content, although, in high-grade ore, pyrite, galena, and chalcopyrite commonly occur together. Ore with high silver values generally contains higher galena content, suggesting a silver-galena association.

Vein Quartz

Vein quartz is generally massive, filling all available open spaces, but sometimes contains small vugs with euhedral crystals. The vein quartz is milky white to semi-vitreous, to occasionally dark gray due to finely disseminated sulfides. In some places, quartz vein material is intensely sheared by post-vein movement.

Pyrite

Pyrite occurs in vein quartz as euhedral cubes ranging from microscopic to 1 cm; as subhedral masses or crystal aggregates and also as anhedral blebs. Fine pyrite commonly forms crude bands in vein quartz parallel to vein walls. The pyrite content in vein quartz ranges from trace to as much as 20 to 30% over a two-foot section of vein within very high-grade ore.

Galena and Chalcopyrite

Galena occurs in concentrations up to 2 to 4% as small blebs and fracture fillings in quartz. It occurs as fine-grained, subhedral crystals and less commonly as coarse aggregates. Chalcopyrite is commonly associated with galena, but overall is less common. Pyrite, galena and chalcopyrite are generally in physical contact with each other when all three are present in the vein quartz.

NEW NIAGARA OREBODY

HISTORY OF DISCOVERY

Mineralization occurring on the B & M, J-3, J-5 and J-9 claims immediately northwest of the No. 6 Shaft stoping has been designated the New Niagara Orebody. This mineralization was originally discovered by Mr. Jaquay in the mid-1970's. However, it wasn't until 1982 that offset drilling by Magic Circle delineated a significant tonnage of high grade material.

PROGRAM METHODS

The overwhelming majority of work conducted during the 1984 program focused on the New Niagara Orebody. This section briefly describes the methods used in the exploration program.

Drilling

Surface expression of the orebody is essentially nil, thus, information on the orebody is derived entirely from drill core. To date, about 100 drill holes have penetrated the Niagara structure in or near the New Niagara ore shoot. Thirty of these holes were drilled by Echo Bay Exploration in 1984.

The upper part of all Echo Bay holes was drilled by Connors Drilling using a TKS Portadrill with a down hole 6-inch diameter rotary-hammer bit. Cuttings samples were collected every ten feet and described. Samples containing anomalous amounts of pyrite were sent in for analysis.

Rotary-hammer drilling was stopped 30 to 100 feet above the projected intersection of the hole with the Niagara structure and the rotary rig was moved off the site. A Longyear 44 (Connors Drilling) was then set up over the rotary hole. Diamond core drilling was initiated and continued through the Niagara structure, generally 15 feet into unaltered granite, before stopping. NX-core was recovered from all holes, except EB-1, 3 and 7, where NC-core was recovered. All core was placed in well labelled standard cardboard core boxes for logging and storage.

Core Logging and Splitting

All core was logged in detail, with colored lithologic and alteration logs accompanying descriptions (see Volume II: CORE LOGS). Mineralized or strongly altered core was split using a double blade four-inch Jay core splitter. Sample intervals were generally made based on lithologic/mineralogic boundaries. The most common sample interval width was two feet, but sampled intervals ranged from one to five feet.

Assaying

Assaying was done by North American Laboratories of Tempe, Arizona. A summary of average assay results by hole number is presented in Appendix I. Certified laboratory assay results for both core and rock chip samples are presented in Appendix III. Sample preparation by North American consisted of crushing the entire sample to one-quarter inch, blending, splitting, and pulverizing one split to -200 mesh. Core samples were then fire assayed (one assay ton) and reported in ounces per ton, while rock chip samples were finished by atomic absorption and reported in parts per million.

Core samples that assayed over 0.100 OPT Au or were in or near ore grade material were check assayed by Loring Laboratories of Calgary, Alberta. For the first batch of 33 check assays sent to Loring, North American made new pulps out of rejects. For the second batch of check assays, North American sent rejects and Loring made their own pulps.

Assay reproducibility was exceptional and we can have a high degree of confidence in our assay results. Figure 2 is a two-

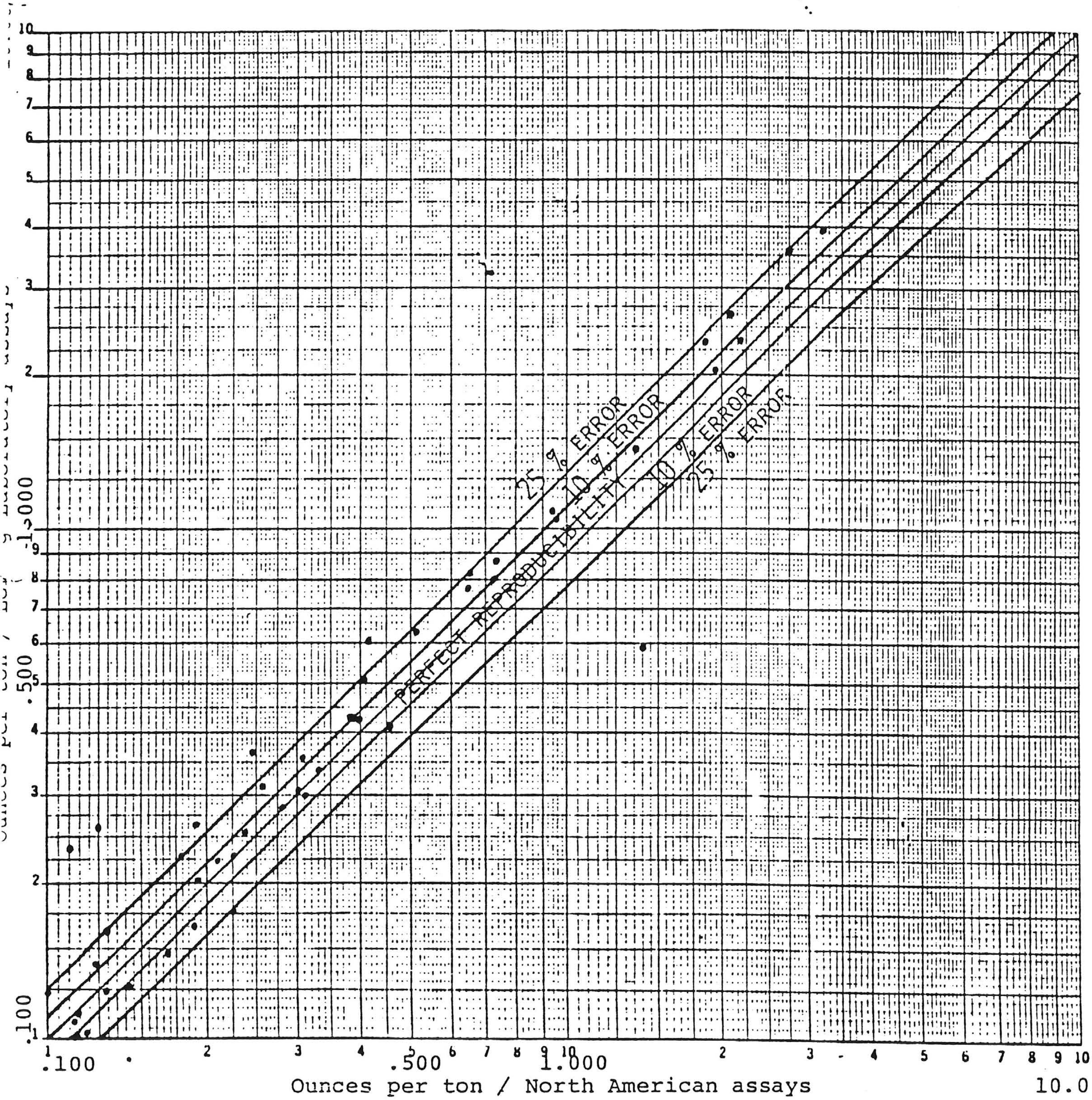

FIGURE 2: Comparison of North American Lab. assays with check assays from Loring Lab.

cycle log graph comparison of the results of the higher assays from the two labs. Generally, Loring assays were slightly higher than North American. Slightly over 42% of the check assays were within 10% of the original assay and a remarkable 89% of the check assays were within 25%. The greatest assay discrepancy between labs was for sample EB-54 (hole EB-5) in which North American's assay result was 1.38 opt Au versus Loring's result of 0.59 opt Au.

OREBODY CHARACTERISTICS

The Niagara orebody appears to be a classic fissure quartz vein deposit. The vein structure stikes N45°W and dips at about 41° to the northeast. The main ore shoot is oblique to the strike and dip of the structure, trending east-west. Several subsidiary shoots deviate from the main shoot; the most important is the northeast trending shoot adjacent to stoping in the Niagara No. 6 shaft.

Mineralization and Alteration

Mineralization in the new Niagara orebody is similar to areas previously mined in the Niagara structure. Mineralization in the orebody occurs in two basic styles, with the one common denominator observed in all mineralization being the presence of quartz and pyrite. High grade (+ 1 opt Au) mineralization will contain 10 to 25% sulfides over two feet. The higher grade mineralization occurs as a discreet vein of massive quartz from 1 to 14 feet thick with minor amounts of sulfides. The second style of mineralization has been termed the quartz stringer zone. The quartz stringer zone consists of 20 to 70% quartz veinlets flooding altered wallrock. The zone is generally lower grade to barren and usually envelopes the main quartz vein both on the foot and hanging walls.

As no definitive alteration analyses have been conducted on the core, the breakdown of alteration types is tentative, based only on visual identification. Alteration associated with mineralization appears to be relatively simple. Chlorite/propylitic and argillic alteration are the most common alteration types. The chloritic alteration assemblage consists of chlorite + quartz + pyrite that grades into propylitic alteration with the addition of epidote. Both the chloritic and propylitic alteration assemblages, which are closely associated, may contain carbonate, clay, K-feldspar, magnetite, biotite, sericite, and fluorite in minor amounts.

The chloritic/propylitic assemblage extends anywhere from a few inches to 100 feet away from the vein, with the average being less than 15 feet. The width of alteration is largely dependent on the degree of structural preparation. Alteration intensity decreases away from the vein. The alteration zone is widespread at the base of the main ore shoot and becomes much more narrow updip from the shoot and the upper parts of the shoot itself. Drill holes EB-24 and 28 are of particular interest because of the widespread chloritic/propylitic alteration with the presence of fluorite, fairly abundant pyrite (5%) and little to no quartz. This wide, well altered, silica poor area in the Niagara structure may be indicative of the bottoms of ore shoots.

Two other alteration types noted in core include potassium alteration and silicic alteration; both types are rare. Potassium alteration occurs as salmon pink to white K-feldspar selvages on quartz veins and replacement extending to 10 mm. adjacent to quartz veins. Silicic alteration occurs simply as silicification of wallrock adjacent to mineralization.

Argillic alteration does not appear to be associated with mineralization, but with post-ore structures. The argillic alteration is very pale green to white in color and is closely restricted to structures. The white clays are most common in the upper part of the Niagara structure, suggesting their origin to be at least partly caused by circulating ground waters.

Thickness Distribution

The thickness of mineralization, defined as intervals averaging greater than 0.100 opt Au., varies from 0 to 35.5 feet. The thicker areas are caused mainly by fairly well mineralized stringer zone mineralization rather than by a single vein width. As seen on Plate 10, the thickest part of the main ore shoot occurs in the central part of the updip portion of the shoot centered around EB-2, MC-Q and O. Updip (or up-plunge) from this thick part of the orebody, the vein narrows significantly into a high-grade discrete vein. Further updip and up-plunge of the main ore shoot, the Niagara structure and mineralization narrows abruptly to almost nil. Downdip from the thickest part of mineralization, the thickness of mineralization narrows more gradually than updip.

Thickness of mineralization in the subsidiary ore shoot adjacent to the old No. 6 Shaft appears to maintain a rather constant thickness of 10 feet.

Grade Distribution

Mineralization ranges in grade (over five feet or greater) from near nil to over 1 opt. Au. The highest grade mineralization occurs near the top of the main ore shoot where six holes have grades exceeding 0.600 opt Au. (see Plate 11). Intermediate grades between 0.200 to 0.400 opt Au extend downdip in the main ore shoot and to the northwest along strike for several hundred feet. Intermediate to high grade mineralization occurs fairly consistently in the subsidiary ore shoot adjacent to the Niagara No. 6 Shaft.

Low-grade mineralization occurs over a widespread area below the 1200 foot level (slope distance) and has been detected to the 2000 foot level. Near the bottom of the presently defined low-grade zone, a high-grade zone of six feet of 0.420 opt Au was intersected in EB-10. This zone is similar in appearance to the high-grade zone 1200 feet updip and may indicate another high-grade zone occurs between EB-10, EB-14, and MC-AG.