

82KNE001 Beverly⁰⁷

003092

GEOLOGICAL REPORT

1975 WORK PROGRAM

JUBILEE MOUNTAIN

BRITISH COLUMBIA

5 MILES N. W. OF SPILLMACHEEN

LAT. 50° 55' N LONG. 116° 27' W

PROPERTY FILE

BY

R. A. BUCKLEY P.ENG.

DEKALB MINING CORPORATION

CALGARY, ALBERTA



G E O L O G I C A L R E P O R T

J U B I L E E M O U N T A I N P R O S P E C T

B R I T I S H C O L U M B I A

R.A. BUCKLEY, P. ENG.

MARCH 1976

COPY NINE

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INTRODUCTION

As a follow-up to the 1974 exploration program on Jubilee Mountain, additional diamond drilling on the prospect was done in the vicinity of the discovery holes.

The 1974 drilling program had encountered sulfide intersections in two of the 18 drill holes (Reference No. 6). Hole 15 intersected 27.5 feet of lead-silver-barite mineralization, while hole 17 encountered 61 feet of similar mineralization.

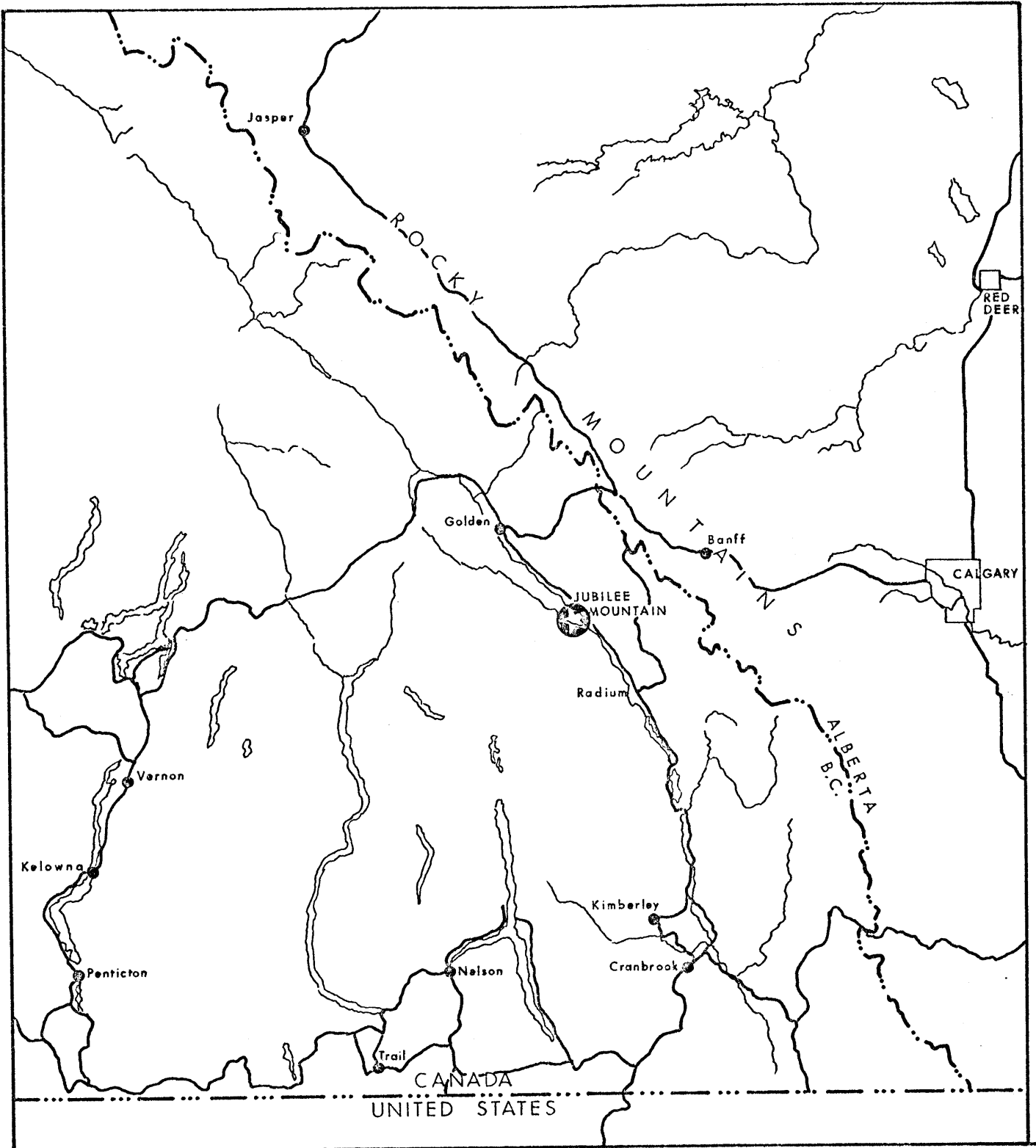
The host for the mineralization appears to be a carbonate breccia in the Upper Cambrian Jubilee Mountain Formation, while the control for the brecciation appears to be regional fracturing.

The Jubilee Mountain Formation consists of clean unmetamorphosed carbonates. Outcroppings of the formation indicate that the rock was deposited in a quiet water environment with local areas where reef building had taken place. Associated with the reefing (Figure 4 and Figure 5), such textures as pelletoid carbonates (Figure 6) and breccias (Figure 7) have been mapped.

GEOGRAPHIC LOCATION

The index map locates this prospect as being in the southeastern portion of British Columbia, approximately 25 miles north of Radium Hot Springs. The nearest village, Spillimacheen, is located on paved highway No. 95. The C.P.R. rail line passes through this valley and is the main haulage route for coal between the Crowsnest Pass and Vancouver.

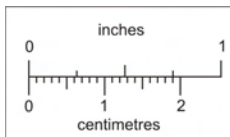
The prospect lies in a small valley near the top of Jubilee Mountain. Access is via a gravel road from Spillimacheen across the Columbia River to the hydro power plant, then by the forestry road that leads up to the fire lookout tower on Jubilee Mountain, a distance of five miles.



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JUBILEE MOUNTAIN
BRITISH COLUMBIA

INDEX MAP



This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.



SCALE: 1" = 40 mi.

MAR, 1976

REGIONAL GEOLOGY

Jubilee Mountain is an isolated mountain located immediately west of the Rocky Mountain Trench Fault.

The mountain itself consists of a succession of Upper Cambrian carbonates, Cambro-Ordovician shales and Silurian carbonates.

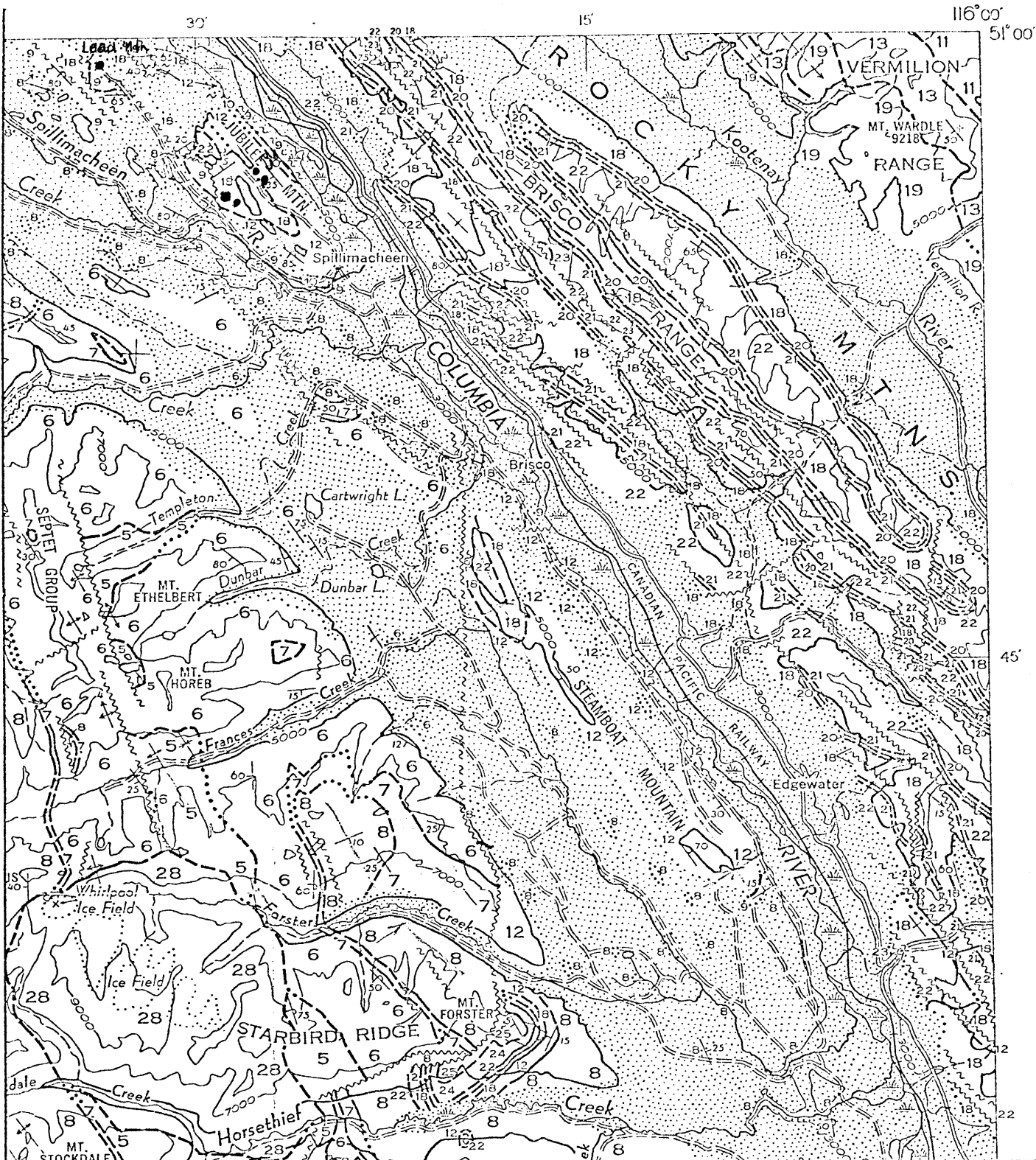
Regional folding stresses have folded the formations into a gentle syncline mapped by Reesor (Mem. 369 G.S.C.) as the Purcell Boundary Syncline. The prospective horizon, the Jubilee Mountain carbonates, crop out on both the east and west side of the mountain, indicating that the syncline is approximately one mile across.

GEOLOGY OF THE PROSPECT AREA

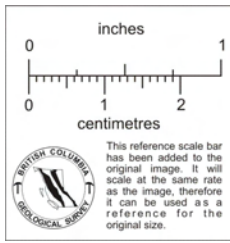
Mineral prospecting has been active in the valley since before the turn of the century (1883). The only productive mine within 30 miles of this prospect is the Silver Giant Mine, slightly over one mile to the west on the western limb of the Purcell Boundary Syncline.

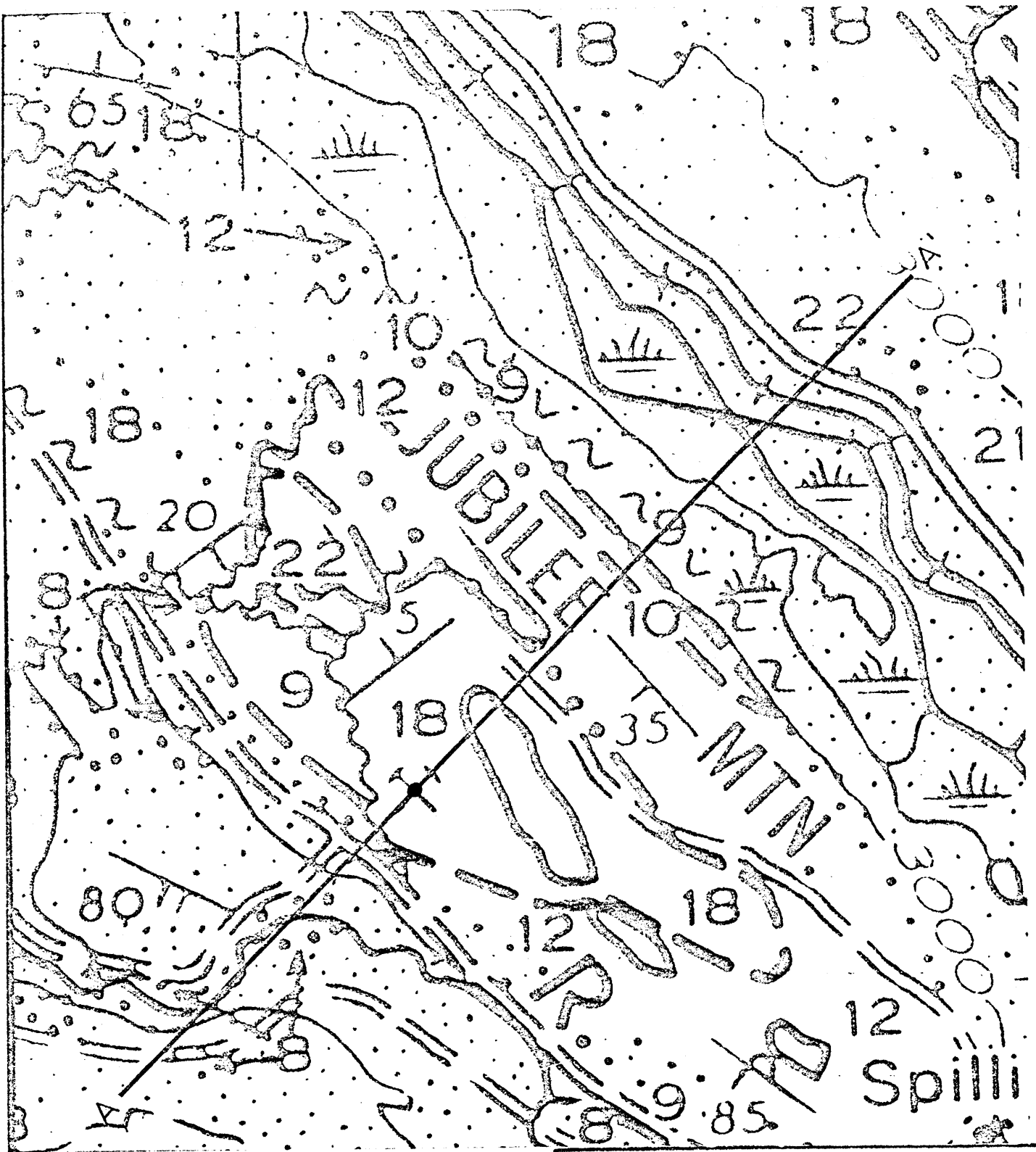
The Silver Giant Mine produced small quantities of mineral during the first half of the century, finally going into production in 1947. After producing from nine levels and an open pit, operations for sulfides ceased. Limited mining for barite, both underground and in open pits, and the re-concentration of the mill tailings to recover barite as an additive for drilling mud has continued during the summer months to the present by the Baroid of Canada Company.

Figure 1 is a reproduction of the preliminary geology map of the area (Reference No. 17). Figure 2 is an optical enlargement of the Jubilee Mountain portion of the preliminary map showing details of the syncline and the location of the prospect with respect to the Silver Giant Mine.



DEKALB MINING CORPORATION
 JUBILEE MOUNTAIN
 BRITISH COLUMBIA
 FIGURE 1.
 REGIONAL GEOLOGY MAP
 NTS MAP 82 K EAST
 SCALE: 1:250,000
 MAY 1974





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JUBILEE MOUNTAIN
BRITISH COLUMBIA

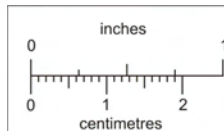
FIGURE .2.

DETAIL GEOLOGY MAP

NTS MAP 82 K EAST

SCALE: 1:50,000

MAY 1974



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The schematic cross section (Figure 3) passes through the Silver Giant Mine, over the mountain peak and through the Jubilee Mountain prospect. By inspection of this cross section, the regional geology and the basis of this prospect can be envisaged.

The same geological features that crop out on the west side of Jubilee Mountain where the Silver Giant Mine is located crops out on the east side of the mountain where this prospect is located.

Various reports (Reference Nos. 2, 3, 4, 5, 11, 16) indicate that the ore bodies of the Silver Giant Mine occur at the top of the Jubilee Mountain Formation carbonate on the contact between the carbonate and the overlying McKay black pyritic shale.

Regional air photo mapping confirms the literature as well as indicating that the mine lies on a major north-south fracture. Although not indicated in the literature, the writer is of the opinion that the ore body of the Silver Giant Mine is associated with a reef system and a major fracture system. This fracture would provide a passageway for mineralizing solutions as well as a location for reef growth. The literature in one instance indicates that the ore body extends upward into the McKay shale which the writer interprets as

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A

CROSS SECTION

A'

6

LEGEND

- ORDOVICIAN
[Blank box] BEAVERFOOT
- CAMBRIAN - ORDOVICIAN
[Dashed line box] M^cKAY FORMATION
- CAMBRIAN
[Brick pattern box] JUBILEE FORMATION
- [Dotted pattern box] DONALD FORMATION
- [Stippled pattern box] ST. PIRON FORMATION

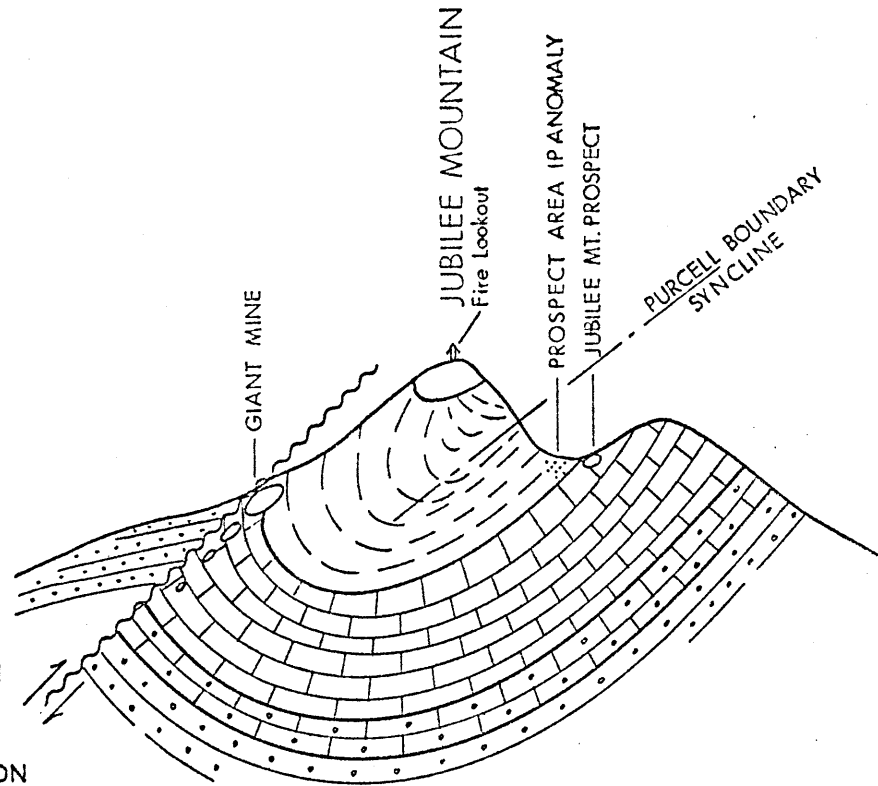
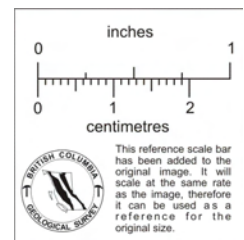


FIGURE 3.

JUBILEE MOUNTAIN PROSPECT

MAY 1974



SCALE: 1:50,000

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

being a reef knob or buildup into the shale (McKay) formation.

Having this understanding of the geology of Jubilee Mountain and the origin of the Giant reef ore body, it seemed natural that exploration should be carried out on the eastern portion of the syncline.

Air photos were examined and an air photo geological map was constructed. Several fractures were mapped in the vicinity of reefoid Jubilee carbonates lying under the Crown Grants. Coincident with these fractures and reefoid rocks, a weak Induced Polarization anomaly had been mapped. A decision was, therefore, made to pattern drill these features to evaluate the sulfide potential on this side of the syncline.

The original thesis was that sulfide mineralization would be associated with reef structures, with the sulfides occurring in the vug or void spaces of the carbonate in a manner similar to the sulfides at Pine Point, N.W.T.

Drilling during the 1974 season indicated, instead, that sulfide mineralization occurred in a carbonate breccia and the reef texture rocks were barren.

DISCUSSION OF THE PARAGENESIS
OF THE SULFIDE MINERALIZATION

In late Cambrian time this region was covered by a shallow sea which deposited relatively clean carbonates mapped today as the Jubilee Formation.

The sea floor, however, did exhibit a pattern of north-south fractures. Movement occurred on some of these fractures, providing escarpments on the sea floor. Reef building began on these escarpments and is mapped today as beds and mats of stromatoidal limestone as photographed in Figure 4 and Figure 5. The back reef environment is represented by pelletoidal limestone as photographed in Figure 6. This rock represents a quiet environment on the ocean floor where lime from the sea water was deposited on small particles. Continued agitation by water currents and wave action gently rolled these fragments around which produced a sub-rounded pellet. The pellet grew in size with additional precipitation, eventually coming to rest and forming a rock unit.

Slight movements continued along the old basement fault structures throughout Jubilee and McKay time keeping channelways open along the fault planes. As time progressed it appears that solutions capable of dissolving the carbonates



FIGURE 4
STROMATOPOROID-LIKE
LIMESTONE AND BARITE



FIGURE 5
CLOSE-UP OF
STROMATOPOROID-LIKE STRUCTURES



FIGURE 6
PELLETOID LIMESTONE



FIGURE 7
SPECIMEN OF SURFACE OUTCROPPING
OF A BRECCIA

were actively creating caverns along the fault zone and within the more porous reefs. As these caverns reached a size where the rock was unable to support such an opening, the cavern caved, resulting in a quantity of broken rock or breccia. The interfragmental space was then infilled with sulfides derived from and precipitated by hydrothermal solutions passing up along the original predepositional fault planes.

Figure 8 is a photograph of a fracture zone that appeared in one of the diamond drill cores. This represents in a miniature scale the process of a fracture zone being enlarged by solution to the point where a small cavern has been developed. If this process were to continue, eventually a larger cavern aligned with the fracture system would be developed. The collapse of such a cavern would produce a form of Karst topography on the stratigraphic top of the Jubilee Formation. The overlying McKay shale beds would then demonstrate abrupt changes in dip as illustrated in drill holes JM 17, 18, 19 & 20 on the cross section in Figure 9 (back pocket).

An abrupt change in the structural elevation of the Jubilee Formation is illustrated in drill holes JM 15, 16 and 21 as shown in the cross section of Figure 10 (back pocket). This cross section probably best illustrates the possibility of Karst topography with mineralization occurring at the boundary of the subsidence where maximum crushing and



FIGURE 8

VUG DEVELOPMENT ALONG A FRACTURE
DUE TO THE ACTION OF
LIME-DISSOLVING SOLUTIONS

brecciation would occur. The collapse of caverns has been well documented in the Mississippi Valley type deposits of Missouri and Tennessee.

Although carbonate breccias as a rock type appear similar, their geneology is quite different. Collapse breccias as discussed above are the type of breccia most likely to be encountered at Jubilee Mountain. The second most likely type is a reef frontal breccia, formed on the seaward side of reefs as talus. The talus consists of fragments of the adjoining reef that has broken free and rolled down the depositional slope.

Other breccias are formed during the deposition cycle as a result of turbidity currents associated with submarine slides. Tectonic breccias formed during folding and faulting have also been recognized in certain areas. Examples of the last two breccias are usually small in areal extent and not usually connected with mineralizing solutions. This category, therefore, is not of a size or grade to be of economic interest as a metallic mine.

A structure contour map (Figure 13, back pocket) has been constructed on top of the Jubilee Mountain formation. This map represents today's surface structure on top of the Jubilee Carbonate. The purpose of such a map is to determine

if such features as Karst topography, fault zones, solution collapse, etc., could be mapped.

Contouring indicates that extreme differences in elevation occur on the Unconformity but the control data is too widely spaced for the contours to delineate such features that would lead to a possible mineral location. With more control points (i.e. more drilling) some of these features could be mapped.

DISCUSSION OF DRILL RESULTS

Drill hole JM 19 was drilled to follow up the 1974 intersection of sulfides in JM 17. (Figure 9, back pocket). Although this hole encountered lead sulfides and similar breccia it did not sample the same quantity of lead as intersected in JM 17.

JM 20, collared to the east and drilled back under these intersections, did not encounter any sulfides. The rock under the sulfide zone, however, is extremely porous, exhibiting the highest amount of porosity and permeability of any sections mapped to date (Figure 9, back pocket). It appears that this section would correlate with the lower section of Hole JM 18. A portion of this hole is photographed on page 33 of the 1974 report (Reference 6). These porous stratigraphic sections illustrated in these two holes demonstrates that a carbonate reef has been penetrated. The relationship of the lithology and the overlying sulfides is unclear.

The breccia containing the sulfides of Hole JM 17 and Hole JM 19 is a result of reef collapse or of cavern collapse. Either process could occur near or in a reef and only additional exploration will provide the final answer.

An additional follow-up hole, JM 22, 130 feet to the

northwest, intersected 17 feet of lead-barite mineralization. The lead in this hole occurs as disseminated sulfides associated with barite. Therefore, the relationship of the mineralization in this hole and that encountered in JM 17 and JM 19 is not known. If this mineralization is related to the IP anomaly, then additional intersections can be expected to the northwest and southeast.

Diamond drill hole JM 22 (Figure 11, cross section, back pocket) encountered several possible fault or fracture zones where the drill rods dropped several feet. Air photo mapping places a strong north-south fracture in this region. It was probably encountered in this hole at 252 feet.

A vertical hole, JM 21, was located to evaluate the 27 foot intersection of JM 15 drilled in 1974. Mineralization was not encountered although the hole should have penetrated nearly the same rock as recovered in JM 15.

Two features of these holes are quite diagnostic of the events which occurred in this region.

1. The abrupt change in elevation of the Jubilee Mountain Formation.
2. The increased thickness of the Detrital Zone in the McKay Shale.

By inspection of the cross section (Figure 10) displaying diamond drill holes JM 15, 16 and 21, it is noted that the elevation of the Jubilee Formation changes drastically between JM 15 and JM 21. It would be possible to interpret a collapse zone in the vicinity of these holes based on the structural elevation of the Jubilee Mountain Formation Unconformity. Since the Detrital zone is abnormally thick in the JM 21 hole it could be concluded that the hole does in fact occupy a zone that experienced a higher rate of subsidence (several periods of collapse ?) than the surrounding rock sequence.

The next drill hole to test this structure, JM 23, was drilled to the southwest to examine the rock between JM 15/16 and JM 13/14. This hole encountered several mineralized zones - 135-143 (8 feet), 173-176 (3 feet), 203-212.5 (9.5 feet), and 228.5-238 (9.5 feet). These zones are nearly 100% barite with traces of lead, silver and copper.

CONCLUSIONS

The intersections in the JM 23 hole (Figure 12, back pocket) although scattered over a 103 foot zone, probably correlates with the intersection drilled on JM-15. This zone, being much higher in its barite content, is currently not being correlated with the intersections of holes JM 17, 19 and 22, which are primarily lead. It is, therefore, concluded that two exploration targets exist on this prospect, one being the above-described JM 15/23 barite prospect, and the other, the lead-silver-barite JM 17/19/22 prospect.

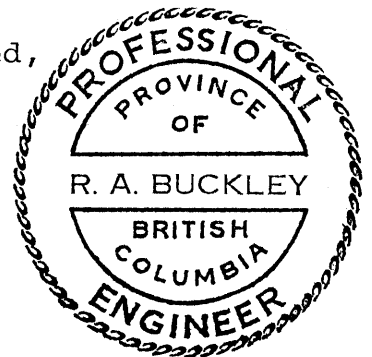
RECOMMENDATIONS

1. A gravity survey is recommended over this prospect. Approximately 2 line miles would cover the prospective areas.
2. Additional diamond drilling is recommended to evaluate the presently mapped sulfide intersections.

Respectfully Submitted,

R.A. Buckley
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R.A. Buckley, P. Eng.



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Q U A L I F I C A T I O N S

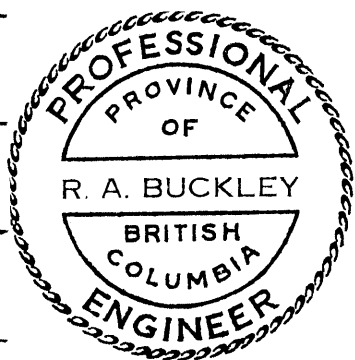
R. A. BUCKLEY

- A. I, Ronald A. Buckley, am by profession a Geologist, residing in the City of Calgary, in the Province of Alberta.
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- C. I graduated in the year 1959 from McGill University, Montreal, in the Province of Quebec, with a Master of Science Degree in Geology.
- D. Since graduation, I have been employed by a Mining Company, a Provincial Department of Mines, and three Oil Companies in the search for oil, gas and metallic minerals.
- E. I am a member:

The Alberta Association of Petroleum Geologists
Engineering Institute of Canada, Affiliate
Mineralogical Association of Canada
Society of Economic Geologists
Society of The Sigma XI
Canadian Institute of Mining and Metallurgy
Association of Professional Engineers of Alberta
Professional Engineers of British Columbia



R.A. Buckley, B.Sc., M.Sc., P.Geol., P.Eng.



A P P E N D I X

A P P E N D I X

SUMMARY OF DRILL HOLES

<u>HOLE</u>	<u>AZIMUTH</u>	<u>DIP</u>	<u>ELEVATION</u>	<u>LATITUDE</u>	<u>DEPARTURE</u>	<u>LENGTH</u>
JM 19	--	Vertical Hole	4952.7	1297.5N	1423.6E	422'
JM 20	223 ^o	62 ^o	4933.6	1429.3N	1560.5E	457'
JM 21	--	Vertical Hole	4940.1	1595.8N	1354.0E	368'
JM 22	180 ^o	50 ^o	4940.1	1595.8N	1354.0E	373'
JM 23	240 ^o	58 ^o	4960.0	1643.8N	1380.7E	267'

DIAMOND DRILL HOLE CORE DESCRIPTIONS

FOR

HOLES JM 19 to JM 23 INCLUSIVE

Diamond Drill Record

DEKALB MINING CORPORATION

Hole No.	JM 19	Project No.	
Property	Length	Lat.	Hor. Comp.
District	Bearing	Dep.	Etch. at
Commenced	Dip	Elev.	True Dip
Completed	Objective	Location	Date Logged
			Total Recovery %
			Logged by

Footage			Description	Assay No.	Length Feet	Analysis						Mineralized Zone Length-Grade
Run	From	To				Au	Ag	Cu	Pb	Zn	BaSO ₄	
	233	235	Jubilee Mountain Carbonate. Light grey, dense with stylolitic structures. Galena knots 1/32" on stylolitic structures occasionally as isolated knot in carbonate. Also occasional isolated knot of pyrite in carbonate.	75-15	2.0	Tr	.06	.02	.20	.02	NA	
	235	237.5	As above, slight increase in galena.	75-16	2.5	Tr	Tr	.02	.37	.01	NA	
	237.5	239	As above, slight decrease in galena.	75-17	1.5	Tr	.06	.02	.15	.02	NA	
	239	241	Rock type as above. Vein brecciated. Matrix black mud. Trace galena pyrite.	75-18	2.0	Tr	.04	.06	.42	.02	NA	
	241	243	Crushed and brecciated, healed with darker limestone. Less galena.	75-19	2.0	Tr	.04	.01	.08	.01	NA	
	243	245	Rock type as above. Slightly darker. Barite veins (?) indistinct boundaries or replacement blob. Galena associated with barite.	75-20	2.0	Tr	.26	.26	.12	.03	2.68	
	245	247	Dark grey with rounded pellets, 1/2". Galena on boundary of barite.	75-21	2.0	Tr	.14	.06	3.65	.01	23.01	
	247	248.5	Light grey. Fine vuggy carbonate. Trace galena.	75-22	1.5	Tr	.06	.03	.12	.02	4.05	
	248.5	250	Light grey, some breccia. Trace galena.	75-23	1.5	Tr	.80	.69	.57	.03	26.17	

Diamond Drill Record

DEKALB MINING CORPORATION

Hole No.	JM-19	Project No.			
Property		Length	Lat.	Hor. Comp.	Ver. Comp.
District		Bearing	Dep.	Etch. at	Total Recovery %
Commenced		Dip	Elev.	True Dip	Logged by
Completed		Objective		Location	Date Logged

Footage			Description	Assay No.	Length Feet	Analysis						Mineralized Zone Length-Grade
Run	From	To				Au	Ag	Cu	Pb	Zn	BaSO ₄	
	282	284	Fragmental in part. 3" barite vein, disseminated galena in adjoining rock. Malachite, azurite in vein.	0654	2.0	.005	1.04	.32	1.22	.05	6.75	
	284	286	Fragmental. Disseminated galena. Barite stringers/veins. Colliform structures - stromatoporoids (?).	0655	2.0	.005	.52	.24	1.75	.03	5.77	
	286	288	Fragmental, somewhat vuggy. Galena along fractures.	0656	2.0	Tr	.10	.02	.39	.01	.02	
	288	290	Fragmental, less so than above. Trace galena, several 1" openings with terminated quartz coating.	0657	2.0	Tr	.06	.01	.09	.01	.02	
	290	292	Mottled appearance, healed fragments. Barren of sulfides.	0658	2.0	Tr	Tr	.01	.08	.01	.01	
	292	294	Fine-grain, fragmental, black argillaceous sections, scattered galena crystals.	0659	2.0	.005	.34	.24	.87	.04	1.38	
	294	296	Fragmental, disseminated galena.	0665	2.0	Tr	.98	.76	2.44	.06	3.74	
	296	297	Bedded fragments, disseminated galena.	0666	1.0	Tr	.54	.35	.31	.06	2.91	
	297	299	Mottled carbonate, dark grey, barren of galena.	0667	2.0	Tr	.06	.02	.03	.02	.04	
	299	301	Mottled, light grey.	0668	2.0	Tr	.04	.01	.02	.02	.03	
	301	303	Fragmental, 10% galena.	0669	2.0	Tr	1.44	.49	5.36	.05	.94	
	303	308	Mottled carbonate, light grey. In part fragmental.	0670	5.0	Tr	.06	.02	.04	.01	.04	

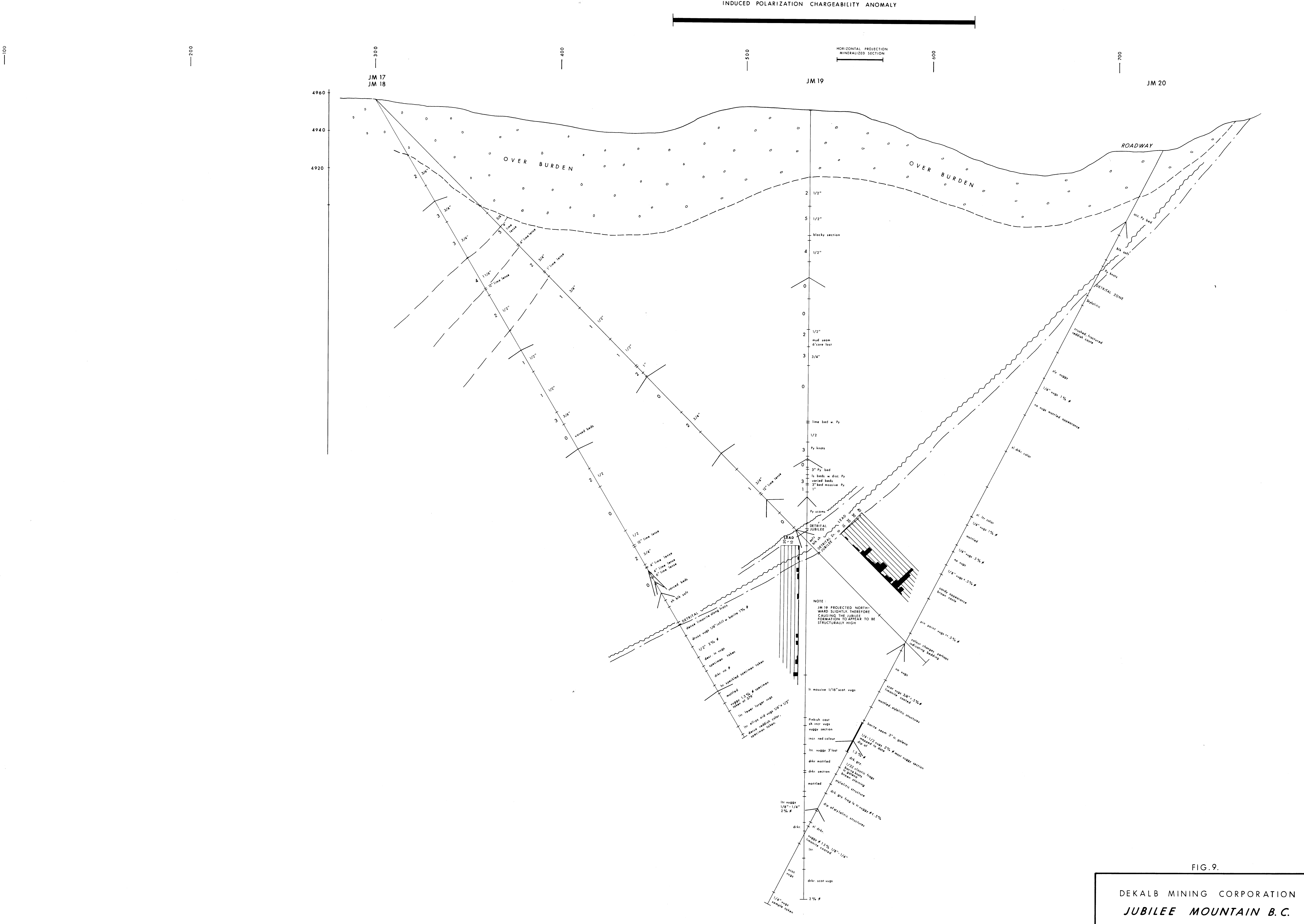
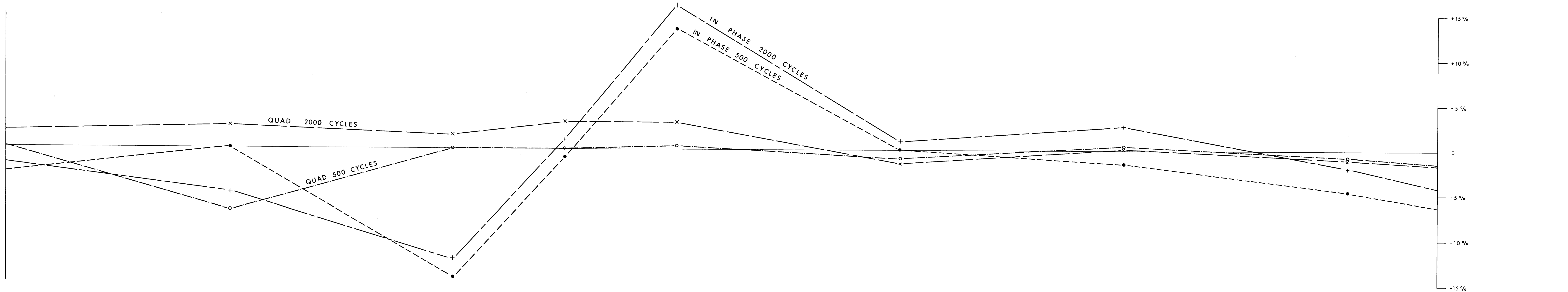
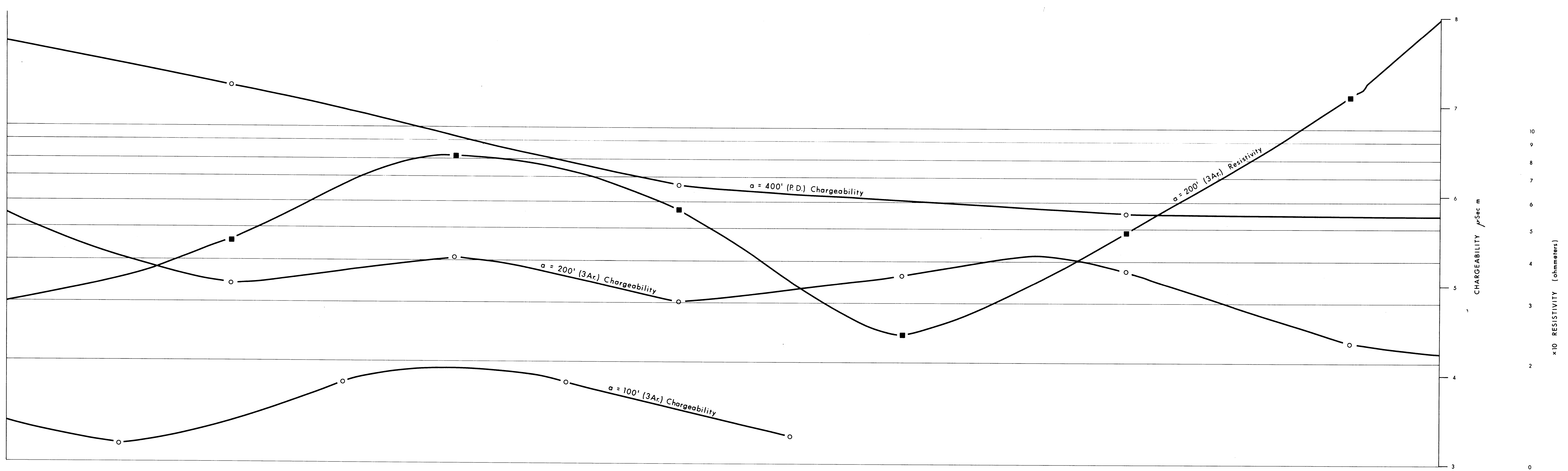


FIG. 9.
 DEKALB MINING CORPORATION
 JUBILEE MOUNTAIN B.C.
 CROSS SECTION AZIMUTH 043° (TRUE)
 LOOKING NORTHWARD
 DIAMOND DRILL HOLES JM17, 18, 19 & 20
 ASSAYS SHOWN FOR LEAD ONLY

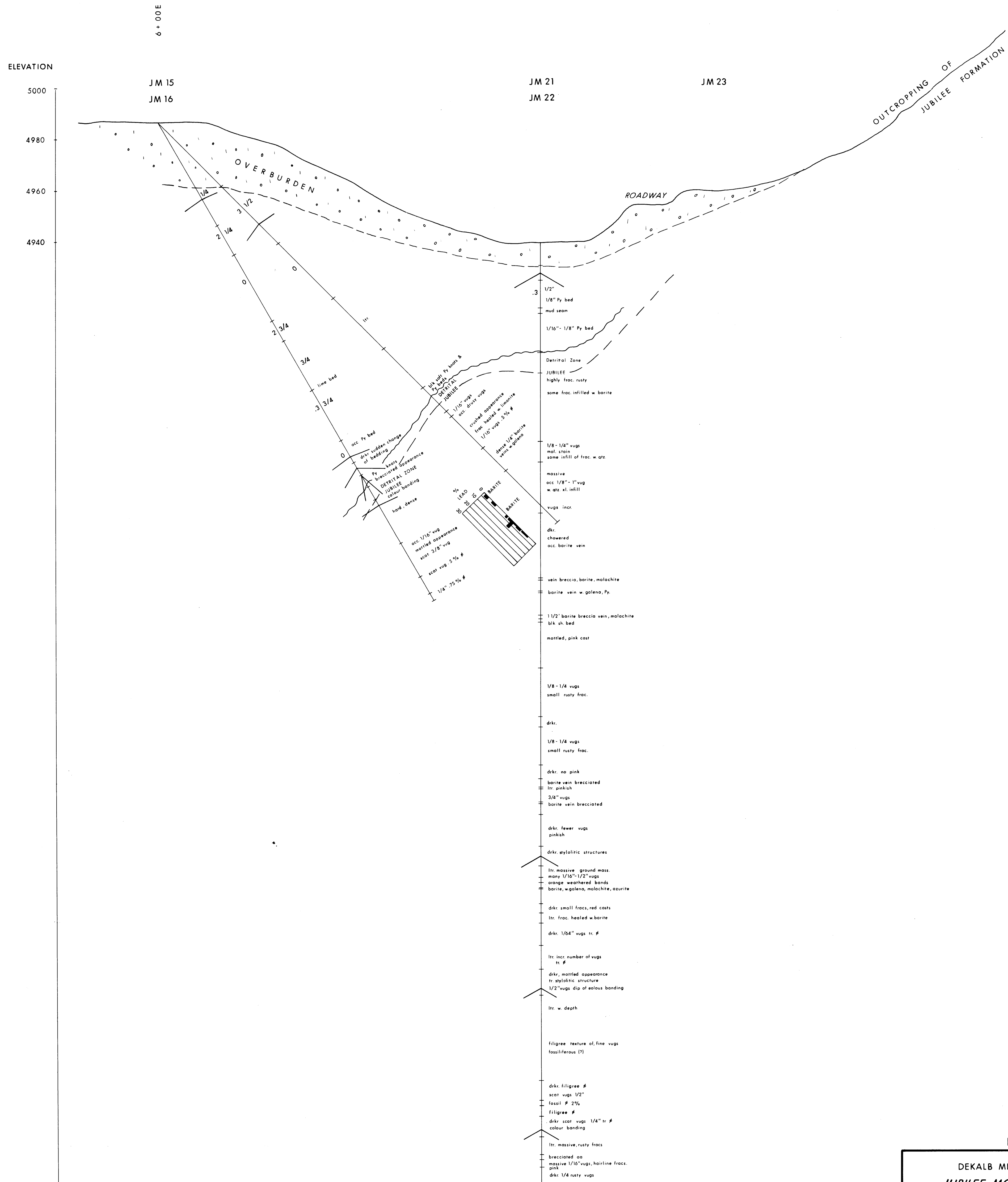
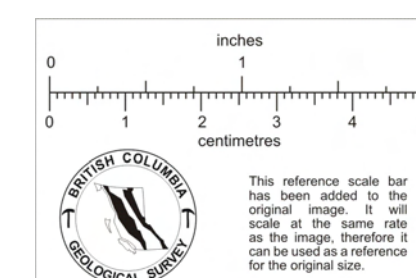


FIG. 10.

DEKALB MINING CORPORATION
JUBILEE MOUNTAIN PROPERTY
 GOLDEN MINING DISTRICT

CROSS SECTION JM15, 16, 21, 22 & COLLAR OF 23
 ALONG AZIMUTH OF 043°
 ASTRONOMICAL NORTH

ASSAYS SHOWN FOR LEAD ONLY



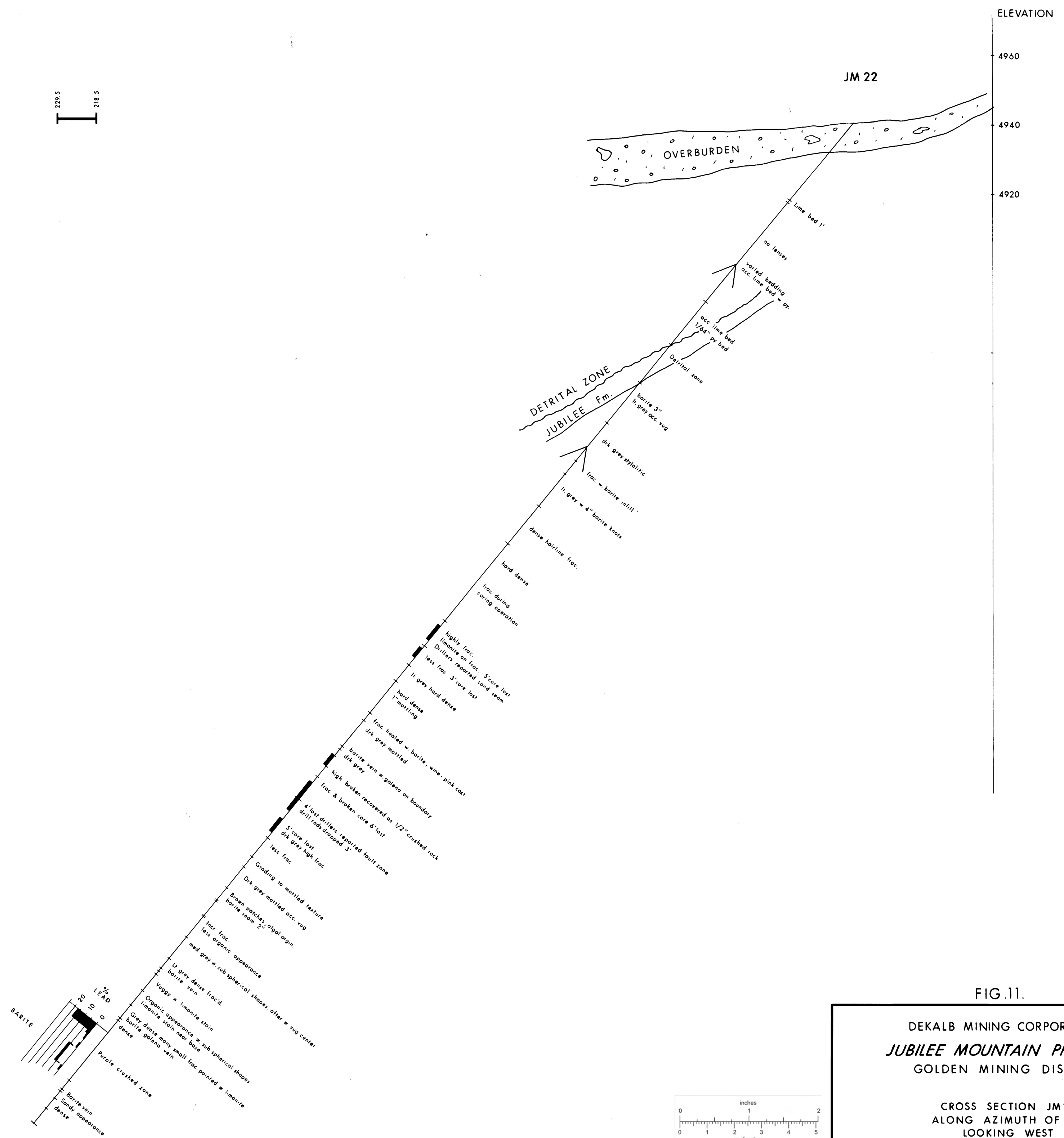


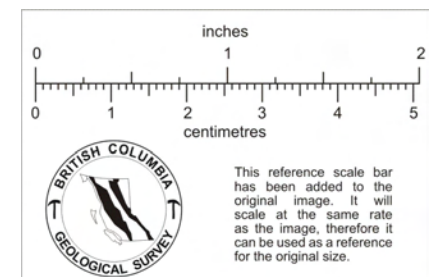
FIG. 11.

DEKALB MINING CORPORATION
JUBILEE MOUNTAIN PROPERTY
 GOLDEN MINING DISTRICT

CROSS SECTION JM22
 ALONG AZIMUTH OF 180°
 LOOKING WEST

ASSAYS SHOWN FOR LEAD ONLY

FEB. 1976 1" = 20' R. A. BUCKLEY P. Eng.



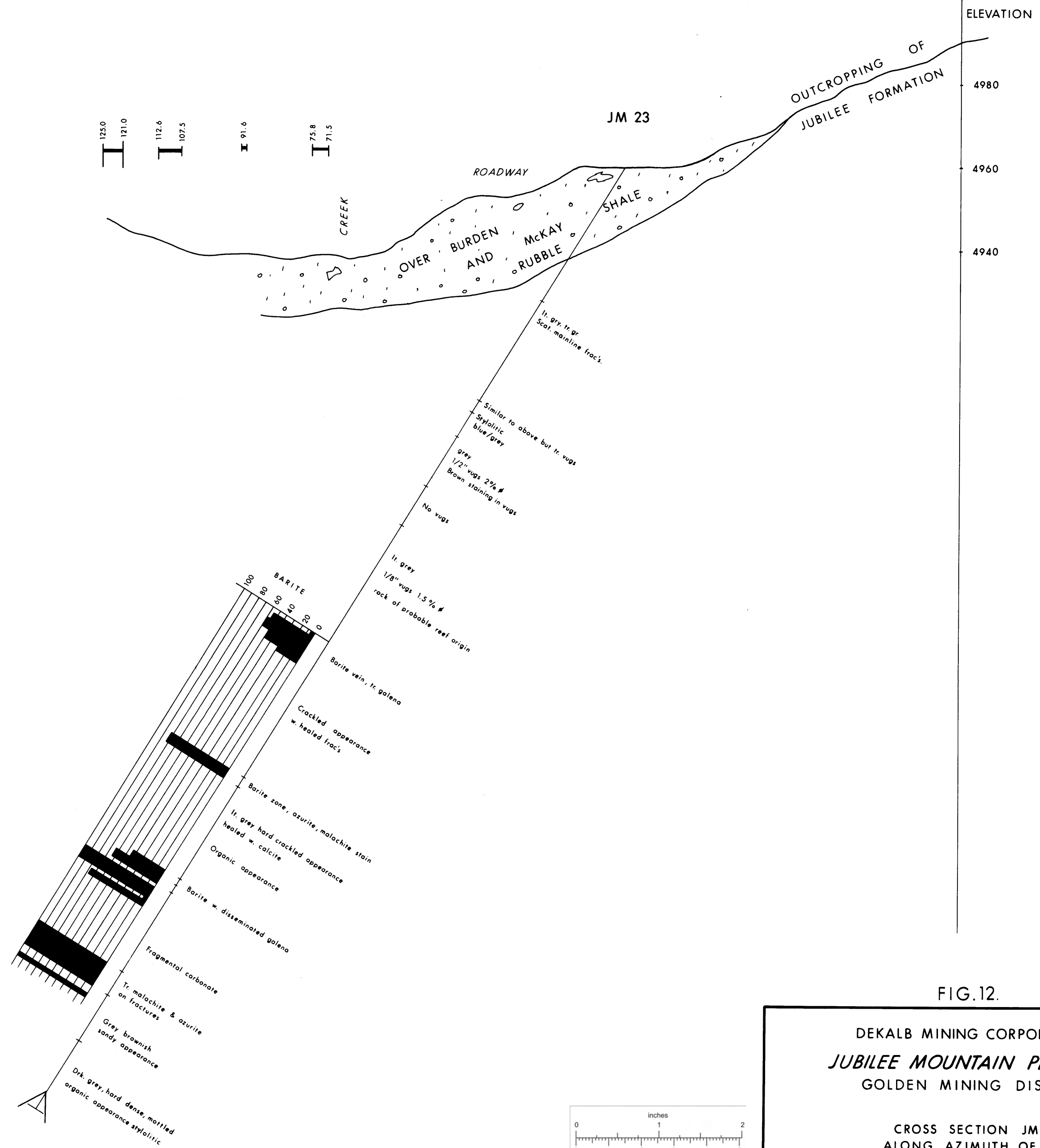


FIG.12.

DEKALB MINING CORPORATION
JUBILEE MOUNTAIN PROPERTY
 GOLDEN MINING DISTRICT

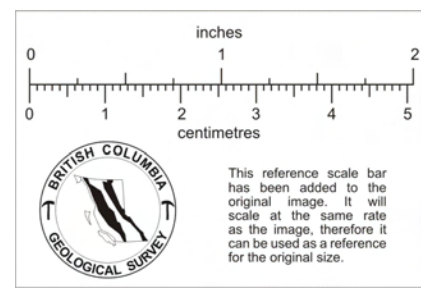
CROSS SECTION JM23
 ALONG AZIMUTH OF 240°
 LOOKING NORTH

ASSAYS SHOWN FOR BARITE

FEB. 1976

1" = 20'

R.A. BUCKLEY P.Eng.



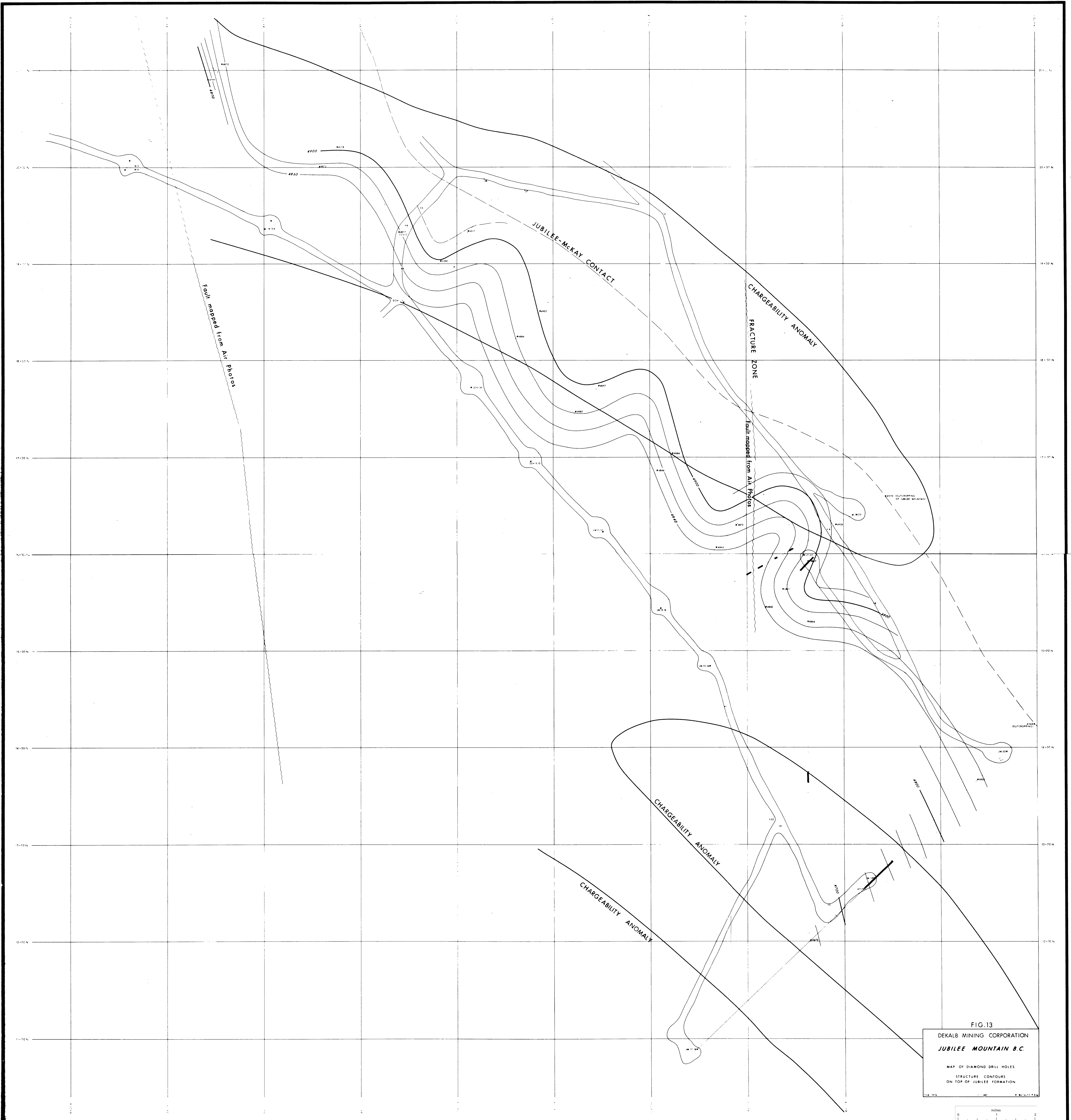


FIG. 13
 DEKALB MINING CORPORATION
JUBILEE MOUNTAIN B.C.
 MAP OF DIAMOND DRILL HOLES
 STRUCTURE CONTOURS
 ON TOP OF JUBILEE FORMATION

