State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

BRISTOL SILICA COMPANY (silica) Gold Hill area

Owner: F. I. Bristol, Grants Pass, Oregon

Location: SE¼ sec. 30, T. 36 S., R. 3 W., about 5 miles from the town of Rogue River. Material is trucked 1½ miles over a good dirt road to U. S. Highway 99 and thence 3½ miles to the town of Rogue River.

Area: The total area is 80 acres; two claims of 20 acres each were located in the NE¼ SE¼ sec. 30, the SE¼ SE¼ sec. 30 is patented and held by lease.

History: This deposit was discovered in the late 1930's. It was put into production and markets were developed by Mr. Bristol all within five years.

Topography: The deposit lies across the top of the west spur of a ridge between the left fork of Foots Creek and Galls Creek. The highest elevation is about 2700 feet and the lowest about 1800 feet in a distance of less than a quarter of a mile. The angle of slope is uniformly 23° towards the south. The general contour of the deposit is such that cheap quarrying can be conducted progressively from the site which is now open.

Development: Very little development work has been done on the property - only that incidental to quarrying an amount sufficient to supply silica required by the sales department of the company. The deposit has not been sampled in detail nor has its extent been proved by drilling.

The surface of the exposed quartz is approximately 370,000 square feet, which, based on weight of 165 pounds per cubic foot, would be approximately 30,000 tons per vertical foot of depth. A reasonable estimate of the depth of the deposit is 100 feet, thus indicating a reserve of 3,000,000 tons.

Analyses: The following analyses have been made.

| | Analysis No. 1 | Analysis No. 2 | Analysis No. 3 |
|---|---|---|---|
| Silica | 98.52% | 98.24% | 98.71% |
| Ferric Oxide | .54 = .37 Fe | .54 = .37 Fe | .48 |
| Alumina | .10 | .12 | .27 |
| Calcium Oxide | None | None | |
| Magnesia | Trace | Trace | |
| Phosphoric Anhydride | .018 = .003 P | .018 = .003 P | 0.089 |
| Loss on ignition | .80 | .96 | .41 |

Analyses Nos. 1 and 2 are by E. W. Lazell, Ph. D., Portland, Oregon, and No. 3 is by Lerch Brothers Incorporated, Hibbing, Minnesota.

Geology: The deposit is an elongated body of creamy white quartz whose exposed surface is roughly one thousand feet in length in a north-south direction, and whose width averages about 350 feet. It is flanked

BRISTOL SILICA COMPANY (Cont.)

on its western margin by a body of limestone of undetermined extent, and its eastern boundary is a fine-grained dark-colored basic igneous rock which may be classified broadly as greenstone. The quartz is microcrystalline, and its origin probably is pegmatitic. It has been subjected to later pressure and movement which has changed its physical characteristics by partial metamorphism. Evidence of shearing action can be noted on many of the cleavage and fracture planes. A thin section of the material showed clearly the sharp margins of the crystals under the microscope with no evidence of secondary silica as a cementing medium. There were no other minerals present in the thin section. Feldspars are wholly absent, and no pyrite was observed. The only foreign mineral is limonite which is present in very small amounts as "stain" along the surface of the shrinkage and fracture planes. This has been introduced by surface waters from an outside source. The cleavage planes strike uniformly N. 55° W., and dip 82° E.

General: Climate is mild; winters are never severe; operations can be carried on throughout the full year.

The silica is crushed at the company's plant at the town of Rogue River. The plant is adjacent to the main line of the Southern Pacific Railroad. At present the use of the material is largely confined to chicken grit, but there is a growing demand for the material as metallurgical flux. The quartz is crushed according to specifications received from the purchaser.

Informants: Kenneth Hamblen, Press Reports, Ray C. Treasher

Reference: Report on file by Kenneth Hamblen, mining engineer.

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

# Report on

# THE BRISTOL SILICA DEPOSIT

## Jackson County, Oregon

by

Prenton E. Hotz

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United States Geological Survey
Grants Pass, Oregon
January, 1942.

February 16, 1942

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

# Report on Bristol Silica Deposit

## Introduction:

The Bristol Silica deposit is in Jackson County, Oregon in the Gold Hill mining district about 13 miles east of Grants Pass. Two twenty acre claims are in the W½ Sec. 30, T. 36 S., R. 3 W Willamette Meridian. A dirt road 1¼ miles long was laid out to connect the deposit with the Pacific Highway and the town of Rogue River where a crushing plant was constructed. The deposit was discovered and located during the winter of 1938 and the first shipment of crushed silica was made in August, 1939.

So far as is known this deposit is the only one of its kind and purity in Oregon. There are several other bodies of silica in the Pacific Northwest, but the only one that compares with the Bristol property in purity and magnitude is north of Spokane, Washington. The chief use of the silica mined from the Bristol deposit has been for poultry grit though some has been shipped for use as building sand, filter rock, refractory silica, core sand and the manufacture of soap. With the coming of Bonneville power to the Pacific Northwest this deposit assumes greater importance as a source of high grade silicon for the manufacture of ferro-silicon and certain types of glass.

The deposit was mapped in detail by the writer and Robert T. Littleton under the direction of Francis G. Wells, geologist of the United States Geological Survey. A plane table map was made by Littleton assisted by employees of the Bristol Silica Company. The writer is responsible for the preparation of the geologic map.

Mr. F. I. Bristol, owner and operator, rendered invaluable assistance in the preparation of this report.

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## General geology:

The country rocks comprise altered volcanics, argillites, quartzites and marbles. These rocks are exposed over a large area in southwestern Oregon. Originally classified as Paleozoic by Diller* and Wells*, they have recently been re-assigned to the Triassic.*

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*Diller, J. S., and Kay, G. F., Mineral resources of the Grants Pass quadrangle and bordering districts, Oregon: U.S.Geological Survey Bull. 380, pp. 48-79, 1908.

*Wells, Francis G., and others, Preliminary geologic map of the Medford quadrangle, Oregon: Oregon Dept. Geol. and Min. Indust.,, 1939.

*Wells, Francis G., and others, Preliminary geologic map of the Grants Pass quadrangle, Oregon: Oregon Dept. Geol. and Min. Indust., 1940.

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*Wells, F. G. and Hotz, P. E. _____ _____ _____ _____ _____

Marble is the only unit of the country rocks which is sufficiently exposed at the Bristol deposit to warrent special mention. The other rocks have been adequately described by Wells*. Small, lenticular marble masses lie in several discrete belts which strike N-NE parallel

*Wells, F. G. and others, op. cit. (1939 and 1940).

to the structural trend of the region. As seen in figure_____ a pod-shaped mass of marble borders the silica deposit on the north and northwest. Several smaller marble lenses lie along the lower portion of the western contact. The marble is normally fine-grained and gray. In some places along the contact with the silica body it becomes slightly coarser-grained and is pure white. Elsewhere it is metamorphosed locally to a tremolite rock which in turn is replaced by blue quartz.

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General structure:

The attitude of the country rock conforms to the general structure of the rocks in this part of Southwest Oregon. The principal trend is N 30 E and the dip varies from 45 to 65 degrees to the southeast. The marble occurs as small pods which lense rapidly and are seldom more than a few hundred feet thick and a few score wide. The contact between marble and the enclosing rock is faulted in several places, for example the contact between marble and the volcanics northwest of the silica body. The actual displacement is not known but probably it is but a few feet. The fracture zone commonly is parallel to the contact and is a bedding-place fault developed between rocks of differing competency at the time of deformation.

The ore body:

There are two kinds of quartz in this deposit. White quartz forms the main mass of the deposit while a blue variety borders 2/3 of the deposit as a narrow band 15 to 75 feet wide. The blue rock contains an undesirable amount of impurities but is of interest in considering the origin of the deposit.

The white silica is dense, very fine-grained quartz. It is translucent, milky to cream-colored and not glassy. Seen under the hand lens the rock is very finely crystalline with a sugary appearance on fresh surfaces. No inclusions other than tiny grains of magnetite can be seen. In some places narrow discontinuous gray bands and streaks of included magnetite are visible.

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Thin sections examined with the microscope show that the rock is 95 per cent quartz with accessory magnetitie and apatite. The magnetite does not exceed 1 per cent while the apatite, which is responsible for the phosphorus contact of the silica varies from 1 to 41.5 per cent. Apatite is more abundant in specimens taken from the borders of the deposit than it is in the center. Hematite pseudomorphs of pyrite are occasionally seen.

The blue quartz, unlike the white, shows some variation in character. All specimens are translucent and have a distinctive bluish cast. Small included streaks and clots of magnetite dust give it a mottled appearance. Some specimens, such as those from the northeast side of the deposit, are massive and even-grained; others, which occur along the western contact, have a distinct linetion due to alternations of quartz with foils and laminae of tremolite. This rock grades very rapidly to massive rock in one direction and to calcite-tremolite rock in the other.

Thin sections of the blue quartz from the western contact have relic crystals of diopside and tremolite. One specimen from the northeast side of the deposit has included calcite crystals which are altering to tremolite. Other specimens are similar to the white quartz when seen in thin section except that they have a little more magnetite. There seems to be no more apatite in the blue quartz than in the white variety.

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Structure of the ore body:

The white quartz body is elongate in a north-northeast direction approximately parallel to the structure of the enclosing rocks. The southern half is roughly lense-shaped. The northern half has more or less the form of an isosceles triangle with a long narrow tongue of quartz extending northward from its apex. The surface extent is about 1400 feet and the average width is 280 feet. The widest part is about midway up the slope where it is over 680 feet. The steep outward dipping contacts give the body a wedge-shaped appearance in cross-section.

There are two prominent sets of joints both of which strike about N 60° W. The joints of one system, which are spaced at intervals of 2 or 5 feet, dip steeply to the southwest while the other, which is closely spaced at intervals of 1 to 4 inches, dips northeast from 45 to 65 degrees. Besides these two major joints the rock is broken by a myriad of closely-spaced irregular and curved fractures which are normal to the other two systems. Thus the rock is broken into small irregularly-shaped pieces which greatly facilitate mining as well as the final crushing.

There is noticeable displacement of the east and west contacts along two faults having a northwesterly trend more or less parallel to the jointing near the middle of the body. Many shiny polished surfaces are visible on the widely-spaced south-dipping joints indicating slight displacement along these planes. Two normal faults with small displacement are well-exposed in the quarry. The lower west contact between the blue quartz and country rock is a fault and it is believed that there has been movement along much of the southwestern contact. The contact between the white quartz body and the fringe of blue quartz is faulted in places as is indicated by narrow zones of fracture and granulation. The displacement along these boundary faults has been small. None of the faults affect the value of the deposit.

**Genesis**

The relationships of the blue and white quartz to each other and to the enclosing country rock are important to a consideration of the genisis of the deposit.

One of the most important relationships is the general structural concordance between quartz and the country rock. There is a close parallelsm of directional trends between the marble and the blue quartz especially along the west border of the deposit where the attitude of the narrow band of blue quartz is the same as that of the marble. Within a few feet of the contact the marble is transformed to a tremolite rock which in turn is replaced by the blue quartz.

In contrast, the contact between the white and the blue quartz is abrupt and although the western contact of the white quartz parallels the blue quartz-marble contact it cross-cuts both the marble and the blue quartz at the upper end of the deposit. Furthermore, there is no concordance along the northeastern contact between the white and blue quartz. Small veinlets of lighter colored quartz cut the blue quartz in a few places., and there is some evidence of slight replacement of the lineated bluish rock by more massive lighter colored quartz.

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It is believed that both the blue and the white quartz are of hydrothermal origin. There is nothing which indicates that the deposit is a wholesale replacement of some rock such as marble, though in places there is evidence of partial replacement of the marble by the blue quartz.

There is no evidence to indicate the controlling factors for the emplacements of the siliceous material. Careful examination of the surrounding area has not revealed similar deposits of silica though quartz veins are common.

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There were two separate and distinct periods of quartz deposition. The blue quartz was deposited first as a small lense-like body parallel to the structure of the invaded rocks. It was sufficiently rich in magmatic solutions and vapors to partially replace the marble with which it came in contact. When it had cooled and become solid it fractured and a second wave of siliceous material came in and was deposited. This material had little effect on the invaded rocks. Cooling and contraction combined with outside forces resulted in fracturing and the development of joints and faults.

Quality:

The following are analyses of samples of the white silica:

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $SiO_2$ | 99.57 | 99.40 | 99.58 | 98.71 | 99.54 |
| $Fe_2O_3$ | no analysis for this oxide | | | .48 | .15 |
| $Al_2O_3$ | no analysis for this oxide | | | .27 | .06 |
| CaO/MgO | no analysis for this oxide | | | nil | .14 |
| $P_2O_5$ | .068=.030P | .045=.019 P | .064=.029 P | .089=.038 P | .11=.048 P |

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1. Electro-metallurgical Sales Corp., Portland, Oregon
2. " " " " " "
3. " " " " " "
4. Lersh Bros. Inc., Hibbing, Minn.
5. Electro-metallurgical Sales. Corp., Portland, Oregon

It will be noted that all the samples contain phosphorus. Phosphorus is of concern where the quartz is to be used as a flux, as in the manufacturing of ferro-silicon.

The blue quartz is considered valueless for flux. No adequate analyses have been made of the blue variety but it is considered to have a high percentage of impurities. However, there seems to be no reason for its not being mined for use in enterprises in which purity is not a prime element.

Mining:

The Bristol Silica deposit is well-exposed at the surface of a broad, south-facing 20 degrees slope. The present quarry is 50 feet deep, 50 feet wide and has been extended approximately 70 feet in from the original surface to the working face. The quarry is located on the crest-line of the hillside where there is a minimum of overburden. The thin veneer of weathered material, which is seldom more than 6 feet thick, necessitates a minimum of stripping before the quartz is mined. So far there have been only a few tons of waste

since everything below the overburden has been clean rock. The waste is dumped below the quarry from the end of the tramway.

Sufficient quartz to supply the mill is mined by two men working one shift a day. The holes are drilled by hand using a single jack and 7/8 inch steel drill. The holes are drilled to a depth of 36 inches and are loaded with 40 percent special geletin.

Approximately 15 tons of rock are broken down for each hole. Because of the closely spaced intersecting fractures the quartz naturally breaks into small fragments which are seldom more than 6 inches across. The material is shot down on to a wooden trap from where it is loaded into a 2 ton car, and is trammed by hand to a 75 ton wooden storage bin. Thequartz is then trucked to the company plant at Rogue River where it is crushed.

Crushing plant:

The crushing plant is completely electrified and has a capacity of approximately 48 tons per day. A 9 x 18 inch jaw crusher reduces the rock to a size of 1½ inches after which it passes between two 24 x 14 inch rolls which grind it to the required size. These rolls are adjustable to permit gringing to sizes anywhere from 1 to ¼ inch. From the rolls the crushed product is conveyed and elevated to a bank of two three-deck vibrating screens where it is sized and distributed to the bins in the warehouse. The dust from the rolls is elevated to the dust-catcher.

Development and estimated quantity:

A small amount of development work has been done on the property; only sufficient to remove silica required by the sales department of the company. A number of samples for analysis were taken in order to locate the best grade of quartz. Previous to this survey the deposit had not been mapped in detail nor had its extent been proven by drilling.

The surface of exposed white quartz is approximately 396,000 square feet, which, based on a weight of 165 lbs. per cubic foot, would be 32,000 tons per vertical foot of depth. Assuming a mineable depth of 100 feet, a conservative estimate of minimum tonnage is 3,200,000 tons.

Future of the deposit:

The amount of silica mined, crushed and shipped has been relatively small. However, because of increased industrial activity in the Portland area, this deposit assumes greater potential importance.

The estimated minimum reserve of 3,200,000 tons seems ample to support an industry. It must be remembered that this figure is conservative and there is nothing in the geologic set-up to indicate that depths greater than 100 feet might not be expected.

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Quarrying is probably the cheapest and most practical method of removing the quartz. When a depth of 75 to 100 feet has been attained it would be wise to bench the quarry. Thus a series of open cuts could be established one above the other up the hill in step-like fashion. Gravity chutes or conveyor belts might be used to transfer the rock from the quarries to the bin level.

If future quarrying follows the crest-line of the hill there will never be more than a few feet of overburden to deal with. This can most easily be stripped by hand or perhaps with a bulldozer. On the lower east slope the overburned becomes progressively thicker until in places it is over 15 to 20 feet.

The chief problems to be overcome are those of market and transportation. The distance from the mine to the crushing plant is only 5 miles over good road, but the distance from the crushing plant to the Portland area is over 300 miles by rail. An increased demand for the quartz might overcome this problem since there are other bodies of similar size and purity closer to Portland.

The uses for and the requirements which must be fulfilled by quartz in industry are given in the U. S. Bureau of Mines Bulletin 266* and Information Circulars 6472 and 6473*.

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*Weigel, W. M., Technology and uses of silica and sand, U. S. Bureau of Mines, Bull. 266, 1927.

*Santmyers, R. M., Quartz and silica Part I - General summary. U. S. Bureau of Mines Inform. Cir. 6472, August, 1931.

Santmyers, R. M., Quartz and silica Part II, Quartz, quartzite and sandstone, U. S. Bureau of Mines Inform. Cir. 6473, August, 1931.

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The possible uses for the quartz from the Bristol Silica deposit are listed below.

Metallurgical and chemical uses:

Fluxing, ferrosilicon, filter rock, quartz for acid towers, sodium silicate (water-glass).

Abrasives

Sandpaper and abrasives wheels, soap, kitchen cleansers, scouring, buffing and polishing compounds.

Fillers for

Paint and wood, rubber, plaster and cement.

Glass

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| | |
|---|---|
| Structural uses | Building sand, core sand. |
| Refractory linings | |
| Ceramics | White ware and enamel, placing sand. |
| Poultry grit | |

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# REPORT

# ON

# BRISTOL SILICA DEPOSIT

-

# JACKSON COUNTY, OREGON

EXPOSURE AT QUARRY

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INTRODUCTION:-

The property of the Bristol Silica Company is located in Jackson County, Oregon, about five miles from the town of Rogue River, which is the nearest town on the Southern Pacific Railroad. The material is trucked one and one-half miles over a good dirt road, which was built by the Company, to the Pacific Highway No. 99, and thence three and one-half miles to the town of Rogue River. The property comprises the west half of the southeast quarter of section thirty TWP thirty-six, range three west, Willamette Meridian. Two claims of twenty acres each were located and named Silica No.1, and Silica No. 2. These two comprise the west half and the east half respectively of the northeast quarter of the southeast quarter of section thirty. The southeast quarter of the southeast quarter of section thirty is patented land and held by lease. The total area of the ground is eighty acres.

The climate in this part of southwestern Oregon is very mild, and winters are never severe. Operations can be carried on throughout the full year.

GEOLOGY:-

The deposit is an elongated body of creamy white quartz whose exposed surface is roughly one thousand feet in length in a north-south direction, and whose width east to west

Kenneth B. Faulder

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averages about three hundred and fifty feet. It is flanked on its western margin by a body of limestone of undetermined extent, and its eastern boundary is a fine grained dark colored basic igneous rock which is classified broadly as greenstone. The quartz is microcrystalline, and its origin probably is pegmatic. It has been subjected to later pressure and movement which has changed its physical characteristics by partial metamorphism. Evidence of shearing action can be noted at many of the cleavage and fracture planes. The mineral was thought to be quartzite rather than quartz due to its microcrystalline texture, and also because of its geological features. A thin section of the material showed clearly the sharp margins of the crystals under the microscope with no evidence of secondary silica as a cementing medium. This is usually present in quartzite. There are no other minerals present. Feldspars are wholly absent, and no pyrite was observed. The only foreign mineral is limonite which is present in very small amounts as "stain" along the surfaces of the shrinkage and fracture planes. This has been introduced by surface waters from an outside source. There is but 0.37% of iron in the material. (See Analysis.) The cleavage planes are uniformly north fifty-five degrees west, and the dip eighty-two degrees east.'

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SAMPLING:-

Two samples were submitted to E. W. Lazell for analysis. The analyses are attached to this report. A general sample was taken consisting of one hundred seventy separate pieces of quartz broken from rock in place, and taken over the entire deposit in order to approximate as nearly as possible an average sample. The second sample, which is shown on the attached analysis was taken from crushed material at the quarry site screened to ten mesh. The analyses were very close in percentage of silica, there being but a difference of 0.28%. The iron and phosphorous were identical, and there was only 0.02% difference in alumina. The almost exact check of the two analyses is an index to the uniformity of the deposit.

TOPOGRAPHY:-

Plate No. 1 shows a profile of the deposit. The line A-A represents the generally north and south strike of the deposit at its maximum point of apex. The angle of slope is uniformly twenty-three degrees toward the south. The surface exposure of the deposit also slopes at approximately the same angle toward the east in its lesser dimension as shown in lines B-B and C-C. The general contour of the deposit is such that very cheap quarrying can be conducted progressively from the site which is now opened.

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ASSURED MINERAL:-

The surface area of the deposit as shown on Plate No. 2 in true plan is approximately three hundred seventy thousand square feet. The quartz has a specific gravity of 2.6, and weighs one hundred sixty five pounds per cubic foot, or thirteen cubic feet to the ton. There are twenty-eight thousand tons of quartz per vertical foot of depth. The assured mineral in this deposit can be safely assumed to be at least one hundred feet deep, although it is quite certain that it will extend at least to a depth equal to the difference in elevation between the ends of the deposit. This exceeds four hundred feet at the point of highest elevation of the surface exposure.

SUMMARY:-

This deposit of silica is of considerable commercial importance. Although there are several silica deposits in the northwest, both quartz and quartzite, the only ones approaching the Bristol property in purity and magnitude are north of Spokane, Washington. The distance by rail from the Bristol property to Portland is over a hundred miles shorter than from the deposits near Spokane. A detailed study of the silica deposits adjacent to the lower Columbia River industrial area, together with a comprehensive treatise on the technology of silica, was conducted by Dr. Edwin T. Hodge,

Kenneth Hamilton

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consulting geologist for the Corps of Engineers, U. S. Army. This has been published in two volumes, comprising 408 pages, under the date of January, 1938. No mention is made of the Bristol deposit as it was discovered after that date.

The deposit is close to rail and highway transportation, and quarry costs will be very low.

There is no overburden on the property which would have to be stripped, and which would be a source of contamination.

The high percentage of silica and extremely low percentage of impurities makes this material suitable for most chemical, metallurgical or refractory uses.

There are at least three million tons of high grade silica which can be economically quarried in this deposit. Exploration by diamond drilling should be done to determine the true extent of the deposit. This should greatly increase the tonnage.



Kenneth E. Chamberlain

E. W. LAZELL, PH. D.
CHEMICAL AND EFFICIENCY ENGINEER
CHEMICAL AND PHYSICAL LABORATORIES
537 RAILWAY EXCHANGE BUILDING
PORTLAND, OREGON

Oct. 21, 1938

Mr. Kenneth Hamblen
Lumberman's Bldg.
Portland, Oregon.

Dear Sir;-

I report the analysis of two samples of quartzite submitted by you.

Laboratory No. 39431 - Chicken Grit

| | | | |
|---|---|---|---|
| Silica ..... | 98.52 % | | |
| Ferric Oxide ..... | .54 | = | .37 Fe. |
| Alumina ..... | .10 | | |
| Calcium Oxide ..... | None | | |
| Magnesia ..... | Trace | | |
| Phosphoric anhydride ..... | .018 | = | .003 P. |
| Loss on ignition ..... | .80 | | |

Laboratory No. 39432 - Average Sample of deposit

| | | | |
|---|---|---|---|
| Silica ..... | 98.24 | | |
| Ferric Oxide ..... | .54 | = | .37 Fe. |
| Alumina ..... | .12 | | |
| Calcium Oxide ..... | None | | |
| Magnesia ..... | Trace | | |
| Phosphoric Anhydride ..... | .018 | = | .003 P. |
| Loss on ignition ..... | .96 | | |

Respectfully submitted,

E W Lazell

Quadruplicate.

200 Ft Below Apex

BRISTOL LIMESTONE Gold Hill District Jackson County

Owner & Operator: No. operation. Claims held by location, August 1937, by F. I. Bristol, Rogue River, W. B. Sullivan, and Kenneth E. Hamblen, Portland, Oregon.

Location: NW¼ sec. 6, T. 37 S., R. 3 W.; and SW¼ sec. 31, T. 36 S., R. 3 W., Jackson County, north of the Left Fork of Foots Creek, at elevations ranging from 1800' to 2200'.

Area: Nine placer claims, named Limestone no. 1 to Limestone no. 9, unpatented, recorded at Medford, Oregon.

History: Property was located in 1937 by studying maps of limestone outcrops, and then following the trend of these.

Development: No development work, other than several pits which serve as assessment work. Trails have been brushed out, which facilitated measuring limestone body and estimating total tonnage.

Equipment: None

Transportation: County highway up Foots Cr., and up Left Fork of Foots Creek. Very poor road up to elev. of about 1700'. A 5% grade over a road 2.1 miles can be constructed from the lower end of the quarry site, to the junction of the Left Fork and Main Fork roads. Construction would be of the bulldozer type and cost would be a minimum. No data on right-of-way easements for such a road.

Mining Facilities: Water appears to be scarce; power is on Left Fork road, a distance of not over 1 mile from quarry site; there is plenty of timber, mostly fir. Climate is similar to that at Grants Pass. No data on water rights, or length of water season.

Topography: is semi-mountainous with very steep hillsides. The deposit is virtually bounded by a hillside on the southwest end which would facilitate quarry operations. Vegetation cover is principally brush of the manzanita-buckthorn-madrona type, with widely spaced 12" - 18" fir trees.

Geology: This is the area of ~~Paleozoic~~ meta-sediments and meta-igneous rocks of Mesozoic (?) age, as indicated by F. G. Wells on the Medford geologic map. This series includes lenticular limestones that, in this region, trend about N. 19 E., to N. 22 E., or about magnetic north. Dip is almost vertical. There is some evidence of an E-W fault that displaces the limestone about 500 feet to the west, halfway up the hillside. The lense seems to average from 200' to 600' in width (Hamblen and Bristol have surveyed the lense and mapped its width at frequent intervals). The horizontal extension is over 1000 feet as it continues across two 1/16th sections. Quality is reported to be 97% plus $CaCO_3$. Very little iron.

Geology (continued)

The limestone is dark in color and is twisted and contorted by shearing stresses. White calcite has formed, generally parallel to the shearing lines, and there are occasional knots or "augen" of white calcite.

Economics: It is planned to start quarrying limestone at the southwest corner of the deposit, and establish a quarry face along the eastern side which will permit at least 300-600 feet of face. There is a reasonable amount of dump space in the creek canyon. The bunker is to be constructed below the quarry face and farther to the southwest. There is undoubtedly a large quantity of limestone available; whether it is in the order of a million tons or not was not determined within the short time spent on the property. But certainly it is sufficient to justify opening a quarry for agricultural and paper-mill limestone. Quantity and quality seem to be satisfactory; quarrying conditions tend to be favorable for low costs, road construction should be low in cost.

Hand-specimens:

No. G.P.-30, NW¼ NW¼ sec. 6, T. 37 S., R. 3 W., about 250' east of Twp. line and 850' south of range line, at an elevation of 1925'.

No. G.P.331, S½ SW¼ SW¼ sec. 31, T. 36 S., R. 3 W., about 250' east of Twp. line and 15' north of range line, at an elevation of 2150'.

No. G.P.-32, W½ SW¼ NW¼ sec. 6, T. 37 S., R. 3 W., from a lense southeast of the lense mentioned above. Elevation of 1900'.

No. G. P.-33, E½ SE¼ NE¼ sec. 1, T. 37 S., R. 4 W., from outcrop prospected at one time by cement company. This outcrop is probably part of the same one as sampled by no. G.P.-32. Elevation of 1700'

Informant: F. I. Bristol and Ray C. Treasher
Report Made by: Ray C. Treasher
Date: January 23rd, 1940.

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Recommendations & Conclusions:

Hamblen's estimate of a million tons, I believe, is not far from correct. The analyses were made by Lazell, a number of years ago, and Lazell could produce no report, so these analyses may be open to question. Quarrying conditions are excellent, as the quarry operations will take advantage of the natural cleavage of the rock to assist in breaking. (natural cleavage is practically vertical) Dump room seems to be ample if properly handled. Bristol and Hamblen have had experience with this type of material, and it has been my experience that they tend to be rather conservative with their estimates, and understand methods of sampling to prove an ore body, and working conditions necessary for successful operation

Ray C. Treasher.

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PORTLAND 1, OREGON
PHONE:--CAPITOL 6-2161...Extension 488

Hollis Dole was born in Grants Pass, Oregon...took geology at the University of Oregon...then went to work for the State Department of Geology and Mineral Industries here in the State.

World War II, he served in the Navy...I think he came out as a Lieutenant Commander. He had several interesting experiences in the South Pacific...another Naval Officer with equal rank, and Hollie went into Guadalcanal to look it over for the eventual shore installation, by the navy, and spent quite a lot of time together...this pal and buddy happened to be Richard Nixon. Hollis Dole and I have been in Washington together to testify on mineral policies, and I can assure that Richard Nixon thought a great deal of Hollis Dole.

After the war was over, Hollis Dole did his graduate work in Geology at the University of Utah, and then returned to work for the Department of Geology and Mineral Industries. I know for a fact that he has been offered more than twice his present salary, to go to work for such companies as the Aluminum Company of America, Reynolds Metals and others. He loves his work, has a tremendously deep interest in the development of minerals in the State of Oregon. He has a remarkable ability to get along with people of all political parties. He is basically a conservative Republican, maybe I should say an extreme free enterpriser. You can't be in the mining business and be a success without that. Hollis Dole is extremely able, in the mining field, and has that rare quality of having a great deal of ability in practical politics. I can assure you that he will be of great help to you on any question that arises regarding any mineral deposit in Oregon, the personality of the people involved, and the political background on any particular mineral.

SAM H. WILLISTON
CORDERO MINING COMPANY
131 UNIVERSITY AVENUE
PALO ALTO, CALIFORNIA

PHONE:--DAVENPORT 5-3254

Sam Williston spent a great deal of time in Oregon. He lived on Lake Oswego, just outside of Portland, and his mining company maintained their offices in Portland. During the 30's he had prospecting crews swarming the State of Oregon, and operated quite a number of mines, also did a lot of development work on prospects in the State of Oregon.

He became President of the Oregon Mining Association, and actually was the "sparkplug" of the Oregon Mining Association.

During World War II, was very active in hearings before the Senate Military Affairs Committee, who developed what mineral programs we had that were successful during the war. Sam became vitally interested in preserving our domestic mining industry,and has been very active.

I spent a lot of time with Sam Williston in Washington, D.C., when he was in charge of supply of raw materials, "The Defense Minerals Administration", during the Korean conflict. He eventually resigned, feeling he would do more good outside than inside. He is considered by the mining industry to be the best informed man in the world on "strategic and critical minerals". Sam has two jobs.. one is running the Cordero Mining Company, which is the mining division of the Sun Oil Company, also associated with another company in Baltimore, Maryland, top surveryors of oil wells.

Sam Williston, more or less commutes between Palo Alto and Baltimore, Maryland...probably spending a week a month in Baltimore.

Sam is very independent in his thinking. He is tremendously worried about the United States of America, and will do anything for it. He is a prospector and inventor at heart, and a free enterpriser from the word go...

HARRY MOFFETT
AMERICAN MINING CONGRESS
RING BUILDING
WASHINGTON 6, D.C

PHONE:--DIAMOND 7-2900

You will enjoy Harry Moffett, he is the man on the hill for the American Mining Congress. He can get you information on mining, but it will reflect the viewpoint, more of the major mining companies than would be reflected by Sam and Hollis Dole. He would have more accurate information, readily available to you, than the Bureau of Mines or the Geological Survey ever thought of having. I have known Harry about ten years, and found him a rather wonderful fellow to work with.

Recognizing that a healthy domestic mining industry is vital to the State's and Nation's economy, and in order that the minerals industry may provide an essential mobilization base for any national emergency, the Party adopts the following plank in its minerals platform:

(1) A consistent minerals policy designed to insure an economically sound and stable domestic mining industry should be adopted immediately by the National Government. Strategic minerals production has declined to a dangerously low level and our needs are now almost entirely supplied from foreign sources which are wholly vulnerable to blockade in time of war. We are courting disaster when we allow our mines to shut down or become anemic because of foreign competition, some of it supported by United States assistance.

(2) Research in both mining and metallurgy should be accelerated so that there may be discovery and development of new mineral resources and metal products.

(3) Power of federal agencies to withdraw public lands should be restricted unless and until such withdrawals are approved by Congress.

(4) Specified uses, among other listed multiple uses in public lands legislation, must include prospecting and mining if we are to discover new mineral deposits necessary for our economic health and security, and if our public lands are not to become only playgrounds for the favored few.

Recognizing that a healthy domestic mining industry is vital to the State's and Nation's economy and security, and that it may provide an essential mobilization base for a possible future emergency, the Party adopts the following as its minerals platform:

The immediate adoption of a policy at the national level that will insure an economically sound and healthy domestic mining industry; strategic minerals, which are now largely imported but are found domestically, to be investigated and allowed to develop in order that they may be available for expansion during times of emergency; assurance that domestic mineral resources, necessary to satisfy industrial and security needs, be kept open and available for production; research and mineral and metallurgical investigations at both the State and Government level be accelerated in order to meet the requirements of the Nation so that there may be a wise and efficient development of mineral resources.

July 21st 1950

WE CAN PRODUCE HIGH GRADE CHROME ORE

By Fayette I. Bristol, Rogue River, Oregon.

This paper is being written as the United States is undergoing partial mobilization to fight a war in Korea with very good chances of it breaking out in other parts of the world.

As of today there is no domestic production of chrome ore in the United States. Our stock-pile of chrome ore is very short.

The writers background in domestic chrome ore production is as follows;

Was a chrome ore producer in 1942, 1943 and 1944.

Was chairman of Military Affairs Committee hearing and an R F C hearing held in Grants Pass, Oregon. Out of these meetings came the establishment of local buying depots for strategic minerals during the war.

President of Oregon Mining Association and member of American Institute of Mining and Metalurgical Engrs.

During the war with Germany and Japan substantial production of high grade chrome was made. The stock-pile at Grants Pass, Oregon received approximately 50% of the high grade chrome produced and production continued up to and including the spring of 1949 when operating costs climbed above the market price.

This area of chrome ore producing mines is throughout Jackson, Josephine and Curry counties in Oregon and Siskiyou and Del Norte counties in California.

All of this country is very rugged. In most cases the chrome mines are on high ridges where much snow is encountered during the winter. Truck hauls will avarage 60 miles. A very few mines can operate during the winter although the climate in the valleys is very mild.

There are in this area approximately 350 mines and prospects from which some chrome ore can be produced.

Chrome ore occurs in irregular kidneys in the Peridotites. The remarkable thing about these kidneys is that the best place to look for another one is in the neighborhood of the one you have just finished mining out. It is very rare that a chrome mine has any real tonnage blocked out. Development work is the biggest part of the cost.

The largest producers in World War I were the largest producers in World War II, even though most of them were considered worked out in World War I.

The modern bulldozer opened up many new areas in World War II.

So today after producing more chrome ore than we thought possible during World War II there is now more high grade chrome ore indicated than was the case in 1941.

In 1941 it was possible to get good miners in this area for $26.00 per week.

The price paid for chrome ore during 1942 and 1943 was based on this wage scale.

It so happens that as of the present the lumber mills have moved into this area and it is enjoying the highest wages in the U. S., plus a boom.

The men in the woods are now getting $85. to $100. per week and are the same type of help needed to mine chrome ore.

The foregoing are the basic problems of producing chrome ore.

This area can produce;

30,000 tons of Metalurgical grade chrome ore in 1951
75,000 " " " " " " " 1952
110,000 " " " " " " " 1953

To do this the following must be done;

Program made effective by September 1, 1950, delivery to be accepted in Grants Pass, Oregon and Yreka, California after this date in carload lots and truck load lots by January 1, 1951.

Prices good through 1953.

As the grade of chrome ore delivered will depend more on the price structure than anything else, the price must favor the highest grade.

Basic price

$120.00 per long dry ton of 2240 pounds for ores and concentrates analyzing as follows;

| | |
|---|---|
| Chromic oxide ($Cr_2O_3$) | 48.00% |
| Chromium (Cr) to iron (Fe) ratio | 3.00:1 |

(The chromium (Cr) content of any ore or concentrates is 68.4% of the chromic oxide ($Cr_2O_3$) content)

Premiums

Chromic oxide content - above 48%: $5.00 per ton for each 1% of chromic oxide content.

Chromium to iron ratio - above 3.00 to 1: $5.00 per ton for each 0.10 to 1 ratio up to but not exceeding 4.00 to 1.

Penalties

Chromic oxide content - below 48%: $4.00 per ton for each 1% of chromic oxide content down to and including 40%

Chromium to iron ratio - below 3.00 to 1: $3.00 per ton for each 0.10 to 1 ratio down to and including 2 to 1.

This price schedule means paying approximately $50.00 per ton premium for domestic chrome ore or a total cost to the nation of $5,000,000. per year to insure a supply of high grade chrome ore.

During the war with Germany and Japan over 63 of the first 68 boats carrying chrome ore to the U. S., were sunk. So the cost of $5,000,000. per 100,000 tons would be a real saving.

Taxes would recover a substantial portion of the $5,000,000.

July 20th 1950

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All of this country is very rugged. In most cases the chrome mines are on high ridges where much snow is encountered during the winter. Truck hauls will average 60 miles. A very few mines can operate during the winter although the climate in the valleys is mild.

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Prices good through 1953.

As the grade of chrome ore delivered will depend more on the price structure than anything else. The price must favor the highest grade.

Basic Price

$130.00 per long dry ton of 2240 pounds for ores and concentrates analyzing as follows;

| | |
|---|---|
| Chromic oxide ($Cr_2O_3$) | 48.00% |
| Chromium (Cr) to iron (Fe) ratio | 3.00:1 |

(The chromium (Cr) content of any ore or concentrates is 68.4% of the chromic oxide ($Cr_2O_3$) content)

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Chromium to iron ratio - Above 3.00 to 1: $5.00 per ton for each 0.10 to 1 ratio up to but not exceeding 4.00 to 1

Penalties

Chromic Oxide content - Below 48%: $4.00 per ton for each 1% of chromic oxide content down to and including 40%

Chromium to iron ratio - Below 3.00 to 1: $3.00 per ton for each 0.10 to 1 ratio down to and including 2 to 1.

This price schedule means paying approximately $60.00 per ton premium for domestic chrome ore or a total cost to the nation of $5,000,000. per year to insure a supply of high grade chrome ore.

During the war with Germany and Japan over 65 of the first 68 boats carrying chrome ore to the U. S., were sunk. So the cost of $5,000,000. per 100,000 tons would be a real saving.

Taxes would recover a substantial portion of the $5,000,000.

THE STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
702 Woodlark Building
Portland 5, Oregon.

(C O P Y)

Report on

# THE BRISTOL SILICA DEPOSIT

Jackson County, Oregon

by

Preston E. Hotz

United States Geological Survey
Grants Pass, Oregon
January, 1942.

Analysis by E.P.W. Harding, Portland, Oregon, Aug. 31, 1937.

| | |
|---|---|
| Silica | 98.52 |
| Loss on Ignition | 0.20 |
| Ferric Oxide | 0.38 |
| Aluminum Oxide | 0.24 |
| CaO | 0.74 |
| Magnesium Oxide | 0.36 |

Analysis by E.W. Lazell, Portland, Oregon, Oct. 21, 1938, for Mr. Kenneth Hamblen

Laboritory No. 39431 - Chicken Grit

| | | |
|---|---|---|
| Silica | 98.52 | |
| Ferric Oxide | 0.54 | or 0,37 Fe |
| Alumina | 0.10 | |
| Calcium Oxide | None | |
| Magnesia | Trace | |
| Phosphorus Anhydride | 0.018 | Or 0.003 P |
| Loss on Ignition | 0.80 | |

Laboratory No. 39432 - Average Sample of Deposit

| | | |
|---|---|---|
| Silica | 98.24 | |
| Ferric Oxide | 0.54 | or 0.37 Fe |
| Alumina | 0.12 | |
| Calcium Oxide | None | |
| Magnesia | Trace | |
| Phosphorus Anhydride | 0.018 | or 0.003 P |
| Loss on Ignition | 0.96 | |

Analysis headed "Nixon Analysis"

| | |
|---|---|
| Iron | 0.48 |
| Phos | 0.039 |
| Alumina | 0.027 |
| Silica | 98.71 |
| Loss on Ignition | 0.41 |
| | 99.909 |

(C O P Y)

BRISTOL SILICA COMPANY — Gold Hill District

Owner: F.I. Bristol, Grants Pass, Oregon.

Location: SE.¼ sec. 30, T. 36 S., R. 3 W., in Jackson County, about 5 miles from the town of Rogue River. Material is trucked 1½ miles over good dirt road to highway No. 99 and thence 3½ miles on Highway No. 99 to the town of Rogue River.

Area: The total area is 80 acres; two claims of 20 acres each were located in the NE.¼ of the SE.¼ of sec. 30 and the SE.¼ of the SE.¼ is patented and held by lease.

History: This deposit has been discovered only recently. The detail study of silica deposits adjacent to the lower Columbia River industrial area, conducted by Dr. Edwin T. Hodge, Consultant Geologist for the Corps of Engineers, U.S. Army, during 1937, had no information on this deposit. Discovery and development has been subsequent to that time.

Equipment: No information has been submitted concerning the equipment on the silica property.

Geology: "The deposit is an elongated body of creamy white quartz whose exposed surface is roughly one thousand feet in length in a north-south direction, and whose width east to west averages about 350 feet. It is flanked on its western margin by a body of limestone of undetermined extent, and its eastern boundary is a fine grained dark colored basic igneous rock which is classified broadly as greenstone. The quartz is microcrystalline, and its origin is probably pegmatite. It has been subjected to latter pressure and movement which has changed its physical characteristics by partial metamorphism. Evidence of shearing action can be noted at many of the cleavage and fracture planes. A thin section of the material showed clearly the sharp margin of the crystals under the microscope with no evidence of secondary silica as a cementing medium. There are no other minerals present. Feildspars are wholly absent, and no pyrite was observed. The only foreign mineral is limonite which is present in very small amounts as 'stain' along the surface of the shrinkage ane fracture planes. This has been introduced by surface waters from an outside source. The cleavage planes are uniformly N. 55° W., and the dip 82° E."

Climate: Climate is mild; winters are never severe; operations can be carried on throughout the full year.

Topography: The material lies across the top of the west slope of the river between the right fork of Foots Creek and Galls Creek. The highest elevation is about 2700 feet and the lowest about 1800 feet in a distance of less than a quarter of a mile. The angle of slope is uniformly 23° towards the south. The general contour of the deposit is such that very cheap quarrying can be conducted progressively from the site which is now open.

Development: Very little development work has been done on the property; only sufficient to remove silica required by the sales department of the company. The deposit has not been sampled in detail nor has its extent been proven by drilling.

Analysis: TThefollowing analysis have been submitted for this material:

| | Analysis No. 1 | Analysis No. 2 | Analysis No. 3 |
|---|---|---|---|
| Silica | 98.52% | 98.24% | 98.71% |
| Ferric Oxide | .54 = ,37 Fe | .54 = .37 Fe | .48 |
| Alumine | .10 | .12 | .27 |
| Calcium Oxide | None | None | |
| Magnesia | Trace | Trace | |
| Phosphorus Anhydride | .018 = .003 P | .018 = .003 P | .089 |
| Loss on ignition | .80 | .96 | .41 |

Analysis Nos. 1 and 2 are by E.W. Lazell, Ph. D., Portland, Oregon, and No. 3 is by Lerch Brothers Incorporated, Hibbing, Minnesota.

Quantity: The surface of the exposed quartz is approximately 370,000 square feet, which, based on weight of 165 pounds per cubic foot, would be 28,000 tons per vertical foot of depth. A conservative estimate of the depth of the deposit is 100 feet, which gives an assured tonnage of 3,000,000 tons minimum.

Metallurgy: The silica is crushed at the company's plant in Rogue River. The plant is adjacent to the main line of the Southern Pacific Railroad. At present the use of the material is largely confoned to chicken grit. The quartz is crushed according to specifications received from the purchaser. No data has been submitted on the details of the crushing plant.

Recommrndations: Additional markets for this material might be found in the pre-cast stone industry and as metallurgical silica. Reference to the analysis will show that this rock has a high degree of purity and in event of the industrial developmen of the lower Columbia River area and the use of power in heavy industries, this rock should find a useful application. Material very simular to this from the Merit Silica Deposit, Chelan County, Washinton, is reported to be suitable for the manufature of fused quartzware.

Informant: Kenneth Hamblen
Owner
Press Reports
R.C. Treasher

Reference: Kenneth Hamblen's Report (quoted)

(C O P Y)

Mr. F.I. Bristol
Bristol Silica Co.
Rogue River, Oregon.

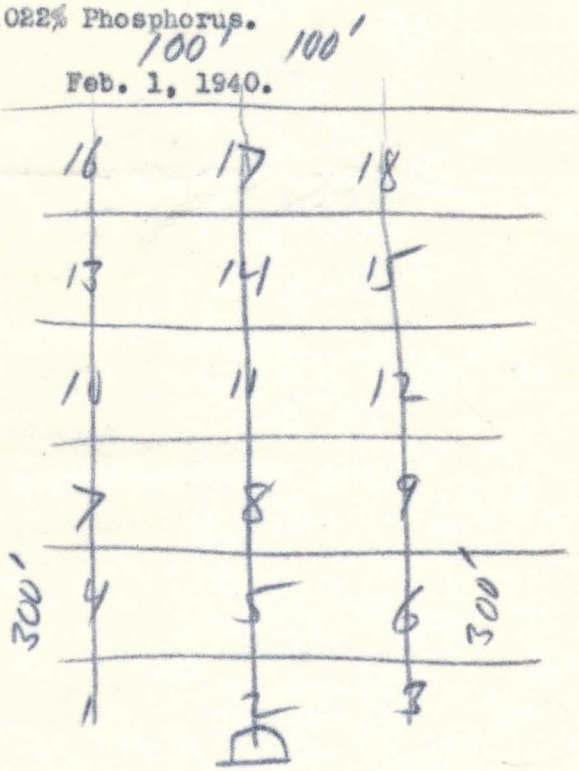
Electro-Metallurgical Sales Corporation
Analysis Received May 15, 1939.

$SiO_2$..... 99.54%
$Fe_2O_3$..... 0.15
$Al_2O_3$..... 0.06
CaO plus MgO..... 0.14
$P_2O_5$..... 0.11 P equals 0.048%

Cannot use rock exceeding 0.05 $P_2O_5$ or 0.022% Phosphorus.

Electro-Metallurgical Sales Corporation Feb. 1, 1940.

| Sample No. | $SiO_2$ | Phos. |
|---|---|---|
| 1 | 99.14 | 0.089 |
| 2 | 99.58 | 0.029 |
| 3 | 98.48 | 0.178 |
| 4 | 99.40 | 0.019 |
| 5 | 99.52 | 0.034 |
| 6 | 99.56 | 0.048 |
| 7 | 99.62 | 0.043 |
| 8 | 99.15 | 0.041 |
| 9 | 98.78 | 0.116 |
| 10 | 99.49 | 0.042 |
| 11 | 99.60 | 0.035 |
| 12 | 98.92 | 0.11 |
| 13 | 99.62 | 0.041 |
| 14 | 99.67 | 0.033 |
| 15 | 98.91 | 0.084 |
| 16 | 99.61 | 0.029 |
| 17 | 99.57 | 0.030 |
| 18 | 99.26 | 0.057 |




With one exception, namely sample No. 4, all the samples are disappointingly high in phosphorus content, and a number of them considerably higher then we would care to tolerate.

However, as I advised in the Dec. 15th letter the problem of elimination of the phosphorus may not be ânsurmountable , and we suggest, therefore, that you maintain your record of locations from which these samples were taked intact so that more exhaustive surveys may be undertaken when our project has become sufficiently definite to warrent more intensive and exhaustive investigation of the deposit.

We wish to thank you very much for your cooperation and to assure you of our intention to continue to consider your property as a potential source of supply.

Very truly yours,

ELECTRO METALLURGICAL SALES CORPORATION
R.E. Brown, District Manager.

Mr. F. I. Bristol,
Bristol Silica Co.,
Rogue River, Oregon.

Electro-Metallurgical Sales Corporation,
Analysis Received May 15, 1939.

$SiO_2$.....99.54%
$Fe_2O_3$..... 0.15
$Al_2O_3$..... 0.06
CaO plus MgO..... 0.14
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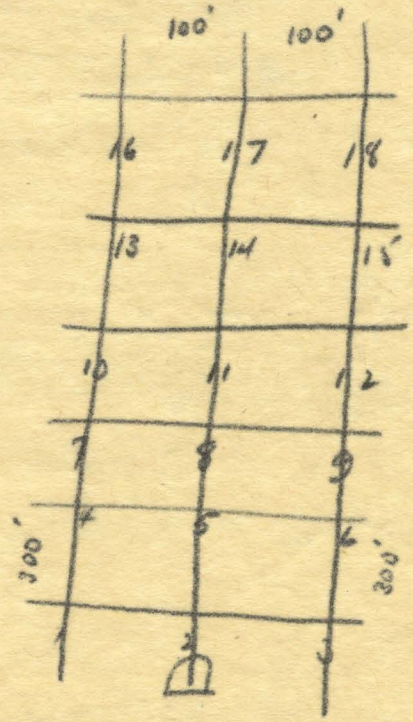


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We wish to thank you very much for your cooperation and to assure you of our intention to continue to consider your property as a potential source of supply.

Very truly yours,

ELECTRO METALLURGICAL SALES CORPORATION
R. E. Brown, District Manager.

Analysis by E. P. W. Harding, Portland, Oreg., Aug. 31, 1937.

| | |
|---|---|
| Silica | 98.52 |
| Loss on Ignition | 0.20 |
| Ferric Oxide | 0.38 |
| Aluminum Oxide | 0.24 |
| CaO | 0.74 |
| Magnesium Oxide | 0.36 |

Analyses by E. W. Lazell, Portland, Oreg., Oct. 21, 1938, for Mr. Kenneth Hamblen

Laboratory No. 39431 - Chicken Grit

| | | |
|---|---|---|
| Silica | 98.52 | |
| Ferric Oxide | 0.54 | or 0.37 Fe |
| Alumina | 0.10 | |
| Calcium Oxide | None | |
| Magnesia | Trace | 0.018 |
| Phosphoric anhydride | 0.018 | or 0.008 P |
| Loss on Ignition | 0.80 | |

Laboratory No. 39432 - Average Sample of Deposit

| | | |
|---|---|---|
| Silica | 98.24 | |
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| Alumina | 0.12 | |
| Calcium Oxide | none | |
| Magnesia | trace | |
| Phosphoric Anhydride | 0.018 | or 0.008 P |
| Loss on Ignition | 0.96 | |

Analysis headed "Nixon Analysis".

| | |
|---|---|
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| Phos | 0.039 |
| Alumina | 0.27 |
| Silica | 98.71 |
| Loss on Ignition | 0.41 |
| | 99.909 |

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
910 State Office Building 1400 SW Fifth Avenue
Portland, Oregon 97201

SPECIAL PAPER 22

# SILICA IN OREGON

By Ronald P. Geitgey
Appendix by Gary L. Baxter
Oregon Department of Geology and Mineral Industries

1990

Conducted and published in conformance with ORS 516.030

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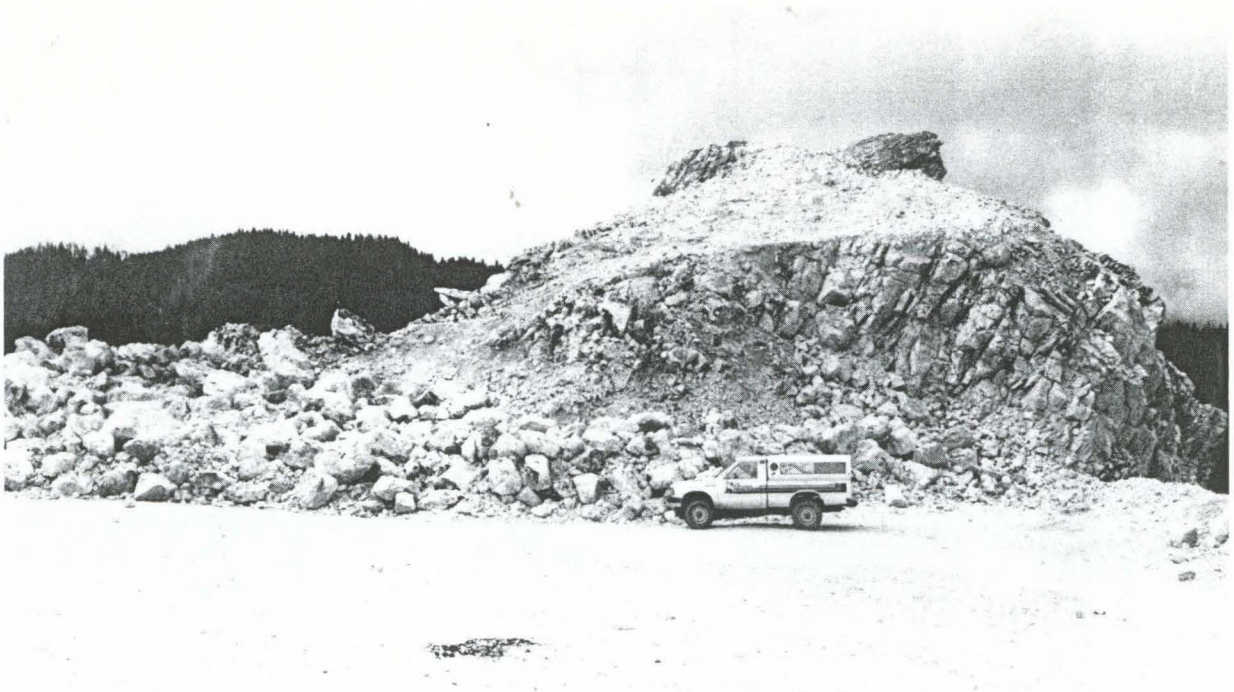

*Figure 3. Quartz Mountain, Douglas County. Quartz replacement body is mined, crushed, and screened on site and shipped by truck to Riddle, Oregon, for use in nickel smelting and ferrosilicon production.*

(G. Rannells, Quartz Mountain, personal communication, 1990).

The geology of the Quartz Mountain silica deposit was described by Ramp (1960). Relict textures indicate the deposit is the result of silicification of a volcanic tuff (Figure 2). Samples 42 and 43 (Plates 1 and 2) were taken from a stockpile and from a working face in the Quartz Mountain pit (Figure 3), respectively.

## BRISTOL SILICA AND LIMESTONE COMPANY

The Bristol Silica and Limestone Company deposit is located in Jackson County about 12 mi northwest of Medford near the towns of Rogue River and Gold Hill (sample locations 44 and 45, Plates 1 and 2). The initial claims were staked in 1937, and production has continued since that time. The silica body appears to be a replacement of a carbonate lens within the Applegate Group (Oregon Department of Geology and Mineral Industries, 1943, page 55; Brooks, 1989, page 47).

The deposit is mined by open-pit methods, and primary crushing is done at the pit (Figure 4). The material is transported by truck to a plant located on a rail line about 5 mi away where it is further crushed, screened, and bagged (Figure 5). Bristol produces crushed quartz in several size ranges for decorative stone, exposed aggregate panels, roofing, poultry grit, nursery bedding, and filter bed media. Past production has been sold for metallurgical uses and for the manufacture of silicon metal and silicon carbide. A small amount of limestone and dolomite also has been produced for agricultural and horticultural markets (A. Starkey, General Manager, Bristol Silica and Limestone Company, personal communication, 1989). Samples 44 and 45 were taken from a pit stockpile and from a crushing plant, respectively.

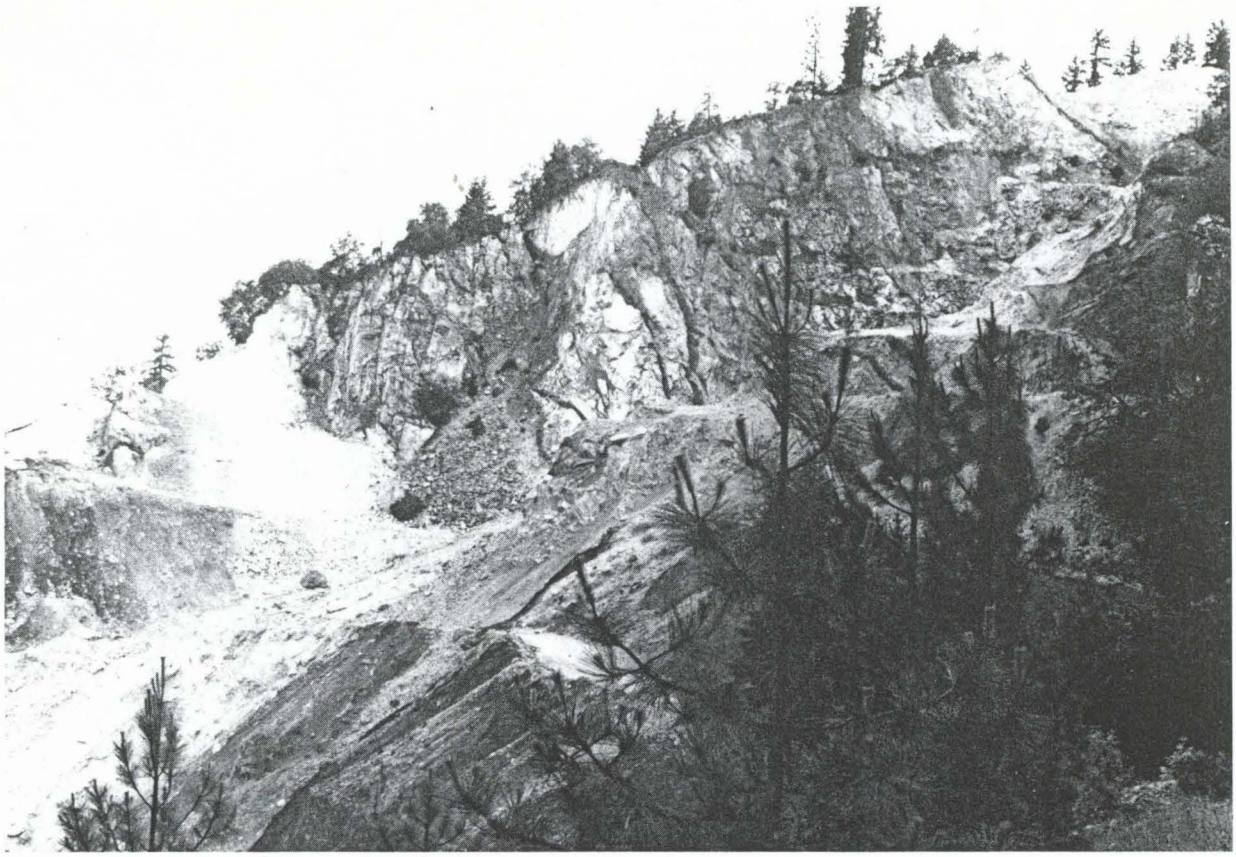

*Figure 4. Main pit of the Bristol Silica and Limestone Company, Jackson County; quartz replacement body in carbonate host rock.*

*Figure 5. A portion of the Bristol Silica and Limestone Company processing plant where crushed quartz from the pit is further crushed, screened, and bagged.*

HG-206, 7, 8, 9
$Al_2O_3$, 7+, $SiO_2$

September 12, 1947

Sample submitted by H. M. Dole

Sample received on September 2, 1947

Analysis requested As reported

Analysis by:

L. L. Hoagland
Assayer

| Lab. No. | Sample Marked | Results of Analysis | | Remarks |
|---|---|---|---|---|
| P-6491 | HG-206 | Silica ($SiO_2$) | 97.10% | |
| | | Iron ($Fe_2O_3$) | 0.97% | |
| | | Alumina ($Al_2O_3$) | 0.96% | |
| P-6492 | HG-207 | Silica ($SiO_2$) | 97.30% | |
| | | Iron ($Fe_2O_3$) | 1.75% | |
| | | Alumina ($Al_2O_3$) | 1.30% | |
| P-6493 | HG-208 | Silica ($SiO_2$) | 55.78% | |
| | | Iron ($Fe_2O_3$) | 9.00% | |
| | | Alumina ($Al_2O_3$) | 22.00% | |
| P-6494 | HG-209-A Washed quartz | Silica ($SiO_2$) | 96.92% | |
| | | Iron ($Fe_2O_3$) | 1.56% | |
| | | Alumina ($Al_2O_3$) | 0.66% | |
| P-6494 | HG-209-B Clay & soil | Silica ($SiO_2$) | 64.68% | |
| | | Iron ($Fe_2O_3$) | 5.20% | |
| | | Alumina ($Al_2O_3$) | 10.50% | |
| * * * * | * * * * | * * * * * * * * * * * * * * * | | * * * * * * * * * * * * * |

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street
Baker, Oregon

1069 State Office Building
Portland 1, Oregon

239 S.E. "H" Street
Grants Pass, Oregon

HG-206, 7, 8, 9
$Al_2O_3$, Fe, $SiO_2$

## REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein as fully as possible and submit this blank filled out along with the sample.

Your name in full H. M. Dole

Post office address P.O. Box 417 Grants Pass, Oregon

Are you a citizen of Oregon Yes Date on which sample is sent 8-28-47

Name (or names) of owners of the property F. I. Bristol

Are you hiring labor?

Name of claim sample obtained from Bristol Silica

Are you milling or shipping ore?

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County Jackson Mining district Gold Hill

Township 36 S Range 3 W Section 30 Quarter section

How far from passable road and name of road right on

| | Channel (length) | Grab | Assay for | Description |
|---|---|---|---|---|
| Sample no. 1 | | x | $Al_2O_3$, Fe, $SiO_2$ | |
| Sample no. 2 | | | | |

(Samples for assay should be at least 1 pound in weight.)

(Signed) H. M. Dole

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Description

| Sample number | GOLD | | SILVER | | | | | |
|---|---|---|---|---|---|---|---|---|
| | oz./T. | Value | oz./T. | Value | | | | |
| | | | | | | | | |
| | | | | | | | | |

Report issued Card filed Report mailed Called for

(over)

SIR-5

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street, Baker, Oregon | 1069 State Office Building, Portland 1, Oregon | 239 S.E. "H" Street, Grants Pass, Oregon

HG-206, 7, 8, 9
$Al_2O_3$, Fe, $SiO_2$

## REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein as fully as possible and submit this blank filled out along with the sample.

Your name in full H. M. Dole

Post office address P.O. Box 417 Grants Pass, Oregon

Are you a citizen of Oregon Yes Date on which sample is sent 8-28-47

Name (or names) of owners of the property F. I. Bristol

Are you hiring labor?

Name of claim sample obtained from Bristol Silica

Are you milling or shipping ore?

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County Jackson Mining district Gold Hill

Township 36 S Range 3 W Section 30 Quarter section

How far from passable road and name of road right on

| | Channel (length) | Grab | Assay for | Description |
|---|---|---|---|---|
| Sample no. 1 | | x | $Al_2O_3$, Fe, $SiO_2$ | |
| Sample no. 2 | | | | |

(Samples for assay should be at least 1 pound in weight.)

(Signed) H. M. Dole

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Description

| Sample number | GOLD oz./T. | GOLD Value | SILVER oz./T. | SILVER Value | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |

Report issued Card filed Report mailed Called for

(over)

SIR-5

HG-206, 7, 8,
$Al_2O_3$, Fe, Si

September 12, 1947

Sample submitted by H. M. Dole

Sample received on September 2, 1947

Analysis requested As reported

Analysis by:

L. L. Hoagland
Assayer

| Lab. No. | Sample Marked | Results of Analysis | | Remarks |
|---|---|---|---|---|
| P-6491 | HG-206 | Silica ($SiO_2$) | 97.10% | |
| | | Iron ($Fe_2O_3$) | 0.97% | |
| | | Alumina ($Al_2O_3$) | 0.96% | |
| P-6492 | HG-207 | Silica ($SiO_2$) | 97.30% | |
| | | Iron ($Fe_2O_3$) | 1.75% | |
| | | Alumina ($Al_2O_3$) | 1.30% | |
| P-6493 | HG-208 | Silica ($SiO_2$) | 55.78% | |
| | | Iron ($Fe_2O_3$) | 9.00% | |
| | | Alumina ($Al_2O_3$) | 22.00% | |
| P-6494 | HG-209-A Washed quartz | Silica ($SiO_2$) | 96.92% | |
| | | Iron ($Fe_2O_3$) | 1.56% | |
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| * * * * | * * * * | * * * * * * * * * * * * * * * | | * * * * * * * * * * * * * |

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

ASSAY REPORT Office Number ~~937-1003~~

Grants Pass, Oregon
Baker, Oregon

August 26 193

Sample submitted by ~~Ted Wallace~~ Gen. Del. Grants Pass, Ore.

Sample description ~~No.1 White quartz, containing a small amount of chalcopyrite & pyrite. 4 lbs. 1" & smaller. No. 2- Greatly altered limonitic material~~ 5 lbs. 1½" & smaller.

The assay results given below are made without charge as provided by Chapter 176, Section 10, Oregon Laws 1937, the sender having complied with the provisions thereof.

NOTICE: The assay results given below are from a sample furnished by the above named person. This department had no part in the taking of the sample and assumes no responsibility, other than the accuracy of the assay of the material as furnished it by the sender.

| Sample Number | GOLD | | SILVER | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ounces per ton | Value | Ounces per ton | Value | Percent | Value | Percent | Value | Total Value |
| No. 1 | 4.18 | 146.30 | 0.8 | .56 | | | | | 146.86 |
| No. 2 | 0.20 | 7.00 | 1.2 | .84 | | | | | 7.84 |

Market Quotations:

Gold $ per oz.
Silver $35.00 per oz.
$ .70 per oz.
$ per oz.

STATE ASSAY LABORATORY

Assayer

Bristol Silica Company.

Located — Plant on railroad siding in town of Rogue River Oregon.

Buildings. 9 bunkers total cap 300 tons. enclosed Warehouse 30'x40' Truck ramp. Office Build

Machinery. 9x18 Fort Wayne Jaw Crusher — 12x24 United Iron Works rolls - 4'x6' mill used as tumbler — ~~two~~, three deck 2½'x5' vibrating screens — 35'x16" conveyor belt 55' - 8x5 Bucket ~~elevator~~. Scales, chutes etc.

Products. Poultry grit and minus 3/8" industrial silic 9 sizes ~~in stock~~ carried in stock.

Raw Material. Trucked 5 miles from deposit in Miller gulch

Owner: F. I. Bristol, Rogue River, Oregon.

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

ASSAY REPORT Office Number 992-S

Grants Pass, Oregon
Baker, Oregon

August 26 1939

Sample submitted by George Hatliff 122 S. Stephens St. Roseburg, Ore.

Sample description No.1-Gray quartz containing a noticeable amount of pyrite.-
2 lbs. 2". No.2-Four pieces of gray, siliceous material containing
a small amount of pyrite.

The assay results given below are made without charge as provided by Chapter 176, Section 10, Oregon Laws 1937, the sender having complied with the provisions thereof.

NOTICE: The assay results given below are from a sample furnished by the above named person. This department had no part in the taking of the sample and assumes no responsibility, other than the accuracy of the assay of the material as furnished it by the sender.

| Sample Number | GOLD | | SILVER | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ounces per ton | Value | Ounces per ton | Value | Percent | Value | Percent | Value | Total Value |
| | Trace | | Blank | | | | | | |
| | 0.01 | .35 | Trace | | | | | | .35 |

Market Quotations:
Gold $35.00 per oz.
Silver $ per oz.
$ per oz.
$ per oz.

STATE ASSAY LABORATORY

Assayer

**Note: Careful quantitative tests failed to show the presence of any tellurium in the sample.**

CRIB MINERAL RESOURCES FILE 12

RECORD IDENTIFICATION
RECORD NO..... M061032
RECORD TYPE..... X1N
COUNTRY/ORGANIZATION. USGS
MAP CODE NO. OF REC..

REPORTER
NAME..... JOHNSON, MAUREEN G.
UPDATED..... 80 12
BY..... FERNS, MARK L.; (BROOKS, HOWARD C.)

NAME AND LOCATION
DEPOSIT NAME..... BRISTOL SILICA CO. MINE

MINING DISTRICT/AREA/SUBDIST. GOLD HILL

COUNTRY CODE..... US
COUNTRY NAME: UNITED STATES

STATE CODE..... OR
STATE NAME: OREGON

COUNTY..... JACKSON

| QUAD SCALE | QUAD NO OR NAME |
|---|---|
| 1: 62500 | GOLD HILL |

| LATITUDE | LONGITUDE |
|---|---|
| 42-24-42N | 123-06-09W |

| UTM NORTHING | UTM EASTING | UTM ZONE NO |
|---|---|---|
| 4695264.8 | 491572.9 | +10 |

TWP..... 36S
RANGE.... 03W
SECTION.. 30
MERIDIAN. WILLAMETTE

LOCATION COMMENTS: SE 1/4

COMMODITY INFORMATION
COMMODITIES PRESENT..... SIL

PRODUCER(PAST OR PRESENT):
MAJOR PRODUCTS.. SIL

COMMODITY SPECIALIST INFORMATION:

EXPLORATION AND DEVELOPMENT

STATUS OF EXPLOR. OR DEV. 6
PROPERTY IS INACTIVE

DESCRIPTION OF DEPOSIT

DEPOSIT TYPES:
REPLACEMENT?
FORM/SHAPE OF DEPOSIT:

SIZE/DIRECTIONAL DATA
SIZE OF DEPOSIT..... SMALL
MAX LENGTH..... 1500 FT
MAX WIDTH..... 250 FT

DESCRIPTION OF WORKINGS
SURFACE

PRODUCTION
YES
SMALL PRODUCTION

| | | | | | |
|---|---|---|---|---|---|
| 23 | ORE EST | 1000.00+ | TONS | 1938-1972 | 99.5+ % SIO2 |

RESERVES ONLY

| ITEM | ACC | AMOUNT | THOUS. UNITS | YEAR | GRADE OR USE |
|---|---|---|---|---|---|
| 1 | | 3000.000 | TONS | 1943 | EST |

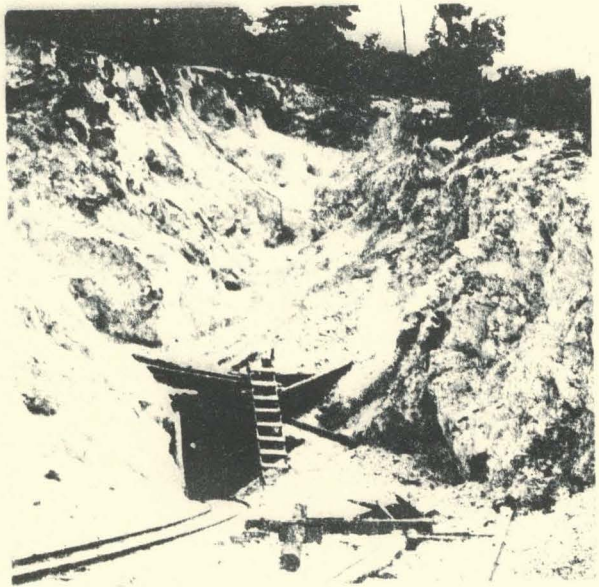
GEOLOGY AND MINERALOGY

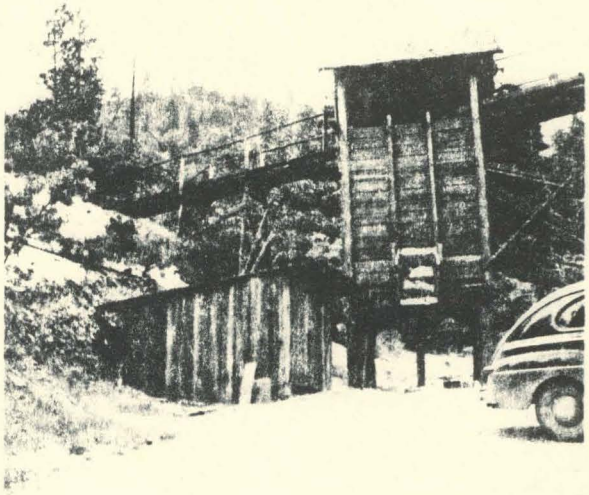
AGE OF HOST ROCKS..... PERM-TRI
HOST ROCK TYPES..... GREENSTONE, METASEDIMENTS

LOCAL GEOLOGY
NAMES/AGE OF FORMATIONS,UNITS,OR ROCK TYPES
1) NAME: APPLEGATE GROUP
AGE: PERM TRI

COMMENTS (GEOLOGY AND MINERALOGY):
DEPOSIT WAS BELIEVED TO BE A REPLACED LIMESTONE

GENERAL REFERENCES
1) MINERAL AND WATER RESOURCES OF OREGON, 1969, ODGMI BULL. 64, P.239
2) OREGON METAL MINES HANDBOOK, 1943, ODGMI BULL. 14-C, VOL. 2, SEC. 2, P.55





# NORTHWEST TESTING LABORATORIES

3828 N. MISSISSIPPI AVENUE
PORTLAND 12, OREGON

MATERIALS INSPECTION
PHYSICAL TESTING
CHEMICAL ANALYSIS
FEEDS AND FERTILIZERS

Febuary 22, 1954

ASSOCIATIONS
EASTERN U. S. AND
FOREIGN COUNTRIES
ESTABLISHED 1890

Bristol Silica Company
Rogue River, Oregon

Subject: Silica Quartz Samples from Rogue River Oregon, (34-35 mesh) order No. 3160.

Report:

Calculated averages for the four car loads of silica sand covered by order number 3160.

SCREEN ANALYSIS

| Screen No. | % Ret'd |
|---|---|
| 10 | 0.00% |
| 20 | 0.045% |
| 28 | 20.253% |
| 35 | 74.594% |
| -35 | 5.108% |

Chemical Analysis

Loss in weight in $H_2PO_4$ treatment. . . . . 0.22%

California Research Corporation specification number 400.20 dated May 21, 1954 was folled in thes analyses.

Respectfully submitted,

NORTHWEST TESTING LABORATORIES

Charles R. Lane

Charles R. Lane

CRL/rr

BRISTOL SILICA COMPANY (silica) Gold Hill District

Owner: F. I. Bristol, Grants Pass, Oregon.

Location: SE.¼ sec. 30, T. 36 S., R. 3 W., in Jackson County, about 5 miles from the town of Rogue River. Material is trucked 1½ miles over a good dirt road to Highway No. 99 and thence 3½ miles on Highway No. 99 to the town of Rogue River.

Area: The total area is 80 acres; two claims of 20 acres each were located in the NE.¼ of the SE.¼ of sec. 30 and the SW.¼ of the SE.¼ is patented and held by lease.

History: This deposit has been discovered only recently. The detail study of silica deposits adjacent to the lower Columbia River industrial area, conducted by Dr. Edwin T. Hodge, Consultant Geologist for the Corp of Engineers, U. S. Army, during 1937, had no information on this deposit. Discovery and development has been subsequent to that time.

Equipment: No information has been submitted concerning the equipment on the silica property.

"Geology: The deposit is an elongated body of creamy white quartz whose exposed surface is roughly one thousand feet in length in a north-south direction, and whose width east to west averages about 350 feet. It is flanked on its western margin by a body of limestone of undetermined extent, and its eastern boundary is a fine grained dark colored basic igneous rock which is classified broadly as greenstone. The quartz is microcrystalline, and its origin probably is pegmatic. It has been subjected to later pressure and movement which has changed its physical characteristics by partial metamorphism. Evidence of shearing action can be noted at many of the cleavage and fracture planes. A thin section of the material showed clearly the sharp margins of the crystals under the microscope with no evidence of secondary silica as of cementing medium. There are no other minerals present. Feldspars are wholly absent, and no pyrite was observed. The

BRISTOL SILICA COMPANY (continued)

only foreign mineral is limonite which is present in very small amounts as 'stain' along the surface of the shrinkage and fracture planes. This has been introduced by surface waters from an outside source. The cleavage planes are uniformly N. 55° W., and the dip 82° E."

Climate: Climate is mild; winters are never severe; operations can be carried on throughout the full year.

Topography: The material lies across the top of and the west slope of the river between the right fork of Foots Creek and Galls Creek. The highest elevation is about 2700 feet and the lowest about 1800 feet in a distance of less than a quarter a mile. The angle of slope is uniformly 23° towards the south. The general contour of the deposit is such that very cheap quarrying can be conducted progressively from the site which is now open.

Development: Very little development work has been done on the property; only sufficient to remove silica required by the sales department of the company. The deposit has not been sampled in detail nor has its extent been proven by drilling.

Analyses: The following analyses have been submitted for this material:

| | Analysis No. 1 | Analysis No. 2 | Analysis No. 3 |
|---|---|---|---|
| Silica | 98.52 % | 98.24 | 98.71 |
| Ferric Oxide | .54 = .37 Fe. | .54 = .37 Fe. | .48 |
| Alumina | .10 | .12 | .27 |
| Calcium Oxide | None | None | |
| Magnesia | Trace | Trace | |
| Phosphoric Anhydride | .018 = .003 P. | .018 = .003 P. | 0.089 |
| Loss on ignition | .80 | .96 | .41 |

Analyses Nos. 1 and 2 are by E. W. Lazell, Ph. D., Portland, Oregon, and No. 3 is by Lerch Brothers Incorporated, Hibbing, Minnesota.

BRISTOL SILICA COMPANY (continued)

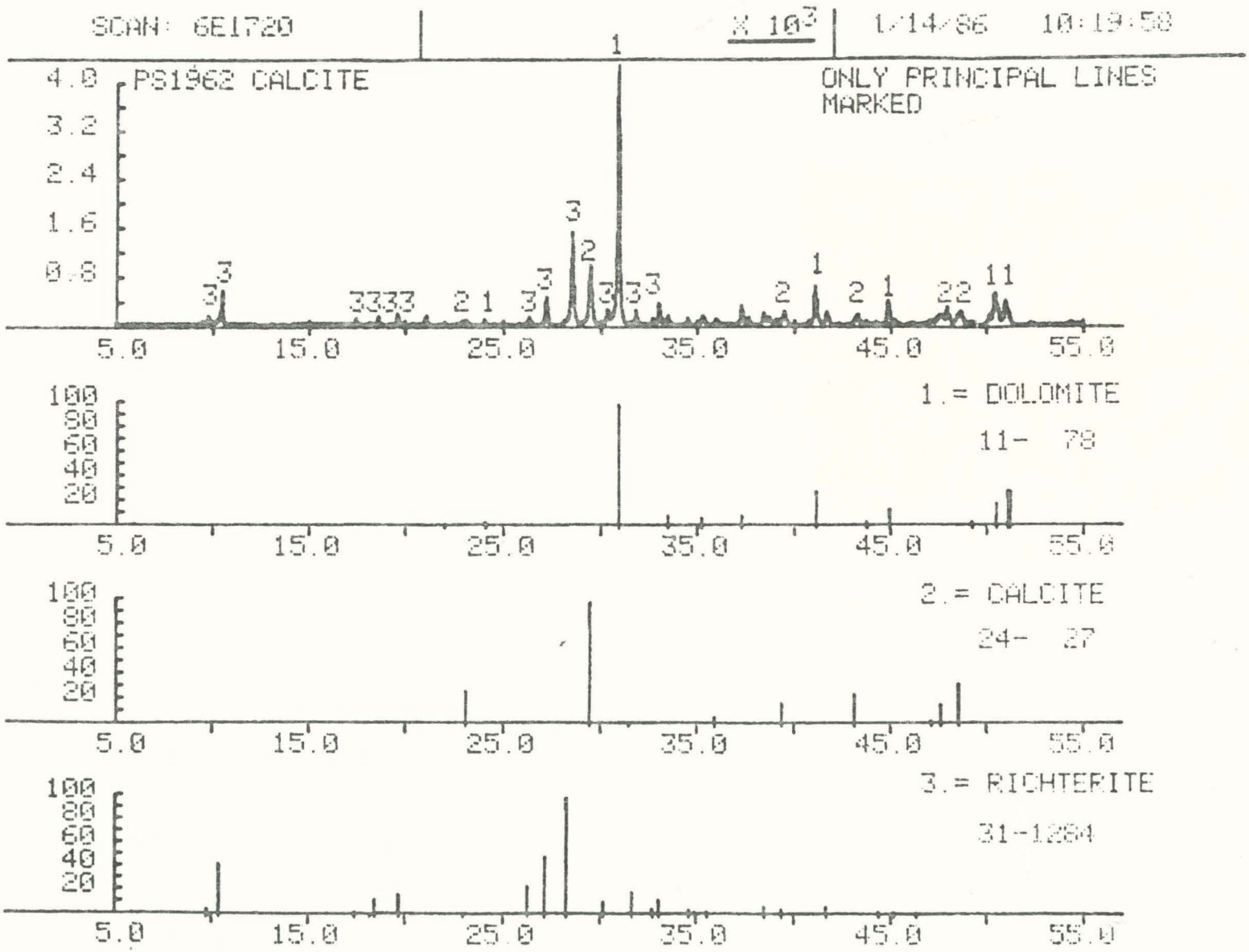
Quantity: The surface of the exposed quartz is approximately 370,000 square feet, which, based on weight of 165 pounds per cubic foot, would be 28,000 tons per vertical foot of depth. A conservative estimate of the depth of the deposit is 100 feet, which gives an assured tonnage of 3,000,000 tons minimum.

Metallurgy: The silica is crushed at the company's plant in Rogue River. The plant is adjacent to the main line of the Southern Pacific Railroad. At present the use of the material is largely confined to chicken grit. The quartz is crushed according to specifications received from the purchaser. No data has been submitted on the details of the crushing plant.

Recommendations: Additional market fro this material might be found in the pre-cast stone industry and use as metallurgic silica. Reference to the analyses will show that this rock has a high degree of purity and in event of the industrial development of the lower Columbia River area and use of power in heavy industries, this rock should find a useful application. Material very similar to this from the Merit Silica Deposit, Chelan County, Washington, is reported to be suitable for the manufacture of fused quartzware.

Informant: Kenneth Hamblen
Owner
Press Reports
R. C. Treasher

Reference: Kenneth Hamblen's Report (quoted)


SCAN: 6E1720
X 10³
1/14/86 10:19:58
PS1962 CALCITE
ONLY PRINCIPAL LINES MARKED
4.0
3.2
2.4
1.6
0.8
5.0
15.0
25.0
35.0
45.0
55.0
1.= DOLOMITE
11- 78
2.= CALCITE
24- 27
3.= RICHTERITE
31-1284
100
80
60
40
20

Bondar-Clegg, Inc.
625 Spice Island Dr.
Building 1, Unit A
Sparks, Nevada 89431
702 (359-9330)

BONDAR-CLEGG

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

# Geochemical Lab Report

REPORT: R90-10803.4

DATE PRINTED: 25-APR-90
PROJECT: NONE GIVEN PAGE 1

| SAMPLE NUMBER | ELEMENT UNITS | Au OPT | Ag OPT |
|---|---|---|---|
| P4 TW3901 | | <0.002 | 0.03 |
| P4 TW3901 | | <0.002 | <0.02 |
| P4 TW3902 | | <0.002 | <0.02 |
| P4 TW3902 | | <0.002 | <0.02 |
| P4 TW3903 | | <0.002 | <0.02 |
| P4 TW3903 | | <0.002 | 0.03 |