

ASSESSMENT REPORT

PUP PROPERTY

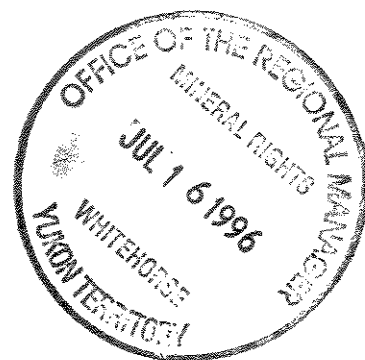
NTS 116 B/4 Y.T.

LAT. 64°02'N; LONG.139°40'W

(PUP 1-44; YB54126-YB54169)

GEOLOGICAL AND GEOCHEMICAL SURVEY

August 16-22, 1995



JUNE 8, 1996

K . R. PRIDE

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# ASSESSMENT REPORT ON THE PUP PROPERTY

## 1. SUMMARY

During the period of August 16-22, 1995, contour soil and silt sampling, preliminary geological mapping and rock sampling was carried out on the Pup Property. Contour soil and silt sampling (101 samples) was designed to follow-up Cu/Zn/Pb silt anomalies detected by a 1978 RGS survey and a 1979 Cominco survey. Preliminary geological mapping by Cominco indicates that the claims are underlain by the Nasina Assemblage, consisting of Devon.-Mississippian black meta-pelites, quartzites and thin felsic meta-tuffs and the Klondike Schist Assemblage, consisting of Permian(?) felsic meta-tuffs, rhyolite, mafic meta-tuffs, meta-gabbro and intercalated meta-pelites and quartzites.

Contour soil sampling detected four areas anomalous in Cu/Zn/Pb/Ag underlain by quartz-sericite-schist and rhyolite. Geological mapping and prospecting sourced one of the anomalies to a 2 cm thick layer of massive chalcopyrite which appears to be parallel to layering in felsic-meta-tuffs.

The results of whole rock geochemistry on samples of quartz-sericite schist and siliceous cherty units confirmed that a significant component of the Klondike Schist comprises calcalkaline felsic volcanics, including quartz-eye rhyolite, massive flow-banded rhyolite, crystal and ash tuffs.

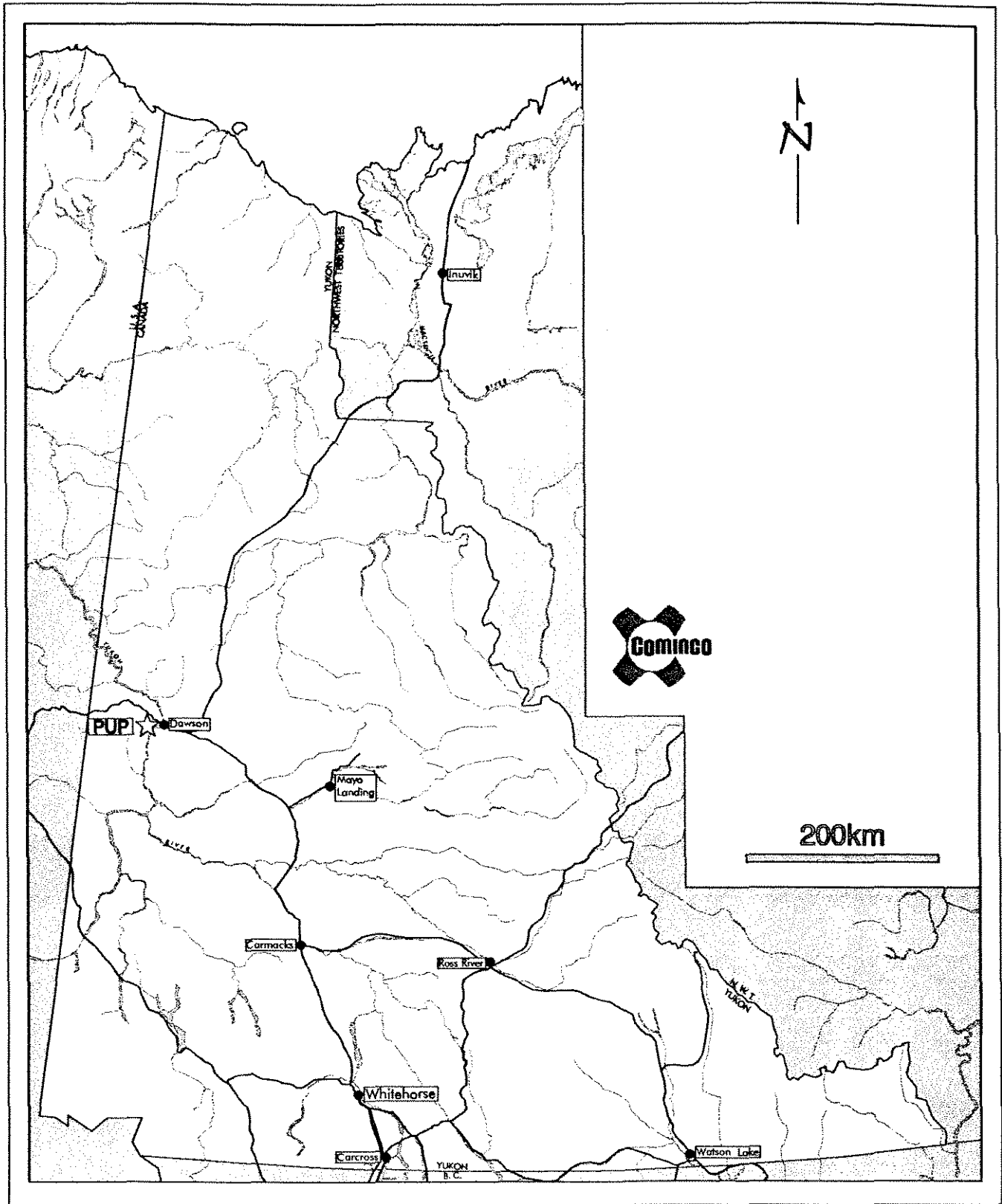
Lead isotope analysis of one lead-bearing soil sample indicates a Mississippian age for the mineralized source which is similar to the age of the VMS deposits at KZK and Wolverine.

## 2. LOCATION

The Pup Property (NTS:116B/4) is located 15 km southwest of Dawson and straddles Swede Creek. Access is by truck and helicopter from Dawson City. The property is heavily vegetated with moss-mat, buck-brush and black spruce which limits rock exposures to less than 1%.

## 3. TENURE

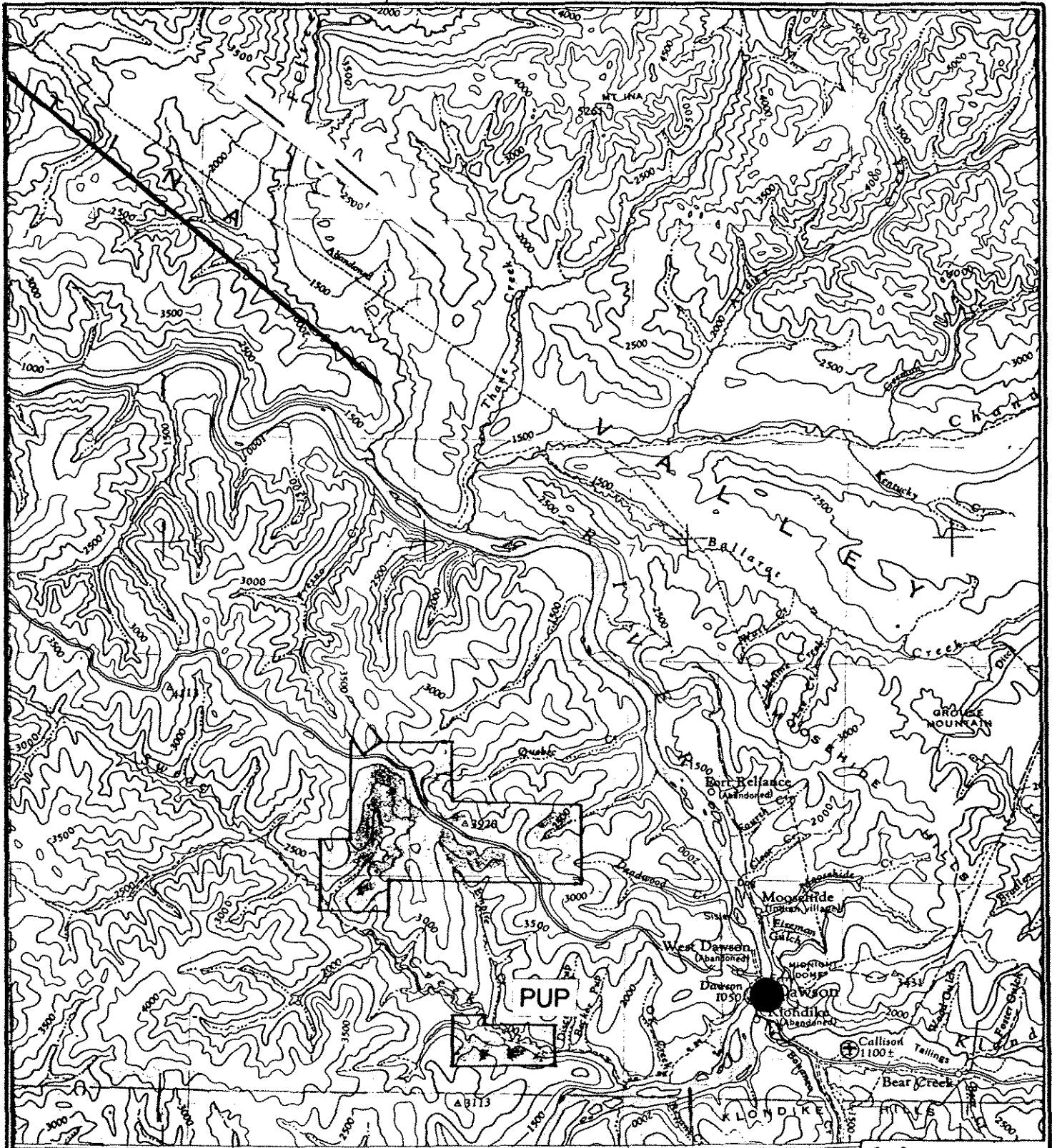
The Pup Property is 100% owned by Cominco Ltd. and comprises 44 mineral claims. The Pup 1-44 claims, having record numbers YB54126-YB54169, were recorded on July 25, 1995.




Drawn by:		Traced by: a. m. a.	
Revised by:	Date:	Revised by:	Date:

# PUP PROPERTY Location Map

Scale: As Shown      Date: Dec. 13, 1995      FIGURE 1



140°00'                      45'                      30'

 116 B/4

Drawn by:		Traced by:	
Revised by	Date	Revised by	Date

# PUP PROPERTY LOCATION MAP

Scale: 1:250,000      Date: DEC. 13, 1995      FIGURE 2

#### **4. REGIONAL GEOLOGY**

The recent discovery of polymetallic massive sulphide deposits in the Yukon Tanana Terrane (YTT) including the Kudze Kayah and Wolverine deposits, has focused exploration in Yukon on syngenetic, stratiform mineralization in Devonian-Mississippian meta-sedimentary and meta-igneous rocks. YTT is divisible into 3 structural assemblages: 1) a lower pre-Devonian quartzo-felspathic and marble continental margin sequence known as the Nisling Assemblage; 2) a middle Late Devonian to middle Mississippian carbonaceous quartzite, quartz mica schist, marble, mafic and felsic meta-igneous continental arc sequence termed the Nasina/Nisutlin Assemblage; and 3) an upper mid-Permian anorogenic bimodal igneous package included in the Klondike schist. These rocks are polydeformed and polymetamorphosed.

Three Mesozoic and two Tertiary magmatic arcs overprint and obscure the older assemblages. Much of the terrane escaped Pleistocene glaciation and is characterized by less than 1% outcrop by area. Surface weathering commonly extends to depths of greater than 75 m. Weathering as in many cases removed all obvious signs of mineralization and resulted in the dispersion of soluble metals in the near surface.

#### **5. THE 1995 PROGRAM**

Geochemical sampling and preliminary geological mapping was carried out between August 16-22, 1995. The collection of 101 soil and silt samples was designed to follow-up anomalous drainage basins highlighted by a 1978 RGS stream sediment survey and a 1979 Cominco survey.

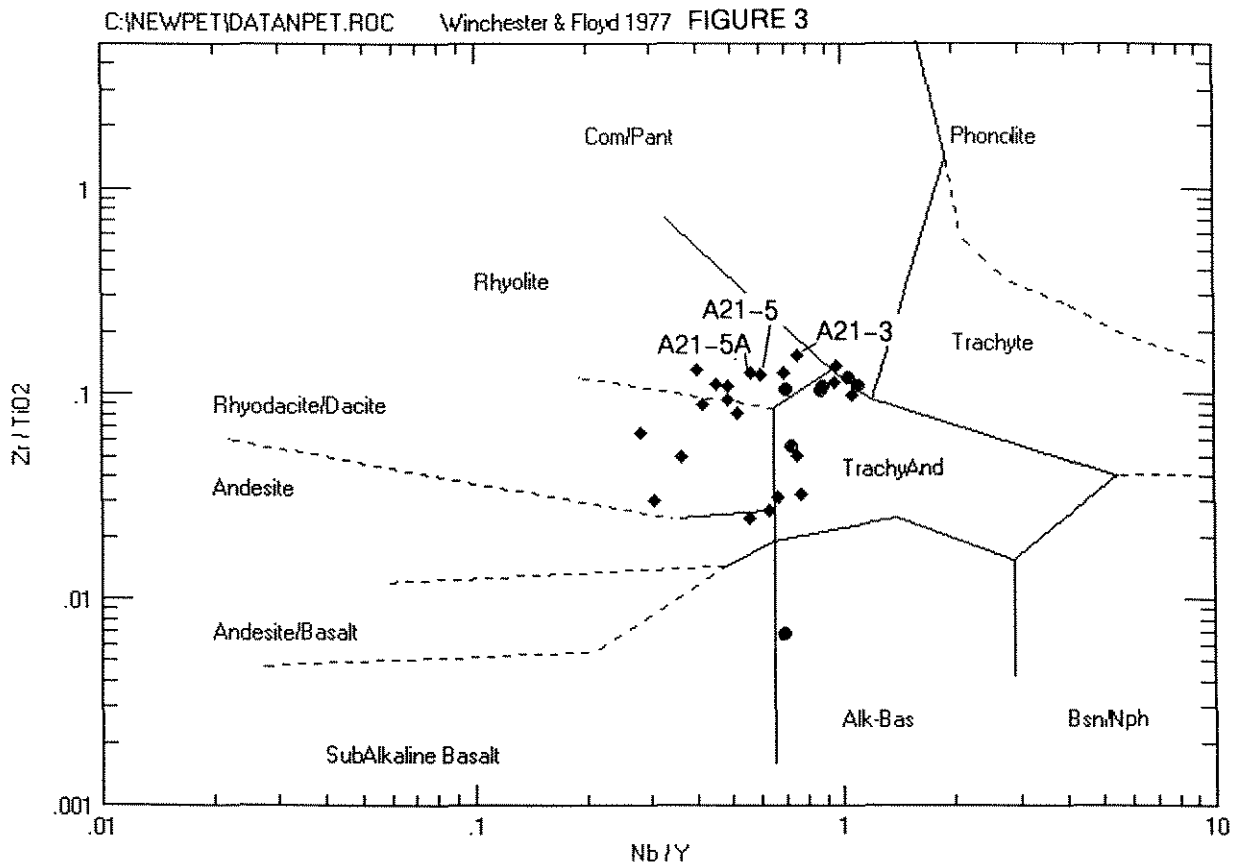
##### **5.1 Contour Soil Sampling**

Soil samples were collected from the B-horizon using a long-narrow profile spade and placed in pre-numbered kraft paper sample bags and then shipped to Cominco's Exploration Laboratory at 1486 East Pender St., Vancouver, B. C. for analyses. The samples were dried and sieved to -80 mesh, then 0.50 grams of the -80 mesh fraction was digested in acid (3HNO<sub>3</sub>: 1HCL) and analyzed for Cu, Zn, Pb by A.A. The geochemical sample locations and analytical data are presented in plate 1-2 and Appendix II.

Contour soil sampling detected four areas anomalous in Cu/Zn/Pb/Ag. Geological mapping determined that these anomalies are sourced by quartz-sericite-schist and rhyolite. Prospecting sourced one of the anomalies to a 2 cm thick layer of massive chalcopyrite which appears to be parallel to layering in felsic-meta-tuffs (map unit 3).

## 5.2 Whole Rock Geochemistry

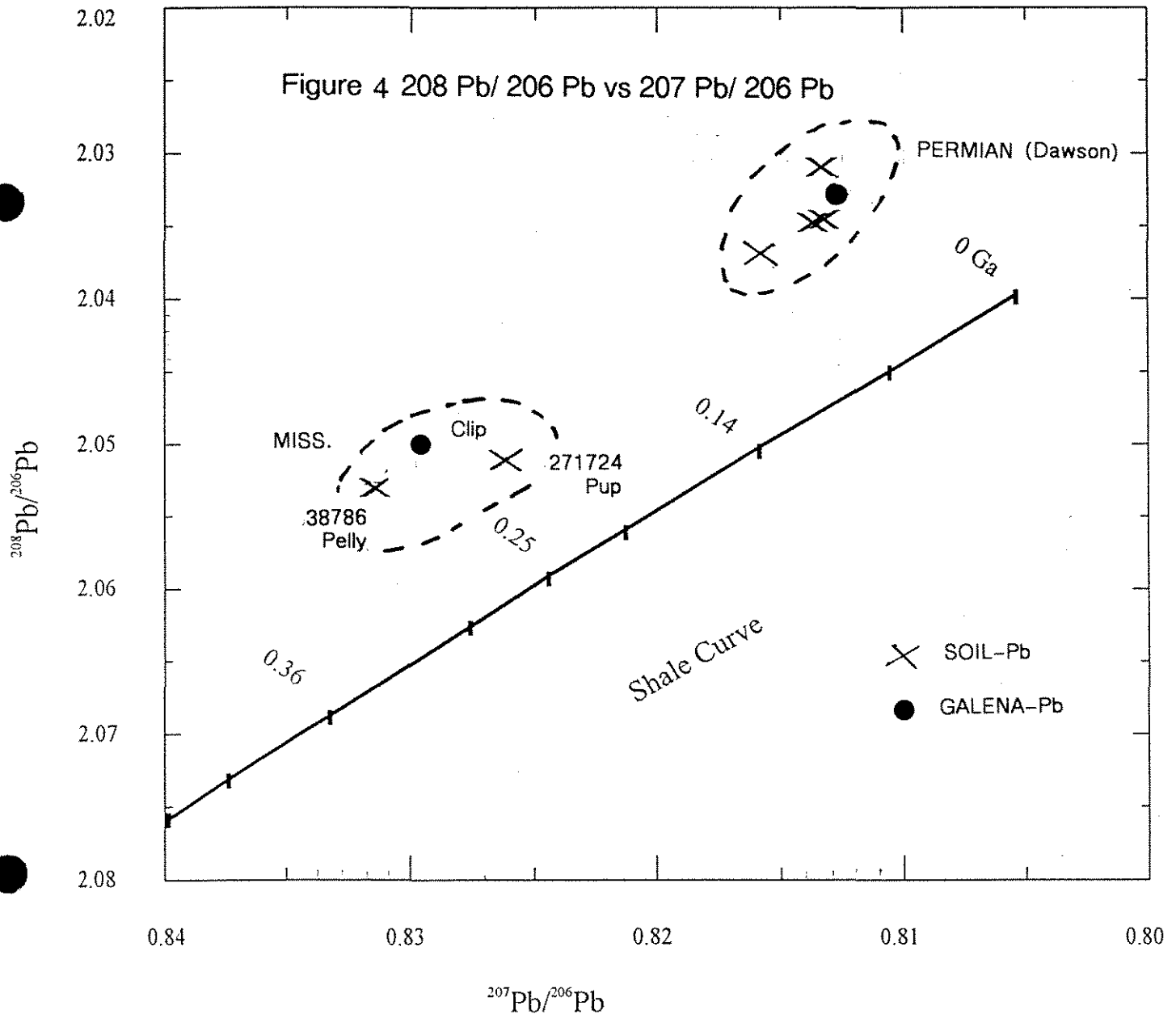
The whole rock analysis involved crushing and milling 3 grams of material. Cu, Pb, Zn, Ni and Ag were obtained by Atomic Absorption after aqua regia decomposition. Ba, Nb, Y and Zr were obtained by X-Ray fluorescence of a pressed pellet. Major element oxides were obtained by Lithium Borate fusion/X-Ray fluorescence. The Winchester and Floyd plot, figure 3, indicates a significant felsic volcanic component to the suite of rocks from the Pup Property. The analytical data are presented in Appendix III.



## 5.3 Lead Isotope Geochemistry

Pb-isotope analytical work on one lead-bearing soil sample 271724 (670 ppm Pb) was conducted by the University of B. C.'s Geochronology Lab. The data, listed below and plotted on figure 4, indicate a Mississippian age. One lead-bearing soil sample from the Pelly Mt. area and one galena lead isotope analysis from Cominco's Clip Property (Miss. age) are also plotted.

Lab No.	ppm Pb	$^{206}\text{Pb}/^{204}\text{Pb}$	$^{207}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{204}\text{Pb}$
271724 Pup soil	670	18.956	15.657	38.870
38786 Pelly soil	305	18.945	15.74	38.889
Clip Prop.rock	3000	18.811	15.695	38.885






## 6. CONCLUSIONS AND RECOMMENDATIONS

Follow-up of the 1978-1979 stream sediment Cu/Pb/Zn anomalies with contour soil sampling highlighted four areas anomalous in Cu/Pb/Zn. The soil values were generally an order of magnitude higher than the silt values. For example, a stream sediment sample 273783, containing 17 ppm Cu, 26 ppm Pb, 77 ppm Zn, is 300 m down stream from a 250m long contour soil anomaly with up to 535 ppm Cu, 137 ppm Pb and 156 ppm Zn. Prospecting this anomaly was successful in locating a small chalcopyrite showing, hosted by rusty weathering felsic meta-tuffs and massive quartz-eye rhyolite. The mineralization, consisting of a 1 cm thick bed of massive chalcopyrite, is parallel to the layering developed in the felsic-meta tuffs and is folded around a north trending anticlinal fold axis.

A contour soil line 200 m up Swede Ck. from the showing has a 250 m long soil anomaly with up to 181 ppm Cu, 670 ppm Pb and 327 ppm Zn. Two other areas of anomalous Cu, Pb and Zn in soils are: 750 m along strike to the south (126 ppm Cu, 112 ppm Pb, 207 ppm Zn) and 1 km down Swede Ck., where 5 consecutive soils are anomalous for a distance of 600 m (up to 146 ppm Cu and 451 ppm Zn). These anomalies are sourced by pyritized and sericitized felsic meta-tuffs and blue-quartz-eye rhyolite of undetermined age and are likely derived from low concentrations of basemetal sulphides.

Whole rock geochemistry of strongly foliated quartz-muscovite and quartz-sericite schist, confirmed field observations that these rocks represent felsic volcanic rocks (rhyolite, ash tuffs and crystal tuffs). Pb-isotope analysis on a lead-bearing soil sample indicated a Mississippian age.

Additional soil sampling, prospecting and geological mapping is recommended to determine the source of the three geochemical anomalies discussed above.

Report by:   
 K. R. Pride, P. Geo  
 Senior Geologist, Cominco Ltd.  
 Western Canada

Approved for  
 Release by:   
 D. W. Moore  
 Manager Exploration, Cominco Ltd.  
 Western Canada

Distribution:  
 Mining Recorder (2)  
 Western Canada (1)

## APPENDIX I: STATEMENT OF EXPENDITURES

Helicopter (2 hrs at \$ 750/hr)	\$ 1,500.00
Geochemical analyses (101soils x \$10.75/sample+ 3 rocks x\$42/sample)	1,853.00
Salaries (3man-days x \$ 250/man-day)	750.00
Domicile (3man-days x \$ 125/man-day)	375.00
Report preparation	150.00
<b>Total :</b>	<hr/> <b>\$ 4,628.00</b>

## APPENDIX II:SOIL GEOCHEMICAL DATA

Pup						
Labno	Fieldno	Cu	Pb	Zn	Ag	
S9509610	270048	24	27	88	0.4	
S9509611	270049	15	36	79	0.4	
S9509612	270050	19	22	67	< 4	
S9509613	270051	20	34	66	0.6	
S9509614	270052	9	21	37	< 4	
S9509615	270053	11	16	23	< 4	
S9509616	270054	22	127	164	0.5	
S9509617	270055	21	192	91	0.4	
S9509618	270056	27	32	84	< 4	
S9509619	270057	26	31	104	< 4	
S9509620	270058	86	38	58	0.5	
S9509621	270059	102	44	60	< 4	
S9509622	270060	126	102	209	0.6	
S9509623	270061	126	112	207	< 4	
S9511415	271186	50	12	86	1.2	
S9511416	271187	169	44	110	0.5	
S9511417	271188	52	18	124	0.9	
S9511418	271189	23	6	62	0.5	
S9511419	271190	11	54	80	0.6	
S9508075	273783	17	26	77	< 4	
S9507412	273784	16	21	42	< 4	
S9507413	273785	8	20	37	< 4	
S9507414	273786	18	16	64	0.5	
S9507415	273787	14	23	39	< 4	
S9507416	273788	7	62	42	< 4	
S9507417	273789	13	22	44	< 4	
S9507418	273790	12	38	65	< 4	
S9507419	273791	24	13	94	0.8	
S9507420	273792	11	19	36	< 4	
S9507421	273793	9	37	210	< 4	
S9507422	273794	12	50	80	< 4	
S9507423	273795	13	35	49	0.8	
S9507424	273796	146	61	451	2.1	
S9507425	273797	77	15	193	1.6	
S9507426	273798	120	42	312	1.4	
S9507427	273799	137	68	338	0.9	
S9507428	273800	107	18	158	< 4	
S9507429	273801	123	46	409	1.8	
S9507430	273802	19	73	154	0.6	
S9508076	273803	40	22	173	0.5	
S9507431	273804	23	40	117	0.5	
S9507432	273805	24	57	88	0.4	
S9508077	273806	5	10	56	< 4	
S9507433	273807	26	68	82	0.6	
S9507434	273808	14	28	76	< 4	
S9507435	273809	60	72	255	1	
S9507436	273810	21	32	76	< 4	
S9507437	273811	28	15	74	< 4	
S9507438	273812	14	23	58	< 4	
S9507439	273813	16	19	52	< 4	
S9507440	273814	61	17	112	< 4	
S9507441	273815	33	13	85	0.5	
S9526681	280147	7	6	32	< 4	
S9526682	280148	6	8	15	< 4	
S9526683	280149	4	10	10	< 4	
S9526684	280150	28	15	12	< 4	
S9526685	280151	13	8	53	< 4	
S9526686	280152	9	7	40	< 4	
S9526687	280153	21	6	50	< 4	
S9526688	280154	9	4	25	0.4	
S9526689	280155	21	18	40	0.4	
S9526690	280156	87	50	57	0.4	
S9526691	280157	31	38	30	0.4	
S9526692	280158	82	49	206	0.4	
S9526693	280159	44	33	222	< 4	
S9526694	280160	103	280	395	< 4	
S9526695	280161	67	66	78	< 4	
S9526696	280162	39	33	94	0.4	
S9526697	280163	25	30	71	< 4	
S9526698	280164	108	4	66	< 4	
S9507552	271718	49	27	176	< 4	
S9507553	271719	16	15	23	< 4	
S9507554	271720	87	32	285	0.4	
S9507555	271721	88	31	69	< 4	
S9507556	271722	61	46	158	< 4	
S9507557	271723	154	119	327	< 4	
S9507558	271724	181	670	193	3.4	
S9507559	271725	81	44	55	0.6	
S9507560	271726	49	13	34	0.5	
S9510065	271257	31	24	80	< 4	
S9510066	271258	23	87	64	< 4	
S9510067	271259	18	23	60	< 4	
S9510068	271260	18	12	56	0.6	
S9510069	271261	47	68	155	< 4	
S9510070	271262	61	23	132	0.5	
S9510071	271263	25	13	98	0.4	
S9510072	271264	18	< 4	97	< 4	
S9510073	271265	33	11	84	< 4	
S9510074	271266	27	8	81	< 4	
S9510635	271267	22	8	86	< 4	
S9510075	271268	18	28	70	< 4	
S9510076	271269	13	16	100	< 4	
S9510077	271270	24	15	65	0.4	
S9510078	271271	14	18	79	0.6	
S9510079	271272	27	19	219	< 4	

## APPENDIX III: ROCK GEOCHEMICAL DATA

YUKON VMS-WD

Job V 95-0639R

Report date 29 MAY 1996

LAB NO	FIELD NUMBER	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Nb ppm	Y ppm	Zr ppm
R9524138	A21-3	1430	19	79	.8	9	32	191
R9524139	A21-5	2	8	1	<.4	19	18	119
R9524140	A21-5A	11	11	50	<.4	15	36	143

## ANALYTICAL METHODS

Cu Aqua regia decomposition / AAS  
 Pb Aqua regia decomposition / AAS  
 Zn Aqua regia decomposition / AAS  
 Ag Aqua regia decomposition / AAS  
 Nb X-Ray fluorescence / pressed pellet  
 Y X-Ray fluorescence / pressed pellet  
 Zr X-Ray fluorescence / pressed pellet

LAB NO	FIELD NUMBER	SiO2 %	TiO2 %	Al2O3 %	Fe2O3 %	FeO %	MnO %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	Ba %	LOI %	TOTAL %
R9524138	A21-3	74.14	0.30	13.09	2.68		0.04	0.89	0.25	4.04	2.57	0.05	0.28	1.54	99.87
R9524139	A21-5	83.42	0.12	8.00	1.00		0.02	0.12	0.09	1.30	4.61	0.02	0.20	1.01	99.91
R9524140	A21-5A	72.54	0.16	10.22	1.76		0.04	0.15	3.65	2.14	5.13	0.03	0.21	3.56	99.59

## STATEMENT OF QUALIFICATIONS

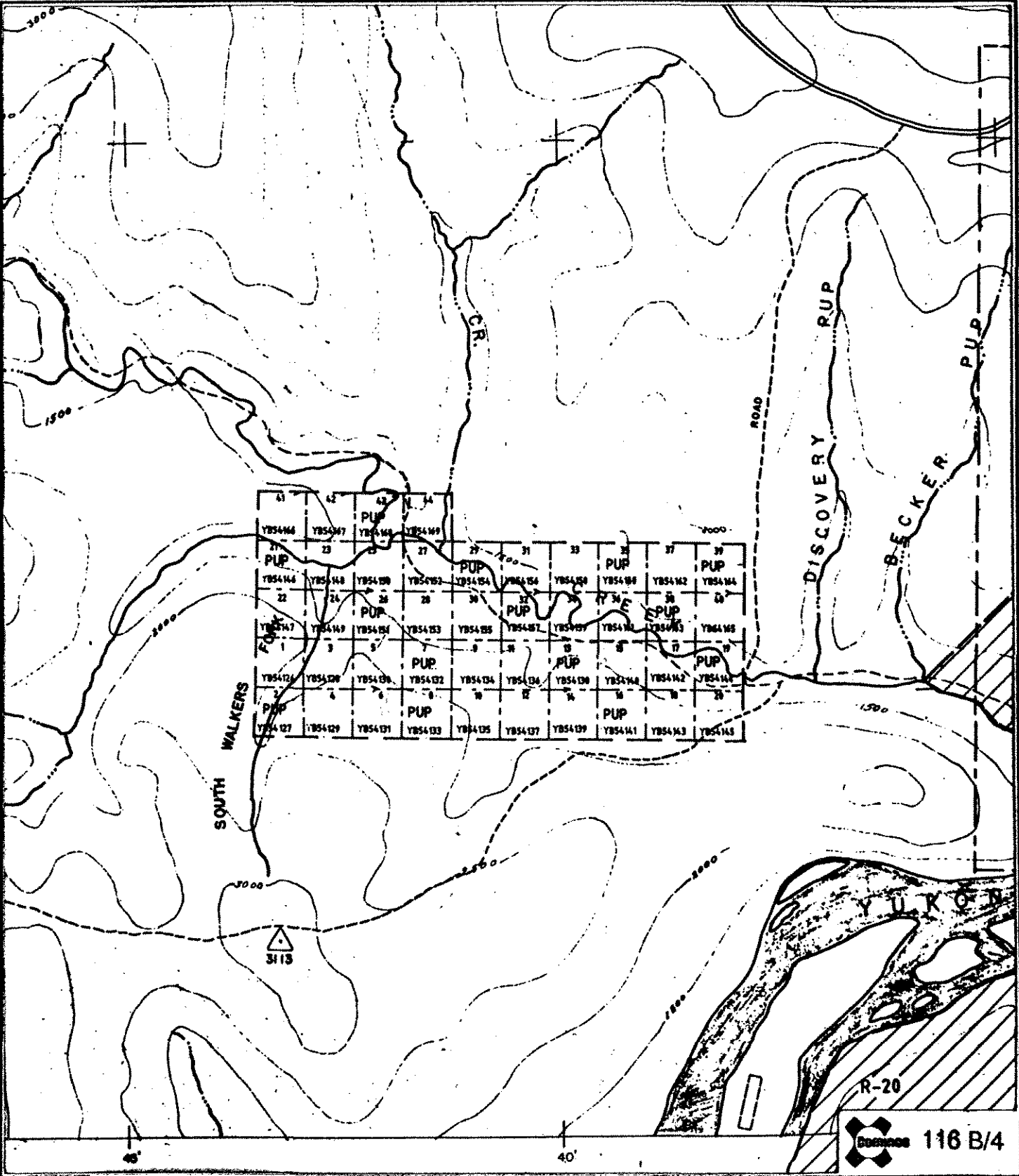
I, Ken. R. Pride, residing at 160 Sunset Drive, Lions Bay B. C., here by declare that I:


1. obtained a BSc. in Geology from the University of British Columbia in 1973,
2. have been employed by Cominco as an exploration geologist from 1973 to the present,
3. am a registered member of the Association of Professional Engineers and Geoscientists of British Columbia.

Dated June 17, 1996:



K. R. Pride  
K. R. Pride, Senior Geologist,  
Cominco Ltd.



R-20  
 116 B/4

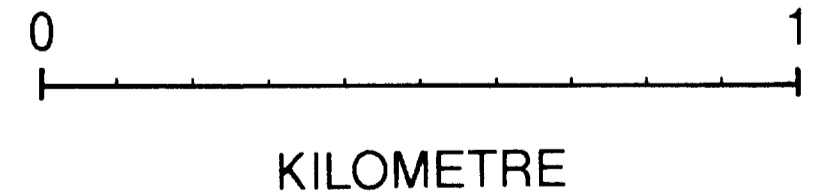
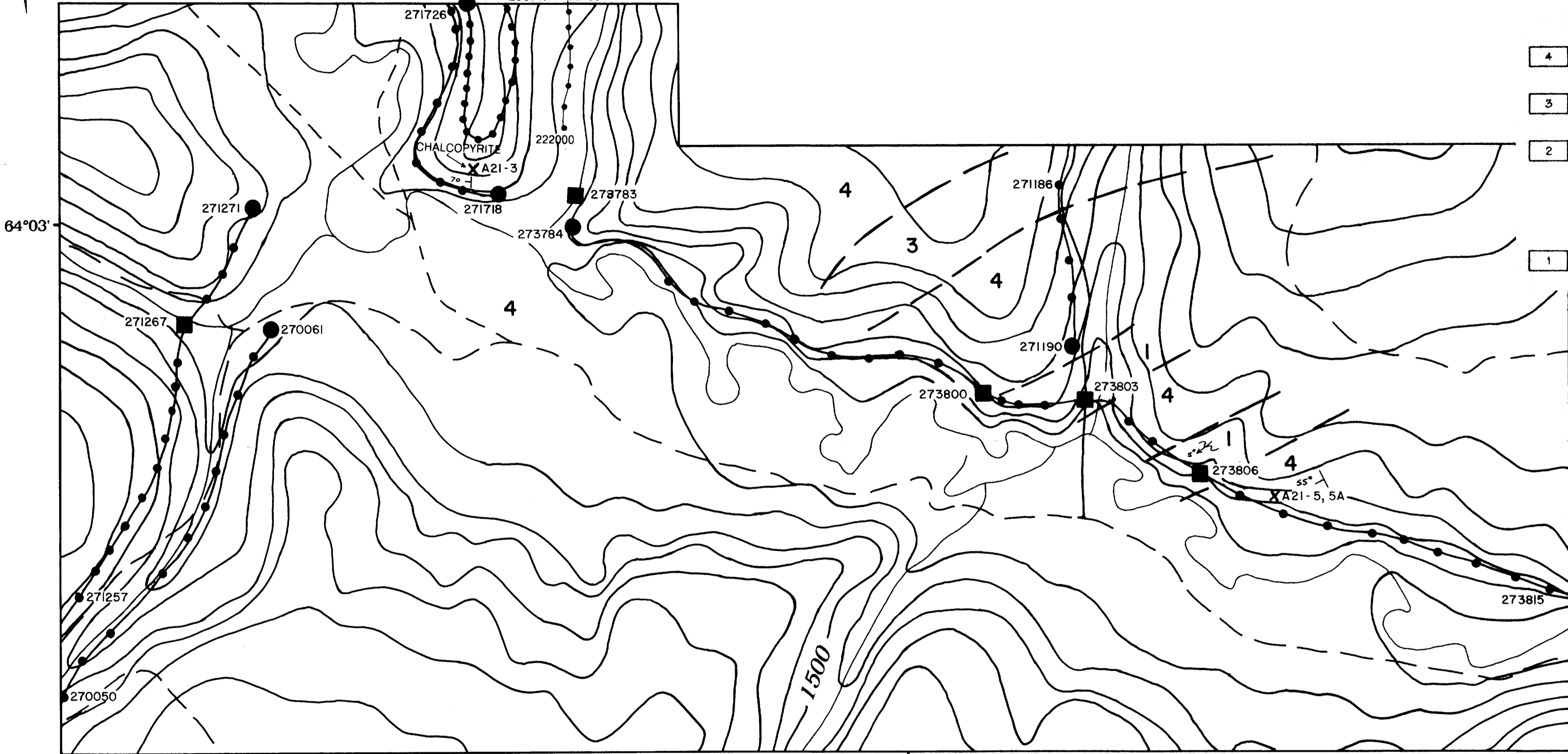
Drawn by:		Traced by:	
Revised by	Date	Revised by	Date

# PUP PROPERTY CLAIM MAP

Scale: 1:50,000      Date: DEC. 13, 1995      Plate:



Labno	Fieldno	Cu	Pb	Zn	Ag
S9509610	270048	24	27	88	0.4
S9509611	270049	15	36	79	0.4
S9509612	270050	19	22	67	<.4
S9509613	270051	20	34	66	0.6
S9509614	270052	9	21	37	<.4
S9509615	270053	11	16	23	<.4
S9509616	270054	22	127	164	0.5
S9509617	270055	21	192	91	0.4
S9509618	270056	27	32	84	<.4
S9509619	270057	26	31	104	<.4
S9509620	270058	86	38	58	0.5
S9509621	270059	102	44	60	<.4
S9509622	270060	126	102	209	0.6
S9509623	270061	126	112	207	<.4
S9511415	271186	50	12	86	1.2
S9511416	271187	169	44	110	0.5
S9511417	271188	52	18	124	0.9
S9511418	271189	23	6	62	0.5
S9511419	271190	11	54	80	0.6
S9508075	273783	17	26	77	<.4
S9507412	273784	16	21	42	<.4
S9507413	273785	8	20	37	<.4
S9507414	273786	18	16	64	0.5
S9507415	273787	14	23	39	<.4
S9507416	273788	7	62	42	<.4
S9507417	273789	13	22	44	<.4
S9507418	273790	12	38	65	<.4
S9507419	273791	24	13	94	0.8
S9507420	273792	11	19	36	<.4
S9507421	273793	9	37	210	<.4
S9507422	273794	12	50	80	<.4
S9507423	273795	13	35	49	0.8
S9507424	273796	146	61	451	2.1
S9507425	273797	77	15	193	1.6
S9507426	273798	120	42	312	1.4
S9507427	273799	137	68	338	0.9
S9507428	273800	107	18	158	<.4
S9507429	273801	123	46	409	1.8
S9507430	273802	19	73	154	0.6
S9508076	273803	40	22	173	0.5
S9507431	273804	23	40	117	0.5
S9507432	273805	24	57	88	0.4
S9508077	273806	5	10	56	<.4
S9507433	273807	26	68	82	0.6
S9507434	273808	14	28	76	<.4
S9507435	273809	60	72	255	1
S9507436	273810	21	32	76	<.4
S9507437	273811	28	15	74	<.4
S9507438	273812	14	23	58	<.4
S9507439	273813	16	19	52	<.4
S9507440	273814	61	17	112	<.4
S9507441	273815	33	13	85	0.5
S9526681	280147	7	6	32	<.4
S9526682	280148	6	8	15	<.4
S9526683	280149	4	10	10	<.4
S9526684	280150	28	15	12	<.4
S9526685	280151	13	8	53	<.4
S9526686	280152	9	7	40	<.4
S9526687	280153	21	6	50	<.4
S9526688	280154	9	4	25	0.4
S9526689	280155	21	18	40	0.4
S9526690	280156	87	50	37	0.4
S9526691	280157	31	38	30	0.4
S9526692	280158	82	49	206	0.4
S9507552	271718	49	27	176	<.4
S9507553	271719	16	15	23	<.4
S9507554	271720	87	32	285	0.4
S9507555	271721	88	31	69	<.4
S9507556	271722	61	46	158	<.4
S9507557	271723	154	119	327	<.4
S9507558	271724	181	670	193	3.4
S9507559	271725	81	44	55	0.6
S9507560	271726	49	13	34	0.5
S9510065	271257	31	24	80	<.4
S9510066	271258	23	87	64	<.4
S9510067	271259	18	23	60	<.4
S9510068	271260	18	12	56	0.6
S9510069	271261	47	68	155	<.4
S9510070	271262	61	23	132	0.5
S9510071	271263	25	13	98	0.4
S9510072	271264	18	<.4	97	<.4
S9510073	271265	33	11	84	<.4
S9510074	271266	27	8	81	<.4
S9510635	271267	22	8	86	<.4
S9510075	271268	18	28	70	<.4
S9510076	271269	13	16	100	<.4
S9510077	271270	24	15	65	0.4
S9510078	271271	14	18	79	0.6
S9527091	221994	27	19	219	<.4
S9527092	221995	26	25	43	<.4
S9527093	221996	19	25	53	<.4
S9527094	221997	229	20	41	<.4
S9527095	221998	202	18	43	<.4
S9527096	221999	535	137	156	<.4
S9527097	222000	34	41	78	<.4



Labno	Fieldno	Cu	Pb	Zn	Ag
S9526692	280158	82	49	206	<.4
S9526693	280159	44	33	222	<.4
S9526694	280160	103	280	385	<.4
S9526695	280161	67	66	78	<.4
S9526696	280162	39	33	94	0.4
S9526697	280163	25	30	71	<.4
S9526698	280164	108	4	60	<.4

**LEGEND**

- 6 Dykes: quartz-phenocrystic, rhyolite to rhyodacite porphyry dykes (age unknown). Dykes range from 2m to 30m wide.
- 5 Sills: medium to coarse-grained gabbroic sills. Compositionally, sills are sub-alkaline basalts (age unknown).
- Miss-Permian**
  - 4 Rhyolite: massive, medium to thick-bedded flows. Siliceous, pyritic with blue-quartz-eye phenocrysts. Sericitic alteration common.
  - 3 Felsic Tuffs: foliated-echistose, quartz-sericite ± chlorite. Minor crystal-tuffs, with phenocrysts of feldspar and blue-quartz. Strong sericitic alteration and chalcopyrite
  - 2 Mafic Flows and Tuffs: dark green, weakly foliated andesitic basalt to sub-alkaline basalt flows. Minor specular hematite and chalcopyrite. Graded bedded tuffs have a sub-alkaline basalt geochemical signature.
- Devon-Miss**
  - 1 Phyllite: Nasina Group black clastics. Underlies and intercalated with units 3 & 4 felsic volcanics.

- 271726 ● 271718 Soil Sample Traverse (Field Number)
- 278783 Silt Sample (Field Number)
- X A21-3 Rock Sample (Field Number)

PUP PROPERTY			
Drawn by:	Traced by:	<b>GEOLOGY &amp; GEOCHEM</b> DAWSON M.D., YUKON <b>093496</b> #1 Scale: 1 : 10,000 Date: Dec., '95 Plate: 1-2	
Revised by:	Date:		