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EXHIBIT "A"

REPORT OF EXAMINATION

of

MINING PROPERTY OF

"SUTRO TUNNEL COALITION, INCORPORATED"

Gold Hill, Nevada.

by:

ALFRED MERRITT SMITH

REPORT OF EXAMINATION

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MINING PROPERTY OF

"SUTRO TUNNEL COALITION, INCORPORATED"

Gold Hill, Nevada.

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ALFRED MERRITT SMITH

I N D E X

Page	Subject
1.	Purpose and Scope of Examination.
1.	Credentials of Writer.
2-3	Acknowledgments.
2.	References.
3-4	Methods of Work.
3-4	Sampling.
3-4	Assaying.
4.	Composite Sample for Tests.
4.	Explanation of "Fill."
5.	Footwall and Hangingwall Veins.
5-6	United Comstock Mines Co.
6-7	Arizona-Comstock to add Cyanide Plant.
7-8	Results.
8.	Summary of Tonnages and Values.
8.	Comparison with Reports of Spencer and Squires.
9.	Costs.
10-11.	Results of Tests.
10-11.	Saving by Cyanide Annex.
10-11.	Reasons for Combined Flotation & Cyanidation.
11.	Possible Additional Ore.
11.	Check Assays.
12.	Higher Results by U. S. Bureau of Mines.
12.	Costs per ton of Ore.
13.	Summary.

A P P E N D I C E S

A. Nevada State Analytical Laboratory Assay Sheets.

B. Assay Map of Crown Point Mine, Gold Hill, Nevada.
C. Description of Mine Samples with Assay Values Under New and Old Gold-Silver Prices.
D. Computations of Tonnage and Values.
E. Map in Plane of Comstock Lode Showing Proven and Possible Ore.
F. Metallurgical Tests, Report of U. S. Bureau of Mines, Reno, Station.
G. U. S. Bureau of Mines Assay Sheets, And a Comparison with Nevada State Analytical Laboratory Assays.

REPORT OF EXAMINATION

OF

MINING PROPERTY OF

"SUTRO TUNNEL COALITION, INCORPORATED"

Gold Hill, Nevada.

By: ALFRED MERRITT SMITH (1)

Purpose and Scope of Examination

This examination was made to determine, with reasonable accuracy, the value and tonnage of commercial gold-silver ore now developed in the Crown Point mine at Gold Hill, Nevada, in order to ascertain the soundness of a project for which a loan of $135,000 had been solicited by Sutro Tunnel Coalition, Incorporated, a mining company, from the Federal Emergency Administration of Public Works.

The primary object was to learn if the ore in sight would justify the government loan requested. Therefore, a detailed description of several subjects usual in mine reports was deemed unnecessary. The geological, physical and economic features have been adequately covered in mining engineers' reports included in the application for a loan. It is sufficient to add that they are very favorable.

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(1) Alfred Merritt Smith
B.Sc., University of Nevada, 1900
E.M., University of Nevada, 1907.
One Time
Mining Engineer and Geologist, Southern Pacific Co.;
Mining Engineer, Nevada State Bureau of Mines;
Instructor in Prospecting, Mackay School of Mines, University of Nevada;
Geologist to U.S.Reclamation Service, Humboldt River Investigations;
Manager or Consulting Engineer for mines and mills in the United States and Foreign Lands;
Author of several State Bulletins on Mining and Minerals in Nevada, etc.

Further information on these subjects may be obtained by reference to an immense bibliography on the Comstock Lode, available in all large mining libraries.(2)

Acknowledgments

Acknowledgment is made of the valuable assistance of Director John A. Fulton of the Mackay School of Mines, University of Nevada, for selecting a group of advanced and graduate students to assist in the mine sampling; also of the important work of Director Walter S. Palmer of the Nevada State Analytical Laboratory, who contributed all assaying at no charge to the PWA because of the great importance of the project to Nevada. Thanks are due to State Analyst, Wm. I. Smyth, for making all of the assays in person and checking all results.

The co-operation of Supervising Engineer, E. S. Leaver, of the U. S. Bureau of Mines, Reno Station, obtained at the solicitation of State Engineer Robert A. Allen and U. S. Senator P. A. McCarran, was invaluable. The metallurgical tests made by Mr. Leaver and his staff established beyond doubt the necessary method of ore treatment.

The courteous assistance given at the mine by Gen. Mgr. James M. Leonard was appreciated, and greatly aided and expedited our work.

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(2) A few references are as follows:

Becker, G.F.-"Geology of the Comstock Lode and the Washoe District", with atlas. U.S.Geol. Survey Monograph No.3, (1882) 422 pages.

Hague, A. & Iddings, J.P.-"On the Development of Crystallization in the Igneous Rocks of Washoe, Nevada, with notes on the Geology of the District." U.S.Geol. Survey Bull. 17, (1885).

Lord, E. - "Comstock Mining and Miners", U.S.Geol. Survey, Monograph 4, (1883) 451 pages.

Reid, J.A.- "The Structure and Genesis of the Comstock Lode" Cal. Univ. Dept. Geol. Bull.4, (1905) 244 pages.

Especial reference is made to the kindness of Messrs. W. J. Loring and Howard W. Squires, officials of the Arizona Comstock Mining Company, Virginia City, for personally conducted trips through their mine and mill, and the contribution of important information.

Methods of Work

Acting upon instructions from Robert A. Allen, State Engineer for Nevada, P.W.A., the writer, who is the Examiner Engineer for Nevada, P.W.A., conducted a thorough sampling of the mine workings with the assistance of Robert W. Prince, graduate mining engineer, and six advanced students from the graduating class of the Mackay School of Mines, University of Nevada, Reno. The men were supplied with an automobile and drove from Reno to Gold Hill, 46 miles, each day, returning to Reno at night. At the mine they were divided into three groups; each group was equipped with a map, instruments and tools. One group was placed on each of the three mine levels and put to work. Customary mine sampling practice was followed, with the possible exception that rather larger samples than usual were cut and quartered down to insure greater accuracy. The time occupied in sampling was 6 days. A description of each sample, its width and assay value both under old and new values of gold and silver is attached as "Appendix C."

Each night the samples were taken to Reno and delivered to the Nevada State Analytical Laboratory, where they were prepared and assayed under the supervision of Professor W. S. Palmer, Director, the work being done by Professor Wm. I. Smyth, State Analyst. A total of 127 samples were taken as representing all exposed ore in the mine. Each third sample was also delivered to the U. S. Bureau of Mines, Station at Reno for check assay. Duplicates of the assay sheets are attached as "Appendix A."

The mine sampling, thus carefully done and supervised, and the carefully checked assaying by highly competent assayers in the State and Government laboratories, furnished unusual conditions for accuracy.

A portion was cut from each of the 127 ore samples by means of sampling apparatus, and made into one composite sample which was delivered to the Bureau of Mines for metallurgical tests. The report upon these tests is attached to this report and made a part thereof.

Explanation of "Fill"

A portion of the mine was worked during the pioneer days, between 1865 and 1885. At that time ore of less than $30 per ton value could not be extracted at a profit, and in mining, much ore of lower grade was not removed from the stopes, but was used to back-fill mine workings. In other places, not so filled, the old timbers have decayed and collapsed, allowing the adjacent ground to fill up the old stopes with ore that had been left in place by the early day miners. This ore left behind formerly had been adjacent to rich ore removed, and has now become, because of reduced mining costs and improved milling methods, ore of commercial grade. The "fill" in the mine is of higher value than the undisturbed "ore in place." This is characteristic of the present condition of a number of mines on the Comstock that were worked in pioneer days. Because of the increased value of gold, a number of these mines can now be reopened and worked with profit.

Footwall and Hangingwall Veins

In computing tonnage and value of ore, a series of blocks between levels were laid out and figured separately, and afterwards combined. (See "Appendix D").

In the Crown Point mine the Comstock Lode or vein fissure is from 40 to 60 feet wide, but it is not all ore. It has a westerly dip of about 50° above the present bottom of the mine at a depth of 194 feet below the collar of the old Yellow Jacket shaft. On the footwall is a streak or vein of quartz ranging from 2 to 6 feet wide, having a value of $8.22 per ton. ("Appendix D, p. 4").

On the hangingwall is another vein with an average width of 5 feet, having a value of $11.12 per ton. ("Appendix D, p. 5").

Between these two veins is a zone of comparatively barren rock, enriched at a few points where small cross fractures occur. Crosscuts have been run on some of these cross fractures, and are therefore mostly in ore, which might lead to an opinion that substantial ore bodies 40 or 50 feet wide exist, which is not the case. The block between the "Footwall vein" and "Hangingwall vein" contains a few spots of mineable ore on and adjacent to cross fractures, but this central zone is mostly waste rock.

United Comstock Mines Co.

Reference is made to the operation of the United Comstock Mining Company, which during its life controlled the group of old Gold Hill mines from the Alpha to the Overman, including all of the mines in the present Sutro Tunnel Coalition, Incorporated. The failure of that company in 1924 was due to grave mistakes in mining, milling and general engineering. Low cost mining was attempted by a caving system to a main haulage tunnel about 2 miles long leading to the mill. As the ground cannot be successfully cave mined, enormous quantities of clay and waste rock diluted the ore. The valueless clay prevented successful cyanidation of the already diluted ore. Judicious mining and a properly designed mill would have easily made the enterprise successful. Notwithstanding various serious errors in the entire set-up, the operation would have been successful under the present high price of gold and silver.

In the Crown Point mine there is very little clay; the proven ore is near the surface; the established value of the ore is good; mining and sorting of ore and waste will be simple and the cost low; tramming and hoisting are for short distances and comparatively low lifts; the method of ore treatment and design of mill have been outlined by acknowledged metallurgical authority by thorough examination and tests. A carefully prepared composite ore sample was used in the tests, which definitely represents all of the positively assured ore in the mine. In short, all of the errors made by the unfortunate United Comstock will be avoided. The ore is of more than double the value per ton of that milled by United Comstock, and all of the conditions are very much better.

<u>Arizona-Comstock to add Cyanide Plant</u>

The addition of a cyanidation annex to the proposed mill will insure a higher extraction of values and a substantial increase of total net profit. It is often true that the highest extraction will not lead to the highest net profit, because of increased costs. This fact was in the minds of the Arizona-Comstock Management when they built their present simple flotation mill, upon the operation of which Squires bases[3] his milling costs. After a year of operation it has been found that suitable extraction cannot be obtained in such a mill without cyanidation, and therefore a cyanide annex is to be added to their mill this year.

In some respects the problems and conditions at the Arizona-Comstock and the Crown Point are similar. The essential differences are two; first, the ore in the Crown Point has all been blocked out and its value established; second, the mining costs at Crown Point will be lower because of better conditions of ground, ore transportation and temperature underground.

It is readily seen that the present project will avoid the errors made by other companies.

Results

Attached to and made a part of this report as "Appendix A" are the assay returns from the State Analytical Laboratory and the U. S. Bureau of Mines. Additional sheets are attached giving the sampler's description of each sample in which the values are stated both under the old and the new values of gold and silver. The values under the old standard are given for purposes of comparison with the assay map and computations which had been submitted by Sutro Tunnel Coalition, Incorporated. Our own estimates are based on the new and higher gold-silver values.

(3) Squires, Howard W. "Report on Crown Point Mine", Nov. 8, 1933. Included in Application of Sutro Tunnel Coalition, Incorporated for a loan from P. W. A., as "Exhibit C".

We also prepared an assay map, a photograph of which is attached as "Appendix B", upon which is inserted, at the points taken, the number, width and total assay value per ton of the veins, in the order stated. The values are given under the old schedule with gold at $20.67 and silver at 40¢ per oz. To determine present values, add one-third, i.e., a value of $6.00 on the map is equal to $9.00 at present metal prices.

Summary of Tonnages and Values

(Gold @ $34.00 and Silver at $0.64⅓ per oz., Troy)

Fill	15,652 tons	@ $15.16 per ton	$237,284.32
Footwall Vein	12,348 "	@ 8.22 " "	101,500.50
Hangingwall Vein	85,952 "	@ 11.12 " "	955,786.24
Totals and Average	113,952	$11.36	$1,294,571.12

Total Gross Value (as used in our estimates)
Average value per ton ore, $11.36 — $1,294,571.12

Total Gross Value (old gold-silver prices)
Average value per ton ore, $ 6.99 — $ 796,669.92 (4)

Our investigation approximately checks Squires as to assured tonnage, but gives only 52 percent of his gross value. The Spencer (5) report gives 173,000 tons, value $12.00 per ton. He exceeds us by 59,048 tons, and we obtain only 61% of his gross value.

The discrepancy is probably due to these engineers having computed average ore value from miscellaneous mine data, and to some extent from selected assays of samples which they did not take themselves. Neither engineer sampled the mine.

(4) Op.Cit., p.7
(5) Spencer, F.M., "Report on Crown Point Mine, Gold Hill, Nevada, for Sutro Tunnel Coalition, Incorporated", October 1933. Included in Application of Sutro Tunnel Coalition, Incorporated, as "Exhibit B".

Costs

The mining costs of Squires (see "Exhibit C" of application) are based upon his own present operations at the Arizona-Comstock (old Hale and Norcross) mine at Virginia City, of which he is General Manager. His costs are higher than will be necessary at the Crown Point mine. In the Arizona-Comstock, mining is at greater depth; various workings are hot, making labor less efficient, and much bad ground has to be heavily timbered.

On the other hand, in the Crown Point mine, conditions are excellent in all of the exposed workings. The ground is neither dusty nor wet, the ventilation good, and mine cool. The ground breaks well. Ore will be trammed very short distances to an inclined shaft, hoisted to the surface, dumped in bins directly behind the mill. Mining methods will therefore be less expensive. The cost should be at least 50 cents per ton lower than at the Arizona-Comstock.

The excellent report by Squires includes full operating costs of present day Comstock Lode mine and mill operation, the total being $5.225 per ton. Squires, however, does not include an item for amortizement of mill and mining equipment, which would make an increase of about 23 cents per ton. Development ahead of mining is included at $0.50 per ton, and depreciation is figured at $0.037 per ton. His figures verify the writer's experience in 1901-1903 at the Nevada Reduction Works, Dayton, Nevada, working ore (both rock in place and fill) from the Silver Hill mine, in this same district, where an ore value of $5.00 per ton marked the limit of profit.

Results of Tests

A copy of results from a series of metallurgical tests mady by the U. S. Bureau of Mines, Reno Station, are attached herewith, as "Appendix F."

It is evident that nothing can be gained by preliminary amalgamation treatment, because of low extraction.

The Bureau of Mines tests indicate an extraction of approximately 76.3% by flotation alone, which would be the maximum obtainable with the mill proposed by the applicant. The proposed mill would cost $67,500 as designed by Sweeney,(5) have capacity of 100 tons ore per day, and is of good design, high class specifications, and would operate efficiently to the above extraction.

Flotation followed by cyanidation will result in a total extraction of 92.5%, which is an additional saving of $1.70 per ton. The net increased saving after deducting $0.60 cost of cyanidation, would be $1.10 per ton, $110.00 per day, or $125,347 on the total ore in sight.

A 100-ton filtration cyanide annex to the proposed mill will cost about $25,000, increasing the total mill cost to $92,500. It is obvious that it should be included in the plans for 4 reasons:

1st: It will effect a substantial saving by increased extraction of gold and silver.

2nd: Variations in the character of the ore, which will undoubtedly occur, will not affect high extractions by means of a simple standardized mill practice.

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(5) Sweeney, E. L. Report, plans and specifications for a flotation mill for Sutro Tunnel Coalition, Incorporated, Feb. 4, 1931, included in application as "Exhibit D."

3rd: It will insure a mill that will successfully treat both sulphide and oxidized ores of all types which may be encountered in the development of the property of the "Sutro Tunnel Coalition, Incorporated."

4th: It is the opinion of the Supervising Engineer of the U. S. Bureau of Mines, expressed to the writer, that it is the safe type of mill for the project, as represented by the samples submitted to him.

Possible Additional Ore:

This report and the feasibility of the entire operation is based upon the tonnage of reasonably assured ore resulting from mine development. No account has been taken of possibilities of additional undeveloped ore.

There are good possibilities of additional ore to the extent of 800,000 tons or more. The adjacent mines, Belcher, Kentuck and Yellow Jacket, belonging to this company, are located along the main Comstock vein, and the attached white print (Appendix E) shows the very small area of vein section which will be worked by the present project. There is reason to believe that the ground to the north and south, as well as at depth below the former main haulage tunnel of the United Comstock, will yield great tonnages of ore by intelligent development and mining. This probability is of more importance than the present project, and should lead to the employment of many men for years to come.

Check Assays

As an independent check on the assays of the Nevada State Analytical Laboratory, 42 alternate samples were submitted to the U. S. Bureau of Mines, Reno Station, for reassay.

The results of the check assays, together with an assay-by assay comparison which was made by the writer, are attached herewith as Appendix "G".

The assay results of the U. S. Bureau of Mines average $0.455 per ton higher than those of the State Analytical Laboratory. Therefore, the higher values obtained by the U. S. Bureau of Mines indicate that there would be a total net profit of $50,730 more than the net profit previously computed from assays by the Nevada State Analytical Laboratory and used in this report. The work of both assayers was performed with extreme care, and the difference is not accounted for. The U. S. Bureau used assay-ton charges; the State Laboratory used one-half assay-ton charges.

The total net profit on the operation as shown by U. S. Bureau of Mines assays will be $587,640.

Total Cost Per Ton of Ore

Mining	$2.835	
Development	.50	$3.335
Milling	1.55	
Marketing bullion and concentrate	.30	1.850
Compensation Insurance	0.130	
Supervision	.230	
Taxes	.025	
Amortization of mill, 15 years, 30,000 tons per year	.230	.615
	Total Cost Per Ton	$5.80

These costs can be lowered to $5.00 by good management.

SUMMARY

114,000 tons ore (in round numbers) @ $11.36 per ton gross value. (Gold $34, Silver $.645)

Extraction, 92.5% $10.51; loss in residue per ton $0.85.

Total mining and milling costs 5.80

Net Profit per ton $ 4.71

Total Profit: $536,940

Total Profit, (as computed from U. S. Bureau of Mines Assays)

$587,640

The operation as outlined will be commercially successful with ordinary good management of mine and mill.

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WALTER S. PALMER, DIRECTOR
VINCENT P. GIANELLA, GEOLOGIST
WILLIAM I. SMYTH, ANALYST
B. F. COUCH, SECRETARY

No. 5139 - 1

Reno, Nevada

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Jan. 5, 1934.

Mr. A. M. Smith,

C/o PWA City

Appendix A

Report on sample or specimen received from you on .... 193...., is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton		
		Gold	Silver	
1	....	0.05	3.0	
2	....	0.11	3.5	
3	....	0.19	4.8	
4	....	0.31	7.6	
5	....	0.56	12.5	
6	....	0.42	7.6	
7	....	0.16	4.6	
8	....	0.54	11.7	
9	....	0.42	15.6	
10	....	0.42	7.4	
11	....	0.44	13.1	
12	....	0.59	13.3	
13	....	0.61	14.4	
14	....	0.31	9.7	
15	....	0.09	4.0	

W.I.S.
Analyst.

W S Palmer
Director.

The Laboratory very often receives a letter which does not state definitely what is desired on a given sample or we may misunderstand a request, therefore in case we have not made the determination you desire or you wish further information regarding these samples, please write within a month, and refer to the number of this report.

The State Analytical Laboratory makes free determinations of Nevada ores and minerals only for citizens of the State. As satisfactory assays cannot be made on very small single piece specimens, no gold or silver assays are run on specimens under three ounces in weight unless special conditions are shown to prevail. Assays below 20 cents per ton are reported as traces or none.

Please address samples and communications to State Analytical Laboratory, University of Nevada, Reno, Nevada.

WALTER S. PALMER, DIRECTOR
VINCENT P. GIANELLA, GEOLOGIST
WILLIAM I. SMYTH, ANALYST
B. F. COUCH, SECRETARY

No. 5139 - 2

Reno, Nevada

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Mr. A. M. Smith

Report on sample or specimen received from you on .... 193...., is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton		
		Gold	Silver	
16		0.16	10.2	
17		0.29	9.3	
18		0.26	7.6	
19		0.04	2.2	
20		0.13	2.4	
21		0.24	10.1	
22		0.08	4.0	
23		0.33	4.6	
24		0.38	11.0	
25		0.22	6.9	
26		0.30	9.4	
27		0.51	7.6	
28		0.29	9.7	
29		0.34	14.5	
30		0.31	11.8	

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No. 5139 - 3

Reno, Nevada

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Mr. A. M. Smith

Report on sample or specimen received from you on .... 193...., is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton	
		Gold	Silver
31	....	0.57	14.0
32	....	0.24	4.1
33	....	0.24	4.7
34	....	0.24	8.0
35	....	0.08	3.4
36	....	0.34	9.9
37	....	0.08	4.8
38	....	0.09	3.1
39	....	0.03	2.7
40	....	0.01	0.6
41	....	0.12	4.2
42	....	0.07	7.2
43	....	0.43	7.0
44	....	0.11	5.2
45	....	0.08	3.2

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WALTER S. PALMER, DIRECTOR
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B. F. COUCH, SECRETARY

No. 5139 - 4

Reno, Nevada

UNIVERSITY OF NEVADA
STATE ANALYTICAL LABORATORY

Jan. 5, 1934

Mr. A. M. Smith

Report on sample or specimen received from you on ....193......, is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton Gold	Ounces Per Ton Silver
46	....	0.63	19.8
47	....	0.06	4.8
48	....	0.23	5.2
49	....	0.17	4.6
50	....	0.11	3.0
51	....	0.20	6.8
52	....	0.16	6.0
53	....	0.03	2.2
54	....	0.07	2.5
55	....	0.12	3.8
56	....	0.54	6.1
57	....	0.10	2.4
58	....	0.04	4.2
59	....	0.20	5.1
60	....	0.11	3.2

W.I.S.
Analyst.

W S Palmer
Director.

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No. 5139 - 5

Reno, Nevada

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Jan. 5, 1934

Mr. A. M. Smith

Report on sample or specimen received from you on .... 193...., is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton	
		Gold	Silver
61	. . . .	0.11	4.7
62	. . . .	0.19	6.3
63	. . . .	0.05	3.9
64	. . . .	0.13	1.9
65	. . . .	0.25	10.9
66	. . . .	0.11	9.5
67	. . . .	0.14	4.7
68	. . . .	0.05	3.2
69	. . . .	0.14	2.9
70	. . . .	0.23	3.9
71	. . . .	0.01	0.3
72	. . . .	0.02	0.4
73	. . . .	0.24	5.4
74	. . . .	0.06	3.9
75	. . . .	0.36	10.2

W. I. S.
Analyst.

W S Palmer
Director.

WALTER S. PALMER, DIRECTOR
VINCENT P. GIANELLA, GEOLOGIST
WILLIAM I. SMYTH, ANALYST
B. F. COUCH, SECRETARY

No. 5139 - 6

Reno, Nevada

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Jan. 5, 1934

Mr. A. M. Smith

Report on sample or specimen received from you on ....193......, is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton		
		Gold	Silver	
76		0.46	10.2	
77		0.22	5.8	
78		0.05	2.5	
79		0.16	8.8	
80		0.09	3.1	
81		0.14	5.9	
82		0.11	7.9	
83		0.06	6.5	
84		0.02	1.5	
85		0.05	1.5	
86		0.07	3.4	
87		0.12	6.8	
88		0.31	7.1	
89		0.03	2.2	
90		0.03	2.9	

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Director.

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The State Analytical Laboratory makes free determinations of Nevada ores and minerals only for citizens of the State. As satisfactory assays cannot be made on very small single piece specimens, no gold or silver assays are run on specimens under three ounces in weight unless special conditions are shown to prevail. Assays below 20 cents per ton are reported as traces or none.

Please address samples and communications to State Analytical Laboratory, University of Nevada, Reno, Nevada.

WALTER S. PALMER, DIRECTOR
VINCENT P. GIANELLA, GEOLOGIST
WILLIAM I. SMYTH, ANALYST
B. F. COUCH, SECRETARY

No. 5139 - 7

UNIVERSITY OF NEVADA
STATE ANALYTICAL LABORATORY

Reno, Nevada
Jan. 5, 1934

Mr. A. M. Smith

Report on sample or specimen received from you on .... 193....., is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton		
		Gold	Silver	
91	....	0.13	4.8	
92	....	0.12	7.1	
93	....	0.09	5.8	
94	....	0.19	3.7	
95	....	0.05	2.6	
96	....	0.07	1.7	
97	....	0.07	1.8	
98	....	0.16	7.5	
99	....	0.04	0.6	
100	....	0.34	6.9	
101	....	0.04	1.7	
102	....	0.14	7.1	
103	....	0.05	1.4	
104	....	0.02	1.4	
105	....	0.08	4.6	

W.I.S.
Analyst.

W S Palmer
Director.

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WALTER S. PALMER, DIRECTOR
VINCENT P. GIANELLA, GEOLOGIST
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B. F. COUCH, SECRETARY

No 5139 - 8

Reno, Nevada

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Jan. 5, 1934

Mr. A. M. Smith

Report on sample or specimen received from you on ....193......, is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton Gold	Silver
106		0.05	2.4
107		0.04	2.8
108		0.01	0.7
109		0.03	2.1
110		0.12	7.0
111		0.13	5.4
112		0.09	3.0
113		0.06	2.5
114		0.08	4.4
115		0.09	3.1
116		0.03	1.8
117		0.03	1.2
118		0.17	6.8
119		0.05	2.4
120		0.22	4.1

A.M.S.
Analyst.

W S Palmer
Director.

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WALTER S. PALMER, DIRECTOR
VINCENT P. GIANELLA, GEOLOGIST
WILLIAM I. SMYTH, ANALYST
B. F. COUCH, SECRETARY

No. 5139 - 9

UNIVERSITY OF NEVADA

STATE ANALYTICAL LABORATORY

Reno, Nevada

Jan. 5, 1934

Mr. A. M. Smith

Report on sample or specimen received from you on .... 193......, is as follows:

Number	MINERALS OR ROCK	Ounces Per Ton Gold	Ounces Per Ton Silver
121	....	0.02	0.6
122	....	0.34	6.5
123	....	0.25	4.0
124	....	0.05	3.8
125	....	0.03	1.6
126	....	0.24	17.0
127	....	0.10	3.1

8 pages.

W.I.S.
Analyst.

W S Palmer
Director.

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APPENDIX "A"

To Accompany Report of Alfred Merritt Smith.

Assay Results from Ore Samples from
Crown Point Mine of Sutro Tunnel
Coalition, Inc.,
GOLD HILL, NEVADA

APPENDIX "B"

To Accompany Report of Alfred Merritt Smith

PHOTOSTAT REPRODUCTION OF ASSAY MAP OF

CROWN POINT MINE

APPENDIX C

DESCRIPTIONS and ASSAYS of MINE SAMPLES

Crown Point Mine,

Sutro Tunnel Coalition, Incorporated.

Gold Hill, Nevada.

DESCRIPTION OF SAMPLES

ample Number	Width	Oz Gold	Oz Silver	Total Values	
			Gold at / Silver at	20.67 / 0.40	34.00 / 0.64½
Sta. 118 plus 33.5' N. across 6' of fill in stope. Dip 40° West Wall.	4.2'	0.05	3.0	2.23	3.64
Sta. 118 plus 48.8' N. across 4.6' of fill in face of drift. Sampled at right angles to walls of stope.	4.6'	0.11	3.5	3.67	6.00
Sta. 118 plus 14' N. West Wall of drift across 6.5' of white quartz in place. Walls of vein not defined. Approx. dip 40°.	4.6'	0.19	4.8	5.85	9.56
Sta. 213 plus 17' N. across 5' of fill. East wall. Dip 45° W.	4.0'	0.31	7.6	9.45	15.44
Sta. 212 plus 15' N. across 5' of fill. East wall. Dip 45° W.	3.5'	0.56	12.5	16.58	27.10
Sta. 121 plus 15' NE on drift across 5.3' of quartz and andesite in face of drift. Cut at right angles to dip of vein.	5.3'	0.36	4.6	10.12	15.21
	Reassay--	.42	7.6		
. Sta. 122 plus 17' S. across 4.5' on west wall from the hanging wall to floor of drift.	3.2'	0.16	4.6	5.15	8.41
. Sta. 212 plus 5' S. across 6' fill in stope. Cut at right angles to dip.	6.0'	0.54	11.7	15.84	25.91
. Sta. 213 plus 10' SE across 5' fill. East wall. Dip 45° W.	3.5'	0.56	13.5	16.98	27.75
	Reassay--	.42	15.6		
0. Sta. 212 plus 40' N. across 4.2' of fill. East wall. Dip. 45	4.0	0.42	7.4	11.64	19.05
1. Sta. 212 plus 30' N. across 4.8' of fill. East wall. Dip 45° W.	3.6'	0.44	13.1	14.33	23.41
2. Sta. 213 plus 2' N. across 6' of fill. East wall. Dip 45° W.	4.7'	0.75	14.4	21.10	34.79
	Reassay--	.59	13.3		

	Sample Number	Width	Oz-Gold	Oz-Silver	Total Values	
.	Sta. 213 plus 19' S.across 5.6' of fill, dip 40°E.wall.	4.5'	0.61	14.4	18.37	30.03
.	Sta. 215 plus 25' W.across 7.7' of quartz and andesite on S. wall of drift. In place. Cut perpendicular to dip of vein. Dip 40°W.	7.7'	0.31	9.7	10.29	16.80
.	Sta. 210 plus 6' E. across 7' of quartz and andesite. Dip 40° W. on E. wall of drift.	4.5'	0.09	4.0	3.46	5.64
.	Sta. 212 plus 29' N. across 4.8' quartz and andesite on east wall of drift from floor of stope to floor of drift. Dip 40°.	3.4'	0.16	10.2	7.38	12.02
.	Sta. 211 plus 14'S. across 7' of quartz, calcites, andesite, from the floor to back on west wall. Dip 40° W.	5.0'	0.29	9.3	9.71	15.86
.	Sta. 216 plus 9' W. from N. wall across 5' right angles to dip. Dip 40°W. Quartz with andesite inclusions	5.0' Reassay--	0.31 .26	8.0 7.6	9.61	15.70
9.	Sta. 118 plus 13' W. from S. wall across 2.75' of quartz-andesite stringer cut from hanging wall to floor of drift at right angles to dip.(Width estimated 5')	2.75'	0.04	2.2	1.70	2.78
0.	Sta. 118 plus 23.6' N. across 6' of quartz, andesite fill on West wall cut from floor to back of drift. Back lagged	4.5'	0.13	2.4	3.65	5.97
1.	Sta. 211 plus 16' E. cut on N. wall across 6' at right angle to dip. Dip 40° W. quartz with inclusions of andesite. (Owner considers a part of vein 50' wide)	6.0' Reassay--	0.21 .24	10.1 10.1	9.00	13.68
2.	Sta. 118 plus 9' E. Cut from S. wall across 5.5' at right angle to 40°dip. Qtz. andesite	5.5'	0.08	4.0	3.25	5.3
3.						

Sample Number	Width	Oz-Gold	Oz-Silver	Total Values	
Sta. 214 plus 10' N. cut from 2' measured from footwall on east wall, and 2' measured on west wall from hanging wall. Cut at right angle to dip 40° W. of footwall.	2.0	0.33	4.6	8.66	14.19
Sta. 120 plus 21' SW. Floor sample 4' x 4' x .5' brecciated qtz. with some andesite	3.0	0.35	9.0	10.35	17.71
Reassay--		.38	11.0		
Sta. 214. From East wall across 3' qtz. andesite dipping 45°W. measured from footwall to back. Stringer in footwall.	3.0	0.22	6.99	7.31	11.99
Sta. 120 plus 15' W. on S. wall. Cut across 6' of quartz & andesite at right angles to dip of vein.	6.0'	0.30	9.4	9.96	16.26
Sta. 118 plus 2' W. from S. wall fill across 6' dip of wall 45°	5.0'	0.70	7.5	17.47	26.84
Reassay		.51	7.6		
Sta. 211 plus 5' W. from N. wall across 6' of qtz. with andesite at right angles to dip (40°) W. from floor to back	6.0'	0.29	9.7	9.87	16.12
Sta. 210 plus 6' W. from N. wall across 5.6' at right angles to dip. Qtz. andesite and calcite. Dip 40° W.	5.6'	0.34	14.5	12.83	20.91
Sta. 120 from S. wall across 6.5' of qtz. andesite at right angles to dip 40° W.	6.5'	0.31	11.8	11.13	18.15
Sta. 211 plus 2.5' S.E. wall across 7' of loose qtz. calcite, and andesite. Vein dip 45° W.	5.0'	0.57	14.0	17.38	28.51
Sta.212 plus 14' S. from west wall across 3' fill from hanging wall to floor. Dip 40°W.	2.0'	0.24	4.1	6.60	10.30
Sta. 120 plus 21' W. fron N. wall across 6' of qtz. at right angles to dip of vein 40° W. Foot wall and hanging wall not defined.	6.0'	0.21	4.9	6.30	10.30
Reassay--		.24	4.7		

Sample Number	Width	Oz.Gold	Oz-Silver	Total Vaules	
Sta. 211 plus 6' S. Floor sample across 3' of qtz. andesite and calcite. Dip 40° W.	2.0'	0.24	8.0	8.16	13.32
Sta. 215 plus 15' W. from S. wall across 6' of qtz. andesite. Cut at right angles to dip of vein 40° W.	6.0'	0.08	3.4	3.00	4.89
Sta. 127 plus 14' N. East wall and back across 5.5' at right angles to dip of 45° W. Qtz and chert	5.5'	0.19	11.1	8.37	13.62
	Reassay--	.34	9.9		
Sta. 125 plus 2.5' S. across 5.4' qtz and cherty-silica. Cut at right angles to 45° dip. East wall	5.4'	0.08	4.8	3.57	5.82
Sta. 125 plus 16' S. across 6.8' on east wall. Dip 48° W. Qtz. and chert	5.0'	0.09	3.1	3.10	5.06
127 plus 47.7' S. from pile of muck taken from face of drift. 2' of vein qtz. exposed in face dip 53° W. Grab Sample	--	0.03	2.7	1.70	2.76
Sta. 125 plus 16.3' cut from S. wall of crosscut to the west. across 7.9' of qtz. and silica(chert)which has been replaced wall rock. Dip 55°	6.5'	0.01	0.6	0.45	0.73
Sta. 127 plus 18' S. across 5' of qtz. and silica from hanging wall in back to foot wall in east wall Dip 53°	4.2'	0.12	4.2	4.16	6.79
Sta. 215 plus 21' N. across 5' qtz. and andesites. Dip 40° W. Qtz is a footwall stringer.	3.2'	0.07	7.2	4.33	7.02
Sta. 124 plus 11' S. across 5.6' of qtz. and silica on east wall dipping 57° W.	4.3'	.43	7.0	11.69	19.14
Sta. 118 plus 21.5' N. across 5' qtz. and andesite from east wall from floor of drift to floor of old drift. Dip 45° W	3.5'	0.11	5.2	4.35	7.09
Sta. 223 plus 21' to 30' W. across qtz. and andesite, dip 35° W. floor sample	5.0'	0.08	3.2	2.93	4.78

ample Number	Width	Oz.Gold	Oz-Silver	Total Values	
Sta. 225 plus 18' NE across 3' qtz. at right angles to dip of 40° of qtz. stringer between walls of andesite	3.0'	0.63	19.8	20.94	34.19
Sta. 227 plus 23' W. from N. wall across 8' to dip. from floor to back Qtz. and andeste. Dip 40° W.	8.0'	.06	4.8	3.16	5.14
Sta. 223 plus 21' W. across 3' of qtz. stringer per--pendicular to dip of 35° W. cut on S. wall. Stringer between walls of andesite	3.0'	0.23	5.2	6.83	11.17
Sta. 227 plus 41' W. Grab sample from pile of qtz. and andesite Estimate 4 tons	--	0.17	4.6	5.35	8.75
Sta. 225 plus 32' W. across 7' of qtz. and andesite from S. wall perpendicular to dip from floor up. Dip 48° see sample 65	7.0'	0.11	3.0	3.47	5.68
Sta. 225 plus 9' W. S.wall across 11.6' of qtz. and andesite perpendicular to dip of 40° from floor up.	11.6'	0.20	6.8	6.85	11.19
Sta. 223 plus 12.4' W. across 5' of qtz. stringer perpendicular to dip of 35° from S. wall. Stringer between walls of	5.0'	0.16	6.0	5.71	9.31
Sta. 225 plus 26' W. from S. wall across 7' qtz. and andesite. Perpendicular to dip of 45° W.	7.0'	0.03	2.2	1.50	2.44
Sta. 223 plus 15' W. to 21 across 6' in floor qtz. and andesite Dip 35° W.	4.2'	0.07	2.5	2.73	3.99
Sta. 227 plus 46' W. from N. wall acrows 5' qtz. stringer between walls of andesite. Dip 20° W. cut perpendicular to Dip.	5.0'	0.12	3.8	4.00	5.53
Sta. 225 plus 54' W. fill of qtz. andesite perpendicular to section Dip 45° across 7' on N. wall. See sample #65	7.0'	.54	6.1	13.60	22.29

Sample Number	Width	Oz.Gold-	Oz Silver	Total Values	
7. Sta. 227 plus 17' W. on N. wall perpendicular to dip of 40° W. across 8' of qtz. lower 2' in andesite. See sample 62	8.0'	.10	2.4	3.02	4.95
3. Sta. 223 plus 32' W. qtz. stringer in S. wall across 3.8' qtz. perpendicular to dip of 30°. Cut from top of drift down to footwall.	3.8'	0.04	4.2	2.50	4.47
9. Sta. 227 plus 64' from south wall across 9.2' andesite fill. Cut perpendicular to wall of stope	9.2'	0.20	5.1	6.53	10.09
0. Sta.227 plus 68' W.S.wall across 5' of qtz with andesite inclusions Dip 45° cut perpendicular to dip	5.0'	0.11	3.2	3.55	5.80
1. Sta. 227 plus 38' W-N.5' Grab sample from pile of qtz. andesite in drift. Material from driving of drift	--	0.11	4.7	4.15	6.77
2. Sta.227 plus 18' W. from N. wall across 6.6' of vein consisting of qtz. with inclusions of andesite between andesite walls. Dip 40° W. Cut perpendicular walls to Dip.	6.6'	0.19	6.3	6.45	10.52
5. Sta. 223 plus 21'W. from S. Wall across 5.3' of qtz. and andesite lower 2.3' andesite with qtz. veinlets. See sample #48 for value of 3' qtz. stringer. Cut perpendicular to dip 35° W.	5.3'	0.05	3.9	2.59	4.21
4. Sta. 225 plus 33' W. from S. wall across 3' of qtz. stringer between andesite walls containing veinlets of qtz. Cut perpendicular to dip of 40° W. See sample #50	3.0'	.13	1.9	3.45	5.62
5. Sta. 225 plus 54' W. from fill of andesite and qtz. Dip 40° W. across 7' on S. wall. Cut perpendicular to Dip. See sample #56	7.0'	.25	10.9	9.53	15.53

Sample Number	Width	Oz-Gold	Oz-Silver	Total Values	
6. Sta. 225 plus 51' W. Grab sample from broken ore in drift to N. two piles estimated 10 tons material from drift advanced in solid ground on east side of fill.	--	0.11	9.5	6.07	9.87
37. Sta. 123 plus 24' S. from 3' qtz. vein striking N. and S. and intersecting fault and vein along which this level was driven. Exposed in N. wall of crosscut. Sample cut perpendicular to dip 60° A.	3.0'	0.14	4.7	4.77	7.79
38. Sta. 123 plus 6' S. from vein along which drift has been driven, east wall perpendicular to dip of 51° Qtz. across 4.5'	4.5'	0.05	3.2	2.31	3.76
59. Sta. 219 plus 9' S. on main drift east wall across 6' qtz. Dip 60° W.	5.0'	0.14	2.9	4.05	6.65
70. Sta. 219 plus 9.75' N. 20° W. Qtz. vein. Dip 45° W. across 3' perpendicular to dip. full width undetermined.	3.0'	0.23	3.9	6.32	10.34
71. Sta. 228 plus 15' S. in face across 3' altered andesite perpendicular to dip 45° Blue color with sulfides)	3.0'	0.01	0.3	.33	.53
72. Sta. 228 plus 10' N. Cut from altered andesite containing qtz. veinlets cut from walls and back. Dip 45° W.	4.0'	.02	.04	.57	.94
73. Sta. 228 plus 20' N. floor sample fron 5' x 4' x 6" section between sets. Old fill. Qtz. and andesite. Qtz. surrounding pieces of andesite. This fill is connected with that in the face of NW crosscut from Sta. 220. See full sample	5.0'	.24	5.4	7.12	11.64
74. Sta. 223 NW to face of drift in fill. Pieces broken off large fill material (Qtz. boulders) Grab sample	5.0'	0.06	3.9	3.80	4.55
75. Sta. 126 N. 24° W. 12.5' Vert. angle 29° N. wall of stope across 3' cut perpendicular to dip of 55° W. Qtz. and site. Andesite altered and completely replaced by cherty silica. Cut from back to floor of stope	3.0'	0.36	10.2	11.52	18.82

Sample Number	Width	Oz-Gold	Oz-Silver	Total Values $
. Sta. 126 N. 19° E. 6.5'Vert. angle plus 21° on N. wall of stope across 2.7' of qtz. and chert, similiar to sample 75. Perpendicular to dip 55° W. Cut from back to floor of stope.	2.7'	0.46	10.2	13.58-22.22
. Sta. 126 N. 51° E. 12' vertical angle plus 48° across 2.5' qtz. cut pependicular to dip 55° W. from back to floor of stope	2.5'	0.22	5.8	6.87-11.22
. Sta. 225 plus 49' W. from N. wall perpendicular to 40° dip across 11' of qtz and andesite	11.0'	0.05	2.5	2.03--3.31
). Sta. 225 plus 51' W. crosscut N. sample from broken ore in drift estimate 3 tons.(Pile at face of crosscut) Face 4.5'	4.5'	0.16	8.8	6.82-11.12
0. Sta. 220 plus 11' to 20' NW. floor sample in qtz. and andesite. Check with sample #81 and 82.	6.0'	0.09	3.1	3.10--5.00
1. Sta. 220 plus 9' NW. from S. wall perpendicular to 40° Dip across 3.5' Qtz.stringer between andesite walls	3.5'	0.14	5.9	5.25--8.4
2. Sta. 220 plus 27' NW from N. wall perpendicular to 40° dip across 4' vein of qtz and andesite	4.0'	0.11	7.9	5.43--8.8
83. Sta. 220 plus 32' NW. loose fill in face of drift.(Grab) Drift lagged on sides face and back and fill has tendency to run fast. Composed of large qtz. andesite boulders. Fill five feet wide.	--	0.06	6.5	3.84--6.2
84. Sta. 218 plus 24' N. across qtz. andesite stringer in foot wall. E. wall of drift. Dip 45° W.	4.5'	0.02	0.60	1.01--1.0
	Reassay	.02	1.50	
85. Sta. 220 plus 4' N. from E. wall of drift cut across qtz. andesite footwall stringer.	4.0'	0.05	1.5	1.63-2.6
86. Sta. 221 plus 6' N. from E. wall of drift across qtz. andesite footwall stringer. Dip 45° W.	6.0'	0.07	3.4	2.81-4.5

ample Number	Width	Oz-Gold	Oa-Silver	Total Values	
Sta. 126 S. 19° W. 13' southwall of stope across 1.4' of qtz. and silica perpendicular to 55° between floor and back of stope.	1.4'	0.12	6.8	5.20	8.47
Sta. 195 plus 24' S. from fill in old workings below present drift.	5.0'	0.31	7.1	9.25	15.12
Sta. 202 plus 23' W. from N. wall of incline shaft dipping 55°W. across 4' of qtz. and andesite. Cut perpendicular to dip. See sample 93	4.0'	0.03	2.2	1.50	2.44
Sta. 205 plus 21' S. from E. wall perpendicular to 45° W. Dip. Qtz.	4.0'	0.03	2.9	1.78	2.89
Sta. 206 plus 11.2' S. from E. wall across 3.6' perpendicular to 45°Dip Qtz.	3.6'	0.13	4.8	4.61	7.52
Sta. 126 S. 8' from S. wall of stope across 2' of Qtz. vein between floor and back o f stop.e Perpendicular to 55° Dip.	2.0'	0.12	7.1	5.32	8.66
Sta. 220 plus 23' W. from N. wall of incline shaft across 2' Sean of Qtz. cut from back of incline down 2' perpendicular to dip 55° W. See sample 89.	2.0'	0.09	5.8	4.18	6.80
Sta. 195 plus 8' NE from W. wall across 45' of loos e fill.	4.5'	0.19	3.7	5.41	8.84
Sta. 209 plus 12' W. from S. wall across 3' qtz. andesite. This is a continuation of Sample 114 Cut perpendicular to Dip.	3.0'	0.05	2.6	2.07	3.38
Sta. 223 plus 14' N. from E. wall across 5' andesite with qtz. Dip 45° W.	4.0'	0.07	1.7	2.13	3.48
Sta. 201 plus 32' W. from N. wall across 8' qtz. vein with andesite in footwall	6.0'	0.07	1.8	2.17	3.54

Sample Number	Width	Oz-Gold	Oz-Silver	Total Values	
. Sta. 126 S. 61° E. 12' from S. wall of stope across 2' of qtz. vein perpendicular to dip.	2.0'	0.16	7.5	6.60	10.28
. Sample taken from qtz. boulders with inclusions of andesite. 100' SE of tressel. Material from outcrop(Grab)	--	0.04	0.6	1.06	1.75
. Sta. 225 plus 12' W. from N. wall perpendicular to 40°dip across 5' qtz. and andesite between andesite walls.	5.0'	0.34	6.9	9.79	16.01
. Outcrop in place. 15' East of portal of upper level across 7' of oxidized andesite and quartz.	7.0'	0.04	0.68	1.50	5.75
	Reassay	.04	1.70		
2. Sta. 126 N. 69° E. 18' in face of stope across 2' qtz. between wall and back of stope. Dip 55° W.	2.0'	0.14	7.1	5.73	9.34
3. Sta. 207 plus 20' W. from N. wall across 1.33' of silicified andesite this isa continued along the line of sample 105 and extends 1.33' below it.	1.33'	0.05	1.4	1.59	2.60
4. Sta. 205 plus 17' N. from E. wall across 4' of qtz. andesite of footwall stringer	4.0'	0.02	1.4	.97	1.58
5. Sta. 207 plus 20' W. from N. wall across 2.4' of qtz. andesite. See sample 103. Cut perpendicular to dip of 46°W.	2.4'	0.08	4.6	3.49	5.69
6. Sta. 201 plus 32' W. fron N. wall Qtz. and andesite across 3.7' perpendicular to dip.	3.7'	0.06	3.9	1.99	4.56
	Reassay	.05	2.4		
07. Sta. 209 plus 17' W. from N. wall across 3.5' of amythest qtz. perpendicular to dip vein.	3.5'	0.04	2.8	1.94	3.17
08. Sta. 202 plus 34' W. from N. wall of shaft perpendicular to 55°dip across 4' andesite with some qtz.	4.0'	0.01	0.7	.49	.79

ample Number	Width	Oz-Gold	Oz-Silver	Total Values	
. Sta, 125 plus 8' S. from floor of stope to floor of drift across 5.5' dip 55°W.	4.5'	0.03	2.1	1.46	2.37
9. Sta. 205 plus 9' S. from east wall across 3.4' perpendicular to 45° dip. Qtz with andesite.	3.4'	0.12	7.0	5.28	8.59
. Sta. 2 07 plus 6' N. across 4.5' vein in footwall perpendicular to dip of 45° Qtz. and andesite	4.5'	0.13	5.4	4.85	7.90
2. Sta. 207 plus 40' N. from E. wall across 3.5' qtz. andesite. footwall stringer perpendicular to dip of 45° W.	3.5'	0.09	3.0	3.06	5.00
5. Sta. 209 plus 19' N. from fault breccia in face of drift. Strike E.W dip 78° N. oxidized qtz. andesite	2.0'	0.06	2.5	2.24	3.65
. Sta. 209 plus 11' W. from S. wall across 3' qtz. stringer perpendicular to dip 50° W. Between walls of andesite and qtz.	3.0'	0.08	4.4	3.41	5.56
5. Sta. 201 plus 26' W. from S. wall fill qtz. and andesite across 5'	5.0'	0.09	3.1	3.10	5.06
. Sta. 201 plus 11' W. from NW across 1.5' of qtz. andesite, perpendicular to dip of 37° W.	1.5'	0.03	1.8	1.34	2.18
7. Wta.225 plus 12' N. from N. wall across 3.5' of qtz. between andesite walls, perpendicular to dip of 45°.	3.5'	0.03	1.2	1.10	1.79
3. Sta. 227 plus 9' S. from E. wall across 3.5' Qtz. between walls of andesite Dip 40° W.	3.0'	0.17	6.8	6.23	10.17
9. Sta. 22 5 plus 23' W. from N. wall across 6.5' of qtz. between andesite walls perpendicular to dip of 40° W.	6.5'	0.05	2.4	1.99	3.25

ample Number	Width	Oz-Gold	-Oz-Silver	Total Values	
20. Sta. 220 plus 20' N. from E. wall across 2' of qtz. between walls of andesite. Dip 40° W. cut perpendicular to dip.	2.0'	0.22	4.1	6.19	10.12
21. Sta. 195 plus 34' S. Loose fill in face across 5'	5.0'	0.02	0.6	.65	1.07
22. Sta. 195 plus 4' S. from West wall loose fill across 5'	5.0'	0.34	6.5	9.43	15.75
23. Sta. 7. Old workings below 195 (45) floor sample. Old stopes 5' wide	5.0'	0.25	4.0	6.77	11.08
24. Sta. 194 plus 2' N. vein qtz. across 8' from West wall. Dip 45° W.	5.5'	0.05	3.8	2.55	4.15
25. Sta. 197 Face of drift across 3' of fill	3.0'	0.03	1.6	1.26	2.05
126. Sta. 193 plus 12' N. from W. wall across 4' perpendicular to wall of stope Limits undetermined	4.0'	0.24	17.0	8.76	19.13
127. Sta. 194 plus 8' N. from east wall across 8' of qtz. and andesite Dip 45° W.	5.5'	0.10	3.1	3.31	5.40

APPENDIX "D"

To Accompany Report of Alfred Merritt Smith

COMPUTATION OF TONNAGE AND VALUE

Of Assured Ore In

CROWN POINT MINE

Gold Hill, Nevada

ESTIMATE OF ORE AVAILABLE

Fill

(Weight of fill estimated at 100 pounds per cubic foot)

Central Blocks

From level of Tunnel A. extending 25' below Level 4.

Block A. From level of Tunnel A. to Level 4.
Length 150'
Length in plane of vein 222'
Ave. width of fill (calculated from sample widths 4.2')
CONTENTS OF BLOCK 6993 tons

Block B. From Level 4 to 25' below Level 4.
Length 150'
Length in plane of vein 29'
Width of fill 4'
CONTENTS OF BLOCK 870 tons.

NORTH BLOCK

(Adjacent to Central Block)

Triangular Block

Block C. Between Tunnel A. and Level 2.
Length 100'
Length in plane of vein 100'
Ave. width 4'
CONTENTS OF BLOCK 1000 tons

Block D. Between Level 2 and Level 4
Length 100'
Length in plane of vein 115'
Ave. width 3.5'
CONTENTS OF BLOCK 2012 tons

Block E. Between Level 4 and 25' below Level 4.
Length 100'
Length in plane of vein 29'
Width 3.5'
CONTENTS OF BLOCK 507 tons

SOUTH BLOCK

(Adjacent to Central Block)

Block F. Between Tunnel A. extending 25' below Level 4.
Length 100'
Length in plane of vein 244'
Width of fill 3.5'
CONTENTS OF BLOCK 4270 tons.

Total Estimated Tonnage of Fill

Block A	6993	tons
Block B	870	"
Block C	1000	"
Block D	2012	"
Block D	507	"
Block F	4270	"
TOTAL	15652	tons

AVERAGE VALUE $ 9.30 per ton.

ROCK IN PLACE

Footwall Vein

(Calculated width from Sample widths 3')

Central Block

Block G Between level of Tunnel A and extending 25' below level 4.
Length 150'
Length in plane of vein 228'
Ave. width 3'
CONTENTS OF BLOCK 7890 tons

NORTH BLOCKS

Block H. (TRIANGULAR BLOCK)

Between level of Tunnel A and Level 2.
Length 100'
Length in plane of Vein 90'
Width 3'
CONTENTS OF BLOCK 1038 tons.

Block I. Between Level 2 and extending 25' below Level 4.
Length 150'
Length in plane of the vein 139'
Width 3'
CONTENTS OF BLOCK 4810 tons

SOUTH BLOCK

(Adjacent to Central Block)

Block J. Between level of tunnel A and extending 25' below Level 4.
Length 100'
Length in plane of vein 228'
Width of vein 3'
CONTENTS OF BLOCK 5261 tons

Estimated Tonnage of Footwall Vein

Block G	7890	tons
Block H	1038	"
Block I	4810	"
Block J	5261	"
TOTAL	18999	"

Deducting of 35% tonnage as un-minable ore.
TOTAL MINABLE TONNAGE 12348 tons. AVERAGE VALUE $5.083 per ton.

MAIN OR HANGING WALL VEIN

(Calculated width of vein from sample width 15.8')

CENTRAL BLOCK

Block K. Between level of Tunnel A and extending 25' below Level 4
Length 150'
Length in plane of vein 253'
Width of vein 15.8'
CONTENTS OF BLOCK 46123 tons

NORTH BLOCK

(Adjacent to Central Block)

TRIANGULAR BLOCK

Block L. Between Level of Tunnel A and Level 2.
Length 100'
Length in plane of vein 107'
Width of vein 15.8'
CONTENTS OF BLOCK 6502 tons

Block M. Between Level 2 and extending 25' below Level 4
Length 100'
Length in plane of vein 146'
Width of vein 15.8'
CONTENTS OF VEIN 17745 tons

SOUTH BLOCK

Block N. Between level of Tunnel A and extending 25' below Level 4.
Length 100'
Length in plane of vein 253'
Width of vein 15.8'
CONTENTS OF VEIN 30750 tons.

Estimate of tonnage of Main Vein

Block K	46123	tons
Block L	6502	"
Block M	17745	"
Block N	30750	"
TOTAL	101120	tons

Deducting 15% of tonnage as un-minable ore.
TOTAL MINABLE TONNAGE 85,952 tons. AVERAGE VALUE $6,845 per ton.

Method used to determine estimate value per ton of ore in Footwall and Hanging wall veins:

Also fill of old stopes:

The assay value of each sample was multiplied by the width of the sample. The sum of the assay-width products was divided by the sum of the sample widths.

Sample No	Width	(Footwall vein; all samples included) Value (Gold $20.67) Dollars (Silver .40¢)	Value (Gold $34.00) Dollars (Silver .64¢)	Assay - width Products-	
Level 2					
42	3.2	4.33	7.02	13.75	22.4
23	2.0	8.66	14.19	17.32	28.3
25	3.0	7.91	11.99	23.73	35.9
15	4.5	3.41	5.64	15.34	25.3
112	3.5	3.06	5.00	10.52	17.5
111	4.5	4.85	7.90	21.82	35.5
93	2.0	4.18	6.80	8.36	13.6
110	3.4	5.28	8.59	17.96	29.2
90	4.0	1.78	2.89	6.12	11.5
91	3.6	4.61	7.52	16.60	27.0
	33.7			151.52	246.6
Level 3					
96	4.0	2.13	3.48	8.52	13.92
86	6.0	2.81	4.57	16.86	27.42
120	2.0	6.19	10.12	12.38	20.24
85	4.0	1.63	2.67	6.52	10.68
69	5.0	4.05	6.65	20.25	33.25
68	4.5	2.31	3.76	10.04	16.92
67	3.0	4.77	7.79	14.31	23.37
75	3.0	11.52	18.82	34.56	56.46
92	2.0	5.32	8.66	10.64	17.32
76	2.7	13.58	22.22	36.63	59.99
7	2.5	6.87	8.41	17.18	21.03
102	2.0	5.73	9.34	11.46	18.68
98	2.0	6.60	10.28	13.20	20.56
87	1.4	5.20	8.47	7.28	11.86
43	4.3	11.69	19.14	50.27	82.30
37	5.4	3.57	5.82	19.28	31.43
38	5.0	3.10	5.06	15.50	25.30
36	5.4	8.37	13.62	45.20	73.55
41	4.20	4.16	6.79	17.47	28.51
	68.4			367.55	592.79

Estimated average value of ore of Footwall vein
519.07 ÷ 102.1 = $5.083 per ton.

Estimated average value of ore of Footwall vein
Gold @ $34.00 per ounce and Silver @ $0.645 per ounce
839.47 ÷ 102.1 = $8.22 per ton.

Hanging Wall Vein

Level # 2

Sample No.	Width ft.	Assay Value Gold 20.67 per oz.	Silver 40¢ per oz.	Assay - Width Product.	
22	5.5	3.25	5.30	17.67	29.15
44	3.5	4.35	7.09	15.24	24.81
35	6.0	3.00	4.89	18.00	29.34
14	7.7	10.29	16.80	79.25	129.36
30	6.5	11.13	18.15	72.38	117.97
26	6.0	9.96	16.26	59.76	97.56
24	3.0	10.83	17.71	32.49	53.13
29	5.6	12.83	20.91	71.85	117.10
28	6.0	9.81	16.12	58.86	96.72
21	6.0	9.00	13.65	54.00	81.90
31	5.0	17.38	28.51	86.90	142.05
17	5.00	9.71	15.86	48.55	79.30
34	2.0	8.16	13.32	16.32	26.64
	67.8			631.27	1025.03

Level # 3

Sample No.	Width ft.	Gold	Silver	Assay - Width Product	
47	8.0	3.16	5.14	24.28	41.12
55	5.0	4.00	5.53	20.00	27.65
62	6.6	6.45	10.52	42.57	69.43
51	11.6	6.85	11.19	79.46	129.80
46	3.0	20.80	34.19	62.40	102.57
53	7.0	1.50	2.44	10.50	17.08
50	7.0	3.47	5.68	24.29	39.76
100	5.0	9.79	16.01	48.95	80.05
52	5.0	5.71	9.31	28.55	46.55
54	4.2	2.73	3.99	11.47	16.76
48	3.0	6.83	11.17	20.49	33.51
45	5.0	2.93	4.78	14.65	23.90
63	5.3	2.59	4.21	13.73	22.31
58	3.8	2.50	4.47	9.50	16.97
81	3.5	5.25	8.45	18.37	29.57
80	6.0	3.10	5.06	18.60	30.36
82	4.0	5.43	8.84	21.72	35.36
	93.0			469.53	762.75

Estimated average value of ore in Hanging Wall Vein:

1100.8 ÷ 160.8 = $6.845 per ton

Estimated average value of ore in Hanging Wall Vein:

Gold @ $34.00 per ounce and /Silver @ $0.645 per ounce.

1787.78 ÷ 160.80 = $ 11.12 per ton.

FILL

Sample No.	Width	Assay Value Gold $20.67 per oz. Silver 40¢ per oz.		Assay - width Product	
1	4.2	2.23	3.64	9.36	15.29
2	4.6	3.67	6.00	16.88	27.60
4	4.0	9.45	15.44	36.80	61.76
5	3.5	16.58	27.10	58.02	94.85
6	5.3	10.12	15.21	53.68	80.61
8	6.0	15.84	25.91	95.04	155.46
9	3.5	16.98	27.75	59.43	97.12
10	4.0	11.64	19.05	46.56	76.20
11	3.6	14.33	23.41	51.59	84.28
12	4.7	21.10	34.79	99.31	163.51
13	4.5	18.37	30.03	82.67	135.14
20	4.5	3.65	5.97	16.43	26.37
27	5.0	17.47	26.84	87.35	134.20
32	2.0	6.60	10.30	13.20	20.60
56	7.0	13.60	22.29	95.20	156.03
59	9.2	6.53	10.09	60.09	92.83
65	7.0	9.53	15.53	66.71	108.71
73	5.0	7.12	11.64	35.60	58.20
74	5.0	3.80	4.55	19.00	22.75
88	5.0	9.25	15.12	46.25	75.60
94	4.5	5.41	8.84	24.34	39.78
79	4.5	6.82	11.12	30.69	50.04
115	5.0	3.10	5.06	15.50	25.30
121	5.0	.65	1.07	3.25	5.35
122	5.0	9.43	15.75	47.15	78.75
123	5.0	6.77	11.08	33.85	55.40
125	3.0	1.26	2.05	3.78	6.15
126	4.0	8.76	19.13	35.04	76.52
	133.6			1242.77	2024.40

Average value of ore in fill Gold @ $20.67 oz. and Silver at 40¢ per oz. 1242.77 ÷ 133.6 -- $9.30 per ton.

Gold at $34.00 per ounce and Silver @ $0.645 per ounce.

2024.40 ÷ 133.60 - per ton $ 15.16

SUMMARY OF ESTIMATED TONNAGES AND VALUES.

Fill	15652 tons	@ $9.30 per ton	$145,563.60
Footwall Vein	12348 "	@ 5.08 " "	62,764.88
Hanging Wall Vein	85952 "	@ 6.84 " "	588,341.44
TOTAL TONNAGE	113952	GROSS VALUE	$ 796,669.92

Average value of total tonnage $6.99 per ton (Gold $20.67 per oz.)
(Silver 40¢ per oz.)

SUMMARY OF ESTIMATED TONNAGES AND VALUES.

Fill	15652 tons	@ $15.16 per ton	$ 237,284.32
Footwall	12348 "	@ 8.22 " "	101,500.56
Hanging Wall Vein	85952 "	@ 11.12 " "	955,766.24
GROSS TONNAGE	113952	GROSS VALUE	$ 1294,571.12

verage value of total tonnage $ 11.36 per ton (Gold $34.00 per oz.)
(Silver $0.645 per oz.)

APPENDIX "E"

To Accompany Report of Alfred Merritt Smith

PHOTOSTAT REPRODUCTION OF MAP IN PLANE OF COMSTOCK LODE, SHOWING PROVEN AND POSSIBLE ORE IN PROPERTIES OF SUTRO TUNNEL COALITION, INC.

APPENDIX "F"

METALLURGICAL TESTS

Report of U. S. Bureau of Mines,

Reno Station, Nevada.

UNITED STATES
DEPARTMENT OF COMMERCE
BUREAU OF MINES
Rare and Precious Metals Experiment Station
Reno, Nevada.

January 12, 1934. ESL:m

Mr. R. A. Allen,
Nevada Public Works Engineer, for
Public Works Administration,
Reno, Nevada.

Dear Mr. Allen:

Acting under telegraphic instructions dated December 29, 1933, from our Mr. Hood of the Washington Office, U. S. Bureau of Mines, we have completed the following experiments on Crown Point ore from Virginia City, Nevada:

The sample of ore, representing a composite prepared from one hundred twenty seven mine samples, was furnished us by your Mr. A. M. Smith on January 3, 1934.

The composite ore sample, as a whole, is classed as a siliceous ore. A considerable portion of it is oxidized, and this portion contains appreciable amounts of iron and manganese oxides. The sulphide content, amounting to about 1-1/2%, is mostly pyrite. No tests have been made to determine the association of either the gold or silver, but the recovery of the gold by amalgamation shows that about 50% of the gold is free and so recoverable when the ore is crushed to 40-mesh. The composite sample, as received here, was dry crushed in rolls to minus 10-mesh, then mixed thoroughly and cut to samples for assay. Two samples were cut out for a head assay, the average assay results being as follows:

Gold - 0.195 oz. per ton.
Silver - 5.94 ozs.per ton.

Detailed description and results of tests follow:

<u>Test No. 1</u>, <u>Straight Amalgamation</u>:

Feed to test crushed dry to minus 40 mesh. Water then added to make a pulp dilution of 3 : 1, and the wet pulp passed over an amalgam plate in such a manner as to give results comparable to ordinary plate amalgamation.

Results:

Assay of heads to test - 0.195 oz. Au. and 5.94 ozs. Ag.
" " amalgamation tailing - 0.105 oz. Au. and 4.99 ozs. Ag.
Extraction by Amalgamation - 46.2% Au. and 16.0% Ag.

Test No. 2, Amalgamation followed by cyanidation of amalgamation tailing:

Feed to test crushed dry to minus 40-mesh, and then amalgamated just as in Test No. 1. The Amalgamation Tailing, without further grinding, was agitated in a lime-cyanide solution for 48 hours at room temperature (about 23°C.), using a solution containing 2.0 pounds NaCN per ton and enough lime to maintain protective alkalinity throughout the treatment period. The ratio of solution to ore was 4 : 1.

Results:

Assay of cyanide feed (assumed to be same as amalgamation tailing from Test No.1) - 0.105 oz. Au. and 4.99 Ozs. Ag.
Assay of cyanide residue - 0.015 oz. Au. and 2.65 ozs.Ag.
Extraction, based on cyanide feed and residue - 85.6% Au. and 46.9% Ag. Extraction by cyanidation of amalgamation tailing, based on assay of original heads - 46.2% Au. and 39.4% Ag.
Total extraction by combined amalgamation and cyanidation of amalgamation tailing - 92.4% Au. and 55.4% Ag.
Cyanide loss - 0.4 lb. NaCN per ton ore. Lime loss - 11.0 lbs. CaO per ton ore.
Cyanide extraction checked by assay of pregnant solution.

Test No. 3, Straight Cyanidation:

Feed to test crushed dry to minus 40 mesh, then agitated in a lime cyanide solution for 48 hours at room temperature (about 23°C.), using a solution containing 2.0 pounds NaCN per ton and enough lime to maintain protective alkalinity throughout the treatment period. The ratio of solution to ore was 4 : 1.

Results:

Assay of heads to test - 0.195 oz. Au. and 5.94 ozs. Ag.
" " cyanide residue - 0.015 oz.Au. and 2.76 ozs.Ag.
Extraction - 92.4% Au. and 53.6% Ag.
Cyanide loss - 0.4 lb. NaCN per ton ore.
Lime loss - 10.0 lbs. CaO per ton ore.
The extraction was checked by assay of pregnant solution.

Tests No. 4 to 7 inc., Straight flotation:

The feed to each of these tests was ground wet in a pebble mill so that one percent remained on a 65 mesh screen. The tests were all made in a Sub-A type machine, using a pulp density of approximately 22% solids. About one half of the total amount of promoter (Xanthate or Reagents 301 and 208) recorded for each test was added at the beginning and the pulp conditioned for two minutes before starting to remove froth. The rest of the promoter and all of the frother used were added at intervals during the flotation period. The period of flotation for each test was ten minutes which is about the time required for a readily floatable ore. Tests 4 and 5 are duplicates except that pine oil was used in test 5 to give a more voluminous froth and to see if by so doing recovery would be increased. Tests 6 and 7 are also duplicates except that pine oil was used in test 6 and not in test 7. Reagents used and results of each test follow:

Test No. 4.

Reagents used: Kind	Amount - lbs.per ton ore.
Amyl Xanthate (z-5)	0.07
Aerofloat No. 15	0.10
Pine Oil	0.02

Results:

Assay of heads to test (computed from product weights and assays) - 0.1975 oz.Au. 6.08 ozs.Ag
Assay of flotation tailing
0.035 oz.Au. and
1.79 ozs.Ag.
Assay of flotation concentrate
3.46 ozs.Au. and
91.8 ozs.Ag.
Recovery - 83.0% Au. and 71.9% Ag.
Ratio of concentration - 21.1 : 1.

Test No. 5.

Reagents used: Kind	Amount - lbs. per ton ore.
Amyl. Xanthate (Z-5)	0.07
Aerofloat No. 15	0.12

Results:

Assay of heads to test (computed from product weights and assays - 0.204 oz. Au.
5.93 ozs.Ag.
Assay of flotation tailing - 0.04 oz.Au. and 1.75 ozs. Ag.
" " " concentrate 6.42 ozs.Au.and 164.2 ozs.Ag.
Recovery - 80.9% Au. and 71.3% Ag.
Ratio of concentration - 38/9 : 1

Test No. 6.

Reagents used: Kind	Amount - lbs. per ton ore.
Reagent No.301	0.04
" " 208	0.04
Aerofloat No. 15	0.10
Pine oil	0.03

Results:

Assay of heads to test (computed from product weights and assays) - 0.1965 oz. Au.
5.88 ozs. Ag.
Assay of flotation tailing - 0.04 oz. Au. and 1.88 ozs. Ag.
" " " concentrate 3.36 ozs.Au. and 86.6 ozs. Ag.
Recovery - 80.6% Au. and 69.7% Ag.
Ratio of concentration - 21.1 : 1.

Test No. 7.

Reagents used: Kind	Amount - lbs. per ton ore
Reagent No. 301	0.04
" " 208	0.04
Aerofloat No.15	0.10

Results:

Assay of heads to test (computed from product weights and assays) - 0.1945 oz. Au.
6.0 ozs. Ag.
Assay of flotation tailing - 0.04 oz. Au. and 1.79 ozs. Ag.
" " " concentrate 5.26 ozs.Au. and 144.0 ozs.Ag.
Recovery - 80.0% Au. and 71.0% Ag.
Ratio of concentration - 34.8 : 1.

The Amyl xanthate (Z-5) used in these tests is manufactured by the Great Western Electrochemical Company. All the other reagents used are distributed by the American Cyanamid Company.

These four tests show very consistent results and indicate that there is little increase in recovery by removing a larger amount of concentrate. In other words, a very clean concentrate could be made without a resulting decrease in recovery. There is so little difference in results obtained with the different reagents that the final choice would probably be made on the basis of reagent cost, however, in the laboratory machine, Z-5 gave the smoothest froth.

Test No. 8, Cyanidation of flotation tailing:

A portion of the flotation tailing from test No.4, after drying but without further grinding, was agitated in a lime-cyanide solution for 48 hours at room temperature (about 23°C), using a solution containing 2.0 lbs. NaCN per ton of tailing and enough lime to maintain protective alkalinity throughout the treatment period. The ratio of solution to solids was 4 : 1.

Results:

Assay of heads to test (flotation tailing test 4) - 0.035 oz. Au. and 1.79 ozs. Ag.

Assay of cyanide residue - 0.01 oz. Au. and 0.73 oz. Ag.
Per cent of values extracted from flotation tailing by cyanidation - 71.4% Au. and 59.2% Ag.
Total recovery by combined flotation and cyanidation of flotation tailing - 95.0% Au.
88.3% Ag.
Additional recovery by cyanidation of flotation tailing, in ounces per ton of ore - 0.025 oz. Au. and 1.06 ozs. Ag.

Very truly yours,

(Signed) EDMUND S. LEAVER
Supervising Engineer;

Extra copy Mr. R. A. Allen
CC Mr. R.S. Dean, Ch.Engr., Metallurgical Div., Bureau of Mines
Mr. A.C. Fieldner, Ch.Engr., Expt.Stations Div. " " "
Attention:Mr. Hood

Files

APPENDIX "G"

To Accompany Report of Alfred Merritt Smith

U. S. Bureau of Mines Assay Sheets
and a Comparison with Assays made by
Nevada State Analytical Laboratory.

Appendix G

UNITED STATES

DEPARTMENT OF COMMERCE
Bureau of Mines
Rare and Precious Metals Experiment Station

RENO, Nevada

January 18, 1934. ESL:M

Mr. R.A. Allen,
Nevada Public Works Engineer, for
Public Works Administration,
Reno, Nevada.

Dear Mr. Allen:

The following assays were made on samples submitted by your Mr. A.M. Smith on January 12, 1934, from Crown Point Mine, Virginia City, Nevada:

Sample No.	Assay, Ozs. per ton of 2000 lbs. Silver	Gold
1	2.18	0.07
4	9.05	.35
10	9.35	.57
13	13.71	.61
16	9.59	.16
19	1.84	.06
22	8.23	.07
25	6.40	.20
28	8.90	.25
31	14.20	.50
34	7.93	.27
37	4.82	.10
40	.57	.03
43	7.66	.54
46	19.84	.66
49	4.68	.17
52	5.93	.17
55	3.55	.15
58	3.92	.08
61	4.19	.11
64	2.08	.17
67	5.05	.15
70	3.92	.23
73	5.15	.25
76	10.52	.48
79	8.98	.16
82	7.44	.06
85	1.26	.06
88	7.41	.29
91	4.87	.13
94	4.02	.18
97	1.60	.10
100	7.21	.43
103	1.35	.05
106	2.44	.06

Continued - R.A.A. 1/18/34

Sample No	Assay, Ozs. per ton of 2000 lbs. Silver	Gold
109	2.65	0.05
112	2.88	.08
115	3.12	.13
118	8.11	.19
121	1.29	.05
124	4.92	.08
127	5.54	.10

Very truly yours,

(Signed) EDMUND S. LEAVER
Supervising Engineer.

Extra Copy Mr. R.A. Allen
CC Mr. R.S. Dean
Mr. A.C. Fieldner
Files.

A comparison of assays made upon the same ore sample by the U.S. Bureau of Mines, Reno Station, and the Nevada State Analytical Laboratory.

The assays are compared individually. The first line gives U.S. Bureau of Mines results, the second line, Nevada State Analytical Laboratory results.

Sample No.	Ozs.Gold	Ozs.Silver	Val.Gold @ 34.00	Val.Silver @ .64½	Total Val.
1	.07 .05	2.18 3.00	2.38 1.70	1.41 1.94	3.79 3.64
4	.35 .31	9.05 7.60	11.90 10.54	5.84 4.90	17.74 15.44
10	.57 .42	9.35 7.40	19.38 14.28	6.03 4.77	25.41 19.05
13	.61 .61	13.71 14.40	20.74 20.74	8.84 9.29	29.58 30.03
16	.16 .16	9.59 10.20	5.44 5.44	6.18 6.58	11.62 12.02
19	.06 .04	1.84 2.20	2.04 1.36	1.19 1.42	3.23 2.78
22	.07 .08	8.23 4.00	2.38 2.72	5.31 2.58	7.69 5.30
25	.20 .22	6.40 6.99	6.80 7.48	4.13 4.51	10.93 11.99
28	.25 .29	8.90 9.70	8.50 9.86	5.74 6.26	14.24 16.12
31	.50 .57	14.20 14.00	17.00 19.38	9.16 9.03	26.16 28.41
34	0.27 0.24	7.93 8.00	9.18 8.16	5.11 5.16	14.29 13.32
37	0.10 0.08	4.82 4.80	3.40 2.72	3.11 3.10	6.51 5.82
40	0.03 0.01	.57 0.60	1.02 .34	0.37 0.39	1.39 0.73
43	0.54 0.43	7.66 7.00	18.36 14.62	4.93 4.52	23.29 19.14

Continued -

Sample No.	Ozs.Gold	Ozs.Silver	Val.Gold @ 34.00	Val.Silver @ .64½	Total Val.
46	0.66	19.84	22.44	12.80	35.24
	0.63	19.80	21.42	12.77	34.19
49	0.17	4.68	5.78	3.02	8.80
	0.17	4.60	5.78	2.97	8.75
52	0.17	5.93	5.78	3.82	9.60
	0.16	6.00	5.44	3.87	9.31
55	.15	3.55	5.10	2.29	7.39
	0.12	3.80	4.08	2.45	6.53
58	0.08	3.92	2.72	2.53	5.25
	0.04	4.20	1.36	2.71	4.07
61	0.11	4.19	3.74	2.70	6.44
	0.11	4.70	3.74	3.04	6.78
64	0.17	2.08	5.78	1.34	7.12
	0.18	1.90	6.12	1.23	7.35
67	0.15	5.05	5.10	3.26	8.36
	0.14	4.70	4.76	3.03	7.79
70	0.23	3.92	7.82	2.53	10.35
	0.23	3.90	7.82	2.52	10.34
73	0.25	5.15	8.50	3.32	11.82
	0.24	5.40	8.16	3.48	11.64
76	0.48	10.52	16.32	6.78	23.10
	0.46	10.20	15.64	6.58	22.22
79	0.16	8.98	5.44	5.79	11.23
	0.16	8.80	5.44	5.68	11.12
82	0.06	7.44	2.04	4.80	6.84
	0.11	7.90	3.74	5.10	8.84
85	0.06	1.26	2.04	0.81	2.85
	0.05	1.50	1.70	0.97	2.67
88	0.29	7.41	9.86	4.79	14.65
	0.31	7.10	10.54	4.58	15.12
91	0.13	4.87	4.42	3.14	7.56
	0.13	4.80	4.42	3.10	7.52
94	0.18	4.02	6.12	2.59	8.71
	0.19	3.70	6.46	2.39	8.85

Continued -

Sample No.	Ozs.Gold	Ozs.Silver	Val.Gold @ 34.00	Val.Silver @ .64½	Total Val.
97	0.10	1.60	3.40	1.03	4.43
	0.07	1.80	2.38	1.16	3.54
100	0.43	7.21	14.62	4.65	19.27
	0.34	6.90	11.56	4.45	16.01
103	0.05	1.35	1.70	0.87	2.57
	0.05	1.40	1.70	0.90	2.60
106	0.06	2.44	2.04	1.57	3.61
	0.06	3.90	2.04	2.52	4.56
109	0.05	2.65	1.70	1.71	3.41
	0.03	2.10	1.02	1.35	2.37
112	0.08	2.88	2.72	1.86	4.58
	0.09	3.00	3.06	1.94	5.00
115	0.13	3.12	4.42	2.01	6.43
	0.09	3.10	3.06	2.00	5.06
118	0.19	8.11	6.46	5.23	11.69
	0.17	6.80	5.78	4.39	10.17
121	0.05	1.29	1.70	0.83	2.53
	0.22	0.60	7.48	0.39	7.87
124	0.08	4.92	2.72	3.17	5.89
	0.05	3.80	1.70	2.45	4.15
127	0.10	5.54	3.40	3.57	6.97
	0.10	3.10	3.40	2.00	5.40

Average value of assays made by U.S. Bureau of Mines. RENO Station -

Gold	Silver	Total Average
$ 6.96	$ 3.81	$ 10.775

Average value of assays of same ore samples made by Nevada State Analytical Laboratory -

Gold	Silver	Total Average
$ 6.65	$ 3.68	$ 10.32

	Days	Men	Rate	Total	
R	120	26 Skilled	$6.60	$20,592.00	± 76%
	120	20+ Unskilled	2.70	6,608.00	± 24
				$27,200.00	

Shovel operators

Truck men.

Drillers

Powderman.

Carpenters + concrete men on culvert.

Grader + tractor men on road, etc.

SUPPLEMENTAL DATA FOR

REPORT ON PROPERTY OF

SUTRO TUNNEL COALITION INCORPORATED

The U. S. Bureau of Mines, Reno Station, at the request of the writer, has made additional tests upon flotation concentrate from the Crown Point Mine ore. A copy of the results are attached herewith.

The additional tests were made to determine if it would be more economical to cyanide the concentrate at the mill than to ship to smelters. The excellent results obtained from these tests show that it may pay to install a small special plant in the mill and cyanide the concentrate there.

The ratio of concentration, 37.5 : 1, would yield 2.666 tons of concentrate per mill day or 800 tons of concentrate for ten months of operation per year as figured for the proposed mill. Equipment for re-grinding, agitating and filterpressing this quantity would cost about six thousand five hundred dollars ($6500.00) installed. The precipitation unit of the large cyanide plant would be used for both concentrate and flotation tailing solutions.

The construction of such a concentrate treatment plant will result in a saving of freight costs on the concentrate to San Francisco of Salt Lake City smelters. The cost of treatment by cyanidation will about equal the smelting charges and deductions. A saving of about forty dollars ($40.00) per day on freight is indicated.

At the beginning of the mill operation, it is recommended that the concentrate be shipped to smelters, while additional study is being given to the problem of concentrate treatment. The Leaver method of preliminary treatment by sulphur dioxide, strongly indicates that a substantially higher saving of the silver can be made by its use, but it remains to be demonstrated whether the method is economically comparable to finer grinding and longer cyanide contact only.

The net result of all the tests made to date shows the metallurgy of the ore to be simple, and the proposed mill and treatment will give very high extraction and profitable results.

Alfred Merritt Smith
Alfred Merritt Smith
Reno, Nevada January 30,1934

COPY

UNITED STATES

DEPARTMENT OF COMMERCE

Bureau of Mines
Rare and Precious Metals Experiment Station
Reno, Nevada

January 26, 1934

Mr. R. A. Allen,
Nevada Public Works Engineer, for
Public Works Administration,
Reno, Nevada

Dear Mr. Allen:

To obtain additional information on the milling treatment of ore from the Crown Point Mine, Virginia City, Nevada, the following experiments have been made on the composite sample furnished us by your Mr. A. M. Smith on January 3, 1934:

Tests 9 to 12 inclusive. Flotation tests:
These four flotation tests were made to secure enough concentrate for a cyanidation test. The feed for each test was ground wet in a pebble mill so that one per cent remained on a 65-mesh screen. The tests were all made in a Sub-A type flotation machine, using a pulp density of approximately 22% solids. The manipulation was the same for each test; about one half of the promoter used was added to the pulp which was then conditioned in the flotation cell without air for two minutes. The air was then turned on and flotation started, the remainder of the reagents being added at intervals during the flotation period. The period of flotation for each test was 10 minutes.

Reagents used: Kind	Amt., lbs. per ton ore
Amyl Xanthate (Z-5) . . .	0.07
Aerofloat No. 15	0.12

The tailings from the four tests were combined for assay and cyanide tests.
The concentrates from the four tests were combined for cyanide test.
Results of flotation tests:
Assay of flotation tailing - 0.035 oz Au and 1.67 ozs Ag.
" " " conc't, (computed from cyanide residue and pregnant soln. assays of test 14) - 6.02 ozs. Au., 154.45 ozs Ag.
Assay of flotation feed (computed product weights and assays)-0.196 oz Au
5.75 ozs Ag.
Recovery by flotation - 82.6% Au and 71.9% Ag.
Ratio of concentration - 37.5 : 1
This recovery and ratio of concentration checks closely with that of former tests, and indicates that it is easy to obtain consistent results with this ore by flotation.

Test No. 13. Cyanidation of flotation tailing:
A portion of the combined flotation tailing from tests 9 to 12, after drying but without further grinding, was agitated in a lime-cyanide solution for 48 hrs. at room temperature (about 23°C.) using a solution containing 2.0 pounds of NaCn per ton and enough lime to maintain protective alkalinity throughout the treatment period. The ratio of solution to solids was 4 : 1.

Results:
Assay of heads to test (flotation tailing) - 0.035 oz Au and 1.67 ozs Ag.
" " cyanide residue - 0.005 oz Au and 0.69 oz Ag.
Per cent of values extracted from flotation tailing by cyanidation -
85.7% Au
58.7% Ag.
Total recovery by flotation and cyanidation of flotation tailing -
97.6% Au
88.5% Ag
Additional recovery by cyanidation of flotation tailing (ounces per ton of ore) - 0.03 oz Au and 0.98 oz Ag.
Cyanide loss - 0.20 lb NaCN per ton flotation tailing.
Lime loss - 7.4 lbs. CaO per ton flotation tailing.

These results by combined flotation and cyanidation of flotation tailing check closely with those obtained previously by this method.

Test No. 14. Cyanidation of flotation concentrate:

The total amount of combined flotation concentrate obtained from tests 9 to 12 was thickened and ground in a pebble mill to minus 200-mesh. Lime was added to the pulp while grinding in order to neutralize all acidity before adding the cyanide. After grinding, enough cyanide was added to the pulp to make a solution strength of 3.6 pounds NaCN per ton, and the pulp agitated for 72 hrs. at room temperature (about 23°C). The ratio of solution to solids was 14:1.

Results:
Assay of heads to test (flot. conc't) (computed from assay of pregnant soln. and cyanide residue) - 6.02 oz Au, 154.45 ozs Ag.
Assay of cyanide residue - 0.10 oz Au and 14.45 ozs Ag.
Per cent of values extracted from flotation concentrate by grinding to minus 200-mesh and then cyaniding - 98.4% Au and 90.6% Ag.
Combined recovery by flotation and cyanidation of flotation concentrate -
81.4% Au
65.1% Ag
Cyanide loss - 15.4 lbs. NaCn per ton of concentrate which is equivalent to 0.41 lbs NaCN per ton original ore.
Lime loss - 15.0 lbs CaO per ton concentrate which is equivalent to 0.4 lb. CaO per ton original ore.
Combining the results of tests 8 to 14 inclusive, it is shown that the over-all net extraction in the form of values dissolved in cyanide solution, by the combined methods of flotation, and cyanidation of both flotation tailing and flotation concentrate, is - 96.4% Au and 81.7% Ag.

Test No. 15 Cyanidation after pretreatment of original ore with sulphur dioxide.

The relatively low extraction of silver by cyanide from both original ore and from flotation concentrate, and the presence of considerable manganese in both these products, indicates that the refractory silver may be associated with manganese.

A sample of the original ore, ground to minus 40-mesh was treated for several hours by passing sulphur dioxide into the wet pulp. The color of the pulp changed from dark to light. The excess sulphur dioxide was removed by filtration and washing. The filter cake was then repulped and agitated for 30 minutes with lime water to completely neutralize all acidity. Enough cyanide was then added to make a solution strength of 2.0 pounts NaCN per ton, and the pulp agitated 48 hrs. at room temperature (about 23°C.). The ratio of solution to solids during both the sulphur dioxide and the cyanide treatments was 4 : 1.

Results:

Assay of heads to test - 0.195 oz Au and 5.95 ozs Ag.
" " cyanide residue - 0.01 oz Au and 0.78 oz Ag.
Extraction - 94.8% Au and 87.0% Ag.
Cyanide loss - 0.25 lb NaCN per ton ore.
Lime loss - 23.0 lbs. CaO per ton ore.

As was shown in one of our previous tests (No.3), direct cyanide treatment of this ore, crushed to minus 40-mesh, gave an extraction of 92.4% Au and 53.6% Ag. A comparison of these results shows that the preliminary sulphur dioxide treatment is very beneficial to the extraction of the silver, and might be best applied as a preliminary treatment for the flotation concentrate.

Test No. 16. Direct cyanidation of ore ground to minus 100-mesh.

This test was made to furnish comparison with direct cyanidation of minus 40-mesh ore and also with cyanidation of minus 40-mesh ore after preliminary treatment with sulphur dioxide.

The feed to the test was ground in a pebble mill with lime water to minus 100-mesh, then cyanide added to make a solution strength of 2.0 pounds NaCN per ton. The pulp was then agitated for 48 hrs. at room temperature (about 23°C.), usind a ratio of solution to solids of 4 : 1.

Results:

Assay of heads to test - 0.195 oz Au and 5.94 ozs Ag.
" " cyanide residue - 0.005 oz Au and 1.75 ozs Ag.
Extraction - 97.4% Au and 70.5% Ag.
Cyanide loss - 0.4 lbs. NaCN per ton ore
Lime loss - 11.0 lbs. CaO per ton ore

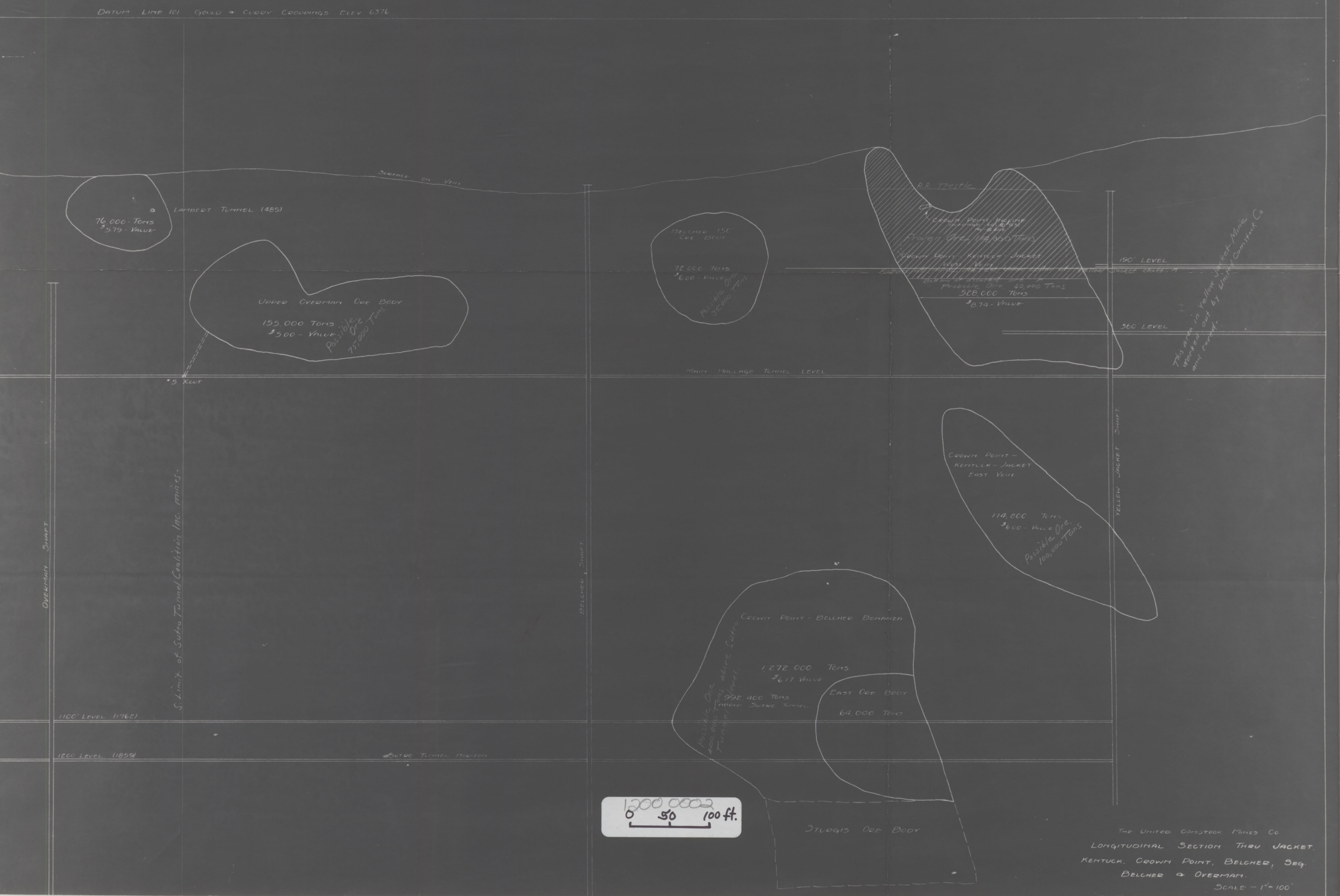
These results, by comparison with those obtained on minus 40-mesh feed by direct cyanidation, show a decided increase in the extraction of both gold and silver which is due to the finer grinding. The extraction obtained by direct cyanidation of minus 40-mesh feed (see test 3) is 92.4% Au and 53.6% Ag.

By comparing with cyanidation of minus 40-mesh ore after treatment with sulphur dioxide, it is shown that the sulphur dioxide treatment causes a higher silver extraction than does fine grinding, but that the gold extraction is slightly higher on minus 100-mesh ore with direct cyanide treatment than on minus 40-mesh ore after sulphur dioxide treatment. (See test 15 for extractions after sulphur dioxide treatment.)

Very truly yours,

(Signed) . . . EDMUND S. LEAVER
Supervising Engineer.

Extra Copy Mr. R. A. Allen
CC Mr. Dean
Mr. Fieldner
Files


DATUM LINE 101 GOULD & CURRY CROPPINGS ELEV 6376
SURFACE ON VEIN
LAMBERT TUNNEL (485)
76,000 - TONS
$5.79 - VALUE
UPPER OVERMAN ORE BODY
155,000 TONS
$5.00 - VALUE
Possible Ore 75,000 Tons
5 XCUT
BELCHER 150' ORE BODY
72,000 TONS
$6.00 - VALUE
possible Ore 35,000 Tons
R.R. Trestle
CROWN POINT INCLINE
Proven Ore, 114,000 Tons
CROWN POINT - KENTUCK - JACKET WEST VEIN
Bottom of assured ore
Probable Ore, 60,000 Tons
528,000 TONS
$8.74 - VALUE
190' LEVEL
360' LEVEL
This area in Yellow Jacket Mine worked out by United Comstock Co and caved.
MAIN HAULAGE TUNNEL LEVEL
OVERMAN SHAFT
S. Limit of Sutro Tunnel Coalition Inc. mines.
BELCHER SHAFT
YELLOW JACKET SHAFT
CROWN POINT - KENTUCK - JACKET EAST VEIN
114,000 TONS
$6.00 - VALUE
Possible Ore, 100,000 Tons
CROWN POINT - BELCHER BONANZA
1,272,000 TONS
$6.17 VALUE
992,400 TONS ABOVE SUTRO TUNNEL
Possible Ore 400,000 Tons above Sutro Tunnel level.
EAST ORE BODY
64,000 TONS
1100' LEVEL (1762)
1200 LEVEL (1858)
SUTRO TUNNEL HORIZON
STURGIS ORE BODY
1200 0802
0 50 100 ft.
THE UNITED COMSTOCK MINES CO.
LONGITUDINAL SECTION THRU JACKET, KENTUCK, CROWN POINT, BELCHER, SEG. BELCHER & OVERMAN.
SCALE - 1" = 100'