PETER JORALEMON
815 MONTGOMERY STREET
SAN FRANCISCO 4

# SONOMA INTERNATIONAL
# MT. JACKSON MINE
# SONOMA COUNTY, CALIFORNIA

By Peter Joralemon, Ph.D. February 21, 1964

## TABLE OF CONTENTS

| | |
|---|---|
| Summary and Conclusions | Page A |
| Introduction and Scope of Report | 1 |
| Location | 1 |
| History | 1 |
| Mine and Plant Facilities | 2 |
| General Geology | 4 |
| Mine Geology | 4 |
| Ore Deposits | 5 |
| Ore Reserves | 6 |
| Proposed Exploration and Development | 8 |
| Economics | |
| Operating Costs | 9 |
| Pre-Production Expense | 10 |
| Metal Price | 13 |
| Ore Value | 13 |
| Mine Economics | 13 |
| Valuation | 15 |

## TABLES AND ILLUSTRATIONS

| | | |
|---|---|---|
| Fig. 1 | Index Map, Mt. Jackson Property | After Page 1 |
| Table I | Production and Operating Statement | 2a |
| Table II | Relation of Mercury Price to Operating Income | After Page 2 |
| Table III | Production by Levels | 7a |
| Fig. 2 | Generalized Geologic Plans, Upper Levels | In Back Pocket |
| Fig. 3 | Generalized Geologic Plans, Lower Levels | " " " |
| Fig. 4 | Vertical Longitudinal Proj. | " " " |
| Fig. 5 | Geologic Map of 1086 Level | " " " |
| Fig. 6 | Geologic Map of 1200 Level | " " " |
| Fig. 7 | Vertical Longitudinal Proj. showing drilling below 1200 Level | " " " |

PETER JORALEMON
815 MONTGOMERY STREET
SAN FRANCISCO 4

# SONOMA INTERNATIONAL
# MT. JACKSON MINE
# SONOMA COUNTY, CALIFORNIA

By Peter Joralemon, Ph.D. February 21, 1964

## SUMMARY AND CONCLUSIONS

The Mt. Jackson mercury mine of Sonoma International ranks sixth or seventh among the nation's producers, with a total production of 104,000 flasks. Like many other mercury mines, Mt. Jackson has been operated during periods of relatively good prices and closed when the price fell below an economic level. Unlike many of the other mines, the Mt. Jackson Mine is in excellent ground and the underground workings remain in good condition with little or no maintenance, thus minimizing reopening costs.

The Mt. Jackson Mine is fully equipped to operate at a capacity of 120 tons per day. The net value of the property, buildings, machinery, equipment, and automotive equipment have a net book value after accumulated depletion and depreciation of $38,398.44. The original cost of buildings, machinery, and equipment was $297,534.65, which has been maintained in reasonable working condition. Replacement value would be considerably in excess of this figure.

The ore bodies occur in and near a mass of intensely silicified serpentine that is locally termed silica-carbonate rock. This silica-carbonate rock occurs as a steeply dipping tubular mass that branches upwards into two closely spaced pipes. One branch apexes at a depth of 500 feet and the other flares as it approaches the surface.

The original form of the silica-carbonate mass has been altered by intense faulting.

The most productive zone in the mine is in the form of a vertical pipe, 400 feet in diameter, that passes from one to the other of the silica-carbonate pipes with depth.

The ore bodies occur as steeply dipping vein-type deposits, tabular bedded deposits, and circular pipes.

The ore bodies have been mined over a vertical range of over 1200 feet and drilling below the bottom level indicates that mineralization continues for at least another 250 feet.

Nothing is known about the depth persistence of ore below the 1450 Level. The Mt. Jackson Mine is already among the deepest of

the domestic mercury mines and there is no geologic reason now apparent why the ore should not continue for at least several hundred feet below the 1450 Level.

Mercury deposits are notably erratic and most mines make no attempt to block out large reserves, depending instead on level by level experience. No ore can be considered as measured or proven below the 1200 Level, although 19 drill holes below this level have cut ore of better than average grade. The most dependable way to calculate ore reserves at Mt. Jackson is to determine trends of production and grade on established levels and project these trends into undeveloped areas.

Ore production has varied from 830 tons per vertical foot at a depth of from 690 to 875 feet below the outcrop to 360 tons per vertical foot on the bottom (1200) Level. This decrease in tons per foot occurs at a level where development work in the eastern half of the ore zone has been sharply curtailed. Despite favorable ore intersections in pilot drill holes, the downward continuation of this productive east zone has not been developed on the 1086 or the 1200 Levels.

It is apparent that the western ore zone continues for at least 250 feet below the 1200 Level. This zone alone should contain 360 tons per vertical foot, or a total of 90,000 tons in this interval. If the downward continuation of the eastern zone is proven, as seems probable, the total reserves in both zones may approach 700 tons per vertical foot, or 174,000 tons.

During the past five years of company operation, the ore produced had an average recovered content of 7.7 pounds of mercury per ton, although the average grade of 1200 Level ore was 6.45 pounds per ton. Encouraging drill intersections in two ore bodies below the 1200 Level indicate that the ore grade in the next 250 feet should fall between 7.0 and 7.7 pounds per ton.

Three exploration and development projects are strongly recommended:

1. Explore and develop the downward extension of the east ore zone on the 1086 Level.

2. Develop ore indicated by drilling above proposed 1325 Level.

3. Explore and develop ore indicated by drilling above 1450 Level.

The total cost of this program, including necessary dewatering and other pre-production work, is estimated at $168,629.

Cost studies indicate that ore can be mined and milled at a direct cost of $13.04 per ton, $129.10 per flask assuming the 7.7 pound grade, or $142.14 per flask with a 7 pound grade.

Assuming a continuing price of $250 per flask of mercury, FOB mine, the indicated ore will have a gross recoverable value of between $23.03 and $25.33 per ton, allowing an operating profit of between $9.99 and$12.29 per ton, or between $107.86 and $120.90 per flask.

At a mining rate of 2080 tons per month, the mine may be expected to show an operating profit of between $20,875 and $25,625 per month for a period of between 44 and 84 months.

After deducting the pre-production costs, the indicated ore to the 1450 Level should yield a total operating profit of between $733,000 and $1,965,000. This gives a return on the pre-production investment in the ratio of between 4.5:1 and 12:1.

In view of the past productive history at the Mt. Jackson Mine, as well as the favorable geologic and economic indications, the reopening of this mine under present or predictable future conditions is fully justified.

Peter Joralemon

PETER JORALEMON
315 MONTGOMERY STREET
SAN FRANCISCO 4

# SONOMA INTERNATIONAL
# MT. JACKSON MINE
# SONOMA COUNTY, CALIFORNIA

By Peter Joralemon, Ph.D. February 21, 1964

## INTRODUCTION AND SCOPE OF REPORT

The following study is planned to determine the feasibility of reopening the Mt. Jackson quicksilver mine. In the course of this valuation the writer examined the surface features of the Mt. Jackson Mine as well as the underground conditions shown on the upper levels.

Economic problems were discussed with Messrs. George Reed, former Resident Manager; J. W. Cook, the company's Secretary-Treasurer; and Douglas Meyers, former member of the mine operating staff.

Geological features of the mine were studied in the company's extensive engineering and geologic files. Discussions with Mr. Francis H. Frederick, for many years consulting geologist to the Mt. Jackson Mine, have aided in clarifying the geologic picture.

Background information on the Mt. Jackson Mine has been drawn from the California Journal of Mines and Geology, volume 44, No. 3, 1948; from numerous private reports prepared during the past twenty years; and from past years' Company Annual Reports.

## LOCATION

The Mt. Jackson Mine is about 3 miles north of Guerneville in western Sonoma County. A good paved road leads to the mine from the center of Guerneville.

The property originally included mineral and surface rights to 418.3 acres in one block. The surface rights to most of this area have been recently sold, leaving 61.5 acres surrounding the mine, mill, and other surface installations. Property location is shown in Figure 1.

## HISTORY

The Mt. Jackson and the adjacent Great Eastern mines were originally under separate ownership but are now consolidated and owned by Sonoma International, Inc.

Quicksilver was discovered in this area about 100 years ago and the first recorded production from Mt. Jackson was in 1875.

The mine has operated intermittently since that time, closing during periods of low metal price. It operated continuously from 1940 to March 1956. In 1956 Black Mammoth Consolidated Mining Co. of Canada acquired control of the property and commenced extensive studies aimed toward the possibility of large scale production. Improvements were made to surface plants and extensive underground exploration was carried out. The concept of large scale production was abandoned and, after a year-long shutdown, operations were resumed with the existing plant. Production continued until August 1961, at which time the company operation was forced to terminate because of the falling price of quicksilver.

In September 1961, the mine was reopened by Truitt and Associates under a leasing arrangement by which the company was to receive a minimum rental for plant and equipment plus a production royalty. This lease continued until June 1962, and consisted in large part of a scavenging operation, mining pillars and odd remaining blocks of ore throughout the mine. No appreciable development work was carried out during the lease period and the mine was closed because of lack of developed ore in 1962.

It has been idle since that time.

The total recorded production from the Mt. Jackson and Great Eastern mines is 104,000 flasks of mercury, making it the sixth largest producer in California, exceeded by the Oat Hill, Sulphur Bank, Guadalupe, New Idria, and New Almaden mines. It ranks sixth or seventh among the nation's producers.

Detailed production figures prior to 1941 are not available. The production and operating statement covering the period from 1941 to 1962 is presented in Table I.

A chart showing fluctuations in the price of mercury since the turn of the century is presented in Table II. On the same graph, the operating income of the Mt. Jackson Mine per flask of mercury produced over the past twenty-one years is shown. The relationship of operating profit to metal prices is discussed in the section on economy.

## MINE AND PLANT FACILITIES

The Mt. Jackson Mine is serviced by a two compartment underground shaft extending from the main access adit (60 Level) for a depth of 1256 feet. Below the main adit eleven levels have been established and over four miles of underground workings have been driven to explore and develop the ore.

The shaft is reported to be in firm ground down to the 1200 Level, where it entered a strong fault zone. Some shaft repairs are anticipated at this level, but the rest of the shaft should be in good

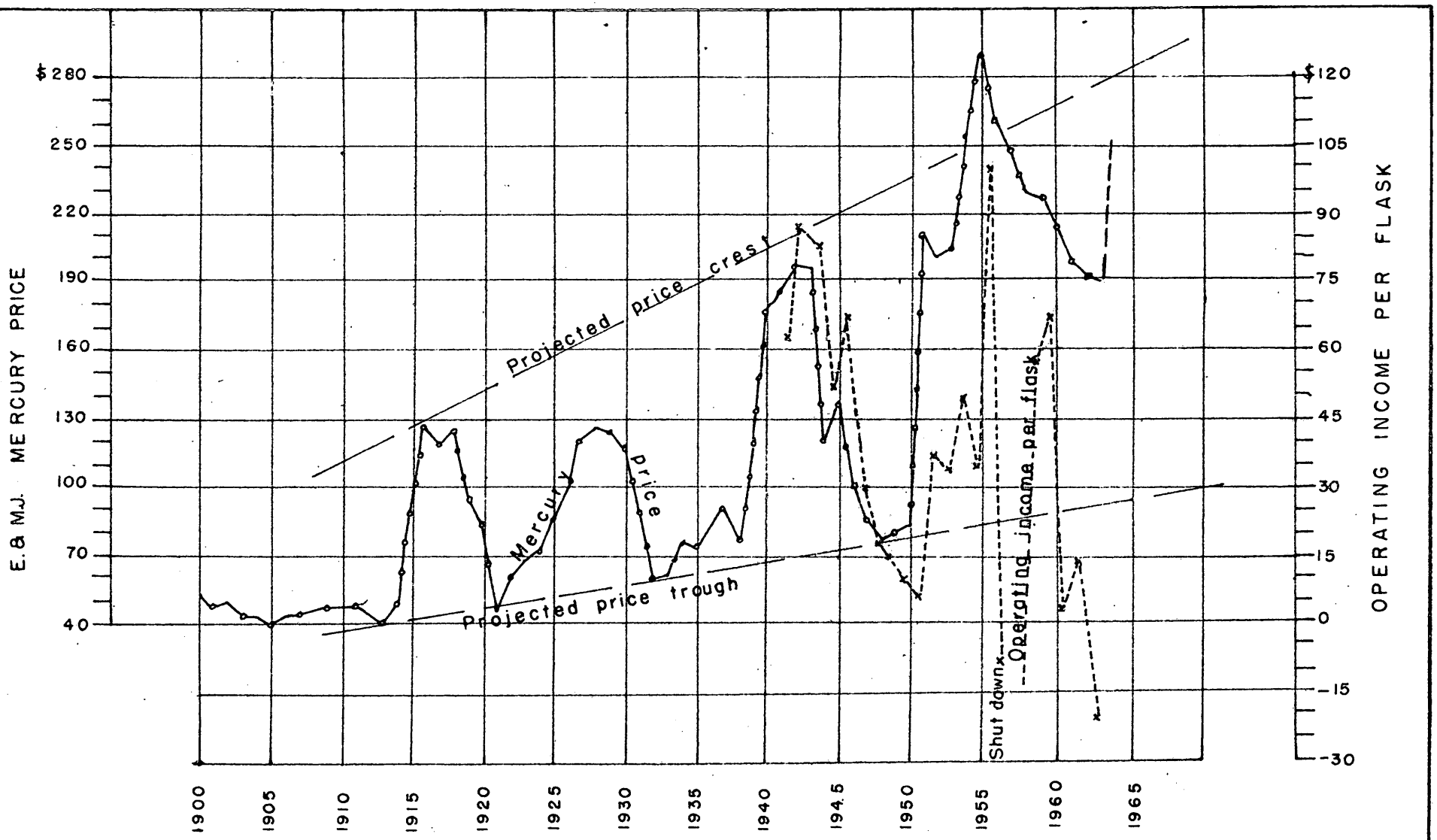



TABLE II. RELATION OF MERCURY PRICE TO OPERATING INCOME

MT. JACKSON MINE

## TABLE I

Production and Operating Statement. Production commenced September 9, 1940

| Period | Tons Furnaced | Flasks Produced | Recovery Per Ton | Sales Value Per Flask | Selling Cost Per Flask | Operating Cost Per Flask (1) | Operating Cost Per Ton | Operating Income | Operating Income Per Flask |
|---|---|---|---|---|---|---|---|---|---|
| Fiscal years ended: | | | | | | | | | |
| June 30,1941 | 20,475 | 1,105 | 4.101# | 168.10 | 4.72 | 100.39 | 5.42 | 69,599.32 | 62.99 |
| June 30,1942 | 33,138 | 2,070 | 4.747 | 189.96 | 3.39 | 98.01 | 6.12 | 183,320.62 | 88.56 |
| June 30,1943 | 42,116 | 2,720 | 4.908 | 190.60 | 4.96 | 103.16 | 6.66 | 224,338.28 | 82.48 |
| June 30,1944 | 41,170 | 3,003 | 5.543 | 152.54 | 6.84 | 93.78 | 6.84 | 155,899.31 | 51.92 |
| June 30,1945 | 34,212 | 2,922 | 6.491 | 132.62 | 5.52 | 59.57 | 5.09 | 197,279.29 | 67.53 |
| June 30,1946 | 30,299 | 2,741 | 6.875 | 103.34 | 3.13 | 70.35 | 6.36 | 81,856.02 | 29.86 |
| June 30,1947 | 41,897 | 3,693 | 6.699 | 85.54 | 3.38 | 63.35 | 5.58 | 70,433.63 | 18.81 |
| June 30,1948 | 43,066 | 4,120 | 7.27 | 76.65 | 2.24 | 59.09 | 5.65 | 63,125.81 | 15.32 |
| June 30,1949 | 36,708 | 4,271 | 8.84 | 79.06 | 3.71 | 65.08 | 7.57 | 43,896.96 | 10.27 |
| June 30,1950 | 35,682 | 3,561 | 7.58 | 71.17 | 3.66 | 61.81 | 6.17 | 20,300.51 | 5.70 |
| June 30,1951 | 31,789 | 2,566 | 6.13 | 147.14 | 1.90 | 108.18 | 8.73 | 95,078.60 | 37.06 |
| June 30,1952 | 42,017 | 2,448 | 4.43 | 201.85 | 2.87 | 164.26 | 9.57 | 84,976.64 | 34.72 |
| June 30,1953 | 37,134 | 3,009 | 6.158 | 193.64 | 2.96 | 140.57 | 11.39 | 150,764.70 | 50.11 |
| June 30,1954 | 41,497 | 2,661 | 4.873 | 196.37 | 3.39 | 158.64 | 10.17 | 91,381.49 | 34.34 |
| June 30,1955 | 43,287 | 2,345 | 4.12 | 304.12 | 4.94 | 198.85 | 10.77 | 235,268.22 | 100.33 |
| Sub-Tot. & Av. | 554,487 | 43,235 | 5.926 | 142.02 | 3.77 | 97.37 | 7.59 | 1,767,519.40 | 40.88 |
| July 1,1955 to Mar.2,1956 (2) (Shutdown) | 21,495 | 1,159 | 4.098 | 262.32 | 5.22 | 266.82 | 14.39 | - 11,263.28 | - 9.72 |
| June19-30,'57 | 1,072 | 95 | 6.735 | 247.59 | 0.88 | 433.60 | 38.43 | - 17,755.75 | - 186.89 |
| Fiscal years ended: | | | | | | | | | |
| June 30,1958 | 29,721 | 3,461 | 8.85 | 229.60 | 6.69 | 155.56 | 18.11 | 233,078.15 | 57.35 |
| June 30,1959 | 30,489 | 3,925 | 9.784 | 226.52 | 7.15 | 151.60 | 19.52 | 265,980.54 | 67.77 |
| June 30,1960 | 36,074 | 3,227 | 6.799 | 211.04 | 8.56 | 198.78 | 17.78 | 11,918.87 | 3.70 |
| June 30,1961 | 40,478 | 3,358 | 6.305 | 198.35 | 9.58 | 174.19 | 14.45 | 48,949.86 | 14.58 |
| June 30,1962 (3) | 25,550 | 1,461 | 4.3 | 182.88 | 10.75 | 194.35 | 11.11 | - 32,906.56 | - 22.22 |
| June 30-Oct.1962 | 4,464 | 204 | 3.47 | 183.19 | 3.34 | ± 180.00 | ± 8.22 | - 1,004.58 | - 0.15 |
| Sub-Tot.& Av. | 167,848 | 15,731 | 7.12 | 213.49 | 8.10 | 173.08 | 16.26 | 508,260.43 | 32.31 |
| Total | 744,190 | 60,125 | 6.13 | 163.03 | 4.92 | 120.44 | 9.73 | 2,264,516.55 | 37.67 |

(1) Operating costs include all direct costs excluding depreciation and general administrative.
(2) Black Mammoth period, high exploration charges.
(3) Scavenging operation subsequent to Sonoma's operation.

working order.

A single drum hoist with a rope capacity of 1500 feet services the shaft at a hoisting speed of 200 feet per minute. A two-ton skip is suspended below the cage.

The second shaft compartment contains manway, pipes, and power cable.

Because of the presence of methane gas and hydrogen sulfide in the mine, particular attention has been paid to establishing an adequate forced ventilation system. A surface blower at the top of the second manway exit to the mine forces 40,000 cubic feet of air to the lower levels. It is thence forced to the working faces by secondary fans. The main shaft air is upcast.

The mine is now flooded to a depth of over 265 feet and a considerable flow of stream water has been entering the mine from a broken flume leading by a glory hole section of the mine. This flume has now been repaired. Under normal circumstances the mine makes from 40 to 80 gallons of water per minute. This has been easily handled from sumps and pump stations on the 1200, 1086, 975, 875, and 500 Levels.

The ore zone in the mine stands unusually well so that timber consumption is at a minimum. Most ore extraction has been in shrinkage or cut and fill stopes, and only rarely have conditions been such as to require square set stopes.

Ore is hauled by compressed air trammer from the shaft pocket on the 60 Level to two surface bins near the portal. Ore passes from the bins through either a Kue Ken 12" x 20" or a Universal 12" x 24" crusher to a conveyor which carries the 1½" material to a fine ore bin. From here the ore is fed directly into a 4' by 64' Gould rotary furnace with the customary condenser system, rated at a capacity of from 100 to 120 tons per day.

Mercury recovery in this plant is thought to have exceeded 90%.

In addition to the treatment plant, the surface facilities include machine and blacksmith shops equipped with lathe, drill press, furnace and forge, and timber shop with 30" and 12" cut-off saws.

Mining equipment now stored on the surface includes six Eimco mucking machines, 15 one ton mine cars, 15 side dump 1½ ton cars, and two compressed air trammers. In the surface storage shed are kept a number of Copco jacklegs as well as assorted stopers and jackhammers. One large leynor is equipped for long hole drilling with sectional steel. An Ex and an Ax air driven diamond drill as well as an airdriven rotary down-the-hole drill are included in the inventory.

Finally, 6 double drum slushers and 12 single drum tuggers are included.

The mine and surface compressed air requirements are serviced by two modern Copcos and three older compressors, with a total capacity of about 3300 feet.

All equipment was in use two years ago and could be reactivated with only minor repairs.

The mine property, buildings, machinery, equipment, and automotive equipment show a cost value of $432,295.37 on the 1963 balance sheet, with a net value after accumulated depletion and depreciation of $38,398.44.

## GENERAL GEOLOGY

The geologic environment of the Mt. Jackson ore deposit is strikingly similar to that of many other mercury deposits occurring along the 200 mile long Pacific Slope mercury belt. In all the mercury ore bears a close spatial and genetic relationship to the bodies of intensely silicified serpentine locally termed "silica-carbonate rock".

The Mt. Jackson Mine is located in the wide coast range belt of shales and sandstones of the Franciscan formation. The property is underlain by black shaly sandstones of this formation, containing bands of an apparent fault breccia that are composed of a matrix of shale enclosing angular fragments of serpentine.

The Franciscan sediments are intruded by a series of serpentine bodies that have been almost entirely altered to silica-carbonate rock. Two bands of serpentine cut across the Mt. Jackson property, as illustrated in Figure 1. One of these, containing the known mercury ore bodies, trends east-west and may be traced on the surface for a length of nearly 3000 feet and a width of from 50 to 200 feet. The other belt, almost entirely unexplored, trends to the northwest and is intermittently exposed on the property for over 5000 feet.

These serpentine masses appear to lie along old fault systems and have been cut and offset by post-intrusion faults.

## MINE GEOLOGY

In the mine area the serpentine has been altered more or less completely to an opalite-like mass of fine-grained quartz and calcite that gives evidence of repeated brecciation and cementation. Only rare residual fragments of serpentine remain to give a clue as to the original nature of this rock.

In a general way the silica carbonate mass explored in the mine is tubular in cross section, branching upward into a western

mass that apexes about 500 feet below the surface and an eastern fork that flares broadly near the surface. The two prongs are separated by a zone of fault breccia. The explored portion of the silica carbonate mass averages about 400 feet long and 300 feet wide. Plan maps shown in Figures 2 and 3 show the outline of the body on the thirteen underground levels.

This tubular or pipe-shaped body stands nearly vertical near the surface and rakes at about 45° to the east on the lower levels.

The silica-carbonate mass has been cut and offset by a complex series of east-west, northeast, and northwest faults that appear to be later than the original serpentine and earlier than the period of intense silicification. This faulting, together with the original irregularity of the silica-carbonate body, has produced a mass that varies widely in form and dimension from level to level.

## ORE DEPOSITS

The mercury deposits occur in and immediately adjacent to the silica-carbonate body and are generally concentrated near the contact. Perhaps 10% of the ore production has come from the shaly sandstone within 100 feet of the silica-carbonate rock. The balance of the ore occurred within the silicified body.

The ore consists of a gangue of silica-carbonate rock with fractures coated with cinnabar. Pyrite is not abundant. A black hydrocarbon, known locally as bitumen, frequently occurs with the better mercury ore. In places the silica-carbonate rock has been altered to a soft, crumbly ocherous material that generally contains exceptionally high values.

Although both branches of the silica-carbonate mass contain ore bodies there is a suggestion of a vertical zone of better ore that passes from the eastern to the western branch with depth. Thus the bulk of the production has come from the 400 foot long zone between coordinates 200W and 200E shown on Figure 4. If this vertical zone persists with depth it may pass out of the western silica-carbonate mass just below the proposed 1450 Level.

A strong fault zone lying near the western margin of the west branch of silica-carbonate rock has been cut at the shaft station on the 1200 Level. It is possible that this fault zone may separate this western mass from another still deeper body in much the same way that the east and west branches on the upper levels are separated by a strong fault zone.

If this is proven to be the case the structural picture will be one of en echelon lenses of silica-carbonate, dipping to the south, and through which passes the vertical zone of maximum mineralization.

Individual ore shoots occur in the form of steeply dipping pipes and tabular lodes. The tabular bodies, such as the southeastern

ore shoot developed on the 620, 690, and 775 Levels (see Fig. 3), follow long narrow dike-like silica-carbonate bodies. The pipe-shaped shoots more generally occur within the larger masses of silica-carbonate.

Some of the ore shoots have been mined continuously over a vertical range of nearly 1000 feet (see Fig. 4). Most are from 200 to 300 feet long and range in width from ten feet to over 50 feet.

Ore shoots are controlled to some extent by pre-mineral cross faults and commonly bridge the interval separating such faults. In places the ore shoots are controlled by and bottom against flatly dipping sheeted zones in the silica-carbonate rock. This secondary control may create zones of better ore that dip flatly to the west. Examples of such sheeting control may be seen on the east end of the 975 Level, above and below the 1086, and below the east end of the 1086 Level, as shown in Figure 4.

## ORE RESERVES

Mercury deposits are notably erratic and unpredictable and even producing mines seldom have more than a few months' reserves in sight. At the Mt. Jackson mine, the year-long leasing period in 1961 and 1962 largely exhausted all proven reserves above the 1200 Level and no development work was done to prove new reserves.

In a letter dated October 13, 1961, George Reed reports: "A detailed study of this mine will reveal that the ore distribution is so erratic that every stope is like a prospecting venture every day. This is why tonnage and grade estimates can only be made level by level by experience. Any given small block of ground can fool the most experienced miner even though he has some drill holes through it".

In most metal mines, reserves can be calculated on a block-by-block basis with reasonable accuracy. This method is not practical in most mercury mines, as Mr. Reed points out. The surest way of calculating ore reserves in a mine such as Mt. Jackson is to determine the production and grade trends on levels already mined and to project these trends into undeveloped areas, either laterally or at depth.

For example, a mine that has produced a uniform 1000 tons of ore per vertical foot to the bottom level may be assumed capable of producing about the same tonnage at greater depth, unless geologic features change radically. Similarly, if past mine history shows a ratio of 10 tons of ore developed for each foot of development work, this ratio may be expected to continue in undeveloped areas.

Table III reconstructs as accurately as possible the production and grade of ore by levels. Since no production data are available prior to 1941, the upper level figures are estimates. Table III also presents estimates of ore developed per foot of development work on all levels.

The substantial drop in tons and flasks per vertical foot on the bottom two levels may indicate that the ore zone is narrowing below the 975 Level. The longitudinal projection in Figure 4 shows that the ore shoot in the eastern silica carbonate mass bottoms against sheeted rock above the 975 Level. No systematic attempt has been made to pick up the downward extension of this shoot below the sheeted zone, despite the fact that limited drilling below the 975 Level has picked up ore intersections ranging in value from 6 to 27 pounds Hg per ton. If, as seems probable, this northeastern shoot continues downward below the 1200 Level, the ton per foot and flasks per foot ratio should continue at the rate of 700 tons per vertical foot, yielding 60 flasks.

Similarly, the flasks per foot of development should show no important decrease on and below the 1200 Level if the downward extension of this ore shoot is picked up.

Between the 1086 and the 1200 Level, 360 tons of ore have been developed per vertical foot. Even if the northeast downward extension of the ore shoot is not found, this ratio may be expected to continue for several hundred feet further. The ore developed should range between a minimum of 360 and a maximum of 700 tons per vertical foot. The interval between the 1200 and the proposed 1325 Level should contain between 45,000 and 87,000 tons of ore, as should the zone from the 1325 to the 1450.

Prior to the leasing operation during 1962, the ore mined during the previous 5 years contained a recovered average of 7.7 pounds Hg per ton. The average recoverable grade of ore mined on the 1200 Level was 6.45 pounds per ton.

The decrease in ore grade on the 1200 Level was due in large part to the loss of the high grade tonnage from the northeastern ore shoot above the 975. If, as anticipated, the extension of this shoot is found on lower levels, the ore grade should increase at least to the average of 7.7 pounds per ton. The grade of ore expected at depth should fall somewhere between these limits. The assumption of a 7.0 pound recovered average grade below the 1200 Level seems conservative.

The foregoing discussion points out that a total of 90,000 tons of 7.0 pound ore may be expected between the 1200 and 1450 Levels. Although no development work has been done below the 1200 Level, some exploratory drilling has been done in this area to indicate that the

TABLE III

Production by Levels
Mt. Jackson Mine

| Level Interval | Tons | Recovered Pounds Hg per Ton | Tons per Vertical Ft. | Flasks per Vertical Ft. |
|---|---|---|---|---|
| 150 and above | 110,000 | 5.5 | 480 | 35.0 |
| 220-150 | 57,000 | 5.6 | 820 | 61.0 |
| 360-220 | 98,000 | 7.23 | 750 | 72.0 |
| 500-360 | 97,000 | 6.29 | 690 | 57.0 |
| 690-500 | 114,000 | 6.45 | 640 | 54.5 |
| 775-690 | 75,000 | 6.78 | 830 | 74.0 |
| 875-775 | 79,000 | 7.51 | 830 | 82.0 |
| 975-875 | 70,000 | 6.50 | 700 | 60.0 |
| 1086-975 | 54,000 | 7.60 | 420 | 42.5 |
| 1200-1086 | 45,000 | 6.45 | 360 | 30.5 |

| Level | Development Footage | Flasks Produced | Flasks per Ft. Development |
|---|---|---|---|
| 0,60,150 | 6090 | 8000 | 1.32 |
| 220 | 1800 | 4200 | 2.33 |
| 360 | 2000 | 9300 | 4.65 |
| 500 | 1700 | 8250 | 4.85 |
| 690 | 2500 | 9650 | 3.86 |
| 775 | 1300 | 6600 | 5.09 |
| 875 | 1600 | 7900 | 4.95 |
| 975 | 1000 | 6050 | 6.05 |
| 1086 | 900 | 5400 | 6.00 |
| 1200 | 1000 | 3800 | 3.80 |
| Total | 19,890 | | |
| Shaft | 1,300 | | |
| Total Development | 21,190 | | |

Recorded production 104,000 Avg. flasks per foot of development 4.5.

above expected tons and grade may be conservative. This work is shown in Figure 4 and in more detail in Figures 6 and 7.

Nearly 20 diamond drill holes have been drilled beneath the southeast ore body on the 1200 Level. This ore is largely in sandstone rather than silica-carbonate. Because of the pattern of drilling with holes diverging with depth, this zone is explored only to a depth of about 50 feet beneath the level. As is the case throughout the mine, these holes show widely erratic values, varying from a fraction of a pound to 228 pounds per ton. There can be little doubt that an ore body nearly 200 feet long, at least 50 feet deep, and up to 40 feet wide, will be found immediately below the 1200 Level.

Vertical drill hole 413 cut an ore section nearly 140 feet below the 1200 Level. As drilled, this section was 40 feet deep, averaging 12.7 pounds Hg per ton. If this ore zone exhibits the same flat westerly dip shown by many others in Figure 4, it may continue to the east beneath the shallower ore body discussed above.

Four drill holes radiating downward from the northwest part of the 1200 Level passed through five additional ore indications, each of which justifies further drilling.

Nothing is known about the depth persistence of ore below the 1450 Level. The Mt. Jackson Mine is already among the deepest of the domestic mercury mines, although the New Almaden mine is reported to have had commercial ore to the depth of 2200 feet. There is no geologic reason now apparent why the ore should not continue for at least several hundred feet below the 1450 Level.

## PROPOSED EXPLORATION AND DEVELOPMENT

To explore and develop the ore bodies now indicated by limited drilling, the following program is proposed:

1. Northeast ore body, between 1086 and 1200 Levels.

Six ore intersections have been found in scout drill holes in this area. The most promising, 5 feet of 27 pound ore, was cut in drill hole 636, 50 feet above the 1086 Level (See Figure 5). In addition to these intersections the drilling is sufficient to indicate a silica-carbonate body of substantial size in this area. A 300 foot east drift should be driven from the northeast end of the 1086 Level. From this drift, a diamond or long hole drilling program should be systematically carried out to confirm the presence of ore indicated in the earlier pilot drilling.

Favorable results on the 1086 should lead to a similar program on the 1200 Level.

This work may be done without interrupting the other phases of exploration and has an excellent chance of developing an ore body that may be quickly put into production.

2. Ore intersections below west end 1200 Level.

Additional drilling may be done from the 1200 Level to confirm the ore intersections found in drill holes 679, 680, 681, and 682.

3. Indicated ore below 1200 Level.

The ore intersections below the 1200 Level show sufficient promise to justify sinking the shaft to the 1450 and driving drifts on the 1325 and 1450 Levels. After the 1325 Level is established, further drilling should be planned to better delineate the ore cut in hole 413.

The quality of the ore showings in these three areas and the past history of the Mt. Jackson Mine make these steps an excellent speculation.

## ECONOMICS

### Operating Costs

In determining the feasibility of reopening a mine, the primary factor to be considered is whether such an operation would bring in sufficient income to justify the pre-production expenses.

On Table II, the operating profit per flask of mercury produced at Mt. Jackson is shown in comparison to E&MJ mercury prices. It will be noted that the operation showed an operating loss for only two complete years. The first period, 1955 to 1956, was at a time when the Black Mammoth Mining Company was experimenting with the concept of mining low grade tonnages on a large scale. The grade of ore mined during this period was 4.098 pounds Hg per ton, as compared to the twenty-one year average of 6.125 pounds per ton.

The second full year period of operating loss was during the leasing operation in 1961 and 1962 when most of the ore mined was from cleanup operations. The average grade of ore during this year was 4.3 pounds per ton.

With the exception of these two years of experimenting, the mine has been able to show a continuous operating profit for the past twenty-one years, despite the violently fluctuating metal price. During the last four years of company operation, the average operating income per flask produced was $35.85, representing 16½% of the gross sales value of the mercury.

Tables I and II indicate that successful operations were carried out by keeping the ore grade above 6 pounds. This was accomplished by maintaining a degree of selectivity in mining.

The mining costs during the last four years of company operations varied from a low of $14.45 per ton to a high of $19.52. Economy moves made during the leasing operations brought the operating costs down to $11.11. By maintaining these economy steps in the future it seems likely that the mining costs can be kept below $14.00 per ton.

In November 1963, Mr. George F. Reed, former Resident Manager at Mt. Jackson, made a comprehensive review of mining costs in a future operation. Mr. Reed bases his study on an operation mining 2080 tons per month or 80 tons per day on a 6 day week. He feels that by careful management the crew can be kept to 23 men, including 11 miners, 2 hoistmen, 2 top-landers, 1 mechanic helper, 1 diamond driller, 4 plant operators, 1 mechanic-electrician, and 1 supervisor.

A summary of Mr. Reed's estimate is presented below:

| | Per Ton | Per Month |
|---|---|---|
| Labor, payroll taxes, and compensation insurance | $ 8.23 | $17,115.45 |
| Consultant fee | .24 | 500.00 |
| Power | 1.08 | 2,250.00 |
| Material and supplies (1961 rate + 5%) | 2.89 | 6,011.20 |
| Property taxes and fire insurance | .24 | 499.20 |
| Misc., trucking, water, phone, etc. | .36 | 748.80 |
| Total | $13.04 per Ton | $27,124.65 per Month |

Mr. Reed was conservative in his estimate and it seems reasonable to assume that with good supervision the $13.04 per ton cost may be maintained.

## Pre-Production Expenses

Certain pre-production steps will be necessary before the mining operation may begin. These include pumping out the mine, necessary shaft and hoist repair, and mill rehabilitation, as well as sinking the shaft 205 feet and establishing the 1325 and 1450 levels, driving the 1086 east drift, and necessary long-hole, rotary, and diamond drilling.

On February 10 the water level in the mine was at the 935 foot level. It is impossible to calculate accurately the total volume of water that would be contained in the flooded workings below that

level, but it is possible to arrive at a rough estimate. A total of 248,500 tons of ore have been drawn from the 875, 975, 1086, and 1200 Levels. Assuming an equivalent amount of waste was also removed in shafts, raises, and drifts, and assuming also that all open spaces are available to the water, the mine below the 935 Level should be able to hold 6,200,000 cubic feet, or about 46,500,000 gallons. In addition to this, the mine normally makes 72,000 gallons per day.

The estimated pre-production costs are listed below in table form. Pumping costs are based on preliminary discussions between Mr. Meyers and the J. W. Stang Company. The tentative pumping plan calls for installation of two pumps with a capacity of 850 g.p.m.

1. Muck out and retimber No. 2 portal to sheave wheel:

| | | |
|---|---|---|
| Time factor 10 days, 2 men: | Labor | $480.00 |
| | Taxes & Ins. | 128.00 |
| | Timber | 200.00 |
| | | $808.00 |

2. Remove, bake, and reinstate hoist motor $500.00

3. Pumping:

| | |
|---|---|
| Estimated water in mine, 2/10/64 | 50,000,000 gal. |
| Time element, @ 1,224,000 gal. per day | 41 days |
| Normal inflow, 72,000 gal. per day for 41 days, plus 30 days preparation | 5,212,000 gal. |
| Time element | 6 days |

Labor: 3 hoistmen, 3 pumpers, 1 mechanic, 1 supervisor. Total - 8 men.

| | |
|---|---|
| Time: 47 days @ $195.00 per day | $9,165.00 |
| Superintendent | 1,500.00 |
| | $10,665.00 |
| Payroll taxes and insurance 26½ | 2,826.00 |
| | $13,491.00 |
| Pump Rental $800 per month each | $ 1,200.00 |
| Power $100 per day | 4,700.00 |
| Pipe and cable rental | 1,500.00 |
| | $ 7,400.00 |
| | $20,891.00 |
| Possible shaft repair below 1086 Level | 5,000.00 |
| Mill rehabilitation | 3,000.00 |
| | $28,891.00 |
| Contingencies, 10% | 2,889.00 |
| | $31,780.00 |

The costs of the three exploration-development projects previously discussed are estimated as follows:

| | | |
|---|---|---|
| 1. Drifting and drilling, northeast end 1086 Level: | | |
| Drifting 300 feet @ $40.00 | $12,000.00 | |
| Drilling 2000 feet @ $4.00 | 8,000.00 | |
| | $20,000.00 | |
| Contingencies, 10% | 2,000.00 | |
| | $22,000.00 | |
| 2. Establish 1325 Level: | | |
| Sink 80 feet @ $200.00 | $16,000.00 | |
| Drift 400 feet @ $40.00 | 16,000.00 | |
| Raise 250 feet @ $20.00 | 5,000.00 | |
| Diamond drilling, 1200 feet @ $4.00 | 4,800.00 | |
| 5" drill holes, 375 feet @ $14.00 | 5,250.00 | |
| | $47,050.00 | |
| Contingencies, 10% | 4,705.00 | |
| | $51,755.00 | |
| 3. Establish 1450 Level: | | |
| Sink 125 feet @ $200.00 | $25,000.00 | |
| Drift 400 feet @ $40.00 | 16,000.00 | |
| Raise 250 feet @ $20.00 | 5,000.00 | |
| Diamond drilling, 1200 feet @ $4.00 | 4,800.00 | |
| 5" drill holes, 375 feet @ $14.00 | 5,250.00 | |
| | $56,050.00 | |
| Contingencies, 10% | 5,605.00 | |
| | $61,655.00 | |

Summary of Pre-Production Costs

| | | | |
|---|---|---|---|
| 1. | Upper level mucking and timbering | $ 808.00 | |
| 2. | Repair hoist motor | 500.00 | |
| 3. | Pumping, shaft repair | 25,891.00 | |
| 4. | Mill Rehabilitation | 3,000.00 | |
| | | $30,199.00 | |
| 5. | Contingencies | 3,020.00 | $33,219.00 |
| 6. | 1086 Level program | $22,000.00 | |
| 7. | Establish 1325 Level | 51,755.00 | |
| 8. | Establish 1450 Level | 61,655.00 | 135,410.00 |
| | | | $168,629.00 |
| 9. | First month operating costs | | 30,000.00 |
| | Total Required | | $198,629.00 |

## Metal Price

Table II shows the extremely erratic behaviour of the price of mercury since 1900. In the past, the periods of high prices have corresponded closely with periods of war and the peacetime demand has generally been poor.

After climbing briefly to over $300 per flask during the Korean war, the price of mercury decreased sharply to below $200, where it remained until November 1963. Since then it has climbed steadily to its present level of about $260, FOB New York, or at least $250 FOB Mt. Jackson Mine.

This recent price increase, unrelated to military or political causes, may have been caused by increased industrial uses or by the fact that the domestic production has now fallen far below the consumption level.

The price curve shows that both the minimum and maximum prices during each price cycle are increasing. The present price falls about midway between the "trough projection" and the "crest projection" on the curve and appears to be a reasonable figure to use in establishing the mean value of future ore production from the mine.

## Ore Value

Based on the conservative figure of 7 pound recoverable mercury content, the Mt. Jackson reserves have a value of $23.03 per ton. The high-grade drill intersections below the 1200 Level suggest that a 7.7 pound mercury content is a more realistic figure. Using this figure gives an ore value of $25.33 per ton.

## Mine Economics

The discussion on reserves indicates that the block between the 1325 and the 1200 Levels should contain a minimum of 45,000 tons and could contain as much as 87,000 tons if the downward extension of the northeast ore body is proven. The interval between the 1325 and 1450 should contain an equivalent amount.

The operating income or profit is calculated below, using the minimum and probable expected ore grade:

| | | |
|---|---|---|
| Grade | 7.0 lb. | 7.7 lb. |
| Tons per day | 80 | 80 |
| Tons per month | 2,080 | 2,080 |
| Mercury, flasks per month | 192 | 211 |
| Value $250.00/flask FOB mine | | |
| per month | $48,000 | $52,750 |
| per ton | $23.03 | $25.33 |

| | | | |
|---|---|---|---|
| Operating cost | per month | $27,125 | $27,125 |
| | per ton | 13.04 | 13.04 |
| | per flask | 142.14 | 129.10 |
| Operating income | per month | 20,875 | 25,625 |
| | per ton | 9.99 | 12.29 |
| | per flask | 107.86 | 120.90 |

Between 1200 and 1325 Levels:

| | 45,000 tons | | 87,000 tons | |
|---|---|---|---|---|
| | 7 lb. | 7.7 lb. | 7 lb. | 7.7 lb. |
| Flasks mercury | 4,150 | 4,550 | 8,000 | 8,800 |
| Operating income | $447,620 | $544,050 | $862,880 | $1,063,920 |
| Deduct pre-operating Costs to 1325 Level, excl. first month operating costs | 100,735 | 100,735 | 100,735 | 100,735 |
| Balance | $346,885 | $443,325 | $762,145 | $ 963,185 |

Between 1325 and 1450 Levels:

| | 45,000 tons | | 87,000 tons | |
|---|---|---|---|---|
| | 7 lb. | 7.7 lb. | 7 lb. | 7.7 lb. |
| Flasks mercury | 4,150 | 4,550 | 8,000 | 8,800 |
| Operating income | $447,620 | $544,050 | $862,880 | $1,063,920 |
| Deduct pre-operating Costs, 1325-1450 Levels | 61,655 | 61,655 | 61,655 | 61,655 |
| Balance | $385,965 | $482,395 | $801,225 | $1,002,265 |
| Net operating income to 1450 Level after pre-production costs | $732,850 | $925,720 | $1,563,360 | $1,965,450 |
| Ratio operating income to pre-production costs | 4.5:1 | 5.7:1 | 9.6:1 | 12.0:1 |

Time Required

| | | |
|---|---|---|
| Dewatering and possible shaft repair | 2 mo. | |
| Sink and establish 1325 Level, incl. drilling | 5 " | (1) |
| Mine 45,000-87,000 tons ore above 1325 Level, @2080 tpm | 22 to 42 mo. | |
| Mine 45,000-87,000 tons ore above 1450 Level | 22 to 42 mo. | |
| Total | 51 to 91 mo. | |

(1) Note: If 1086 Level exploration is successful, production may commence before shaft sinking is completed.

The required pre-production expenses of $168,600 will be repaid in 8 months of production of 7 pound ore, or in 6½ months of production of 7.7 pound ore.

## VALUATION

The mining industry has accepted a method of calculating the present value of a mine, taking into consideration the high risk factor present in all mining, as well as the fact that any mine is a wasting asset. The valuation formula, known as the Hoskold formula, allows the payment of interest on the invested capital at a rate commensurate with the risk (10% per year is commonly used) and permits the redemption of capital by annually investing the dividend overplus at a safe rate of interest. In effect, the Hoskold formula suggests that at the end of the life of the mine the investor should have received his full investment plus a fair rate of interest, and in addition should have received annual income at a speculative rate for the life of the mine. The formula allows the potential investor to choose a reasonable purchase price for the mine.

The present value of the possible new ore at the Mt. Jackson Mine is given below, based on 5% redemption of capital with interest to purchaser at 10%.

| Reserves | 45,000 | | 87,000 | |
|---|---|---|---|---|
| Grade | 7# | 7.7# | 7# | 7.7# |
| Annual Income | $250,500 | $307,500 | $250,500 | $307,500 |
| Life | 3-2/3 yrs. | 3-2/3 yrs. | 7 yrs. | 7 yrs. |
| Factor | 2.7969 | 2.7969 | 4.4879 | 4.4879 |
| Present Value of Reserves | $700,600 | $1,124,200 | $860,000 | $1,380,000 |
| Less Pre-production costs | 168,600 | 168,600 | 168,600 | 168,600 |
| Fair Investment Price | $532,000 | $ 955,600 | $691,400 | $1,211,400 |

The Hoskold formula shows that a minimum investment price of $532,000 would be reasonable in view of anticipated profits. The actual investment price of $168,600 is less than a third of this figure.

The program of dewatering and exploration-development outlined in previous sections has an excellent chance of returning a substantial profit on the investment and has the wholehearted approval of the writer.

Peter Joralemon

MME Form 51
June 1963

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION

EXPLORATION CONTRACT
(Short Form)

| Docket No. | Commodity | Contract No. | County | State |
|---|---|---|---|---|
| OME 6336 | Mercury | 14-23-090- | Sonoma | California |

It is agreed _____ (Date), between the United States of America, acting through the Department of the Interior, Office of Minerals Exploration, hereinafter called the "Government," and

Sonoma International, Inc., a Nevada Corporation

whose mailing address is 260 California Street, Room 1010 San Francisco, California 94111, hereinafter called the "Operator," as follows:

ARTICLE 1. Authority and scope.--(a) This contract, entered into under the authority of Public Law 701, 85th Cong., 2d sess. (72 Stat. 700; 30 U.S.C. § 641 - 646), consists of this form, the attached Annex I (land description), Exhibit A (work and costs), and the maps and documents listed. The work is a search for new or unexplored deposits of the commodity designated above. The Operator shall begin the work on or before November 1, 1967 (Date) and, subject to the provisions of Article 7 and Exhibit A, shall complete the work within 18 months from the date of the contract.

(b) The description of the work and the fixed cost for each unit of work to be performed (per foot of drilling, per foot of drifting, per hour of operations, etc.) are hereby agreed upon as specified in Exhibit A. The estimated total cost of the work is $_____. The Government will contribute 50 percent of the total fixed unit costs of the work performed, not in excess of $_____ in accordance with the provisions of Articles 4 and 5.

(c) Interest computation.-- Simple interest at the rate of _____ percent shall accrue from the dates Federal funds are made available until the period specified for payment of royalty expires, or until the amount of Federal funds contributed is fully repaid with interest.

(d) The Operator shall not transfer or assign this contract or any right or obligation thereunder without the written consent of the Government.

ARTICLE 2. Operator's rights in land.--(a) The Operator represents and undertakes that Annex I correctly describes the land which is the subject of this contract and the nature of the Operator's right of property and possession therein (whether as owner, lessee, or otherwise), and that such right, title, or interest is subject only to the following claims, liens, or encumbrances:

Owner

(b) The Subordination Agreement of the holder of any claim, lien, or encumbrance listed above and (if the Operator does not hold the legal title) the Lien Agreement of any holder of the legal title of the land (lessor, seller, optionor, etc.) are attached as follows:

None

(c) The Operator shall preserve and maintain his right, title, or interest in the land and his right to the possession thereof for the purposes of this contract, and shall devote the land and all existing improvements, facilities, buildings, installations, and appurtenances to the purposes of this contract. The Operator shall neither transfer, convey, nor surrender the land nor any right, title, or interest therein, nor permit nor suffer any claim, lien, or encumbrance thereon, without expressly referring to and providing in the instrument of conveyance, lien, or encumbrance for the preservation of the Government's right to a royalty on production and liens for the payment thereof. Two true copies of such instrument shall be furnished to the Government. If the Government's rights to royalty as provided in Article 6 have been terminated, the provisions of this paragraph (c) shall become inapplicable.

ARTICLE 3. Performance of the work.--(a) Operator's responsibility.--The work shall be performed diligently, efficiently, in a workmanlike manner in accordance with good mining standards, and in compliance with State laws governing health, safety, and liability insurance covering employment. The Operator shall provide suitable and adequate equipment, facilities, materials, supplies, and labor to complete the work as specified in Article 1(a).

(b) Government may inspect.--The Operator shall consult with and inform the Government on all phases of the work as it progresses. The Government may enter at all reasonable times to inspect the work under the contract and production operations during the period that royalty is payable to the Government. The Operator shall provide the Government with all reasonable means of access for such inspections.

ARTICLE 4. Contribution by the Government.--The Government will make its contribution on the basis of the monthly vouchers referred to in Article 5(b), but all payments by the Government are provisional only, subject to audit. Until the account between the Operator and the Government is finally audited and settled and the Operator's final report has been received, the Government may withhold such sums as are necessary to protect its interests. To the extent that amounts in excess of fixed unit costs or in excess of the estimated total cost may be necessary for the performance of the work, the Operator shall incur and pay such amounts for his own account without contribution by the Government. The Government will not contribute to the cost of any work performed prior to the date of this contract. The Government may make payments for the account of the Operator directly to independent contractors and suppliers rather than to the Operator.

ARTICLE 5. Reports, accounts, audits.--(a) Operator's records.--The Operator shall keep suitable records and accounts of the units of work performed and of any production in which the Government may have an interest; and shall preserve those with respect to work performed for at least three years after final payment by the Government, and those with respect to production for at least three years after any obligation to pay royalties to the Government has terminated. The Government may inspect and audit said records and accounts at any time, either by itself or by a certified public accountant. The Comptroller General of the United States or his representative, until the expiration of said three-year periods, shall have access to and the right to examine all pertinent books, documents, papers, and records of the Operator.

(b) Monthly reports.--The Operator shall provide the Government with four copies of monthly reports in three sections as follows:

(1) Operator's Monthly Voucher claiming costs for work performed;

(2) Operator's Progress Report showing the number of units of the various types of work performed; and

(3) a narrative report of the work performed during the reporting period, including adequate engineering-geological maps or sketches, drill hole logs and locations, and assay reports on samples taken concurrently with advance in mineralized ground.

(Forms for reporting under (1) and (2) above will be provided by the Government.)

(c) Final report.--Upon completion of the work or termination of the Government's obligation to contribute to costs, the Operator shall furnish the Government with three copies of a final report (in addition to the final monthly report). This final report shall include a geological and engineering evaluation of the results of the work performed under the contract with an estimate of the ore reserves resulting from such work, complete assay data, adequate geological and engineering maps or sketches, and a summary of the work performed and the unit costs thereof.

(d) Report of sales.--The Operator shall provide the Government with suitable accounting and documentary evidence covering all production to which the Government's royalty relates, such as two copies of smelter or concentrator settlement sheets and certified accounts of production and sale or other disposition of production.

(e) Compliance with requirements.--If the Government determines that any of the Operator's reports, records, or accounts are insufficient or incomplete, or if the Operator fails to make them, the Government may procure the preparation or completion of same with suitable attachments as an expense of the work to which the Operator shall contribute. The Government may withhold approval and payment of any vouchers relating to insufficient or incomplete reports, records, or accounts.

ARTICLE 6. Repayment by Operator.--(a) Certification.--If the Government considers that mineral or metal production from the land covered by the contract may be possible as a result of the exploration work, it shall so certify in writing to the Operator at any time not later than six months after a sufficient final report and final accounting (see Article 5) have been furnished.

(b) Royalty on production.--The Operator, whether or not the producer (for example, if the Operator either transfers or does not retain his interest in the land), shall pay to the Government a royalty on all minerals and metals mined or produced from the land as follows:

(1) irrespective of any certification of possible production--from the date of the contract until the lapse of the time within which the Government may issue such certification or until the total net amount contributed by the Government is fully repaid with interest, whichever occurs first; or

(2) if the Government issues a certification of possible production--for a period of ten years from the date of the contract or until the total net amount contributed by the Government is fully repaid with interest, whichever occurs first.

(c) Payment of royalty.--(1) The Government's royalty shall be five percent of the gross proceeds (including any bonuses, premiums, allowances, or other benefits) from the production sold, in the form sold (ore, concentrate, metal, or equivalent), at the point of delivery (the f.o.b. point); except, that charges of the buyer arising in the regular course of business and shown as deductions on the buyer's settlement sheets (such as treatment processes performed by the buyer, sampling and assaying to determine the value of the production sold, and freight payable by the buyer to a carrier (not the Operator or producer)), shall be allowed as deductions in arriving at the "gross proceeds" as that term is used herein. No costs of the Operator or producer are deductible in arriving at the "gross proceeds" as that term is here used.

The term "treatment processes" means those processes (such as milling, concentrating, smelting, refining, or equivalent, but excluding fabricating or manufacturing) applied to the crude ore or other production after it is extracted from the ground to put it into a commercially marketable form.

(2) The Government's royalty shall be computed and paid currently upon each lot sold, held, or used in integrated operations, as the case may be.

(d) Unsold production.--If any production (ore, concentrate, metal, or equivalent), after the lapse of six months from the date the ore was extracted from the ground, remains neither sold nor used in integrated manufacturing or fabricating operations (for instance if it is stockpiled), the Government, at its option, as long as it so remains, may require the computation and payment of its royalty on the value of such production in the form (ore, concentrate, metal, or equivalent) it is in when the Government elects to require computation and payment. If any production is used in integrated manufacturing or fabricating operations before the Government makes its election, the Government's royalty on such production shall be computed on the value thereof in the form in which and at the time it is so used. "Value" as here used means what is or would be gross income from mining operations for percentage depletion purposes in Federal income tax determination, or the market value, whichever is greater.

(e) Lien for payment.--To secure the payment of royalty (see Article 6(b)), the Operator hereby grants to the Government a lien upon his interest in the land and upon any production of minerals and metals therefrom until the royalty claim is extinguished by lapse of time or is fully paid.

(f) Notice to purchasers.--The Operator or producer shall give notice of the Government's claim for royalty to any purchaser of the production, and shall authorize and direct such pruchaser to pay the royalty directly to the Government and to furnish the Government with copies of the settlement sheets. If the records of any production and sales or other disposition of production, whether the production is by the Operator or by others, are not made available to the Government, the amount of the royalty may be estimated by the Government, and this estimate shall be final and binding upon the Operator or producer.

(g) No obligation to produce.--Nothing in this contract shall be construed as imposing any obligation on the Operator or the Operator's successor in interest to engage in any production operations.

(h) Government not obligated to buy.--Nothing in this contract shall be construed as imposing any obligation on the Government to purchase any minerals and metals mined or produced from the land.

ARTICLE 7. Termination of the Government's Obligations.--(a) If the Government determines that operations at any time have failed to achieve anticipated results and further work is not justified, the Government may give the Operator written notice thereof, and thereupon:

(1) the Government shall be free of all obligation to pay on account of units of work not then performed; and

(2) the Operator shall be free of all obligation to prosecute the work other than such as may be necessary and incidental to final accounting and reporting.

(b) If the Government determines that the Operator is in default under the terms of the contract, the Government may give the Operator written notice of such default with a specification of reasonable time within which the default must be cured; and if the Operator fails to cure such default as required, thereupon:

(1) the Government shall be relieved of all obligation to pay on account of units of work not performed when the notice was given, and

(2) the Operator shall be free of all obligation to prosecute the work other than such as may be necessary and incidental to final accounting and reporting.

The Government may also avail itself of any other remedy the law may provide for breach of contract, including the right to rescind the contract and to demand repayment of all moneys contributed by the Government under the contract.

(c) The giving of any notice by the Government under the provisions of this Article 7 shall not affect the Government's rights as provided for in the contract with respect to royalty and liens to secure the payment thereof, and such rights shall be fully preserved.

(d) The determinations of the Government are subject to appeal under Article 11.

ARTICLE 8. Notices to be given by the Government may be delivered to the Operator or may be sent by certified mail addressed to the Operator at his mailing address stated in this contract. If mailed, notices are deemed to have been delivered five days after the date of mailing.

ARTICLE 9. Officials not to benefit.--No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 10. Nondiscrimination in Employment.--The provisions respecting nondiscrimination in employment which are required by section 301 of Executive Order 10925, dated March 6, 1961, as amended and supplemented, are attached hereto as Exhibit B and are hereby incorporated in and made a part of this contract.

ARTICLE 11. Disputes.--Any dispute arising under this contract which is not disposed of by agreement shall be decided by the Director, Office of Minerals Exploration, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Operator. The decision of the Director, Office of Minerals Exploration, shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Operator mails or otherwise furnishes to the Director, Office of Minerals Exploration, a written appeal addressed to the Secretary of the Interior. The decision of the Secretary or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence.

The term "Director, Office of Minerals Exploration," as used herein includes his duly authorized representative.

ARTICLE 12. Work Hours Act of 1962 - Overtime Compensation.--This contract, to the extent that it is of a character specified in the Work Hours Act of 1962 (Public Law 87-581, 76 Stat. 357-360) and is not covered by the Walsh-Healey Public Contracts Act (41 U.S.C. 35-45), is subject to the following provisions and to all other provisions and exceptions of said Work Hours Act of 1962.

(a) Overtime requirements.--No Operator or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic to be employed on such work in excess of eight hours in any calendar day or in excess of forty hours in any workweek unless such laborer or mechanic receives compensation at a rate of not less than one and one-half times his basic rate of pay for all hours worked in excess of eight hours in any such calendar day or in excess of forty hours in any such workweek, as the case may be.

(b) Violations; liability for unpaid wages; liquidated damages.--In the event of any violation of the clause set forth in subparagraph (a) of this paragraph, the Operator and any subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such Operator and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed, with respect to each individual laborer or mechanic employed in violation of the clause set forth in subparagraph (a) of this paragraph, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (a) of this paragraph.

(c) Withholding for unpaid wages and liquidated damages.--The Office of Minerals Exploration may withhold or cause to be withheld, from any moneys payable on account of work performed by the Operator or subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Operator or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (b) of this paragraph.

ARTICLE 13. Copeland (Anti-Kickback) Act--Nonrebate of wages.--The regulations of the Secretary of Labor applicable to contractors and subcontractors (29 CFR, Part 3), made pursuant to the Copeland Act, as amended (40 U. S. C. 276c) and to aid in the enforcement of the Anti-Kickback Act (18 U. S. C. 874) are made a part of this contract by reference. The Operator will comply with these regulations and any amendments or modifications thereof and will be responsible for the submission of affidavits required of independent contractors thereunder. The foregoing shall apply except as the Secretary of Labor may specifically provide for reasonable limitations, variations, tolerances, and exemptions.

ARTICLE 14. Changes and added provisions.--

_____

_____

_____

_____

Executed in quintuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

_____
(Operator)

By_____

Title_____

By_____

I, _____, certify that I am the
(Name)

_____ secretary of the corporation named as Operator herein; that

_____, who signed this contract on behalf of the Operator, was then
(Name)

_____ of said corporation; that said contract was duly signed for
(Title)

and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

_____

[CORPORATE SEAL]



INT.-DUP. SEC., WASH., D.C. 31011

Murphy

DRAFT FMMurphy/mm
7/21/64

EXPLORATION CONTRACT
SONOMA INTERNATIONAL, INC.
OME-6356

ANNEX I

The land referred to in Article 2 of the contract consists of 418.3 acres of land in secs. 8, 9, 16, and 17, T. 8 N., R. 10 W., M.D.M., Sonoma County, California.

The Operator owns the surface and mineral rights to 61.5 acres of the land which includes a block of two patented mining claims, the Mt. Jackson (Lot 39) and the Great Eastern (Lot 40), and an additional parcel of 21.2 acres of fee land, and has mineral rights to 356.8 acres of land adjoining the block to the south, east, and west.

The land on which the Operator has both surface and mineral rights is shown hatched, and the outer boundaries of all the land are shown in green on Plate 1 entitled "Property Map, Sonoma International, Inc., Mt. Jackson Quicksilver Mine . . .," attached hereto and made part hereof.

SECOND DRAFT
FMMurphy/mm
7/23/64

EXPLORATION CONTRACT
SONOMA INTERNATIONAL, INC.
OME-6356

EXHIBIT A

The purpose of this project is to explore by deepening an existing shaft, drifting and crosscutting on two levels from the shaft, and percussion drilling long holes therefrom for mercury-bearing ore bodies occurring within and adjacent to large masses of intensely silicified and carbonated serpentine surrounded by shales and sandstones of the Franciscan formation of Jurassic(?) age.

General Provisions

The drifts and crosscuts shall not be less than 5 by 7 feet in cross section in the clear of timber and shall be timbered as necessary using standard 8 by 8 inch drift sets or equivalent round timber.

The long holes shall be designed to explore the masses of silica-carbonate rock traversed by the drifts and crosscuts, and if practical, not less than 25 feet of the sedimentary rocks bordering the silica-carbonate masses. The long holes to be drilled are estimated to range from 50 to 200 feet in length. No long hole drilled under this contract shall bottom closer than 40 feet to any other hole.

All significantly mineralized areas exposed in the drifts and crosscuts shall be sampled by cutting channels at intervals of not more than 10 feet; and, in addition, a representative bulk sample shall be taken of each round broken. All significantly mineralized areas traversed by the long holes shall be sampled at intervals of not more than 5 feet.

Each sample from whatever source shall be split as necessary and one split shall be assayed for mercury. The Operator shall store one split of each sample in a suitable and identified container for Government inspection and possible use. With prior Government approval, the Operator may dispose of the stored samples.

True copies of assay certificates of all samples shall be submitted with the Operator's monthly reports, which shall also include maps or sketches showing the work completed during the reporting period. The maps shall show the location and values of the samples and the general geologic formations and sturctures traversed by the shale, drifts, crosscuts, and long holes.

In the drifts and crosscuts rails shall be not less than 16-pound size, and the diameter of the air and water lines not less than 2 inches and 1 inch, respectively. The diameter of the air and water lines for the new section of the shaft shall not be less than 4 inches and 2 inches, respectively. The drifts, crosscuts, and new section of the shaft shall be ventilated using not less than 12-inch diameter vent tube.

Under this contract not more than 236 feet of shaft sinking, retimbering the 1200 level shaft station, establishing a shaft station and pocket on the 1450 level, drilling 280 feet of well hole, 1300 feet of drifting and crosscutting, 260 feet of timbering in drifts and crosscuts, 7,000 feet of long-hole drilling, and the assaying of 600 samples shall be performed.

No work under this contract shall be performed at locations which are within 200 feet of the outer boundary of the land in the contract.

The location, direction, and extent of each work item are subject to Government approval.

## Description of the Work

On the 1200 level retimber the station for a distance of approximately 56 feet from the shaft, spacing the station sets on approximately 4-foot centers. From the end of the crosscut on this level at approximately coordinates 610 N. and 100 E., continue the working a maximum of 300 feet in an easterly direction, as indicated on Plate 5, entitled, "1200 Level, Mt. Jackson Mine, Sonoma International, Inc. . . .," attached hereto and made part hereof. In the fault zone traversed by the crosscut, drive drifts northwesterly and southeasterly for a combined total of not more than 100 feet. From the crosscut and/or the drifts along the fault, drill fan patterns of long holes from selected stations for a combined total of 3,000 feet of drilling.

At appropriate times down-the-hole percussion drill stations shall be cut near the shaft on the 1200 level and a proposed one at 1,325 feet. From each station a 140-foot deep well hole for pumping shall be drilled to below the succeeding projected lower level for improving working conditions and safety in the shaft.

From the present bottom of the shaft, estimated to be 54 feet below the floor of the 1200 level, deepen the shaft an additional maximum of 236 feet in two lifts. The new section of shaft shall be continued at the same size, 7 by 10 feet, and with the same type of 8 by 8 inch timber as the present shaft, with the manway compartment cross section being 3.5 by 5 feet and the hoist compartment 4 by 5 feet, in the clear of timber. No AP

At a point about 125 feet below the 1200 level, drift not more than 30 feet from the shaft to provide a site for one of the drill hole stations referred to above.

At a point in the shaft about 250 feet below the floor of the 1200 level, cut a station approximately 30 feet in length equivalent to double drift size for the 1450 level. The station shall be timbered for a maximum distance of 30 feet from the shaft with sets placed on approximately 4-foot centers. A skip pocket not exceeding 500 cubic feet in size shall be excavated below the floor of the 1450 level.

From the 1450 level station, drive a crosscut easterly for a maximum distance of 550 feet as indicated on Plate 7 entitled "1450 Level (Proposed) Mt. Jackson Mine . . . .," attached hereto and made part hereof. At locations authorized by the Government and confirmed in writing, a maximum of 350 feet of additional drifting or crosscutting may be performed to explore favorable areas indicated by prior work. From the crosscuts and drifts a combined total of 4,000 feet of long holes may be drilled.

The approximate location of all of the work proposed on each level is indicated in red on the plates previously mentioned.

## Estimated Cost of the Work

**Fixed Unit Costs**

| | |
|---|---|
| Sinking main shaft, 236' @ $150.00/ft. | $35,000.00 |
| Retimber station on 1200 level 1/ | 2,000.00 |
| 1450 level station and pocket: | |
| 30 feet of drift @ $38.50/ft. | 1,155.00 |
| 1,600 cu. ft. excavation for station and pocket @ $0.90/cu.ft. | 1,440.00 |
| 30 feet of station timbering @ $13.00/ft. | 390.00 |
| Well hole drilling (includes 2 drill stations) | |
| 280 feet of drill hole @ $14.00/ft. | 3,920.00 |
| 1,300 feet of drifting and crosscutting @ $38.50/ft. | 50,050.00 |
| 260 feet of timbering in drifts and crosscuts @ $6.50/ft. | 1,690.00 |
| 7,000 feet of long-hole drilling @ $1.00/ft. | 7,000.00 |
| 600 samples assayed for mercury @ $2.00/sample | 1,200.00 |
| Total estimated cost of project | $104,245.00 |
| Government participation @ 50% (rounded) | $52,120.00 |

1/ The completed job is the unit of work.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
450 Golden Gate Avenue, Box 36012
San Francisco, California, 94102

Air Mail

July 15, 1964

Memorandum

To : Chief, Division of Exploration Operations, OME, Washington, D. C.

From : Acting Field Officer, OME, Region II

Subject: OME-6356 (Mercury)
Sonoma International, Inc.
Mt. Jackson Mine
Sonoma County, California

EXTRA COPY
O. M. E
RECEIVED JUL 17 1964

| DATE | INITIALS | CODE |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

Reference to your letter of June 10, 1964, of the above subject, the applicant was advised what OME would allow in its proposed exploratory program.

Enclosed are copies of the applicant's letters to the banks and their replies; and also the applicant's depreciation schedule prepared by Francis Frederick, a consultant mining engineer representing the applicant.

Attached to this letter is my estimated costs for the work proposed by the applicant. The applicant's sinking cost is high and the reason for this is that the waste rock is handled twice.

During the sinking program the muck will be hoisted to the 1200-ft. level where it will be dumped into a 2-ton capacity makeshift bin. The bin will be located high enough above the level (floor) in order for the skip to dump. From the 1200-ft. level the muck will be dumped into the main shaft skip and hoisted to the 690-ft. level where it will automatically be dumped into an old stope just off the shaft.

Mr. Frederick was advised that OME will take a dim view on supporting the costs for handling the waste rock "twice."

In my estimated cost, I did not calculate any personnel in handling the main shaft, but I did use 66 2/3% of the depreciation schedule.

The applicant is planning to work on the 1086-ft.level while OME program is in progress of sinking, crosscutting, and drifting on the 1200-ft. level.

PAUL V. FILLO

Paul V. Fillo

Enclosures
Letters
Schedule Applicant's
Schedule OME

cc: Chief, Division of Exploration Operations, OME, Washington, D. C.

## Cost Estimate

The following tables show the breakdown on the proposed work:

### LABOR RATES

| | | Per Hr. | Per Shift |
|---|---|---|---|
| Hoistman | | $2.50 | $20.00 |
| Miners | | 3.00 | 24.00 |
| Surface man | | 2.50 | 20.00 |
| Mechanic | | 2.50 | 20.00 |
| Mine Foreman | | 3.27 | 26.16 |
| Mine Superintendent | $\frac{\$1,000}{26}$ | | 38.46 |

### DETAIL OF LABOR COSTS

1200-ft. level - 400 feet drifting - 2 shifts - 8 feet per day
(Concurrent with shaft sinking)

| | | | | Per Day | Total |
|---|---|---|---|---|---|
| 4 | Miners | at $24.00 | | $96.00 | |
| 2 | Hoistmen | " 20.00 | 50% | 20.00 | |
| 2 | Outside men | " 20.0 | 50% | 20.00 | |
| 1 | Mechanic | " 20.00 | 33 1/3% | 6.67 | |
| | Mine Foreman | " 26.16 | 33 1/3% | 8.72 | |
| | Mine Superintendent | $\frac{1,000}{26}$ | X 33 1/3% | 12.82 | |
| | Geol. & Engr. | $\frac{350}{26}$ | X 25% | 3.37 | |
| | | | | $167.58 | |

$\frac{167.58}{8}$ = $20.95 per foot

$20.95 X 400 = $8,380.00

**Shaft Sinking (9½ X 6½ outside dimension) - 236 feet - 3 shifts @ 1.4 feet per shift - 4.2 feet per day**

| | | | | Per Day | Total |
|---|---|---|---|---|---|
| 3 | Hoistmen @ | $20.00 | | $ 60.00 | |
| 6 | Miners @ | 24.00 | | 144.00 | |
| 3 | Outside men @ | 20.00 | 50% | 30.00 | |
| 1 | Mechanic @ | 20.00 | 33 1/3% | 6.67 | |
| | Mine Foreman | 26.16 | 33 1/3% | 8.72 | |
| | Mine Superintendent | 38.46 | 33 1/3% | 12.82 | |
| | Geol. & Engr. | $\frac{\$350}{26}$ | X 25% | 3.37 | |
| | | | | $265.58 | |

$\frac{265.58}{4.2}$ = $63.23 per foot

63.23 X 236 = **$14,922.28**

**1450-Ft. level Crosscut & Drifting - 900 feet - 2 shifts - 8 feet per day**

| | | | | Per Day | Total |
|---|---|---|---|---|---|
| 4 | Miners @ | $24.00 | | $96.00 | |
| 2 | Hoistmen " | 20.00 | 50% | 20.00 | |
| 2 | Outside men @ | 20.00 | 50% | 20.00 | |
| 1 | Mechanic @ | 20.00 | 33 1/3% | 6.67 | |
| | Mine Foreman @ | 26.16 | 33 1/3% | 8.72 | |
| | Mine Superintendent | $\frac{1000}{26}$ | X 33 1/3 | 12.82 | |
| | Geol. & Engr. | $\frac{350}{26}$ | X 25% | 3.37 | |
| | | | | $167.58 | |

$\frac{167.58}{8}$ = $20.95 per foot

$20.95 X 900 = **$18,855.00**

1200-Ft. Level - Well Hole Drilling - 140 feet - 1 shift - 5 feet per day

| | | | Per Day | Total |
|---|---|---|---|---|
| 2 Miners @ | $24.00 | | $48.00 | |
| Geol. & Engr. | | $\frac{350}{26}$ X 25% | 3.37 | |
| | | | $51.37 | |

$\frac{\$51.37}{5}$ = $10.27 per ft.

$10.27 X 140 = $1,437.80

1250-Ft. Level - Well Hole Drilling - 140 feet - 1 shift - 5 feet per day

| | | | Per Day | Total |
|---|---|---|---|---|
| 2 Miners @ | $24.00 | | $48.00 | |
| Geol. & Engr. | | $\frac{350}{26}$ X 25% | 3.37 | |
| | | | $51.37 | |

$\frac{\$51.37}{5}$ = $10.27 per ft.

$10.27 X 140 = $1,437.80

1200-Ft. Level Rehabilitation of Station - 1 Shift - 15 days

| | | | Per Day | Total |
|---|---|---|---|---|
| 1 Hoistman @ | $20.00 | | $20.00 | |
| 2 Miners @ | 24.00 | | 48.00 | |
| Mine Superintendent | $\frac{1,000}{26}$ | X 50% | 19.23 | |
| | | | $87.23 | |

$87.23 X 15 = $1,308.45
overtime 68.00

$1,376.45

Percussion Long Hole Drilling - 7,000 feet (1200-Ft. Level - 3,000 ft.)
(1450-Ft. Level - 4,000 ft.)

| | | Per Day | Total |
|---|---|---|---|
| 2 Miners @ $24.00 | | $48.00 | |
| 1 Surfaceman @ 20.00 X 50% | | 10.00 | |
| Geol. & Engr. $\frac{350}{26}$ X 50% | | 6.73 | |
| | | $64.73 | |
| $\frac{\$64.73}{80}$ = $0.81 per ft. | | | |
| $0.81 X 7,000 = | | | $5,670.00 |

1450 Station Slab Excavation, Skip Pocket, Drill Station for Well Drill Hole - Total 15 days - 2,400 cu. ft.

| | Per Day | Total |
|---|---|---|
| 2 Miners @ $24.00 | $48.00 | |
| 1 Hoistman @ $20.00 X 50% | 10.00 | |
| 1 Mechanic @ 20.00 X 33 1/3% | 6.67 | |
| Mine Foreman @ $26.16 X 33 1/3% | 8.72 | |
| Mine Supt. $\frac{1,000}{26}$ X 25% | 9.62 | |
| | $83.01 | |
| $83.01 X 15 = | $1,245.15 | |
| Overtime | 56.38 | |
| | $1,301.53 | $1,301.53 |
| $\frac{\$1,301.53}{2,400}$ = $0.54 per cu ft. | | $ 0.54 |

## SUMMARY OF LABOR COST

| Project | Working days | Cost per ft. | Footage | Total Costs |
|---|---|---|---|---|
| Rehabilitation, 1200-Level Station | 15 | 22.94 | 60 ft. | $ 1,376.45 |
| Well Hole Drilling (1200 Level) (1450 Level) | 40 | 10.27 | 280 ft. | 2,875.60 |
| Drifting 1200 Level | 50 | 20.95 | 400 ft. | 8,380.00 |
| Sinking Shaft | 60 | 63.23 | 236 ft. | 14,922.28 |
| Station on 1450 Level | 5 | .54 Cu/ft. | 1,200 Cu/ft. | 648.00 |
| Skip Pocket 1450 Level | 2 | .54 Cu/ft. | 500 Cu/ft. | 270.00 |
| Crosscut & Drifting 1450 Level | 113 | 20.95 | 900 ft. | 18,855.00 |
| Percussion Long Holes (1200 Level) | 38 | .81 | 3,000 ft. | 2,430.00 |
| Percussion Long Holes (1450 Level) | 50 | .81 | 4,000 ft. | 3,240.00 |
| Drill Station for Well Hole Drilling | 2 | .54 Cu/ft. | 350 Cu/ft. | 189.00 |
| Drill Station for well Hole Drilling | 2 | .54 Cu/ft. | 350 Cu/ft. | 189.00 |
| Total | 377 | | | $53,375.33 |

16 Months

**Drifting and Crosscutting, Materials & Supplies - 1,300 feet**
**20% timbered**

| | | | | |
|---|---|---|---|---|
| Rail | 16# | @ | $1.70 per foot | $ 2,210.00 |
| Spikes, fishplates | | | .12 " " | 156.00 |
| Pipe 2" airline (1200') | | | .70 " " | 840.00 |
| Pipe 1" waterline (1200') | | | .30 " " | 360.00 |
| Drill steel | (1300') | | 1.50 " " | 1,950.00 |
| Explosives | | | 3.75 " " | 4,875.00 |
| Hoses, air & water | | | | 150.00 |
| Shovels, picks, wrenches, axes | | | | 200.00 |
| Ventline | 12" (650') | | .90 " " | 585.00 |
| Power | $90.00 per day - 1/3 per shift (8 hrs.) | | | |
| | 1200-ft. level 100 shifts (30 X50%) | | | 1,500.00 |
| | 1450-ft. level 225 " ($30 X 50%) | | | 3,375.00 |
| Estimated 20% timber (1300 feet) | 260 feet X $6.50 | | | 1,690.00 |
| | | | | $17,891.00 |

$$\frac{17,891.00}{1300} = \$13.76 \text{ per foot}$$

Shaft Sinking - Materials & Supplies (236 feet) (9½' X 6½') outside dimension - 8 X 8 timbers - Manway Comp. 3½' X 5' - Hoisting Comp. 4' X 5'

| | | |
|---|---|---|
| Lagging | 480 Bd. ft. | |
| Sets | 349 " " | |
| Ladder, etc. | 20 " " | |
| | 849 | |
| 47 Sets X 480 = | | 22,560 Bd. ft. |
| 47 " X 349 = | | 16,403 Bd. ft. |
| 47 " X 20 = | | 940 Bd. ft. |
| | | 39,903 Bd. ft. |

| | | | |
|---|---|---|---|
| 40,000 Bd. ft. @ | $100 per M | $4,000.00 | |
| Guides 4" X 4" @ | .63 per ft. | 148.68 | |
| Hanging Rods @ | 1.25 " " | 295.00 | |
| Pipe 4" airline | 1.30 " " | 306.80 | |
| Pipe 2" waterline | .70 " " | 165.20 | |
| Vent Line 12" @ | .90 " " | 212.40 | |
| Drill Steel | 1.25 " " | 295.00 | |
| Explosive | 5.00 " " | 1,180.00 | |
| Hose Air and Water | | 150.00 | |
| Shovels, Picks, Axes, Wrenches | | 150.00 | |
| Spikes | | 30.00 | |
| Power - 33 1/3 per cent of $90 X 169 shifts | | 5,070.00 | |
| | | | $12,003.08 |

$\frac{\$12,003.08}{236}$ = $50.86 per ft.

1200-Ft. Level - Rehabilitation - Materials & Supplies - Timber - 60 feet (60% Lagging)

| | | | |
|---|---|---|---|
| 10 Sets | 10' X 8' | | |
| 5 " | 5' X 7' | | |
| 10 " | | 2,666 Bd. Ft. | |
| Lagging (60%) | | 2,016 " " | |
| 5 Sets | | 590 " " | |
| Lagging (60%) | | 587 " " | |
| | | 5,859 " " | |
| 6,000 Bd. Ft. @ $100 per M | | | $600.00 |

Wall Drill Hole (280 feet) Material & Supplies

| | | |
|---|---|---|
| Hose (Air & Water) | $150.00 | |
| Tools (Wrenches, Axes) | 40.00 | |
| | | $190.00 |

$\frac{190}{280}$ = $0.68 per foot

Percussion Long Hole Drilling - 7,000 feet - Materials & Supplies

| | | |
|---|---|---|
| Hose (Air & Water | $ 75.00 | |
| Bits 10 X $30 | 300.00 | |
| Tools (Wrenches, Axes, Shovels | 50.00 | |
| | | $425.00 |

$\frac{425.00}{7000}$ = $0.06 per ft.

Slab Excavation - Materials and Supplies - 2,400 Cu. Ft.

| | | |
|---|---|---|
| Drill Steel | $0.10 cu.ft. (2400 Cu.Ft.) | $240.00 |
| Explosives | 3.75 X 63' (Equivalent to 2400 Cu.Ft.) | 238.00 |
| | | $478.00 |

$\frac{\$478.00}{2400}$ = $0.20 cu.ft.

Operating Equipment - Owned by the applicant (General Equipment to be used 66 2/3% of the time)

| | |
|---|---|
| 100 H.P. Main Hoist | $12,500.00 |
| Skip cage | 3,300.00 |
| 2 Atlas Cop Co. Compressor (1400 c.f.m) | 7,475.00 |
| 8 Mine cars | 1,600.00 |
| Ventilation System Surface Motor 40 H.P. & 20 H.P. underground | 3,250.00 |
| Pumps, 500' level 100 H.P. | 1,625.00 |
| 875' level 40 H.P. | 910.00 |
| 1,200' level 40 H.P. | 910.00 |
| 4" water line 1200' | 900.00 |
| | $32,470.00 |

66 2/3% of $32,470.00 = $21,644.50

**Sinking Equipment to be Used 100 Per Cent**

| | | | |
|---|---|---|---|
| 15 | hp Elect. Hoist | $1,750.00 | |
| 2000-lb. Air Tugger | | 1,150.00 | |
| 3 - | 45 lb. Jack Hammer | 1,190.00 | |
| | Wilden Diaphragm sump pump | 429.00 | |
| 5 | hp. Blower | 490.00 | |
| | Mucking bucket | 180.00 | $ 5,189.00 |

**Drifting and Crosscutting Equipment to be used 100 Per Cent**

| | | | |
|---|---|---|---|
| 2 | Eimco 12-B Loaders | $3,460.00 | |
| 2 | Jacklegs | 1,000.00 | |
| 3 | Mine cars | 780.00 | |
| 1 | 5 hp. Blower | 375.00 | $5,615.00 |

**Depreciation Schedule**

Sinking $21,644.50
5,189.00
$26,833.50

$\frac{\$26,833.50}{60}$ = $447.23 per mo.

$447.23 X 2.3 $1,028.63

$\frac{\$1,028.63}{236}$ = $4.36

**Depreciation Schedule**

| | |
|---|---|
| Drifting and Crosscutting | $21,644.50 |
| | 5,615.00 |
| | $27,259.50 |

$\frac{\$27,259.50}{60}$ = $454.32 Per Mo.

$454.32 X 6.3 = $2,862.22

$\frac{\$2,862.22}{1300}$ = $2.20 Per Ft.

**Depreciation Schedule**

Well-drill Hole Equipment

| | |
|---|---|
| Joy 12-B Rotary Drill Complete | $6,110.00 |
| Atlas Copco Compressor $7,475 X 25% | 1,868.75 |
| | $7,978.75 |

$\frac{\$7,978.75}{60}$ = $132.98

$132.98 X 1.5 = $199.47

$\frac{\$199.47}{280}$ = $0.72 per Ft.

**Depreciation Schedule**

Long-hole Drilling

| | |
|---|---|
| Gardner-Denver D-89 Drifter with Column and rods | $1,400.00 |

$\frac{\$1,400}{60}$ = $23.20

$23.20 X 3 = $69.60

$\frac{\$69.60}{7000}$ = $0.01 Per Ft.

**Depreciation Schedule**

| | |
|---|---|
| Slab Excavation Equipment | |
| 1 - Jack leg | $ 500.00 |
| 3 Mine cars | 780.00 |
| 1 Kimco Loader 12-B | 1,730.00 |
| | $3,010.00 |

$\frac{\$3,010}{60}$ = $50 X 1/2 = $25

$\frac{\$25.00}{2400}$ = $0.01 Per Cu.Ft.

**Repairs, Assays, and Accounting**

| | | |
|---|---|---|
| Repair - Parts | $1,000.00 | |
| Assaying 600 samples @ $2 | 1,200.00 | |
| Accounting, phone, etc. | | |
| $125/ Mo. X 16 | 2,000.00 | |
| | | $4,200.00 |

The above items were prorated on the basis of labor cost and added to Compensation line.

Compensation insurance and payroll taxes were calculated separately for each item using 27% of labor cost.

## SUMMARY OF TOTAL COST

| | 60 Ft. Rehabilitation | 1300 Ft. Drifting & Crosscutting | | 236 Ft. Shaft Sinking | | 7000 Ft. Long Hole Drilling | | 280 Ft. Well Drill Hole | | 2400 Cu/Ft. Slab Excavation | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Per Ft. | Total | Per Ft. | Total | Per Ft. | Total | Per Ft. | Total | Cu/Ft. | Total | |
| Labor | $1,376.45 | $20.95 | $27,235.00 | $63.23 | $14,922.28 | $0.81 | $5,670.00 | $10.27 | $2,875.60 | $0.54 | $1,296.00 | $ 53,375.33 |
| Material & Supplies | 600.00 | 13.76 | 17,888.00 | 50.86 | 12,002.96 | .06 | 420.00 | .68 | 190.40 | .20 | 480.00 | 31,531.36 |
| Depreciation | - | 2.20 | 2,860.00 | 4.36 | 1,028.96 | .01 | 70.00 | .72 | 201.60 | .01 | 24.00 | 4,184.56 |
| Compensation, Acct'g | 371.64 | 5.66 | 7,358.00 | 17.07 | 4,028.52 | .22 | 1,540.00 | 2.77 | 775.60 | .14 | 336.00 | 14,409.76 |
| and Repairs | 126.00 | 1.65 | 2,142.00 | 4.98 | 1,176.00 | .06 | 462.00 | .75 | 210.00 | .03 | 84.00 | 4,200.00 |
| | 3% | 51% | | 28% | | 11% | | 5% | | 2% | | |
| Total | $2,474.09 | $44.22 | $57,483.00 | $140.50 | $33,158.72 | $1.16 | $8,162.00 | $15.19 | $4,253.20 | $0.92 | $2,220.00 | $107,751.01 |
| Comparison with application | | High | | Low | | High | | High | | | | |

# Annual Report 1961

SONOMA QUICKSILVER MINES, INC.

GUERNEVILLE • CALIFORNIA

## *Officers and Directors*

| | |
|---|---|
| S. R. SMITH | *President and Director* |
| J. E. R. WOOD | *Vice-President and Director* |
| J. W. COOK | *Secretary-Treasurer and Director* |
| E. T. KOFORD | *Director* |
| WALLACE TODD | *Director* |

*The accompanying report and financial statements are respectfully submitted for the general information of the stockholders of SONOMA QUICKSILVER MINES, INC., and are not intended for use in connection with any sale or purchase of, or offer or solicitation of offers to buy or sell, any securities.*

August 15, 1961

To the Shareholders of
Sonoma Quicksilver Mines, Inc.

## *Report of the President*

It will be noted from the financial statements that the quicksilver industry experienced another disappointing year. A consistent decline in the world price structure accompanied by uncontrollable higher costs confronted the company with an uneconomic situation resulting in the suspension of operations at our quicksilver mine until such time as prices return to a level that would justify reopening. At the present time there is greater research activity in mercury than at any other period in its history. It would appear that the metal's future is closely tied to these efforts.

The company's activities in Bolivia have been sharply increased with the recently installed rod mill and crushing plant at the Juliana Tungsten Mine now operating, and with the recent optioning of the Negro Pabellon tin mine near Oruro. Initial investigations at the latter property have disclosed attractive possibilities. A comprehensive examination is currently under way and if original findings are confirmed a complete mining and milling plant will be installed. A promising silver, tin, and lead mine has also been optioned and will be examined in detail later this year. Other tin, silver, and antimony properties are available to us on reasonable terms. Further information concerning these properties is dealt with in more detail by F. H. Frederick, chief company geologist, in another section of this report. The company's legal status in Bolivia has now been fully recognized by the government there. Your management now feels that it can now concentrate its effort in Bolivia, a country that rates as one of the great mining areas of the world. Bolivia has operating advantages and other favorable conditions that could result in the company ultimately building a very substantial enterprise. We are again indebted to R. H. Thielemann, Chairman, Metallurgy Department of Stanford Research Institute and member, Materials Division of the National Aeronautics and Space Agency, for the notes on tin, tungsten, silver and mercury. These metals appear to have a bright future.

It is with great regret that we announce the loss of one of our directors; Mr. H. L. Hotle, a Director for our company since its founding in 1941, passed away in March, 1961. Mr. J. W. Cook, the company's Secretary and Treasurer, was appointed to serve as a Director. Mr. H. R. Whittall of Vancouver, Canada, resigned from the Board in April and Mr. Wallace Todd, a mining engineer residing in California, was appointed as a Director.

On behalf of the Board of Directors,

S. R. SMITH,
President

# *Outlook for Special Metals*

By R. H. Thielemann

It is becoming increasingly clear that as the world's population increases and more nations become industrialized, the demand for all of the commercially important metals will increase sharply. The recent activity on the part of both Germany and Japan to develop sources for the metals they need to supply their rapidly increasing requirements is indicative. It follows that the scramble for the world's important metal deposits can be expected to become increasingly intense in the not too distant future.

In reviewing the requirements for individual metals, it is apparent that the demand for some of them will become more critical than it will for others. In particular, those metals which possess special unique properties that are necessary for certain applications will be the ones that are most sought after. A list of these special property metals would certainly include tungsten, tantalum, tin, silver, mercury, uranium and platinum. Economically attractive deposits of any of these metals will certainly be an important asset to any group that acquires them. Of these metals, tungsten, tin, silver and mercury are of particular interest at this time, and the situation with regard to each is presented herewith.

## Tungsten Outlook

The requirements for materials that will withstand higher and higher temperatures are becoming increasingly severe and tungsten appears to be the only metal or material that will satisfy these requirements. During the last year a great deal of progress has been made in learning how to purify tungsten, consolidate it into ingots, and work it into the desired shapes. The largest and most important immediate application for tungsten is for nozzle liners in solid propellant rocket nozzles. Because it has the highest melting point of all the metals (6170°F) and because it has high strength at temperatures above 3000°F, tungsten is being used for many new applications where structural integrity at extremely high temperatures is necessary.

Significant in the unfolding tungsten picture is the fact that several large companies with excellent research capabilities have entered the tungsten field. New technologies are being developed to produce high purity tungsten metal in important quantities. A great deal of research effort is being directed to the development of tungsten base alloys which will have certain improved properties. There is every reason to expect that the use of tungsten will continue to increase because of the many new requirements that are unfolding.

## Tin Outlook

During the past three years, the world consumption of tin has exceeded world production by 5 to 10 per cent in each year. World consumption of tin rose 11 per cent in 1959 and still exceeded production which rose only 5 per cent. Although the United States accounts for almost 50 per cent of the world's consumption of tin, it mines a negligible quantity (50 long tons in 1959 compared to 77,370 long tons consumed). Because of the increased world demand for tin, supplies in stockpiles are being rapidly depleted and the present high price of $1.17 per pound reflects this situation.

The largest application for tin is for the tinplate that is made for containers. Although plastics, glass and aluminum are competitive container materials in many instances, the use of tin-coated steel is still increasing. The recent development of thinner gage tin-

plate has met enthusiastic approval in the container industry, and as the population increases, the requirements for tinplate for containers will increase accordingly.

Tin has two special properties that make it unique. It has excellent corrosion resistance and bonds readily to most common metals. It is for these reasons that tin is important for tinplate, solders, and as an alloying element in certain alloys where special properties can be imparted. The outlook for tin appears to be extremely attractive.

## *Outlook for Special Metals*

### Silver Outlook

Because of the increased uses for silver in industrial applications, and because of decreasing production, silver is being consumed at a much higher rate than it is being produced. If the sale of silver by the U. S. Treasury continues at the present rate, it is reliably estimated that the supply will be exhausted in less than two years.

The main industrial uses for silver are for photographic film, silverplate, electrical contacts, dental fillings, jewelry and brazing alloys; the requirements for silver are increasing for each. The other important use for silver is coinage. It seems likely indeed, that the present price of 90 cents a troy ounce will have to be increased if the supply of silver is going to keep pace with the demand.

### Outlook for Mercury

Although there have been no new startling developments in the last year which require large amounts of mercury, there are many significant applications in which mercury is being consumed in increasing quantities. One of these is the mercury battery. Another is mercury vapor lighting for industrial plants. The silent mercury toggle switch is still another.

Aside from these, there was the recent announcement of a new high efficiency fuel cell which uses a sodium mercury amalgam as a consumable electrode. The development of compact nuclear power plants to produce electrical power for space exploration devices is continuing. In these power plants, heat is transferred from a nuclear heat source to mercury and mercury vapor is expanded through a turbine which drives an electrical generator.

Because of its unique physical and chemical properties, there is no substitute for mercury in the many important applications which have been, and are being, developed. Since the known resources of mercury are definitely limited, there is every reason to expect that the demand will soon exceed the present world supplies.

## *Balance Sheet, June*

| *Assets* | *June 30* 1961 | 1960 |
|---|---|---|
| CURRENT ASSETS: | | |
| Cash | $ 18,756.72 | $112,542.43 |
| Quicksilver on hand and in transit—substantially at realizable value | 144,254.00 | 125,825.00 |
| Operating materials and supplies—at cost | 27,349.63 | 34,220.67 |
| Prepaid expenses, miscellaneous receivables, etc. | 9,193.99 | 9,824.50 |
| Total current assets | 199,554.34 | 282,412.60 |
| MINE PROPERTY, PLANT, AND EQUIPMENT—At cost (Note 2): | | |
| Mining property | 130,325.60 | 130,325.60 |
| Buildings | 61,005.65 | 60,830.58 |
| Machinery and equipment | 242,504.00 | 240,128.20 |
| Automotive equipment | 13,370.04 | 14,828.04 |
| Total | 447,205.29 | 446,112.42 |
| Less accumulated depletion and depreciation | 369,706.79 | 344,852.96 |
| Mine property, plant, and equipment—net | 77,498.50 | 101,259.46 |
| DEFERRED EXPLORATION COSTS—Net (Note 1) | Nil | 20,942.70 |
| INVESTMENT IN BOLIVIAN VENTURE (Note 3) | 177,649.44 | 34,808.22 |
| TOTAL | $454,702.28 | $439,422.98 |

*The accompanying notes to financial stateme*

*30, 1961 and 1960*

| *Liabilities* | *June 30* 1961 | 1960 |
|---|---|---|
| CURRENT LIABILITIES: | | |
| Notes payable | $ 36,155.80 | |
| Accounts payable | 38,261.14 | $ 20,952.85 |
| Accrued wages | 8,246.50 | 12,569.25 |
| Payroll taxes accrued and withheld | 7,940.93 | 10,421.12 |
| Other accrued liabilities | 2,619.30 | 3,180.05 |
| Total current liabilities | 93,223.67 | 47,123.27 |
| STOCKHOLDERS' EQUITY: | | |
| Capital stock, $.10 par value—authorized, 5,000,000 shares; outstanding, 2,365,000 shares | 236,500.00 | 236,500.00 |
| Paid-in surplus | 440,250.00 | 440,250.00 |
| Deficit | (315,271.39) | (284,450.29) |
| Stockholders' equity—net | 361,478.61 | 392,299.71 |
| TOTAL | $454,702.28 | $439,422.98 |

*are an integral part of this statement.*

# *Statement of Income and Deficit*

FOR THE YEARS ENDED JUNE 30, 1961 AND 1960

| | *Year Ended June 30* | |
|---|---|---|
| | *1961* | *1960* |
| GROSS REVENUE FROM QUICKSILVER PRODUCTION | $666,056.00 | $681,022.50 |
| EXPENSES: | | |
| Mine operations: | | |
| Mining and development | 398,608.83 | 453,517.86 |
| Furnacing and assaying | 98,771.70 | 102,149.34 |
| Depreciation and amortization | 30,170.51 | 29,276.31 |
| General | 87,558.49 | 85,822.16 |
| Total | 615,109.53 | 670,765.67 |
| Marketing | 32,167.12 | 27,614.27 |
| General and administrative | 31,868.43 | 53,164.03 |
| Total expenses | 679,145.08 | 751,543,97 |
| LOSS FROM OPERATIONS | 13,089.08 | 70,521.47 |
| OTHER (INCOME) EXPENSE—Net: | | |
| Sale of stock received from compensation insurance exchange | | (11,199.62) |
| Accident awards paid | 2,025.00 | 3,816.43 |
| Write-off of deferred exploration costs (Note 1) | 15,707.02 | |
| Other (income) expense—net | 17,732.02 | (7,383.19) |
| NET LOSS FOR YEAR | 30,821.10 | 63,138.28 |
| DEFICIT, BEGINNING OF YEAR | 284,450.29 | 221,312.01 |
| DEFICIT, END OF YEAR | $315,271.39 | $284,450.29 |

*The accompanying notes to financial statements are an integral part of this statement.*

# *Notes to Financial Statements*

FOR THE YEAR ENDED JUNE 30, 1961

1. SUSPENSION OF OPERATIONS

The Company plans to suspend operations at its quicksilver mine before the end of August 1961. Because the suspension of operations is for an indefinite period the $15,707.02 unamortized balance of deferred exploration costs at June 30, 1961 has been written off as of that date and has been included in the determination of the net loss for the year then ended.

2. MINE PROPERTY, PLANT, AND EQUIPMENT

Mine property, plant, and equipment and related accumulated depletion and depreciation at June 30, 1961 consisted of the following:

| | Cost | Accumulated Depletion and Depreciation (Cents omitted) | Net |
|---|---|---|---|
| Mining property | $130,326 | $120,770 | $ 9,556 |
| Buildings | 61,005 | 47,378 | 13,627 |
| Machinery and equipment | 242,504 | 189,455 | 53,049 |
| Automotive equipment | 13,370 | 12,103 | 1,267 |
| Total | $447,205 | $369,706 | $77,499 |

Mining property comprises approximately 440 acres owned in fee.

3. BOLIVIAN VENTURE

The Company has entered into an agreement under which it is to provide 76 per cent of the capital required by and is to receive 76 per cent of the profits of a venture for the operation of a tungsten mine and concentrating mill in Bolivia. To June 30, 1961 the Company had disbursed $177,649.44 in connection with this venture, representing, for the most part, advances and payments for costs and expenses of the venture. The Company had received no income from this venture to June 30, 1961.

4. FEDERAL INCOME TAXES

At June 30, 1961 the Company had an operating loss carry-forward of approximately $329,000, which under presently applicable provisions of the Internal Revenue Code may be carried forward ($265,000 for one year, $1,000 for four years, and $63,000 for five years) as a reduction of future taxable income, if any. In addition, development costs in the net amount of $52,000 which have been charged against income in the Company's accounts in prior years are deductible for tax purposes on the basis of future ore production.

The Company's Federal income tax returns have been examined by the Internal Revenue Service through the year ended June 30, 1953.

# *Accountants' Opinion*

HASKINS & SELLS
CERTIFIED PUBLIC ACCOUNTANTS

120 MONTGOMERY STREET
SAN FRANCISCO 4

Sonoma Quicksilver Mines, Inc.:

We have examined the balance sheet of Sonoma Quicksilver Mines, Inc. as of June 30, 1961 and the related statement of income and deficit for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and statement of income and deficit present fairly the financial position of the Company at June 30, 1961 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

HASKINS & SELLS

July 21, 1961

Guerneville, California
August 11, 1961

S. R. Smith, President
Sonoma Quicksilver Mines, Inc.
Guerneville, California

Dear Sir:

The following is my report on operations at the Sonoma Quicksilver Mine for the fiscal year ending June 30, 1961.

# *Resident Manager's Report*

## Production

The rotary furnace plant treated 40,478 tons of ore, from which 3,358 flasks were recovered. This is an average recovery of 6.3 pounds of quicksilver per ton. The average price received was $198.35 per flask as compared with $211.04 the previous year.

Operating costs per ton treated were down to $12.53 per ton the last six months of the fiscal year and $14.12 per ton for the entire fiscal year as against $16.21 per ton the previous fiscal year. The production cost per flask was lowered about $10.00 which was not sufficient to offset the average drop in our sales price for the year. At this writing the price is lower; the sales value of quicksilver at the mine is currently $170.00 per flask as compared to the average sales prices of $188.77 for the fiscal year ending June 30, 1961, and to $202.48 for the previous year. The following tabulation shows our average selling price for quicksilver delivered to New York, our net selling price or value at the mine, and our production cost per flask for the two past fiscal years.

| | | Per Flask | | | |
|---|---|---|---|---|---|
| | No. Flasks Produced | Our Avg. Selling Price N. Y. | Our Avg. Marketing Cost | Net Sales Value at our Mine | Our Avg. Production Cost |
| Fiscal 1960 . . . | 3,227 | $211.04 | $ 8.56 | $202.48 | $181.20 |
| Fiscal 1961 . . . | 3,358 | 198.35 | 9.58 | 188.77 | 171.21 |
| At June 30, 1961 . . | | 192.00 | 10.00 | 182.00 | |
| At August 10, 1961 . . | | 180.00 | 10.00 | 170.00 | |

Following is a tabulation of ore production by levels for the past two years:

| | 1960 | | 1961 | |
|---|---|---|---|---|
| | Tons | Assay Content Lbs. Hg/Ton | Tons | Assay Content Lbs. Hg/Ton |
| 690 level . . . . . | 311 | 13.6 | — | — |
| 775 level . . . . . | 439 | 14.9 | 829 | 6.8 |
| 875 level . . . . . | 1,897 | 17.0 | 2,462 | 5.5 |
| 975 level . . . . . | 418 | 24.9 | 2,813 | 6.8 |
| 1086 level . . . . . | 28,813 | 7.0 | 7,109 | 6.7 |
| 1200 level . . . . . | 4,165 | 5.5 | 27,265 | 7.7 |
| Mine Total and Averages . . | 36,043 | 7.7 | 40,478 | 7.3 |
| Recovered from plant . . . | 36,043 | 6.8 | 40,478 | 6.3 |

## Furnace Plant

Average tonnage treated in the furnace per twenty-four hour day for the full year was 111 tons as compared to 98 tons the previous year. The longest shutdown was two

days for partial rebricking of the furnace; total running time was 98.4% of the total time for the year.

### Mine Development and Operation

No major changes in equipment or methods were made in the mine after August, 1960, when the hoisting of all ore and waste through the main shaft from 1200 Level was commenced and hoisting through the 1086 winze was stopped. Mining is still done by a combination of shrinkage stoping, and open stopes with pillars of waste. Much use is made of slusher scraping.

*Resident Manager's Report*

A new labor contract was in effect, with higher wages. Duty per man was increased in enough cases to offset the increase in wages. The new skip and 60 Level pocket arrangement installed in the previous fiscal year has made it possible to deliver more tonnage with only two men per twenty-four hours doing the top-tramming, crushing and grizzly work; previously four men were required for the same work. The planned pocket on 1200 Level was not installed because of soft faulted ground conditions at the 1200 station and in the shaft below the 1200 Level.

Late in the fiscal year we opened up ore in 1203-A area at the north central part of the 1200 Level and in No. 13 area on 1086 Level. These areas are in the same vertical zone as an area mined on 975 Level north of the central part of our main workings. The ore is silica-carbonate rock of moderate grade near a sandstone contact. These areas on the 1086 and 1200 Levels were recently found with percussion longhole drilling. At the present price of mercury these ore bodies can yield only a small profit or break even.

During the last few months we increased our footage of diamond drilling per month. Downward extent of the main ore bodies was indicated below the 1200 Level where 2,916 feet of diamond drilling was done in 24 down-holes from that level. The usual high-grade sandstone breccia ore and lower-grade silica-carbonate ore were found in many of the holes drilled.

The following is a summary of the development work done during the fiscal year.

SHAFT SINKING: In August last year the shaft work was stopped at 54 feet below 1200 Level floor. Total shaft deepening was 23 feet for the fiscal year.

LATERAL WORK: A total of 936 feet of drifting and cross-cutting was done during the year, entirely on the 1200 Level.

RAISING: Footage advance in main raises totaled 165 feet in two raises, both from the 1200 Level.

STOPE RAISES AND STOPE LATERALS: In addition to the main raises and lateral work at the main levels many hundreds of feet of workings were driven from stopes, raises, and main levels in the preparation, following, and mining of the ore bodies between levels.

DIAMOND DRILLING: A total of 7,662 feet of core drilling was done in 70 holes varying in length from 26 to 272 feet. Several hundred feet were drilled at the 500 Level and 775 Level, and 24 holes totaling 2,916 feet were drilled downward from the 1200 Level into the next 125-foot block below the 1200 floor. The balance of the core drilling was done in the blocks between the 975 Level and the 1200 Level.

LONGHOLING: About 15,000 feet of longhole percussion drilling with sectional steel were drilled looking for and outlining ore bodies. Holes up to 180 feet long were drilled by this method.

Respectfully submitted,

GEORGE F. REED
Resident Manager

August 12, 1961

S. R. Smith, President
Sonoma Quicksilver Mines, Inc.
Guerneville, California

Dear Sir:

The following is a brief report on the exploration, development, and production at the company's quicksilver mine in California and at the tungsten mine in Bolivia during the past year, and on the work planned at the tin, tungsten, and silver mines under lease and option in Bolivia.

*Report of Consulting Geologist*

## Sonoma Quicksilver Mine, Guerneville, California

A considerable amount of diamond drill core drilling was done from the 1200 Level to determine the ore grade and pattern below the 1200 Level. Substantial blocks of usual grade ore were found in silica-carbonate rock and in the adjoining sediments. Drilling from the 975 Level in 1956 showed 40 feet of vertical extent of ore averaging 12 pounds of quicksilver per ton at 394 to 434 feet below the 975 Level, or at 143 to 183 feet below the now existing 1200 Level. Recent downhole drilling has been limited to exploring and proving only the next 125 feet below the present bottom level. The core drill program recently completed to 125 feet below the 1200 Level proves the existence of a block 250 feet long (east and west), 70 feet wide (north and south) and 125 feet deep containing the main ore bodies which are expected to yield ore of the same grade, character, and quantity produced or developed in the block between the 1086 Level and the 1200 Level. The drilling also proves the existence of the usual surrounding or "fringe area" ore bodies outside the main block. Of a total of 24 holes drilled in the last 12 months in the block below the 1200 Level, 21 holes showed ore grade sections. Assay averages of continuous lengths from each of several of the downholes are as follows:

| Hole No. | Inclination of Hole | Depth in Hole, Feet | Assay Average, Lbs. Hg/Ton |
|---|---|---|---|
| 651 | –35° | 15 to 65 | 6.3 |
| 652 | –35° | 10 to 50 | 6.5 |
| 653 | –35° | 10 to 50 | 9.0 |
| 654 | –45° | 10 to 75 | 8.5 |
| 655 | –66° | 15 to 45 | 11.5 |
| 666 | –45° | 0 to 45 | 46.9 |
| 673 | –30° | 35 to 55 | 21.4 |

Total production from the block between the 975 and 1086 Levels to date is 53,000 tons containing 7.8 pounds Hg per ton. Total production from the block between the 1086 and 1200 Levels, to date, is 37,000 tons containing 7.2 pounds Hg per ton. Recent longhole percussion drilling and core drilling at the several lower levels show that some blocks of ore remain to be mined from above the 1086, and between the 1086 and 1200 Levels.

Based on the production and development data it appears each new level of 125 feet vertical extent should yield between 50,000 and 60,000 tons of commercial ore when the quicksilver price is near the average of the past six years. Evidence in the mine to date indicates a slight decrease in tonnage possibilities for each level as more depth is attained. There has been no abrupt change, and none is expected. Exploration has not

been completed at the 1086 and 1200 Levels and considerable additional tonnage of usual grade ore is expected at those levels. The deepest exploration in the ore section of the main host rock at 183 feet below the 1200 Level has disclosed excellent ore; no effort has been made to explore below that depth. Ore undoubtedly extends deeper, the quantity available for profit depends very much on the market price of the product.

The accompanying longitudinal projection map of the whole mine shows the work done during the fiscal year, the general position of the stoping, and an indication of the ore trend in depth.

*Report of Consulting Geologist*

### Investigation, Mine Development and Operations in Bolivia, South America

The Juliana tungsten mine near Oruro, Bolivia, under examination, development and preparation since November 1959 started limited production from exploration and development work at the mine in January 1961 while the treatment plant was being improved. The old treatment plant has been improved so that the plant will soon be able to treat 80 to 100 tons per day. Improvements to the mill include addition of a more efficient crushing plant, a rod mill, vibrating screens, jigs, and flotation cells. The old plant included a small ball mill, concentrating tables, and some diesel-electric generators. Additional diesel-electric power has been added for the mine and mill. Compressors and modern drilling equipment have been added to the mine equipment. In the mine the incline shaft has been deepened 60 feet and a new level established at 100 feet below the old deepest main level. Stoping has commenced from that new level, and additional lateral and depth development is in progress. The accompanying vertical longitudinal projection map of the Juliana Mine shows the new work in relation to the old stopes and the ore trends.

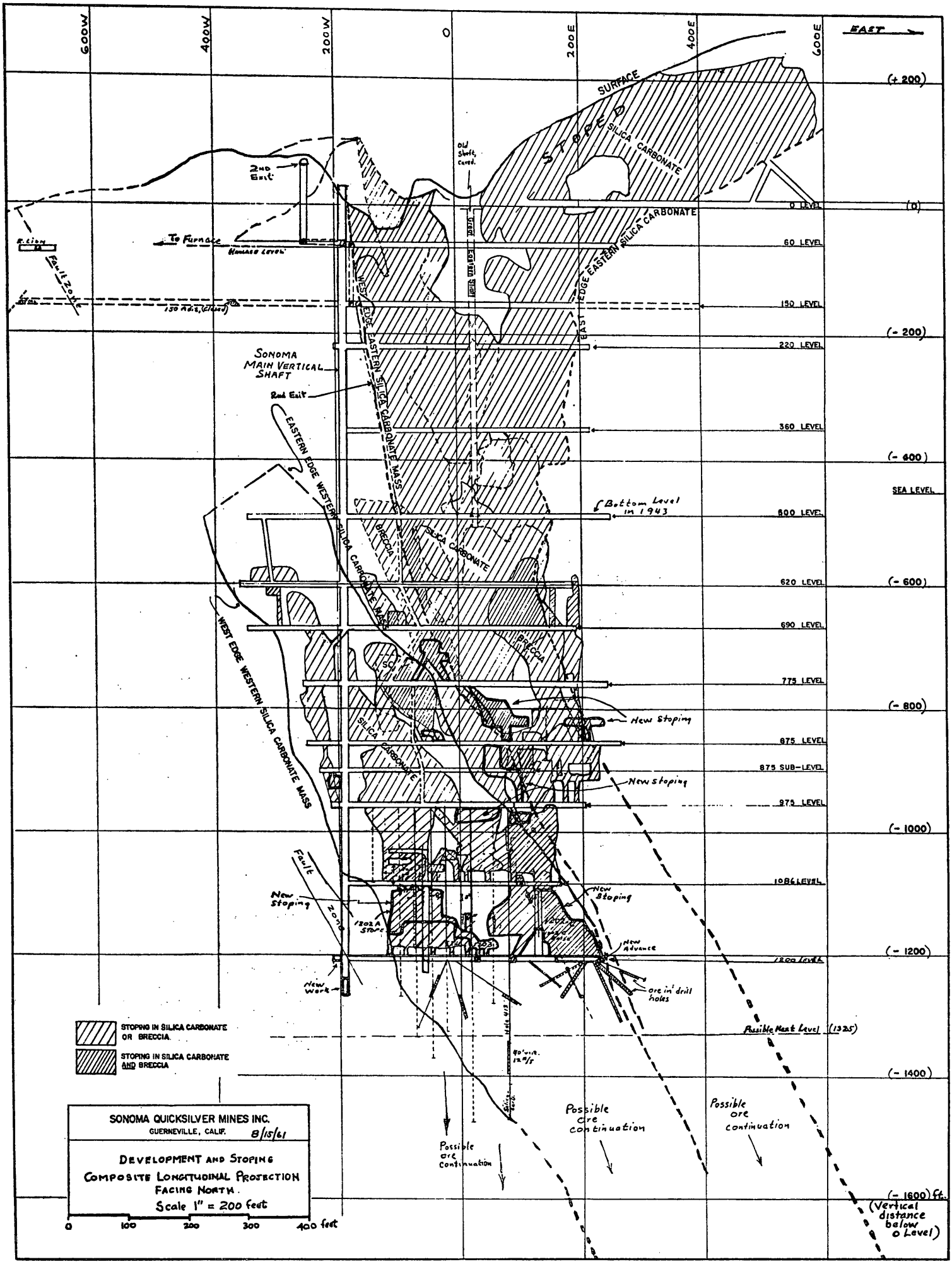
To date the new mine development has proved several hundred feet of length of high-grade tungsten ore, varying in width from 3 to 10 feet, and in content from 2 to 12 per cent tungsten trioxide. Average ore grade of the newly mined ore is expected to be between 3 and 5 per cent. A considerable tonnage of old stope fill and pillars is expected to average between 1 and 2 per cent $WO_3$. The mine is capable of delivering 50 tons per day of newly mined ore. One year of production of new ore has already been proved and it is anticipated that the mine can operate at that pace for several years. In addition to the newly mined ore the old stope fills, pillars, old mill tailings, and old mine dumps can yield lower grade but profitable ore for several years. The mill is designed to treat 80 to 100 tons daily, so that newly mined high-grade and supplemental low-grade can be treated together at a satisfactory rate. Due to the very low operating costs and favorable tax conditions in Bolivia a rather large margin of profit is possible at the current tungsten price.

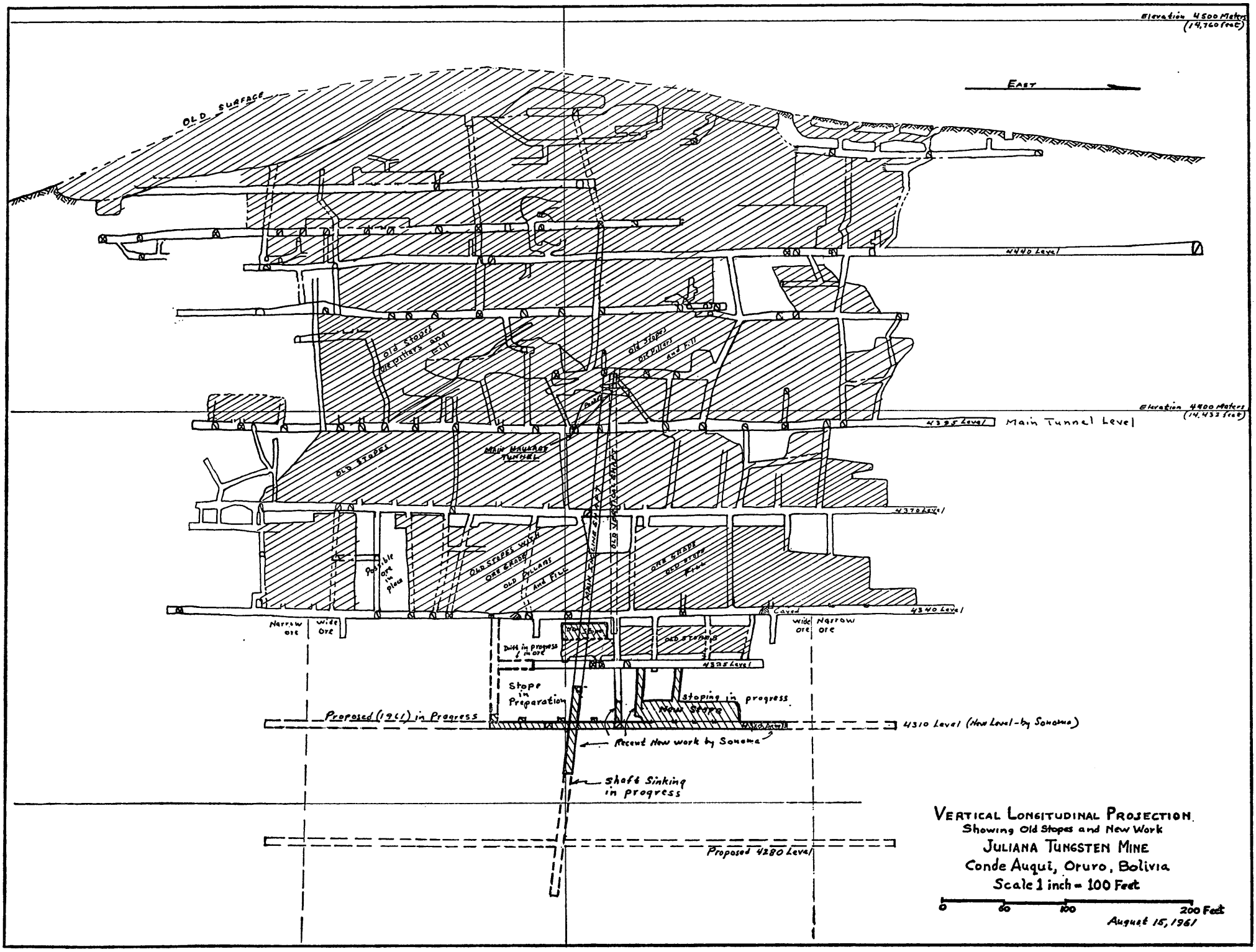
The Negro Pabellon tin mine, also near Oruro and recently optioned by Sonoma, is being surveyed and sampled. Sonoma has an 80 per cent interest in the lease and option. Preliminary studies indicate the mine to be similar to the Juliana Mine in potential yield, high margin of profit, and with possibly less investment requirements. There are several veins, at least six, that have not been mined below a tunnel level. A shaft about 250 feet deep has partially developed some of the veins. The lease-option terms are such that the expected monthly returns from the Juliana Mine operations could easily carry the Negro Pabellon mine and mill costs until it goes into profitable production on 2 per cent or better tin ore at 75 or 100 tons per day.

The Vila-Cota silver, tin, lead, zinc mine, also not far from Oruro and recently acquired under a lease and option arrangement, has not been studied in detail. The mine contains narrow high-grade silver and tin veins considered capable of a very high margin of profit on a low daily tonnage. A detailed examination will be made of this mine in the next several months.

Respectfully submitted,

FRANCIS H. FREDERICK


600W
400W
200W
0
200E
400E
600E
EAST
(+200)
(0)
(-200)
(-400)
SEA LEVEL
(-600)
(-800)
(-1000)
(-1200)
(-1400)
(-1600) ft.
(Vertical distance below 0 Level)
SURFACE
STOPED
SILICA CARBONATE
0 LEVEL
60 LEVEL
150 LEVEL
220 LEVEL
360 LEVEL
800 LEVEL
620 LEVEL
690 LEVEL
775 LEVEL
875 LEVEL
875 SUB-LEVEL
975 LEVEL
1086 LEVEL
1200 LEVEL
2nd Exit
To Furnace
Humboldt Level
Old Shaft, caved.
Fault Zone
SONOMA MAIN VERTICAL SHAFT
2nd Exit
EASTERN EDGE WESTERN SILICA CARBONATE MASS
WEST EDGE EASTERN SILICA CARBONATE MASS
EAST EDGE EASTERN SILICA CARBONATE
BRECCIA
Bottom Level in 1943
New Stoping
New stoping
Fault Zone
New Stoping
New Stoping
New Advance
New Work
ore in drill holes
Possible Next Level (1325)
Possible ore continuation
Possible ore continuation
Possible ore continuation
STOPING IN SILICA CARBONATE OR BRECCIA
STOPING IN SILICA CARBONATE AND BRECCIA
SONOMA QUICKSILVER MINES INC.
GUERNEVILLE, CALIF. 8/15/61
DEVELOPMENT AND STOPING
COMPOSITE LONGITUDINAL PROJECTION
FACING NORTH.
Scale 1" = 200 feet
0
100
200
300
400 feet




VERTICAL LONGITUDINAL PROJECTION
Showing Old Stopes and New Work
JULIANA TUNGSTEN MINE
Conde Auqui, Oruro, Bolivia
Scale 1 inch = 100 Feet

August 15, 1961

# SONOMA QUICKSILVER MINES, INC.

## ANNUAL REPORT

for the year ended

June 30, 1962

San Francisco, California

# *SONOMA QUICKSILVER MINES, INC.*

FOR THE PERIOD ENDING JUNE 30, 1962

| | |
|---|---|
| Authorized Capital | 5,000,000 shares |
| Issued | 2,365,000 shares |
| Unissued | 2,635,000 shares |

## *Officers and Directors*

### *Directors*

| | |
|---|---|
| J. W. COOK | *Occidental, California* |
| M. S. JACOBUS | *San Francisco, California* |
| E. T. KOFORD | *Santa Rosa, California* |
| WALLACE TODD, M. E. | *Reno, Nevada* |
| J. E. R. WOOD, P. Eng. | *Vancouver, B. C.* |

### *Officers*

| | |
|---|---|
| J. E. R. WOOD, P. Eng. | *President* |
| WALLACE TODD, M. E. | *Vice President* |
| J. W. COOK | *Secretary-Treasurer* |

### *General Manager, Juliana Operations*

| | |
|---|---|
| RALPH M. CONRAD, M. E. | *Oruro, Bolivia* |

### *Consulting Engineers*

| | |
|---|---|
| GEORGE F. REED, M. E. | *Occidental, California* |
| WALTER F. MECKEL, M. E. | *Lima, Peru* |

### *Transfer Agent*

| | |
|---|---|
| CROCKER-ANGLO NATIONAL BANK | *San Francisco, California* |

### *Registrar*

| | |
|---|---|
| WELLS FARGO BANK | *San Francisco, California* |

SAN FRANCISCO OFFICE
260 CALIFORNIA STREET

BOLIVIAN OFFICE
CASILLA 442, ORURO

*The accompanying report and financial statements are respectfully submitted for the general information of the stockholders of SONOMA QUICKSILVER MINES, INC., and are not intended for use in connection with any sale or purchase of, or offer or solicitation of offers to buy or sell, any securities.*

Vancouver, B. C.
August 22, 1962

To the Shareholders of
Sonoma Quicksilver Mines, Inc.

Your directors and I have pleasure in presenting the Annual Report for the year to June 30, 1962, together with the Profit and Loss Account and the Balance Sheet.

This past year has been one of low and declining prices for the two metals your company is primarily interested in, mercury and tungsten.

*Report of the President*

Your Guerneville mercury mine was leased to Truitt & Associates September 13, 1961 on a royalty basis varying from 12½% to 15% of the gross production plus certain rental charges. Your company received $26,791.09 under this agreement during the period under review. Report by Mr. George Reed, Consulting Engineer, covers this operation.

Your Bolivian operations are ably described in the report of Mr. Ralph M. Conrad, General Manager of the Juliana operation in which your company holds a 76% interest. Our minority partners are Mr. Joseph L. George of Palo Alto, his Bolivian company, Empresa Minera Porco Limitada, and Mr. Francis H. Frederick of San Francisco. Here production has increased steadily, averaging 13.213 Fine Long Tons of Concentrate monthly December through June. You will note that the quality of ore down to the deepest workings is high grade with favorable geological and structural conditions for continuing reserves. Unfortunately the price of tungsten has fallen off from $14.45 in July, 1961 to a quoted price of $7.35 per long ton unit, although a recent sale was made for your Company at $10.00 per long ton unit.

On March 19, 1962 an advantageous Agency Agreement was entered into with the W. R. Grace & Co. whereby they will sell our production on a fee basis.

Your General Manager's Report sets out the serious impact of these low tungsten prices, presently lower than before the Korean War, but costs are being lowered and it is anticipated a modest profit can be won with a small increase in the current market price.

Any forecast of the tungsten market is chancey as it is so highly vulnerable due to indiscriminate offerings from China and to a lesser degree from Russia. There is reason for cautious hope that the price will not be permitted to go lower and may improve as very few mines in the Western World can operate at these levels.

As is probably known to most of our stockholders, the United States Government has provided for indemnity of certain investments made by American business, in certain acceptable foreign countries. When our company considered a Bolivian investment, we were assured that our investment would qualify and would be insured by the United States Government against expropriation. Your representatives filed the necessary forms, including a certificate of acceptability furnished by the Bolivian authorities. A phone call to a Guaranty officer handling our case in the Agency for International Development on November 16, 1961 indicated that all necessary information was now in their hands and they were able to draft the Guaranty Certificate. Since that time repeated phone

calls and at least four personal visits in Washington by your directors as well as other visits by our legal representative in Washington, have not been able to secure the necessary Guaranty by our government. Each time we have been asked for further information and were assured that this would be all that is required and that the Guaranty Certificate would be forthcoming. This pattern has been followed even up to this current week and at this writing we are still furnishing information. We hope that by the time of the annual meeting September 10th, we will have a more favorable report.

As a matter of interest, your company is owned by 1,500 shareholders domiciled in 36 states of the United States of America and 4 provinces of the Dominion of Canada, Great Britain and Mexico.

Your directors consider it essential that other mining interests be acquired in metals currently profitable. Not only are your staff in Bolivia examining opportunities there, but through your directors opportunities of merit in the United States and Canada are being investigated at negligible cost to your company.

On June 6, 1962 the surface rights on 356.80 surplus acres were sold to the Dwight B. Heard Investment Company for $35,680. Present and future surface requirements were amply protected by retaining 61.5 acres surrounding the Guerneville Mine and Mill Plant.

Since December 31, 1961 there has been a moratorium on all your directors' and officers' salaries and remuneration with the one exception of your Secretary, Mr. J. W. Cook, who effective July is on a small salary. We are indebted to your Vice President, Mr. Wallace Todd, for his indefatigable effort on behalf of your company. He has made two trips to Bolivia to further the company's interest, the first from February 14 to March 6, 1962 entirely at his own expense, and the second from July 22 to August 19, 1962.

At the Annual Meeting you will be asked to approve a change of name to Sonoma International, Inc. to more properly reflect the company activity.

It is with considerable regret that we record the resignation of your Chairman of the Board, Mr. S. R. Smith, due to health reasons, but his interest in company affairs continues and his guidance and counsel are generously available to your Board.

It is with deep regret that we record the passing last June of Mr. Graydon Weaver. For fifteen years he was the Guerneville Mine Boss.

The employees at the Juliana operation have our thanks for a well done job under difficult conditions. We also record our appreciation for the co-operation and efforts of our Juliana partners, Messrs J. L. George and Francis H. Frederick.

On behalf of the Board of Directors,
J. E. R. WOOD,
President

*Consulting Engineer's Report*

J. E. R. Wood, President
Sonoma Quicksilver Mines, Inc.
San Francisco, California

Guerneville, California
August 17, 1962

Dear Sir:

The following is my summary report on operations at the Mt. Jackson Mine, Guerneville, for the fiscal year ending June 30, 1962, together with a short statement on ore reserves.

## General

Due to low metal prices, mining and furnacing of ore by the company were terminated late in August, 1961. Cleanup of furnace mud continued for a few days in September. September 13, 1961, Truitt & Associates started to reopen the mine under a leasing arrangement where the company receives a minimum rental for plant and equipment plus a royalty on metal produced.

### Summary of Production
### Company Operation

| | | | |
|---|---|---|---|
| July . . . . | 3,309 tons | 4.60# per ton recovered | 208 Flasks |
| August . . . . | 2,724 tons | 5.61# per ton recovered | 201 Flasks |
| September . . . | 374 tons | 9.75# per ton (cleanup) | 48 Flasks |

### Lessee Operation

| | | | |
|---|---|---|---|
| October through June, 1962 Total . . . | 19,017 tons | 3.86# per ton recovered | 966 Flasks |
| Year . . . . . | 25,550 tons | 4.23# per ton recovered | 1,423 Flasks |

By levels the year's production was:

| | | | |
|---|---|---|---|
| 60 level . . . | 1,203 tons | 875 level . . . | 596 tons |
| 500 level . . . | 1,212 tons | 975 level . . . | 4,762 tons |
| 620 level . . . | 1,219 tons | 1086 level . . . | 2,623 tons |
| 775 level . . . | 54 tons | 1200 level . . . | 13,881 tons |
| | | Total . . . . | 25,550 tons |

## Ore Reserves

To June 30, 1962, the combined tonnage produced from the floor of the 1200 level upward for 250 feet to the 975 level floor is 98,924 tons. Mining has continued since June 30th, so we can say the two levels, 1086 and 1200, have produced an average of 50,000 tons per level with an average content of approximately 7.3# of mercury per ton. This is equal to or a little better than the average grade of ore produced by the whole mine since 1941. A fairly intensive program of diamond drilling below the 1200 floor was done during the fiscal year ending June 30, 1961. This confirmed, as well as can be expected in this type of ore, the downward extension of the ore zones. The deepest hole in which we have ore is over 200 feet vertically below the 1200 level, so it seems reasonable to expect that the next 250 feet below us holds another 100,000 tons of average or better grade ore. The above mentioned hole, number 413, shows 40 feet of vertical depth which averages 12 pounds of mercury per ton.

Respectfully submitted,

GEORGE F. REED,
Consulting Engineer

# SONOMA QUICKSI

## *Balance Sheet, June*

| *Assets* | *June 30* 1962 | 1961 |
|---|---|---|
| CURRENT ASSETS: | | |
| Cash | $ 8,283.26 | $ 18,756.72 |
| Quicksilver on hand and in transit | — | 144,254.00 |
| Accounts receivable | 21,302.26 | — |
| Operating materials and supplies—at cost | 19,866.02 | 27,349.63 |
| Prepaid expenses, etc. | 1,766.40 | 9,193.99 |
| Total current assets | 51,217.94 | 199,554.34 |
| MINE PROPERTY, PLANT, AND EQUIPMENT—At cost | | |
| Mining property | 125,250.00 | 130,325.60 |
| Buildings | 61,005.65 | 61,005.65 |
| Machinery and equipment | 242,479.00 | 242,504.00 |
| Automotive equipment | 9,510.72 | 13,370.04 |
| Total | 438,245.37 | 447,205.29 |
| Less accumulated depletion and depreciation | 382,286.42 | 369,706.79 |
| Mine property, plant, and equipment—net | 55,958.95 | 77,498.50 |
| INVESTMENT IN BOLIVIAN VENTURE | 271,391.09 | 177,649.44 |
| TOTAL | $378,567.98 | $454,702.28 |

# ILVER MINES, INC.

## e 30, 1962 and 1961

| *Liabilities* | *June 30* 1962 | 1961 |
|---|---|---|
| CURRENT LIABILITIES: | | |
| Notes payable | | $ 36,155.80 |
| Accounts payable | $ 1,416.00 | 38,261.14 |
| Accrued wages | | 8,246.50 |
| Payroll taxes accrued and withheld | | 7,940.93 |
| Other accrued liabilities | 20.00 | 2,619.30 |
| Total current liabilities | 1,436.00 | 93,223.67 |
| STOCKHOLDERS' EQUITY: | | |
| Capital stock, $.10 par value—authorized 5,000,000 shares; outstanding, 2,365,000 shares | 236,500.00 | 236,500.00 |
| Paid-in surplus | 440,250.00 | 440,250.00 |
| Deficit | (299,618.02) | (315,271.39) |
| Stockholders' equity—net | 377,131.98 | 361,478.61 |
| TOTAL | $378,567.98 | $454,702.28 |

# SONOMA QUICKSILVER MINES, INC.

## *Statement of Income and Deficit*

FOR THE YEARS ENDED JUNE 30, 1962 AND 1961

| | *Year Ended June 30* | |
|---|---|---|
| | *1962* | *1961* |
| GROSS REVENUE FROM QUICKSILVER PRODUCTION | $ 81,213.00 | $666,056.00 |
| Lease operations: Royalties | 22,041.09 | |
| Rentals | 4,750.00 | |
| | 108,004.09 | 666,056.00 |
| EXPENSES: | | |
| Mine operations: | | |
| Mining and development | 37,059.04 | 398,608.83 |
| Furnacing and assaying | 13,176.43 | 98,771.70 |
| Depreciation and amortization | 15,613.95 | 30,170.51 |
| General | 31,286.81 | 87,558.49 |
| Total | 97,136.23 | 615,109.53 |
| Marketing | 6,974.85 | 32,167.12 |
| General and administrative | 23,200.65 | 31,868.43 |
| Total expenses | 127,311.73 | 679,145.08 |
| LOSS FROM OPERATIONS | 19,307.64 | 13,089.08 |
| OTHER (INCOME) EXPENSE—Net: | | |
| Accident awards paid | | 2,025.00 |
| Write-off of deferred exploration costs | | 15,707.02 |
| Income from sale of acreage | 34,961.01 | |
| NET INCOME (LOSS) FOR YEAR | Inc. 15,653.37 | Loss 30,821.10 |
| DEFICIT, BEGINNING OF YEAR | 315,271.39 | 284,450.29 |
| DEFICIT, END OF YEAR | $299,618.02 | $315,271.39 |

Oruro, Bolivia
August 8, 1962

J. E. R. Wood, President
Sonoma Quicksilver Mines, Inc.
San Francisco, California

Dear Sir:

The following is a report on operations of Sonoma Quicksilver Mines, Inc., in Bolivia for the fiscal year ending June 30, 1962.

*Report of Resident Manager in Bolivia*

## Production

Production from the Juliana Mine, at Oruro, Bolivia, for the 1962 fiscal year was as follows:

| Month | Tons Milled | % $WO_3$ Heads | Fine Long Tons Concentrate | $ Value per FLT | $ Value Rec'd | Value Anticipated at June/61 Price | Diff. $ |
|---|---|---|---|---|---|---|---|
| July . . . | 352 | 2.50 | 4.565 | 1,445.42 | 6,598.34 | 6,598.34 | — |
| August . . | 529 | 2.80 | 6.435 | 1,445.42 | 9,301.28 | 9,301.28 | — |
| September . | 506 | 2.60 | 5.760 | 1,289.83 | 7,429.42 | 8,325.62 | 896.20 |
| October . . | 879 | 2.20 | 7.690 | 1,402.65 | 10,786.38 | 11,115.28 | 328.90 |
| November . | 481 | 3.20 | 8.600 | 1,075.97 | 9,253.34 | 12,430.61 | 3,177.27 |
| December . | 736 | 3.27 | 13.290 | 965.99 | 12,838.01 | 19,109.63 | 6,271.62 |
| January . . | 778 | 2.85 | 10.830 | 1,198.75 | 12,994.65 | 15,543.90 | 2,549.25 |
| February . | 670 | 3.02 | 12.620 | 1,186.03 | 14,974.93 | 18,131.20 | 3,156.27 |
| March . . | 638 | 3.08 | 10.200 | 988.05 | 10,078.11 | 14,634.29 | 4,556.18 |
| April . . . | 616 | 3.02 | 13.970 | 852.78 | 11,913.34 | 20,083.52 | 8,170.18 |
| May . . . | 760 | 3.37 | 17.518 | 981.23 | 17,189.19 | 25,211.87 | 8,022.68 |
| June . . . | 700 | 3.22 | 14.061 | 852.78 | 11,990.94 | 20,215.05 | 8,214.11 |
| | | (Aver.) | | | | | |
| TOTAL . . | 7,645 | 2.90 | 125.539 | | 145,347.93 | 180,700.59 | 35,352.66 |

It will be noted from the above table that production has been increasing steadily, the dip in June being due to shutdowns for repairs to the rod mill.

Income has suffered from falling tungsten prices. Had the price of July, 1961 of $14.45 per long ton unit been maintained throughout the fiscal year the Juliana mine would have created a gross income of $180,700.00 and an operating profit of the order of $24,622.00. As of June 15, 1960, when our Consulting Engineer submitted the report upon which decision was based to proceed, a quotation of $21.50 per long ton unit was received from an international metal buyer. Report calculations were based on $19.04 per long ton unit. At this price the gross income would have been $239,009.00 and the operating profit $82,931.00.

Based on our average production achieved December through June of 13.213 Fine Long Tons of concentrate, the monthly gross income and operating profit would have been $19,092.78 and $4,939.00 at the July, 1961 price of $14.45 per long ton unit and $25,157.55 and $11,040.00 at $19.04 per long ton unit.

Current tungsten prices and markets are extremely poor, but following normal trends improving market conditions can be anticipated in the near future, with resulting profits to the company.

To avoid depending on one metal, steps are being taken to diversify operations. We are currently producing antimony ores from the Quillacas property adjoining the Juliana mine and studies of other properties are continuing. Present rates of tungsten production could be improved, but selling at current prices deplete our reserves without allowing a reasonable profit, hence, efforts will continue to gain income from sources other than the Juliana mine.

### Mine Development and Operations

The Juliana Mine at present has 105 persons on the payroll, forty-seven being in the mine, thirty-two in the mill, and the others being supervisory employees and surface crew. Present tonnages being mined and milled are below milling capacities, but steps are being taken to improve hoisting facilities so that production can be increased when market conditions justify this increase.

Drifts to the west on the 4325 and 4310 levels continue in ore and stope preparations are being made at these points. A winze from the 4310 level continues in ore to a depth of forty-five feet with 5% $WO_3$ values on a four-foot width. This winze will be continued to several levels to assure Juliana of sufficient reserves. A split vein is also being developed on the 4325 level to the west and, though erratic, exceptionally high values, to 20% $WO_3$, have been encountered over three-foot widths. A broken ore reserve of 1,600 tons, averaging 3.0% $WO_3$, is on hand in shrinkage stopes, while present stoping and development ore is in excess of hoisting capacities, hence our broken ore reserves are increasing. In addition to the above old stope fills running to 2% $WO_3$ have been proven which can be pulled when tungsten prices improve.

A lease was taken on the Quillacas property adjoining the Juliana mine in May, 1962. The 385 acres include wolframite veins, wolframite placers, and antimony veins. The wolframite is not of immediate interest because of depressed tungsten prices, but some 85,000 cubic yards of placers carrying 1.9 lbs. per cubic meter were blocked out. This can be a very profitable operation in the future. The antimony veins are of immediate interest and some 8.5 tons of 63% antimony have been produced and sacked during the period of investigation. This ore is presently selling for $250.00 per long ton. Until reserves are proven we will continue to work with contractors on a split check basis. This will give the company an assured small profit without risking capital or equipment until such time that a larger operation is feasible.

The La Bomba mine, under lease, one mile north of Juliana may be worked for fluorspar and scheelite in the near future. A verbal agreement has been made to ship fluorspar to Oruro at a favorable price, which would also serve to up-grade the tungsten values. This will also be a small hand operation, but may serve to open up new markets.

Sonoma Quicksilver Mines, Inc. has also obtained an option on a large undeveloped tin area, Malmisa, between Oruro and Potosi. Preliminary investigations have been favorable and a major American company is interested in a joint venture. Past hand operations have proven two major veins, plus many small high-grade areas. The potentials of the area are attractive. Additional studies are planned in the near future.

Other mining properties are constantly being offered to the company. The merits of each is considered, and visits made when time allows. Bolivia is highly mineralized and relatively unexploited, hence the possibility of obtaining good mining properties are far better than in most areas. By careful selection it should be possible for the company to obtain control of additional properties for either operation, sale or joint ventures.

## Local Conditions

The company's present relationship with the union and personnel is extremely good. Increased contract work and bonuses have given greater average income, but costs per ton have decreased. The school run by the company has been improved, movies brought to the camp, athletics promoted, and a few agitators dismissed. Increased incentives should be considered when conditions permit, but all are aware of present economic conditions and are not demanding immediate changes.

The political situation in Bolivia remains calm and additional American aid through various programs should further promote stability and progress.

## Conclusions

Sonoma Quicksilver Mines, Inc. have a mine with sufficient blocked out ore for several years operation, a mill with replacement value of $150,000.00—other producing and potential properties, and goodwill which is invaluable in future operations. A slight increase in tungsten prices could insure the company of a profitable year, while gains are continually being made in efficiency of operations.

Yours respectfully,

SONOMA BOLIVIAN MINING LIMITADA
RALPH M. CONRAD,
Resident Manager

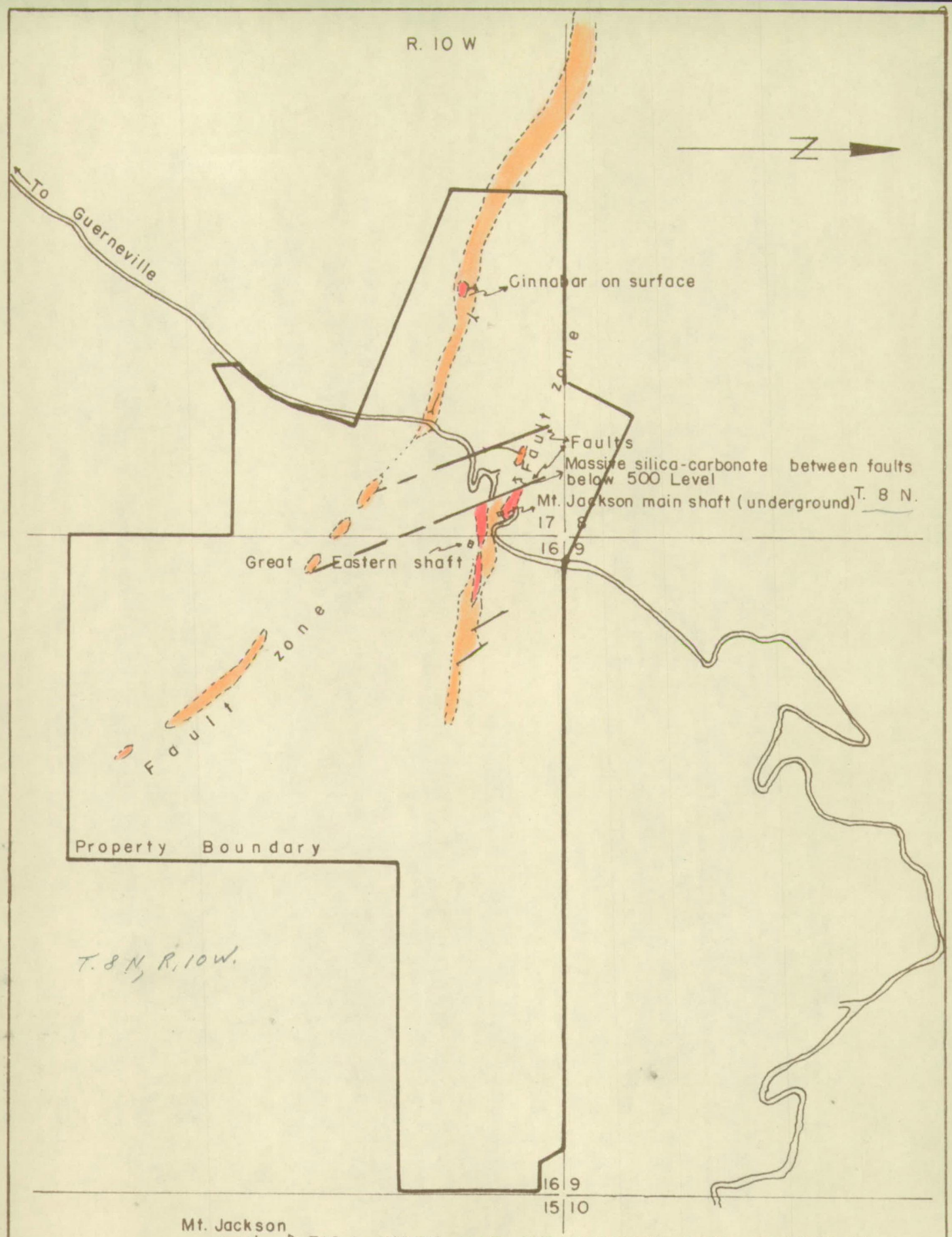



FIG. I. INDEX MAP, MT. JACKSON MINE PROPERTY
SONOMA INTERNATIONAL, INC.
SONOMA COUNTY, CALIF.
1" = 1000'

Silica-carbonate rock  Productive areas near surface

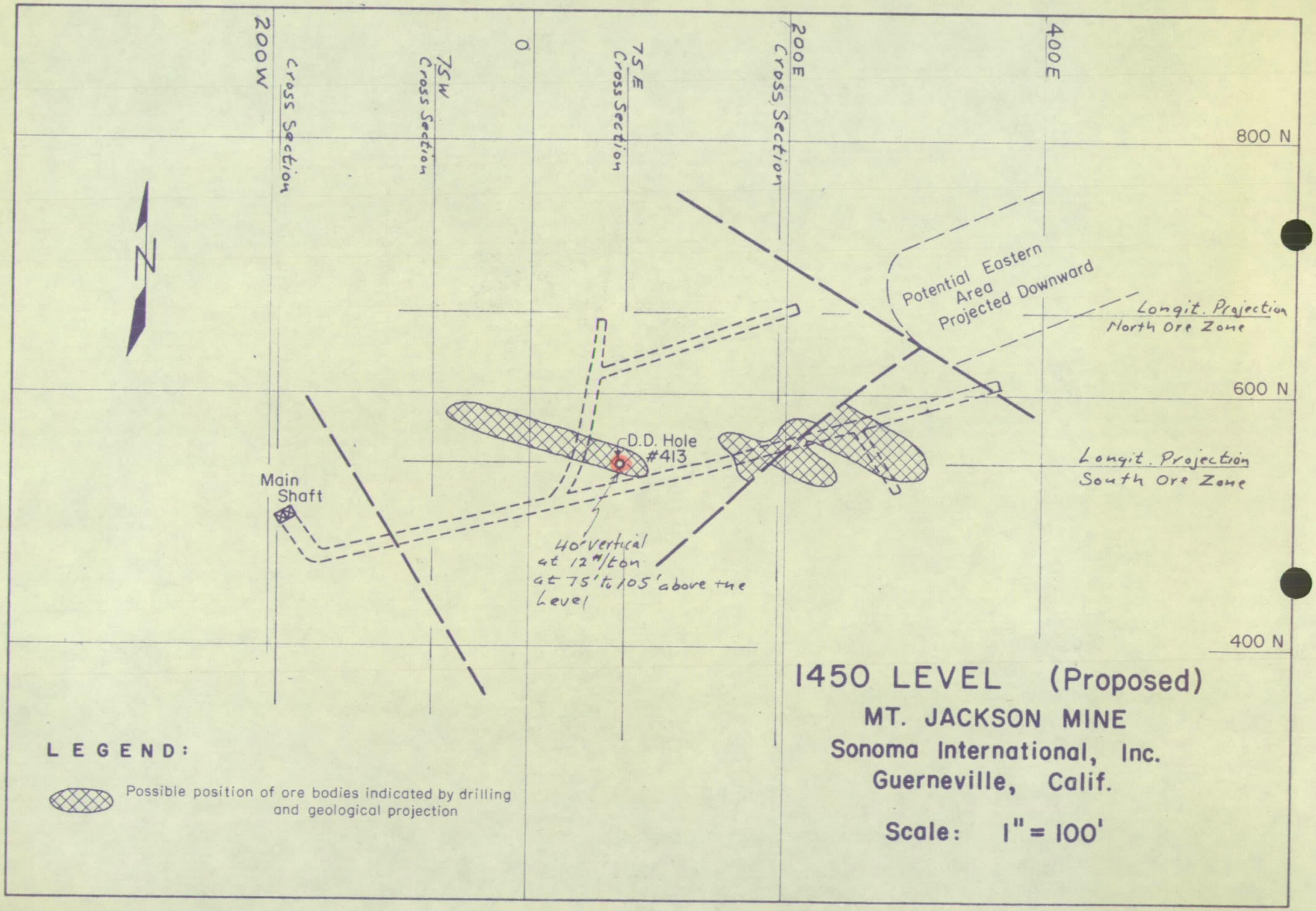

200 W
Cross Section
75 W
Cross Section
0
75 E
Cross Section
200 E
Cross Section
400 E
800 N
600 N
400 N
N
Potential Eastern Area Projected Downward
Longit. Projection North Ore Zone
Longit. Projection South Ore Zone
D.D. Hole #413
Main Shaft
40' vertical at 12#/ton at 75' to 105' above the Level
1450 LEVEL (Proposed)
MT. JACKSON MINE
Sonoma International, Inc.
Guerneville, Calif.
Scale: 1" = 100'
LEGEND:
Possible position of ore bodies indicated by drilling and geological projection

PLATE 7

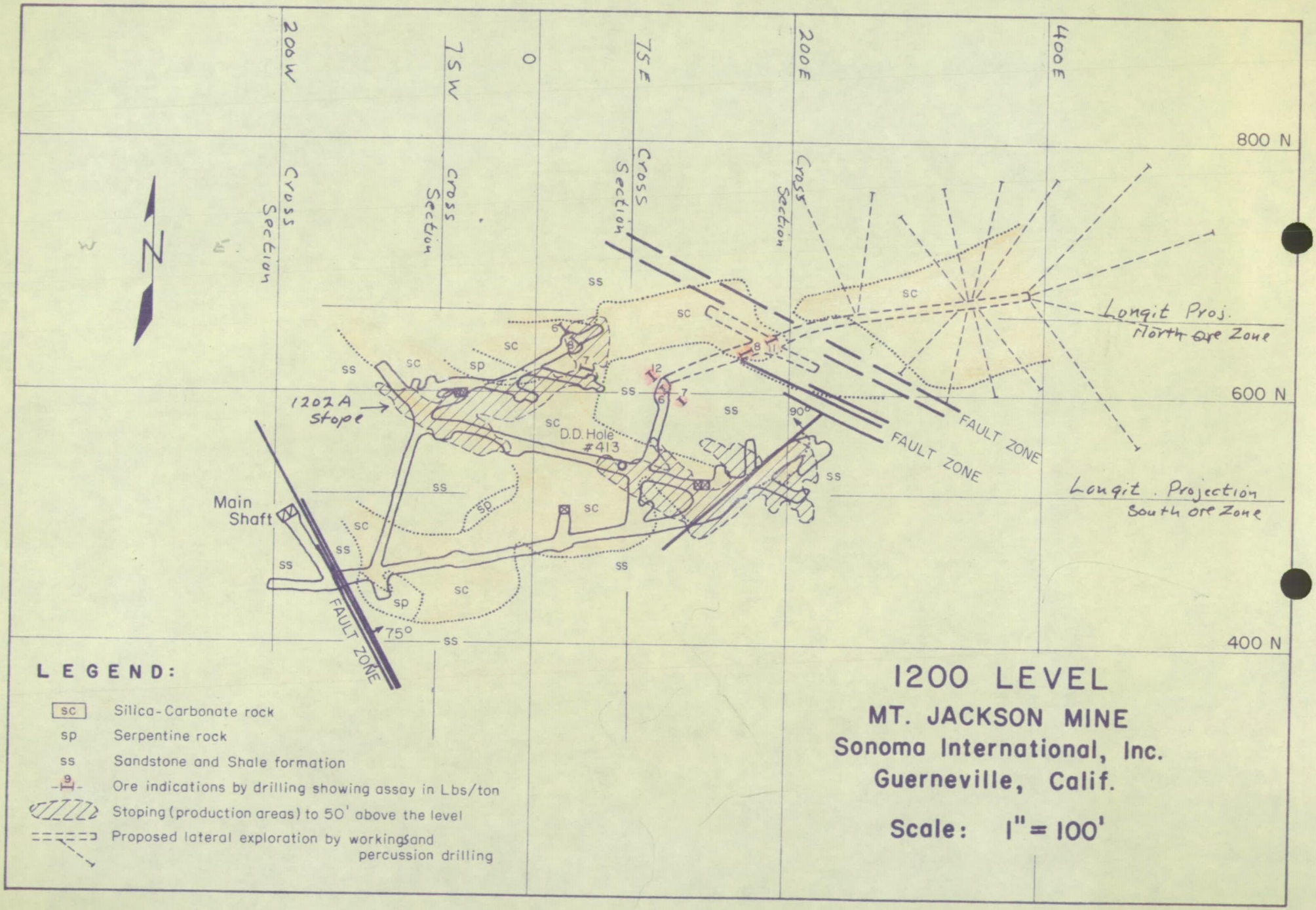
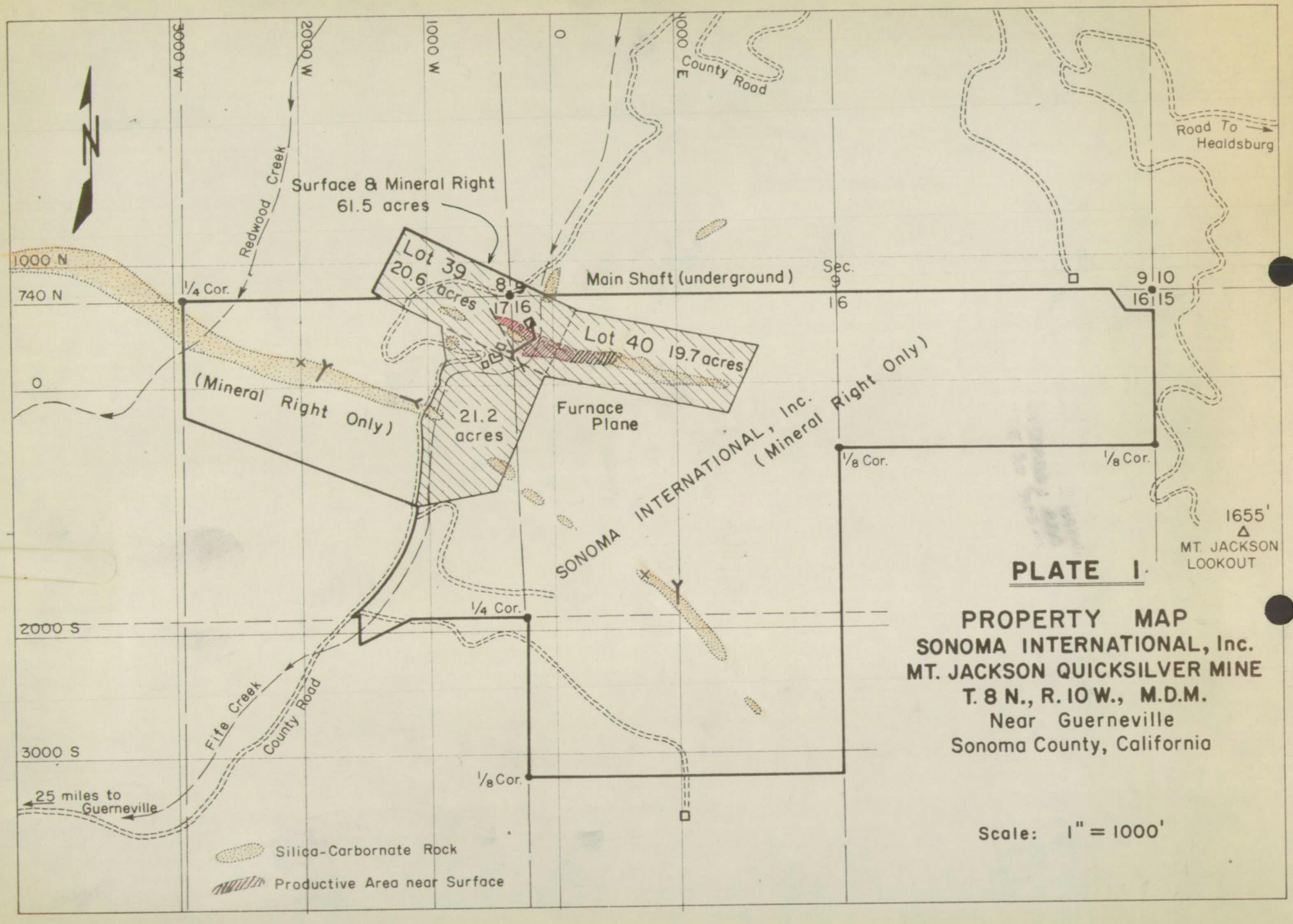

200 W
75 W
0
75 E
200 E
400 E
800 N
600 N
400 N
Cross Section
Cross Section
Cross Section
Cross Section
N
W
E
S
ss
sc
sp
1202A Stope
D.D. Hole #413
Main Shaft
FAULT ZONE
75°
90°
Longit Proj. North Ore Zone
Longit. Projection South Ore Zone
LEGEND:
sc Silica-Carbonate rock
sp Serpentine rock
ss Sandstone and Shale formation
Ore indications by drilling showing assay in Lbs/ton
Stoping (production areas) to 50' above the level
Proposed lateral exploration by workings and percussion drilling
1200 LEVEL
MT. JACKSON MINE
Sonoma International, Inc.
Guerneville, Calif.
Scale: 1" = 100'

PLATE 5


N
3000 W
2000 W
1000 W
0
1000 E
County Road
Road To Healdsburg
Redwood Creek
Surface & Mineral Right
61.5 acres
Lot 39
20.6 acres
Lot 40 19.7 acres
Main Shaft (underground)
Sec. 9
1/4 Cor.
1000 N
740 N
0
2000 S
3000 S
(Mineral Right Only)
21.2 acres
Furnace Plane
SONOMA INTERNATIONAL, Inc.
(Mineral Right Only)
1/8 Cor.
1/8 Cor.
1/4 Cor.
1/8 Cor.
1655'
MT. JACKSON LOOKOUT
Fife Creek
County Road
25 miles to Guerneville
Silica-Carbornate Rock
Productive Area near Surface
PLATE I
PROPERTY MAP
SONOMA INTERNATIONAL, Inc.
MT. JACKSON QUICKSILVER MINE
T. 8 N., R. 10 W., M.D.M.
Near Guerneville
Sonoma County, California
Scale: 1" = 1000'

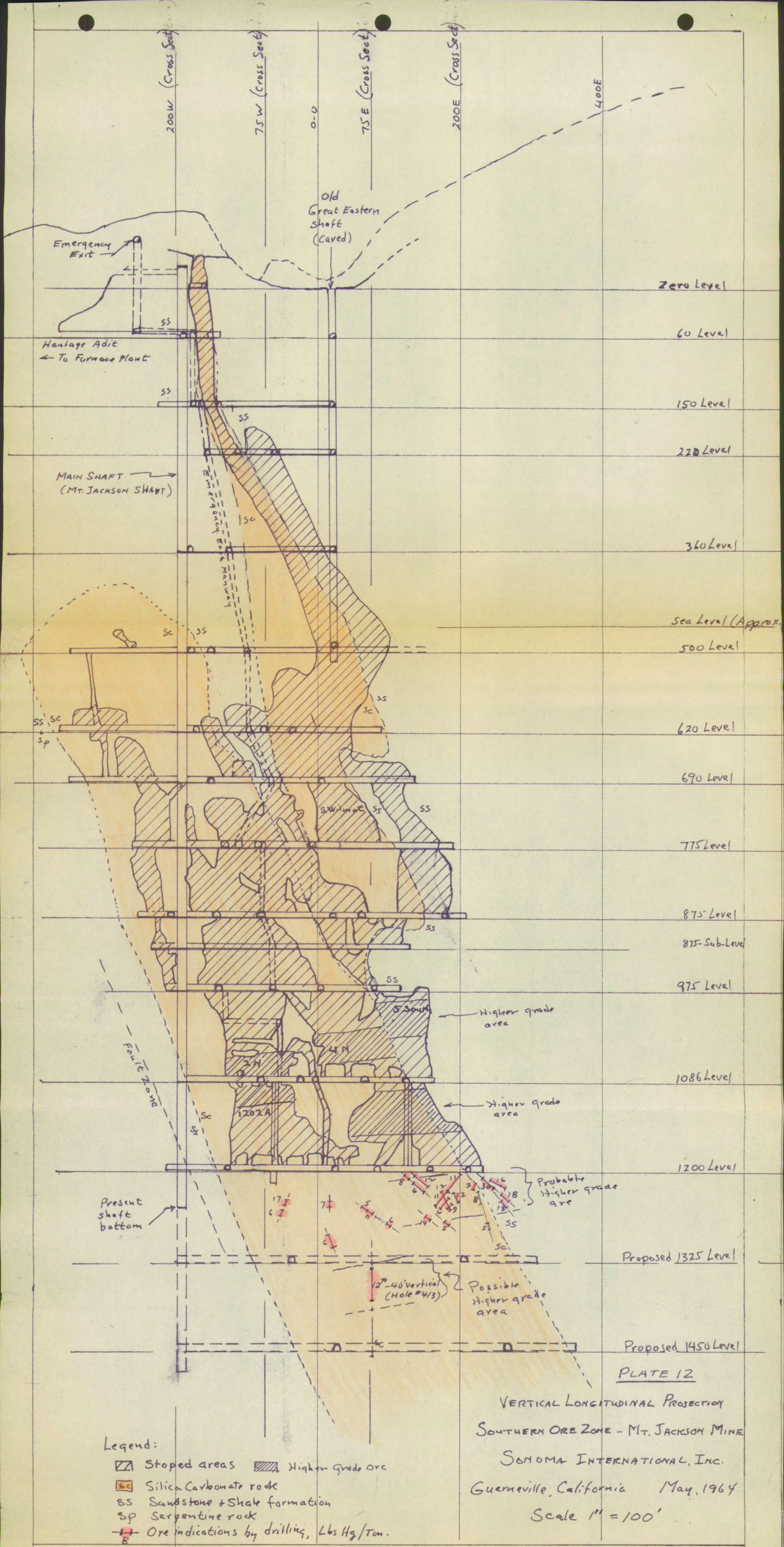



PLATE 12

VERTICAL LONGITUDINAL PROJECTION

SOUTHERN ORE ZONE - MT. JACKSON MINE

SONOMA INTERNATIONAL, INC.

Guerneville, California May, 1964

Scale 1" = 100'

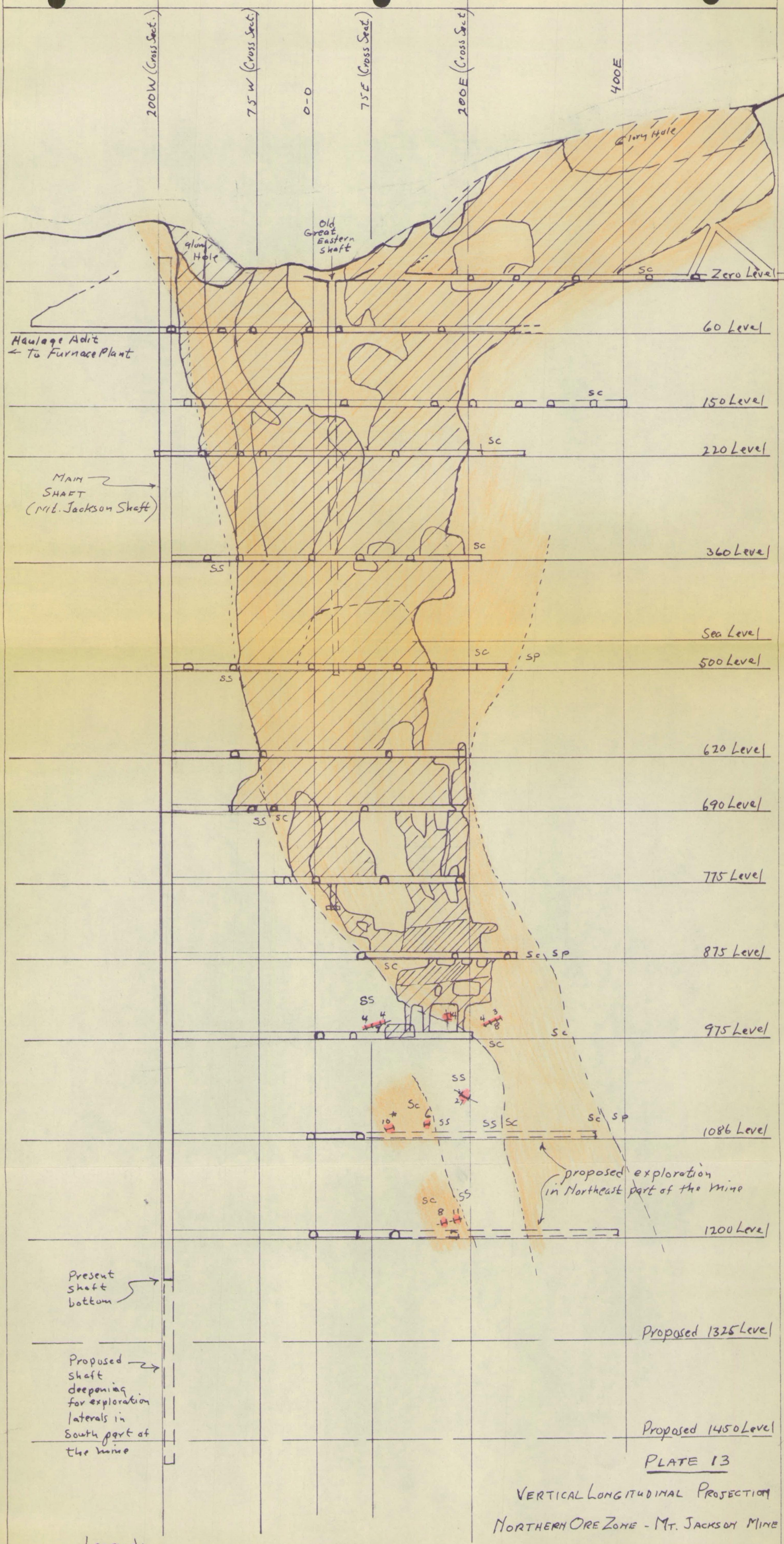



PLATE 13

VERTICAL LONGITUDINAL PROJECTION

NORTHERN ORE ZONE - MT. JACKSON MINE

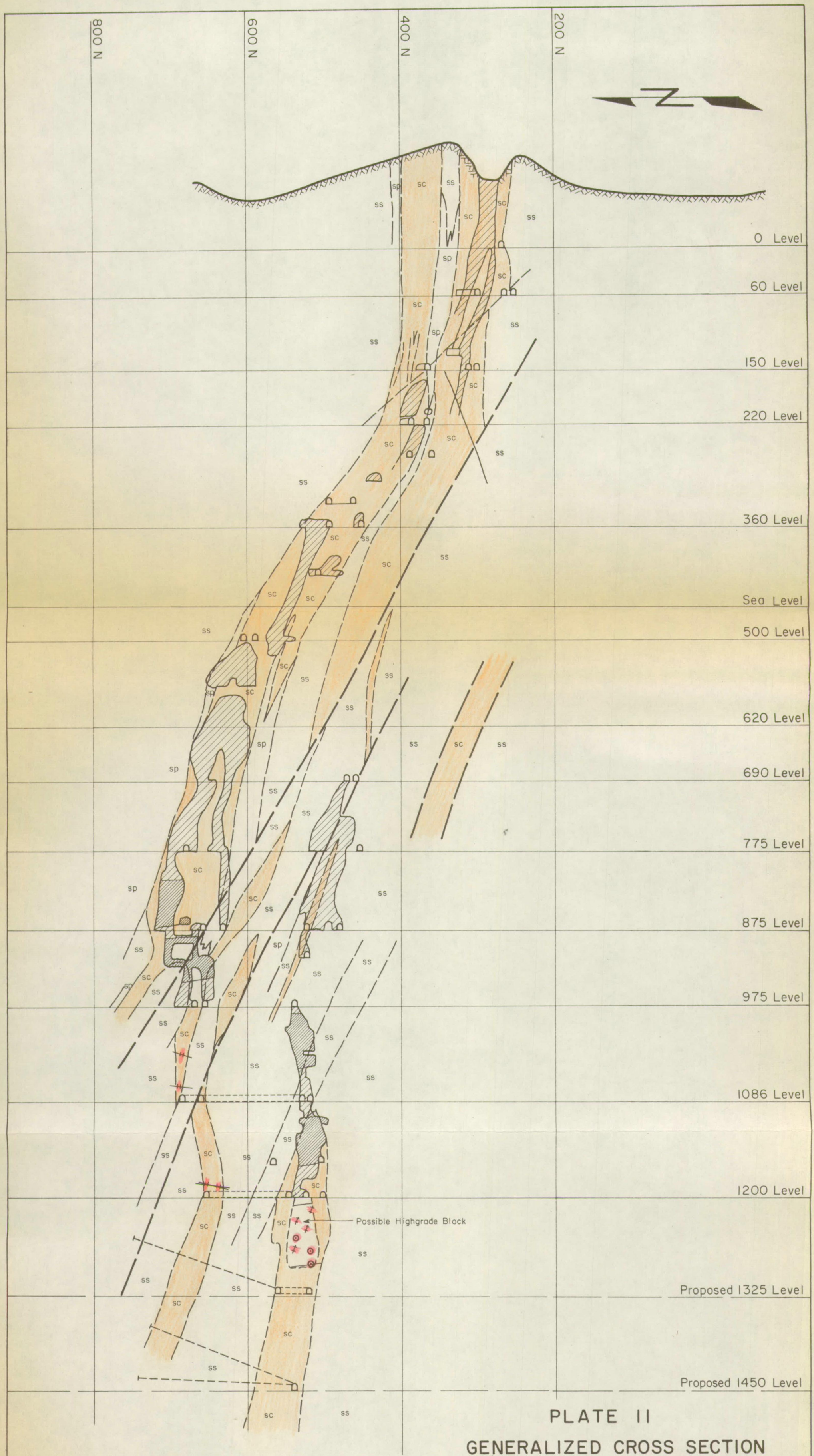
SONOMA INTERNATIONAL, INC.

Guerneville, California May, 1964

Scale 1" = 100'

Legend:

- Stoped areas
- Higher Grade Ore
- SC Silica Carbonate rock
- SS Sandstone + Shale formation
- Sp Serpentine rock
- Ore Indications by drilling, Lbs. Hg/Ton.

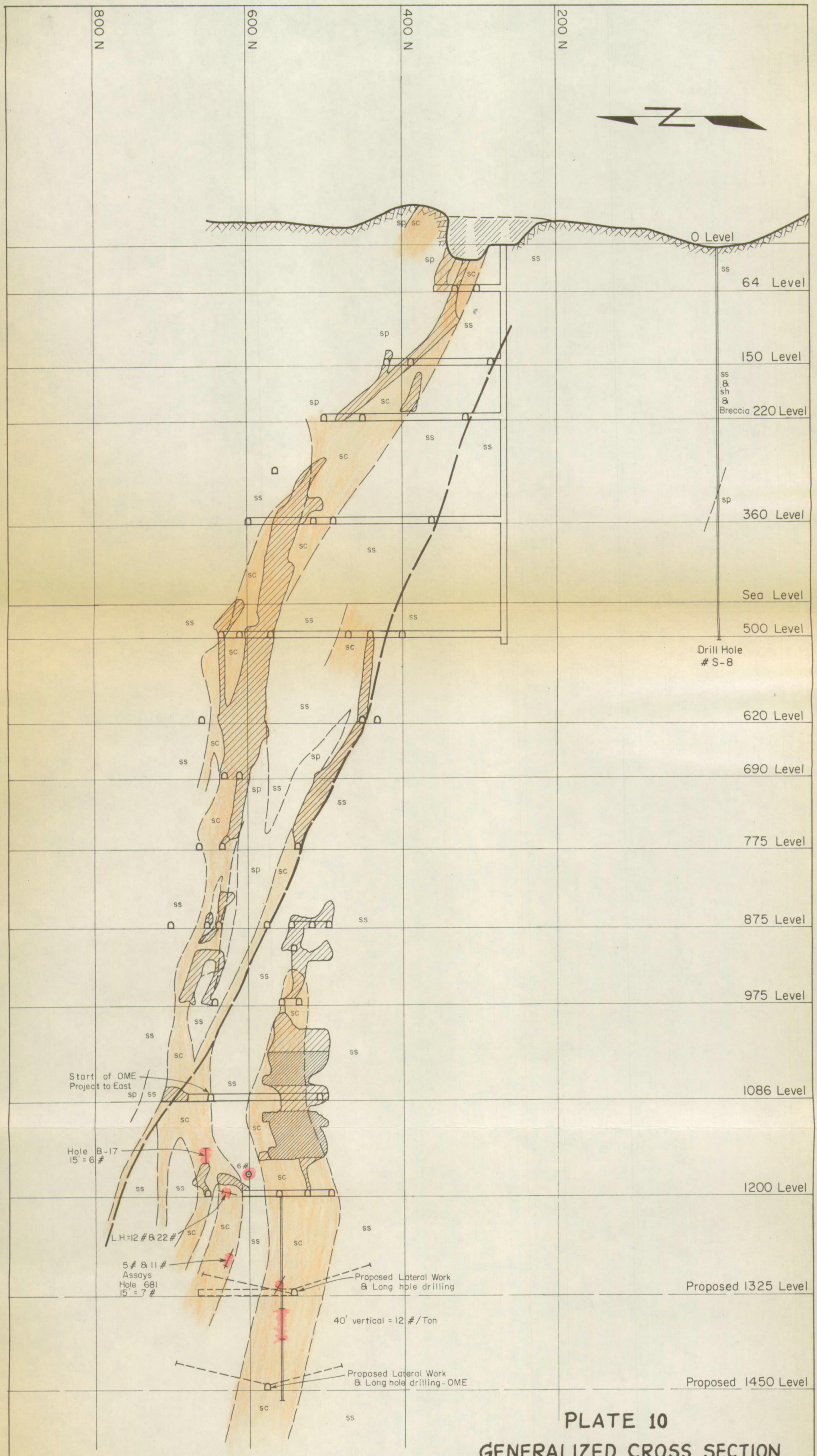



sc Silica-Carbonate rock
ss Sandstone & Shale formation
sp Serpentine
Stoped areas
Higher grade ore
Ore intersection
Proposed laterals and drilling

# PLATE II

## GENERALIZED CROSS SECTION
## at 200 E Coordinate
## Mt. Jackson Mine
## Sonoma International, Inc.
## Sonoma County, Calif.

May, 1964
Scale: 1" = 100'




Ore intersection
Stoped areas
Higher grade ore
SC Silica-Carbonate rock
ss Sandstone, Shale, and Fault breccia
sp Serpentine

# PLATE 10

## GENERALIZED CROSS SECTION at 75 E Coordinate

Mt. Jackson Mine
Sonoma International, Inc.
Sonoma County, Calif.
May, 1964
Scale: 1" = 100'

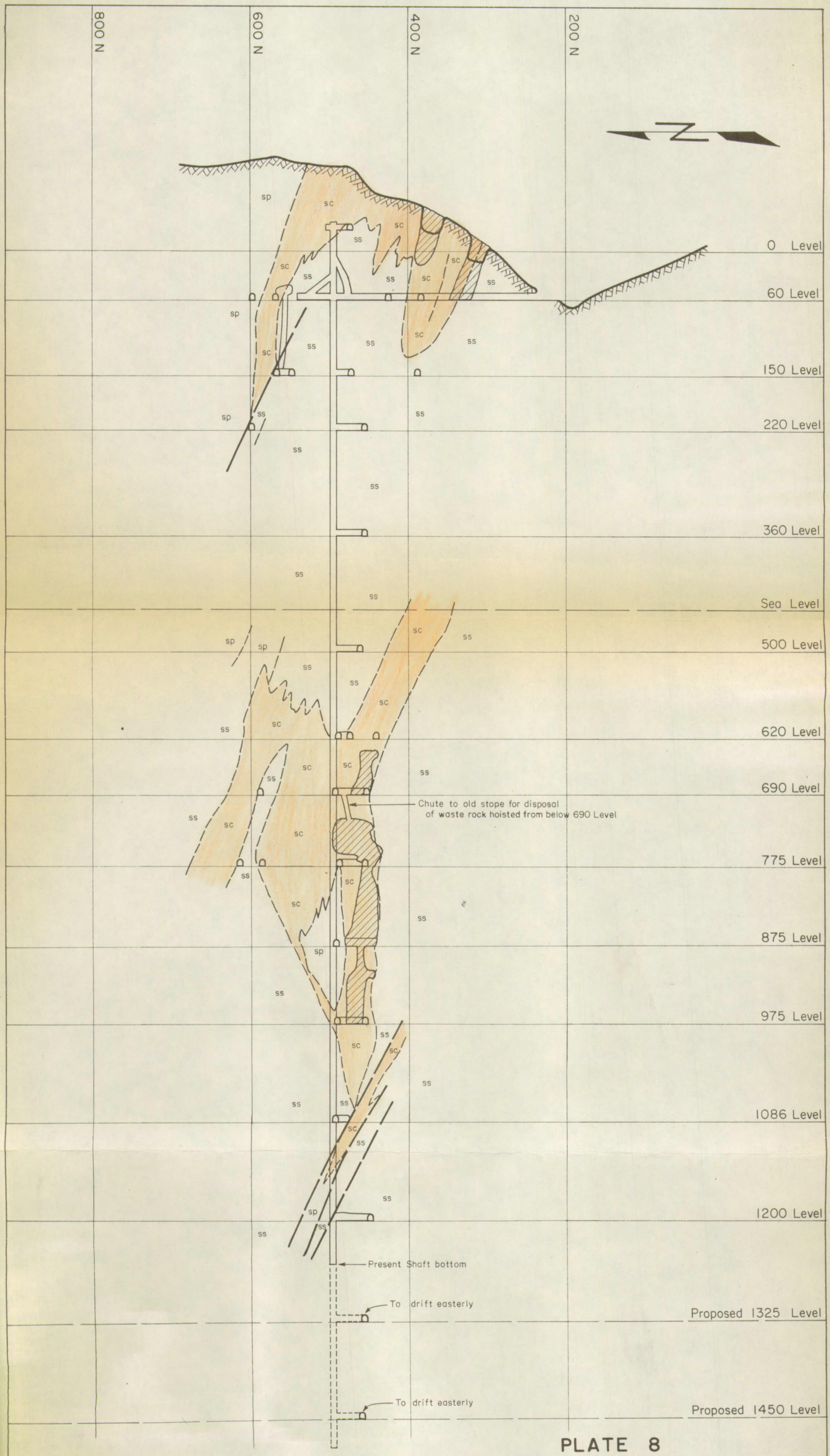
sc Silica-Carbonate rock
ss Sandstone & Shale formation
sp Serpentine
Stoped areas — Higher grade ore
Drill hole indications of ore, Lbs/ton

# PLATE 9

## GENERALIZED CROSS SECTION
## at 75 W Coordinate
## Mt. Jackson Mine
## Sonoma International, Inc.
## Sonoma County, Calif.

May, 1964

Scale: 1" = 100'




sc Silica-Carbonate rock
ss Sandstone & Shale formation
sp Serpentine
Stoped areas
Higher grade ore

# PLATE 8

## CROSS SECTION
## at 200W Coordinate at Main Shaft
## Mt. Jackson Mine
## Sonoma International, Inc.
## Sonoma County, Calif.

May, 1964
Scale: 1" = 100'

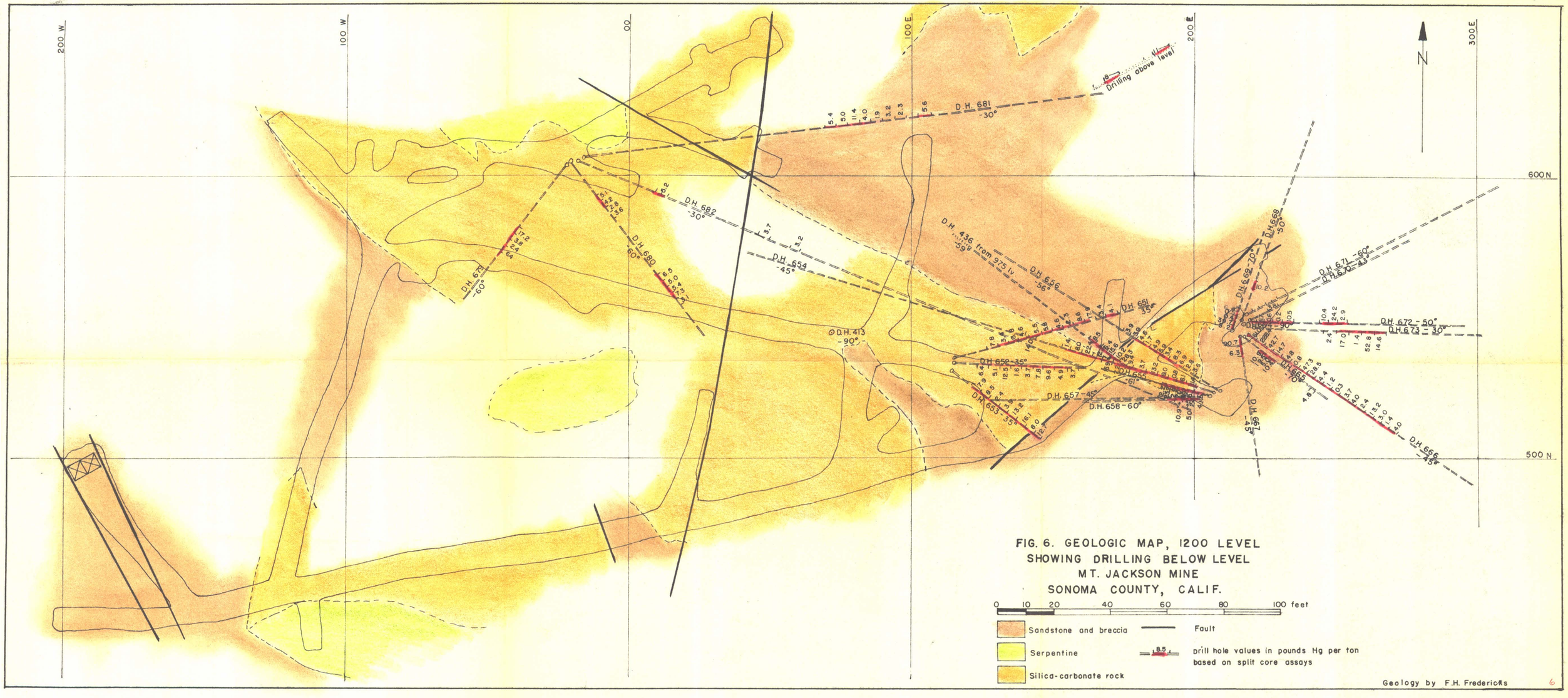



FIG. 6. GEOLOGIC MAP, 1200 LEVEL
SHOWING DRILLING BELOW LEVEL
MT. JACKSON MINE
SONOMA COUNTY, CALIF.

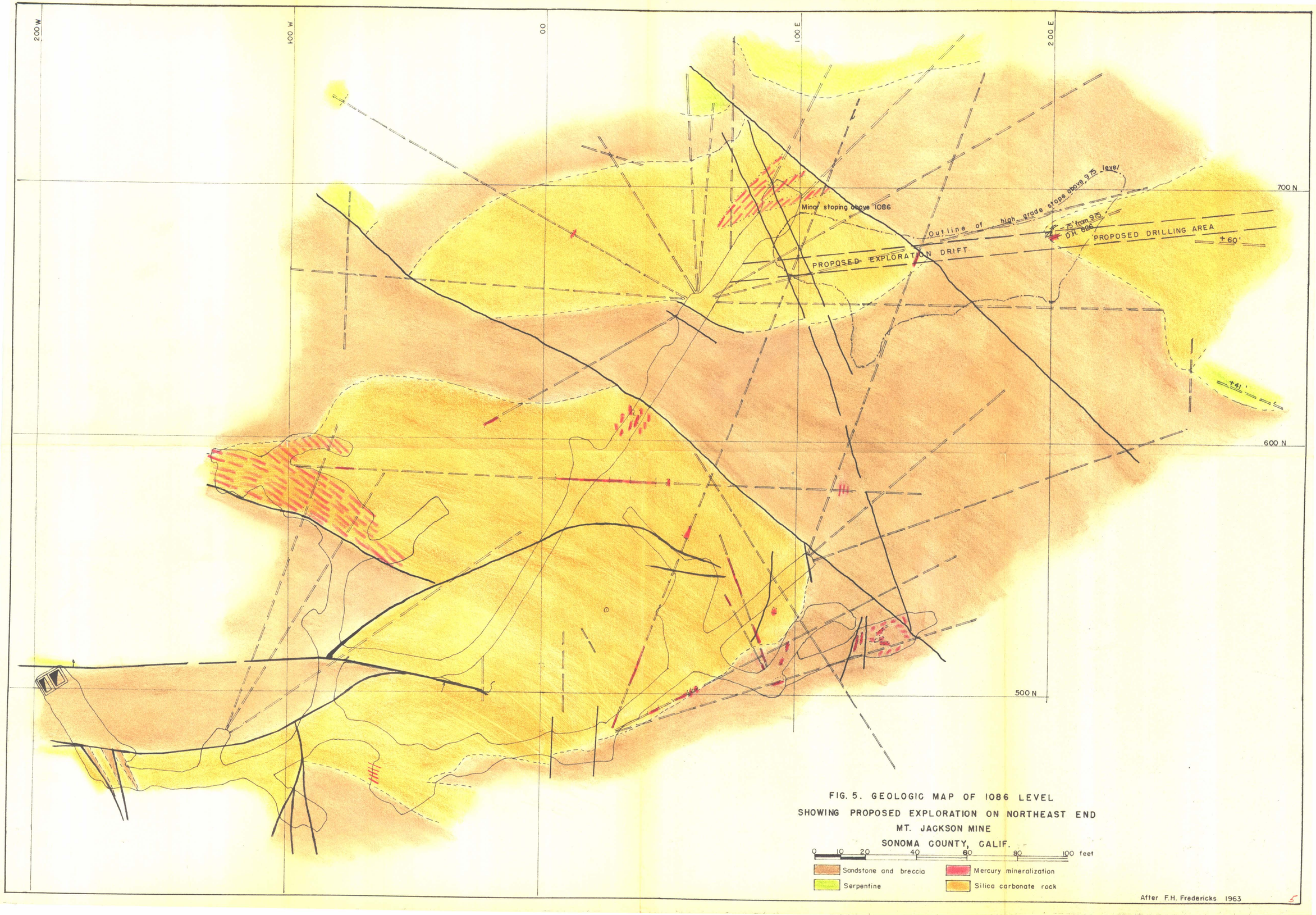



FIG. 5. GEOLOGIC MAP OF 1086 LEVEL
SHOWING PROPOSED EXPLORATION ON NORTHEAST END
MT. JACKSON MINE
SONOMA COUNTY, CALIF.

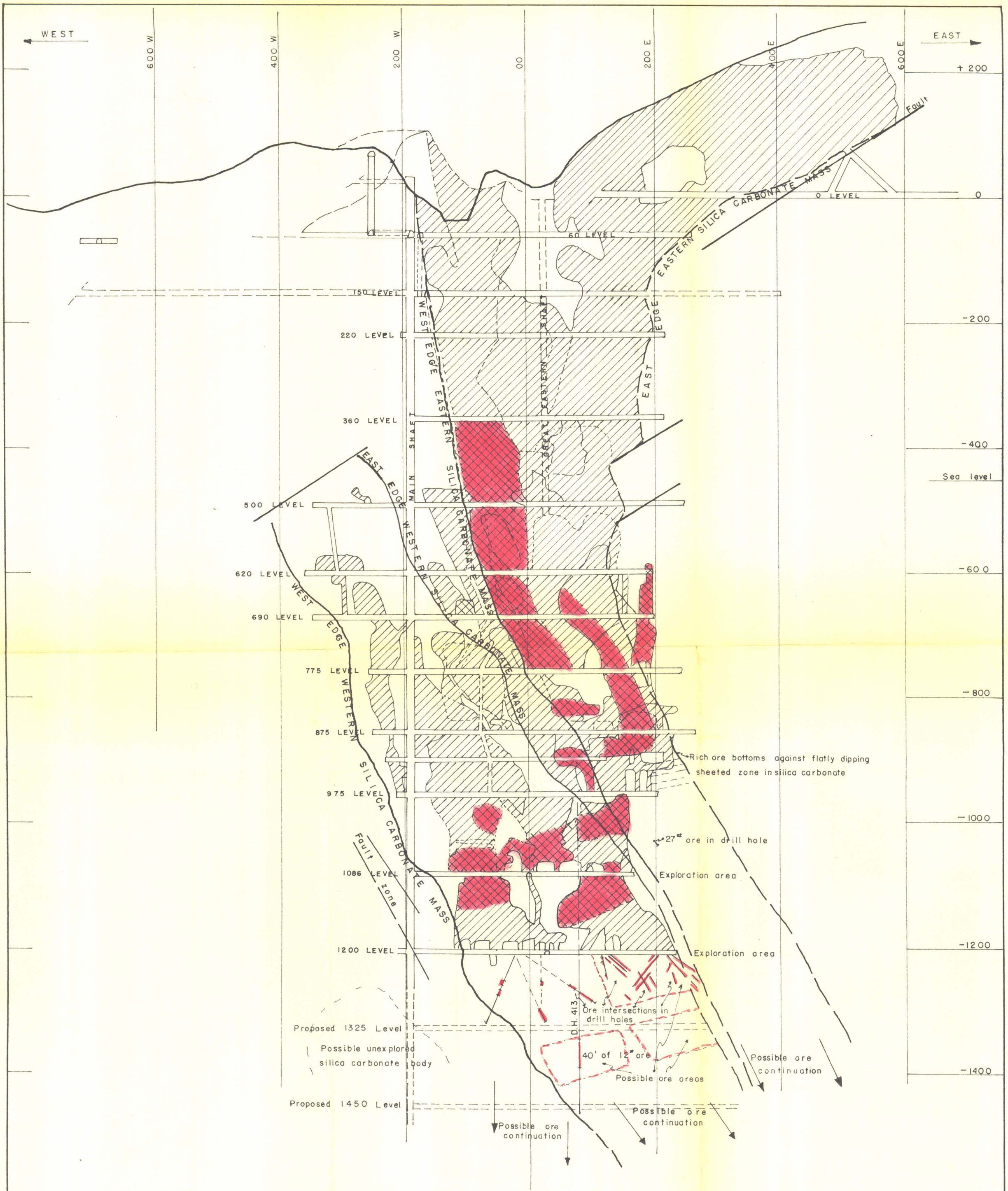



FIG 4. VERTICAL LONGITUDINAL PROJECTION
MT. JACKSON MINE
SONOMA COUNTY, CALIF.

After F.H. Fredericks 4/1/63

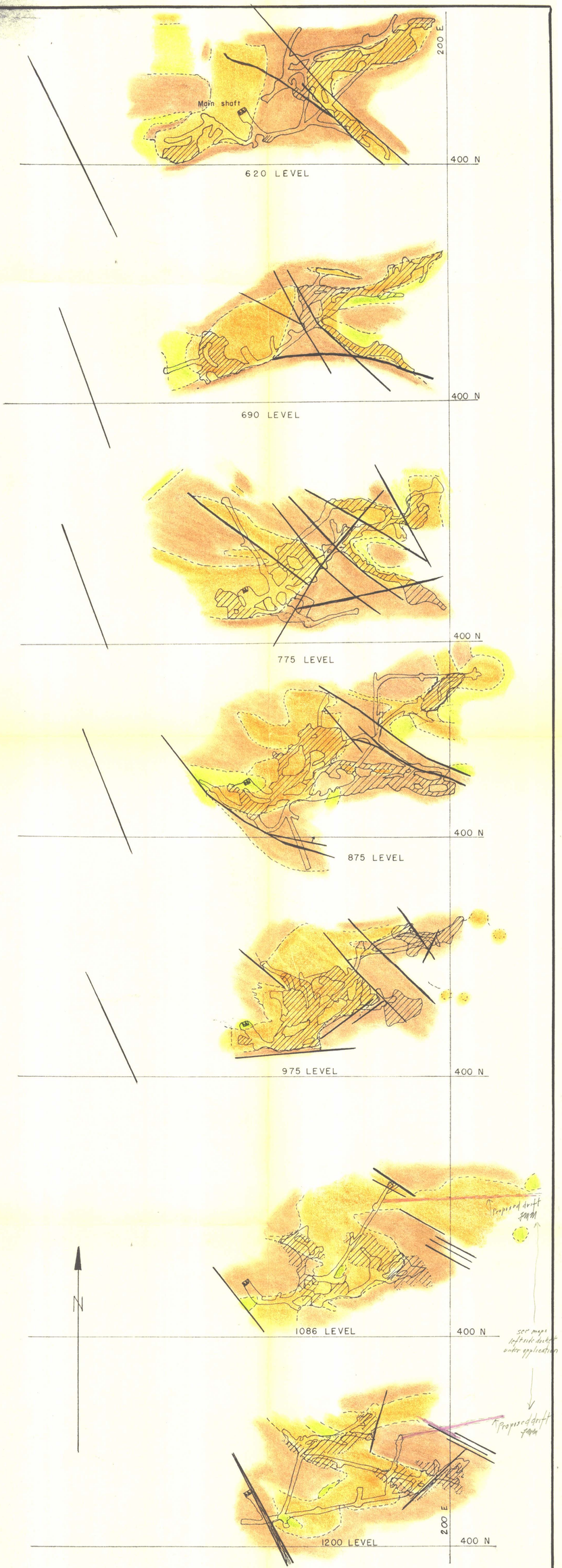



FIG. 3. GENERALIZED GEOLOGIC PLANS, LOWER LEVELS
MT. JACKSON MINE
SONOMA COUNTY, CALIF.

0 50 100 200 300 400 feet

Sandstone, shale, breccia
Serpentine
Silica-carbonate rock
Stoping above level
Fault

Geology by F.H. Fredericks

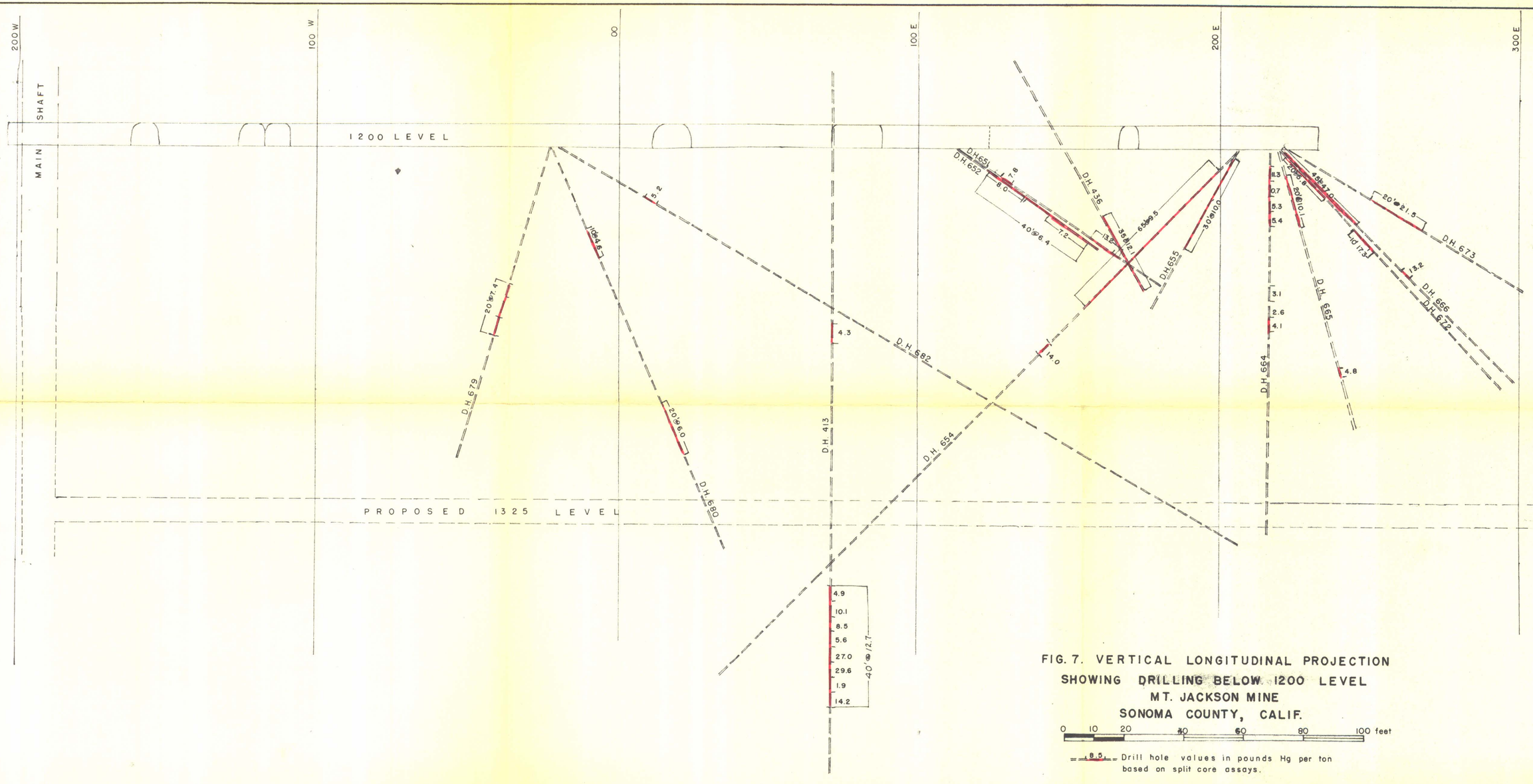



FIG. 7. VERTICAL LONGITUDINAL PROJECTION
SHOWING DRILLING BELOW 1200 LEVEL
MT. JACKSON MINE
SONOMA COUNTY, CALIF.

0 10 20 40 60 80 100 feet

8.5 Drill hole values in pounds Hg per ton based on split core assays.

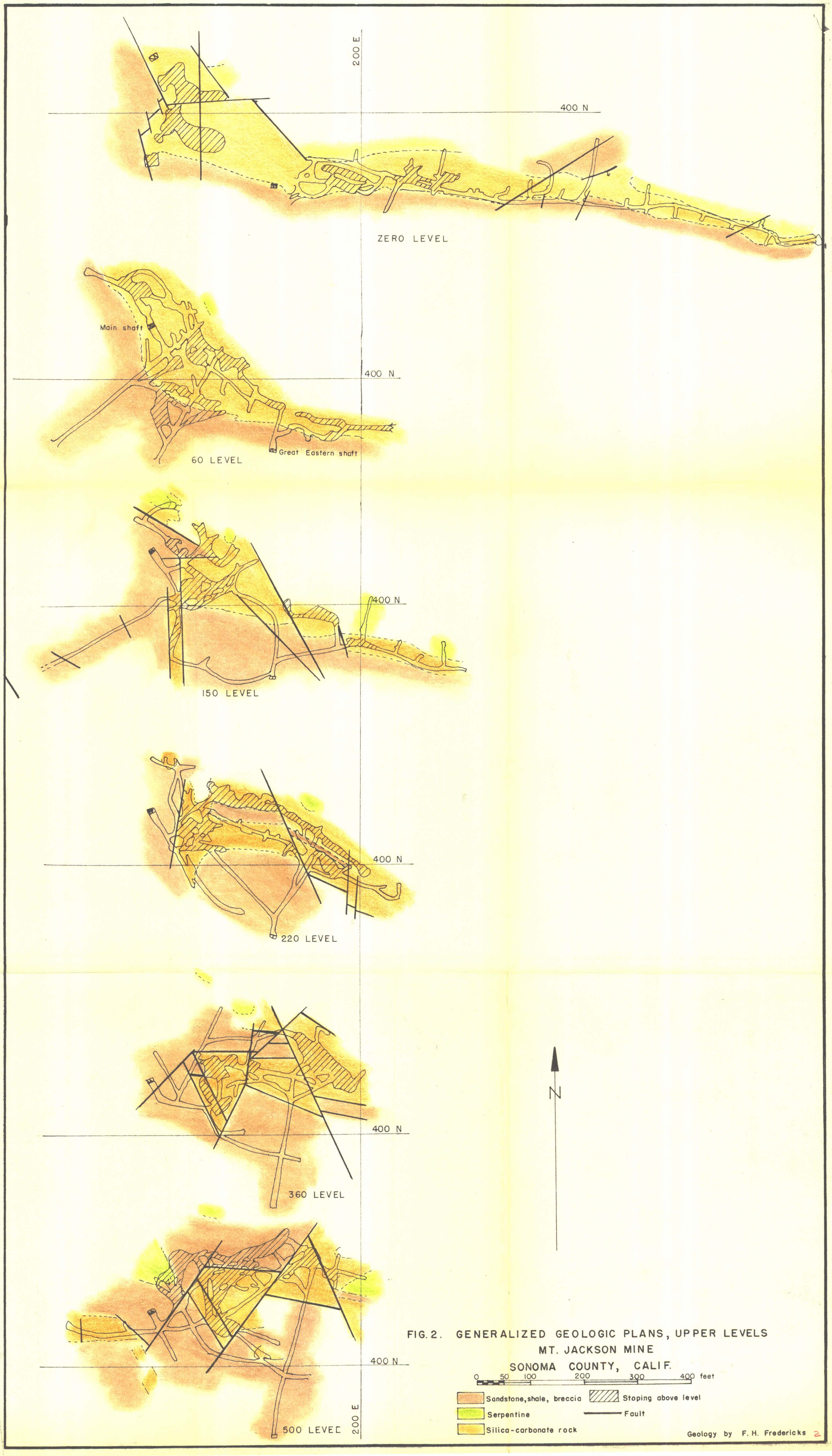



FIG. 2. GENERALIZED GEOLOGIC PLANS, UPPER LEVELS
MT. JACKSON MINE
SONOMA COUNTY, CALIF.