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AL

PROSPECTUS DATED JUNE 4, 1991
AS AMENDED JUNE 14, 1991

Purcell Prop.
82F/14

AVRIL EXPLORATIONS INC.

(hereinafter called the "Issuer")
Suite 1016 - 470 Granville Street
Vancouver, B.C. V6C 1V5

500,000 Common Shares

Shares	Price to Public	Agents' Commission *	Net Proceeds to be received by the Issuer **
Per Share	$0.50	$0.075	$0.425
Total	$250,000	$37,500	$212,500

* The Agents have been granted a warrant entitling them to purchase up to 125,000 shares at $0.50 each as consideration for their guarantee of this Offering.

** Before deduction of the balance of the costs of the issue estimated to be $10,000.

THERE IS NO MARKET THROUGH WHICH THESE SECURITIES MAY BE SOLD. THE PRICE TO BE PAID TO THE ISSUER FOR THE SECURITIES WAS ESTABLISHED BY NEGOTIATION BETWEEN THE ISSUER AND THE AGENTS.

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AGENTS

McDERMID ST. LAWRENCE CHISHOLM LIMITED

1000-601 West Hastings Street
Vancouver, B.C.
V6B 5E2

EFFECTIVE DATE: JUNE 14, 1991

JUN 6/91 ✓

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82FNW033
230

GEOLOGICAL EVALUATION REPORT

ON THE

PURCELL PROPERTY

Reverted Crown Grants:	Record Nos.	Located Claims:	Record Nos.
Grey Copper L580)		Grey Copper Fr. 1	613(4)
Goodenough L581)	18230(2)	Link 1	1264(6)
Purcell L849)		Link 2	1265(6)
Rawdon L855	18231(2)	Chambers Fr. 1	1266(6)
Idaho No. L1013	18232(2)	Chambers Fr. 2	1267(6)
		Grey Copper Fr. 2	6374(5)
		Grey Copper Fr. 3	6375(5)

Reco Mountain - Sandon Mining Area

Slocan Mining Division

Kootenay Land District

New Denver, British Columbia

North Latitude 49° 59.3' **West Longitude 117° 11'**

N.T.S. 82-F-14

for

AVRIL EXPLORATIONS INC.
1016 - 470 Granville Street
Vancouver, B.C.
V6C 1V5

December 31, 1990
Revised April 22, 1991

Donald W. Tully, P.Eng.

DON TULLY ENGINEERING LTD.
SUITE 1205, 555 - 13TH STREET
WEST VANCOUVER, BRITISH COLUMBIA
V7T 2N8

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APPENDICES

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Appendix 2 Calculations by Ostler and Linn concerning deemed economic potential of the Grey Copper 5A level area

Appendix 3 Assay Certificates (18 pages):
#A9018004
#A9019595
#A9019954
#A9015968
#A9015970
#A9018343
#A9020088
#A9020517

MAPS

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Figure 14	Silver in Soils: 1987 and 1990 Surveys	(Ostler-Linn #17)	(Appendix 1)
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Figure 21	1990 Soil Survey: Silver Frequency Distribution Curve	(Ostler-Linn #13)	(Appendix 1)
Figure 22	East Vein - Surface Exposure	(Ostler-Linn #21)	(Appendix 1)

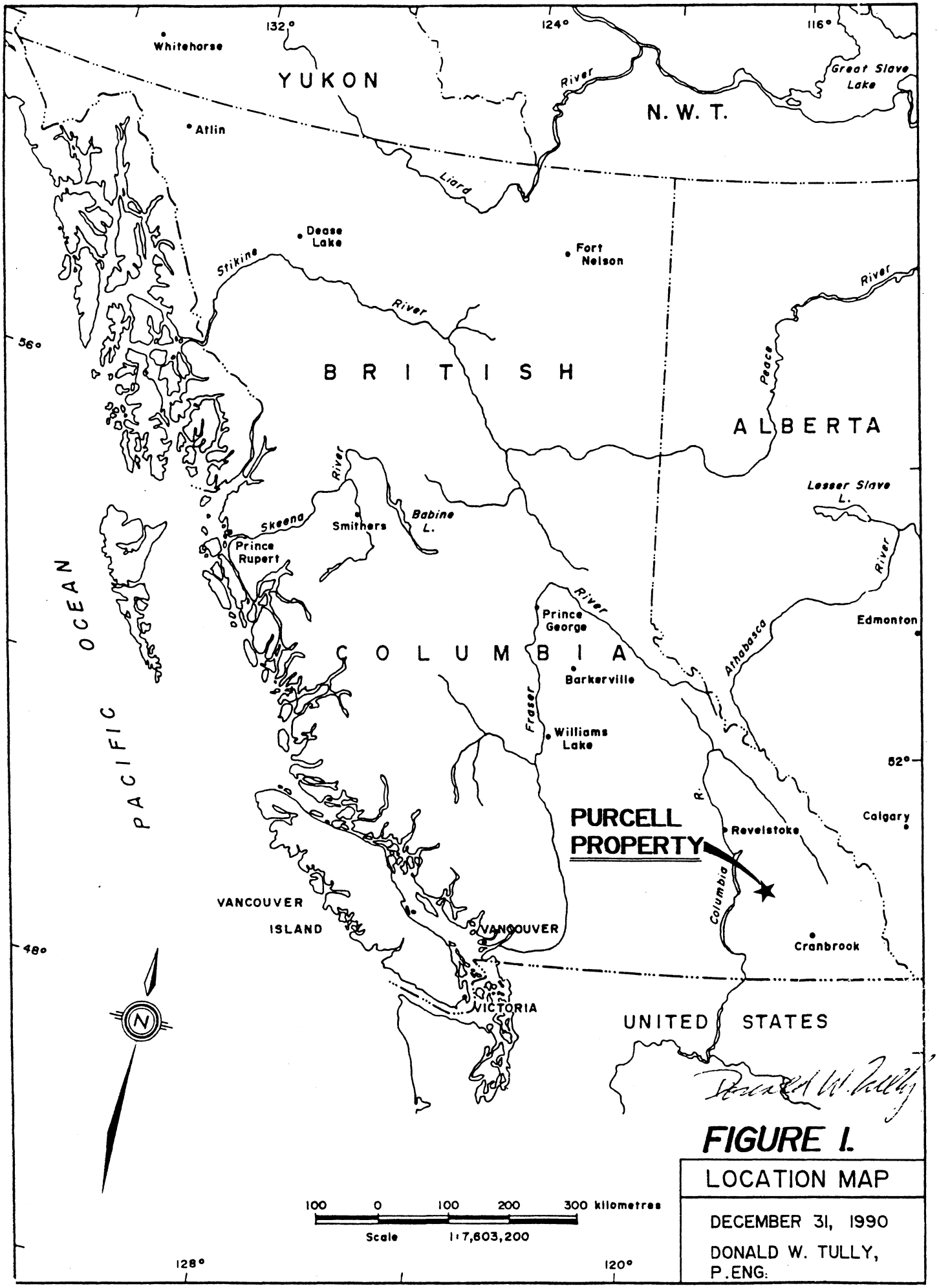


FIGURE I.

LOCATION MAP

DECEMBER 31, 1990

DONALD W. TULLY, P.ENG.

1.0 INTRODUCTION

1.1 This report was prepared pursuant to a request from the Directors of AVRIL EXPLORATIONS INC., Suite 1016, 470 Granville Street, Vancouver, British Columbia, V6C 1V5.

1.2 The purpose of this report is to summarize the previous development work done on the PURCELL PROPERTY and assess the mineral potential of this group of claims.

1.3 This report is based upon a field examination of the PURCELL PROPERTY on July 26-27, 1990, a study of relevant reports and maps and personal communications. Appreciation is acknowledged to Messrs J. Ostler and M. Linn for the database of information for this report. A program of mineral exploration, development and limited mine production is recommended.

2.0 SUMMARY AND CONCLUSIONS

2.1 The PURCELL PROPERTY is located in the Slocan Range of the Selkirk Mountains in southeastern British Columbia.

2.2 The PURCELL PROPERTY comprises ten contiguously located claim-units covering an area ±70 hectares (±168 acres) subject to final survey. The 10 claim-units consist of five reverted Crown grants, three of which are recorded as one, and seven located claims.

2.3 The claim group is situated about 450 km east of Vancouver, British Columbia and some 15 km east of the town of New Denver which is located on the east shore of Slocan Lake. The road distance from Vancouver to New Denver is about 765 km (462 miles) via Highways 1, 3 and 6 (Figures 1 and 2).

2.4 The history of mining on the PURCELL PROPERTY began when silver-lead ores were discovered in the now famed Slocan Mining District about a century ago in

Kootenay - Boundary Country

British Columbia
Canada

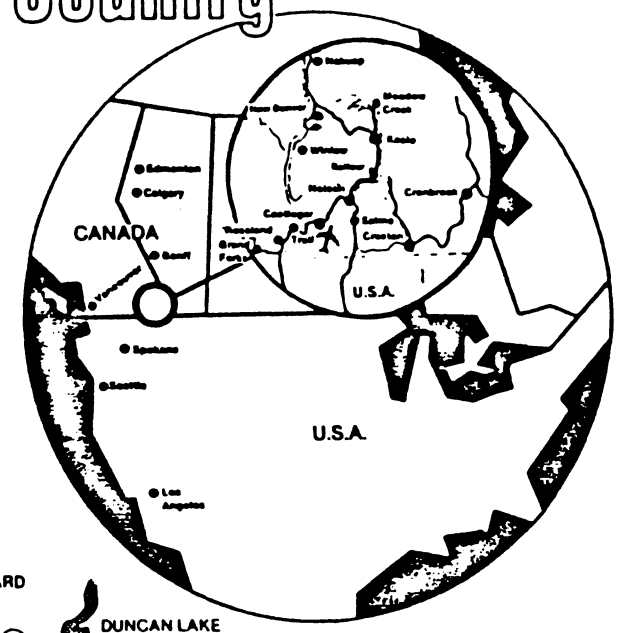


FIGURE 2.

AREA MAP
SCALE: Approx. 1:1,000,000 DECEMBER 31, 1990 DONALD W. TULLY, P.ENG.

1891. High-grade silver and lead-bearing veins were found and development commenced in 1891 on the Grey Copper (L580), Goodenough - Reucau (L581, L624) and Idaho No. 2 (L1013) veins. Although the records may not be entirely accurate, silver production from the Goodenough Vein on the Reucau claim was reported to be $556,572.05 at prevailing metal prices during the period 1896-1919 (C.E. Cairnes - 1935). The Grey Copper Vein System has produced rich silver and lead values from a narrow structure. Although the Purcell (L849) and the Idaho No. 2 were staked in 1892, there is little record of development on the Idaho No. 2 prior to 1928. Following 1928 some drifting was done on the zinc-rich Idaho No. 2 Vein system but low metal prices resulted in a suspension of operations in 1931. Work began again on the Idaho No. 2 in 1951 but was redirected to the Grey Copper No. 3 Level in 1953. In 1975 George Sipos acquired control of the Goodenough, Grey Copper, Purcell Idaho No. 2, Rawdon, Bluebird and Stranger reverted Crown-granted claims as the Bluebird Group. Sipos caused work to be done on the Grey Copper No. 5A Level in 1978. In 1979 Sipos incorporated Sipald Resources Ltd. and acquired control of the present PURCELL PROPERTY. Sipald Resources did considerable rehabilitation work and reported a modest production in 1980 from the Grey Copper No. 3 Level. Sipald continued the work program into 1981 and was reported to include surface mapping, trenching, examination of mine dumps at the Goodenough No. 6 and No. 8 Levels, the Idaho No. 2 dump, the Purcell adit was reopened and a diamond drill hole directed northward towards the vein below the Big Stope on the Grey Copper No. 3 Level which reportedly had some encouragement. In 1983 work was done on the road to the Purcell adit and the Idaho No. 2 was rehabilitated. Sipald Resources leased the Goodenough mine dumps to Modern Metal Recovery Systems Ltd., in 1983, who forwarded a test shipment to the concentration mill at Ainsworth, B.C. and collected a 5-ton concentrate which was shipped to the smelter at Trail, B.C. The smelter return reportedly credited this shipment as containing 4.431 tons grading 0.2% copper, 11.4% lead, 29.8% zinc, 110.05 oz/ton silver and 0.017 oz/ton gold. Wavecrest Resources Ltd., optioned the PURCELL PROPERTY mine dumps later in 1983 and in 1984 Knie Resources Inc., optioned the property. Sipald Resources Ltd. was reorganized and renamed Rawson Resources Ltd. in 1986. Rawdon Resources carried out a program of geochemical soil sampling during 1987. In, 1988 Rawdon

Resources was sold to the Advanced Ecology Group, later becoming the Consolidated Advanced Ecology Corp., in 1989. This company optioned the property to General Tunnel Co. Ltd. which conducted a limited work program at the Grey Copper No. 3 adit in 1989. The PURCELL PROPERTY was sold to Avril Explorations Inc., in 1990. Avril Explorations carried out a program of geochemical soil sampling, machine-trenching, hand-trenching, rock drilling and blasting, underground rock channel sampling and geological mapping in 1990.

2.5 Slocan Group sediments of pelites, argillite, sandstone and quartzite, limestone and minor tuffaceous horizons underlie the PURCELL PROPERTY. These metamorphosed sediments have been overturned and intruded by felsic to intermediate intrusives of the Nelson Batholith. During folding and intrusive emplacement the process of anatexis has occurred in some horizons and provided brittle host rocks for vein development. Deformation during late Tertiary time resulted in the development of a pattern of northeast trending fractures and fissures that host the quartz-calcite and siderite veins carrying sphalerite, galena, silver-bearing minerals and sulphides of iron.

2.6 A program of soil sampling was carried out over the southeast sector of the property during 1990. A previous soil sampling survey in 1987 was done over the northwest portion of the property. The soil samples from the 1990 geochemical survey were analyzed for copper, lead, zinc and silver and were factored with those assays from the 1987 soil survey. The results indicated at least five zones of significantly anomalous zones of zinc, lead and accompanied by silver on the property area. Frequency distribution curves for these elements show values greater than 330 ppm zinc, above 42 ppm lead and 0.47 ppm silver are anomalous (Figures 19, 20 and 21).

2.7 Geological mapping indicated the surficial fold and fracture pattern of geologic features on the property and the underground mapping and channel sampling added to the database for planning further mineral exploration. The results of the underground sampling and mapping have indicated several zones for immediate development of potential zinc-silver mineral reserves as follows:

a) Strong zinc-silver mineralization (0.05% lead, 38.8% zinc, 7.90 oz/t silver over 36 cm and 0.07% lead, 41.3% zinc, 23.1 oz/t silver over 17 cm) on the northeast face of Grey Copper 5A Level drift (Figure 12).

b) Substantial zinc-silver mineralization in the same 5A drift extending for some 12 m back from the drift face and also from a point in the same drive between 25 m and 35 m back from the drift face (Figure 12).

c) It is expected zinc-silver mineral reserves should occur above and below the (a) and (b) locations indicated above. Three exploratory raises are proposed.

d) Evidence of good zinc-silver mineralization in the track beneath the Big Stope area on the Grey Copper No. 3 Level and reported evidence of a 1980 diamond drill hole intersection in the plane of the Grey Copper Vein and some 60 m below the No. 3 Level drive is an indication that further potential may well exist for mineral reserves beyond the face of the No. 5A Level drive (Figure 9).

e) In addition to the five zones of surface lead-zinc-silver geochemical anomalies, further mineral exploration of the potential of the East Vein near the Grey Copper No. 3 portal and also the West Vein in the Idaho No. 2 (Main) drive area, may prove rewarding.

2.8 It is concluded the PURCELL PROPERTY has a high-priority mineral target area for immediate development on the Grey Copper 5A Level.

2.9 A two-phase program of mineral exploration is recommended. Further mineral exploration should await the results of the recommended Phase 1 program. The estimated total cost of the high-priority (Phase 1) portion of the recommended program is $140,000.

3.0 PROPERTY - LOCATION, ACCESS, PHYSIOGRAPHY, ENVIRONMENTAL CONSIDERATIONS

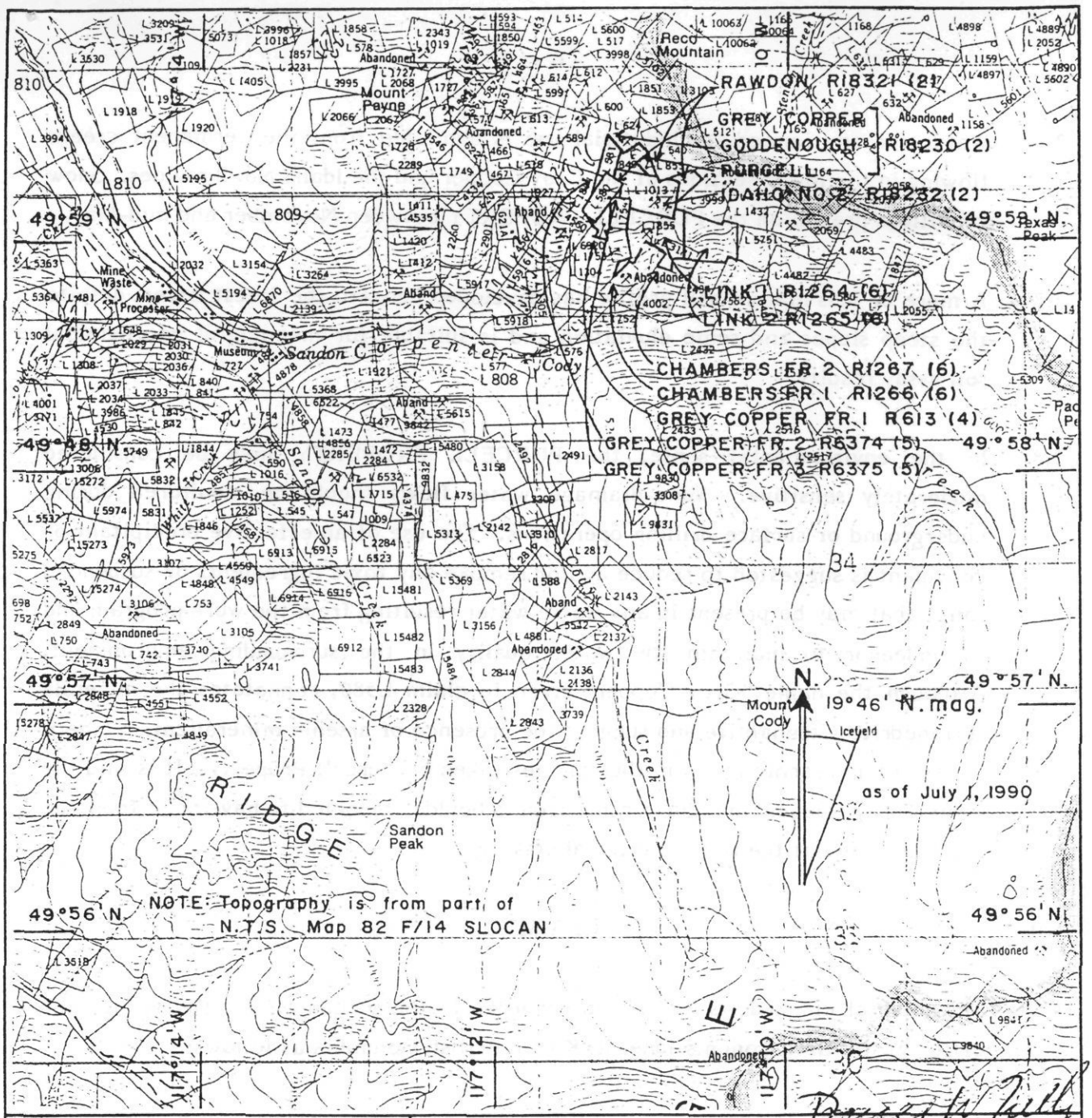
3.1 The PURCELL PROPERTY is located some 450 km east of Vancouver, British Columbia. It is situated in the Slocan Range of the Selkirk Mountains within the Slocan Provincial Forest of southeastern British Columbia (Figures 1, 2 and 3).

3.2 Ten claim-units, consisting of five reverted Crown grants three of which are recorded as one, and seven located claims comprise the property. This ground covers an area of about 70 hectares (168 acres) as shown on Figures 3 and 5.

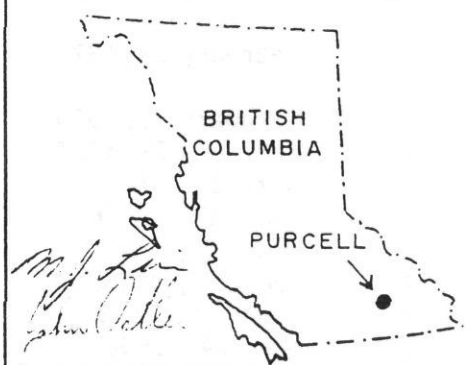
3.3 Motor vehicle access is available to and over most of the property. The road distance from Vancouver via Highways 1, 3 and 6 is about 765 km (467 miles). The road distance from New Denver on Highway 31A through Sandon and Cody townsites is some 20 km (12 miles) to the PURCELL PROPERTY. The ground is situated on the steep southwest - facing slope of Reco Mountain. Reco Mountain is the main physiographic feature of the area rising to an elevation of some 2,591 m (8,500 ft). Carpenter Creek valley occupies the area south of Reco Mountain and is the main access route into the Sandon Mining Area.

3.4 Elevations over the claimed ground range between $\pm$1,555 m (5,100 ft) and some 2,134 m (7,000 ft) above sea-level in the west sector of the property area.

3.5 Forest fires and former logging operations have removed the original forest cover which is now replaced by later growth fir, spruce and hemlock. A moderate amount of timber is available for mine use in the lower reaches of the property area but above 2,134 m (7,000 ft) alpine meadow conditions begin to appear. The major ravine on the property occurs in the area of the surface outcrop of the Grey Copper - Purcell - Goodenough vein systems and also the Idaho No. 2 system. These gullies are the site of frequent snowslides and are overgrown in part by thickets of willow and alder.



LOCATION



Ostler & Linn - Figure 2

CASSIAR EAST YUKON EXP. LTD.

SCALE

0 1 2 3 km

0 1 2 mi

AVRIL EXPLORATIONS INC.

LOCATION and TERRAIN

PURCELL PROPERTY

49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA, N.T.S. 82F/14

JOHN OSTLER; M.Sc., P.Geol.
MICHAEL LINN, B.Sc.

DECEMBER, 1990

To accompany a report by Donald W. Tully, P.Eng., dated December 31, 1990

FIGURE 3.

3.6 Water for any immediate industrial use is available from the permanent creeks flowing in the lower sections of the Grey Copper and the Idaho No. 2 ravines. Snow conditions prevail on the PURCELL PROPERTY between November and mid-May.

3.7 A more or less mature soil profile has developed beneath the forest cover, despite the steep slopes and some eluviation and is suitable for meaningful geochemical soil assay results.

3.8 In the environmental sense, the PURCELL PROPERTY may be considered moderately sensitive. Mine-drainage water flows should be monitored during underground or surface drilling operations. The use of an effective precipitant or coagulant is suggested to reduce and/or remove any toxic ingredients or suspended solids that may be present in any waste water resulting from the work program and to endeavor to maintain the water quality in the surrounding environment. Although the name "Grey Copper" given to claim L580, connotates the minerals tetrahedrite - tennantite and suggest the presence of arsenic mineralization, there is very little arsenic found in the samples taken on Purcell Property. It is said the name "Grey Copper" may have come from a boulder reported to have been found on the claim area at the time of original staking.

4.0 CLAIMS

4.1 Ten mineral claim-units have been recorded in the Slocan Mining Division at the office of the Gold Commissioner at Kaslo, British Columbia as follows:

Claim Name	Record No.	No. of Units	Record Date
Grey Copper L580) Goodenough L581) Purcell L849)	18230(2)	1	February 28, 1975
Rawdon L855	18231(2)	1	February 28, 1975
Idaho No. 2 (L1013)	18232(2)	1	February 28, 1975
Grey Copper Fr. 1	613(4)	1	April 21, 1979
Link 1	1264(6)	1	June 27, 1979
Link 2	1265(6)	1	June 27, 1979
Chambers Fr. 1	1266(6)	1	June 27, 1979
Chambers Fr. 2	1267(6)	1	June 27, 1979
Grey Copper Fr. 2	6374(5)	1	May 24, 1990
Grey Copper Fr. 3	6375(5)	1	May 24, 1990
Total		10	

4.2 The ten claim-units comprise the PURCELL PROPERTY and are owned 100 percent by AVRIL EXPLORATIONS INC., Suite 1016, 470 Granville Street, Vancouver, B.C., V6C 1V5 and are shown on Figures 3 and 4 of this text as well as British Columbia Mineral Titles Map M82 - F - 14E.

4.3 The total area of the claim group is ±70 hectares (±168 acres), subject to final survey. The five reverted Crown claims, namely the Grey Copper (L580), Goodenough (L581), Purcell (L849), Rawdon (L855) and Idaho No. 2 (L1013) were acquired by application and the remaining Grey Copper Fr. 1, Fr. 2, Fr. 3, Link 1, 2 and the Chambers Fr. 1 and Fr. 2 were located. Consequently, the property boundaries are defined almost completely by former claim surveys as indicated on Figure 4 and also on Figure 5.

4.4 Any proposed mineral exploration near the boundary of the property claim area should first be surveyed to establish the exact position relative to any adjoining property area.

5.0 HISTORY - PREVIOUS DEVELOPMENT OF THE AREA AND PROPERTY

5.1 Following the discovery of placer gold on the Big Bend of the Columbia River in 1865 there was a rush of prospectors into the Kootenay Mountains. Access to the region at that time was by boat from points in the northern U.S.A. such as Sandpoint, Bonners Ferry and Kettle Falls and thence northward along the Kootenay Lake and the Columbia River - Arrow Lakes Waterways. Two of these prospectors are reported to have climbed Mount Payne on September 9, 1891 in search of a route towards the Hot Springs at Ainsworth. These men, Eli Carpenter and Jack Seaton, discovered the Payne Vein on that date and staked the Payne claim. This claim was the first claim recorded in the area. Founded in 1892 the town of Sandon, located on Carpenter Creek about two kilometres southwest of Mount Payne, became a headquarters for supplies for the many mines and prospects in this area. Before the end of 1891 some 80 claim locations had been recorded in the vicinity of Mount Payne and Reco Mountain. The following year, 750 claim

locations were recorded. By the end of 1892, sixteen properties were under development and shipments of silver-lead ore had been made from six mining operations. The earliest claim locations were made under the Apex Law which provided for a claim 600 feet by 1,500 feet in dimension with extralateral rights. This law was repealed in 1892 and the claim dimensions changed to 1,500 feet square with vertical sides. Prior to 1895, most of the shipments of ore were made by pack-horse from the mines through Sandon to Nakusp on Upper Arrow Lake, although some was shipped by the more arduous route to Kalso on Kootenay Lake. Thence the ore was forwarded by boat and rail to smelters in Montana and also in Kansas. By 1895 the Kalso and Slocan narrow-gauge railway was built between Kalso and the new town of Cody, located about 1½ km east of Sandon in the valley of Carpenter Creek. In 1895, the C.P.R. completed a rail line from Nakusp to Three Forks and on to Cody and later in 1911 took over the Kaslo and Slocan railway. An ore milling complex was constructed at Cody to process concentrates of silver and lead ore. Lead smelters were erected in 1896 at Nelson and also at Trail, B.C. and this reduced the long haul of concentrates to the United States and greatly enhanced the mining potential of the Sandon area. By 1911 research in the metallurgical treatment of zinc made concentrates of this metal much more acceptable to the smelters. Zinc was becoming the dominant metal in the deeper horizons of the mines in the Sandon Mining Camp. The record shows this camp produced 900,000 tons of ore, between 1893 and 1950, containing 25,257,486 ounces of silver, 3,148 ounces of gold, 221,810,746 pounds of lead, and 44,825,365 pounds of zinc, from 36 properties. Prior to 1925 the records indicate the gross metal content of the ores and concentrates and after 1925 the net metal content is recorded. The records may not be complete because of low mill recovery and the deliberate discarding of sphalerite. Most of the important mineral discoveries were made by the end of 1892. Production peaked in 1918 and declined until after World War II when a rise in metal demand revived the camp between 1946 and 1953. In the early days, the town of Sandon suffered many of the calamities common to isolated mining communities. Forest fires devastated the town on May 3, 1900 following an eight-month miner's strike which lasted from June 1899 through February 1900. Today, the Sandon townsite is virtually a "Ghost Town" of interest to tourists and mining souvenir hunters. Silmonac Mine (formerly the Victor and later the Violamac) has operated more or less continuously since the

discovery of this mine in 1921. The Silmonac Mine is situated about 1½ km west of Sandon and is currently operating at ±50 tons per day.

5.2 J. Ostler, P.Geol., and M. Linn, B.Sc., have investigated the background and previous development work done on the claims comprising the PURCELL PROPERTY and this historical study, as outlined on pages 4 through 23 in their report dated December 31, 1990, is reprinted as follows:

"1.5 Early Previous Work: 1891 to 1975

Exploration around the area now covered by the Purcell Property commenced in 1891. Mineral targets sought were northeasterly trending veins carrying high concentrations of silver and lead-bearing minerals. By 1901, sufficient work had been done on most of the claims around the Purcell Property-area to justify their having been surveyed and Crown-granted (Figure 3). At that time, mineralized quartz and carbonate veins were explored on surface and underground on the Goodenough L581, Grey Copper L580, Purcell L849 and Idaho No. 2 L1013 claims.

1.5(i) Goodenough Vein

The Goodenough Vein was probably the best-known of the veins mined in the area now covered by the Purcell Property.

The Goodenough L581 and Reucau L624 claims were staked over the Goodenough (No. 3) Vein by two different groups in 1891. By 1895, a tunnel was driven northward into the steep hillside along the narrow quartz-siderite vein toward the Reucau-Goodenough claim boundary (Figure 4). The tunnel was named the A or No. 2 level. In that tunnel, the vein was up to 51 cm (20 in) thick and contained argentite, pyragyrite, native silver, tetrahedrite and galena.

Work on the No. 2 and No. 4 levels in the Goodenough workings during 1895 were reported upon by a provincial government geologist as follows:

Goodenough

This claim is a fraction, lying near the Reucau, and has a small lead of very rich ore; at present the owners are driving a tunnel, and are in about 200 feet. No 2 Tunnel is in about 150 feet, and is 65 feet below surface. 35 tons of ore are ready for shipment. 20 tons of ore were shipped this summer and realized $6,875. Ten men are at work.'

B.C. Min. Mines, Ann. Rept.; 1895, p. 675

"The Goodenough L581 claim was Crown-granted to J.H. Thompson and associates on August 14, 1896. Returns from a 600-ton ore shipment sent from the Goodenough Vein that year were summarized as follows:

'... The small Reco-Goodenough vein, the width of which is measured in inches, is probably the richest vein yet mined, as from the smelter returns of about 600 tons, the average was 407 ounces of silver per ton and 42% lead. The high percentage of lead makes this ore a very desirable one for the smelters, and the lead contents are usually sufficient to pay the freight and treatment charges, and the duty charged on the lead.'

B.C. Min. Mines, Ann. Rept.; 1896, p. 37

By 1896, net smelter returns from the Goodenough Vein contained from 167 to 507 oz/ton silver with 15 to 67% lead (B.C. Min. Mines, Ann. Rept.; 1896, p. 47).

The Goodenough Vein was mined on both the Goodenough and Reucau claims concurrently by different companies from common cross-cuts located near the claim boundary. Reports of shipments from the Goodenough related only to that part of the vein mined on the Goodenough claim (Figure 4). Shipments from the vein on the Reucau claim were reported in annual reports with other shipments from the Reco group (Section 1.7, this report).

Ore was being mined on several levels accessible from the No. 2, 4 and 6 tunnels during 1896. Progress in the Goodenough workings on both sides of the Goodenough-Reucau claim boundary was recorded by a provincial government geologist as follows:

'... From the Small or Goodenough vein, lying several hundred feet to the east, has come the richest silver-bearing galena yet found in Kootenay, the silver evidently occurring as argentite, although much ruby silver is found in some of the solid galena. The mining operations are being carried on in co-operation with the Goodenough mine, and three tunnels, Nos. 2, 4 and 6, have been driven to and then extended both ways along the vein in each of these properties; the vein being from 2 or 3 inches wide up to 20 inches of solid ore, with in places only a streak of iron-stained matter. The ore so lies that generally the ground can be mined out along it, leaving the more to be afterwards broken down clean. The ground is faulted in one place with a lateral throw of the vein for 10 feet, and where the vein passes through the porphyry dykes the ore shoot is found, generally, to be about the most productive part of the vein. From these tunnels several hundred feet of drifting have been driven, the vein being not always productive, but in the miner's term "in and out", and these levels will be continued much farther before reaching the limits of the claim (see Goodenough mine below).

This ore, while mined from a small vein, is very profitable, and at time of visit, in August, several tons of rich ore were piled at each tunnel mouth, and the following data from smelter returns will give some idea of the value:- The galena ore has run from 225 to 730 ounces of silver per ton, and

67% lead; one lot of 21 tons assaying 730 ounces of silver per ton, and 67% lead; and two shipments in 1896, or 45 tons, yielded net (or 95% of assay) 24,820 ounces of silver, and 27 tons of lead, or $340 per ton, after deducting all charges.

The carbonate ore from this vein, for 20 carloads, has yielded from 230 to 337.8 ounces of silver per ton, and 19 to 28% lead.

This company now propose to build an aerial tramway down to Cody Creek, and there erect a concentrator. Foreman, Alex McPhee. Number of men, 15 (in Aug.).

Goodenough

The Goodenough, title, Crown grant, 8.3 acres, and the location the Grey Copper, 600 by 1,284 feet, lying south of the Reucau, are owned by Jno A. Whittier, Jno. Thompson, and Jno. Martin, Sandon, and six men were at work on the "small vein" as described in the Reco above. In the workings, tunnel No. 6, or the lowest, was a cross-cut for 275 feet, and near the point of intersection with the vein an upraise had been made for 169 feet to tunnel level No. 4 along the Reucau-Goodenough line, following for nearly all that distance several inches of very high grade ore. In the N.E. the drift ran off into the Reco ground, while to the S.W. the Goodenough drift, in 170 feet, with 500 feet of the vein on this level available before leaving the side line, had good ore for 110 feet both above and below the level, with a narrow streak of carbonates to the face, an improvement in the ore shoot being expected when the vein passed through the dyke 30 feet ahead. In the tunnel levels Nos. 2 and 4, relation of the vein to the surface was such that but a comparative short distance along the vein could be worked out on this ground, and all was stoped out, but on the Reco these two levels were being extended to the N.E.

There is a fair amount of good timber. As in the other mines, greatest activity is during the winter season, when the cost of shipping ore to Sandon, by rawhiding, is $3 per ton, instead of $7 by packing on mules in the summer. The grade of the ore, of course, is similar to that sent from the Reco, the smelter returns for carload lots giving from 277 to 507 ounces silver per ton, and 48 to 67% lead for galena ore, and 168.5 to 322.5 ounces of silver per ton, and 2 to 34% lead for carbonate ores, while one lot of 6-1/2 tons assayed 768 ounces silver per ton and 64.1% lead.'

B.C. Min. Mines, Ann. Rept.; 1896, p. 59

More than 300 m (984 ft) of underground development had been completed in levels 1 to 6 on the Goodenough Vein by 1896. A further 183 m (600 ft) of tunnel was driven on the vein in 1898 (B.C. Min. Mines, Ann. Rept.; 1898, p. 1074). By 1905 the No. 8 level was developed (Figure 4) and a total of more than 1,476 m (4,843 ft) of tunnel and an unknown amount of stope had been excavated over a vertical distance of 161 m (529 ft) on the two claims.

"The Goodenough Vein had produced about $700,000 in revenue from the Reucau claim and another $100,000 from the Goodenough claim, of which $80,000 came from smelting galena. From that production, about $287,000 in dividends were paid to shareholders from the Reucau claim and $45,000 were paid to shareholders from the Goodenough claim (Zinc Commission; 1906, p. 260) (B.C. Min. Mines, Ann. Rept.; 1905, p. G192).

Work on the Goodenough Vein on both sides of the Goodenough-Reucau boundary was summarized by a provincial government geologist as follows:

'... Of the three veins mentioned, the best known is the most easterly, the No. 3 or, or as it has been called, the Reco or Goodenough vein, which cuts through from the Goodenough into the Reco ground, and which has been developed by a series of cross-cut tunnels ran in on the Goodenough ground near the dividing line, at the joint expense of the Reco and Goodenough mines, from such cross-cuts the respective companies have run drifts on their own portions of the vein.

The vein in the Reco ground is found between clean, hard walls, from which the ore parts readily, and in width varies from a mere rusty streak up to about 24 inches, having an average width of about 6 inches of quartz, etc., of which an average of about 3 inches is solid ore, which consists of silver sulphides, argentite, ruby silver, and some galena, with grey copper and zinc. The ore is easily hand-sorted in the workings, no grade being produced other than shipping ore, which for the first five years that property was operated, from 1894, averaged as shipped, 309.6 oz. of silver to the ton and 46% lead. Laterally, however, shipments have been somewhat lower in grade, lower freight and treatment rates not calling for such close sorting, and average about 225 oz. in silver and 55% lead. Zinc is present in the ore, but in unimportant amount, being about 5%.

The mine is opened up by tunnel No. 2, 900 feet long; No. 4, a cross-cut of 57 feet and drift of 1,050 feet; No. 6, a cross-cut of 270 feet, and a drift 1,025 feet long; No. 7, an intermediate "blind" level, is 640 feet long. No 8 has a cross-cut 350 feet, with a drift of 550 feet. Although some ore exists above levels Nos. 2 and 4, the vein has been pretty well stoped out as far as the levels have been run, and the greater part of the ore known is between Nos. 7 and 4. Comparatively little ore has come out of No. 8 level as yet, but it is possible that the ore-chute on No. 7 will go down and be found on the production of No. 8.

It is of more than passing interest to note the values which have been extracted and realised upon from this small vein. Mr. Harris reports that, as worked up to present, the vein alone has produced on Reco ground about $700,000 from ore shipped, while from the vein in Goodenough ground another $100,000 was mined. The original cash outlay for the purchase of the mine and its development was $2,700, while in 10 years there has been paid in dividends, chiefly from this vein, $287,000.'

B.C. Min. Mines, Ann. Rept.; 1905, p. G192

"From the reports of the provincial government geologists, it was obvious that ore shipments were made on a regular basis from the two operators on the Goodenough Vein. Unfortunately, shipping records were not available to the writers.

The Goodenough claim was acquired in 1905 by J.A. Whittier who grouped the claim with the Grey Copper and Purcell claims. He operated the mine on the Goodenough claim from 1905 until after 1917.

Mr. Whittier embarked upon an aggressive program in the No. 8 level hoping to intersect large quantities of good ore 137 m (450 ft) below development stopes on the No. 6 level.

Old mine maps indicate that he explored the vein on that level extensively (Figure 4). It is apparent that production financed development from 1908 until 1916. No detailed records of in are known to the writers. Cairnes (1935) reported that the Goodenough Vein produced high-grade silver ore in the following years: 1895 to 1904, 1909, 1913 and 1915 to 1919. During 1917, a 4-man crew produced 62 tons of ore (B.C. Min. Mines, Ann. Rept.; 1918, pp. F162-F163).

Cairnes (1935) reported total production from the Goodenough Vein on the Reucau claim as follows:

'Years:	lb of Ore	Ag ounces	Lead pounds	Net smelter
1894 to 1919	7,731,001	875,374.44	3,285,618	$556,572.05'

Cairnes, C.E.; 1935, p. 108

Cairne's tally of production from the Goodenough Vein could not have supported the $700,000 reported by Mr. Harris to have been received from ore shipments by 1905 from the mine on the Reucau side of the boundary. It seems likely that many of the smelter receipts from the Goodenough Vein were not available to Mr. Cairnes when he wrote his report.

Reco Silver Mines Ltd. held the Goodenough and Grey Copper claim together with the Bluebird, Reucau and Noble Five group from the mid-1960's until 1974. In 1969, work in the No. 7 and 8 levels of the Goodenough Mine disclosed a parallel vein lying east of the Goodenough Vein in those workings.

The tenor of that vein is unknown to the writers; the Goodenough workings having been caved near the No. 8 portal during their 1990 work on the property.

"1.5(ii)Grey Copper Vein

The Grey Copper Vein was discovered in the creek gully below the Goodenough Vein in 1891 (Figure 4) and the Grey Copper L580 claim was staked to cover it.

By 1893, the claim was owned by J. Thompson and associates who had stripped a wide sphalerite-rich vein for 61 m (200 feet) in the creek gully, probably where later the No. 5 and 5A levels were driven (Figures 4, 9 and 20). There, the Grey Copper Vein was up to 0.9 m (3 ft) thick and averaged 0.3 m (1 ft) in thickness. Assays from the vein; probably from galena-rich areas, ran from 145 to 160 oz/ton silver and 72% lead (B.C. Min. Mines, Ann. Rept., 1893, p. 1060).

The Grey Copper L580 claim was Crown-granted to J.A. Whittier on July 27, 1896 (Figure 3).

By 1905, the Grey Copper Vein was grouped with the Goodenough and Purcell claims. Both the Grey Copper and the Goodenough veins were being developed by J.A. Whittier.

When the Grey Copper claim was visited by a geologist from the Zinc Commission in 1905, an upper level tunnel (Level No. 2) had been driven 15 m (50 ft) into the hillside along the vein. A lower tunnel (Level No. 3) located 18 m (60 ft) vertically below the upper tunnel had been driven in for 37 m (120 ft) along the vein into the hill (Zinc Commission, 1906). These tunnels were about 55 m (180 ft) above the part of the vein that had been stripped and sampled in 1893.

The Zinc Commission's geologist observed that the pay-streak on the Grey Copper Vein was 0.3 m (12 in) thick in the upper (No. 2) level and 0.6 m (24 in) in the lower (No. 3) tunnel. It was estimated that these two tunnels were separated by a distance of 26 m (85 ft) on the plane of the vein and that a 1,000-ton block of ore lay between. A five-cut sample from the lower tunnel (Level No. 3) assayed 42.6% zinc, 18.8% lead and 33 oz/ton silver.

A 40-ton test shipment milled at the Payne concentrator near Sandon assayed as follows:

	Silver oz/ton	Lead %	Zinc %
Assay of original ore	17	4.6	41
Assay of lead product	100	61.0	13
Assay of zinc product	12	1.5	50.4

Zinc Commission Report; 1906, p. 260

"When Cairnes (1935) visited the Grey Copper claim during the early 1930s, five adits had been driven northeastward into the vein from the gulch between elevations of 1,524 and 1,829 m (5,000 to 6,000 ft). Levels 1 to 4 were within 30 m (100 ft) of each other. The Grey Copper Vein was exposed intermittently for a horizontal distance of about 305 m (1,000 ft) and a vertical distance of about 90 m (295 ft) in the gully (Figures 4 and 18).

It is interesting to note that Cairnes (1935) recorded the existence of the East Vein lying on the side of the hill less than 90 m (295 ft) southeast of the Grey Copper Vein. No early work was recorded from the East Vein. However, examination along the trend of the vein during the 1990 exploration program revealed several very old test pits that had been dug to explore its extent.

It had been suspected that the Grey Copper Vein was contiguous with the Purcell Vein, the workings of which were located about 200 m (656 ft) northeast of the Grey Copper No. 1 adit. A series of trenches were dug between the two groups of workings in an attempt to establish their contiguity. Those trenches were sloughed in when Cairnes visited the Grey Copper claim.

Cairnes (1935) noted that a 37-ton ore shipment had been made from the Grey Copper claim during 1917 that contained 80 oz/ton silver and 50% lead, probably from hand-cobbed galena.

By 1931, the Grey Copper claim was being developed by J. Miciewic of Sandon, B.C. who shipped 2 tons of gold-silver-lead-zinc ore that year. An additional 2 tons of ore returning good values of silver, lead and zinc were shipped during 1933 B.C. Min. Mines, Ann. Rept.; 1931, p. A138 and 1933, p. A220).

By 1951, the Grey Copper claim had become part of the Bluebird group comprising the Grey Copper, Bluebird, Stranger, Rawdon and Idaho No. 2 claims (Figures 3 and 4). The claims were developed by Bluebird Slocan Mines Limited of Vancouver, B.C. and managed by J. Mollard (B.C. Min. Mines, Ann. Rept.; 1953, p. A139).

The company built two large camp buildings; since collapsed, at the eighth eastern switchback on the Noble Five road on ground now covered by the Grey Copper Fr. 2 claim (Figure 4). In 1953, the Grey Copper No. 3 level was extended for 46 m (150 ft) to 198 m (650 ft) in from the portal. Also, a raise was completed between the No. 3 and No. 2 levels. It was located in the No. 3 tunnel about 76 m in from the portal (Figure 19A).

The age of platform timbers and oxidation of the vein in stope walls indicated to the writers that the 1,000 tons of high-grade ore delineated between the No. 2 and No. 3 levels in 1905 was probably mined during the early 1950's. When Sipald Resources Ltd. rehabilitated this working in 1980, that ore-block had been stoped out up to No. 1 level (George Sipos, pers. comm.).

1.5(iii) Purcell Vein

The Purcell L849 claim was staked on July 19, 1892 and Crown-granted on August 25, 1897 to the Purcell Mining Corporation. By 1905, it was grouped with the Goodenough and Grey Copper claims under the management of J.A. Whittier.

The Purcell Vein is located about 200 m (656 ft) northeast and up the hill from the Grey Copper No. 1 portal. These two veins are on strike with each other (Figures 4 and 18). The writers share the long-held view that these are probably two exposures of the same vein.

The 1990 exploration crew found a series of eight old trenches on the hillside between the Grey Copper and Purcell workings which seemed to be the result of an attempt to connect the two along the vein. These trenches were sloughed in and were not reopened during the work program.

The Purcell workings were located near the centre of the Purcell claim at an elevation of about 1,975 m (6,478 ft) (Figure 4). During the 1990 exploration program, they were badly caved and no attempt was made to reopen them.

It appeared from Sookochoff's (1986) maps that the Purcell workings were accessible through a northeasterly trending 54 m (177 ft) long adit that jogged 12 m (39 ft) southeastward 36 m (118 ft) in from the portal (Figure 4). Two northward trending raises located 12 m (39 ft) and 42 m (138 ft) in from the portal were driven upward along the vein toward surface. Near the end of the adit was a small stope from which, silver-bearing galena was mined (George Sipos, pers. comm.).

At least 20 old exploration trenches and pits were located northeast of the road from just above the Purcell portal up hill to an old horse trail near the Purcell-Bluebird claim boundary. Probably the trenches were excavated to explore the northeastward extension of the narrow galena-bearing quartz vein drifted upon in the workings below.

The date of the trenching above the Purcell adit was unknown to the writers who found no record of early exploration on the Purcell claim in the literature.

1.5(iv) Idaho No. 2 Vein System

The Rawdon L855 claim was staked over the Bluebird and Idaho No. 2 claims by J.A. Whittier on July 8, 1892. When it was surveyed and Crown-granted to J.S. Montgomery and associates on December 20, 1898, the claim covered only two areas not previously included in the other two claims (Figure 3).

"By 1920, the Rawdon claim had been included with the Bluebird claim in the inventory of C. Cunningham (B.C. Min. Mines, Ann. Rept.; 1920, p. N124).

The Idaho No. 2 L1013 claim was staked by G.P. Aspenwall on July 11, 1892 and was Crown-granted to J.B. McArthur and associates on August 5, 1897.

No record of work on the Idaho No. 2 claim from 1892 until 1928 is known to the writers. However, in subsequent reports there are references to earlier work on the claim. By the mid-1920's, the Idaho No. 2 Vein had been followed on surface in a series of trenches from an elevation of about 1,899 m (6,200 ft) on the Idaho No. 2 claim up to the Big Vein workings on the Bluebird claim. The Big and Idaho No. 2 veins were found to be the same structure which had been exposed for a vertical distance of at least 152 m (500 ft). It averaged over 0.9 m (6 ft) in thickness.

Obviously encouraged by the width and contiguity of the vein, early miners drove two tunnels on the Idaho No. 2 Vein (Figure 4). The No. 1 tunnel was at an elevation of 1,939 m (6,361 ft) and the No. 2 tunnel was at an elevation of 1,906 m (6,252 ft). A small shaft was sunk above the No. 1 tunnel to test the down-dip extension of a galena-rich section of the vein. All subsequent recorded work was done in the No. 2 tunnel.

Bluebird Mines Limited of Kaslo, B.C. was incorporated in 1928 to develop the Bluebird Property which comprised the Bluebird, Stranger, Rawdon and Idaho No. 2 claims (Figures 3 and 4). W.H. Burgess was the managing director of the company at that time. He conducted work on both the Idaho No. 2 and Stranger claims.

Work on the Idaho No. 2 Vein in 1928 comprised the extension of the No. 2 tunnel to a point 96 m (315 ft) in from the portal (B.C. Min. Mines, Ann. Rept.; 1928, p. C287). The stated objective of that work was to intercept the down-dip extension of silver-bearing galena previously found on surface above the No. 1 tunnel.

A 1928 local newspaper account of this work described the vein in this tunnel as 'Eight feet of material showing prinklings of galena and iron pyrites.' At that time, the company had little interest in the rich lodes of sphalerite encountered along the vein. However, the company was very encouraged by the increasing galena content near the working face.

Work progressed that winter. A newspaper account of the company's annual meeting held on March 20, 1929 quoted Mr. Burgess as announcing that '... very rich ore had been disclosed in the Idaho No. 2 tunnel. The values were given as 100 ounces of silver, 84% lead and 5% zinc ...'.

A clipping from a 1933 Financial Post survey of mining companies summarized subsequent 1928 work as including several cross-cuts and a 39 m (127 ft) raise.

"During 1929, an electric survey was conducted over the whole property for Bluebird Mines Ltd. by the Radiore Company. The results of the electric survey were not available to the writers.

The following year, 3.2 km (2 mi) of tractor trail was constructed from the Noble Five Property to the Idaho No. 2 tunnels to provide direct road access to the workings. Later, that trail became the main access road connecting the Grey Copper and Idaho No. 2 workings-areas (Figure 4).

In 1931, a contract was let to continue work on the Idaho No. 2 tunnel. It was extended for 260 m (852 ft) across the Idaho No. 2 claim onto the Rawdon claim. When operations ceased late that year, the working face of the No. 2 tunnel was 360 m (1,180 ft) in from the portal.

Low metal prices during the 1930s depression forced abandonment of operations.

The Idaho No. 2 workings were inaccessible when Cairnes inspected the property during the mid-1930's. Cairnes (1935) summarized the workings as comprising a "90 foot shaft and an adit 200 feet long". Cairnes description could have referred to the upper shaft and the No. 1 tunnel and not the main No. 2 tunnel which at the time of his visit to the property had caved.

From the description of the workings, the writers are not certain whether the raise from the No. 2 tunnel connected with the shaft above the No. 1 tunnel to provide ventilation.

The Idaho No. 2 and Rawdon claims were part of an enlarged version of the Bluebird Property in 1951. Then, the property included the Bluebird, Grey Copper, and Stranger claims. It was controlled by Bluebird Slocan Mines Limited of Vancouver, B.C.

During 1951, the old tractor trail connecting the Noble Five road with the Idaho No. 2 workings was widened to permit 4-wheel drive access to the workings. This improved access facilitated an extensive underground drilling program conducted in the Idaho No. 2 tunnel that year (Figure 22). Drilling resulted in the confirmation of a 0.6 to 1 m (2 to 3 ft) thick zinc-rich structure trending parallel with and located northwest of the Idaho No. 2 Vein.

During 1952, a branch tunnel was driven 24 m (80 ft) northeasterly from a point 122 m (400 ft) in from the portal in the No. 2 tunnel. This branch tunnel ran along a 15 m (50 ft) length of a lode containing abundant sphalerite. From a point 183 m (600 ft) in from the portal, a cross-cut tunnel was driven northwesterly for 6 m (20 ft) to expose another lode containing abundant sphalerite.

"As was previously mentioned (Section 1.5(ii), this report) Bluebird Slocan constructed a 2-building camp near the Grey Copper No. 3 portal in spring, 1952. As soon as the new camp was built, the old buildings at the Idaho No. 2 workings were abandoned.

When drifting was completed at the Idaho No. 2 tunnel, development emphasis was redirected to the Grey Copper No. 3 tunnel for the 1953 season.

1.6 Recent Previous Work: 1975 to 1990

George Sipos of Kaslo, B.C. acquired the Goodenough, Grey Copper, Purcell, Idaho No. 2, Rawdon, Bluebird and Stranger reverted Crown-granted claims on February 28, 1975. He called these claims the Bluebird group.

During 1976, physical work was done on the claims which comprised mostly location and improvement of access to old workings.

An exploration contract was let by Sipos to Allstate Mining Corporation in 1977 and more physical work was done. Allstate was a private company controlled by George Sipos and Horst Aldinger. On April 21, 1978, the Grey Copper Fr. 1 was recorded by Mr. Sipos (Figure 4) to cover a possible down-hill extension of the Grey Copper Vein below the No. 5 level. During 1978, about 10 m (33 ft) of slash drifting on the Grey Copper No. 5A level (Figure 20) produced 20.5 tons of ore that grossed $2,974.18 or $145.08/ton (Sookochoff, 1980). It contained 0.015 oz/ton gold, 9.59 oz/ton silver, 3.6% lead and 26.8% zinc.

On June 27, 1979, Horst Aldinger recorded the Link 1 and 2 and Chambers Fr. 1 and Fr. 2 claims (Figure 4).

That summer Sipos and Aldinger continued to improve access to several of the workings on the property. Sipos leased out development rights to the Grey Copper No. 5 and 5A levels. A raise connecting the Grey Copper No. 5 and 5A levels was developed and sampled (Figure 20) and 9.5 tons of ore was shipped from a slushing operation in the No. 5A level before the lease terminated.

A smelter record from that shipment showed that a net of 8.5385 dry tons of ore contained 36.95 oz/ton silver, 4.5% lead, 42.5% zinc and 0.3% cadmium.

Laurence Sookochoff (1980) examined the Bluebird Property during summer, 1979 and took some samples from the Grey Copper workings and other showings around the property for Sipald Resources Ltd., another company formed by George Sipos.

On August 13, 1979, the Bluebird Property was split. All claims north of the Bluebird-Rawdon boundary remained in the Bluebird Property; all claims south of that boundary became the Purcell Property, generally as it is today. The Purcell Property was transferred to Sipald Resources Ltd. Sipald did a

"public financing to raise further exploration and development money for the Purcell Property and commenced trading on the V.S.E. in spring, 1980.

Armed with Sipald's treasury and buoyed by high metal prices, Mr. Sipos embarked upon an ambitious program of exploration and development on the newly segregated Purcell Property. The 1980 work, including both surface and underground exploration, was supervised by Lawrence Sookochoff, P.Eng.

Early during that program, Sookochoff (1980 and 1982) examined mineralized areas including the Goodenough No. 6 and 8 dumps, and the Idaho No. 2 shaft-area dumps. Road outcrops across the property were mapped and trenches above the Purcell adit were sampled.

A single drill hole, 152 m (500 ft) long was collared south of and above the Grey Copper No. 3 level on ground now covered by the Grey Copper Fr. 3 claim (Figures 4 and 18). The hole was drilled northward at an angle that resulted in its intersection with the Grey Copper Vein about 61 m below the Big Stope on an ore-shoot in the No. 3 level (George Sipos, pers. comm.). The drill intersected over 1.8 m (6 ft) of sphalerite with minor galena in siliceous argillite breccia that assayed about 7 oz/ton silver. Mr. Sipos could not remember what the lead and zinc values were for that intersection. Sookochoff (1986) calculated the true width of that intersection to have been 1.06 m (3.5 ft) at 138 m (453 ft) down in a hole that was 146 m (479 ft) long.

It is interesting to note that if the Grey Copper No. 5A level is extended along the vein to underneath the Big Stope in the No. 3 level, it would develop the vein very close to the intersection of the drill hole with the vein. The writers believe that the ore-shoot mined in the Big Stope up in the No. 3 level, persists for 55 m (180 ft) vertically downward to the No. 5A level.

When the drill hole was completed, a nearby exposure of the East Vein was trenched by lowering the drill access road. The East Vein assayed about 100 oz/ton silver from a 1 cm (0.4 in) thick seam of galena (George Sipos, pers. comm.). It was not recognized in the drill hole (Sookochoff, 1986).

Late during 1980, the Grey Copper No. 3 adit was reopened and examined. It was discovered, much to the distress of Sipald's directors, that the 1,000-ton block of ore proven between the No. 2 and No. 3 levels had been mined out. Subsequently, some high-grade ore was recovered from a small-scale slashing operation near the Big Stope and farther along the vein at the Rat Stope (Figure 19A). The writers had no records of ore shipments from that work.

The Purcell Vein received significant attention during the 1980 program (Figures 4 and 18).

"A small soil survey revealed several soil-silver anomalies above the Purcell adit. Two of the many old trenches above the adit were reopened and sampled. One small grab sample of galena assayed 20.11% lead and 128.63 oz/ton silver Sookochoff (1986). A composite float sample from the same area graded 68.58% lead and 433.2 oz/ton silver (Sookochoff, 1982).

Sookochoff (1980, 1982 and 1986) conducted an intensive sampling program on the Idaho No. 2 Vein System in an effort to delineate shoots of high-grade silver-bearing galena in a generally zinc-rich system (Figure 22). He confirmed the 1951 drill results which tested the presence of a zinc-rich main shear averaging from 1.8 to 2.5 m (6 to 8 ft) in thickness, flanked to the northwest by a second zinc-rich structure averaging 0.6 to 0.9 m in thickness.

Sipald's 1981 exploration on the Purcell Property was supervised by J.C. Snell, P.Eng.

That year, the Purcell adit was reopened and examined (Section 1.5(iii), this report). No further work was done on the Purcell Vein during that exploration program.

An electromagnetic survey was conducted over the Grey Copper Vein and its possible extension to the Purcell workings. The survey was unsuccessful in locating the trace of the vein, probably due to topographic effects and the non-conductive nature of sphaleritic mineralization.

Sampling during 1981 including the Grey Copper Vein near the No. 5A portal and the No. 6 and 8 Goodenough dumps. Snell calculated that the Goodenough No. 6 dump contained 25,000 tons of rock grading an average of 0.41% lead, 1.09% zinc and 3.74 oz/ton silver, and that the No. 8 dump contained 30,000 tons of rock grading an average of 0.56% lead, 0.93% zinc and 2.58 oz/ton silver (Sookochoff, 1982).

That year, physical work comprised mostly road work. The upper road from the Purcell workings to the Idaho No. 2 portal was completed in 1981. The road connecting the Bluebird No. 4 portal on the Rawdon claim with the rest of the Purcell Property was completed by 1983.

The Bluebird No. 4 adit was developed during the 1970s before the Bluebird and Purcell properties were split. It was a cross-cut that was driven across the Rawdon claim to the Big Vein on the Bluebird claim and encountered no mineralization on the Purcell Property (Figure 4). The Bluebird No. 4 portal was examined by the writers during the 1990 exploration program and was found to be caved.

About 152 m (500 ft) of the Idaho No. 2 tunnel was cleaned out and, in places, retimbered in 1983. The work was contracted by Sipald to Sipos' and Aldinger's service company. Samples from the cross-cut 122 m (400 ft) in from the portal intersected a 21.3 m (70 ft) length of the vein parallel to the main Idaho structure. There, the parallel structure was 1.06 m (3.5 ft) thick

"and assayed 0.24% lead, 10.21% zinc and 8.3 oz/ton silver. The cross-cut located 183 m (600 ft) in from the portal intersected a 1.37 m (4.5 ft) width of the parallel structure that graded 6.23% lead, 11.2% zinc and 3.3 oz/ton silver (Figure 22).

In July 1983, Sipald optioned mining rights to the dumps on the Goodenough claim to Modern Metal Recovery Systems Ltd. of Nelson, B.C. Modern Metal Recovery sent a large test shipment of dump material to the mill at Ainsworth, B.C. Recovery was reported in a Sipald Resources news release to have been 63%. Modern Metal Recovery sent a 5-ton shipment of hand-sorted material to the smelter at Trail, B.C. A smelter receipt from that shipment credited Modern Metal Recovery with 4.431 dry tons grading 0.2% copper, 11.4% lead, 29.8% zinc, 110.05 oz/ton silver and 0.017 oz/ton gold.

Subsequently, Sipald bought out Modern Metal Recovery's assets including the option on the Goodenough dumps. In October, 1983, Sipald reoptioned the dumps to Wavecrest Resources Ltd. which, after a large promotion, let the option lapse.

The Purcell Property was optioned to Knie Resources Inc. in June, 1984. That option was dropped later that year with no significant work having been done on the ground.

Faced with extreme difficulty in refinancing Sipald, Mr. Sipos did the honourable thing for the shareholders and sold control of the company to Bernard Fitch and associates in 1986.

Mr. Fitch consolidated, refinanced and renamed the company Rawdon Resources Ltd. later that year.

Rawdon's crew conducted an intensive soil survey on a northeast-southwest trending grid laid out over the Goodenough, Grey Copper, Purcell and Rawdon claims (Figures 14 to 17). They were testing for contiguity of the Grey Copper and Purcell veins and for any other undiscovered veins in that area. The soil-sample data from that survey was processed and filed by C. Geoffrey Spearing, B.Sc., and John Ostler, M.Sc., P.Geol. (1988).

Soil-metal anomalies occurred over all known veins and in several areas where no veins were exposed (Figures 14 to 17). Interpretation of the survey results was made difficult by the presence of a large number of mine dumps and haulage roads in the survey-area.

Control of Rawdon Resources Ltd. was sold to the 'Advanced Ecology Group' in 1988. They bought the company to facilitate financing of a garbage separation plant at Nanaimo, B.C. They had little interest in the Purcell Property.

"The company was financed and renamed Advanced Ecology Corp. later that year. During 1989 the company was consolidated and again renamed Consolidated Advanced Ecology Corp. to facilitate further financing.

On June 23, 1989, Consolidated Advanced Ecology signed a letter of intent with General Tunnel Company Ltd., a private company controlled by J.C. Snell, P.Eng. and associates, to option the Purcell Property to General Tunnel. Snell had supervised the 1981 work on the property and remained very interested in its potential.

Work on the property by Snell's company comprised minor mucking at the Grey Copper No. 3 adit with a bulldozer. The deal lapsed that year.

On March 13, 1990, Consolidated Advanced Ecology optioned the Purcell Property to Avril Explorations Inc., a private company controlled by John Ostler, M.Sc., P.Geol., who had supervised developments on the property for Advanced Ecology since 1988. The Grey Copper Fr. 2 and 3 were staked and recorded on May 24, 1990 to cover two small areas of open ground among the surveyed claims near the Grey Copper Vein (Figure 4). On October 29, 1990, Avril completed the option and bought out the optionor's residual interest to attain 100% ownership of the Purcell Property."

5.3 Ostler and Linn have summarized the record of production from the PURCELL PROPERTY on pages 21-23 of their report dated December 31, 1990 as follows:

"**1.7 Summary of Known Production Records**

1.7(i) Goodenough Vein

1895	20 tons	from Goodenough claim; net revenue = $6,875 (B.C. Min. Mines, Ann. Rept., 1895, p. 675)
1896	600 tons	from Goodenough claim; average grade = 42% lead, 407 oz/ton silver which included:

Galena Ore in carload lots (20-ton lots) that averaged 48-67% lead, 277-507 oz/ton silver including a 6.5-ton shipment that graded 64.1% lead, 768 oz/ton silver

Carbonate Ore in carload lots (20-ton lots) that averaged 2-3% lead, 168.5-322.5 oz/ton silver) (B.C. Mine. Mines, Ann. Rept., 1896, p. 37)

"1896		from Reucau claim
		Galena ore:
	21 tons	grading 67% lead, 730 oz/ton silver
	45 tons	grading 60% lead, 551.5 oz/ton silver
	400 tons	Carbonate ore: grading 19-28% lead, 230-337.8 oz/ton silver (B.C. Min. Mines, Ann. Rept., 1896, p. 59)
1894-1905		Total production quoted from mine manager:
		Goodenough claim: Net Revenue = $100,000 (of which $80,000 came from galena ore) Dividends = $45,000
		Reucau claim: Net Revenue = $700,000 Dividends = $287,000
		(Zinc Commission, 1906, p. 260 and B.C. Min. Mines, Ann. Rept., 1905, p. 287)
1917	62 tons	from Goodenough claim (B.C. Min. Mines, Ann. Rept., 1918, pp. F162-3)
1894-1904, 1909-1913, 1916-1919		Reucau claim: total estimated production

Lb ore	Lb Lead	Oz Silver	N.S.R.
7,732,001 (3866 tons)	3,285,618 (42.5% Pb)	875,374.44 (226.4 oz/t)	$556,572.05

(Cairnes, C.E., 1935, p. 108)

1983	? tons	Goodenough No. 6 and 8 dumps; bulk sample got 63% recovery at Ainsworth mill
1983	5 tons	Goodenough No. 6 and 8 dumps; hand-sorted ore graded 0.2% copper, 11.4% lead, 29.8% zinc, 110.5 oz/ton silver, 0.017 oz/ton gold.

1.7(ii) Grey Copper Vein Production

1905	40 tons	from No. 3 level, averaging 4.6% lead, 41% zinc and 17 oz/ton silver (Zinc Commission, 1906, p. 260)
1917	37 tons	from No. 3 and 5 levels, grading 50% lead and 80 oz/ton silver (Cairnes, C.E., 1935, p. 51)

"1931	2 tons	gold-silver-lead-zinc ore (B.C. Min. Mines, Ann. Rept., 1931, pp. A24, A138)
1933	2 tons	silver-lead-zinc ore (B.C. Min. Mines, Ann. Rept., 1933, p. A200)
1953"	1000 tons	blocked out in 1906 between No. 2 and 3 levels grade estimate = 18.8% lead, 42.6% zinc and 33 oz/ton silver was mined out in 1980 when No. 3 level was opened and inspected.
1978	20.5 tons	from No. 5A level, grading 3.6% lead, 26.8% zinc, 9.59 oz/ton silver and 0.015 oz/ton gold
1979	9.5 tons	from the No. 5A level, grading 4.5% lead, 42.5% zinc and 36.95 oz/ton silver
1980	?	small tonnage probably mixed with other ore"

5.3 During the period of June 11 through July 30, 1990 a program of machine trenching, rock drilling and blasting, hand-trenching, road and trail clearing, soil and rock geochemical sampling surveys, underground rock channel sampling and geological mapping was carried out by Avril Explorations Inc. This work program encompassed a total of 172.5 man-days employing seven men at a total cost of $84,014.29.

6.0 REFERENCES

6.1 The following publications and reports contain information pertinent to the database of the PURCELL PROPERTY and the immediate environs:

6.2 Annual Reports of the Minister of Mines for British Columbia for the years:

1892 - p. 531 (Sandon)
1893 - pp. 1053, 1055, 1057, 1060 (Grey Copper, Sandon)
1895 - pp. 675 (Goodenough)
1896 - pp. 37, 46, 47, 58-60, 558 (Grey Copper, Goodenough)
1897 - pp. 572-573 (Purcell, Idaho No. 2)
1898 - pp. 1074, 1193 (Goodenough, Rawdon)
1902 - p. 1026 (Goodenough)
1904 - p. 192 (Goodenough)
1906 - p. J160 (Goodenough)
1907 - p. H145 (Goodenough)
1908 - p. L100 (Goodenough)

1918 - p. F448 (Grey Copper)
1920 - p. N124 (Rawdon)
1928 - p. C287 (Rawdon, Idaho No. 2)
1929 - p. C309 (Idaho No. 2)
1931 - pp. A24, A138 (Grey Copper)
1933 - pp. A200, A206 (Grey Copper)
1946 - pp. A155, A156 (Grey Copper)
1948 - p. A145 (Grey Copper)
1951 - p. A170 (Idaho No. 2)
1952 - AA175 (Rawdon, Idaho No. 2)
1952 - Bulletin No. 29, pp. 11-15, 18-61 (M.S. Hedley)
1953 - p. A139 (Rawdon, Idaho No. 2)

6.3 BCMEMPR Reports:
1974 - Geology, Exploration & Mining in B.C., p. 75
1977 - Exploration in B.C., p. E51
1979 - Geological Fieldwork in B.C. (Paper 1980-1), p. 187
1980 - Exploration in B.C., p. 92
1982 - Geological Fieldwork in B.C. (Paper 1983-1), p. 19
1985 - Geological Fieldwork in B.C. (Paper 1986-1), pp. 289-301 (Logan, J.M.)
1989 - Geological Fieldwork in B.C. (Paper 1990-1), pp. 251-255 (Beaudon, G.; Sangster, D.F.)

6.4 Geological Survey of Canada:
1930 - Economic Geology Series No. 8, pp. 333, 341-342
1934 - Memoir 173, pp. 3-13, 17, 19, Maps 272A, 273A (C.E. Cairnes)
1935 - Memoir 184, pp. 17-19, 50-51 (C.E. Cairnes)
1960 - Memoir 308, pp. 111-113, 133, 147 & Maps 1090A, 191A (H.W. Little)
1976 - Open File 432, 1 Map and Notes (Read, P.B. and Wheeler, J.O.

6.5 Canada Department of Mines:
1906 - Mines Branch Report No. 12 - Report of the Zinc Commission, pp. 259-260

6.6 1969 - Lepeltier, C.: A Simplified Statistical Treatment of Geochemical Data by Graphical Representation; Econ. Geology, Vol. 64, pp. 538-550.

1970 - Douglas, R.J.W. et al: Geology and Economic Minerals of Canada; Dept. Energy, Mines and Res., Economic Geology Rept. No. 1, pp. 367-420.

1976 - Holland, S.S.: Landforms of British Columbia, A Physiographic Outline; B.C. Min. Energy, Mines and Petr. Res., Bull. 48, p. 80.

1978 - Sinclair, A.J. et al: An Analysis of Distribution of Mineral Occurrences in British Columbia; B.C. Min. Mines and Petr. Res., Bull. 68, p. 31.

1980 - Sookochoff, L, P.Eng.: Geological and Progress Report on the PURCELL PROPERTY for Sipald Resources Ltd.

1982 - Sookochoff, L., P.Eng.: Geological and Progress Report on the PURCELL PROPERTY for Sipald Resources Ltd. (12 pp).

1986 - Sookochoff, L., P.Eng.: Geological and Progress Report for Rawdon Resources Ltd. (formerly Sipald Resources Ltd. (15 pp).

1988 - Spearing, C.G. and Ostler, J., P.Geol.: Soil Geochemical Report on the PURCELL PROPERTY (B.C.A.R. #16984), 18 pp.

1990 - Beaudoin, G.: Geological Compilation Map, Northern Kakanee and Southern Goat Ranges, N.T.S. 82F; B.C. Min. Energy, Mines and Petr. Res., Open File 1990-18, 1 map.

1990 - Guill, R.W.: The Apex Mine - A Case Study in Small Scale Underground Mining, CIM Volume 83, No. 942, pp. 72-74.

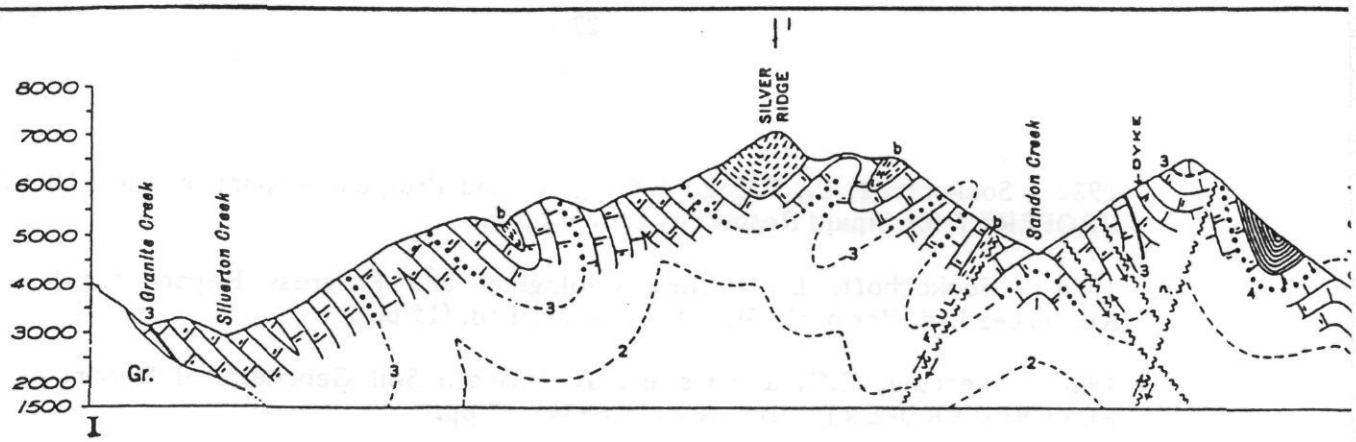
1990 - Robertson, B.E., Vehkala, J.T. and Kerr, J.S.: Alimak Narrow Vein Mining at the Dome Mine, CIM, Volume 83, No. 938, pp. 63-66.

1990 - Ostler, J. and Linn, M.: Report of Geological and Geochemical Exploration on the PURCELL PROPERTY including underground sampling on the Grey Copper Vein dated December 31, 1991, B.C. Assessment Report, 69 p.

7.0 REGIONAL AND LOCAL GEOLOGICAL SETTING

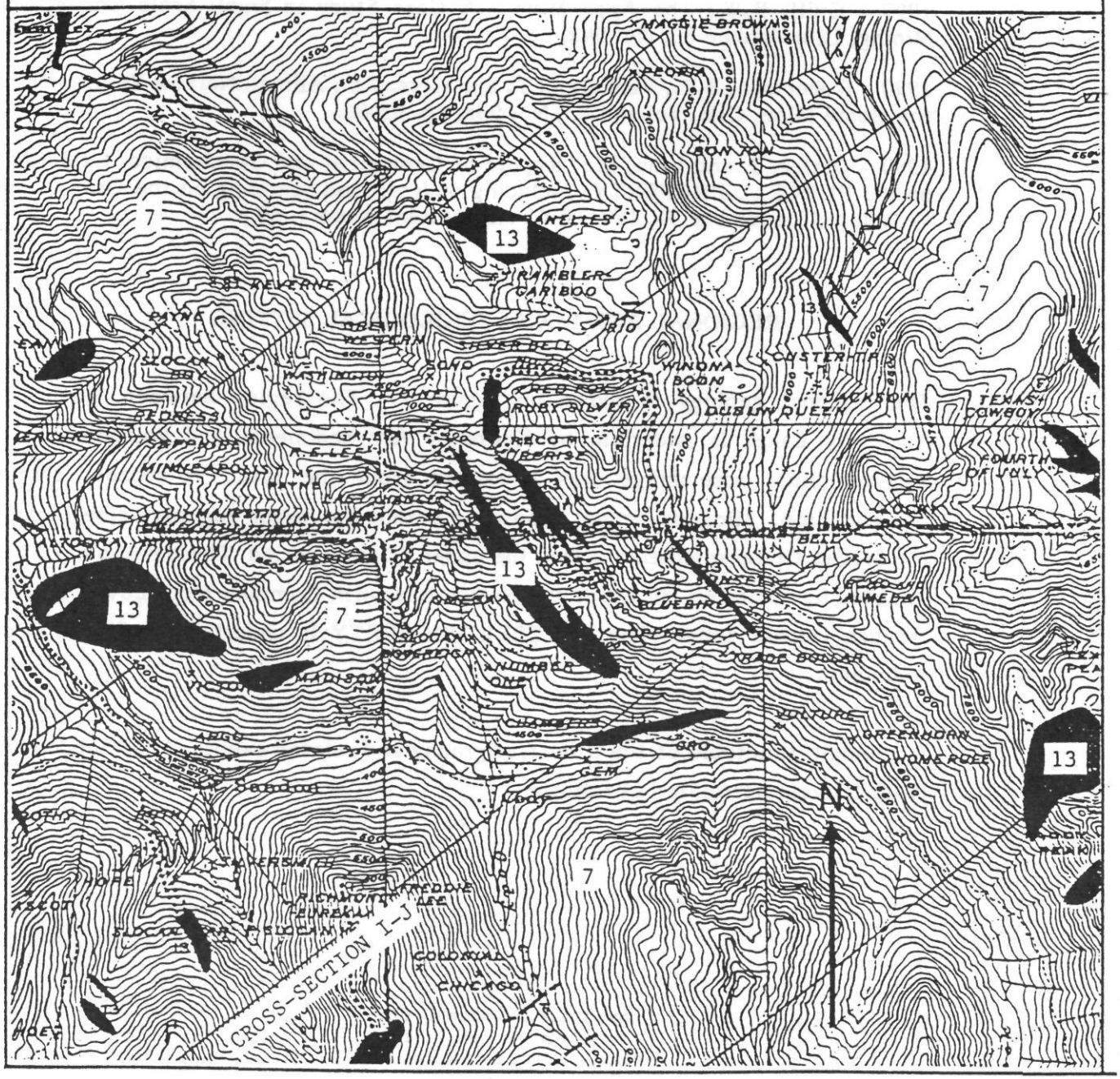
7.1 The regional geology is shown on Figure 7. The region between Slocan and Kootenay Lakes is underlain by Kootenay Arc sediments and volcanics. This eugeosynclinal assemblage was deposited from the late Proterozoic through Triassic time. Miogeosynclinal deposition within the larger eugeosyncline included the Slocan Group sediments during the upper Triassic period. These rocks have been intruded by numerous phases of the Nelson Batholith Complex from Lower Jurassic through Recent time. The PURCELL PROPERTY is underlain by Slocan Group sediments.

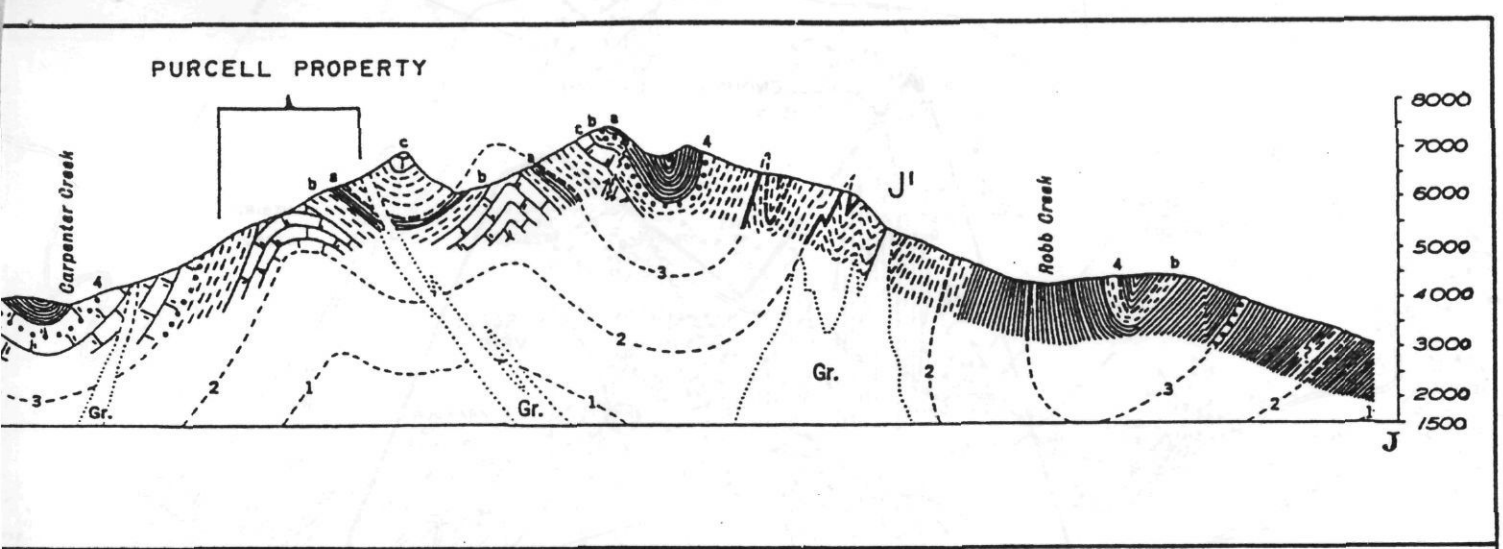
7.2 A geologic timetable of the lithostratigraphy and related events in the Sandon area is tentatively postulated as follows:



6A: PART OF CROSS-SECTION I-J

6B: PART OF G.S.C. MAP 273A





LEGEND for 6B

RECENT

- 14 — Delta and stream deposits

POST-TRIASSIC

- 13 — Granite, syenite, granodiorite, quartz diorite and their porphyritic and felsitic equivalents; zones of dykes or sills are represented by dots, single dykes or sills by lines
- 12 — A complex of coarse (pegmatitic) granite, fine to medium gneissic granite, and inclusions of Precambrian rocks
- 11 — Granite and granodiorite
- 10 — Porphyritic granite
- 9 — Crushed, mostly porphyritic, granite
- 8 — Gneiss (granitized pre-batholithic rocks), crushed granite, and masses of partly altered pre-batholithic rocks

NELSON BATHOLITH

TRIASSIC

SLOCAN SERIES

- 7 — Slate, argillite, limestone, quartzite, and tuffaceous sediments

KASLO SERIES

- 6 — Serpentine
- 5 — Extrusives (andesite and dacite) and related intrusives; some intercalated, tuffaceous sediments
- A — Schists, quartzite, argillite, limestone, altered volcanics and tuffaceous sediments; probably chiefly Slocan series

- Areas of few rock exposures
- Geological boundary
- Geological boundary (position approximate)
- Geological boundary (position assumed)
- Fault (position approximate)
- Glacial striae
- (F) — Fossil locality

LEGEND for 6A

- Gr. — Granite and allied rocks
- Limestone
- Limestone (position approximate)
- Limestone (assumed)

Numbers 1, 2, 3, 4, (on Sections) indicate successive horizons

- a — Fissile slate and argillaceous rocks
- b — Fissile slate and argillaceous rocks interbedded with more massive phases and with slightly coarser strata
- c — Chiefly massive argillaceous and quartzitic strata
- Fault

HORIZONTAL SCALE

0 1 2 3 km

0 1 2 mi

FIGURE 7.

To accompany a Report by D.W.Tully, P.Eng., dated December 31, 1990

John Ostler

Ostler & Linn – Figure 6

CASSIAR EAST YUKON EXP. LTD.

AVRIL EXPLORATIONS INC.

REGIONAL GEOLOGY from G.S.C. MEMOIR 173

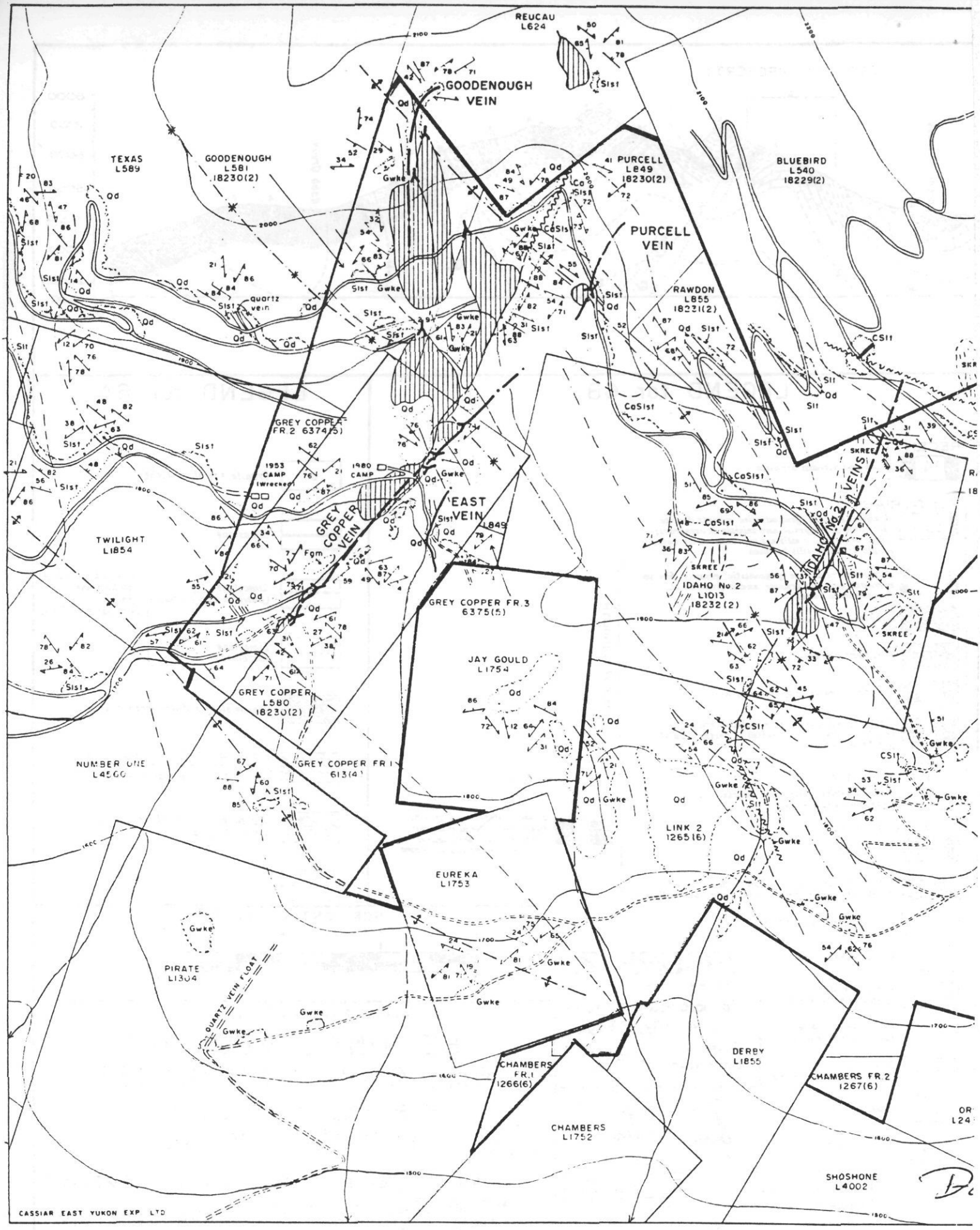
PURCELL PROPERTY

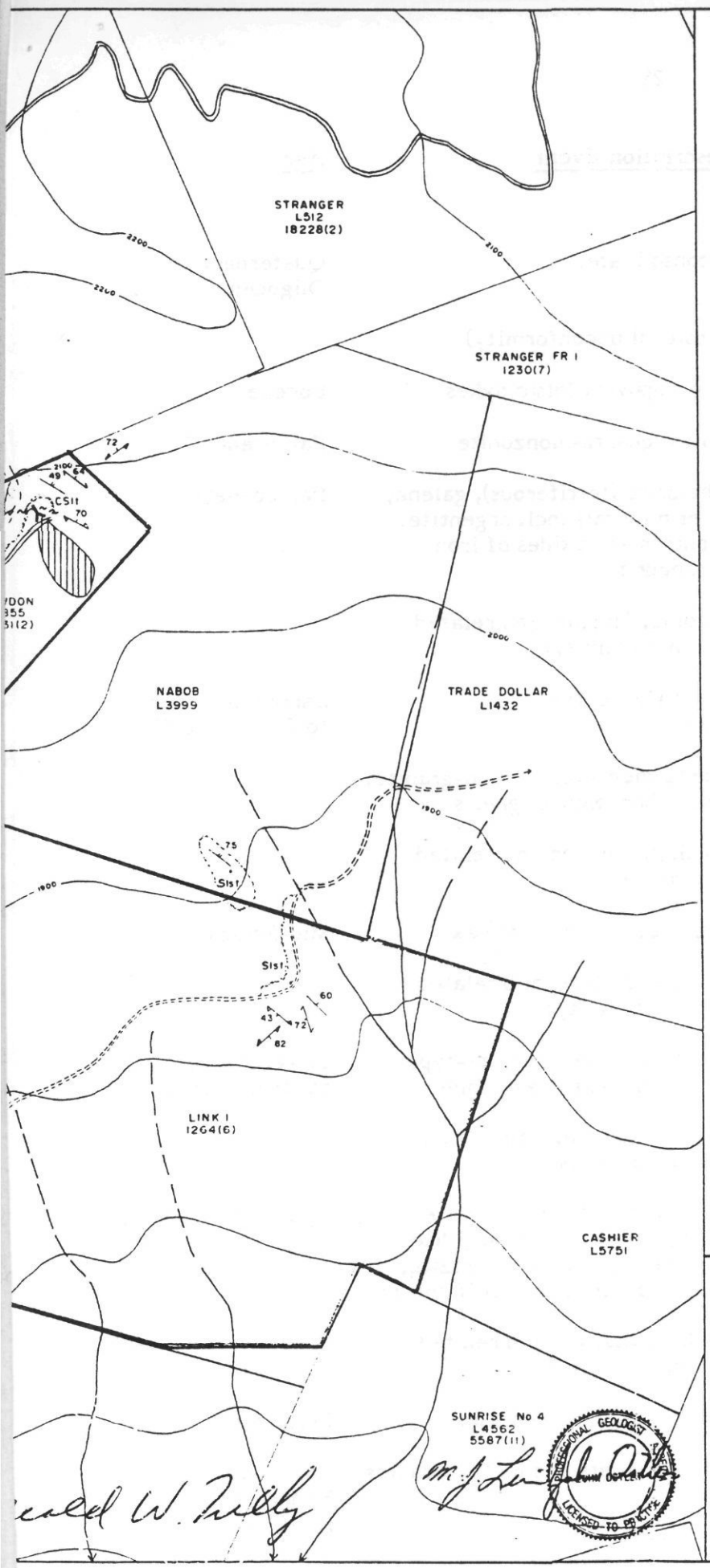
49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA, N.T.S.82F/14

JOHN OSTLER; M.Sc., P.Geol.
MICHAEL LINN, B.Sc.

DECEMBER, 1990


REUCAU
L624
GOODENOUGH
VEIN
TEXAS
L589
GOODENOUGH
L581
18230(2)
PURCELL
L849
18230(2)
BLUEBIRD
L540
18229(2)
PURCELL
VEIN
RAWDON
L855
18231(2)
GREY COPPER
FR 2 6374(5)
1953
CAMP
(wrecked)
1980
CAMP
EAST
VEIN
L849
GREY
COPPER
VEIN
TWILIGHT
L1854
IDAHO No.2
VEINS
IDAHO No 2
L1013
18232(2)
GREY COPPER FR 3
6375(5)
JAY GOULD
L1754
GREY COPPER
L580
18230(2)
NUMBER ONE
L4560
GREY COPPER FR 1
613(4)
LINK 2
1265(6)
EUREKA
L1753
PIRATE
L1304
QUARTZ VEIN FLOAT
CHAMBERS
FR.1
1266(6)
CHAMBERS
L1752
DERBY
L1855
CHAMBERS FR.2
1267(6)
SHOSHONE
L4002
CASSIAR EAST YUKON EXP LTD



LEGEND

TABLE OF LITHOLOGIC UNITS

AGE	FORMATION AND LITHOLOGY
Eocene to Pleistocene	
Fgm	conglomerate and arkosic sandstone; angular clasts of Slocan Group rock, poorly sorted and stratified, cemented in a grey pelitic matrix
Eocene	Slocan Silver Veins
	northeasterly striking quartz-siderite-calcite veins containing massive sphalerite and galena with minor pyrite, tetrahedrite, pyrargyrite, argentite and native silver
Jurassic	Nelson Batholith Intrusives
Qd	northwesterly striking concordant quartz diorite bodies and barren white quartz veins; quartz diorite contacts are commonly gradational with metasomatized and anatexized arenaceous Slocan Group rocks
Triassic	Slocan Group: basin-filling sedimentary sequence
Gwke	lithic greywacke deposited in turbidite beds 1 cm to 1.5 m thick, very light grey weathering to pale green, tends to form rounded bluffs
Slst	siltstone, dark grey weathering to light grey, deposited in thin turbidite beds
Slt	black slaty or phyllitic pelite that weathers light grey, breaking into flags that tend to form skree
CaSlst	dark blue-grey siltstone containing a significant amount of carbonate; weathered surfaces are mid-grey and variably pitted
CSlt	carbonaceous slate and phyllite, recessively weathers to dark grey; breaks into shards forming extensive skree

STRUCTURE

Geological contact: defined / approximate / assumed

Fault

Syntform (F2)

Antiform (F2)

Vein attitude

Bedding: upright / overturned / tops unknown

Cleavage: first / second / third

TOPOGRAPHY

creek / intermittant creek / contour in metres / road / trail / limit of outcrop

Workings: trench / mine dump / portal / shaft / Surface trace of vein: defined / approximate / assumed

cut / fill

Claims:

claim boundary →

Purcell Property → boundary

SUNRISE No 4 ← claim name

L4562 ← surveyed lot number, if any

5587(11) ← record number, if any

SCALE

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 metres

0 100 200 300 400 500 600 700 800 900 1000 feet

N.

19° 46' N. mag.

FIGURE 8.

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

Ostler & Linn - Figure 9

AVRIL EXPLORATIONS INC.

GEOLOGY

PURCELL PROPERTY

49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA N.T.S. 82 F/14

JOHN OSTLER; M.Sc., P.Geol. DECEMBER, 1990

MICHAEL LINN, B.Sc.

Donald W. Tully

M. J. Linn John Ostler

PROFESSIONAL GEOLOGIST LICENSED TO PRACTICE

To accompany a Report by Donald W. Tully, P.Eng., dated December 31, 1990

Formation	Description/Event	Age
Sand, gravel, boulders, glacial debris, fanglomerate, arkosic sediments and fluvial sedimentation	unconsolidated	Quaternary to Oligocene
	(erosional unconformity)	
Intrusions	Lamprophyre, felsic dykes	Eocene
	Biotite quartz-monzonite	Paleocene(?)
Mineralization Quartz-iron carbonate veining Metamorphism	Sphalerite (ferriferous), galena, silver minerals incl. argentite, sulphides and oxides of iron tetrahedrite	Paleocene(?)
	(Folding, faulting and related tectonic activity)	
Intrusions	Mount Carpenter Stock	Early Paleocene to Cretaceous(?)
	Quartz-monzonite, leuco-granite, biotite-hornblende, gneiss	
	(Folding, faulting and related tectonic activity)	
Intrusions	Nelson Batholith Complex	Mid-Jurassic
	(Folding, faulting and related tectonic activity)	
	Diorite and intermediate-type intrusions and metavolcanics	Lower Jurassic to Upper Triassic
	(Folding, faulting and related tectonic activity)	
Sedimentation	Slocan Group sedimentary series of greywacke, pelite, argillite, siltstone, limestone, quartzite, sandstone with minor tuff horizons	Upper Triassic
	(Folding, faulting and related tectonic activity)	
Kalso volcanics	Mafic to acidic vulcanism	Permian(?)
Basement complex	Metasediments and metavolcanics	Cambrian Hadrynian Helikan

7.3 Ostler and Linn have mapped, as shown on Figure 8, and described the geologic features of the PURCELL PROPERTY on pages 31-34 and 36-38 in their report dated December 31, 1990 as follows:

"**2.3 Property Geology**

2.3(1) Slocan Group Stratigraphy

The oldest rocks mapped on the Purcell Property are metamorphosed sediments of the Triassic-age Slocan Group (Figure 9) which the writers divided into five lithological units based on composition and sedimentology. The five units were: carbonaceous slate and phyllite, slate and phyllite, calcareous meta-siltstone, non-calcareous meta-siltstone and meta-greywacke.

Hereafter the prefix 'meta' is omitted to avoid boring repetition.

Carbonaceous slates and phyllites occupy a broad northwesterly property striking belt that extends from near the northeastern boundary of the property across the Bluebird claim to the Stranger claim (Figure 9).

These are fine-grained black rocks that weather to dark grey. Their tendency to break into shards along cleavage planes makes them weather recessively. Except for fresh road cuts, outcrops of this unit are mostly screes or piles of broken shards.

The incompetence of these carbonaceous pelites during deformation is evident at the Bluebird No. 4 cross-cut portal on the eastern part of the Rawdon claim (Figures 4 and 9) where minor folds from the first two phases of deformation complexly contort strata. Tunnels driven through carbonaceous slate and phyllite require extensive timbering and maintenance.

Dark green to black slates and phyllites stratigraphically overlie carbonaceous slates and phyllites. The contact between them is conformable and gradational. The non-carbonaceous slates and phyllites form a northwesterly striking band across the Purcell, Rawdon and Idaho No. 2 claims (Figures 6 and 9). Due to complex deformation, true thicknesses of rock units can not be guessed with reasonable accuracy.

Slate and phyllite outcrops weather into light grey flags that tend to form scree which is quite extensive on the eastern part of the Idaho No. 2 and Nabob claims (Figure 9).

Stratigraphically above the slate and phyllite is an extensive siltstone unit which is dark grey on fresh surfaces that weather to light grey. This siltstone comprises a multitude of thin turbidite beds that are commonly well-defined by colour differentiation on weathered surfaces.

"This rock unit is exposed across the northeastern and southwestern parts of the Purcell Property stratigraphically above slate and phyllite and below greywacke. Contacts between this unit and others seem to be conformable.

The siltstone is comparatively competent in the Purcell Property-area. Tunnels through it near the Goodenough and Purcell portals require only a moderate amount of timbering. The eastern end of the Grey Copper No. 3 level cuts through siltstone at depth below the Purcell claim (Figures 4 and 9). There, no timber is required.

A narrow unit of carbonate-bearing siltstone lies within the main siltstone unit on the Purcell, Rawdon and Idaho No. 2 claims. Second-phase folding makes this unit seem much thicker than it really is (Figure 9).

Carbonate-bearing siltstone is blue-grey on fresh surfaces and light grey on characteristically pitted weathered surfaces. When struck, this unit produces a high-pitched 'carbonate clink' sound.

A broad, northwesterly striking greywacke unit extends across the central part of the Purcell Property (Figures 6 and 9). It weathers prominently, forming rounded bluffs. Turbidite beds ranging from 1 cm (0.4 in) to 1.5 m (4.9 ft) in thickness are conspicuous in greywacke outcrops. Top determinations from these beds reveal that these rocks are invariably overturned.

Greywacke beds are light grey on fresh surfaces that weather from light greenish grey to white depending on quartz and chlorite content.

Some greywacke outcrops near the Grey Copper workings and on the Link 2 claim appear to be quartz wackes. They are highly silicified from extensive metasomatism during deformation and injection of nearby quartz diorite bodies. Commonly, rock fragments and micaceous minerals in pelitic parts of turbidite beds are obliterated by variable anatexis and metasomatism in the greywacke unit. Pervasively metasomatized greywacke is commonly pale green due to the presence of very fine-grained chlorite.

Greywacke is the most competent metasedimentary rock unit on the Purcell Property. Tunnels driven through it along the Grey Copper Vein require no timbering.

2.3(v) Late Tertiary Fanglomerate

There are several small exposures of Eocene to Pleistocene-age fanglomerate across the Purcell Property. All are erosional remnants located at elevations above 1,750 m (5,740 ft) in creek gullies (section 2.1, this report).

They contain a poorly stratified mixture of Slocan Group, Nelson Batholith and Slocan vein rock clasts. These clasts are subangular and range from sand to cobble-size. They are cemented in a light grey pelitic matrix.

"Fanglomerates are unmetamorphosed and rest unconformably on all other lithologies. Consequently, they are interpreted to have been deposited during the Late Tertiary Period after unroofing of the Slocan silver-lead-zinc veins.

2.3(ii) Slocan Group Provenance

By the Triassic Period, the Cordilleran Geosyncline had evolved into several northwest-southeasterly trending successor basins (Douglas et al, 1970). Slocan Group rocks in the Purcell Property-area are a partial record of filling of one of the successor basins.

Stratigraphically, the lowermost rock unit on the property is a carbonaceous slate which was probably deposited at the bottom of a deep basin in euxinic, quiet water. Sediment supply was from neritic fallout.

A series of slate, siltstone containing some calcareous beds and finally, coarse-grained greywacke was deposited on top of the carbonaceous slate. This coarsening-upward succession was a record of clastic basin infilling from a prograding basin margin. Consequently, as the Triassic-age basin filled, sediments in the Purcell Property-area became more proximal to the source of turbidite deposition near the basin margin.

2.3(iii) Nelson Batholith Intrusives

Slocan Group rocks were intruded by concordant, northwest-southeasterly striking quartz diorite bodies related to the Nelson Batholith during the Jurassic Period (Read and Wheeler, 1976).

Quartz diorites on the Purcell Property are white, medium-grained granoblastic intrusives comprising 75 to 90% plagioclase and orthoclase feldspar, and 10 to 25% quartz with minor amounts of hornblende and chlorite. Biotite and pyrite are scarce in these intrusives.

A northwesterly striking, sub-vertical barren, white quartz vein intrudes quartz diorite along the Idaho No. 2 access road on the southern part of the Texas claim (Figure 9). The writers believe this vein to be due to a late distillation of quartz deposited contemporaneously with the enclosing quartz diorite. This vein seems to be typical of barren northwesterly trending quartz veins that are exposed throughout the Sandon mining camp.

Quartz diorite has preferentially intruded the greywacke unit that transects the central part of the Purcell Property (Figure 9). As has been mentioned previously, greywacke beds near quartz diorite bodies were variably anatexized and metasomatized resulting in the breakdown of feldspar and the removal of micaceous minerals making the greywackes resemble quartz wackes. The writers found very little evidence of forceful magma injection in the altered greywackes. It was inferred that hot fluids advanced through the most permeable rocks in the Slocan Group stratigraphy; the greywackes, ahead of magma. Channelling was established in conjunction with hydraulic filter pressing which facilitated subsequent magma injection. If

"metasomatism and anatexis advanced ahead of magma injection, evidence of that injection would be blurred by gradational contacts such as those commonly observed between greywacke and quartz diorite on the Purcell Property.

In less permeable strata near the northeastern boundary of the property, quartz diorite dykes and sills have well-defined intrusive contacts with Slocan Group siltstone and slate."

7.4 Structurally, the Slocan sediments have endured several regional phases of deformation and at least three of these have been recognized on the PURCELL PROPERTY. Ostler and Linn have mapped and described these geologic features of the claim area on pages 36-38 of their report dated December 31, 1990 as follows:

"2.3(vi) Property Deformation and Metamorphism

There is evidence of at least three phases of deformation in rocks on the Purcell Property.

The first phase of deformation on the property is equivalent to Read and Wheeler's (1976) second regional phase of deformation. A regional-scale recumbent fold with a gently southwesterly dipping, southeasterly striking axial plane formed in the Sandon camp-area at that time. It was named the Slocan Syncline (Logan, 1986) by early writers. Erosion has exposed the overturned lower limb of this fold in the Purcell Property-area resulting in stratigraphic inversion of Slocan Group strata. This phase of deformation created a pervasive northwest-southeasterly striking cleavage.

First-phase cleavages have generally southwesterly dips in the southwestern part of the property and generally northeasterly dips in the northeastern part of the property, depending on local refolding. First-phase minor folds are most readily observed in slate and siltstone near the northeastern boundary of the property where they have recumbent S-shaped profiles looking northwesterly.

The second phase of deformation produced open to close upright folds with northwest-southeasterly striking, steeply dipping axial planes. Regionally, these folds culminate in a complex antiformal closure the axis of which transects the central part of the Purcell Property (Figures 6 and 9). Second-phase minor folds are most common in pelitic rocks where they are normally upright or box folds. Fold sense in these minor structures depends on relation to local closures.

The approximate locations of several of the second-phase fold closures in the Purcell Property-area have been established during 1990 geological

"mapping (Figure 9). Other suspected closure locations were not recorded on the geological map due to lack of proof in soil-covered areas.

The first two phases of deformation were accompanied by middle greenschist facies regional metamorphism; which in the Purcell Property-area, reached biotite grade. Retrograde minerals include muscovite and chlorite.

Local contact metamorphism accompanied by anatexis and pervasive metasomatism in greywacke in contact with quartz diorite, produced much higher temperature metamorphic mineral assemblages.

Read and Wheeler (1976) estimated that granitic intrusion related to the Nelson Batholith occurred from 173 to 164 million years ago, generally at the same time as the first two phases of deformation in the Purcell Property-area.

It appears to the writers that anatexis and metasomatism in greywacke and quartz-diorite emplacement occurred contemporaneously with the second phase of folding and regional metamorphism.

The quartz diorites invariably contain fracture cleavages parallel with the second and third-phase cleavages in Slocan Group rocks.

The third phase of deformation was comparatively brittle and had no major corresponding metamorphic event.

Cleavages from this phase of deformation strike northeast-southwest and have steep dips. As has been mentioned previously, the writers believe that the Slocan silver-lead-zinc veins were deposited during development of this cleavage. The third phase of deformation was possibly related to wrenching during crustal extension during the Eocene Stage."

7.5 The results of an aeromagnetic survey flown in 1969-1970 by Geoterrex Limited for the Canada Department of Energy, Mines and Resources over N.T.S. 82-F-14 (8482G) are shown on Figure 6. This aeromagnetic survey covers the area of the PURCELL PROPERTY and indicates a very modest magnetic "high" over the west sector of the claim group, more particularly the Grey Copper and Goodenough claims. Further geological mapping may explain this mild aeromagnetic response. An electric survey (Radiore) was done in 1929. The results of this survey are not known. A ground electromagnetic survey over the PURCELL PROPERTY done in 1981 is reported to have revealed little information of geologic importance.

8.0 RESULTS OF THE 1990 EXPLORATION PROGRAM

8.1 The field work program was carried out during the period June 11 through July 30, 1990. A total of 172.5 man-days of machine trenching, hand-trenching, rock drilling and blasting, road and trail clearing soil and rock geochemical sampling, underground rock-channel sampling and geological mapping was performed by seven men.

8.2 The results of the 1990 soil survey carried out over the southeast sector of the PURCELL PROPERTY are shown on Figures 5, 14 through 21 inclusive. A total of 153 soil samples were taken and analyzed for copper, lead, zinc and silver. 63 rock samples were taken and assayed for gold, silver, copper, lead, zinc and arsenic. Eleven of these samples were also analyzed for 32 elements using the ICP method. The samples were analyzed at Chemex Labs Ltd., North Vancouver, B.C., and the certificates are shown in APPENDIX III. The soil-metal distribution curves were generated using 1990 data. Anomalous and sub-anomalous threshold values generated from the curves were used in contouring data from both the 1987 and 1990 surveys on the map. The 1987 soil-grid area is shown on Figure 5. Arsenic values in the rock samples was of a low tenor.

8.3 J. Ostler and M. Linn have described the results of the 1990 soil survey on pages 38-46 of their report dated December 31, 1990 as follows:

> **"3.1 1990 Soil Survey**
>
> **The 1990 soil survey was conducted over the Link 1 and 2, Chambers Fr. 1 and 2 claims and over parts of the Idaho No. 2 and Rawdon claims. Soil lines comprising the 1990 grid were run east-west at 50 m (164 ft) intervals. The southern part of the grid was laid out from a base line located near the eastern boundary of the Link 1 claim. The northern part of the 1990 grid was laid out east and west from a secondary base line that was extended northward from 00S, 350W (Figures 14 to 17). A total of 7.3 km (4.45 mi) of lines were surveyed by hip chain and compass in laying out the grid, which comprised 15 lines of various lengths covering 30 ha (72 A) (Figures 4 and 14 to 17). Soil stations were located at 50 m (164 ft) intervals along the lines.**
>
> **The area of intersection of the 1900 era horse trail and the creek below the Bluebird No. 4 adit was used as a starting point for the 1990 grid (Figures 4 and 14 to 17). The unsurveyed base line is not tied in with any of the old Crown-grant survey pins. This combined with magnetic deflection and**

"minor compassing and slope correction errors accumulate to make the 1990 grid station co-ordinates slightly different from their true co-ordinates relative to the 00S, 00W post on the base line and to old survey pins and posts around the property.

Soil survey results comprise Appendix C. These results are contoured on Figures 14 to 17.

At most sample stations, soils were sufficiently developed to enable collection of a sample from an illuviated "B" horizon. Sampling depths varied from about 0.1 to 0.3 m (0.3 to 1.0 ft).

A large part of the Purcell Property is covered with old mine dumps and haulage roads. Soil samples from these areas tend to have anomalously high soil-metal contents due to contamination from former mining operations. To differentiate between soil-metal anomalies due to contamination from natural soil-metal anomalies, the mine dumps and haulage roads on the property are located on the maps of the soil survey (Figures 14 to 17).

Soils on the Purcell Property are typical of those formed on glaciated lower alpine slopes where a thin layer of ablation till formed the initial regolith for soil development. Periglacial processes such as cryoturbation caused mixing with underlying rock. Subsequent post-glacial organic activity and solifluction developed and complicated soil profiles. On more moderate slopes, this resulted in well-developed soil horizons and comparatively mature soil profiles derived mostly from local parent rock. On steep slopes rapid down-hill transport of soil has resulted in multiple horizons or bare rock bluffs and scree slopes.

Soil-metal concentrations commonly reflect the metal content of the underlying parent rock.

Soil samples were shipped in undyed kraft paper envelopes to Chemex Labs Limited of North Vancouver, B.C. A total of 153 samples were taken from the 1990 grid-area. All samples were analyzed for copper, lead, zinc and silver (Appendix C). The method of analysis forms part of Appendix A.

A statistical analysis using the methods of LePeltier (1969) with minor graphic variation was performed on the soil geochemical data (Figures 10 to 13). Through this method, graphic representations of cumulative frequency curves resulted in the separation of data into common and anomalous populations.

Accepting the assumption that the common logs of the soil data naturally tend to form a normal distribution, these populations reflect the elimination of data below the 50th, 84th and 97.5th centiles and represent regional background, sub-anomalous and anomalous thresholds respectively.

"Once threshold values were established over the 1990 grid-area, data from the 1987 grid were recontoured using the threshold values for the 1990 data and all data were included in the soil-metal contour maps (Figures 14 to 17).

Geochemical contour intervals of the common logs of data from the 1990 grid for copper, lead, zinc and silver were plotted (Figures 10 to 13). They reflected the upper first and second standard deviations on the trends of lognormal distributions of populations of normal soils derived from graphic analysis as follows:

	Cu ppm	Pb ppm	Zn ppm	Ag ppm
84th Centile (sub-anomalous)	52	42	330	0.47
97.5th Centile (anomalous)	97	80	500	0.64

During the 1987 survey, soils were analyzed for gold and arsenic as well as for copper, lead, zinc and silver (Spearing and Ostler, 1988). The writers thought that it was not necessary to test for gold and arsenic during the 1990 soil survey on the Purcell Property because concentrations of those metals in rocks and mineralization on the property were very low.

3.2 Interpretation of Soil-metal Distribution Curves

The Purcell Property is underlain by Slocan Group metasediments and Nelson Batholith Intrusives which are cut through by Slocan silver-lead-zinc veins. The Slocan veins would be thought of by a prospector as "mineralized formation" and the other lithologies would be considered to be "country rock". In this setting, soil-metal distribution curves should reveal identifiable soil-metal data populations from normal soils derived from country rock and from enriched soils derived from mineralized veins. This division of soil-metal data population is quite obvious in the soil-metal distribution curves from the Purcell Property (Figures 10 to 13).

The Slocan veins contain no copper-bearing minerals in their zinc-rich central parts. Tetrahedrite; locally in which much of the copper is replaced by silver, is the only significant copper-bearing mineral in the lead-silver rich upper parts of the veins. These veins do not contribute any significant copper to soils in the property-area.

The copper distribution curve (Figure 10) reflects this. It contains a single lognormal soil-copper data population probably derived almost entirely from country rock.

The lead, zinc and silver soil-metal distribution curves dramatically demonstrate contributions of these metals to soils from both country rock and mineralized veins.

"The lead and zinc distribution curves (Figures 11 and 12) contain near lognormal data population distributions up to about the 75th centile, interpreted to represent contributions of these metals to normal soils from country rock. At that point, the curves are positively skewed representing a statistical excess in high metal concentrations (LePeltier, 1969) The upper positively skewed parts of these curves contain other lognormal data population distributions, interpreted to represent contributions of these metals to enriched soils from Slocan veins.

3.3 Interpretation of 1990 Soil Survey Results

3.3(i) Interpretation of Copper in Soils

The soil-data distribution curve for copper on the Purcell Property indicates that soil-copper concentrations form a single population from a common primary source (Figure 10). The source is interpreted to be Slocan Group metasedimentary rocks.

The distribution of soil-copper concentrations over the property (Figure 14) confirms this. Generally, high soil-copper contents are underlain by variously carbonaceous pelites near the Bluebird claim boundary and on the eastern part of the Purcell Property. The horseshoe-shaped area of sub-anomalous soil-copper near the Idaho No. 2 veins follows pelitic rocks around a southeasterly plunging, second-phase antiform (Figures 9 and 14).

Areas of anomalously high soil-copper concentrations near the Goodenough, Purcell and Idaho No. 2 dumps are interpreted to be related to accelerated leaching of copper from weathered Slocan Group rocks that have been broken up by former mining activities.

It is interesting to note that dump and scree related copper anomalies are not associated with the lower dumps on the Grey Copper and East veins. This is probably because those areas are below the Late Tertiary-age valley bottom where less deeply weathered Slocan Group rocks would not release their copper as rapidly as would the deeply weathered rocks on higher parts of the slope.

3.3(ii) Interpretation of Lead in Soils

The soil-data distribution curve for lead on the Purcell Property (Figure 11) indicates that there are two primary sources of lead in soils, pelitic Slocan Group metasediments and galena from Slocan silver-lead-zinc veins.

The distribution of soil-lead across the property (Figure 15) confirms this. ALso, it reveals that lead is quite mobile in soils and forms broad down-slope dispersion anomalies as well as those from the two types of primary source.

Soil-lead emanating from carbonaceous slates and pelites within the Slocan Group are located around the Bluebird claim boundary. Generally, these are

"mild anomalies that tend to mask anomalies from other sources on the Purcell and Rawdon claims (Figure 15).

There are several soil-lead anomalies presumed to be related to the presence of Slocan silver-lead-zinc veins on the property. The anomaly at the northern boundary of the Goodenough claim is obviously related to the Goodenough Vein which is stoped to surface in that area.

A discontinuous soil-lead anomaly is located about 150 m (492 ft) northwest of the Grey Copper Vein. That anomaly may be related to a vein striking parallel with the Grey Copper Vein that forms the southwesterly extension of mineralization exposed on the Bluebird claim.

A soil-lead anomaly generally coincides with the surface traces of the Purcell, Grey Copper and East veins except on very steep slopes on the southern part of the Purcell claim where eluviation has probably removed soil-lead. Coincident soil-lead and zinc anomalies between the lower workings on the Grey Copper Vein and the East Vein indicate that another silver-lead-zinc vein is located in that area. Accelerated lead liberation from weathered rock in mine dumps and down-slope dispersion significantly blur soil-lead anomalies associated with silver-lead-zinc veins on this part of the property.

An intense soil-lead anomaly is located on the southwestern part of the Rawdon claim. It extends along the nose of the slope southwestward from the Bluebird claim boundary to the Idaho No. 2 access road. This anomaly is probably related to an undiscovered vein.

An extensive coincident lead and zinc anomaly extends southwestward from the Idaho No. 2 veins, across the Link 2 claim to the Chambers claim. Because the anomaly does not follow the creek across the Derby claim, it is assumed not to be related to down-hill dispersion or illuviation. It is presumed to be an expression of the Idaho No. 2 Vein system below the workings-area.

It is believed that the southeastward jog in the creek near the centre of the Link 2 claim below the Idaho No. 2 workings is caused by a northwesterly striking fault that dislocates stratigraphy and the Idaho No. 2 vein system (Figure 9). Dislocation of the vein by the fault would explain why the Idaho veins were not found in the creek below the workings-area.

Soil-lead anomalies on the Chambers Fr. 2 claim and at the centre of the Link 1 claim form a tenuous northeasterly trend to the Trade Dollar workings located on the southwestern part of the Trade Dollar claim (Figure 15). It is possible that a northeasterly striking silver-lead-zinc vein may be present in that area.

"3.3(iii) Interpretation of Zinc in Soils

Soil-zinc anomalies on the property, like those of lead have two primary sources: zinc from silver-lead-zinc veins and carbonaceous pelites within the Slocan Group metasediments (Figures 12 and 16). Anomalies from pelites are located near the Bluebird claim boundary. Unlike lead, zinc is not very mobile in soils in the property-area. Consequently, anomalies caused by down-slope dispersion and illuviation are minimal. This makes zinc the best soil-metal indicator for the location of silver-lead-zinc veins.

Minor soil-zinc anomalies coincide with lead anomalies at the Goodenough and Purcell veins and around the western part of the Rawdon claim. As previously mentioned, these anomalies are probably related to silver-lead-zinc vein mineralization on the northern part of the property. Mineralization in this area is from the upper silver-lead enriched parts of veins. As would be expected, soil-zinc anomalies in these areas are far less well-developed than those of lead and silver (Figures 15, 16 and 17).

Soil-zinc anomalies are very well-developed near exposures of the central zinc-rich part of the Grey Copper Vein on the Grey Copper claim (Figure 16). A soil-zinc anomaly about 150 m (492 ft) northwest of the surface trace of the Grey Copper Vein strongly indicates the presence of a silver-lead-zinc vein that runs parallel with the Grey Copper Vein in that area. Rapid erosion in the gulch near the surface trace of the Grey Copper Vein precludes the development of an intense soil-zinc anomaly along that vein. Between the lower workings on the Grey Copper Vein and the East Vein is an intense linear soil-zinc anomaly that indicates the presence of a silver-lead-zinc vein that runs parallel with the East Vein and is a conjugate to the Grey Copper Vein.

The largest zinc-bearing structure exposed on the property is the Idaho No. 2 vein system. It is confined within a massive soil-zinc lead and silver anomalies that extend across the Idaho No. 2 and Link 2 claims (Figures 15, 16 and 17). As has been mentioned previously, these anomalies do not follow the creeks and therefore are not due to down-slope dispersion or illuviation. They are probably caused by an extension of the Idaho No. 2 vein system between the Idaho No. 2 and Chambers claims.

3.3(iv) Interpretation of Silver in Soils

The soil-data distribution curve for silver (Figure 13) is positively skewed throughout with regard to lognormal distribution trends. This indicates an extreme excess of high soil-silver concentrations in the property-area (LePeltier, 1969). Rigorous establishment of sub-anomalous and anomalous thresholds along the lognormal trend for normal soils includes too much data above the contours on the soil-silver map (Figure 17) making interpretation difficult.

"However, raising the statistical thresholds and contour values to levels that clean up the map would artificially accentuate secondary soil-silver anomalies around the dumps at the expense of primary anomalies related to the presence of type 1 and 2 statistical errors through which either too much or too little data is excluded by the establishment of confidence intervals.

The writers have plotted contours from the thresholds generated from the lognormal trend for normal soils (Figures 13 and 17) to maintain consistency of method with the treatment of distribution of other metals in soils and to display wide-spread dispersion of silver in soils.

Soil-silver anomalies are coincident of silver in soil-lead and zinc anomalies which have been discussed previously. The writers found silver to be a less effective geochemical source indicator than lead or zinc in the Purcell Property-area.

8.4 In summary, significantly anomalous zones of elements found during the soil-geochemical survey and shown on Figures 18, 19, 20, 21 are indicated as follows:

Figure	Element	Location
14	Silver	Small anomalies coincident with soil-lead and zinc anomalous zones noted below
15	Copper	Uni-modal sub-anomalous zones probably derived from meta-sedimentary host rocks
16	Lead	a) Anomalous zone 150 m northwest of Grey Copper Vein System and more or less with zinc values
		b) Area over the surface traces of the Purcell and Grey Copper Veins and more or less coincident with anomalous zinc values
17	Zinc	c) A zone located between the Grey Copper and the East Vein and more or less coincident with lead values
		d) Anomalous values more or less coincident with lead values in the northeast corner of the property on the Rawdon claim
		e) More or less coincident with lead values and trending southwest over the projected surface strike of the Idaho No. 2 Vein

8.5 The results of the underground mapping and rock-channel sampling are discussed below under 9.0.

9.0 MINERALIZATION - DESCRIPTION OF VEIN SYSTEMS - ASSAYS

9.1 Ostler and Linn have discussed the nature of the Slocan silver-lead-zinc veins on pages 34-36 of their report dated December 31, 1990 as follows:

> "2.3(iv) Slocan Silver-Lead-Zinc Veins
>
> Long has it been known that in the Slocan mining camp that northeasterly striking veins were generally mineralized and that northwesterly striking veins were mineralized only near contacts with northeasterly striking structures (Cairnes, 1935).
>
> All mineralized veins on the Purcell Property strike northeasterly. Both on surface and in tunnels, it can be readily observed that mineralized veins cut cleanly across both the Slocan Group stratigraphy, and Nelson Batholith Intrusives and related northwesterly striking structures. Also, the mineralized veins contain none of the regional cleavages found in other rocks on the property. The Slocan silver-lead-zinc veins are interpreted to be younger than the Slocan Group metasediments and the Nelson Batholith intrusives. The writers share the opinion of Beaudoin (pers. comm.) that the Slocan silver-lead-zinc veins are probably Eocene-age, related to Tertiary crustal extension.
>
> There are four major mineralized vein systems known to occur on the Purcell Property: the Goodenough Vein, the Grey Copper and East veins, the Purcell Vein (probably an extension of the Grey Copper Vein) and the Idaho No. 2 vein system. The history of development and some of the mineral showings on these veins are described in detail in sections 1 and 4 of this report.
>
> Mineralized veins on the Purcell Property are typical Slocan silver-lead-zinc veins. At lower elevations they are barren quartz-carbonate veins. In their intermediate sections, they are up to 2.0 m (6.8 ft) thick and are mineralized with dark purple sphalerite containing small segregations and layers of blue-grey galena. Brassy, subhedral pyrite dustings are common at contacts between quartz and sphalerite. Gangue minerals comprise quartz and siderite with minor amounts of ankerite and calcite. On weathered surfaces, pyrite forms yellow limonite, siderite rusts to an orange mixture of hematite and limonite and ankerite alters to limonite and dark purple magnesite.

"A 1,000-ton block of this kind of ore sampled in the Grey Copper No. 3 level in 1905 ran 42.6% zinc, 18.8% lead and 33 oz/ton silver (section 1.5(ii), this report). Zinc-rich mineralization occurs in the Grey Copper Vein, below the No. 7 level on the Goodenough Vein and in the West Vein of the Idaho No. 2 vein system (Figures 4, 9 and 18 to 22).

The Idaho No. 2 Main Vein contains a variation on this style of mineralization. There, sphalerite-rich mineralization is exposed in a 2.4 m (8 ft) thick breccia zone in siltstone and slate (Figure 22).

Generally, high-grade silver-lead mineralization occurs in the upper parts of Slocan veins. This mineralization comprises mostly fine-grained argentiferous galena with minor amounts of tetrahedrite, pyragyrite, argentite and native silver in quartz-siderite-ankerite-calcite gangue. Silver grades run up to 760 oz/ton silver with up to 72% lead (section 1.5(i), this report).

The upper silver-lead rich sections of Slocan Veins are commonly much thinner than the middle zinc-rich sections. The silver-lead rich upper part of the Goodenough Vein is up to 0.5 m (40 in) thick. The Purcell and East; the other examples of upper silver-lead rich veins on the property, are only about 2.5 cm (1 in) thick on average.

Where the East Vein is exposed on surface, it has a 2.5 cm (1 in) thickness of medium-grained galena that is flanked by a 60 cm wide alteration zone containing abundant limonite and magnesite in quartz diorite. Alteration is not obvious where the vein crosses siltstone."

9.2 Ostler and Linn have described both the surface and underground aspects of the Grey Copper and Idaho No. 2 Vein Systems on pages 46-50 and 53-55 of their report dated December 31, 1990 as follows:

"**4.1 Grey Copper and East Veins**

4.1(i) Description of Workings on the Grey Copper Vein

The Grey Copper Vein is exposed in the gully along the centre line of the Grey Copper claim between elevations of 1,722 m (5,648 ft) and 1,836 m (6,023 ft) (Figures 4 and 18). Within this elevation interval, the vein is probed by underground workings on six levels, No. 1 to 5A.

The No. 1 to 4 levels are clustered along the oxidized upper exposure of the vein near the 1,818 m (5,963 ft) elevation (Figures 18, 19A and 19B). Levels 5 and 5A bracket the fresh lower exposure of the vein near the 1,740 m (5,707 ft) elevation.

"During the 1990 exploration program, the No. 2, 3, 5A and 5 levels were mapped and variably sampled. The No. 1 level had been stoped out from below and the No. 4 level had been buried beneath the No. 3 dump. Consequently, no work was done on those two levels.

Most of the development work near the upper exposure of the Grey Copper Vein was done on the No. 3 level (Figures 19A and 19B).

The Grey Copper No. 3 drift is 237 m (777 ft) long and contains five stopes and two short branch tunnels. The first 15 m (50 ft) of this level is timbered through weathered quartz diorite. The timbers date from 1953 and 1980 and are in good condition. The rest of the tunnel is through more competent rock and needs no timbering.

Except below the Big Stope, the first 180 m (590 ft) of this level is set with 18" gauge track with 12 lb. rail. The back 57 m (187 ft) of the No. 3 level and 5 m of tunnel beneath the Big Stope has track with 20 lb. rail.

The only water that enters this working is a small amount from the No. 1 level portal above the Big Stope. This could be arrested by mucking out the No. 1 portal so that it drains outward rather than inward to the stope. Minor mucking around the No. 3 portal and clearing of rubble from the last 1980 exploration blast in the Rat Stope would clear this level for future development.

The Big Stope and upper levels provide excellent ventilation and a good secondary escape route for the western part of the No. 3 drift (Figures 18 and 19A). No secondary access or ventilation is developed in the eastern part of this working yet.

The No. 5 and 5A levels are developed in the lower unoxidized exposure of the Grey Copper Vein. The No. 5A portal is at 1,740 m (5,707 ft) elevation, about 78 m (256 ft) vertically below the No. 3 portal (Figure 18).

Early mining on these levels was done with hand steel; rock was removed using wheel barrows. Recent development on the No. 5A level was by the use of a slusher. Consequently, this drift would require slashing, a lowering of grade to 1% and rails to upgrade it for future development. The No. 5A drift makes no water.

The No. 5A drift follows the vein for 37 m (121 ft). The No. 5 drift follows the vein for 38 m (125 ft) at an elevation 18 m (59 ft) vertically below the No. 5A level (Figure 20). These two drifts are connected by a 25 m (82 ft) long raise in the plane of the vein (Figures 18 and 20).

During the 1979 slushing operation in the No. 5A drift, the raise was blocked with waste rock. Reopening the raise would be of dubious value to further development.

"4.1(ii) Description of the Grey Copper Vein within the Workings

The Grey Copper Vein occupies a plane with an average strike of 059° and an average dip of 80° southeast. Dips on the vein in the No. 3 and No. 5A levels are generally from 55 to 70°, indicating that the vein must be nearly vertical in its unexposed section between these two levels (Figures 18 to 20).

Since early development of the Purcell Property-area, it has been suspected that the Purcell Vein was an uphill extension of the Grey Copper Vein. The Purcell Vein workings have been projected onto the average plane of the Grey Copper Vein (Figure 18) to demonstrate its approximate location with regard to the Grey Copper workings.

For the location of the Purcell Vein to be accurate, either the dip of the plane of the vein would have to flatten to about 64° between the Grey Copper No. 1 and Purcell adits, or the Purcell Vein would have to be an en echelon offset of the Grey Copper Vein. This could be why a connection between the two veins has not been found.

As has been mentioned previously, the surface exposure of the Grey Copper Vein between the No. 1 and 3 portals is very oxidized. There, the vein is up to 40 cm (1.3 ft) thick and averages about 20 cm (0.66 ft) thick. It comprises quartz, iron oxides, pyrite, and residual galena and sphalerite. The same pervasive oxidation is present in the vein in the No. 2 drift and for the first 56 m (184 ft) in the No. 3 drift (Figures 18 and 19A).

The vein averages about 20 cm (0.66 ft) in thickness from 56 to 82 m (184 to 269 ft) in from the portal. It widens to about 60 cm (2 ft) in three areas that are extensively stoped above the No. 3 level.

Mineralization in this area comprises massive purple sphalerite assaying up to 54% zinc. With this are segregations of blue-grey galena containing from 80 to 100 oz/ton silver and up to 72% lead.

Only the silver-bearing galena was ore to early miners who stoped out the vein wherever vein widths exceeded 30 cm (1 ft) and where galena comprised a significant part of the mineralization.

During 1953 development, both galena and sphalerite mineralization were taken. The 1,000-ton block of ore sampled by the zinc commission's geologist during 1905 was taken from the Big Stope at that time. That ore block contained 18.8% lead, 42.6% zinc and 33 oz/ton silver.

The vein is sheared out along a subsequent parallel fault from 82 to 105 m (269 to 344 ft) along the No. 3 drift. There is little economic potential on the vein in this area.

"From 105 to 128 m (344 to 420 ft) along the No. 3 drift, the fault veers away from the vein and good widths of mineralization are exposed (Figure 19B). Two small stopes are extended where widths exceed 30 cm (1 ft). Mineralization in this part of the vein is similar to that near the Big Stope except that sphalerite comprises a larger part of the mineralization here.

At 128 (420 ft) in from the portal, the Grey Copper Vein is intersected by a 4 to 6 cm (1.6 to 2.4 in) thick galena silver-bearing vein which is presumed to be the East Vein.

Miners continued driving along the Grey Copper Vein for an additional 12 m (40 ft) then lost it along a sub-parallel fault (Figure 19B).

Seduced by silver assays ranging from 100 to 164 oz/ton, early miners veered off along the galena-rich vein. They followed it for 14 m (46 ft) and lost it in a series of cross-faults.

It is very curious that upon having lost the East Vein, miners did not return to drifting along the Grey Copper Vein. Instead, they drove an additional 89 m (292 ft) into country rock beneath the plane of the Grey Copper Vein.

During the 1990 exploration program, 11 channel samples were taken from the Grey Copper Vein in the No. 3 drift. They averaged 13.35% lead, 29.24% zinc and 28.93 oz/ton silver. Sampling in the drift was not rigorous and the slight divergence between the zinc commission's grade estimate and that of the writers probably was due to the lack of 1990 samples from higher grade sections of veins in stope ceilings.

Generally, mineralization in Slocan silver-lead-zinc veins is found to be zoned (Cairnes, 1935). In this regard, the Grey Copper Vein is typical (Figure 18). The upper part of the vein as exposed in the Purcell workings is a narrow high-grade silver-bearing galena vein. Grey Copper levels 1 to 3 occupy part of a transition zone where zinc-lead-silver mineralization is exposed as massive sphalerite containing blebs, stringers and segregations of silver-bearing galena. The No. 5 and 5A levels expose part of the zinc-rich central part of the vein where mineralization is almost entirely sphalerite containing about 54.4% zinc and 7.4% iron.

The No. 5A level was sampled at 2 m (6.6 ft) intervals along its 37 m (121 ft) length (Figure 20). These samples averaged 1.18% lead, 29.55% zinc and 4.82 oz/ton silver across an average width of 23.3 cm (0.76 ft). The ore shoot exposed in the last 13 m (43 ft) of the No. 5A drift averaged 27 cm (0.89 ft) in width with a maximum width of 50 cm (1.64 ft) that contained an average of 0.06% lead, 41.21% zinc and 6.66 oz/ton silver in massive sphalerite with siderite-quartz-ankerite gangue."

9.3 The Idaho No. 2 Vein System and the West Vein are described by Ostler and Linn on pages 53-55 of their report dated December 31, 1990 as follows:

> **"4.2 Idaho No. 2 Vein System**
>
> **Presently, the main Idaho No. 2 vein is exposed in two outcrops above the 1,906 m level. The largest outcrop is at the Idaho No. 2 shaft (Figures 9 and 22). There, the main Idaho No. 2 vein is a 2.4 m (8 ft) thick breccia zone containing oxidized sulphides.**
>
> **Early during development of this vein, it was exposed in trenches from the No. 2 portal up to the Bluebird - Idaho No. 2 claim boundary. It was known as the Big Vein on the Bluebird claim.**
>
> **The workings on the Idaho No. 2 vein system comprise two tunnels and a shaft. The No. 1 tunnel and shaft are located at an elevation of 1,939 m (6,361 ft) (Figures 4 and 22). They were buried beneath Sipald Resources' access road and are inaccessible now. Most of the underground exploration was conducted in the No. 2 (main) tunnel driven at an elevation of 1,906 m (6,252 ft) (Figure 22).**
>
> **During the 1990 program, the main Idaho No. 2 tunnel was closed because some roof timbers had fallen off a set near the portal. Consequently, current knowledge of these workings was assembled from reports of former operators.**
>
> **The 1,906 m level is a drift along the main Idaho No. 2 breccia zone for 360 m (1,180 ft) that terminates near the Rawdon-Nabob claim boundary. Reportedly, this drift contains track throughout (G. Sipos, pers. comm.). The weight of the rails and the condition of the track is not known. This drift is driven through moderately incompetent carbonate-bearing siltstone and phyllite that require extensive timbering.**
>
> **During the 1983 exploration program, the main Idaho No. 2 drift was retimbered as far as the cross-cut 183 m (600 ft) in from the portal. The timber beyond that point was in poor condition and would need extensive renovation before further development could be conducted in the back half of the workings (G. Sipos, pers. comm.). The front half of the Idaho No. 2 drift was retimbered in 1983 and probably is still in reasonably good condition.**
>
> **The Idaho No. 2 drift was drilled and sampled by Bluebird Mines Ltd. in 1951 (Figure 22). The 1951 sampling was confirmed during Sipald Resources Ltd.'s 1983 sampling program (Sookochoff, 1986).**

"Mineralization in the drift can be divided into three zones based on thickness, grade and degree of oxidation. For the first 100 m (305 ft) in from the portal, the main Idaho No. 2 structure is a 2 m (6.6 ft) thick breccia zone containing clasts of country rock in a sphaleritic matrix. Part of this zone is intensively oxidized. The greatest thicknesses and best grades of mineralization occur from 100 to 200 m (305 to 610 ft) in from the portal in the central part of the working. There, the main Idaho No. 2 structure is reported to be up to 3 m (9.8 ft) thick and contains both silver-bearing galena and sphalerite. The raise along the vein that was reported in 1929 to have contained ore grading 100 oz/ton silver was driven in that area (Figure 22).

The West Vein, a parallel structure with the main Idaho No. 2 structure located about 12 m (39.4 ft) northwest of the main shear, is explored by drill holes and cross-cut tunnels in the central part of the working. The West Vein reportedly is 0.6 to 1 m (2 to 3.3 ft) thick and contains massive sphalerite assaying up to 53% zinc with minor galena. In form and mineral grade, it resembles the Grey Copper Vein.

The main Idaho No. 2 structure is exposed throughout the eastern part of the drift. Although it persists to near the Rawdon-Nabob claim boundary, former sampling indicates that mineral contents drop to sub-economic levels there.

Considerable rehabilitation and intensive sampling would be required to make an accurate estimation of mineral reserves and economic potential of this working."

9.4 The following is a partial summary of the available underground development information on the Grey Copper, Idaho No. 2, Goodenough, Purcell and Rawdon Vein Systems.

<u>Grey Copper Vein System</u> (Figures 8, 9, 10, 11, 12, 22)

Average Strike-Dip: 059° - 80° SE

Major minerals present: sphalerite, silver, galena and pyrite and iron oxides in quartz-siderite veins. The sphalerite is ferriferous (marmatite), the galena is silver-bearing and argentite may also be present.

Number of levels: 6.

Range of vertical development: 114 m (375 ft) between 1,722 m (5,648 ft) and 1,836 m (6,022 ft).

Average strike: 059°

Level	Elevation	Lateral Development	No. of Stopes	Remarks
No. 1	1,836 m (6,022')	n/a	n/a	n/a = not available
No. 2	± 1,830 m	30 m mapped		Figures 9 and 10
No. 3	1,818 m (5,963')	277 m (770') and two branch tunnels	Big Stope + 4 stopes	Figures 9, 10, 11
No. 4	n/a	n/a	n/a	Buried beneath No. 3 dump
No. 5A	1,740 m (5,707')	37 m (121')		Connected with No. 5 level below by 25 m (82') raise (now filled)
No. 5	1,722 m (5,648')	38 m (125')		Figures 9 and 12
East Vein	+1,818 m (±5,963')	Undeveloped		Figure 22

Idaho No. 2 Vein System and West Vein (Figure 13)

Major minerals present: sphalerite (ferriferous), silver and galena with iron oxides in quartz-siderite veins.

Number of levels: 2 + 1 vertical shaft

Range of vertical development: ± 33 m (± 110')

Average strike: 052°

Level	Elevation	Lateral Development	No. of Stopes	Remarks
No. 1	1,939 m (6,361')	n/a	n/a	near collar of vertical shaft (depth n/a)
No. 2 (Main)	1,906 m (6,252')	± 47 m (1,542')	1 raise	Figure 13 shows 14 diamond drill holes

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West Vein

A parallel vein structure carrying massive sphalerite with minor galena ± 12 m northwest of Idaho No. 2 (Main) shear.

Level	Elevation	Lateral Development	No. of Stopes	Remarks
	+ 1,906 m (+ 6,252')	Access thru x-cut on Idaho No. 2 (Main) drift		Figure 13
Goodenough Vein System				
No. 2 Portal		Figure 5		Caved 1990
No. 4 Portal		Figure 5		Caved 1990
No. 6 Portal		Figure 5		Caved 1990
No. 8 Portal		Figure 5		Caved 1990
Purcell Vein System				
Purcell adit portal + raise		Figures 5 & 9		Caved 1990
Rawdon Claim				
Bluebird No. 4 Portal				Cross-cut access to Big Vein on Bluebird property, Caved 1990

9.5 Ostler and Linn have discussed the mineral reserve potential of the Grey Copper Vein System workings and the East Vein on pages 50-53 of their report dated December 31, 1990 (see Figures 9 and 22) as follows:

> **"4.1(iii) Potential Mineral Reserves near the Grey Copper Workings**
>
> **To estimate potential mineral reserves, assumptions with regard to thickness and grade along the vein must be made and projected from the workings to more distant parts of the vein.**
>
> **The Grey Copper Vein has an average thickness of about 20 cm (0.66 ft) and attains a maximum thickness of about 60 cm (2 ft) in ore shoots. These shoots are about 15 m (50 ft) long and are separated by 15 m (50 ft) lengths of narrower vein. Consequently most of the mineralization is concentrated on ore shoots comprising about 50% of the vein (Figure 18). Ore shoots average about 33 cm (1.1 ft) in thickness and extend to down dip for at least 30 m (100 ft).**

"The zinc commission's grade estimate for the area near the Big Stope in the No. 3 level is a good estimate of mineral grade in ore shoots along that level. The average assay from the ore shoot at the end of the No. 5A drift is probably representative of grade in ore shoots along the vein at that level. Current values of those grades of mineralization are listed below:

Current Value of Average Grade Mineralization

	Pb	Zn	Ag		
No. 3 Level: grade	18.8%	42.6%	33.00	oz/ton	
$CDN Value/ton	$80.28	$682.62	$137.28		$900.18 total
No. 5A Level: grade	0.06%	41.21%	6.66	oz/ton	
$CDN Value/ton	$ 0.26	$660.35	$32.43		$693.04 total

Note: The value tabled above are computed from
L.M.E. prices for December 10, 1990

Pb = $US 0.1825/lb; $CDN .2135/lb
Zn = $US 0.6848/lb' $CDN 0.8012/lb
Ag = $US 4.16/oz; $CDN 4.87/oz

The part of the Grey Copper Vein reasonably accessible through development and extension of existing workings has been divided into six reserve blocks (Figure 18). Blocks 'A' and 'B' are assumed to contain grades of mineralization like that quoted by the zinc commission from the No. 3 drift. Blocks 'C' to 'F' probably contain grades similar to those found in the No. 5A level.

Mineral reserve block 'A' contains an area of 3,596 m^2 (38,687 ft^2) on the average plane of the vein. It is located west of the intersection of the Grey Copper and East Veins in the No. 3 drift. It is bounded below at 15 m (50 ft) below rail level in the No. 3 drift and it is bounded above by the base of surface oxidation on the vein (Figure 18).

The existence of five ore shoots has been established by stopes in this reserve block. Remaining mineral reserves vary from proven to potential. Rigorous definition of ore reserves in this block would require more extensive sampling than has been conducted to date.

It is estimated that reserve block 'A' contains about 1,700 tons of mineable mineralization worth about $CDN 1,530,306 at $CDN 900.18/ton. These reserves are located below the No. 3 level and in unstoped ore shoots above it.

"Reserve block 'B' extends eastward from the intersection of the Grey Copper and East veins to the eastern end of the No. 3 drift (Figure 18). Its upper boundary is generally 60 m (197 ft) above the No. 3 drift and its lower boundary is 15 m (50 ft) below that drift. It contains an area of 8,822 m^2 (94,920 ft^2) on the average plane of the vein.

Because the No. 3 level is driven beneath the Grey Copper Vein east of its intersection with the East Vein, this reserve block is almost unexplored. If the character of the vein in this block is similar to that in reserve block 'A' then reserve block 'B' would contain about 7,278 tons of mineralization worth about $CDN 6,551,510 at $CDN 900.18/ton.

Reserve block 'C' is bounded below by the No. 5 drift, above by the surface exposure of the Grey Copper Vein and to the east by the end of the No. 5A drift (Figure 18). It occupies about 700 m^2 (7,532 ft^2) on the average plane of the vein. Three ore shoots are well-documented in this reserve block. It is estimated that about 385 tons of mineable reserves worth about $CDN 266,820 at $CDN 693.04/ton are located in the reserve block 'C'.

Reserve block 'D' represents the area above the No. 5 drift between reserve blocks 'C' and 'A' (Figure 18). It contains 7,375 m^2 (79,355 ft^2) on the average plane of the vein. This reserve block is totally unexplored. If the character of mineralization in blocks 'D' and 'C' are similar then block 'D' would contain 6,084 tons of mineable mineralization worth about $CDN 4,216,455 at $CDN 693.04/ton.

Reserve block 'E' is located directly below reserve block 'A' and is bounded below by the No. 5 level (Figure 18). It contains 9,628 m^2 (103,597 ft^2) on the plane of the vein.

This reserve block is penetrated by a 1980 drill hole that intersects massive sphalerite and galena mineralization over 1.06 m that assays about 7 oz/ton silver (G. Sipos, pers. comm.; Sookochoff, 1986). This intersection indicates that mineralization on the vein in this area is similar to that in the No. 5A drift. About 7,943 tons of mineable mineralization may located in reserve block 'E' worth about $CDN 5,504,817 at $CDN 693.04/ton.

Reserve block 'F' is located below block 'B' and is east of block 'E' (Figure 18). It contains 8,856 m^2 (95,291 ft^2) on the average plane of the vein with a potential 7,306 tons of mineable mineralization worth about $CDN 5,063,350 at $CDN 693.04/ton.

In conclusion, it is estimated that the six reserve blocks accessible through extension of the Grey Copper workings may contain a total of 30,696 tons of mineable mineralization worth about $CDN 23,133,258 at current metal prices.

4.1(iv) Economic Potential of the East Vein

The East Vein is a narrow, high-grade lead-silver vein that may be a conjugate structure to the Grey Copper Vein. It is exposed in two places: on surface in trenches located about 75 m (246 ft) south of the Grey Copper

"No. 3 portal (Figure 21) and in the No. 3 drift from 128 to 148 m (420 to 485 ft) in from the portal.

This vein is from 1 to 2.5 cm (0.4 to 1 in) thick on surface and up to 6 cm (2.4 in) thick in the No. 3 drift. It carries up to 146 oz/ton silver and up to 72% lead in solid galena.

Its narrowness precludes any economic potential at present silver prices. However, if silver prices run as they did during 1980, then a few tons of high-grade ore could be extracted profitably from the East Vein in the No. 3 drift."

9.6 In summary, the cost calculations for the proposed 1991 exploration program are based on the assumption of nearby milling and concentration capacity being available, a relatively stable price structure for the price of zinc and that mining operations will proceed on a practical basis as planned.

10.0 RECOMMENDATIONS

10.1 A two-phase program of mineral exploration is proposed as follows:

Phase 1

Extend the Grey Copper 5A level from the present face at portal + 37 m (121') to 87 m (285'), (Figures 9, 12) a total of 50 m (164') of drifting to test the continuity and tenor of the zinc-silver-lead mineralization.

To facilitate this work some upgrading of the present road access, waste dump space, slashing the present drift and install mine track will be required. It is also proposed to drive three raises from the extended 5A drift at portal + 37 m (121'), at portal + 62 m (203') and a third raise at portal + 87 m (285') to test the expected zinc-silver-lead mineralization. The third proposed raise at portal + 87 m should be driven on the Grey Copper Vein structure some 35 m (115') and then about 10 m (33') vertically to break-through at surface for ventilation purposes. The first raise at portal + 37 m and the second raise at portal + 62 m are each expected to encounter surface oxidation at 10 m (33') and 15 m (50') respectively above the upgraded track level in the 5A drift. Survey control of the raises is recommended to position of each raise relative to surface.

10.2 Contingent upon positive results from the Phase 1 program and a recommendation to further develop the PURCELL PROPERTY it is proposed to embark upon a further program of mineral exploration as follows:

Phase 2

a) It is proposed to further drift the Grey Copper 5A level to test below the eastern extremity of the No. 3 drift (Figure 9). Two raises from this new drift would also test this inter-level area for zinc-silver-lead mineralization between the 5A and the upper No. 3 drift horizons.

b) Re-open and rehabilitate, map and sample the Idaho No. 2 Vein System.

c) Re-open and rehabilitate, map and sample the Goodenough No. 8 level.

d) Detail soil sample the area of lead-zinc anomalies located in northwest corner of the Idaho No. 2 claim and south of the Purcell Vein workings (Figures 16, 17); on the northwest part of the Grey Copper claim and also on the east-southeast sector of the Grey Copper claim (Figures 16, 17); the area adjacent to and downhill along the strike of the Idaho No. 2 workings (Figures 14, 16, 17).

10.3 Ostler and Linn have indicated on pages 62-64 of their report dated December 31, 1990, that should economic mineralization be encountered during the proposed Grey Copper 5A level drifting and subsequent three-raise program, there is a potential that under optimum conditions, the estimated cost of the Phase 1 program could be partially amortized. Their calculations are shown in APPENDIX 3 to this report.

11.0 ESTIMATED COST OF THE PROPOSED WORK PROGRAM

11.1 Phase 1

A)	**Upgrade of No. 5A Drift and Surface Infrastructure**		
	Laying new track outside No. 5A portal		
	60 m of track at $165/m	$ 9,900	
	Slashing and lowering of No. 5A drift		
	37 m at $165/m	6,105	
	Laying of new track in No. 5A drift	6,105	$ 22,110
B)	**Advance of No. 5A Drift**		
	Driving new 1.5 x 2.1 m (5 x 7 ft) tunnel including track (no timbering needed)		
	50 m at $1,300/m	65,000	65,000
C)	**Driving 3 Raises from the No. 5A Drift**		
	Raise at p+37 m: 10 m advance up the plane of the vein along a 33 cm average thickness of mineralization by a 1 x 3 m raise;		
	44 tons of mineralization moved at $50/ton	2,200	
	60.5 tons of waste rock moved at $50/ton	3,328	5,528
	Raise at p+62 m: 15 m advance up the plane of the vein along a 33 cm average thickness of mineralization by a 1 x 3 raise;		
	66 tons of mineralization moved at $50/ton	3,300	
	90.75 tons of waste rock moved at $50/ton	4,538	7,838
	Raise at p+87 m: 35 m advance up the plane of the vein along a 33 cm average thickness of mineralization by a 1 x 3 m raise;		
	154 tons of mineralization moved at $50/ton	7,700	
	211.75 tons of waste rock moved at $50/ton	10,588	
	and 10 m advance to surface off the plane of the vein for ventilation		
	90.75 tons of waste rock moved at $50/ton	4,537	
	Sampling and Assaying	10,000	32,825
	Contingency		6,699
	Total Estimated Cost on Property		**$ 140,000**

Respectfully submitted,

Donald W. Tully

December 31, 1990
Revised April 22, 1991

Donald W. Tully, P.Eng.
Consulting Geologist

DON TULLY ENGINEERING LTD.
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WEST VANCOUVER, BRITISH COLUMBIA
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12.0 CERTIFICATE

I, DONALD WILLIAM TULLY, of the Corporation of West Vancouver, Province of British Columbia, hereby certify as follows:

12.1 I am a consulting Geologist with an office at Suite 1205, 555 - 13th Street, West Vancouver, B.C.

12.2 I am a registered Professional Engineer of the Provinces of British Columbia and Ontario, member of the CIM and a Charter Member Fellow of the G.A.C.

12.3 I graduated with a degree of Bachelor of Science, Honours Geology, from McGill University in 1943.

12.4 I have practised my profession for forty-five years.

12.5 I have no direct, indirect, or contingent interest in the securities of Avril Explorations Inc. or the Purcell Property, subject of this report, nor do I intend to have any interest.

12.6 This report dated December 31, 1990 is based on a personal field examination made on July 26-27, 1990, and from information gathered from available maps and reports and personal communications.

12.7 I have not examined any mineral properties or claims within the past five years that are located within ten kilometres of the PURCELL PROPERTY.

12.8 Written permission from the author is required to publish this report dated December 31, 1990 in any Prospectus or or Statement of Material Facts.

DATED at West Vancouver, Province of British Columbia, this 25th day of January, 1991, Revised April 22, 1991.

DONALD W. TULLY, P.ENG.
Consulting Geologist

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APPENDIX I

(MAP FIGURES 4-6 AND 9 THRU 22 INCLUSIVE)

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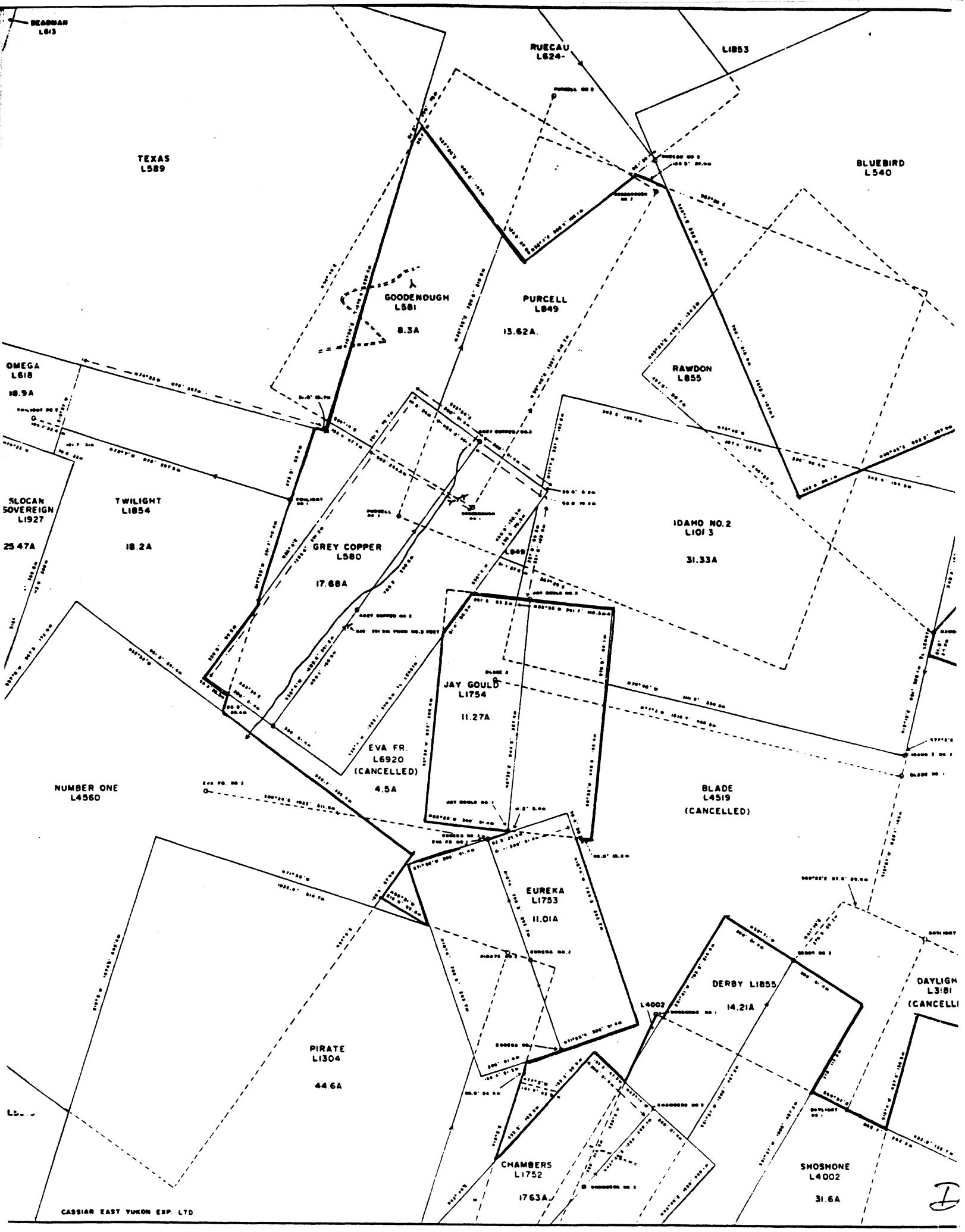
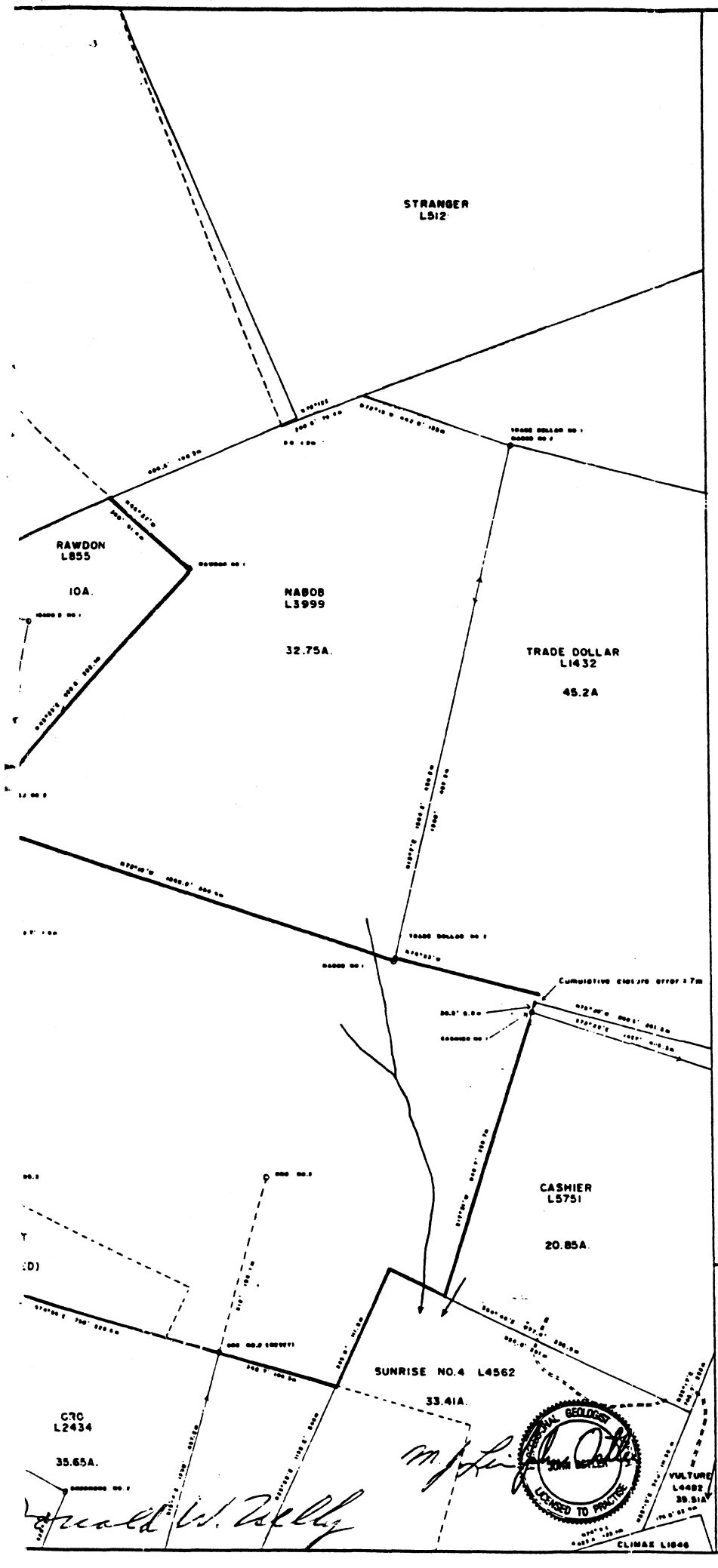

BEAGHAN
L613
RUECAU
L624-
L1853
TEXAS
L589
BLUEBIRD
L540
GOODENOUGH
L581
8.3A
PURCELL
L849
13.62A.
OMEGA
L618
18.9A
RAWDON
L855
SLOCAN
SOVEREIGN
L1927
25.47A
TWILIGHT
L1854
18.2A
GREY COPPER
L580
17.68A
IDAHO NO.2
L1013
31.33A
JAY GOULD
L1754
11.27A
EVA FR.
L6920
(CANCELLED)
4.5A
NUMBER ONE
L4560
BLADE
L4519
(CANCELLED)
EUREKA
L1753
11.01A
DERBY L1855
14.21A
L4002
DAYLIGH
L3181
(CANCELLI
PIRATE
L1304
44.6A
CHAMBERS
L1752
17.63A
SHOSHONE
L4002
31.6A
CASSIAR EAST YUKON EXP. LTD.



LEGEND

Claims: valid superimposed or cancelled

Line

Location line — claim post — location direction

Length indication

Identification — GREY COPPER — name; L580 — lot number; 17.68A — size

Topography — cabin, portal, trail, creek

SCALE

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 metres

0 100 200 300 400 500 600 700 800 900 1000 feet

FIGURE 4.

To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990

N.

19°46' N. mag.

Magnetic declination for the northern part of N.T.S. Map 82 F/14 as of July 1, 1990. Declination decreases 7.4' annually

Ostler & Linn - Figure 3

AVRIL EXPLORATIONS INC.

CROWN GRANT SURVEYS: 1895 to 1901

PURCELL PROPERTY

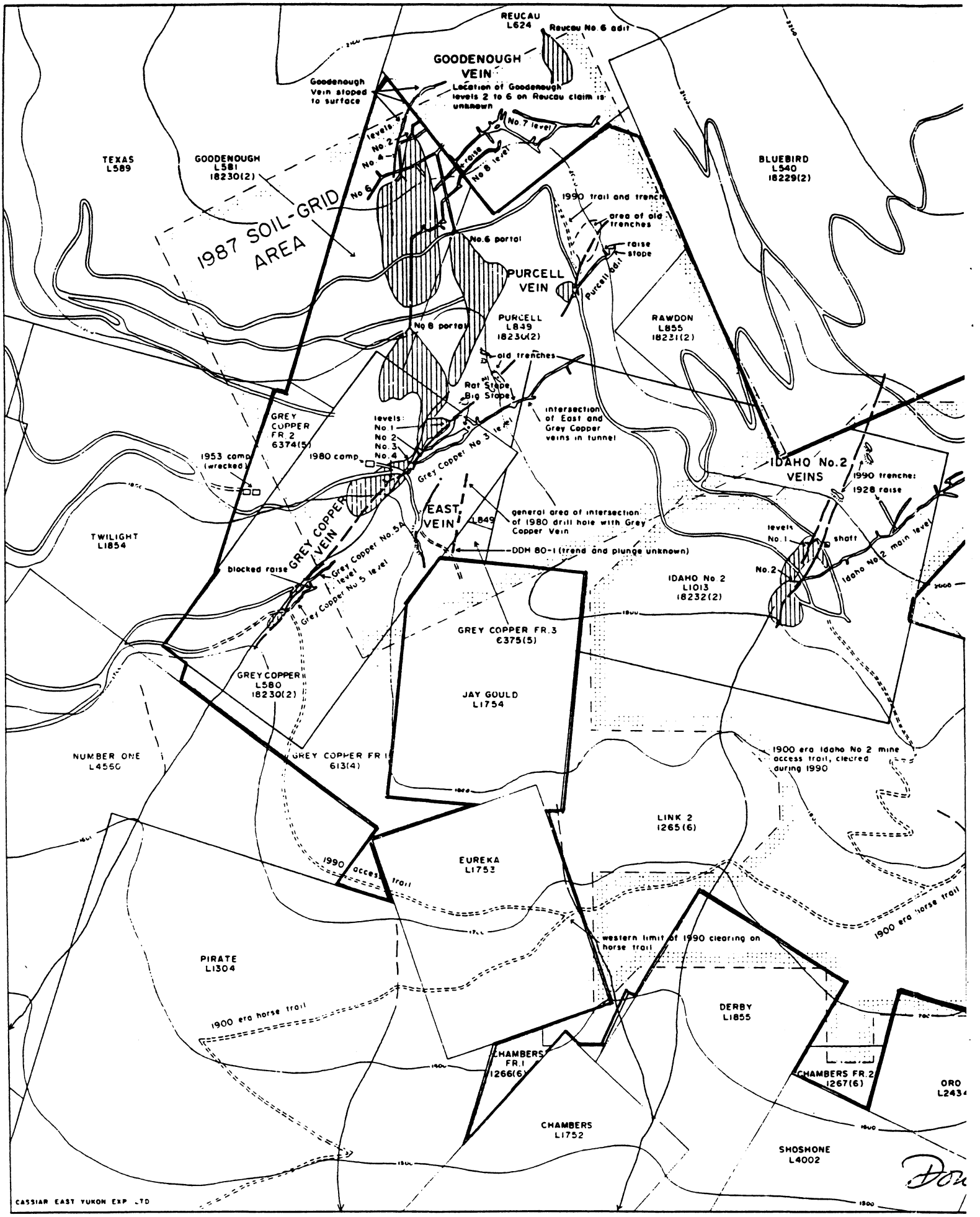
49°59.3'N., 117°11'W.

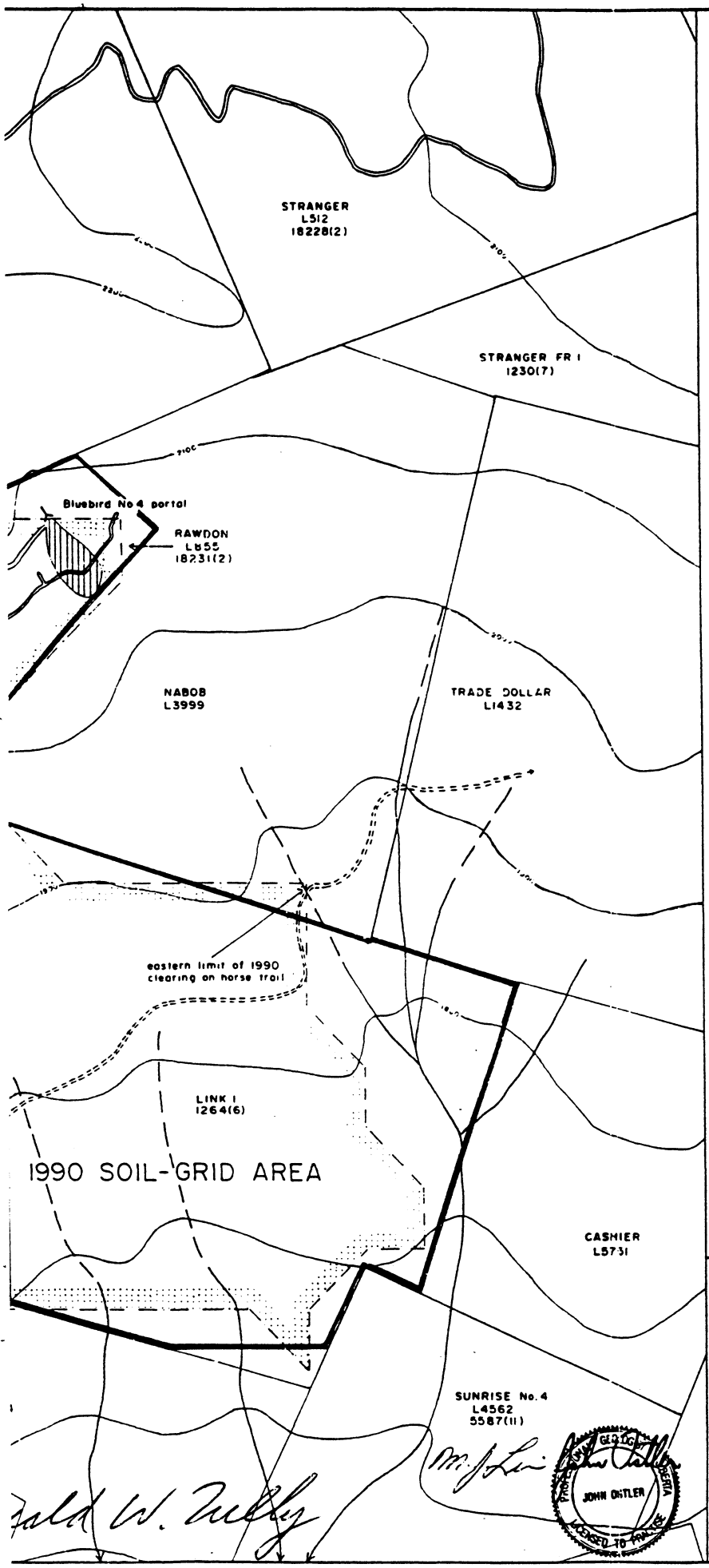
SLOCAN M.D., BRITISH COLUMBIA N.T.S. 82 F/14

JOHN OSTLER; M.Sc., P.Geol.

MICHAEL LINN, B.Sc.

DECEMBER, 1990


REUCAU
L624
Reucau No. 6 adit
GOODENOUGH
VEIN
Goodenough Vein stoped to surface
Location of Goodenough levels 2 to 6 on Reucau claim is unknown
No. 7 level
levels
No. 2
No. 4
No. 6
raise
No. 8 level
TEXAS
L589
GOODENOUGH
L581
18230(2)
1987 SOIL-GRID AREA
BLUEBIRD
L540
18229(2)
1990 trail and trench
area of old trenches
raise stope
No. 6 portal
PURCELL
VEIN
Purcell adit
No. 8 portal
PURCELL
L849
18230(2)
RAWDON
L855
18231(2)
old trenches
Rat Stope
Big Stope
intersection of East and Grey Copper veins in tunnel
GREY
COPPER
FR. 2
6374(5)
levels
No. 1
No. 2
No. 3
No. 4
1953 camp (wrecked)
1980 camp
Grey Copper No. 3 level
IDAHO No. 2
VEINS
1990 trenches
1928 raise
EAST
VEIN
L849
general area of intersection of 1980 drill hole with Grey Copper Vein
GREY COPPER
VEIN
TWILIGHT
L1854
DDH 80-1 (trend and plunge unknown)
levels
No. 1
No. 2
shaft
Idaho No. 2 main level
blocked raise
Grey Copper No. 5A level
Grey Copper No. 5 level
IDAHO No. 2
L1013
18232(2)
GREY COPPER FR. 3
6375(5)
GREY COPPER
L580
18230(2)
JAY GOULD
L1754
NUMBER ONE
L4550
GREY COPPER FR 1
613(4)
1900 era Idaho No. 2 mine access trail, cleared during 1990
LINK 2
1265(6)
EUREKA
L1753
1990 access trail
1900 era horse trail
western limit of 1990 clearing on horse trail
PIRATE
L1304
1900 era horse trail
DERBY
L1855
CHAMBERS FR. 1
1266(6)
CHAMBERS FR. 2
1267(6)
ORO
L2434
CHAMBERS
L1752
SHOSHONE
L4002
CASSIAR EAST YUKON EXP. LTD



LEGEND

Topography: creek, intermittant creek, contour in metres, road, trail

Workings: trench, ore dump, portal, tunnel or raise, shaft; cut, fill

Limit of soil grid area:

Surface trace of mineralized vein: defined, approximate, assumed

Claims: claim boundary, Purcell Property boundary

SUNRISE No.4 ← claim name
L4562 ← surveyed lot number, if any
5587(11) ← record number, if any

SCALE

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 metres

0 100 200 300 400 500 600 700 800 900 1000 feet

FIGURE 5.

To accompany a Report by Donald W. Tully, P.Eng., dated December 31, 1990

N.

19°46' E. mag.

Magnetic declination for the northern part of N.T.S. Map 82 F/14 as of July 1, 1990. Declination decreases 7.4' annually

Ostler & Linn - Figure 4

AVRIL EXPLORATIONS INC.

ROADS, TRAILS, WORKINGS and SOIL-GRID AREAS

PURCELL PROPERTY
49° 59.3'N., 117° 11'W.

SLOCAN M.D., BRITISH COLUMBIA N.T.S. 82 F/14

JOHN OSTLER; M.Sc., P.Geol.
MICHAEL LINN, B.Sc.

DECEMBER, 1990

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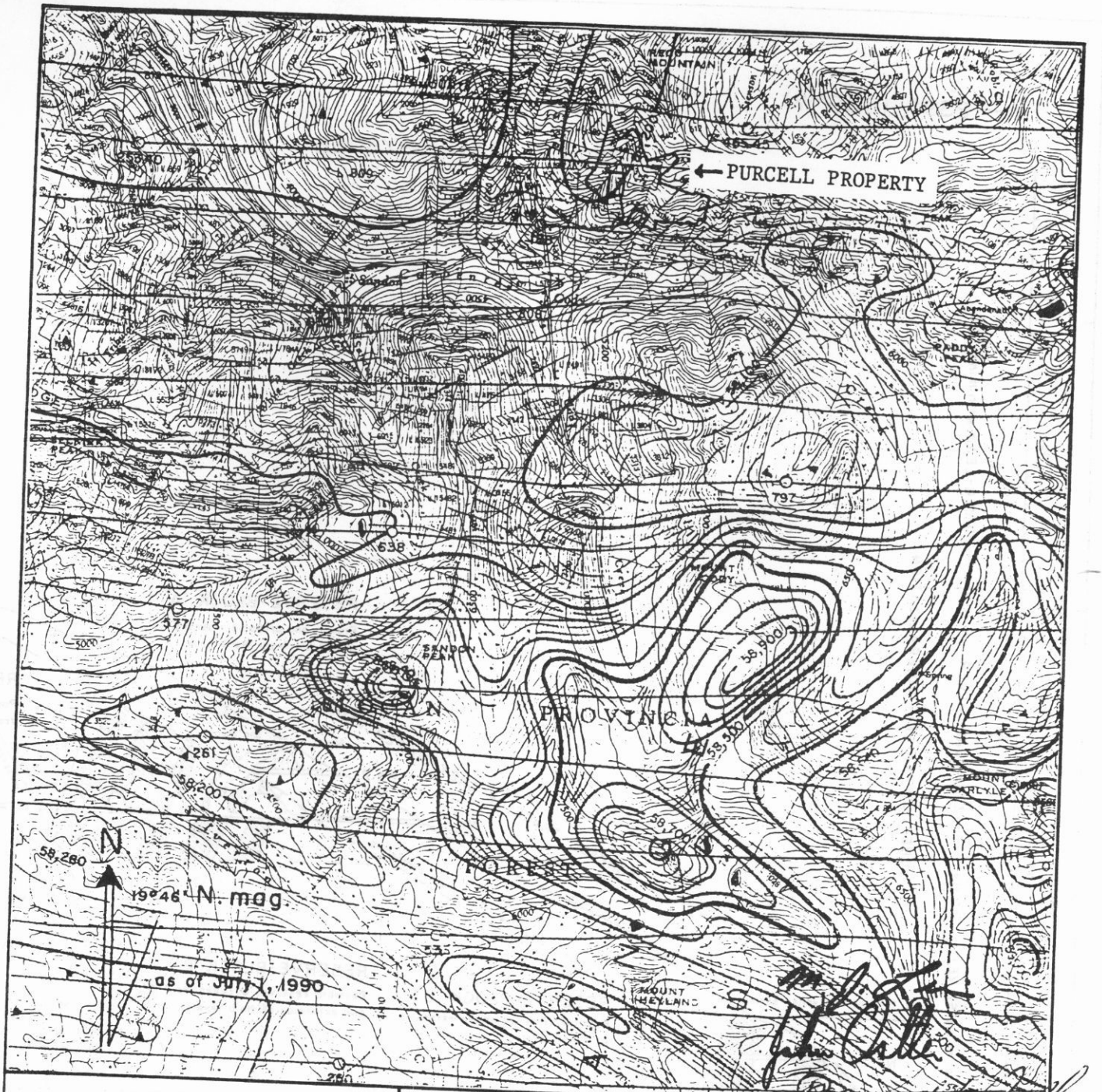


LEGEND

ISOMAGNETIC LINES (absolute total field)

500 gammas

100 gammas

20 gammas

10 gammas

Magnetic depression

Flight lines 15 657

Flight altitude 1000 feet above ground level

Ostler & Linn – Figure 8

CASSIAR EAST YUKON EXP. LTD.

AVRIL EXPLORATIONS INC.

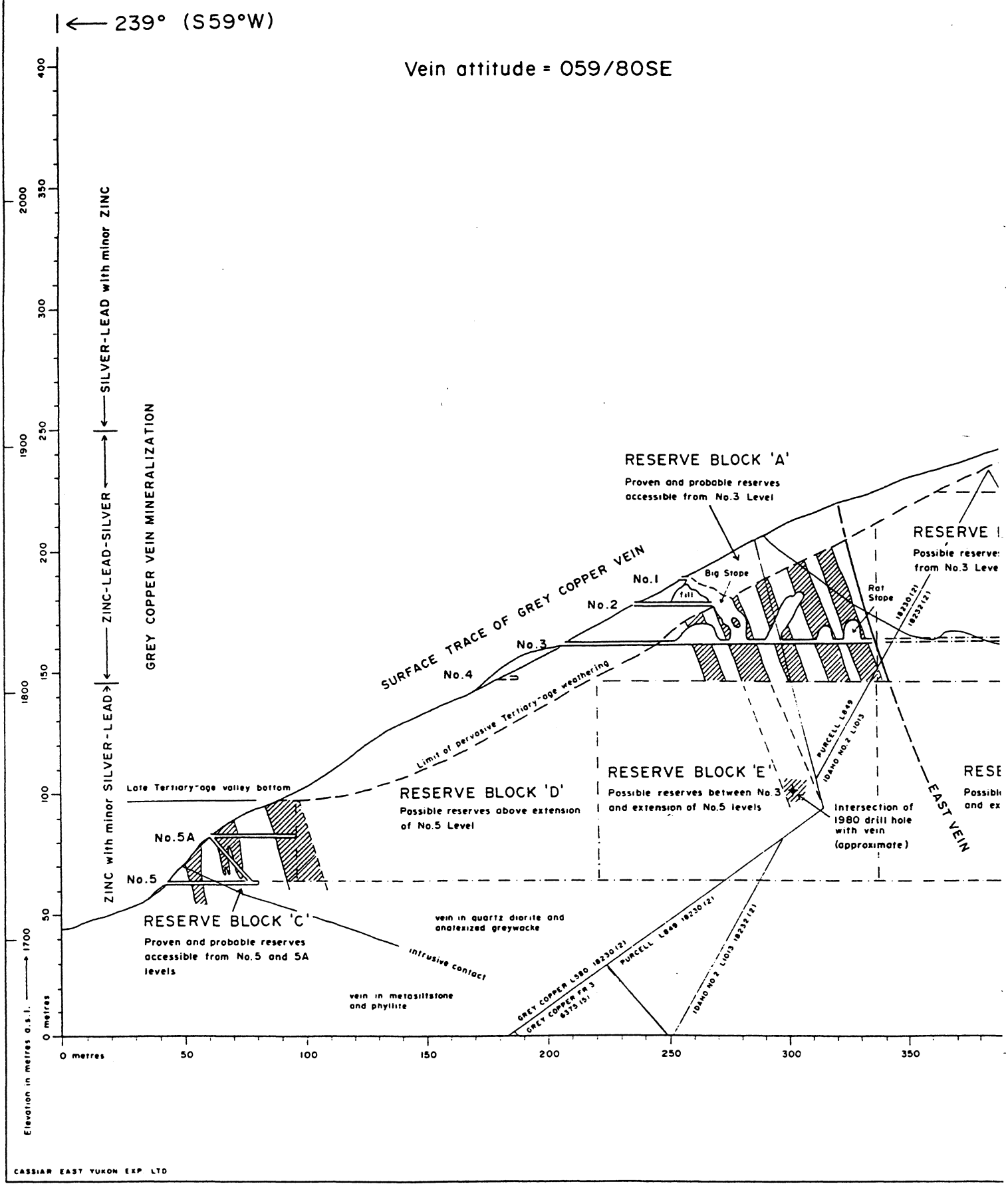
AEROMAGNETISM: E.M.R. MAP 8482G PURCELL PROPERTY 49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA, N.T.S. 82F/14

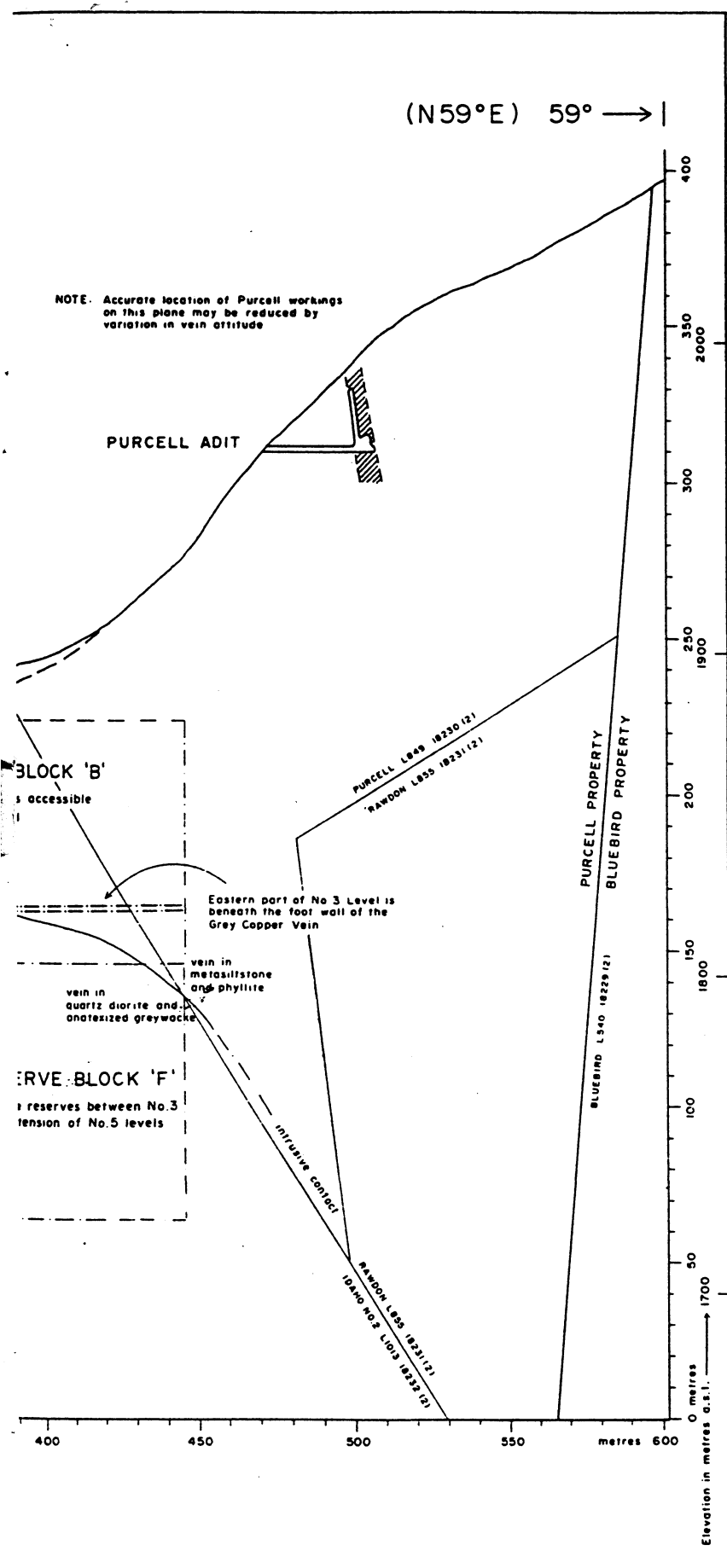
JOHN OSTLER; M.Sc., P.Geol.
MICHAEL LINN, B.Sc. DECEMBER, 1990

To accompany a Report by Donald W. Tully, P.Eng., dated December 31, 1990

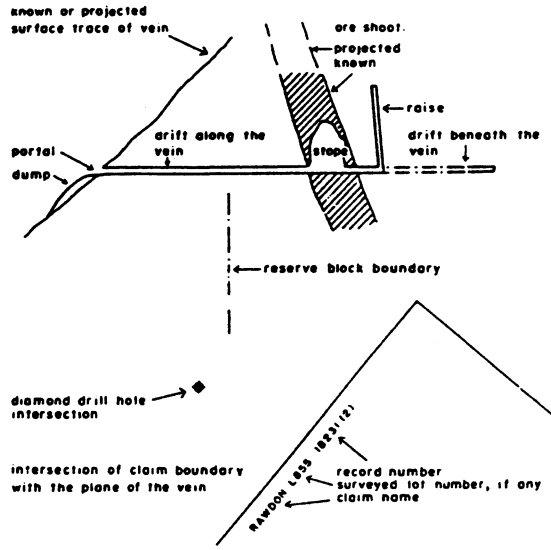
FIGURE 6.

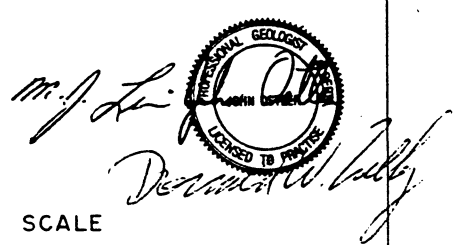


CASSIAR EAST YUKON EXP LTD



LEGEND





SCALE

0 10 20 30 40 50 60 70 80 90 100 metres
0 50 100 150 200 250 300 feet

N.

19°46' E. mag.

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

FIGURE 9.

Ostler & Linn - Figure 18

AVRIL EXPLORATIONS INC.

GREY COPPER & PURCELL VEINS: PROJECTION on the AVERAGE PLANE of the VEIN

PURCELL PROPERTY

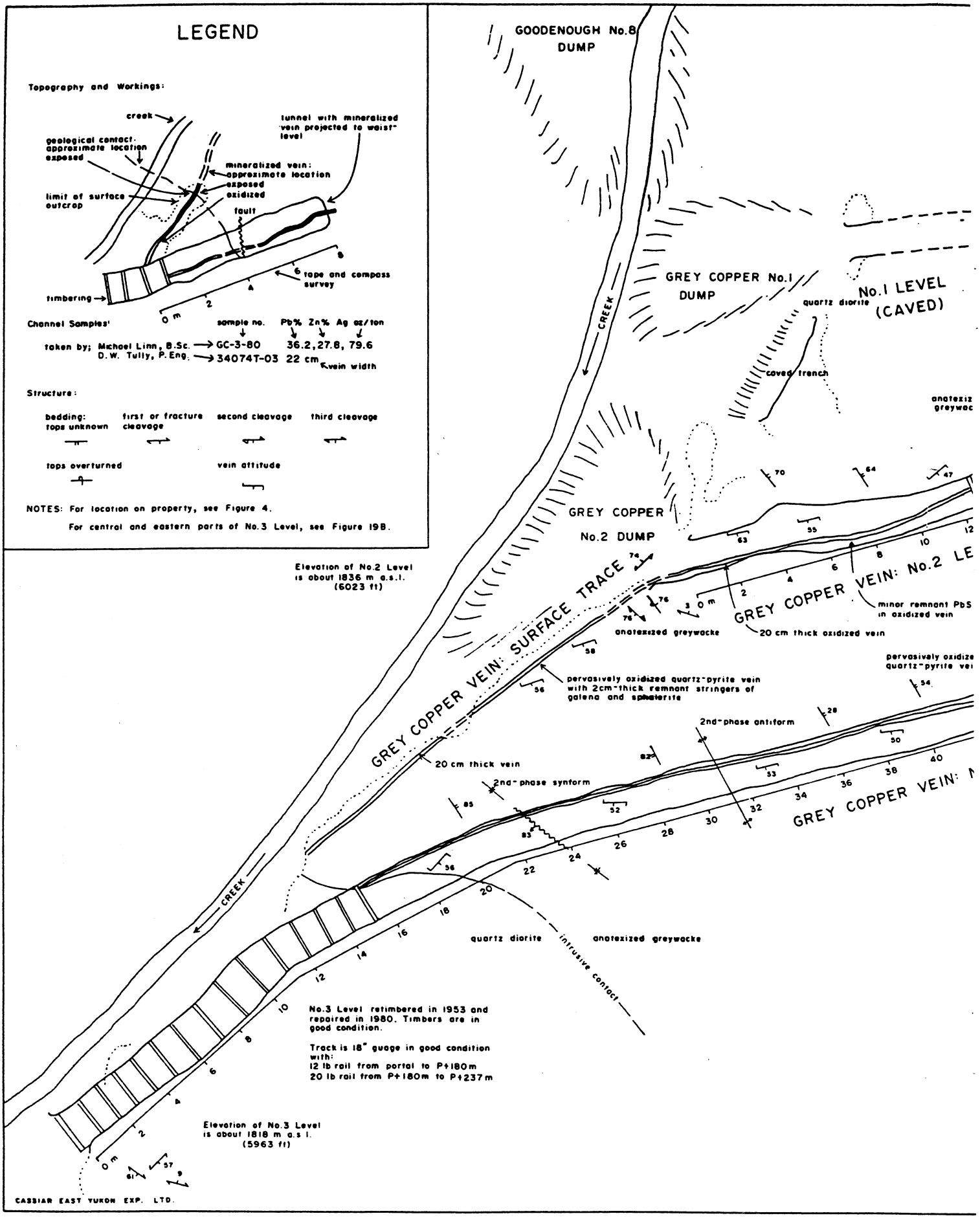
49°59.3'N., 117°11'W.

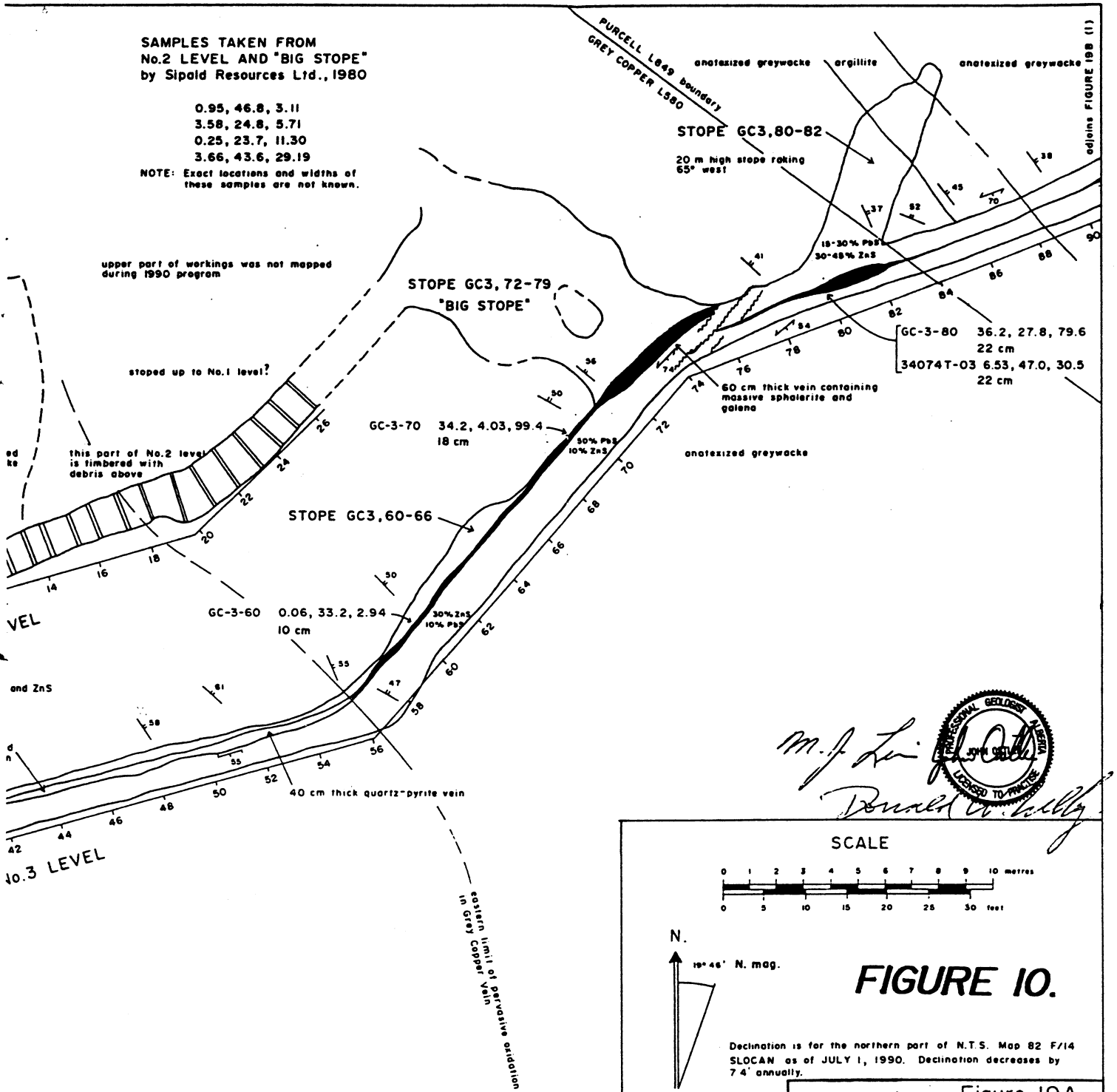
SLOCAN M.D., BRITISH COLUMBIA — N.T.S. 82F/14

JOHN OSTLER; M.Sc., P.Geol.

MICHAEL LINN, B.Sc. — DECEMBER, 1990

To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990


LEGEND
Topography and Workings:
creek
geological contact: approximate location exposed
limit of surface outcrop
mineralized vein: approximate location exposed oxidized
fault
tunnel with mineralized vein projected to waist level
timbering
tape and compass survey
0 m
2
4
6
8
Channel Samples:
sample no.
Pb% Zn% Ag oz/ton
taken by; Michael Linn, B.Sc. → GC-3-80 36.2, 27.8, 79.6
D.W. Tully, P.Eng. → 34074T-03 22 cm ← vein width
Structure:
bedding: tops unknown
first or fracture cleavage
second cleavage
third cleavage
tops overturned
vein attitude
NOTES: For location on property, see Figure 4.
For central and eastern parts of No.3 Level, see Figure 19B.
GOODENOUGH No.8 DUMP
GREY COPPER No.1 DUMP
No.1 LEVEL (CAVED)
quartz diorite
caved trench
CREEK
anotexiz greywac
GREY COPPER No.2 DUMP
Elevation of No.2 Level is about 1836 m a.s.l. (6023 ft)
GREY COPPER VEIN: SURFACE TRACE
GREY COPPER VEIN: No.2 LE
minor remnant PbS in oxidized vein
anotexized greywacke
20 cm thick oxidized vein
pervasively oxidized quartz-pyrite vein with 2cm-thick remnant stringers of galena and sphalerite
pervasively oxidize quartz-pyrite vei
20 cm thick vein
2nd-phase antiform
2nd-phase synform
GREY COPPER VEIN: N
quartz diorite
intrusive contact
anotexized greywacke
No.3 Level retimbered in 1953 and repaired in 1980. Timbers are in good condition.
Track is 18" guage in good condition with:
12 lb rail from portal to P+180m
20 lb rail from P+180m to P+237m
Elevation of No.3 Level is about 1818 m a.s.l. (5963 ft)
CASSIAR EAST YUKON EXP. LTD.



SCALE

0 1 2 3 4 5 6 7 8 9 10 metres

0 5 10 15 20 25 30 feet

N.

19° 46' N. mag.

FIGURE 10.

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

Ostler & Linn - Figure 19A

AVRIL EXPLORATIONS INC.

GREY COPPER VEIN: No.1, 2 and 3 LEVELS, WESTERN PART

PURCELL PROPERTY

49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA N.T.S. 82 F/14

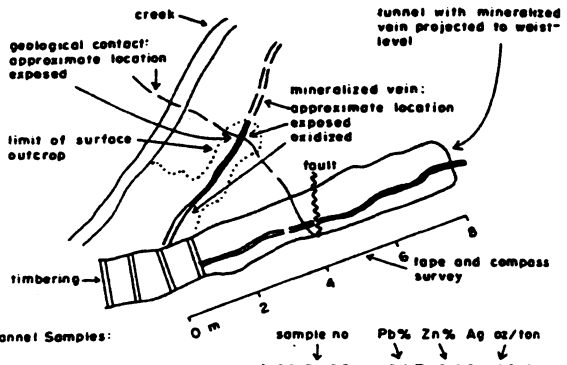
JOHN OSTLER; M.Sc., P.Geol. DECEMBER, 1990

MICHAEL LINN, B.Sc.

To accompany a Report by Donald W.Tully, P.Eng., dated December 31,1990

LEGEND

Topography and Workings:



Channel Samples:

	sample no	Pb%	Zn%	Ag oz/ton
taken by; Michael Linn, B.Sc.	GC-3-158	64.7,	6.28,	146.0
D.W. Tully, P.Eng.	34072T-01	5 cm	← vein width	

Structure:

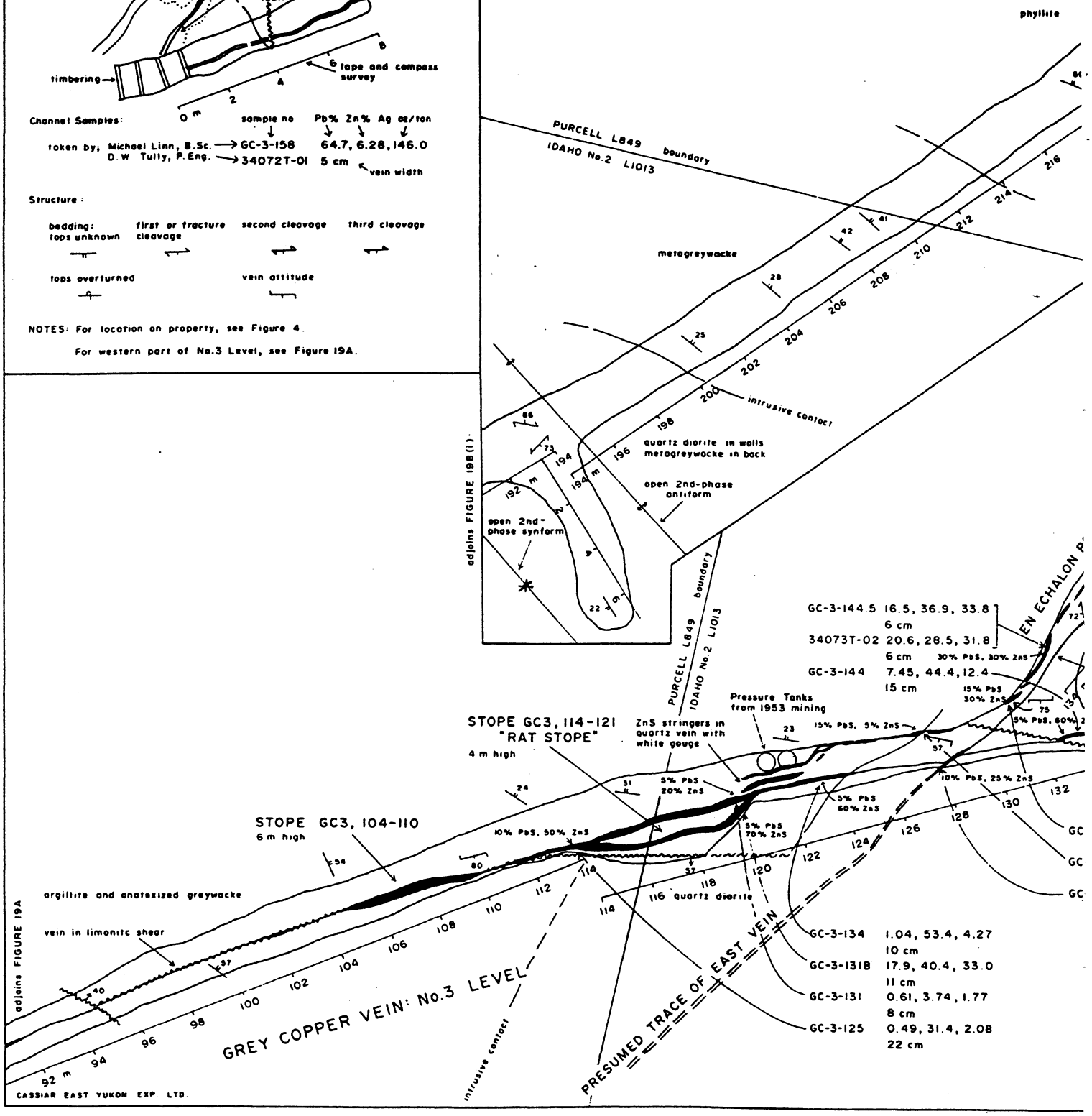
bedding: tops unknown | first or fracture cleavage | second cleavage | third cleavage

tops overturned | vein attitude

NOTES: For location on property, see Figure 4.

For western part of No.3 Level, see Figure 19A.

Figure 19B (ii) No.3 LEVEL: EASTERN PART



CASSIAR EAST YUKON EXP. LTD.

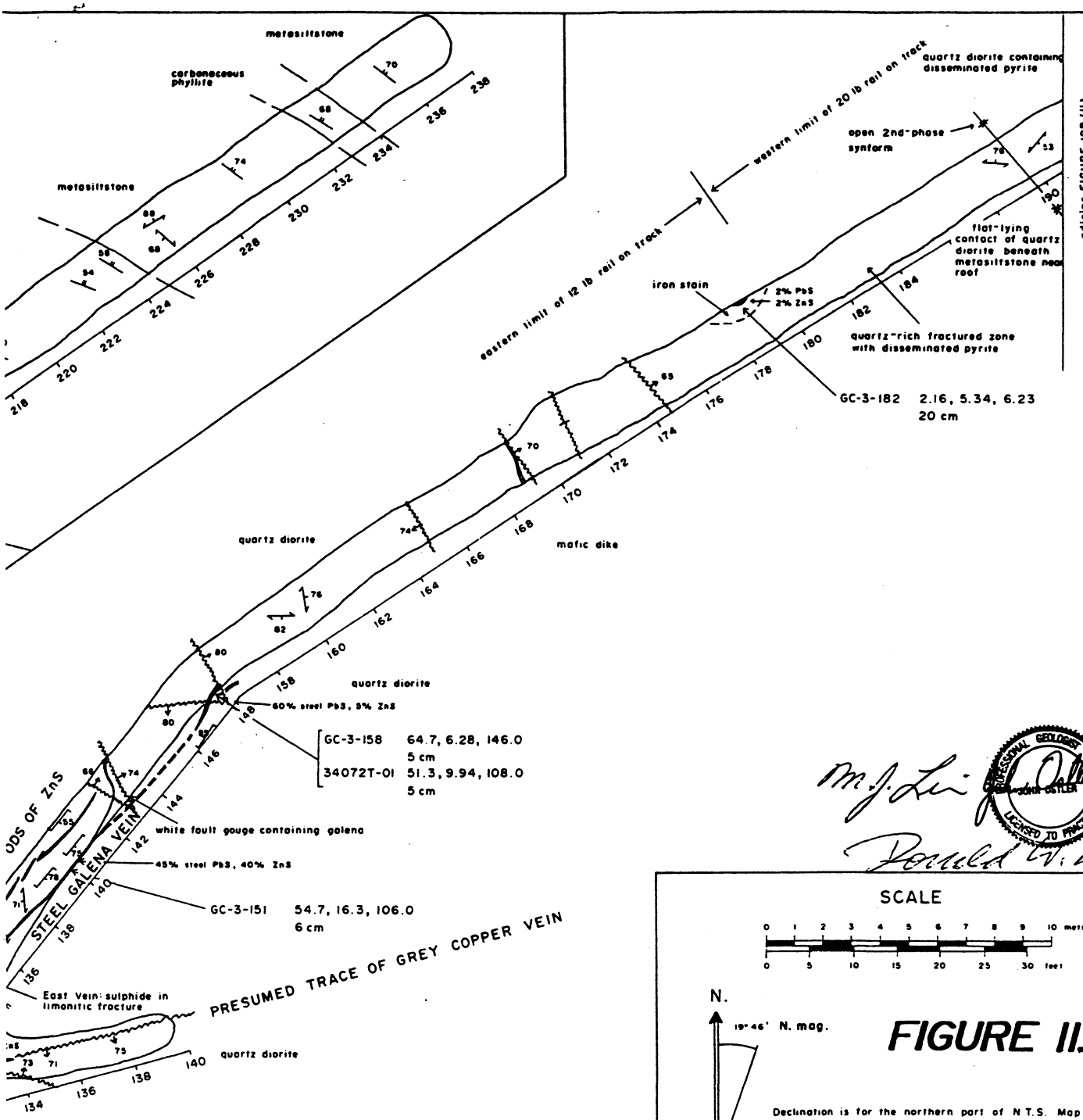


Figure 19B (i) No.3 LEVEL: CENTRAL PART

SCALE

0 1 2 3 4 5 6 7 8 9 10 metres

0 5 10 15 20 25 30 feet

N.

19°46' N. mag.

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

FIGURE II.

Ostler & Linn - Figure 19B

AVRIL EXPLORATIONS INC.

GREY COPPER VEIN: No.3 LEVEL: CENTRAL and EASTERN PARTS

PURCELL PROPERTY

49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA N.T.S. 82 F/14

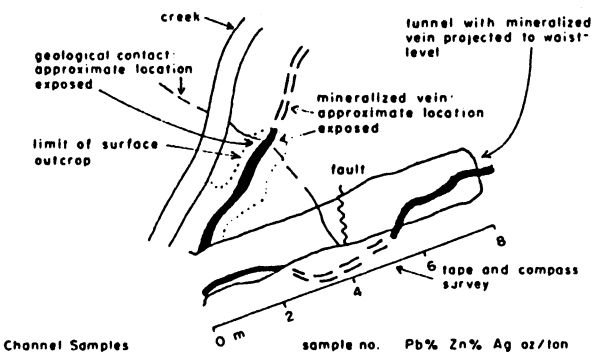
JOHN OSTLER; M.Sc., P.Geol. DECEMBER, 1990

MICHAEL LINN, B.Sc.

To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990

LEGEND

Topography and Workings:



Channel Samples — sample no. — Pb% — Zn% — Ag oz/ton

taken by; Michael Linn, B.Sc. → GC-5A-02.0 63.4, 7.25, 88.6

D.W. Tully, P.Eng. → 34081T-09 20 cm ← vein width

Structure:

bedding, tops unknown | first or fracture cleavage | second cleavage | third cleavage

vein attitude

NOTE: For location on property, see Figure 4.

Elevation of creek is about 1750 m a.s.l. (5740 ft)

GC-5A-37.0 0.05, 38.8, 7.90 36 cm

GC-5A-36.0 0.07, 41.3, 23.1 17 cm

GC-5A-34.0 0.05, 14.6, 1.26 40 cm

34079T-07 0.28, 48.9, 12.1 50 cm

GC-5A-33.6 0.08, 49.6, 8.88 50 cm

GC-5A-32.0 0.04, 53.3, 1.66 22 cm

GC-5A-30.0 0.07, 49.0, 4.59 13 cm

GC-5A-25.0 0.06, 41.1, 5.55 17 cm

GC-5A-24.0 0.09, 42.0, 4.90 19 cm

GC-5A-22.0 0.09, 18.7, 1.27 10 cm

GC-5A-20.0 0.05, 3.83, 0.27 20 cm

GC-5A-18.0 0.20, 40.7, 3.69 8 cm

GC-5A-16.0 0.03, 42.8, 2.01 12 cm

34080T-08 0.04, 41.7, 1.94 12 cm

GC-5A-14.0 0.53, 8.42, 0.74 12 cm

GC-5A-12.0 0.10, 30.7, 1.75 25 cm

GC-5A-10.0 4.75, 25.5, 7.16 26 cm

GC-5A-08.0 1.82, 25.3, 7.27 24 cm

GC-5A-06.0 0.05, 34.5, 1.40 32 cm

GC-5A-04.0 1.38, 18.2, 4.66 15 cm

argillite xenolith

quartz diorite

argillite

quartz diorite

CREEK

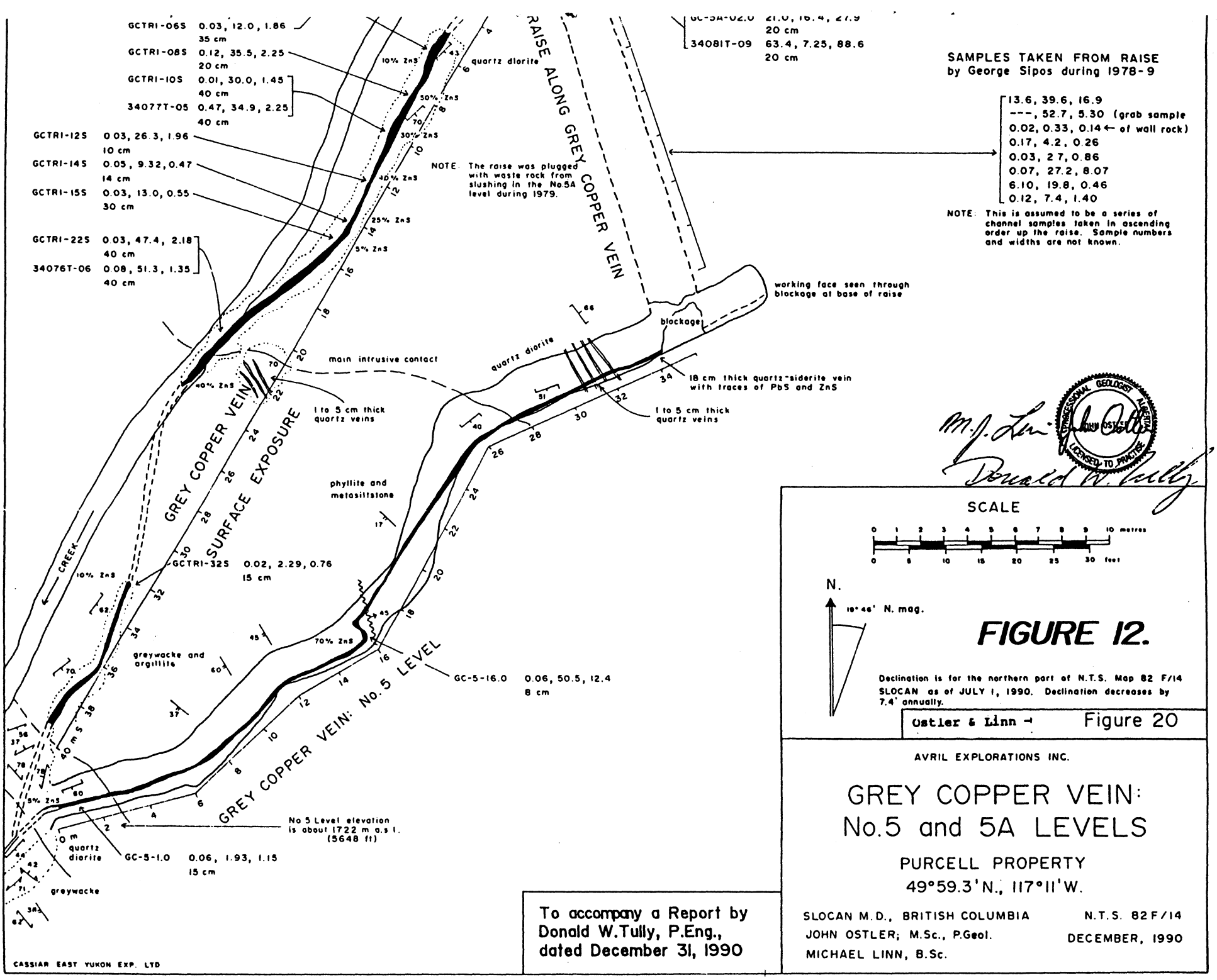
No. 5A LEVEL

GREY COPPER VEIN

No 5A Level elevation is about 1740 m a.s.l. (5707 ft)

GCL-5-PY 0.01, 0.56, 0.09, <0.002 Au (grab sample of pure pyrite)

GCL-5-ZN <0.01, 54.7, 1.45 (grab sample of pure sphalerite)



SAMPLES TAKEN FROM RAISE
by George Sipos during 1978-9

13.6, 39.6, 16.9
---, 52.7, 5.30 (grab sample
0.02, 0.33, 0.14 ← of wall rock)
0.17, 4.2, 0.26
0.03, 27, 0.86
0.07, 27.2, 8.07
6.10, 19.8, 0.46
0.12, 7.4, 1.40

NOTE: This is assumed to be a series of channel samples taken in ascending order up the raise. Sample numbers and widths are not known.

PROFESSIONAL GEOLOGIST ALBERTA JOHN OSTLER LICENSED TO PRACTICE

SCALE

0 1 2 3 4 5 6 7 8 9 10 metres
0 5 10 15 20 25 30 feet

N.
19° 46' N. mag.

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

FIGURE 12.

Ostler & Linn — Figure 20

AVRIL EXPLORATIONS INC.

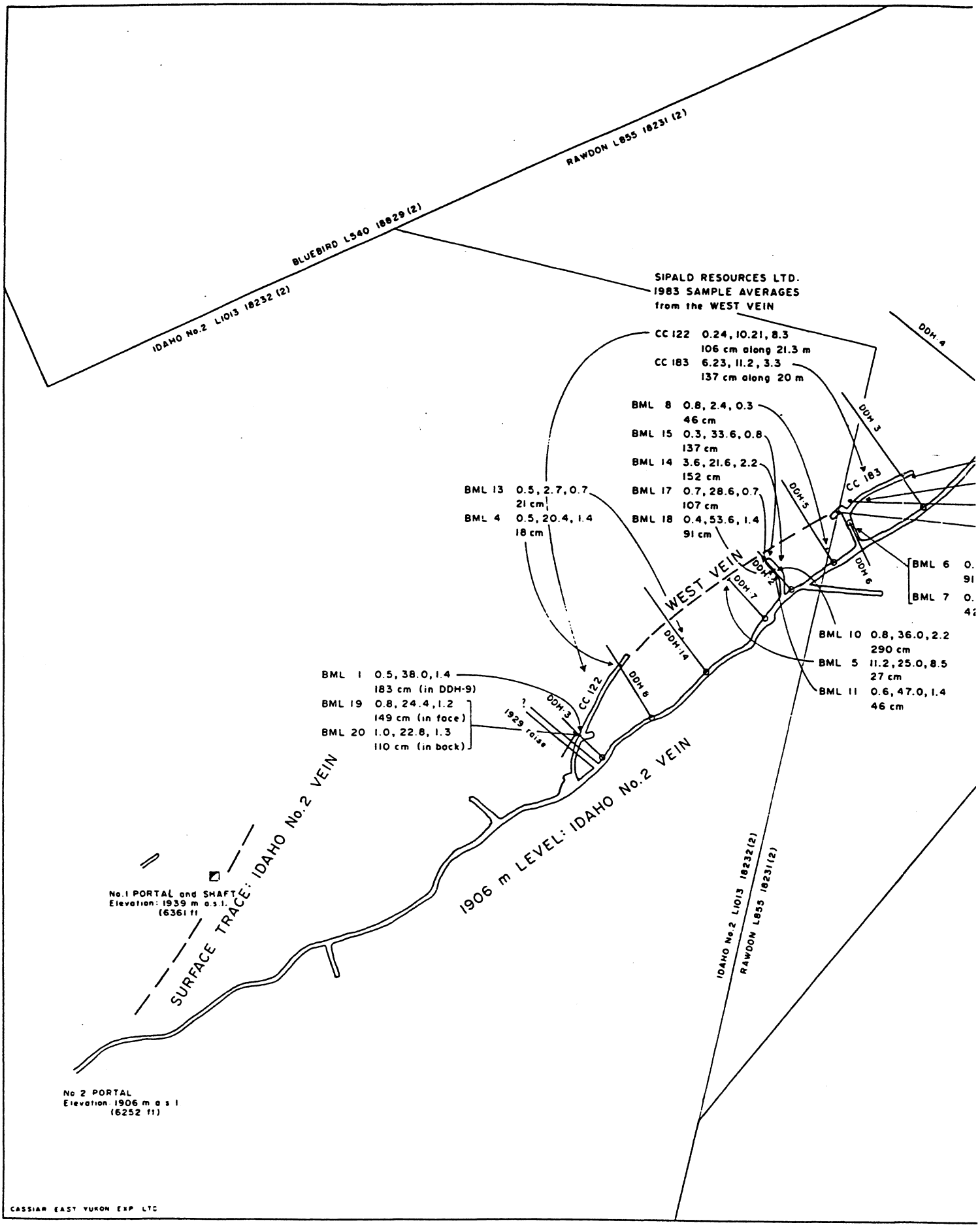
GREY COPPER VEIN: No.5 and 5A LEVELS

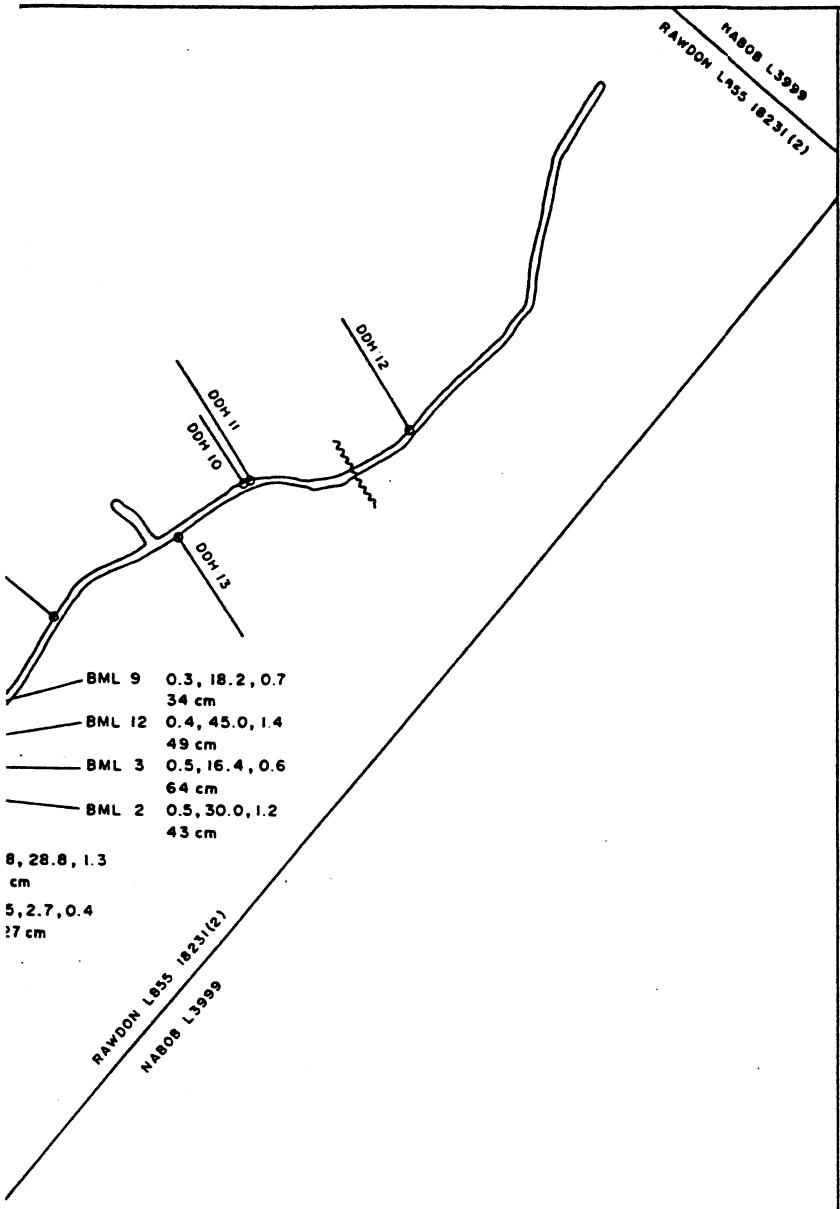
PURCELL PROPERTY
49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA
JOHN OSTLER; M.Sc., P.Geol.
MICHAEL LINN, B.Sc.

N.T.S. 82 F/14
DECEMBER, 1990

To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990


RAWDON L855 18231 (2)
BLUEBIRD L540 18829 (2)
IDAHO No.2 L1013 18232 (2)
SIPALD RESOURCES LTD.
1983 SAMPLE AVERAGES
from the WEST VEIN
CC 122 0.24, 10.21, 8.3
106 cm along 21.3 m
CC 183 6.23, 11.2, 3.3
137 cm along 20 m
BML 8 0.8, 2.4, 0.3
46 cm
BML 15 0.3, 33.6, 0.8
137 cm
BML 14 3.6, 21.6, 2.2
152 cm
BML 17 0.7, 28.6, 0.7
107 cm
BML 18 0.4, 53.6, 1.4
91 cm
BML 13 0.5, 2.7, 0.7
21 cm
BML 4 0.5, 20.4, 1.4
18 cm
BML 6 0.
91
BML 7 0.
4
BML 10 0.8, 36.0, 2.2
290 cm
BML 5 11.2, 25.0, 8.5
27 cm
BML 11 0.6, 47.0, 1.4
46 cm
BML 1 0.5, 38.0, 1.4
183 cm (in DDH-9)
BML 19 0.8, 24.4, 1.2
149 cm (in face)
BML 20 1.0, 22.8, 1.3
110 cm (in back)
DDH 4
DDH 3
DDH 5
DDH 6
DDH 2
DDH 7
DDH 14
CC 183
CC 122
WEST VEIN
1929 raise
SURFACE TRACE: IDAHO No.2 VEIN
1906 m LEVEL: IDAHO No.2 VEIN
No.1 PORTAL and SHAFT
Elevation: 1939 m a.s.l.
(6361 ft)
No 2 PORTAL
Elevation 1906 m a s l
(6252 ft)
IDAHO No.2 L1013 18232(2)
RAWDON L855 18231(2)
CASSIAR EAST YUKON EXP LTD



LEGEND

Workings: drift, cross-cut or raise; shaft; 1951 drill hole

Channel Samples: sample no. → BML 10; Pb%, Zn%, Ag oz/ton → 0.8, 36.0, 2.2; 290 cm ← width

taken by Bluebird Mines Ltd. during 1951

average of channel samples taken by L. Sookochoff, P.Eng. as reported to Sipold Resources Ltd. during 1983

CC 122 ← cross-cut 122 m from portal

Claims:

Purcell Property boundary

claim boundary

record number, if any
surveyed lot number
claim name

RAWDON L855 18231(2)

M.J. Linn

PROFESSIONAL GEOLOGIST ALBERTA JOHN OSTLER LICENSED TO PRACTICE

Donald W. Tully

SCALE

0 5 10 15 20 25 30 35 40 45 50 metres

0 .25 50 75 100 125 150 feet

N.

19° 46' N. mag.

FIGURE 13.

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

Ostler & Linn - Figure 22

AVRIL EXPLORATIONS INC.

IDAHO No.2 VEIN SYSTEM: WORKINGS

PURCELL PROPERTY

49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA

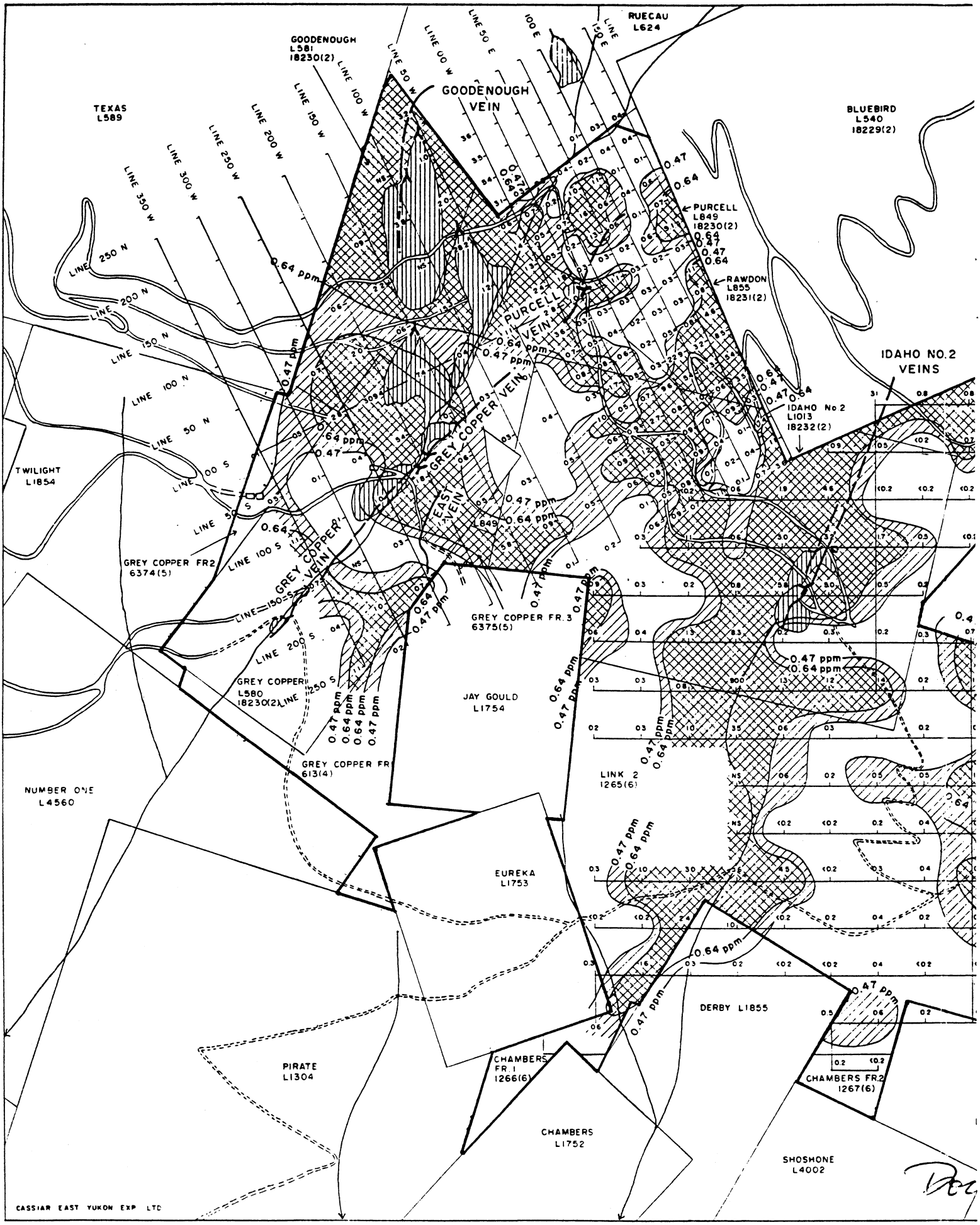
JOHN OSTLER; M.Sc., P.Geol.

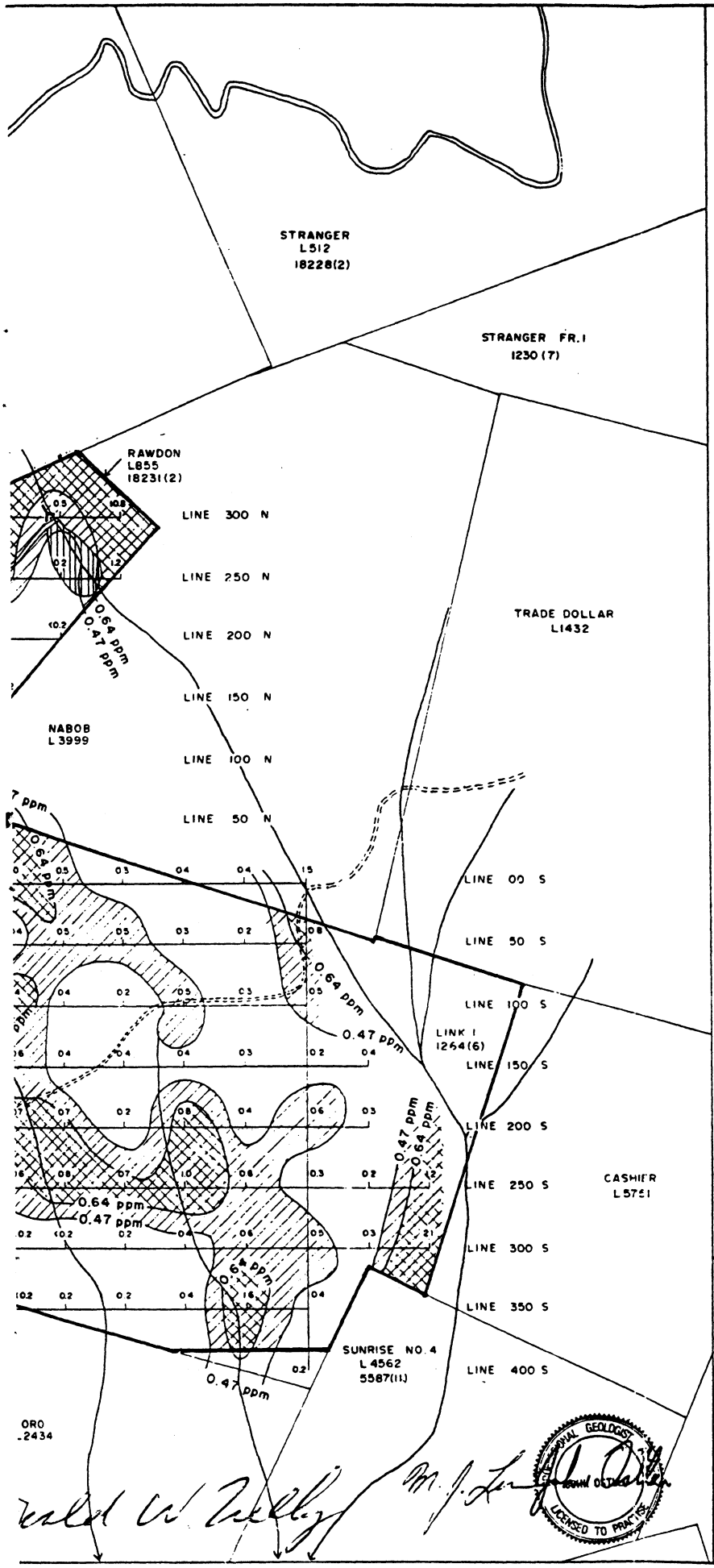
MICHAEL LINN, B.Sc.

N.T.S. 82 F/14

DECEMBER, 1990

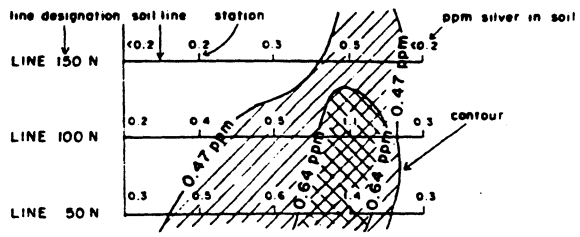
To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990


GOODENOUGH L581 18230(2)
RUECAU L624
GOODENOUGH VEIN
TEXAS L589
BLUEBIRD L540 18229(2)
PURCELL L849 18230(2)
RAWDON L855 18231(2)
PURCELL VEIN
IDAHO NO.2 VEINS
IDAHO No 2 L1013 18232(2)
GREY COPPER VEIN
EAST VEIN
GREY COPPER FR2 6374(5)
GREY COPPER FR.3 6375(5)
GREY COPPER L580 18230(2)
GREY COPPER FR 613(4)
TWILIGHT L1854
JAY GOULD L1754
LINK 2 1265(6)
NUMBER ONE L4560
EUREKA L1753
PIRATE L1304
CHAMBERS FR.1 1266(6)
CHAMBERS FR.2 1267(6)
CHAMBERS L1752
DERBY L1855
SHOSHONE L4002
LINE 350 W
LINE 300 W
LINE 250 W
LINE 200 W
LINE 150 W
LINE 100 W
LINE 50 W
LINE 00 W
LINE 50 E
100 E
LINE 150 E
LINE 250 N
LINE 200 N
LINE 150 N
LINE 100 N
LINE 50 N
LINE 00 S
LINE 50 S
LINE 100 S
LINE 150 S
LINE 200 S
LINE 250 S
0.64 ppm
0.47 ppm
CASSIAR EAST YUKON EXP LTD

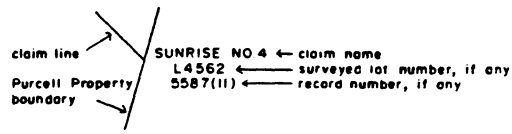


LEGEND

1987 and 1990 Soil Grids:



Claims:

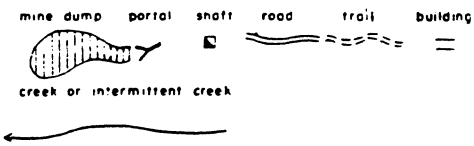


Areas of High Soil-silver Content

0.47 ppm silver contour (sub-anomalous) excludes 84% of data on the lognormal distribution curve for normal soils

0.64 ppm silver contour (anomalous) excludes 97.5% of data on the lognormal distribution curve for normal soils

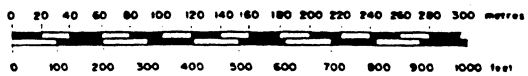
Topography



Surface Trace of Mineralized Vein:

defined — approximate — — — assumed — · — · —

SCALE



NOTE For soil-data distribution curve, see Figure 13

FIGURE 14.

To accompany a Report by Donald W. Tully, P.Eng., dated December 31, 1990

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

Ostler & Linn - Figure 17

AVRIL EXPLORATIONS INC.

SILVER in SOILS: 1987 and 1990 SURVEYS

PURCELL PROPERTY

49°59.3'N., 117°11'W.

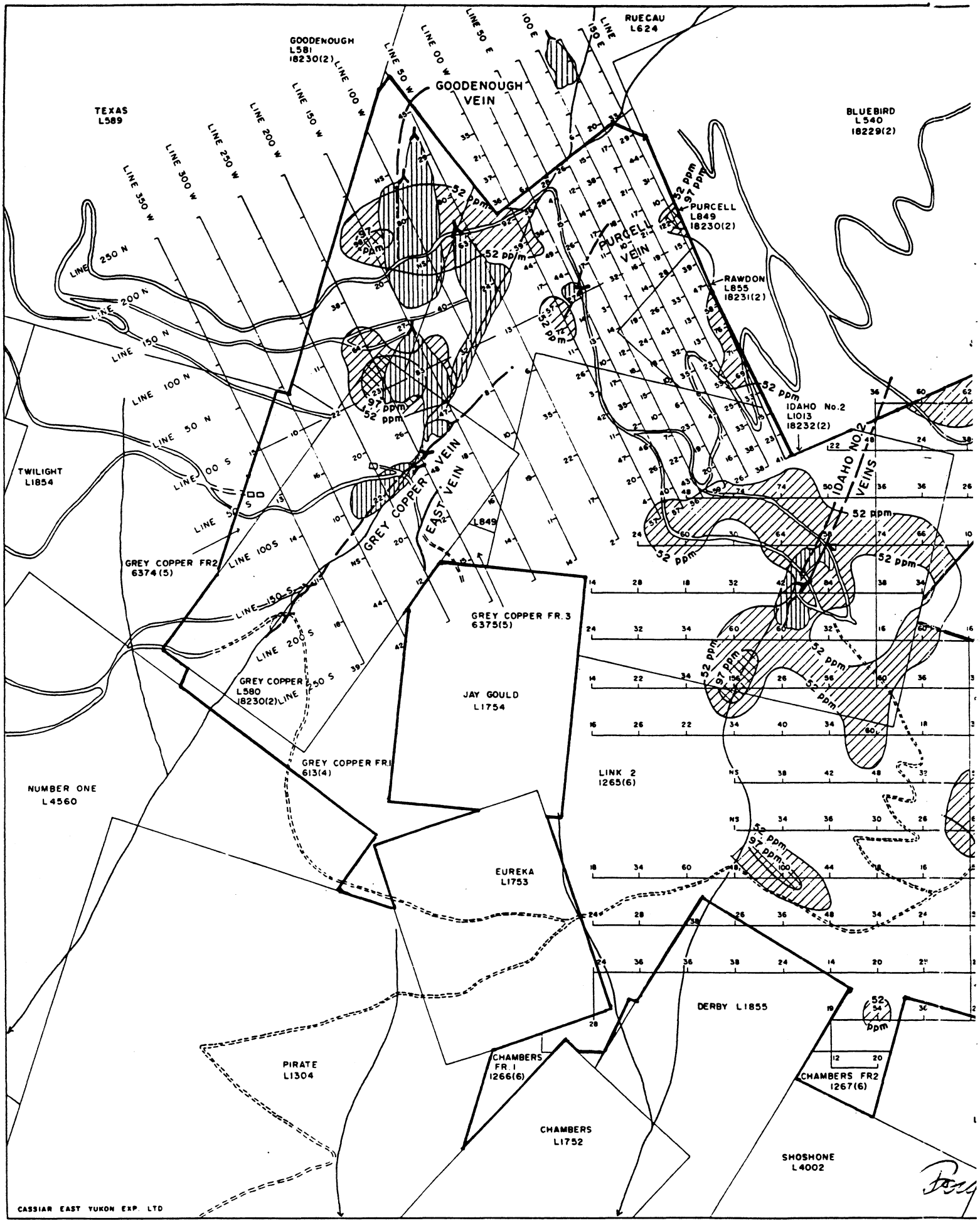
SLOCAN M.D., BRITISH COLUMBIA

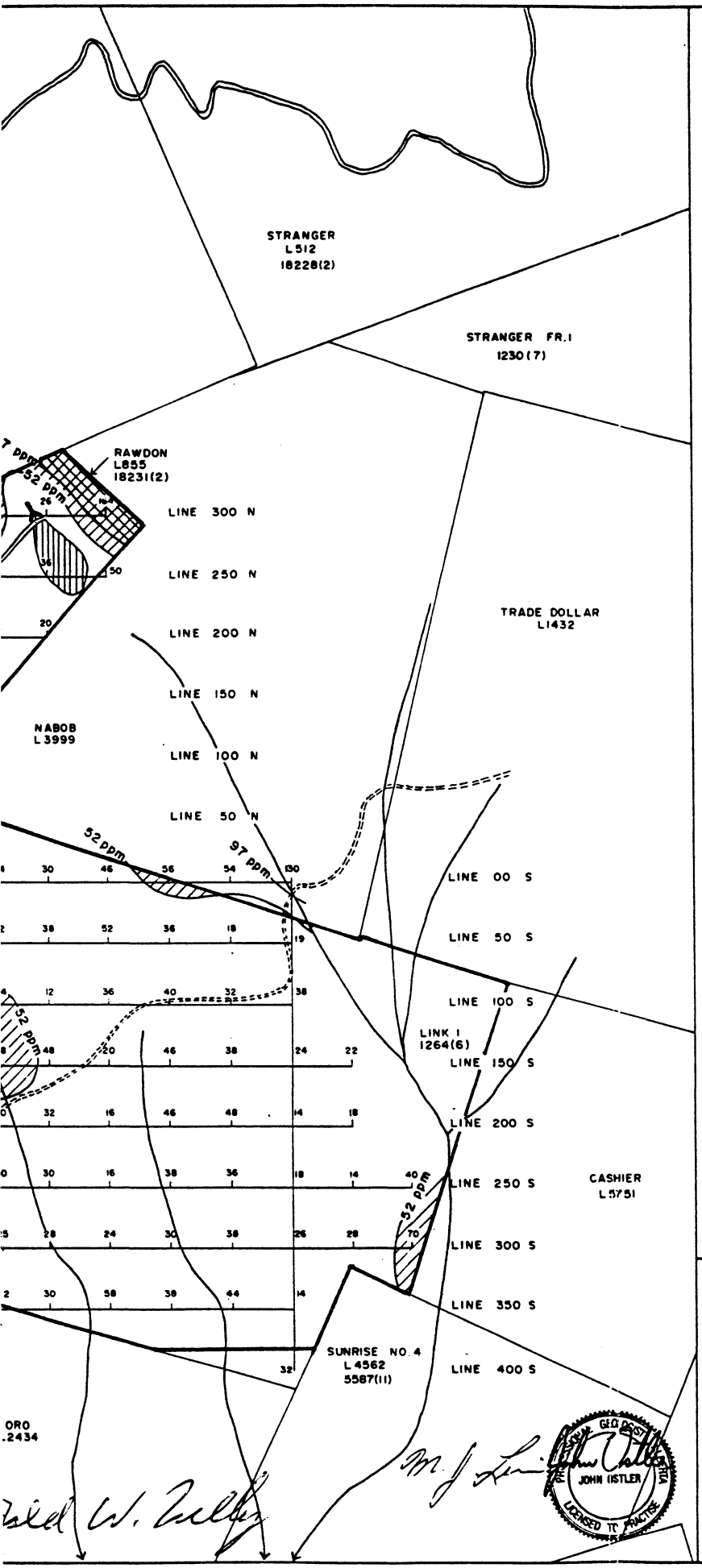
JOHN OSTLER; M.Sc., P.Geol.

MICHAEL LINN, B.Sc.

N.T.S. 82 F/14

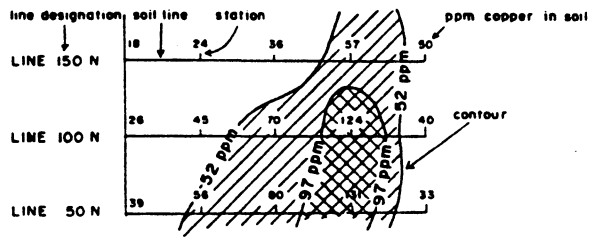
DECEMBER, 1990


GOODENOUGH L581 18230(2)
LINE 100 W
LINE 50 W
LINE 00 W
LINE 50 E
100 E
LINE 150 E
RUECAU L624
GOODENOUGH VEIN
TEXAS L589
LINE 350 W
LINE 300 W
LINE 250 W
LINE 200 W
LINE 150 W
BLUEBIRD L540 18229(2)
LINE 250 N
LINE 200 N
LINE 150 N
LINE 100 N
LINE 50 N
LINE 00 S
LINE 50 S
PURCELL L849 18230(2)
PURCELL VEIN
RAWDON L855 18231(2)
IDAHO No.2 L1013 18232(2)
IDAHO No.2 VEINS
TWILIGHT L1854
GREY COPPER VEIN
"EAST" VEIN
L849
GREY COPPER FR2 6374(5)
LINE 100S
LINE 150 S
LINE 200 S
LINE 250 S
GREY COPPER FR.3 6375(5)
GREY COPPER L580 18230(2)
JAY GOULD L1754
GREY COPPER FR.1 613(4)
NUMBER ONE L4560
LINK 2 1265(6)
EUREKA L1753
DERBY L1855
PIRATE L1304
CHAMBERS FR. 1 1266(6)
CHAMBERS FR2 1267(6)
CHAMBERS L1752
SHOSHONE L4002
52 ppm
97 ppm
CASSIAR EAST YUKON EXP. LTD

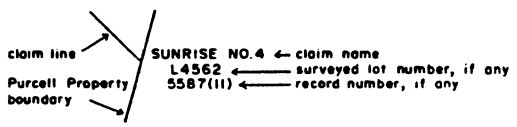


LEGEND

1987 and 1990 Soil Grids:



Claims:

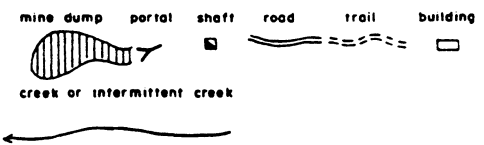


Areas of High Soil-Copper Content

52 ppm copper contour (sub-anomalous) excludes 84 % of data

97 ppm copper contour (anomalous) excludes 97.5 % of data

Topography:



Surface Trace of Mineralized Vein:

defined — approximate - - - assumed

SCALE

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 metres

0 100 200 300 400 500 600 700 800 900 1000 feet

NOTE: For soil-data distribution curve, see Figure 10.

FIGURE 15.

To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990

N.

19° 46' N. mag

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

Ostler & Linn - Figure 14

AVRIL EXPLORATIONS INC.

COPPER in SOILS: 1987 and 1990 SURVEYS

PURCELL PROPERTY

49°59.3'N., 117°11'W.

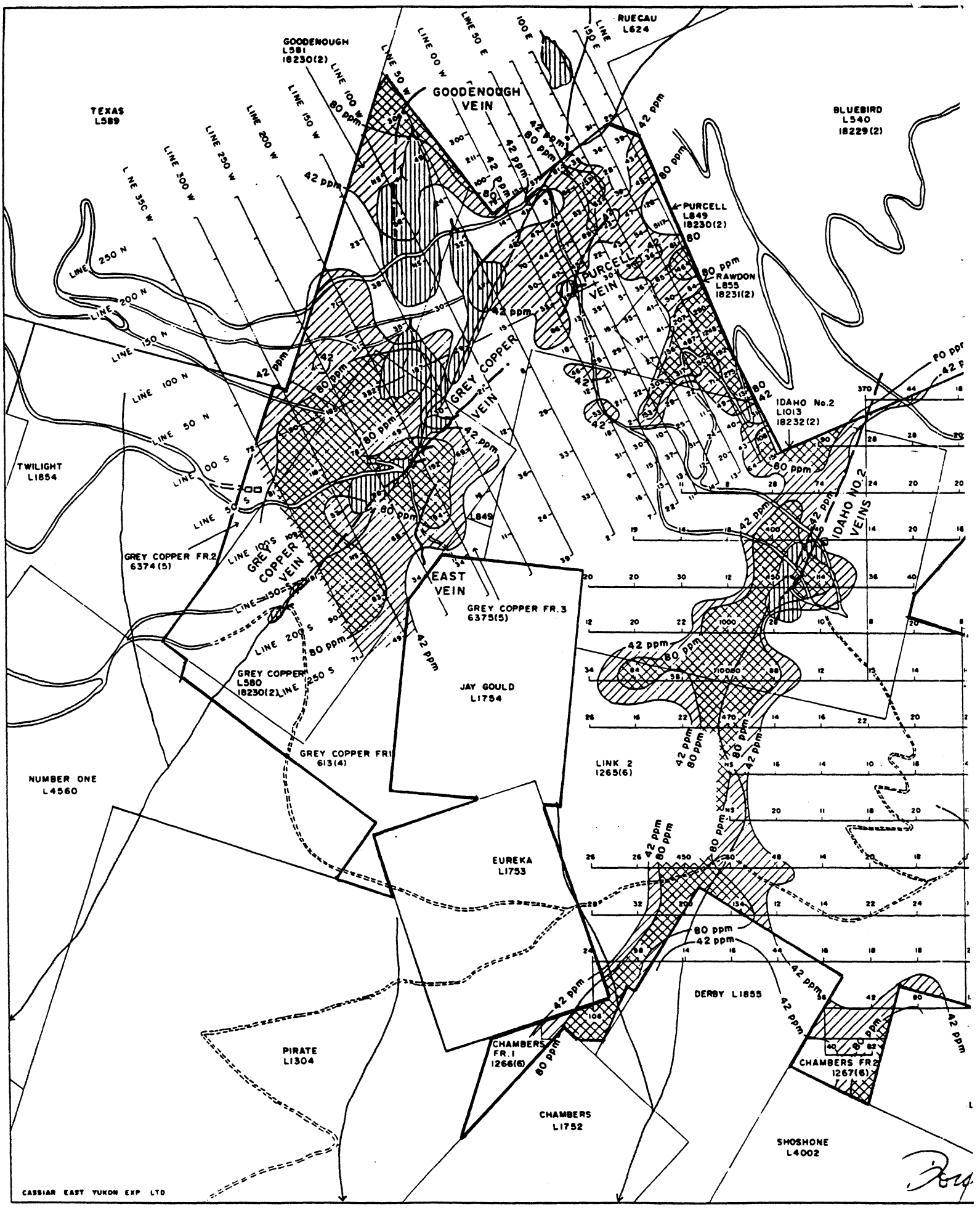
SLOCAN M.D., BRITISH COLUMBIA

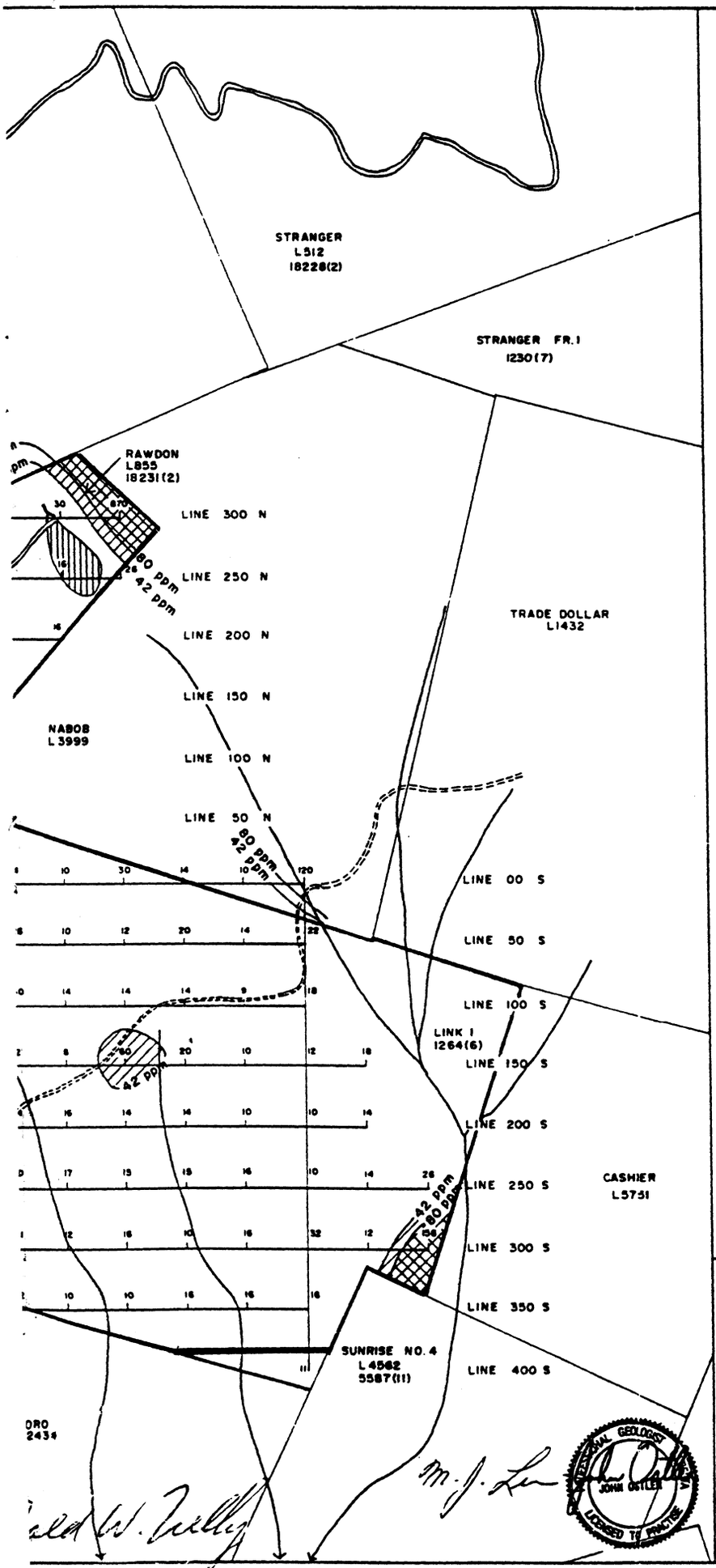
JOHN OSTLER; M.Sc., P.Geol.

MICHAEL LINN, B.Sc.

N.T.S. 82 F/14

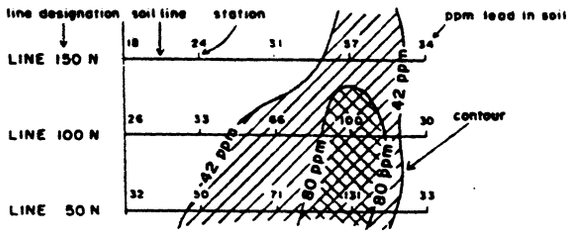
DECEMBER, 1990


GOODENOUGH L581 18230(2)
RUECAU L624
TEXAS L589
BLUEBIRD L540 18229(2)
GOODENOUGH VEIN
PURCELL L849 18230(2)
PURCELL VEIN
RAWDON L855 18231(2)
IDAHO No.2 L1013 18232(2)
IDAHO NO.2 VEINS
GREY COPPER VEIN
GREY COPPER FR.2 6374(5)
GREY COPPER FR.3 6375(5)
EAST VEIN
TWILIGHT L1854
GREY COPPER L580 18230(2)
JAY GOULD L1754
GREY COPPER FR1 613(4)
LINK 2 1265(6)
NUMBER ONE L4560
EUREKA L1753
PIRATE L1304
CHAMBERS FR.1 1266(6)
CHAMBERS FR.2 1267(6)
DERBY L1855
CHAMBERS L1752
SHOSHONE L4002
LINE 50 W
LINE 00 W
LINE 50 E
100 E
LINE 150 E
LINE 100 W
LINE 150 W
LINE 200 W
LINE 250 W
LINE 300 W
LINE 350 W
LINE 250 N
LINE 200 N
LINE 150 N
LINE 100 N
LINE 50 N
LINE 00 S
LINE 50 S
LINE 100 S
LINE 150 S
LINE 200 S
LINE 250 S
80 ppm
42 ppm
CASSIAR EAST YUKON EXP LTD

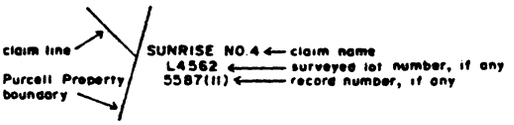


LEGEND

1987 and 1990 Soil Grids:



Claims:

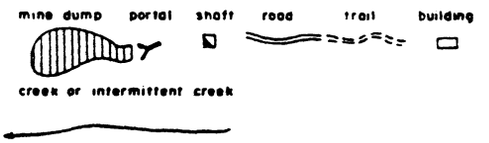


Areas of High Soil-lead Content

42 ppm lead contour (sub-anomalous) excludes 84% of data on the lognormal distribution curve for normal soils.

80 ppm lead contour (anomalous) excludes 97.5% of data on the lognormal distribution curve for normal soils

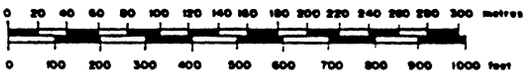
Topography:



Surface Trace of Mineralized Vein:

defined — approximate - - - assumed · · ·

SCALE



NOTE: For soil-data distribution curve, see Figure 11.

FIGURE 16.

To accompany a Report by Donald W. Tully, P.Eng., dated December 31, 1990

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 7.4' annually.

Ostler & Linn - Figure 15

AVRIL EXPLORATIONS INC.

LEAD in SOILS: 1987 and 1990 SURVEYS

PURCELL PROPERTY

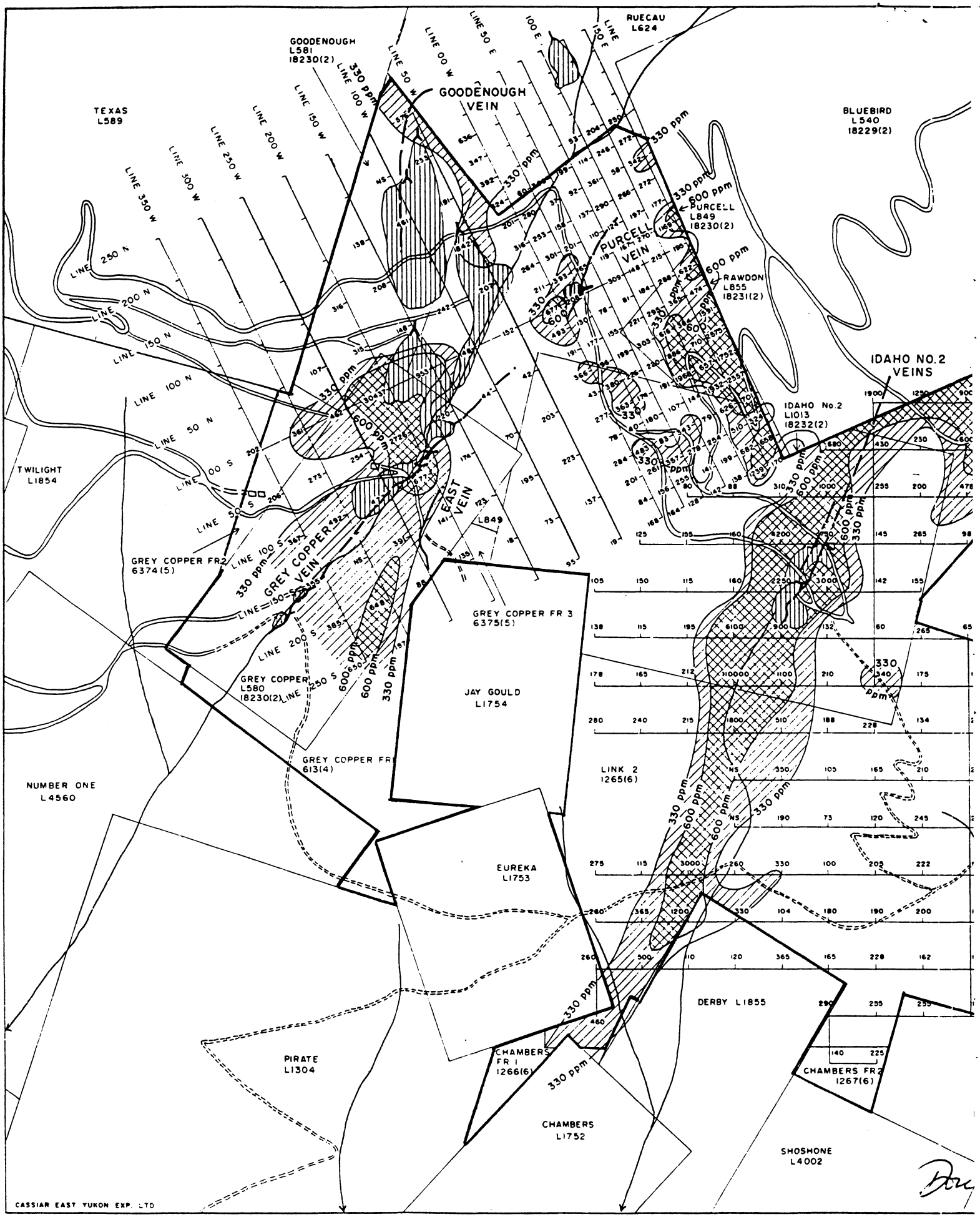
49°59.3'N., 117°11'W.

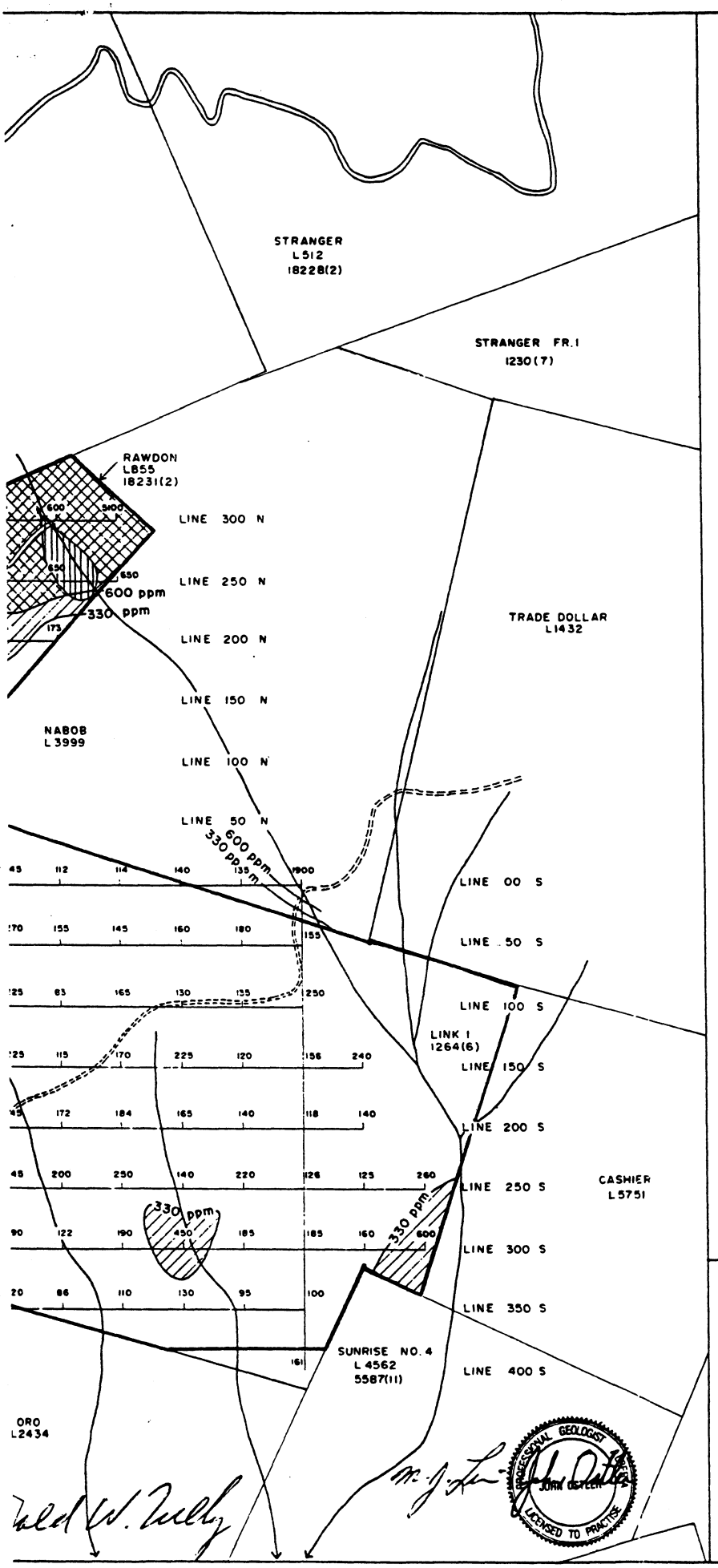
SLOCAN M.D., BRITISH COLUMBIA — N.T.S. 82 F/14

JOHN OSTLER; M.Sc., P.Geol.

MICHAEL LINN, B.Sc.

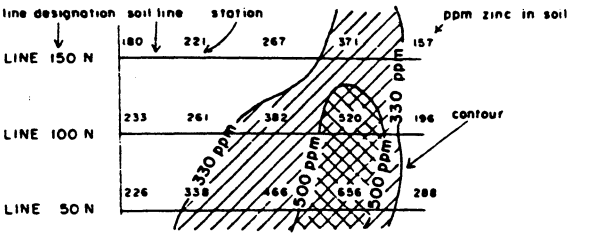
DECEMBER, 1990


GOODENOUGH L581 18230(2)
RUECAU L624
TEXAS L589
BLUEBIRD L540 18229(2)
GOODENOUGH VEIN
PURCELL L849 18230(2)
PURCELL VEIN
RAWDON L855 18231(2)
IDAHO NO.2 VEINS
IDAHO No.2 L1013 18232(2)
TWILIGHT L1854
EAST VEIN
GREY COPPER VEIN
GREY COPPER FR2 6374(5)
GREY COPPER FR 3 6375(5)
GREY COPPER L580 18230(2)
GREY COPPER FR 613(4)
JAY GOULD L1754
LINK 2 1265(6)
NUMBER ONE L4560
EUREKA L1753
PIRATE L1304
CHAMBERS FR 1 1266(6)
CHAMBERS FR2 1267(6)
CHAMBERS L1752
DERBY L1855
SHOSHONE L4002
330 ppm
600 ppm
CASSIAR EAST YUKON EXP. LTD

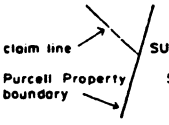


LEGEND

1987 and 1990 Soil Grids:



Claims:



Areas of High Soil-zinc Content

330 ppm zinc contour (sub-anomalous) excludes 84% of data on the lognormal distribution curve for normal soils

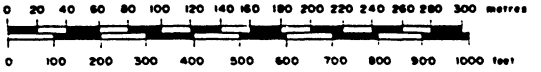
500 ppm zinc contour (anomalous) excludes 97.5% of data on the lognormal distribution curve for normal soils

Topography:

Surface Trace of Mineralized Vein:

defined — approximate - - - assumed ·-·-·

SCALE



NOTE: For soil-data distribution curve, see Figure 12.

FIGURE 17.

To accompany a Report by Donald W.Tully, P.Eng., dated December 31, 1990

Declination is for the northern part of N.T.S. Map 82 F/14 SLOCAN as of JULY 1, 1990. Declination decreases by 74' annually.

Ostler & Linn - Figure 16

AVRIL EXPLORATIONS INC.

ZINC in SOILS: 1987 and 1990 SURVEYS

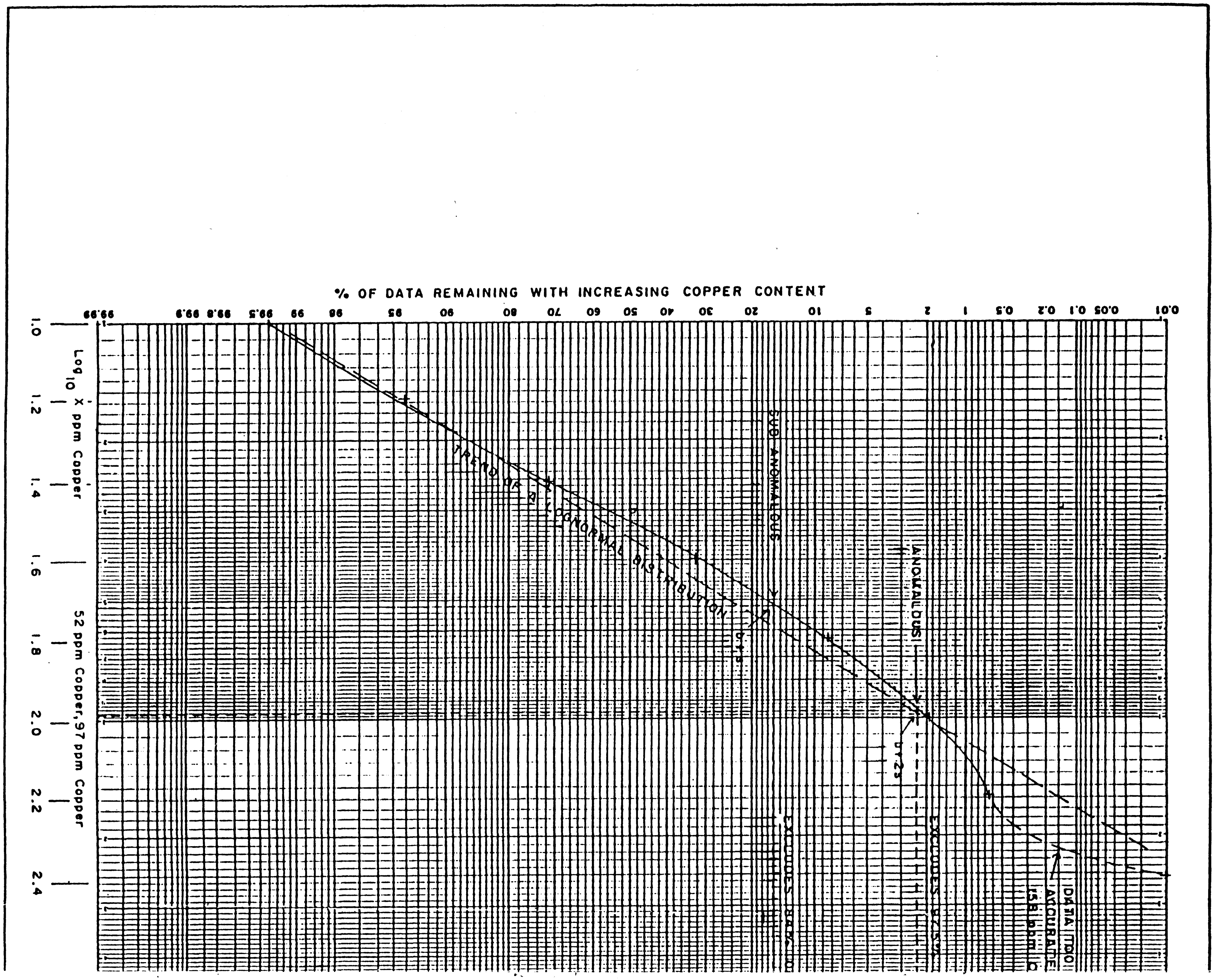
PURCELL PROPERTY

49°59.3'N., 117°11'W.

SLOCAN M.D., BRITISH COLUMBIA N.T.S. 82 F/14

JOHN OSTLER; M.Sc., P.Geol. DECEMBER, 1990

MICHAEL LINN, B.Sc.



% OF DATA REMAINING WITH INCREASING COPPER CONTENT
99.99
99.9
99.8
99.5
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
0.05
0.01
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
Log10 X ppm Copper
52 ppm Copper, 97 ppm Copper
TREND OF A LOGNORMAL DISTRIBUTION
SUB ANOMALOUS
ANOMALOUS
EXCLUDES