ALBERT MARVIN NASH, TRUSTEE

"GOLD HILL NO. 2"

YUKON QUARTZ MINING LEASE NO. 182

(Renewal of Lease No. 27) (File No. 6948)

"SILVER QUEEN"

YUKON QUARTZ MINING LEASE NO. 181

(Renewal of Lease No. 26) (File No. 6968)

"SILVER BASIN NO. 3"

YUKON QUARTZ MINING LEASE NO. 183

(Renewal of Lease No. 28) (File No. 6967)

KENO HILL, MAYO DIVISION OF

DAWSON MINING DISTRICT, YUKON TERRITORY

REPORT BY:

Robert L. Russell
Mining and Geological Engineer
Kellogg, Idaho

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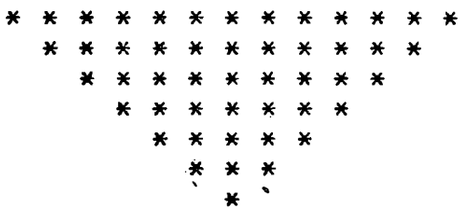

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SUMMARY AND CONCLUSIONS

I have investigated and mapped the Gold Hill No. 2, Silver Queen, and Silver Basin No. 3 claims near the summit of Keno Hill, Yukon Territory, Canada. These claims are located in the center of an intensely mineralized silver-lead bearing area which has been the source of a considerable amount of production of both silver and lead. Several major vein structures, including the productive Comstock-Porcupine, No. 6 and Main vein, can be traced across these claims. In addition, the No. 9 quartzite, a 1,000 ft. thick zone of massive quartzite and the Caribou Hill quartzite occur on these claims. These brittle massive rocks have been the locus of all of the really large orebodies in the Keno Hill area.

I have concluded that these claims, particularly the Gold Hill No. 2 and Silver Queen, should be considered as being unusually favorably located. They should be considered as among the five or six undeveloped individual claims on Keno Hill which show extraordinary promise of becoming producers of high grade silver-lead ores. Production of 18,000 tons of high grade silver ore, assaying about 45 ozs. silver and 12% lead per ton, from the Comstock vein on the adjoining Gold Star Claim extended to within 250 ft. of the end line of the Gold Hill No. 2 claim. This vein can be traced along the surface and across the Gold Hill No. 2 claim. While the surface is largely covered with a thin layer of unfavorable schist, hard quartzite favorable for the occurrence of ore will be encountered at very shallow depth. Knowing that this vein contains an oreshoot on adjacent ground a few hundred feet to the west and that silver-lead ore occurs in several sites at the east end of the claim, together with the favorable thick underlying quartzite, allows me to firmly recommend an intensive exploration program for the Gold Hill No. 2 claim. In fact, even the No. 6 vein will occur

on the Gold Hill No. 2 claim at relatively shallow depth and will be in a hard quartzite environment at that point.

Exploration of the Silver Queen claim is also recommended since very high grade silver assays have been encountered on the Main vein which goes through the claim.

The Silver Basin No. 3 claim is also well located and there are many reported occurrences of high grade silver veins on the adjoining Silver Basin claim and several others.

You are completely vindicated in having paid a large sum of cash for these claims. Having mapped the geology of many of the major silver mines in North Idaho and elsewhere, I can safely say that you are completely justified in actively developing these claims. The indications are that the exploration program outlined herein has very good possibilities of succeeding.

It is indeed unfortunate that the terrain on Keno Hill does not lend itself to exploration by surface trenching and other near surface relatively inexpensive methods. The area of the Silver Basin No. 3 claim is on a steep slope, steeper than can in fact be handled with a bulldozer. While there is considerable outcrop, the friable vein material has been transported down hill or oxidized. The entire Silver Queen claim and the north one-third of the Gold Hill No. 2 claim consist of massive piles of frost-heaved quartzite boulders from one foot square to as large as 15x15 feet. All of the friable vein material in this area has been removed by the frost-heaving action near the surface. The remainder of the claim is covered by overburden or occasional outcrops of Keno Hill schist which overlies the quartzite. Since the schist is totally frozen and the frost-heaved quartzite area is totally impossible to explore by surface exploration, a relatively expensive diamond drilling and underground development program is indicated.

LOCATION AND CLIMATE

The silver-lead deposits of the Mayo District center on Keno and Galena Hills which are located in central Yukon, 35 miles northeast of Mayo and 200 airline miles due north of Whitehorse. The district is reached by an all-weather gravel road from Whitehorse. The property is located near the top of Keno Hill at an elevation of 5,500 to 6,000 feet. The top of Keno Hill is readily accessible by means of a five mile gravel road from Keno City to within 500 feet of the Gold Hill No. 2 claim. The Keno mine of United Keno Hill lies just to the west of the Gold Hill No. 2 claim. The area at this elevation is snow covered from about October 15 to June. Large patches of snow linger on the north-facing slopes of Keno Hill until August. Light snow is not uncommon after September 1 at this elevation. The area in which the property is located is permanently frozen to great depth. Maximum thaw ranges from six inches to three feet. Part of the immediate property area is overlaid by a most unusual feature. A sizeable part of the promontory adjacent to Keno Hill on which the property is located is covered by large quartzite boulders which over the centuries have been heaved up from their outcrop by frost action. That area is a scene of desolation resembling coarse rip-rap used to reduce shore line errosion. The terrain and claimate make surface prospecting of little value.

PROPERTY

The property consists of three mineral claims:

1. "Gold Hill No. 2" mineral claim, lying and being in the Yukon Territory and being composed of Lot 34, Group 1054, situated on Keno Hill in the Mayo Division of the Dawson Mining District as shown on a plan of survey of the said lot, signed by Henry Godkin Dickson, Dominion Land Surveyor, on the 10th day of December, 1920, and approved at Ottowa on the 15th day of July, 1921, by E. M. Dennis, for Surveyor General of Dominion Lands, and of record in the Department of Mines and Technical Surveys under Field Book No. 16982, containing 51.16 acres, more or less, and originally leased pursuant to the Yukon Quartz Mining Act under Yukon Quartz Mining Lease No. 27, File No. 6948, renewal of which Lease No. 27 was granted

to Edward Ovenden Finlaison of the City of Dawson, in the Yukon Territory, under Yukon Quartz Mining Lease No. 182, on the 22nd day of May, 1950, for a term of twenty-one years, to be computed from the 31st day of October, 1949, and renewable for further terms upon the conditions as provided by said Act and the terms and conditions of said Lease; that said Lease No. 182 was thereafter on the 27th day of March, 1958, assigned to the British Columbia Protestant Orphans' Home, of the City of Victoria, in the Province of British Columbia, by The Royal Trust Company of the City of Montreal, in the Province of Quebec, through its branch office in the City of Victoria, in the Province of British Columbia, acting as Executor of the Estate of Edward Ovenden Finlaison, deceased, which said Assignment was entered and registered in the Office of the Mining Recorder at Mayo, Yukon Territory, on the 3rd day of April, 1959, under Number 3816; and that said Lease No. 182 was thereafter on the 9th day of October, 1962, assigned to Albert Marvin Nash, Trustee, of the City of Kellogg, in the County of Shoshone, State of Idaho, by said British Columbia Protestant Orphans' Home of the City of Victoria, in the Province of British Columbia, which said Assignment was entered and registered in the Office of the Mining Recorder at Mayo, Yukon Territory, on the 29th day of October, 1962, under Number 4160.

2. "Silver Queen" mineral claim, lying and being in the Yukon Territory and being composed of Lot 33, Group 1054, situated on Keno Hill in the Mayo Division of the Dawson Mining District as shown on a plan of survey of the said lot, signed by Henry Godkin Dickson, Dominion Land Surveyor, on the 10th day of December, 1920, and approved at Ottawa on the 15th day of July, 1921, by E. M. Dennis, for Surveyor General of Dominion Lands, and of record in the Department of Mines and Technical Surveys under Field Book No. 16982, containing an area of 48.83 acres, more or less, and originally leased pursuant to the Yukon Quartz Mining Act under Yukon Quartz Mining Lease No. 26, File No. 6968, renewal of which Lease No. 26 was granted to Edward Ovenden Finlaison of the City of Dawson, in the Yukon Territory, under Yukon Quartz Mining Lease No. 181, on the 22nd day of May, 1950, for a term of twenty-one years, to be computed from the 31st day of October, 1949, and renewal for further terms upon the conditions as provided by said Act and the terms and conditions of said Lease; that said Lease No. 181 was thereafter on the 27th day of March, 1958, assigned to the British Columbia Protestant Orphans' Home, of the City of Victoria, in the Province of British Columbia, by The Royal Trust Company of the City of Montreal, in the Province of Quebec, through its branch office in the City of Victoria, in the Province of British Columbia, acting as Executor of the Estate of Edward Ovenden Finlaison, deceased, which said Assignment was entered and registered in the Office of the Mining Recorder at Mayo, Yukon Territory, on the 3rd day of April, 1959, under Number 3816; and that said Lease No. 181, was thereafter on the 9th day of October, 1962, assigned to

Albert Marvin Nash, Trustee, of the City of Kellogg, in the County of Shoshone, State of Idaho, by said British Columbia Protestant Orphans' Home, of the City of Victoria, in the Province of British Columbia, which said Assignment was entered and registered in the Office of the Mining Recorder at Mayo, Yukon Territory, on the 29th day of October, 1962, under Number 4160.

3. "Silver Basin No. 3" mineral claim, lying and being in the Yukon Territory and being composed of Lot 42, Group 1054, situated on Keno Hill in the Mayo Division of the Dawson Mining District as shown on a plan of survey of the said lot, signed by Henry Godkin Dickson, Dominion Land Surveyor, on the 10th day of December, 1920, and approved at Ottawa on the 15th day of July, 1921, by E. M. Dennis, for Surveyor General of Dominion Lands, and of record in the Department of Mines and Technical Surveys under Field Book No. 16982, containing an area of 51.65 acres, more or less, and originally leased pursuant to the Yukon Quartz Mining Act under Yukon Quartz Mining Lease No. 28, File No. 6967, renewal of which Lease No. 28 was granted to Edward Ovenden Finlaison of the City of Dawson, in the Yukon Territory, under Yukon Quartz Mining Lease No. 183, on the 22nd day of May, 1950, for a term of twenty-one years, to be computed from the 31st day of October, 1949, and renewable for further terms upon the conditions as provided by said Act and the terms and conditions of said Lease; that said Lease No. 183 was thereafter on the 27th day of March, 1958, assigned to the British Columbia Protestant Orphans' Home, of the City of Victoria, in the Province of British Columbia, by The Royal Trust Company of the City of Montreal, in the Province of Quebec, through its branch office in the City of Victoria, in the Province of British Columbia, acting as Executor of the Estate of Edward Ovenden Finlaison, deceased, which said Assignment was entered and registered in the Office of the Mining Recorder at Mayo, Yukon Territory, on the 3rd day of April, 1959, under Number 3816; and that said Lease No. 183 was thereafter on the 9th day of October, 1962, assigned to Albert Marvin Nash, Trustee, of the City of Kellogg, in the County of Shoshone, State of Idaho, by said British Columbia Protestant Orphans' Home, of the City of Victoria, in the Province of British Columbia, which said Assignment was entered and registered in the Office of the Mining Recorder at Mayo, Yukon Territory, on the 29th day of October, 1962, under No. 4160.

Most of the claims surrounding these three claims were staked at an equally early date and are also held by twenty-one year lease. Many of the bordering claims are held directly by United Keno Hill Mines, Ltd., or Comstock Keno Mines, Ltd. All of the Comstock

Keno claims are held by United Keno Hill under a lease and profit-sharing agreement. The original agreement was for a five-year period, commencing January 1, 1962, and called for a 50-50 split of profits between the two firms. The present agreement, also for a five-year term, commenced January 1, 1969, and renewable for an additional five years, calls for a minimum expenditure of $20,000.00 per year, with a split of 40% to Comstock and 60% to United Keno Hill after costs for mining and treatment.

HISTORY AND PRODUCTION

The first discovery of silver-lead ore in the district was made about 1906 on Galena Creek. It was not until 1919 that samples from the No. 9 vein on Keno Hill were sent to the Yukon Gold Company in Dawson. This company formed Keno Hill, Ltd., which acquired this showing and others and began mining. The Treadwell Yukon Company entered the area in 1921 and began mining on the Ladue claim on Keno Hill. From 1925 to 1936 about 350,000 tons of high grade silver-lead ore was mined from the Sadie-Ladue and Lucky Queen mines on Keno Hill. Upon the exhausting of known orebodies on Keno Hill the mill was moved to Elsa on Galena Hill and the Silver King and Hector mines were operated until 1942. In 1945 Keno Hill Mining Company purchased the assets of Treadwell and later changed the name to United Keno Hill Mines, Ltd. Production was resumed in the Hector-Calumet in 1947 and at the Elsa mine in 1958. By 1958 United Keno Hill had acquired vast holdings on both Keno and Galena Hills. While United Keno Hill has not expanded its holdings greatly since that time, it continues to pick up claims by default of ownership and occasional purchases, provided the capital outlay is nominal. It is not known for its willingness to pay full value for claims.

In about 1960, United Keno Hill began actively exploring the area around the original No. 9 vein on the top of Keno Hill. This area was actively explored and mining from several vein structures such as the Main, No. 9, No. 2 and others took place until about

1967. In addition, the Comstock-Keno area was initially explored in the 1950s. The ore body on Comstock-Keno ground on the Gold Star claim was mined by United Keno Hill between 1963 and 1967 and resulted in the mining of 18,000 tons of ore grading about 45 ozs. silver per ton and 12% lead. Recently United Keno Hill again entered into an operating agreement with Comstock-Keno, agreeing to further develop the Comstock property.

Production from the above sources has resulted in about 2,500,000 tons of silver ore, ranging in value from 30 to 200 ozs. per ton. This has made the area one of the largest silver producing districts in North America.

GENERAL GEOLOGY AND MINERALIZATION OF THE GALENA HILL-KENO HILL AREA

The important geological features in this area are: A southwesterly trending, secondary fold structure referred to as the McQuesten anticline; presence of favorable host rocks - quartzite and greenstone, in particular; and development of vein faults.

The productive silver-lead-zinc deposits occur on the south limb of the McQuesten anticline in proximity to its junction with the Mayo Lake anticline. The axis of the secondary anticline follows the McQuesten river valley and plunges gently southwest down the valley. The south limb dips about 30°-35° SE; the north limb, about 20°-25° NW.

The Keno Hill area is somewhat complicated by closer proximity to the axis of the Mayo Lake anticline and major thrust faulting.

Three stratigraphic sedimentary units of the Yukon group have been mapped in this area: The Lower Schist, Central Quartzite and Upper Schist formations. Practically all of the production has come from the Central Quartzite and therefore this is the most important formation in the district.

Small limestone lenses and minor limy beds occur scattered through the Upper Schist, particularly about 500 ft. above the base

of the unit. A smaller amount of calcareous material occurs in the Central Quartzite but none to date has been found in the Lower Schist.

Numerous sills of dioritic composition, now evidenced by discontinuous greenstone bodies, intrude the Lower Schist and Central Quartzite. A few quartz-feldspar porphyry sills outcrop along the north slope of Keno Hill and the southwest slop of Galena Hill.

Rock Types

Schists and Phyllites. Sericitic, chloritic and graphitic schists occur throughout the three formations but sericitic types predominate, as quartz-sericite, sericite, chlorite-sericite and graphite-sericite schists. The schist rocks in structurally disturbed areas exhibit many small drag-folds, crenulations and white quartz boudins. The phyllites, less foliated than the schists, are slaty and light grey to black in color. They occur in various schist and thin-bedded quartzite members.

Quartzites. Both thick and thin bedded quartzites are found throughout the three formations. Bands of thick-bedded quartzites up to 10 ft. thick, containing no visible bedding, are referred to as massive. More schistose quartzites which tend to part in plates an inch or more in thickness are termed thick-bedded. Less pure quartzites with a pronounced schistosity are referred to as schistose quartzites. Thin bedded quartzites commonly occur in sections of considerable thickness and interbedded with schist.

Limestone. Impure limestone and limy schists and quartzites occur to a minor extent only and appear to be largely confined to certain horizons.

Greenstones. Greenstones occur in elongate sill-like lenses up to 100 ft. or more in thickness. They are massive to somewhat schistose, grey-green rocks composed largely of hornblends, actinolite, plagioclase and chlorite. Originally were diorite or gabbro.

Quartz-feldspar porphyries. Quartz-feldspar porphyries occur scattered through the district as thin, buff-weathering, sill-like bodies composed of quartz, feldspar and muscovite phenocrysts in a similar fine-grained groundmass. Frequently contain disseminated pyrite.

The three principal units forming a belt across Keno and Galena Hill are described below:

1) Lower Schist Formation

The Lower Schist formation underlies the lower north slope of Galena Hill and the top and north slope of Keno Hill. It consists largely of sericite and sericite-graphite schist and is of undertermined thickness, since its lower portion is hidden by deep alluvium of the McQuesten and Ladue valleys. The Lower Schist contains numerous greenstone lenses which outcrop prominently on the lower slopes and form knolls in the McQuesten valley.

2) Central Quartzite Formation

The Central Quartzite formation forms the backbone of both Keno and Galena Hills. It continues southeast from Keno Hill across Bunker and Sourdough Hill into the Mt. Hinton area and westward from Galena Hill under the McQuesten valley. On Galena Hill the Central Quartzite contains three individual quartzite members aggregating 2,400 ft. in thickness. These are the Silver King, Hector-Calumet and Mackeno members. The Central Quartzite on Keno Hill appears to differ from that on Galena Hill in that it contains a 1,200 ft. unit of thick bedded quartzite below the Mackeno member. This prominent member, termed the Number 9 Quartzite (Monument Hill Quartzite by early authors), forms the high spine of Keno Hill and is composed of massive thick-bedded (6 in. to 6 ft.) white to grey quartzite with minor amounts (10%) of highly sheared interbedded graphitic schist. Irregular, discontinuous bulb-like masses of quartz, probably of metamorphic origin, are common. The full thick-

ness of the member is exposed in the steep bluffs of Faro Gulch. On the flat, upland surface it is indicated by an almost continuous area of frost-heaved quartzite boulders; also quartzite talus of the same material forms the slopes of Monument Hill.

No. 9 Quartzite is underlain by 1,000 ft. of thin-bedded quartzite and sericite schist below which is the Caribou Hill Quartzite member. This is 1,000-1,500 ft. thick and consists of thick and thin-bedded quartzite and interbedded schist.

Above the No. 9 Quartzite lies a 1,100 ft. sequence of incompetent schists containing more competent schistose to massive greenstone lenses. This unit, known as the Keno Hill Schist and Greenstone Member, is described from bottom to top as follows:

"Contact Schist"	200 ft. thickness of sericite and sericite-graphite schists.
"Thin-bedded quartzite and greenstone"	Interbedded, think-bedded quartzite, sericite schist, and sericite-graphite schist, with discontinuous lenses of schistose to massive greenstone. Approximately 400 ft. thick.
"Sericite-graphite schist"	Approximately 400 ft. thickness, thin, sheared, graphitic sericite schist.
"Sericite Schist"	Approximately 100 ft. thickness of sericite schist with lesser thin-bedded quartzite.

3) Upper Schist Formation

The Upper Schist formation is composed principally of quartz mica schist, graphitic schist, minor quartzite horizons and a few limestone lenses. The section immediately overlying the Silver King member is characterized by the persistence of a number of limy beds (grading from limy schist to impure limestone) occurring in a highly sheared sericite and quartz sericite schist horizon. Overlying this area are two quartzite horizons separated by about

300 ft. of graphitic quartz sericite schist. These quartzite bands, aggregating about 700 ft. in thickness, are fairly competent, schistose to massive, and light-grey to white; the lower horizon is limy. They are well exposed in Galena Creek canyon above the Silver King bridge; and are indicated to the east across Galena Hill by abundant frost-heaved boulders.

Excluding the major regional thrust faulting, the faults in the district may be divided into the following three types:

1) Bedding faults and low-angle faults

Bedding-fault movement which is pervasive throughout the district is most evident as highly contorted schist beds between more competent quartzites or greenstones. Slippage, however, is evident in predominantly schist horizons where the schist may be completely friable. The low-angle faults have a strike close to the bedding and although they may follow the bedding for some distance, their dip is usually somewhat steeper. They range in width from one to twenty-five feet or more and are thought to be thrust faults although offsets can seldom be measured.

2) Vein Faults

The difference in the nature and strength of the vein faults in different rock types is striking and of important significance. In quartzites and greenstones, the vein faults are breccia and sheeted zones ranging from 5 to 50 ft. in width. Most vein faults in these brittle rocks are composed of angular to rounded breccia fragments, which in most cases are cemented with ore and gangue minerals. There usually exist well-defined gouge-filled fault planes up to several inches in width, although the term gougy can seldom be applied to the veins as a whole. Where quartzites are interlayered with graphitic schist, considerable highly sheared graphite, sericite and gouge may fill part of the vein fracture. There is a definite tendency for strong splits to occur. Such splits may terminate at some distance away from the vein, or return to form a multiple fissure-type vein. If the distance be-

tween strands is not great, the intervening rock may be highly fractured.

In the schists and thin-bedded quartzites, vein faults are represented by narrow fractures and crenulated zones, seldom exceed a foot in width. Movement is largely taken up along the plane of schistosity and in branching fractures.

Vein faults, in passing from competent quartzites and greenstones into schists, reduce immediately in width, often with a noticeable change in strike and dip. The Comstock vein, for example, is a breccia and sheeted zone 5 to 10 feet wide in greenstone, where it dips 65° to 70° S. In passing into the underlying thin-bedded quartzite and sericite schist, it reduces to a tight crenulated zone less than one foot wide which dips 65° north. This bending in the schists further aids in dissipation of the vein fault in the schist as distance from the contact increases. Since the vein faults are of normal displacement, a zone of dilation is formed in the competent rocks near the contact with the schist. Such open zones have often been a favorable site for oreshoots.

3) Cross Faults

Faults which offset vein faults are best designated as cross faults, although there is a strong belief that they may actually predate the ore with most of the offset having occurred after mineralization. A prominent group of northwest-striking, south-dipping cross faults are found on Galena Hill. These include the Brefalt Creek, Arctic, Jack and Hector faults. All are essentially parallel with right lateral displacement.

Vein Fault Systems

Vein faults in the Mayo District have been divided by most geologists into two groups according to their strike. These are termed "longitudinal", where they strike N 50° to 70° E and "transverse" where they are N 0° to 45° E. All dip 50° to 85° S. The transverse veins in several instances appear to occupy tensional links between longitudinal veins. The No. 9 vein system is un-

doubtedly of this nature. On the other hand, the Sadie-Ladue and Lucky Queen systems on Keno Hill gradually curve in strike from about N 55° E, at their northeast extremity to N 20° to 30° E at their south extremity, indicating a concentric fracture pattern. This concentric suggestion can be enlarged to include the Moth, Bellekeno and Shamrock veins to the south.

The strongest vein fault system on Keno Hill is of the longitudinal type, the most important structures being the Comstock, No. 6 and Main veins. These strike N 50° - 60° E and dip steeply southeast. The Onek vein system to the southwest may be the continuation of the above.

The veins on Galena Hill strike N 60° to 80° E and dip steeply south. On the basis of linear trend they form three major systems as follows:

Central System	-	Coral and Wigwam Artic and Mastiff Hector-Calumet Dragon, Mackeno, Formo and Bluebird
Western System	-	Silver King, Elsa, Dixie and No Cash
Eastern System	-	Eagle, Tin Can, etc.

There have been at least two stages of mineralization in the Mayo District. The first stage, which is more evident on Keno Hill than on Galena Hill, deposited quartz, arsenopyrite, pyrite and minor gold in many of the longitudinal veins. Further movement (which was probably more intense) along both longitudinal and transverse vein-faults permitted deposition of minerals of the main or second period of mineralization. Siderite, the principal gangue mineral, was deposited first in the relatively open channelways. This was followed by further deformation and the deposition of sphalerite, galena, freibergite, by both replacement and vein filling. Lessor amounts of quartz, pyrite, chalcopyrite and jamesonite were also deposited during this period.

Thus far, zoning effects have been noted only within individual orebodies. In the Hector-Calumet there is a definite increase

in zinc and a decrease in lead and silver content at the bottom of each ore shoot although the lead-silver ratio remains about the same.

Similarity of Mayo District mineralization to ores of the Silver Belt of the Coeur d'Alene district is striking, although emplacement by fissure filling has played a more important role in the Mayo District than in the Coeur d'Alene.

The early feeling in the district, particularly on the part of Treadwell, was that the silver-lead mineralization extended only to shallow depth. However, subsequent development has shown that the orebodies usually average mine grade at depth. At the Hector-Calumet there is no appreciable change in mineralization to the 1,140-ft. level.

Wall rock alteration has not been extensive, consisting only of limited bleaching and leaching in and immediately adjacent to the vein faults. In the quartzites this consists mainly of removal of the carbonate minerals whereas greenstones are more profoundly altered to schistose masses of carbonate minerals, sericite, pyrite and quartz.

All veins and faults have been oxidized in part to a maximum depth of 500 ft. In the zone of oxidation, the most important effects are the breakdown of siderite, sphalerite, freibergite and pyrite into porous iron oxides (limonite), psilomelane, malachite, plumbojarosite and native silver.

Because of the presence of permafrost, oxidation is far from complete. The upper few feet affected by seasonal thaw are highly oxidized and most of the ore minerals have been removed by percolating ground waters. Galena, however, often remains as anglesite-coated nodules and masses. Within the permafrost zone, oxidation is less complete with siderite being only partly oxidized. Here, silver values are generally somewhat higher than in completely hypogene ores, primarily because of removal of material rather than to actual chemical concentration. The silver removed from galena and freibergite

does not migrate far in the permafrost-oxidation zone before being deposited as finely divided native silver, or held molecularly in oxides such as argentiferous plumbjarosite.

The zinc content of ore within the zone of oxidation is lower than in hypogene ores, showing an average of 2% in the former and 5% to 6% in the latter. According to Boyle, zinc taken into solution has in many cases escaped completely from the deposits as evidenced by the high zinc content of streams and springs.

The zone of reduction within oreshoots is poorly defined and often non-existent. Considerable ruby silver occurring in the ores of the Lucky Queen and Silver King mines probably formed in part under these conditions. However, at the Hector-Calumet mine, ruby silver had persisted to the lowest level where it is undoubtedly of hypogene origin. The No. 9 ore shoot on Keno Hill shows very little oxidation and there is no appreciable increase in silver.

Ore Controls

Wall rock character is important since rock competence greatly influences the nature of vein faults. By far, the largest amount of ore occurs in thick-bedded quartzite horizons. Greenstones, which are likewise quite competent, also serve as a favorable wall rock, although ore widths generally are less than in quartzite. Schists and interbedded thin-bedded quartzites and schist, being relatively incompetent, thus far have not been the host for any substantial oreshoots.

Zones of extreme fracturing and brecciation are important in localizing ore shoots within quartzite and greenstone. Favorable zones are thus formed at vein fault junctions and in dilated zones in quartzite below a schist capping.

Vein-fault splits are particularly important in the Hector-Calumet mine where some of the branching veins rejoin both horizontally and vertically to form cymoid loops. In addition to the main splits there are numerous cross-over or tension fractures with the whole fractured area often forming wide orebodies.

Vein-faults upon passing from quartzite or greenstone into overlying schist or thin-bedded quartzite are deflected in strike and often in dip thus forming a dilated zone. Orebodies of the Birmingham, No Cash and Mackeno on Galena Hill and the Bellekeno, Onek, Comstock, No. 9 and Sadie mines in the Keno Hill area are localized in this environment.

The combined effect of vein split and dilated contact zone are responsible for localizing the orebodies on the Silver King, No. 9 and Shamrock veins.

It is significant that all of the vein faults or vein fault zones which hold one or more commercial ore shoots are those that have considerable lateral extent and upon which considerable left-hand (normal) movement is evident. It is the strong veins which tend to form the highly desirable splits along their strike and the more continuous dilatant zones beneath schist contacts.

GEOLOGY AND MINERALIZATION OF THE GOLD HILL NO. 2, SILVER QUEEN AND SILVER BASIN NO. 3 MINERAL CLAIMS AND VICINITY

This area is underlain by the Keno Hill Schist and Greenstone and the No. 9 Quartzite units of the Central Quartzite. These trend N 70° W and dip 20° - 30° SW.

Outcrops are largely confined to the greenstone knobs which form the pinnacles of Keno and Minto Hills; and to the steep slopes of Faro and Silver basins. The areas underlain by quartzite are thickly covered by blocks of frost-heaved quartzite in contrast to the finer residual soil mantle overlying schist. The veins do not outcrop in the schist areas and float is difficult to trace because of downhill creep. The presence of veins on ground covered by quartzite boulders is indicated by iron and manganese oxide incrustations. Actual vein float tends to break up and settle into the rubble.

Mineralization of both the quartz-arsenopyrite and siderite-galena-freibergite types occurs along numerous vein structures in the Keno Mine-Comstock and Gold Hill No. 2-Silver Queen-Silver Basin No. 3 areas. Most prominent are five strong longitudinal veins which

strike N 65° - 80° E and dip steeply south. Four of these veins occur on the Comstock property.

Main Vein - (Nabob Vein)

This vein, N 75° E 65° - 70° S, is a persistent vein zone, traceable by float and caved pits and trenches for a distance of 7,000 ft. The vein is now visible only in the steep rim of Faro Gulch on the Rico claim (UKH) where it is an iron-stained breccia zone 10 to 20 ft. wide. All workings on the Nabob claim are inaccessible, including the Nabob tunnel which was extended by Comstock Keno in 1952. Information from private reports, which I have been privileged to read, indicate that the Main vein on the Nabob claim is split into two segments approximately 50 ft. apart. Most of the prospect pits are on the south segment of the vein and show the vein to be four to six feet wide and mineralized with siderite, quartz, galena and freibergite. Assays from these old pits on the Nabob and Silver Queen claims assay 70 to 463 ozs. silver per ton and 27% to 70% lead. Most of these are grab samples taken about 1928 and should not be taken as representative of the vein average value. A sample I took from the dump of the Nabob tunnel verifies this, assaying 276 ozs. silver and 36% lead. I was able to trace vein float across the Nabob claim and into the Silver Queen claim. There is evidence of the vein being offset by a fault as shown on the map. The Main (Nabob) vein very definitely outcrops on the Venus Fraction claim to the east of the Silver Queen so there can be little doubt that it extends through the Silver Queen claim. It is my understanding that the No. 9 vein orebody at the Keno mine occurs at the junction of the Main and No. 9 veins and that some of the ore occurred on both the Main and No. 9 veins at that point. United Keno Hill developed and mined this sizeable orebody between about 1961 and 1967. According to various reports in the "Northern Miner", total production was probably in the order of 150,000 tons of ore averaging 45 ozs.

silver and 11% lead.

The 1964 annual report of that company states that half of the 1964 income was derived from the Keno mine and that 45,223 tons mined that year from that source averaged 45.2 oz. silver, 11% lead and 5.3% zinc. There is every reason to believe that similar ore-bodies may be found along the Main vein on the Silver Queen claim.

Comstock-Porcupine Vein

The Comstock vein system is perhaps the strongest of the longitudinal veins on Keno Hill and one of the most continuous in the district. It strikes approximately N 60° E and dips 70° S and has been traced along the surface for 10,000 ft. Development on the Comstock property, on the Gold Star claim adjoining the Gold Hill No. 2 claim, and at the Keno mine has largely been limited to the area where the vein traverses greenstone. The Porcupine adit on United Keno Hill ground explores the Comstock-Porcupine vein at the greenstone-schist contact where a 160 ft. strike length of the vein reportedly averaged three feet in width and assayed 74.5 ozs. silver and 12.3% lead. The Comstock adit on the Gold Star claim exposes the Comstock vein for a distance of 300 ft. Where both walls are greenstone, the vein is a shear zone six to seven feet in width mineralized into siderite, quartz, galena, sphalerite and freibergite. According to reliable reports the oreshoot here was 250 ft. long and averaged 50 ozs. silver per ton, 12% lead and 5.5% zinc. The ore-shoot here is limited to the greenstone, further illustrating the importance of the localizing effect of hard competent rocks on the ore. Where the vein enters schist on the east end of the Comstock adit, the vein narrows and becomes uncommercial. The vein is difficult to trace across the Gold Hill No. 2 claim although it was found in several pits at the east end of that claim. Heavy oxidation in the quartzite rubble to the east of that point suggests that the vein continues considerably further to the east.

As noted on the map, the No. 9 Quartzite outcrops at the east end of the Gold Hill No. 2 claim where it dips flatly underneath that claim. The attached section shows the importance of this fact. The geologic section reveals that while the surface of the Gold Hill No. 2 claim is overlain by unfavorable Keno Hill Schist, the +1,000 ft. thick No. 9 Quartzite extends through the claim at very shallow depth. This means that on the Gold Hill No. 2 claim there is an unusually large and favorable area along the Comstock-Porcupine vein where both walls of the vein may be expected to be the favorable hard brittle quartzite. There is every reason to believe that since the Comstock vein made ore in the small greenstone lenses it will do so in the quartzites lying beneath the Gold Hill No. 2 claim. All of the history of all of the mines in the Galena Hill-Keno Hill area supports this contention since all of the larger orebodies, including the Sadie-Ladue, Lucky Queen, Elsa, Hector-Calumet, No. 9 and Silver King mines occurred in this quartzite environment. We know that the Comstock vein contains ore almost right up to the west endline of the Gold Hill No. 2 claim and this fact lends credence to finding of ore in the hard quartzite beneath the Gold Hill No. 2 claim.

No. 6 Vein

The No. 6 vein is a 70° south dipping vein structure between and parallel to the Main and Comstock-Porcupine veins. The No. 6 vein can be traced across the Keno mine area into Comstock Keno's Little Joe claim. Several pits 100 ft. north of the Gold Hill No. 2 claim show coarse siderite and probably represent the No. 6 vein, although it is also possible that this siderite could represent a northeast trending link vein structure between the Comstock and Main veins. In either case, the vein structures should dip south and into the Gold Hill No. 2 claim at very shallow depth.

PROPOSED EXPLORATION PROGRAM

It is recommended that the Comstock vein be explored on the Gold Hill No.2claim by diamond drilling as shown on the attached

maps. This would involve obtaining a contractor to drill 2,300 ft. of EX size diamond drill hole at an estimated cost of $32,200.00. Cost breakdown is estimated as follows:

2,300 ft. of EX drilling @ $12.00 per ft.,	$27,600.00
4 drill stations bulldozed @ $400.00 each,	1,600.00
Consulting Geologist,	2,000.00
Assaying,	1,000.00
Total,	$32,200.00

This program would explore the 1,500 ft. length of the Comstock vein within the No. 9 Quartzite formation.

If significant silver-lead mineralization is encountered, the next phase of exploration would be an underground adit tunnel 900 ft. to the Comstock vein at about 5,375 ft. elevation, followed by 1,400 ft. of drifting along the vein. I would estimate the cost of the total of 2,300 ft. of drifting and cross-cutting at $60.00 per ft., or a total of $138,000.00.

Diamond drilling is also recommended to test the Main vein on the Silver Queen claim. Four holes 300 ft. in length should be sufficient to cover the strike length of the vein on that claim. I would again recommend that this be done by a contractor. It is estimated that total cost for this drilling would be about $15,600.00

Exploration of the Silver Basin No. 3 claim should be contingent upon success of the above programs since the claim is somewhat removed from the immediate area and is less accessible. As in the case of the Silver Queen and Gold Hill No. 2 claim, the Silver Basin No. 3 claim should be explored initially by diamond drilling but I do not think these holes need to be planned at this time.

It is evident from the above that an initial expenditure of $47,800.00 will be required for drilling and initial financing should be to that extent.

ECONOMIC PERSPECTIVE OF THE GOLD HILL NO. 2, SILVER QUEEN AND SILVER BASIN NO. 3 CLAIMS

It should be pointed out that large claim holdings which are so common these days in so many mining districts are not necessarily an asset in the Keno Hill area. On Keno Hill the Sadie, Ladue and

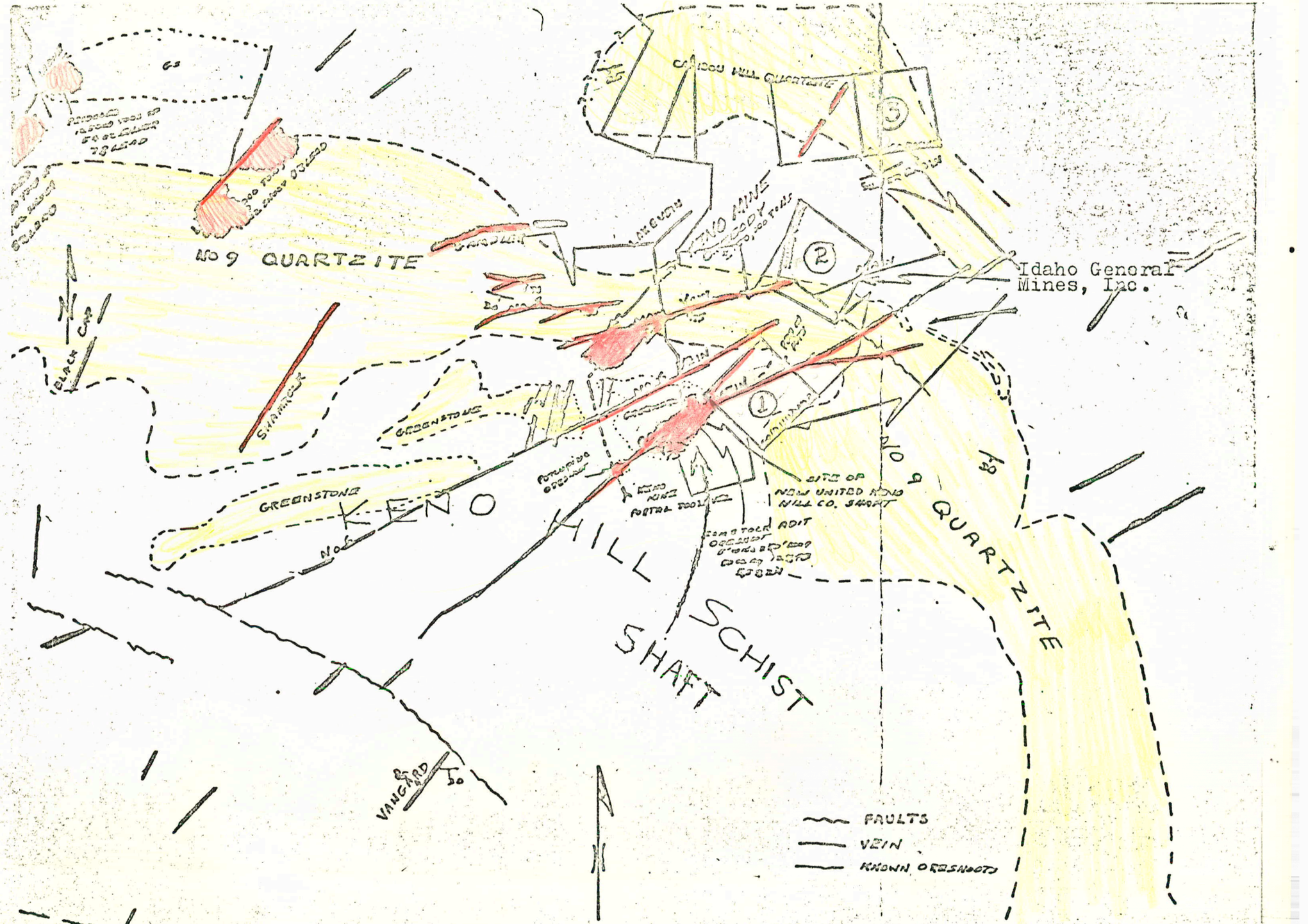
Lucky Queen mines each contained orebodies in excess of 100,000 tons, yet each occurred on a single claim. The Hector-Calumet on Galena Hill produced over 1,000,000 tons largely from two claims. Also, it is important to remember that we are dealing with ores that have a high silver content and a correspondingly high value per ton. For example, the 18,000 tons of ore from the Gold Star claim, which adjoins the Gold Hill No. 2 claim, was produced from an area about 200 ft. long by 200 ft. deep by five feet wide, which at the 45 oz. silver and 12% lead grade it assayed would have a net smelter value of about $93.00 per ton at today's price of $1.70 per oz. silver and 15.5¢ per lb. for lead. That amounts to a total net smelter value of $1,675,000.00. If we were to assume very high costs of, say, $50.00 per ton for mining and milling, the profit on the above 18,000 tons would be on the order of $775,000.00. We assume that $1.70 per oz. is about the lowest price that can be anticipated for silver over the next five to ten years. If the price of silver raised to $2.50 per oz., as is anticipated by most of today's more reliable analysts, the before tax profit of 18,000 tons of 45 oz. silver and 12% lead ore would be about $1,360,000.00 if we use the same high $50.00 per ton costs.

The object of the above exercise is to emphasize that there is ample room for the occurrence of a number of small, yet highly profitable, orebodies on just one claim such as the Gold Hill No. 2, Silver Queen or Silver Basin No. 3. One might reasonably hope for finding an orebody such as the Lucky Queen, which was 123,000 tons grading 96 oz. silver per ton; but even an 18,000 ton orebody of 45 oz.silver grade will still make a profitable venture.

Respectfully submitted,

Robert L. Russell

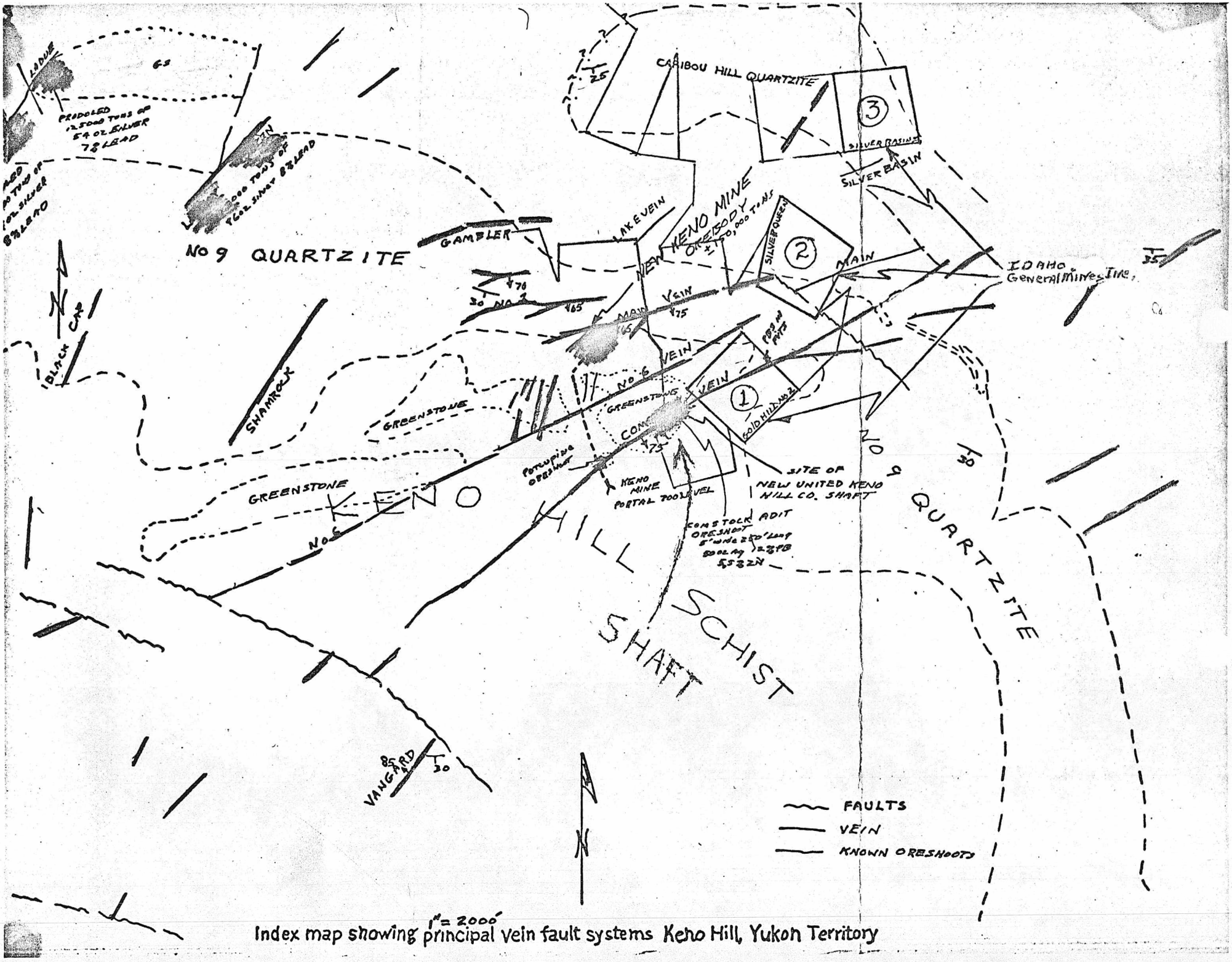
Robert L. Russell
Mining and Geological Engineer



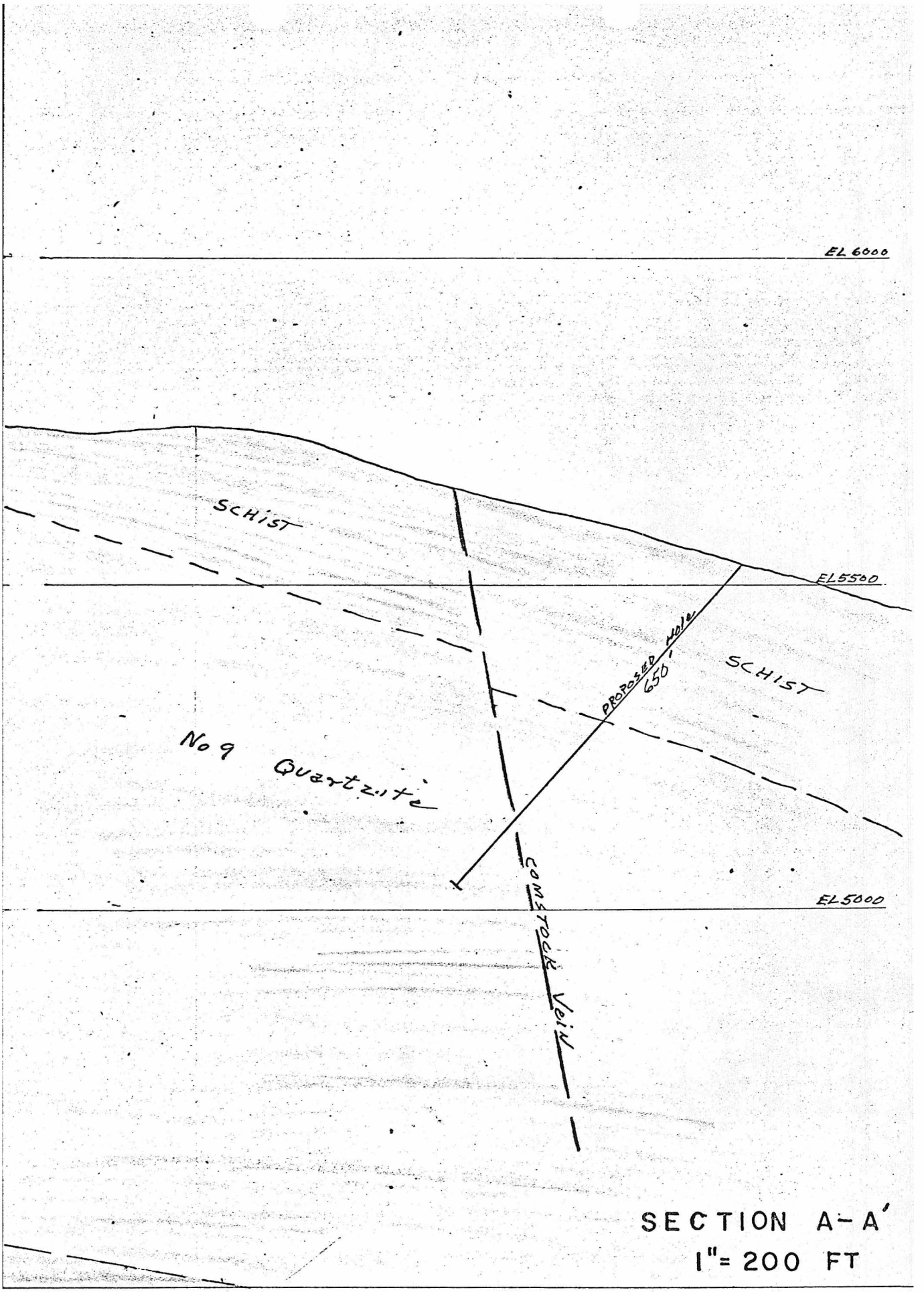
Index map showing principal vein fault systems Keno Hill, Yukon Territory 1" = 2000'

PLATE I

PLATE I

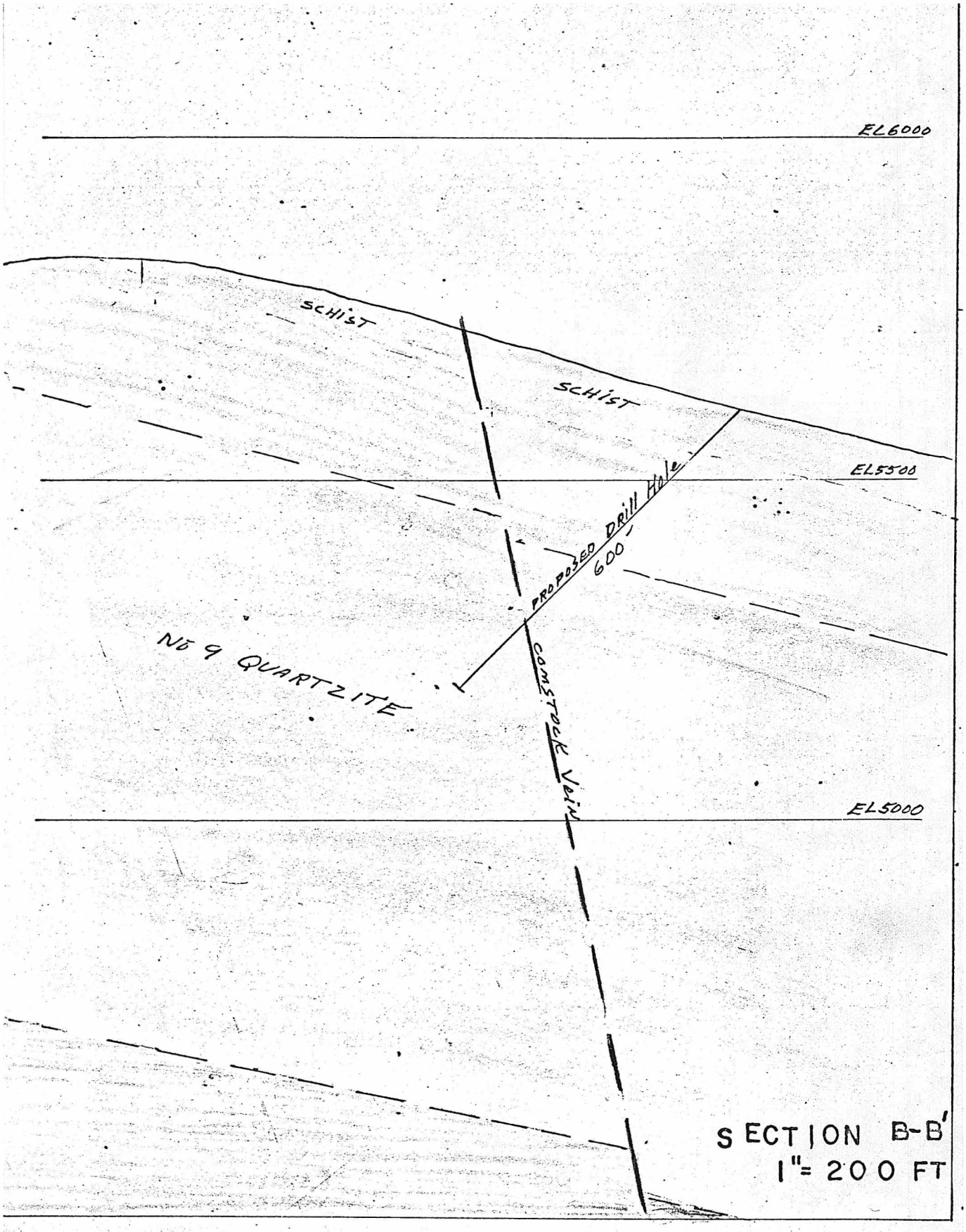


Index map showing principal vein fault systems Keno Hill, Yukon Territory 1" = 2000'



SECTION A-A'
1"= 200 FT

PLATE II



SECTION B-B'
1" = 200 FT

PLATE III

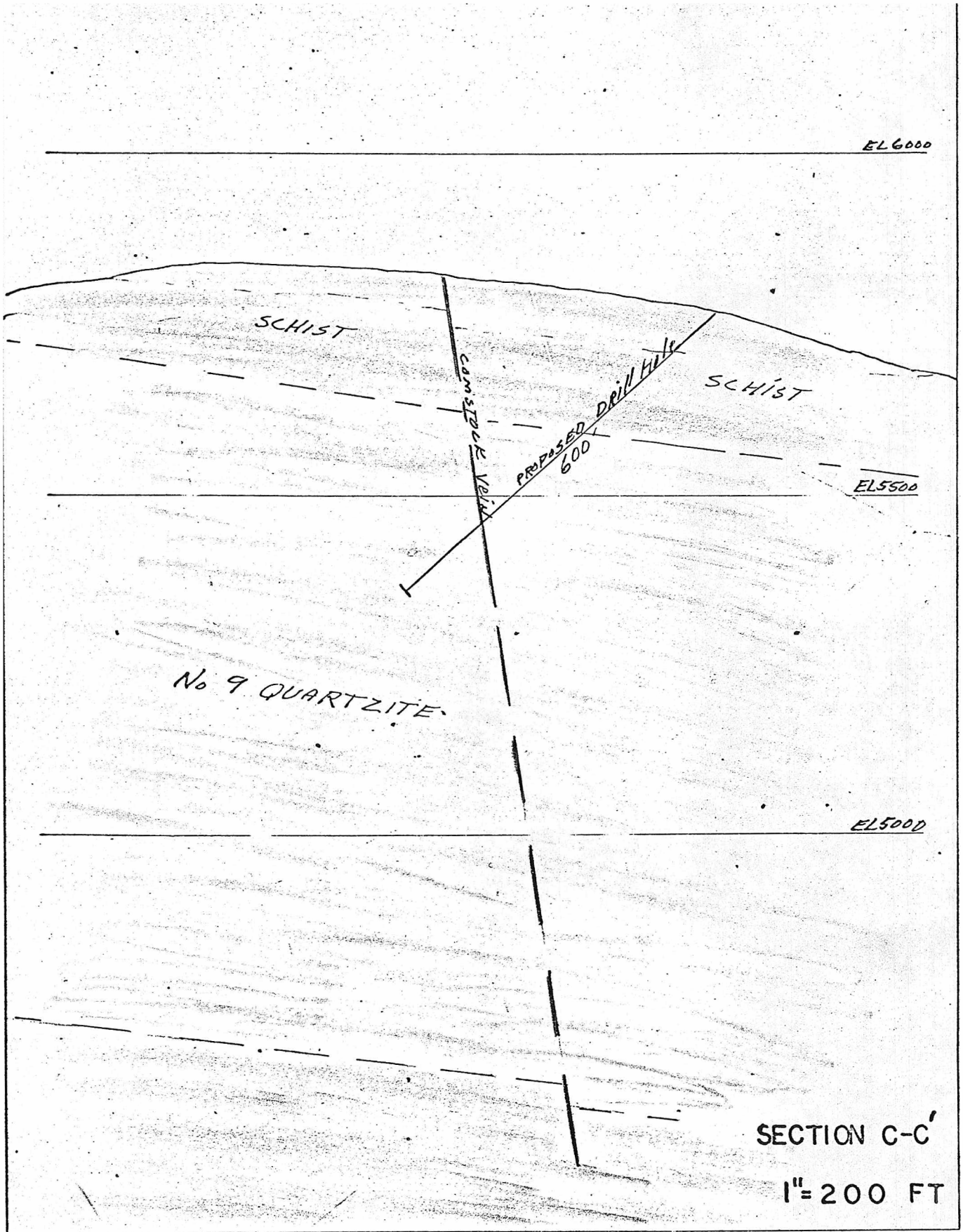
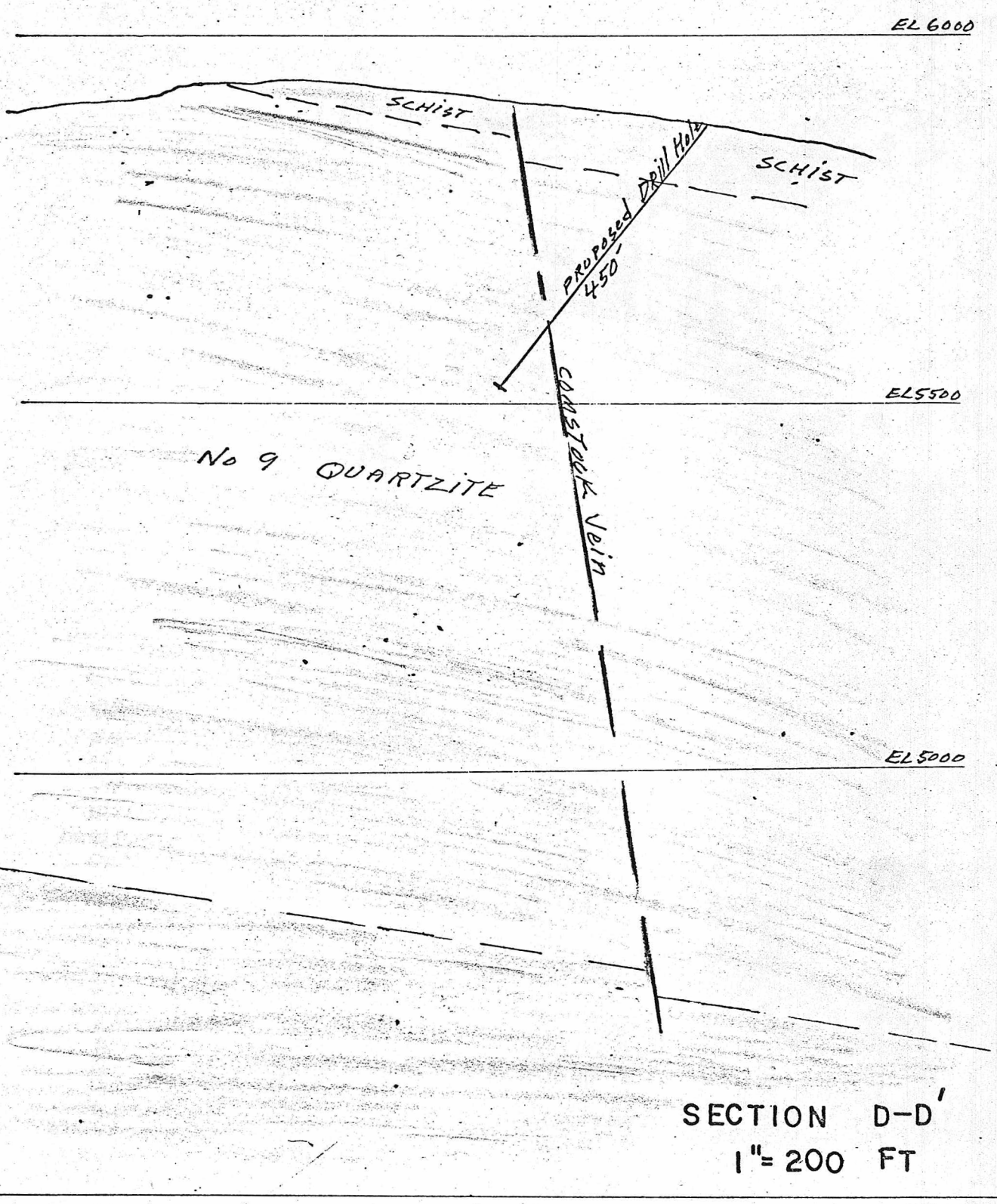

EL 6000
SCHIST
COMSTOCK Vein
PROPOSED DRILL HOLE
600'
SCHIST
EL 5500
No 9 QUARTZITE
EL 5000
SECTION C-C'
1" = 200 FT

PLATE IV



SECTION D-D'
1" = 200 FT

PLATE V