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Report on
The Consolidated Virginia Mine
and
The Underground Mill

The enclosed report was made by Mr. Frederick B. Hyder, mining engineer, who has unqualified recommendations from Mr. D. C. Jackling, the Copper King.

The object in having this report prepared was to get for the Stockholders the opinion of a disinterested engineer on the plans for the underground mill, and the value of the mine.

ZEB KENDALL,
President.

TELEPHONE KEARNY 3045

T. A. HOPKINS, MGR.

INTERNATIONAL APPRAISAL ASSOCIATION
CALIFORNIA BRANCH INCORPORATED
403-405 PACIFIC BLDG.
4TH AND MARKET STS.
SAN FRANCISCO

August 9, 1926.

MR. ZEB KENDALL, *President*
Consolidated Virginia Mining Co.,
707 Alexander Building,
San Francisco, California.

DEAR SIR:

Pursuant to your commission of July 28th, relative to the contemplated mining operations of the Consolidated Virginia Mining Company at their properties in Comstock Lode, Storey County, Nevada, we take pleasure in submitting the following report.

The proposed operations consist of the working of the low-grade ores above the 1750-foot level which remain between stopes or rejected during previous workings of high-grade ore, by means of an underground mill located on the 1750-foot level. This method appears quite feasible and will result in a cheap milling expense.

Based on a study of records of previous workings and of present production, there appears to be available an ore reserve of 2,000,000 tons or more, of an average grade of $7.00 per ton. An analysis of the operation of the proposed mill indicates a daily capacity of 250 tons with a net operating profit of $2.37 per ton. This would result in an annual profit of $215,000 for a period of twenty-two years, for an initial investment of $200,000.00. By doubling the capacity of the mill at an estimated expense of $50,000 additional, the annual profit will approximate $500,000 for a period of eleven years.

A detailed engineering report as furnished by Smith, Emery and Company, of our staff, is attached hereto.

Respectfully submitted,

INTERNATIONAL APPRAISAL ASSOCIATION, INC.

T. A. HOPKINS,

Manager San Francisco District.

TH:L

REPORT

ON

CONSOLIDATED VIRGINIA MINING CO.

BY

INTERNATIONAL APPRAISAL ASSOCIATION, Inc.

REWORKING THE CONSOLIDATED VIRGINIA MINE

We submit the following report on the proposed plan for exploitation of the Consolidated Virginia Mine, based on a personal inspection by our engineer, of the mine and old maps and a critical study of information and estimates supplied by the company's operating officials.

It is proposed to rework that portion of the Comstock lode within the Consolidated Virginia and California Claims above the Sutro Tunnel or 1750-foot level and extended to slightly above the 1200 level, using flat top slice stoping methods.

The greater part of the Bonanza Orebody—approximately 1,000,000 tons of $111 ore—was removed from this ground. There remain the caved and settled stope fills and low-grade ores—perhaps high-grade bunches never found—left by former operations.

The top slicing method will permit rejection of old timbers and waste and complete recovery of the commercial ore in those portions shown by development to be worth stoping.

The ore recovered is to be crushed and treated by flotation in a mill to be constructed underground on the Sutro Tunnel level, the tailings filled into the larger stopes and workings below that level or later, when necessary, pumped to the surface through the Sutro adit.

ORE RESERVES

The Consolidated Virginia and California Claims cover 1310 feet along the lode. Within this ground occurs the junction of the east vein with the Comstock vein apparently determining the location of the Bonanza Orebody which during 1873-1881, both inclusive, produced 1,370,000 tons averaging $111.25 per ton from which $82.07 was recovered. The lower grade ores were left unbroken or used as fill in the square set stopes, which have caved and closed up. Probably 1,000,000 tons of Bonanza Ore were taken from the volume now proposed to be reworked. Portions of this volume were reworked when less than $20 ore was unprofitable. The ground in question is now thoroughly drained by the Sutro Tunnel and is dry and drifts and raises stand well so long as there is ventilation.

The Comstock lode has the following widths on the common endline plane of the Consolidated Virginia and California claims. The lode matter narrows gradually both north and south of this plane. The maps show stopes occupying from 6% to 25% of the area of the lode on the various levels and considerable areas were apparently only superficially prospected because of the low grade—by the standards of time—vein filling encountered by such work as was done.

Level	Width of Vein Matter of Feet	Approximate Area	
		Of Old Stopes from Maps—Square Feet	Of Total Lode in Mine
1200	150	10,100	160,000
1300	220	17,250	230,000
1400	333	26,339	350,000
1500	473	57,800	500,000
1550	320	98,350	335,000
1650	164	37,800	170,000

The original stopes in their final form are incompletely shown on the old maps. Some stopes known to exist but only partly indicated were omitted in making the above estimates. The areas definitely shown on the maps and tabulated above are estimated to correspond to more than one and one-half million tons of ore. But additional large areas were stoped and only about one million tons were removed, the rest being left in place or in fills. The high-grade areas as shown by the drawings of Becker and others were surrounded by considerable areas of low-grade quartz, which was left unbroken. A long drift and short crosscuts in this material adjoining the south stope on the footwall side on 1400-foot level averaged $7.01. All the stopes and old workings have caved and settled. It is estimated in view of these facts that there may now be reworked profitably areas three times as large as the stopes definitely mapped. On the basis of recovery of one ton of commercial ore per 25 cubic feet, to allow for voids in the caved ground, and for rejection of old timber and waste, this would give an estimate of 2,000,000 tons of commercial ore recoverable.

The preparatory development for top slicing would include sufficient crosscutting to determine the portions of the lode worth stoping and the method is sufficiently flexible to permit complete recovery of the commercial ore in such portions as are stoped.

GRADE OF ORE RECOVERABLE

It is commercially impracticable to systematically develop and sample this mass in advance of extraction, but small scale operations during recent years, although unprofitable because of excessive tramming, hoisting and milling costs, have in effect sampled considerable areas, proving, as might reasonably be expected from the history of the property, that there remain large tonnages of ore assaying from five to ten dollars per ton.

ORE PRODUCED ABOVE SUTRO LEVEL, DEC. 1, 1920, to DEC. 31, 1925

(Data on Tonnage produced above Sutro Level in first half of 1922 not available)

	Tons Ore	Average Grade
Dec. 1, 1920, to Dec. 31, 1921	10,795	$7.57
July 1 to Dec. 31, 1922	16,001	6.01
Jan. 1 to Dec. 31, 1923	19,048	5.49
Total Milled	45,844	$6.14
Shipped Crude, 1924-25	3,728	9.79
Grand Total	49,752	$6.42

Included in the ore milled from October, 1922, to February, 1923, there was produced from the 1650 level and a 300-foot crosscut on 1500 level 4833 tons averaging $8.86 and representative of considerable areas on those levels.

Included in the 1923 production milled was 5694 tons from the 1400 level averaging $7.01 chiefly from a drift and crosscuts in the footwall casing of the old South Stope.

In the case of the ore milled, all material extracted from drifts, raises and shrinkage stopes was included, as no selection, sorting or wasting was possible under the conditions, even when by appearance or assaying it was known to be too low grade.

The ore shipped crude was hoisted through the C. & C. shaft and barren material could be dumped. The higher grade of these shipments is in part due to this.

The tonnage milled averaging $6.14 is then representative of the "run-of-mine" of the commercial portions of the volume under consideration. Top slicing methods permit rejection in the stope of old timber waste and ore below profitable grade and selection of better grade of ore than the average of recent operations. It is believed that a grade of seven dollars can be maintained.

The Comstock Silver or "merger" operations on three miles of the lode lying to the south of this mine are unofficially reported to have produced 2,000,000 tons of ore from which $4.50 has been recovered. At 90% extraction this would mean $5.00 ore. Part of this tonnage has been recovered by top slicing.

The Consolidated Virginia ore averaged two to three times that of the rest of the lode, however, and it is reasonable to expect that the vein matter left by the old operations would also be much higher grade.

MINE DEVELOPMENT

A program of development of the mine preparatory to systematic stoping by the top slicing method and including ample crosscutting to determine the portions of the lode to be stoped and insure a high recovery of the commercial ore bodies, has been estimated in detail to cost $75,000. With an allowance of one-third for contingencies, which is justified by the unknown factors, it is believed that a fund of $100,000 is ample to establish the system on a scale to supply 250 tons of ore daily.

From experience in the Comstock Merger Operations, and other mines where the method is used, it is estimated that the development cost will amount to twenty-five cents per ton, and capitalized development should be written off to expense at that rate. The cost of stoping and delivery to the mill will not exceed $1.25 per ton.

MILL CONSTRUCTION

The Minerals Separation, N. A. Corporation has tested representative samples of ore and reports tests showing recoveries from 85% up to about 93% of both gold and silver. A cycle test on four charges, approximating actual milling conditions, on material ground through 85 mesh, have a 35.7 to 1 ratio of concentration with a recovery of 90.4% of the gold and 85.9% of the silver. Minerals Separation report states: "The ore is particularly amenable to flotation and there should be no difficulty in securing results comparable to these in practice."

It is believed that 90% recovery of both metals may be expected in actual operation. The proportion of silver in the ore varies from 50% to 60%.

The location chosen for the mill on the Sutro Level is in hard solid diorite in the footwall of the lode, safe from effects of movements in the lode and affording a strong roof over the necessary chambers.

The primary crusher will be installed at the foot of the ore transfer raise. As the ore is dry and breaks fine, the crushing duty will not be heavy, as most of the ore will go through the grizzly.

The crushed ore will be raised by conveyor belt into an ore bin cut in solid rock, from which it will be fed to two 6 x 5 ball mills grinding in closed circuit through bowl classifiers. Pulp goes to flotation machines. Concentrates will be filtered and tailings will be pumped to old stopes below Sutro Level.

The machinery can be brought in by tram through the Sutro Tunnel, this mine being a little more than four miles from the portal. Railroad delivery would be made at Dayton, three miles by wagon road from the Sutro portal.

The mill will be well ventilated. The main fresh air current will be downcast through the C. & C. shaft directly through the flotation department to the crushing room, thence up the main transfer raise through the upper levels and stopes to an air connection to be driven on the 1400-foot level to the Ophir shaft. This connection to be at the joint expense of the Ophir and Consolidated Virginia companies. Ample water for milling purposes can be caught at the Consolidated Virginia shaft on the 1650 level and conveyed by gravity to the mill. This water

comes down along the footwall from near the surface. Unlimited water is available 30 feet below Sutro level.

Concentrates will be hoisted to surface through the nearby C & C shaft, which has railroad loading facilities.

A detailed estimate of the cost of machinery and installation of a first mill unit having a capacity of 250 tons per 24 hours, including the excavation of the underground chambers with liberal allowance for contingencies, totals $80,000.00.

It is planned to increase the capacity of the mill to 500 tons per day by adding a second unit after the first unit is in successful operation. This doubling of capacity should cost less than $50,000.00 additional.

The assessment levied on the Consolidated Virginia stock amounts to about $216,000.00. In addition to providing the capital requirements indicated above, of $100,000.00 for mine development and $80,000.00 for mill construction, which estimates include no management or overhead expense, the assessment makes provision of $36,000.00 for working capital, overhead and contingencies during the development and "tuning up" period.

It is planned to complete the development to the point of production of 250 tons per day and the construction of the first unit of the mill ready for operation by April, 1927.

EXPECTED OPERATING RESULTS

Milling Ore-Head Assay		$7.00	
Less 10% Loss in Milling		.70	$6.30
Operating costs:			
Sutro Tunnel Royalty (4% Gross?)	$0.28		
Development	0.25		
Mining-Top Slicing	1.25		
Milling Flotation	0.60		
Freight, Smelter Deductions and Treatment of Concentrates	0.95		
Depreciation of Mine and Mill Equipment	0.10		
Management, Taxes, Insurance, except Federal Income Tax	0.50		$3.93
Operating Profit per ton			$2.37

On scale of 250 tons daily or 91,000 tons per year, the annual profit should be $215,670.00.

Should 2,000,000 tons of mill ore be recovered the life of the operation would be 22 years at 250 tons per day.

On a scale of 500 tons per day, which is the economic capacity for this mine, the cost would be reduced and a net profit of about half a million dollars a year for 11 years might be expected.

PRESENT EQUIPMENT

The Consolidated Virginia Company's present plant and equipment comprises besides the old Consolidated Virginia Shaft, which is not in operating condition, the C. & C. shaft 2500 feet deep, three compartment, in good operating condition to the Sutro Tunnel level, with which it connects at a little more than four miles from the portal, but filled with water to about thirty feet below the Sutro, or 1750 level. This shaft is fully equipped with a double drum, electric hoist, 250-horsepower motor and cages. The old 12-inch pump column is used as an air receiver.

A two-stage Ingersol Rand two-stage air compressor, 900 free cubic feet capacity, driven by 200-horsepower motor, will furnish air for twenty drills. An electric cable of large capacity is installed in the shaft to the Sutro level. On the surface near the shaft are fully equipped machine, electric, carpenter, and blacksmith shops and assay laboratory; also railroad shipping facilities. The company owns the Mexican 150-ton cyanide mill and an office building in Virginia City.

CONCLUSION

We are convinced of the feasibility of the proposed plan for reworking the Consolidated Virginia Mine. The top slicing method of stoping proposed is already in successful operation on the Comstock lode and elsewhere and its efficiency, safety, and costs are well established. It is eminently adapted to the conditions in this mine. The ore is particularly amenable to flotation and the plan of constructing the mill underground has the advantage of minimizing the transportation of the ore and facilitating disposal of tailings as well as simplifying the reopening of the mine. The mill site is safe and convenient for both construction and operation. The estimates of capital expenditures have been scrutinized and are believed ample to carry the program to completion. It is believed that the estimates given above of grade of ore, recovery and operating costs and profit can be realized.

Respectfully submitted,

INTERNATIONAL APPRAISAL ASSOCIATION, INC.

T. A. HOPKINS,

Manager San Francisco District.

Dated August 9, 1926.