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Return to

H. S. Neal
Box 408 Labor Sta
Phoenix

Tombstone, Arizona

March 15th. 1938

E. W. Crozier & Wm. Saundercock,

Tombstone, Arizona.

Gentlemen:

Enclosed herewith I submit the report on the Wellington Group of Mines. located in the Turquois Mining District, Cochise County, Arizona.

Respectfully yours,

V. G. Mellgren

V. G. Mellgren, E. M.

Mining & Metallurgical Engineer.

Reconnaissance Report on the
Wellington Croup of Mines.

Holdings:

The Wellington Group of Mines, consists of 21 unpatented lode claims; mention is hem made of the holdings, as shown by the map of Wm. Saundercock at Gleeson, Arizona. The area covered by these holding approximately cover 420 acres.

The property is owned by Wm. Saundercock of Gleeson, Arizona, and E. W. Crozier of Tombstone, Arizona. Title is clear and free of any indebtedness.

Location:

The area embraced within these holdings, is situated in what is known as the Turquois Mining District, in Township 20 South, Range 24 East and lies about five miles westerly from the mining camp of Gleeson and about 11½ miles south westerly from the Tombstone-Gleeson County Highway. This highway is a good dirt auto road and connects with an easily traveled road to the western extremity of the property. The City of Tombstone lies about 13 miles westward.

Accessability:

From a mining and development standpoimt the property is very accessable and this feature of accessability is an important factor in development. Very light expenditures on the mine roads will put them in excellent condition for auto and truck travel.

History:

A brief outline of the past known history may throw a little light on furure prospects. The present owners acquired these hildings after the death of Mr. Hamilton the former owner. It was under the ownership of Mr. Hamilton that the tunnel on the Craw Hill No. 3 claim was driven to cut the exposed surface vein.

The area covered by these holdings and adjacent vicinity has been known to contain gold values for the past fifty years or longer; and irregular work has been done in years past with a view of developing shipping ores. Numerous small shipments have been made off these holdings from the higher grade gold ores and on the eastern extremi-ty of these properties: It is reported that Wm. Lutly and partner shipped about $10,000.00 from one shallow shaft.

In the writing of a report for Mr. Bertrand Stevenson in 1932,

on a property about 3 miles south of these holdings, the writer gathered some interesting notes on the history of the area.

In a discussion of geology; the genesis of the ores will be briefly covered, but at this point, since to the writer's point of view there is a simularity in origin or a community of origin and a single metaclogenesis of the ore occurrance, in this southern Turquois area, adjactent data or history will be of interest.

To the south of this group evidence of operation by the old Indian or Spanish Arrasta method is visable on the lower flat country and the remains of an old foundation of a stamp mill is to be seen near the old Arrasta workings.

Inquiry about the Arrasta foundations brought no information as to early workings, but investigation as to past work on the old stamp mill disclosed the fact that the late John Angus, Sr. of Bisbee, Arizona, shipped in a five stamp mill from San Francisco and plated the free milling gold ores to the south of this property, in the early 80's and the ore mined and milled is reported to have given a gold yield of $58,000.00.

To throw additional light on gold values in the adjacent intrusive areas where selective mining has been done in past years, in the search of the direct shipping ores, assays I have had access to will be given.

Since I have examined the territory to the south of this group I am including these observations for what connection it may throw on the ore deposits of this group.

From observations it appears that the fissures and the master fractures appear to narrow down as they approach the lower rolling hills and pedimentry slopes, to the south, but still retain the same ore characteristics.

As to what connection there may be in zonal depth I have not definitely determined; but the difference in elevation of the southern extremities to the south, would indicate that several hundred feet of erosion has occurred there, and therefore the surface fissures and fractures to the north would be in higher position than the exposed surface fissures to the south. if assays on a lower horizon can be taken to be genetically connected with the higher and less erroded areas it may be of interest as history ~~to~~ at this point; though not on

the prperties under discussion.

Assayed by E. A. Jacobs,
Tucson, Arizona, Jan. 29, 1931.

Samples taken by John W. Dailey.

	Gold	
No.1 A	o.91	12" ore Joe Shaft
2 A	4.37	20" ore " "
3 A	o.150	4 feet above 2 A, a 2 A, but 6" N.E.
4 A	o.50	2' cut on same vein
5 A	o.160	3' ore in open cut.
6 A	o.09	6" stringer 1500' S. W. of Joe Shaft
7 A	o.24	near 6 A, sorted ore on dump
8 A	o.35	20" ore in open cut
9 A	o.51	Old dump at 80' shaft on vein paralleling vein No. 8 A

On Sept. 9, 1931 S. P. Car No. 45,091 was shipped to the Phelps Dodge Corporation, Copper Queen Branch Reduction Works at Douglas, Arizona., which gave the following results:

Gold	Silver	Copper
o.48	o.66	o.29%

The largerportion of this carload was gathered from surface float, the balance being grass-root ore from veins.

Prior to the shipment of the car above mentioned, samples were taken and assayed by the writer, along surface croppings and shallow workings which gave assay values of from $2.80 to $48.00 per ton in gold. (On old gold price of $20.67 per Oz.) These samples were not taken with a view of determining a general vein average, but merely for the purpose of determining the advisability of mining a few car of ore, for direct shipment to the smelter, under a siliceous rate.

In the following brief discussion of the geology of the area, I am using data and information gathered in a study of the Turquois Mining District when the writer was engineer for the Calumet and Arizona Mining Co., at Courtland in 1911-1912 and a latter investigation of the territory to the south in 1931-32, in addition to the present examination.

Topography.

The aera covered by this group is of a more moderate relief on the eastern and western portions, with a more abrupt approach as you near the central portions; but as a whole the topography is such as to permit access to most parts of the property for initial development.

Geology.

The formation covering the Wellington Group is a granitoid rock with accompanying intrusions of rhyolite, diorite diabase, felsite, quartz porphyry and associated monzonite and quartz monzonite porphyry.

From a study of the geology of the Turquois Mining District it appears that a phenomenon apparently genetically connected with the formation of these fault block ranges was due to these batholithic invasions. This was an upward movement, from deep seated reservoirs beneath, of magnetic material in great volume along their axes, these slowly crystalizing into granite, monzonite, diorite and other granitoid rocks. the accompanying compression and tension were factors in the shaping of the uneroded portions of the present mountain relief.

It appears that this portion of the Turquois Mining District under discussion is of Early Tertiary erruption periods, followed in Mid-Tertiary by collapse. In the collapse of the Early Tertiary volcanic covering the underlying older rock formations were broken up, producing a topography in which the salient fratures, as seen to-day, are the north-west-southwest trending fault block mountains and intakmont valleys or plains.

In some cases by latter differentiation they were metal rich, and their residual and volcanic constituants, escaping from them, or being forced out, as the magma crystalized, from a state of mineral solution, made their way into the overlying rocks, though fissures, fractures and fault plains to form the overlying ore bodies. It is to this factor that the writer attributes the formation of the ore deposites of the Turquois Mining District.

The erosion in the northern area of this district has not been so pronounced as it is in the south, so that in and around the Courtland-Gleeson territory the upper or higher ore bearing formations have been mined in both secondary and primary ores of gold-silver-lead and copper.

It appears to the writer that the genisis of the ore deposits of the Truquois District as a whole, have a community of origin, and it is the writers belief that the pathway to the ore depositions has been due to the existing fissures, fractures or fault plains.

To the north and northeast of this group in the Courtland-Gleeson area both sedimentary and igneous rocks are classified; the

earliest in age being pre-Cambrian; where exposed portions of schist, simular to the Pinal schist of the Bisbee area to the south is visable. This exposed schist underlies Bolza Quartz of Cambrain age; accompainied by the younger Abrigo limestones. The next younger observed formation of the northern Turquois area, being Carboniferous, including Mississippian and Pennsylvanian limestones and resting unconformably upon the older formations; the the northern portions of the area, sedimentary Cretaceous simular to Comanchean occur. (Bulletin No. 123, Geological Series No. 5, Arizona Bureau of Mines-Opus Cit.; pages 19-20-21-22.)

From observed occurrance in the northern Turquois Mining District, the younger Cretaceous and Quarternary formations are visable, which as you approach the Wellington Group under discussion, have been removed by erosion; leaving the igneous intrusion exposed in relief; which as - stated I cla-ssify as territary or close to Pre-Cretaceous in age.

The ore occurrance is found mainly in master fissures and shear zones and occur with a general north-south strike, showing a decided tendancy to northeasterly departures, with dip to the west.

Due to the absence of a erosional pedimentary slope in the area under discussion, brings into surface relief the exposed veins; being covered with from a few inches to to 5 or 6 feet of erosional overburden, these exposed surface croppings show persistently along their strike and of seven different exposed veins; they very in width of from 2' up to 60' and can be traced on their strike along the surface for a distance of 3500 feet.

The metal values of the fissure veins are gold, silver, with occassionally traces of copper. Gold values predominate and is classified as "free Milling" gold. On crushing and grinding and panning the iron stained quartz material, particles of free native gold are discernible in the pannings.

The intruding dikes show some off-setting by cross-faulting and development may genetically connect vein displacements with the dike off-setting.

The source of ore deposits of this area is attributed to volcanism, that is, to some upward movement of lavas, differentiated deep within the earth's crust from which segregated and freed metalizing

elements were expelled into the invaded older covering formations. It is to be expected that in the process of deposition of the ore bodies from depth differentiation in the upward migration of solutions rich in metals, that there will be found areas, zones or locations where conditions for deposition in the fissures, factures or shear zones were more favorable to deposition; due to porosity, density and the then existing tempreture and pressure, and it is due to this condition that it is to be expected that there should be encountered zones in this fissure system where future development will disclose the fact, that, metal deposition has been more pronounced; and this factor should be considered in determining the probability of encountering higher grade lenses of ore during the mining and development of what are classified as low grade milling ores. From past data obtained and assays made in this and adjacent areas, it is the writers opinion that this condition will be encountered.

This group as a whole would be classified as undeveloped. While there has been, all told several thousand feet of work done on the property, it consists mostly of open cuts and shallow shafts, with the exception of the cross-cut tunnel on the Craw-Hill No. 3. This tunnel was driven in from the west slope of the hill to cut the expose north-south Craw-Hill No. 3 fissure vein that crops on the surface. This is shown by photos No. 5 and No. 6. In block the letter "A" it is plainly seen on the croppings and in the background "B" and "C" along the vein strike are dimly discernable.

From the western slope this tunnel was driven at approximately right angles to the strike of the vein as shown by photo No. 7 and No. 9. From the mouth of the tunnel in at a distance of 173 feet a winze was sunk on the vein, 47 feet in depth and a drift running 35 feet northerly was driven on the vein material. The winze is on a 55 degree dip to the west.

At 226 feet from portal this cross-cut, cut the ryolite dike exposed on the surface and drifts northeasterly and southwesterly were run along this contact, which is the foot wall on the vein. The southerly drift reached a distance of 68 feet and the northerly drift 31.5 feet.

The cross-cut continues easterly to the 300 foot distance then swings about 14 degrees to the south reaching a total tunnel lenght of 465 feet.

From the portal of the tunnel to the point where the cross-cut cuts the vein it gives a back of approximatenly 154 feet. with the 46 foot winze this would then give depth development of 200 feet, below the exposed surfsce croppings.

As previously stated other development work comprises shallow shafts and surface cuts and from a development stand point gives no information on deeper values.

A sample sheet furnished the writer by Wm. Saundercock is herewith given:

FROM THE WELLINGTON MINES.
ASSAY SHEET
Sampled by W. H. Bellah and Ed Halderman.

No.1-	Gold ozs.	.03	Silver ozs.	0.6	Value Gold-Silver.		$0.79
" 2-	" "	.12	" "	3.1	" " "		3.28
" 3	" "	.35	" "	1.3	" " "		7.59
" 4	" "	1.06	" "	1.8	" " "		21.74
" 5	" "	.38	" "	2.6	" " "		8.58
" 6	" "	.17	Traces		" " "		3.40
" 7 Concentrates,		75.38	" "	17.6	" " "		1512.97

Figure gold at $20.00. Silver 25 cts.

No.1-	Gold ozs.	0.36	Silver ozs.	2.7	Values Gold-Silver.		$14.49
" 2	" "	0.17	" "	0.6	" " "		6.37
" 3	" "	0.10	" "	0.2	" " "		3.64
" 4	" "	0.40	" "	1.3	Cop-2-7		19.23
" 5	" "	0.11	" "	0.5	" " "		4.20
" 6	" "	0.05	" "	0.4	" " "		2.03

Figure gold at $35.00, Silver 44¾cts

No.2-	Gold ozs.	.135	Silver Ozs.	trace	Value Gold-Silver.		$4.73
" 3	" "	.11	" "	"	" " "		3.85
" 4	" "	.355	" "	0.2	" " "		12.43-0.15

Figure Gold at $35.00, Silver 77 cts.

First 6 samples taken from
No. 1 From Wellington Claim near monument croppings.
" 2 " Minnie B. small shaft dump.
" 3 " Minnie A. No. 2 shaft.
" 4 " Minnie A. No. 1 shaft, quartz in dump.
" 5 " Wellington claim small shaft on hill, quartz 3½ feet.
" 6 " Wellington claim 20ft. shaft dump ore.

Second 6 samples taken from
No. 1- From Wellington claim No.2 shaft honeycomb quartz.
" 2 " " " near monument a small shaft quartz 3½ ft.
" 3 " " " in open cut above spring 4 ft. quartz.
" 4 " Indian No. 2 near oak tree shaft.
" 5 " Craw-Hill incline shaft near top quartz 4 ft.
" 6 " Minnie A. No. 2 shaft grab,from dump quartz.

Third, 3 smaples taken from
No. 2- from Craw-Hill No. 3-Tunnel,North drift about 4 feet wide.
" 3 " " " " " North side collar of winze, 4 ft wide.
" 4 " " " " " North side of tunnel quartz 10 ft.

The above concentrates was taken from pannings of samples from different places on the property and reduced to one sample.This was done by W.H. Bellah

W.S.

No.	Gold	Silver
1	0.10 oz.	1.9 oz
2	0,04 "	0.7 "
3	0.13 "	1.8 "
4	0.09 "	1.1 "
5	0.09 "	1.2 "
6	0.07 "	1.0 "
7	0.02 "	0.4 "
8	0.10 "	1.3 "
9	0.11 "	2.0 "
10	0.09 "	1.4 "
11	0.09 "	1.5 "
12	0.09 "	1.5 "
13	0.04 "	1.3 "
14	0.11 "	1.8 "
15	0.20 "	1.9 "
16	0.04 "	1.1 "
17	0.13 "	1.6 "
18	0.18 "	1.6 "
19	0.18 "	1.7 "
20	0.09 "	1.5 "
21	0.16 "	1.7""
22	0.51 "	2.1 "

Assay sheet by writer in Crawl Hill No. 3 tunnel and croppings. No selective sample were taken.

No. 1, Sides and back in 10 feet in the 31.5 foot north drift
" 2 Sides and back lo feet north of No. 1 sample.
" 3 Sides and back in lo feet north of No. 2
" 4 Face of north drift
" 5 At portal of 68 foot south drift
" 6 Sides and back 10 feet south of No. 5
" 7 Sides and back 20 feet in on south drift
" 8 Sides and back 30 feet in on south drift
" 9 Sides and back 40 feet in on south drift
" 10 Sides and back 50 feet in on south drift
" 11 Face of short cross-cut to the west near face of south drift
" 12 Face of south drift
" 13 Sides and back 10 feet west of north-south drift
" 14 Sides and back 10 feet west of No. 13
" 15 Sides and back 10 feet west of No. 14
" 16 Sides and back 10 feet west of No. 15
" 17 Sides and back 10 feet west of No. 16
" 18 Bottom of Winze
" 19 Face of north drift at bottom of winze
" 20 East side of drift in north drift at bottom of winze
" 21 Surface croppings, lo feet wide east of tunnel portal
" 22 4 feet wide surface croppings at windless on Minnie A claim

Water

I have personally made no calculation as to the amount of water to be handled below the present water level, but I have been able to gather some data as to a probable water flow.

At a test run on a shaft in the low country about three miles to the south of this property, a small pump jack, powered by a 5 H.P. gasoline engine, on a lo hour pumping lowered the water in the shaft from the 50 foot level to the 70 foot level on a 1000 gal per hour out put. This covered a ten day pumping test and indications were that at this 70 foot level that the 1000 gals per hour out put was about equaling the flow at this level.

The reported depth of this shaft of 122 feet, would further indicate that water in deeper mining would not be a serious or ex-

pensive set back.

As to water for milling, this naturally would be governed by the process and by the tonnage milled; but from data on ranch wells in the lower flat country it is believed that mill water would be available.

Milling

In the present state of development the matter of milling is a matter for future consideration, but at this point the writer will give the results of tests he made in 1930-31 on ores to the south that minerologically are identical.

A test run under the following flow sheet was made by Bertrand Stevenson:

Crusher

Forrester Rod Mill

Amalgamation Plates

Plate Concentrating Tables.

A test run of 100 tons was handled through the mill and time samples taken.

Assays by Hawley & Hawley, Douglas Arizona, 4/1o/31

Office No.		Gold	Silver
91,488	Heads	o.78	3.4
91,490	Tails	o.25	3.2

The resultant table concentrates assayed only 1.o2 oz.gold and 4.0 oz silver per tom. Theplate clean up was as follows:

Hawley & Hawley

4/22/31 - Gold slug

Office No. 91,688 676.0 Fine

This slug brought a mint return of $498.70

This would indicate that a suitable or satsifactory extraction could not be made by this method.

To determine the advisability of cyanidation, I conducted a cyanide test on tails from the mill test, and basing the extraction on the mill head assay and tail values as determined, I found that on this test that an extraction of 96.o% was possible by plating and cyaniding, that is catching the courser free gold on the plates and cyaniding the resultant tails. The cyanide results; showing cyanide consumption, fineness of grinding etc. are among my office files.

The metalurgy of these ores are matters that will adjust themselves as development progress, but I just briefly touch on this

phase to show that there would be no complicated or complex metalurgical problems in treatment.

It is not the writer's opinion that copper will increase or become associated with these ores in development depth so as interfer with the treatement but as a matter treatment it will be interesting to know that, due to the high silicious content, that this class of ore is in demand at the Phelps Dodge Smelter at Douglas and the writer in 1931 recieved smelter schedule, as follows:

Base treatment charge $2.50 per ton.- Pay 2cts a unit for free silica, deduct copper shortage under 10 lbs.

Under this schedule, returns on car S. P. 45,091, 9/9/31 showed a smelter treatment charge of $1.32 and freight of 6o cts per ton, so that with a copper increase to a point of interference with cyanidation, would give a lower treatment cost, in that the copper penalty would become a pay metal; if a simular or the same schedule was obtqined.

Recommendations

I would recommend that initial work be done on the Craw-Hill No. 3 fissure vein. Sinking of a shaft to the 100 foot level at a point to the south of the present Craw-Hill No.3 tunnel site. The topography of the slope at this point is such that as, from the bottom of the 100 foot shaft, as you drift north along the strike of the vein, at the crest of the hill peak, would put this drift approximately 360 feet below the surface croppings. In addition to depth gained this development would be opening up and developing the vein along the strike.

From results of vein values and vein widths along the vein strike at this level future development could be planned. Raises at 100 foot intervals along this vein drift would block out the Craw-Hill No. 3 vein systematically. It would be advisable to continue the shaft down on the Minnie A to the 100 foot level and drift north and south at this point along the strike of the Minnie A vein. This to the writer appears to be a stronger mineralized fissure and from samples, the metal values of this vein show up higher than the Craw-Hill No. 3. The remaining five known veins could be developed at a later date.

Conclusion

The information and data contained herein has been acquired over

a period of years during which the writer has conducted an "Assay and Engineering Office", at Tombstone, and from data thus collected it is my belief that the Wellington Group is certainly worthy of a systematic development program. The development done to date, though limited has demonstrated the existance of the gold values in the veins and master fissures. The exposed surface croppings show the magnitude of the width and strike distance, and so, by systematic plan of development the values and extent of these bodies could be readily ascertained.

Respectfully submitted.

V. G. Mellgren E.M. ~~M. E.~~

Mining and Metallurgical Engineer.

Loaned by Liberty Rhodes 5/4/33

Put in file temporarily, might

copy later if worth while

Wellington Temp of Claims

Cochise County,

Gold Silver Prospect

C

June 6, 1935.

State Of Delaware,
Office of Secretary of State,
Dover, Delaware.
Gentlemen:

Will you kindly inform me if W. S. Wasserman Company is incorporated under the laws of your State, and if so the date of incorporation, and the name and address of the Statutory agent in Delaware upon whom service may be had. The principal place of business of this Company is in Philadelphia, but I have reason to believe them a Delaware corporation.

Thanking you in advance for the courtesy of a reply,

Yours very truly,

GAL.

A

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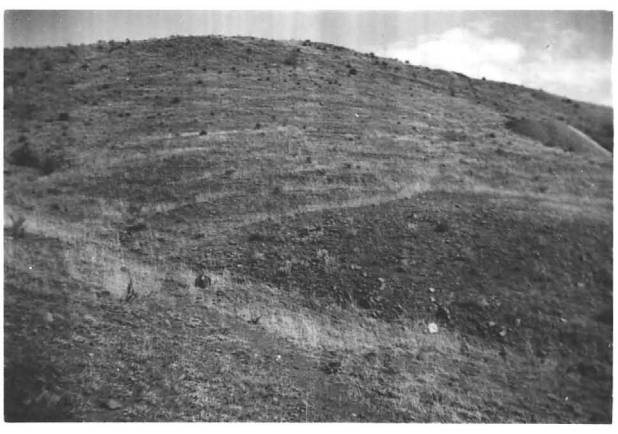

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