BRITISH COLUMBIA

PROSPECTORS ASSISTANCE PROGRAM

MINISTRY OF ENERGY AND MINES

GEOLOGICAL SURVEY BRANCH

PROGRAM YEAR:	2000/2001
REPORT #:	PAP 00-4
NAME:	WILLIAM WELSH

D. TECHNICAL REPORT

- One technical report to be completed for each project area.
- **Refer to Program Regulations 15 to 17, pages 6 and 7.**

SUMMARY OF RESULTS

- This summary section must be filled out by all grantees, one for each project area

Information on this form is confidential subject to the provisions of the *Freedom of Information Act.*

Name WILLIAM WELSH Reference Number 00/01 P13

LOCATION/COMMODITIES

Project Area (as listed in Part A) _____ MINFILE No. if applicable 93K/12.46,43,65

Location of Project Area NTS 93K/8·9 Lat 54°·38' Long 124°-26'

Description of Location and Access PROSPECTING AREA IS ALONG THE PINCHI FAULT, N.W OF FT ST JAMES. ACCESS TO THE AREA IS GAINED VIA THE NORTH RD AND THE PINCHI LAKE RD

Prospecting Assistants(s) - give name(s) and qualifications of assistant(s) (see Program Regulation 13, page 6)
BARBARA WELSH HONS. B.SC. GEOLOGICAL ENGINEERING

Main Commodities Searched For Pt Pd CR.

Known Mineral Occurrences in Project Area PINCHI LAKE MERCURY MINE (93K 049)
MURRAY RIDGE CHROMITE (93K 012)

WORK PERFORMED

1. Conventional Prospecting (area) 15000 Ha
2. Geological Mapping (hectares/scale) 15000 Ha @ 1:20,000
3. Geochemical (type and no. of samples) _____
4. Geophysical (type and line km) _____
5. Physical Work (type and amount) _____
6. Drilling (no. holes, size, depth in m, total m) _____
7. Other (specify) _____

Best Discovery

Project/Claim Name PINCHI MTN Commodities Mg Ni Cr Hg

Location (show on map) Lat. 54°-39'-08" Long 124°-30'-11" Elevation 975 m

Best assay/sample type 1765 PPM Ni 793 PPM Cr 1360 PPM Hg > 15% Mg

Description of mineralization, host rocks, anomalies MINERALISATION IS HOSTED BY SERPENTINIZED PERIDOTITE CONTAINING BLUE GREEN OXIDES OF NICKEL AND CHROMITE. MAGNESITE OCCURS AS VEINS AND LENSES UP TO 56·4% $MgCO_3$

FEEDBACK: comments and suggestions for Prospector Assistance Program PROGRAM IS WELL RUN AND EFFICIENTLY ADMINISTERED AND PROVIDES CONSIDERABLE BENIFIT TO THE MINING INDUSTRY

D. TECHNICAL REPORT (continued)

REPORT ON RESULTS

- Those submitting a copy of an Assessment Report or a report of similar quality that covers all the key elements listed below are not required to fill out this section.
- Refer to Program Regulation 17D on page 6 for details before filling this section out (use extra pages if necessary)
- **Supporting data must be submitted with the following TECHNICAL REPORT or any report accepted in lieu of.**

Information on this form is confidential for one year from the date of receipt subject to the provisions of the *Freedom of Information Act*.

Name WILLIAM WELSH Reference Number 00/01 - P13

1. LOCATION OF PROJECT AREA [Outline clearly on accompanying maps of appropriate scale.]

PROSPECTING AREA LIES ALONG THE PINCHI FAULT APPROX. 26 KM S.E. TO 36 KM N.W. OF FORT ST. JAMES

2. PROGRAM OBJECTIVE [Include original exploration target.]

THE PROGRAM OBJECTIVES WERE TO TEST THREE POTENTIAL TARGETS FOR PLATINUM GROUP ELEMENTS.

1) HYDROTHERMAL PGE, ASSOCIATED WITH SERPENTINIZED PERIDOTITE ALONG THE PINCHI FAULT.

2) PALEOPLACER PGE, ASSOCIATED WITH CHROMITE IN THE MATRIX OF THE TAKLA GROUP CONGLOMERATE UNIT.

3) SHALE HOSTED PGE, HOSTED BY A CARBONACEOUS SHALE UNIT (TAKLA)

3. PROSPECTING RESULTS [Describe areas prospected and significant outcrops/float encountered. Mineralization must be described in terms of specific minerals and how they occur. These details must be shown on accompanying map(s) of appropriate scale; prospecting traverses should be clearly marked.]

SERPENTIZED PERIDOTITE WAS SAMPLED FROM TWO MAIN AREAS:

1) SUNSHINE/CALEX SOUTH OF MURRAY RIDGE

2) PINCHI MTN MAGNESITE, NORTH OF PINCHI LAKE

MOST OF THE SAMPLES EXCEEDED THE DETECTION LIMIT FOR Mg AND THESE WERE ANOMALOUS FOR Ni Cr AND Hg

NO APPRECIABLE QUANTITIES OF PGE WERE FOUND.

D. TECHNICAL REPORT (continued)

REPORT ON RESULTS (continued)

3. PROSPECTING RESULTS (continued)

(SEE ATTACHED REPORT)

D. TECHNICAL REPORT (continued)

REPORT ON RESULTS (continued)

4. GEOCHEMICAL RESULTS [Describe all survey types done (rock, soil, silt) and their objective. Show clearly on accompanying map(s) of appropriate scale all sample sites along with all significant values. Any anomalous areas should be indicated on maps by the use of contouring, variable symbol sizes, or some other suitable technique. Include a discussion/interpretation of results. A copy of analysis/assay certificates **must** be included with sample numbers from map. Details of individual rock samples taken are encouraged. Significant geochemical values obtained must be stated.]

(SEE ATTACHED REPORT)

D. TECHNICAL REPORT (continued)

REPORT ON RESULTS (continued)

5. GEOPHYSICAL RESULTS [Specify the objective of the survey, the method used and the work done. Discuss the results and show the data on an accompanying map of appropriate scale. Any anomalous areas must be indicated on maps by the use of contouring, or some other suitable technique.]

N/A

5. OTHER RESULTS [**Drilling** - describe objective, type and amount of drilling done. Discuss results, including any significant intersections obtained. Indicate on a map of appropriate scale the drill-hole collar location, the angle of inclination and azimuth. Drill logs correlated with assay results must be included. **Physical Work** - describe the type and amount of physical work done and the reasons for doing it (where not self-evident). This includes lines/grids, trails, trenches, opencuts, undergound work, reclamation, staking of claims, etc. Discuss results where pertinent.]

N/A

Signature of Grantee _____ Date NOV 29/2000

PROSPECTING IN THE PINCHI LAKE/FORT ST. JAMES AREA

A. Introduction

Prospecting was carried out along the Pinchi fault zone near Fort St. James, B.C. and northwest past Pinchi Lake to Tezzeron Lake, by William and Barbara Welsh, for a total of 26 days from July 1-26, 2000. A total of 32 rock samples were collected and 24 were analyzed by fire assay for Pt, Pd and Au. I.C.P. analysis for 32 elements was done on a selected suite of twelve of the samples. As well, several small creeks were panned in order to detect the presence of gold and heavy minerals, but for the most part the creeks cut through thick glacial till and did not necessarily represent the underlying geology. One pan concentrate from a creek draining Pinchi Mountain was analysed for Pt, Pd, and Au. Geological mapping was carried out throughout the area.

The selection of the Pinchi-Fort St. James area for prospecting was guided by G.S.C. bedrock mapping which depicted three ultramafic "intrusions (harzburgite-peridotite units which are actually crustal fault slices), associated with the Pinchi fault. These intrusions were mapped by Ash et al (GSB Open File 1993-9) as "mantle tectonite" with fault-associated magnesite alteration zones labeled as "carbonatized harzburgite". The carbonatized harzburgite that was mapped during this prospecting program contained blue and green annabergite, or "nickel bloom".

Dr. Larry Hulbert, of the G.S.C., relayed the following information regarding hydrothermal PGE deposits:

"The main requirements to get hydrothermal PGE mineralization are: a proximal ultramafic body regardless of origin, and a hydrothermal system that passes through the UM rocks. If the hydrothermal products are rich in selenium (selenides or Se-rich sulphides) all the better. It would also appear from my experience that the more oxidizing the conditions during precipitation of mineralization from the hydrothermal system the better, i.e. fO2 ~ to hematite buffer or even more oxidizing....Any hydrothermal system that cuts UM rocks must be analyzed because you never know. If the adjacent sedimentary rocks are rich in Se, Te, As (black shales) then the right conditions may arise to produce hydrothermal PGE's." (pers. comm., 2000).

It should also be mentioned that a carbonaceous black shale unit, rich in arsenic, molybdenum, and zinc, was mapped to the northeast of the Pinchi fault zone, and this unit was considered a strong candidate for potentially hosting PGE mineralization.

The Dog Creek placer occurrence, located to the south of the prospecting area, contains both gold and platinum, and although the source of the platinum is not known, it is assumed that the placer gold originated from local listwanite-gold shear zones which are parallel to the Pinchi fault.

As well, a conglomerate member of the Takla Group sediments was described in "Geology and Economic Minerals of Canada", GSC Economic Geology Report No.1 (p.434), as follows:

"Near Fort St. James the Takla Group contains clasts of serpentine in conglomerate and grains of chromite in the matrix that were derived from the ultramafic intrusions emplaced into the Cache Creek Group of the Pinchi Geanticline."

It is reasonable to assume that PGE could be associated with the chromite in the matrix if it were present in sufficient quantity.

This conglomerate unit, together with adjacent listwanite alteration zones, and the oily black shale in the hangingwall of the fault zone comprised three exploration targets for PGE mineralization in the vicinity of the Pinchi Lake Mercury Mine. Perhaps, the best sites for testing these targets are on the mine property itself, where the hydrothermal activity was most intense, but the property is fenced off and owned by Cominco Ltd., and not available for exploration.

B. Prospecting Targets

1. Hydrothermal PGE deposits

The model for this type of PGE deposit is described in GSC Open File 1440, "Geological Environments fo the Platinum Group Elements ". Anomalous concentrations of platinum occurs in a wide variety of hydrothermal deposit types. These occurrences demonstrate that platiinum can be mobilized and concentrated by relatively low temperature hydrothermal processes. The hydrothermal deposit types in which platinum has been reported have been classified into two categories: the U-Au-Pd-Pt type, examples of which are Coronation Hill and Nicholson Bay, and the Pt-Pd-Au type, for which Rathburn Lake, deposits of the New Rambler and Centennial Ridge District (Wyoming) and the Cliff showing of the Shetland (Unst) ophiolite are taken to be examples. Of the latter type, the common feature at the various localities is that the mineralization occurs along structurally controlled zones in mafic-ultramafic bodies. McCallum et al, (1976) favour the interpretation that the New Rambler deposit was formed at a temperature of around 350^0 C. from hydrothermal solutions that leached the ore metals from the surrounding mafic rocks rather than by alteration or remobilization of a magmatic sulphide deposit. The highly altered ultramafic rocks of Pinchi Mountain (now termed magnesite) would seem to fit this model, but the surrounding veins and stockworks in both the magnesite and adjacent limestone did not contain appreciable quantities of platinum group elements.

There are three known hydrothermal PGE deposits in British Columbia in which mercury is also an ore mineral: Dan (093K 018), AT 2 (093K 048), and Laurion (082ESW109). Of particular relevance to this prospecting program is Dan, which lies along the Pinchi fault, and hosts Hg-Cr-Pt mineralization within the same lithological units as found in the vicinity of Pinchi Lake. Since hydrothermal activity was greater around the Pinchi Lake mercury mine, it was hoped that PGE values would be more greatly enhanced than those found at the Dan occurrence (158 ppb Pt), but as it turned out the opposite was true, even though values for chromium and nickel were comparable. Both the Dan

occurrence and the ultramafic rocks which were sampled around Pinchi Lake, are hosted by listwanite-type alteration.

	ppm			ppb	
	Hg	Ni	Cr	Pt	Pd
"Dan" occurrence	300	150	1700	158	n/a
Pinchi Mtn.	2000	2000	1000	20	16

2. Shale-hosted Ni-Zn-Mo-PGE

An unusually oily shale unit was discovered in the hangingwall of the Pinchi fault zone, which was sampled and assayed, in case the high carbon content (the rock smelled of oil) acted as a catalyst to precipitate PGE Although this shale unit was higher in arsenic, zinc, and molybdenum, the Pt and Pd content was no more than that of the ultramafic rocks.

3. Paleoplacer U-Au-PGE-Sn-Ti-diam-mag-gar-zir

As described above, there is a conglomerate unit in the Takla Group, located immediately adjacent to the Pinchi fault, which has the potential to contain PGE associated with chromite. This conglomerate unit is invariably associated with listwanite-altered serpentinite along the Pinchi fault. However, in fact, the chromite content that was observed was less than one percent, and Pt-Pd assays were similar to those of the listwanite rocks. For the most part, this unit was highly weathered and good outcrop was difficult to find.

C. Summary of Prospecting Activity

1. Teardrop: The Teardrop F.S. road accesses an area to the southeast of Fort St. James in the vicinity of Jumping Lake, in which the Takla conglomerate was mapped by the G.S.C. over a distance of 12 kilometres. Although the roads traversed the conglomerate several times, it was actually only seen in one location, off the main road. To the south of this occurrence, there was a contact with a shale unit, and the rest of the area was covered by thick overburden, so it might be assumed that the mapping was based on air photo interpretation.

2. Sunshine/Calex (MINFILE 093K 046,048)

This area is located on the North Road, 5.7 km east of the Canfor Mill. A new logging road has been built to the north of the main road, which crosses three rocky knolls that trend approximately 075^0. Further to the east, where the North Road swings north, the ridges trend north as well. These latter north-south

structures are felt to be associated with mercury mineralization in the vicinity of the Pinchi fault. The Calex and Sunshine occurrences lie along such a north-trending structure. Along that same trend, were rocks exhibiting tectonite features (blueschist) which are distinctly different from the harzburgite found on Murray Ridge: glaucophane-lawsonite-chlorite schist.

3. Murray Ridge (MINFILE 093K 012)

   Murray Ridge is a prominent hill immediately north of the area described above, and the site of the local ski hill. It was mapped as Harzburgite, variably serpentinized and with variably developed tectonite fabric, containing dunite as pods and dykes with trace to 2% chromite. For the most part, the chromite that was seen was less than !%, and could be considered minor at best.

4. Conglomerate Hill

   Another prominent hill is located on the south shore of Pinchi Lake and can be accessed off the Tachie road. It was mapped as Takla group, and the hill consists of Takla sediments capped by mafic volcanics. The Takla conglomerate was not observed at this location.

5. Pinchi Lake Mercury Mine (MINFILE 093K 047,049)

   The area around the Pinchi Lake Mercury Mine and the north shore of Pinchi Lake was prospected, but for the most part the land is privately-owned. The mine property itself is fenced off. Rocks that were observed along the shoreline are mostly greywacke and siltstone.

6. Rogue Slice

   Off the west-trending road that accesses Pinchi Mountain, there was an unusual fault slice bounded by a vertical cliff at least 30 metres high. The rocks consist of rusty-weathering carbonatized harzburgite containing disseminated sulphides and blue glaucophane and green annabergite. Mantle tectonite features were not observed, but the cliff face is unusual because it occurs in an area of gently rolling hills.

7. Pinchi Lake Magnesite (MINFILE 093K 065)

   Altered serpentinite is exposed on the southwest face of Pinchi Mountain. Air photos show these rusty-

weathering rocks as covering most of the top of the mountain. This area was previously staked as a magnesite deposit, in which magnesian carbonate occurs as veins or lenses, veined by cherty quartz. The $MgCO^3$ content was quoted as being 56.4%. Blue and green oxides are present as small flecks and there is about 0.5% sulphides. This area was felt to be the most likely place to host hydrothermal PGE mineralization because the ultramafic rocks are so intensely altered, and they are bounded by veined and brecciated limestone, but this was found not to be the case.

8. Tezzeron Listwanite Zone (L4) (MINFILE 093K 050)
   Another interesting target was found to the northwest of Pinchi Mountain, consisting of an arcuate, northwest-trending fault zone, The rocks consist of rusty-weathering, carbonatized harzburgite, containing minor sulphides in quartz-carbonate veins and the same blue and green oxides mentioned above. Cinnabar was observed, but only to a minor extent. The geometry of this zone was notable because it consisted of three or more stacked, up-thrusted blocks, bounded by a steep slope on the western side.

9. Tachie Road (MINFILE 093K 079)
   Prospecting was carried out in the region lying between Stuart and Pinchi lakes, along the southwestern edge of the Pinchi fault zone. A promising float sample of brecciated and mineralized harzburgite was obtained from roadbed material from a logging road in the area behind Pope Mountain, but it could not be determined where this material came from originally.

Rock Sample Descriptions

Sample	Assay No.	Au	Pt	Pd	Location	Description
STJ-001					Teardrop	float; chert pebble conglomerate (too clean to be Takla, well-cemented
STJ-002					Teardrop	conglomerate/breccia, adjacent to mafic volcanics - chert pebbles in f.gr. Sil. matrix
STJ-003					Teardrop	float; f.gr. dk.grey basalt (Takla)
STJ-004					Congl. Hill-talus slope below cliff	med,.gr.gabbro, more felsic lenses; dark weathering
STJ-005					Congl. Hill, west	gabbro, rusty weathering, more felsic than #5,
STJ-006					Congl. Hill - lower on scree slope	gabbro, coarser grained, lenses of more felsic material
STJ-007	349935	2	<5	6	Calex, beside pond	epidote-chlorite schist-dunite
STJ-008	349936	<2	<5	6	Calex, beside pond	carbonatized harzburgite, CO3 along fractures, slickensided
STJ-009	349937	<2	<5	10	Calex, roadside	altered peridotite, containing abundant pale blue glaucophane
STJ-010	349938	2	<5	6	Calex, along new rd.	altered peridotite, mariposite, carbonate in breccia
STJ-011					Pinchi L4	bleached mafic volcanic, rusty on weathered surfaces
STJ-012					Pinchi L4	dk.grey limestone, silicified, intensely microfractured
STJ-013		6	<5	6	Pinchi mtn. Road	rusty, sheared, veined mafic volcanic similar to #11, diss. py
STJ-014		4	<5	4	Pinchi mtn. Road	intensely altered listwanite "pipe" adjacent to #13; reddish brown limonite, annabergite
STJ-015		<2	15	<2	Calex, knoll on skid tr	poorly-sorted, rusty, heavily weathered conglomerate; dirty, crumbly matrix
STJ-016					Calex o/c on hwy	CO3-rich serpentinite, ~1% f.gr. diss sulph. same microfract. Pattern seen in limestone near Tezz.L; samll veinlets epidote,chrom
STJ-017		<2	<5	2	Pinchi L4	rusty, red-brown magnesite, diss. green annabergite
STJ-018		<2	<5	<2	Pinchi L4	less altered peridotite than #17, variably rusty on weathered surfaces
STJ-019	349939	4	<10	4	Pinchi clearcut	talc-chlorite schist/serpentinite, with lenses of red cinnabar along foliation
STJ-020	349340	4	10	16	Pinchi clearcut - eor	rusty-weathering serpentinite with diss. f.gr.sulphides (Py,Po) in CO3 veinlets
STJ-021	348741	4	20	4	magnesite @ 9 km	orange-weathering magnesite,sandy texture diss. Py, cpy, blue and green oxides after chromite, nickel sulp., minor erythrite
STJ-022	348142	8	<10	4	rogue slice (cliff)	orange-weathering serpentinite, less altered than #21, but containing blue and green oxides; criss-X qtz. Veinlets
STJ-023	347543	6	10	6	Tsilcoh falls	oily black shales, weathered; overlain by relatively unaltered sil.limestone; diss f.gr. sulphides

Sample	Assay No.	Au	Pt	Pd	Location	Description
STJ-024	346944	<2	<5	4	Pinchi clearcut 2nd "rogue slice"	steep slopeo/c on top; rusty magnesite qtz veins, diss. sulph, Py, cpy, annabergite
STJ-025	346345	<2	5	6	Pinchi clearcut	carbonatized harzburgite, diss. sulp, rusty weathering, sandy texture
STJ-026		12	5	4	Calex n.fault	altered dunite, with diss. sulph, approx.60% olivine, minor chromite with broken edges
STJ-027	349946	<2	20	8	Calex knoll	conglomerate/peridotite from contact ; highly weathered, rusty & crumbly
STJ-028		<2	<5	<2	Pinchi mag. List.cont	silicified limestone, microfract., veined and cross-veined by CO3, with Py
STJ-029		2	<5	8	Pinchi clearcut	rusty, sheared magnesite, in fragments < 2 cm long; altered to soil
STJ-030		<2	<5	4	calex -new road	altered dunite with pale blue glaucophane sampled from muskeg at base of ridge
STJ-031		4	<5	<2	2nd Tezz. Rd.	rusty, f.gr. pyritic black argillite with CO3 along layers
STJ-S01	silt	28	<5	2	Pinchi mag.	lt. brown, some magnetite

G.P.S. Coordinates on mapping traverses

Waypoint	Easting (m)	Northing (m)	Comments
1	435025	6030612	km 17 intersection on Teardrop Rd.
2	433893	6028934	left branch, centre of Takla conglomerate
3	429596	6028077	right branch, " " "
4	428824	6027883	Sample STJ-001 (float)-conglomerate
5	429755	6028970	o/c - limestone
6	429834	6028655	o/c - limestone
7	436200	6030749	o/c Sample STJ-002 - conglom/breccia
8	436414	6030789	o/c Sample STJ-003-Takla volcs (basalt)
9	437167	6030836	o/c - black shale
10	415449	6044548	Conglomerate Hill
11	417088	6043791	road splits
12	417206	6045982	talus slope
13	414286	6040711	Sample STJ-004,5, 6 medto coarse-gr gabb
14	414596	6040409	
15	427658	6039240	STJ-007,8,9
16	409040	6053601	
17	410921	6052678	
18	407061	6059971	Tezzeron road
19	405328	6061221	Tezzeron Lake STJ-011-bleached, rusty ma
20	407075	6059718	STJ-012 - black limestone-microfractured
21	408181	6056399	STJ-013,14-rusty, sheared volcs, veins
22	412755	6052966	o/c-similar to above
23	414975	6052263	
24	414875	6051949	
25	427861	6039759	STJ-015 conglomerate
26	429010	6040038	
27	427994	6039263	STJ-016 - mafic volcs, veined and microfr.
28	406244	6056716	STJ-017 - magnesite with green annabergite
29	403982	6056611	STJ-018 - less altered peridotite
30	401508	6058808	o/c grey argillite
31	401663	6059033	STJ-019 talc-serpentinite with jasper
32	402018	6058920	STJ-020 red-weathering magnesite
33	402431	6057644	deeply-incised stream (pan conc STJ-S01.)
34	403408	6056863	STJ-021 magnesite + annabergite
35	405634	6056643	STJ-022 "rogue slice"- shear cliff tectonite
36	419191	6052401	o/c STJ-023 -oily black shale @ limestone c
37	409931	6055339	o/c 2 km on north road to Tezz. Mafic volcs
38	401143	6059502	STJ-024 another rogue slice n. end of L4 zo
39	401912	6058997	STJ-025 magnesite diss. sulphides
40	401521	6059054	road junction, centre of claim block
41	401519	6059061	
42	410456	6053352	o/c limestone
43	419133	6044472	
44	427338	6039669	STJ-026 new logging road - dunite
45	427448	6039533	#2 cliam post BW 1&2
46	427161	6039170	#2 claim post, BW 3&4
47	427463	6039540	#1 post, BW 5&6
48	427934	6039651	

Waypoint	Easting (m)	Northing (m)	Comments
49	427838	6039863	STJ-027 top of knoll - listwanite
50	428407	6039771	
51	402853	6057315	
52	402763	6057437	STJ-028 silicified limestone, veined
53	402721	6057463	#1 post, BW7
54	403065	6057045	#1 post, BW8
55	403303	6056879	o/c limestone contact
56	403555	6056761	#2 post, BW8
57	410421	6053281	o/c limestone
58	418903	6052306	o/c dirty black shale
59	401153	6059682	#1 post, BW 9&10
60	401369	6059283	
61	401382	6059270	#1 post, BW 11&12
62	401443	6059183	STJ-029 rusty listwanite
63	401629	6058888	#2 post, BW 11&12
64	414762	6055386	STJ-031 - rusty argillite 2nd Tezz. Rd,
65	414430	6013995	Dog Creek placer
66	416376	6014467	o/c Battleship bay, (Tachie Rd)

ALS Chemex

Aurora Laboratory Services Ltd.
Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221 FAX: 604-984-0218

To: KETTLE RIVER VENTURES **

619 NORTH FORK RD., R.R. #1
LUMBY, BC
V0E 2G0

Project :
Comments: ATTN: WILLIAM WELSH

Page Number :1
Total Pages :1
Certificate Date: 21-AUG-2000
Invoice No. :I0025603
P.O. Number :
Account :RIH

CERTIFICATE OF ANALYSIS A0025603

SAMPLE	PREP CODE		Au ppb ICP	Pt ppb ICP	Pd ppb ICP
STJ 13	205	226	6	< 5	6
STJ 14	205	226	4	< 5	4
STJ 15	205	226	< 2	15	< 2
STJ 17	205	226	< 2	< 5	2
STJ 18	205	226	< 2	< 5	< 2
STJ 20B	205	226	< 2	5	6
STJ 26	205	226	12	5	4
STJ 28	205	226	< 2	< 5	< 2
STJ 29	205	226	2	< 5	8
STJ 30	205	226	< 2	< 5	4
STJ 31	205	226	4	< 5	4
STJ 32	205	226	2	< 5	< 2

CERTIFICATION:

ALS Chemex

Aurora Laboratory Services Ltd.
Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221 FAX: 604-984-0218

To: KETTLE RIVER VENTURES **

619 NORTH FORK RD., R.R. #1
LUMBY, BC
V0E 2G0

Project :
Comments: ATTN: WILLIAM WELSH

Certificate Date: 02-AUG-2000
Invoice No. :10023956
P.O. Number :STJ
Account :RIH

CERTIFICATE OF ANALYSIS A0023956

SAMPLE	PREP CODE		Au ppb ICP	Pt ppb ICP	Pd ppb ICP	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppb	K %
349935	205	226	2	< 5	6	0.2	0.12	< 2	20	< 10	< 0.5	< 2	0.26	< 0.5	90	491	1	4.32	10	10	< 0.01
349936	205	226	< 2	< 5	6	< 0.2	0.04	< 2	< 10	< 10	< 0.5	< 2	0.06	< 0.5	95	190	1	4.34	10	< 10	< 0.01
349937	205	226	< 2	< 5	10	< 0.2	0.09	< 2	< 10	< 10	< 0.5	< 2	0.05	< 0.5	88	391	1	4.35	10	< 10	< 0.01
349938	205	226	2	< 5	6	< 0.2	0.09	< 2	10	200	< 0.5	< 2	1.15	< 0.5	67	965	8	3.15	10	2050	0.02
349939	205	226	4	< 10	4	< 0.2	0.74	< 2	< 10	2150	< 0.5	< 2	0.94	< 0.5	9	56	26	1.44	< 10	50	0.19
349940	205	226	4	10	16	< 0.2	0.16	< 2	< 10	10	< 0.5	< 2	0.05	0.5	95	527	27	4.49	10	< 10	< 0.01
349941	205	226	4	20	4	< 0.2	0.09	2	10	60	< 0.5	< 2	1.59	< 0.5	74	793	8	3.81	< 10	1360	< 0.01
349942	205	226	8	< 10	4	< 0.2	0.06	< 2	80	30	< 0.5	< 2	0.37	< 0.5	65	389	3	2.86	10	50	< 0.01
349943	205	226	6	10	6	0.2	2.04	12	< 10	40	0.5	< 2	5.23	2.0	20	111	67	3.56	< 10	50	0.11
349944	205	226	< 2	< 5	4	< 0.2	3.54	< 2	50	100	1.0	< 2	3.62	0.5	36	151	75	4.56	10	80	0.10
349945	205	226	< 2	5	6	< 0.2	0.09	< 2	< 10	< 10	< 0.5	< 2	0.06	< 0.5	94	331	2	4.43	10	< 10	< 0.01
349946	205	226	< 2	20	8	< 0.2	0.24	< 2	< 10	< 10	< 0.5	< 2	0.15	< 0.5	80	708	1	3.86	10	< 10	< 0.01

CERTIFICATION: Said Ketnat *+

ALS Chemex

Aurora Laboratory Services Ltd.
Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221 FAX: 604-984-0218

To: KETTLE RIVER VENTURES **

619 NORTH FORK RD., R.R. #1
LUMBY, BC
V0E 2G0

Project :
Comments: ATTN: WILLIAM WELSH

Page Number :1-B
Total Pages :1
Certificate Date: 02-AUG-2000
Invoice No. :I0023956
P.O. Number :STJ
Account :RIH

CERTIFICATE OF ANALYSIS A0023956

SAMPLE	PREP CODE		La ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
349935	205	226	< 10	>15.00	640	< 1	< 0.01	1910	< 10	< 2	0.01	< 2	7	8	< 0.01	< 10	< 10	16	< 10	26
349936	205	226	< 10	>15.00	665	< 1	< 0.01	2010	10	< 2	0.01	2	5	1	< 0.01	< 10	< 10	7	< 10	22
349937	205	226	< 10	>15.00	685	< 1	< 0.01	1790	< 10	< 2	< 0.01	2	5	< 1	< 0.01	< 10	< 10	12	< 10	26
349938	205	226	< 10	>15.00	380	< 1	0.04	1340	< 10	< 2	0.06	< 2	6	86	< 0.01	< 10	< 10	23	< 10	20
349939	205	226	< 10	0.42	295	< 1	< 0.01	41	430	< 2	0.06	< 2	1	112	0.01	< 10	< 10	13	< 10	50
349940	205	226	< 10	>15.00	730	< 1	< 0.01	2010	90	< 2	< 0.01	2	5	1	< 0.01	< 10	< 10	14	< 10	38
349941	205	226	< 10	14.55	585	< 1	0.03	1765	< 10	< 2	0.07	< 2	6	73	< 0.01	< 10	< 10	22	< 10	32
349942	205	226	< 10	>15.00	475	< 1	0.02	1415	10	< 2	< 0.01	< 2	5	15	< 0.01	< 10	< 10	16	< 10	14
349943	205	226	10	2.08	720	6	0.03	94	1080	10	0.22	< 2	11	235	0.07	< 10	< 10	150	< 10	170
349944	205	226	< 10	3.32	585	1	0.02	225	1130	2	< 0.01	< 2	4	102	0.50	< 10	< 10	75	< 10	80
349945	205	226	< 10	>15.00	675	< 1	< 0.01	2000	40	< 2	< 0.01	< 2	4	1	< 0.01	< 10	< 10	9	< 10	30
349946	205	226	< 10	>15.00	615	< 1	< 0.01	1710	40	< 2	< 0.01	< 2	6	1	< 0.01	< 10	< 10	17	< 10	22

CERTIFICATION: Saro / Letnap

ALS Chemex

Aurora Laboratory Services Ltd.
Analytical Chemists * Geochemists * Registered Assayers
212 Brooksbank Ave., North Vancouver
British Columbia, Canada V7J 2C1
PHONE: 604-984-0221 FAX: 604-984-0218

To: KETTLE RIVER VENTURES **

619 NORTH FORK RD., R.R. #1
LUMBY, BC
V0E 2G0

Project :
Comments: ATTN: WILLIAM WELSH

Page Number :1
Total Pages :1
Certificate Date: 21-AUG-2000
Invoice No. : I0025604
P.O. Number :
Account : RIH

CERTIFICATE OF ANALYSIS A0025604

SAMPLE	PREP CODE	Au ppb ICP	Pt ppb ICP	Pd ppb ICP
STJ-S01	235 --	2	< 5	2

CERTIFICATION:

N

PINCHI LAKE AREA

LEGEND

SCALE: 1 : 20,000

LATE TRIASSIC-EARLY JURASSIC

TrJt — Takla Gp., greywacke, siltstone, minor limestone interbeds

TrJt — Takla Gp. -mafic volcs conglomerate

LATE PALEOZOIC-EARLY MESOZOIC

PPcc — Cache Creek Gp. - limestone

PPcc — Cache Creek Gp. - argillite

PPcc — Cache Creek Gp - basalt diabase, gabbro

MISSISSIPPIAN-TRIASSOC MANTLE ROCKS

Oceanic Ultramafites-peridotite, harzburgite, serpentinite, dunite

magnesite, veined by qtz-CO_3 veinlets, diss. sulphides, nickel bloom

Blueschist, assoc. with the Pinchi Fault

55 + G.P.S. Waypoint

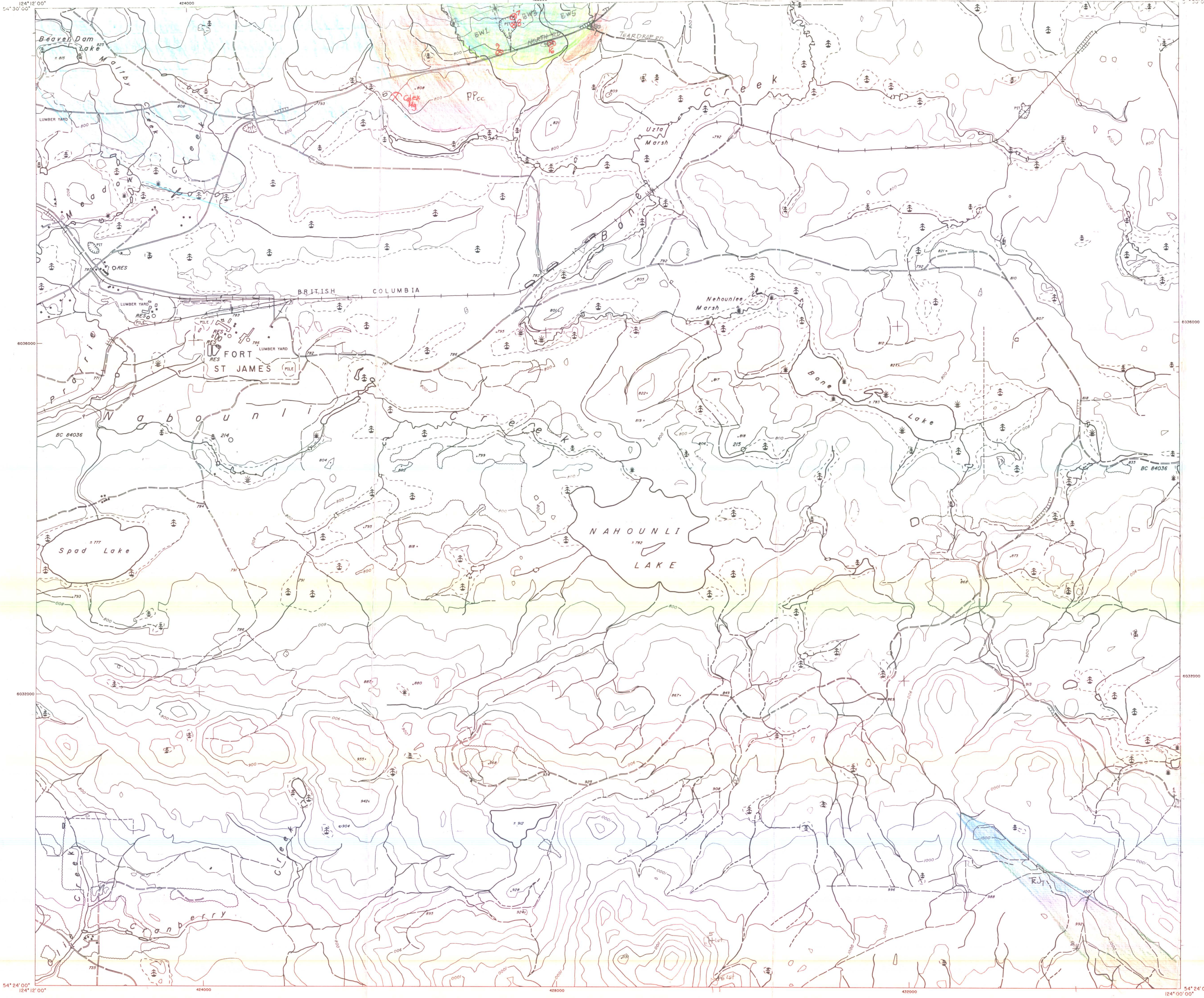
60 ⚒ MINFILE Occurrence

29 ◓ ROCK SAMPLE

S01 ★ STREAM SEDIMENT SAMPLE

FAULT

NOTE: LIMITS OF MAPPING INDICATED BY AREAS COLOURED



LEGEND

Transportation

- Road, paved
- Road, gravel
- Road, rough
- Trail/Cutline/Seismic line
- Railway, single track
- Railway, double track
- Railway, multiple track
- Railway, abandoned
- Wall, retaining
- Cut/Fill
- Bridge, to scale, symbolized
- Tunnel, to scale, symbolized

Landmark features

- Building, to scale, symbolized
- Built up area
- Fence
- Transmission line
- Tower

Drainage and related features

- Coastline/River/Stream, definite
- Coastline/River/Stream, indefinite
- River/Stream, intermittent
- River/Stream, split
- Lake, definite
- Lake, indefinite
- Dyke
- Flooded land
- Swamp/Marsh
- Beaver dam
- Dock/Wharf/Pier, symbolized
- Island, symbolized
- Water level ± 206

Relief features

- Contour, index, definite 200
- Contour, intermediate, definite
- Contour, intermediate, indefinite
- Contour, intermediate, depression
- Spot height 492 ·

Vegetation

- Wooded area

Control data

- Control point, horizotal, permanently marked △ 86HI234
- Control point, vertical, permanently marked ⊙ 86HA456

Cadastral

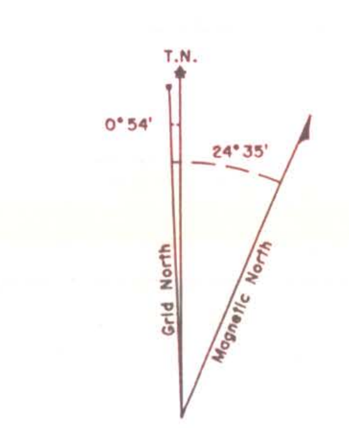
Surveys of Federal and Provincial Crown Land
Sub-division of Provincial Crown Land
Rights-of-way:

- Township
- District lot/Township section/Indian reserve
- Mineral claim/Coal or Phosphate licence
- Rights-of-way, transportation
- 1/4 section/Foreshore lot/Subdivision/ Rights-of-way, utilites
- Cadastral tie

For complete reference to symbols, see "Specifications and Guidelines for Digital Baseline Mapping at 1:20 000" published by the Ministry of Crown Lands.

Notes

Digital data and additional copies of this map are available through MAPS-BC, Surveys and Resource Mapping Branch, Ministry of Crown Lands, Parliament Buildings, Victoria B.C. V8V 1X4



Approximate Mean Declination 1992
for Centre of Map
Decreasing 12.3' Annually

93K.059	93K.060	93J.051
93K.049	93K.050	93J.041
93K.039	93K.040	93J.031

Adjoining Sheet Index in the British Columbia Geographic System.

00·04 (1)

This map was produced in 1992, for the B.C. Ministry of Crown Lands, under its Terrain Resource Information Management (TRIM) initiative, by the Digital Mapping Group Limited (DMG), from 1:70,000 scale aerial photography flown in July, 1984

OF BRITISH COLUMBIA
Crown Lands
Resource Mapping Branch

Universal Transverse Mercator Projection
North American Datum - NAD83
UTM Zone 10

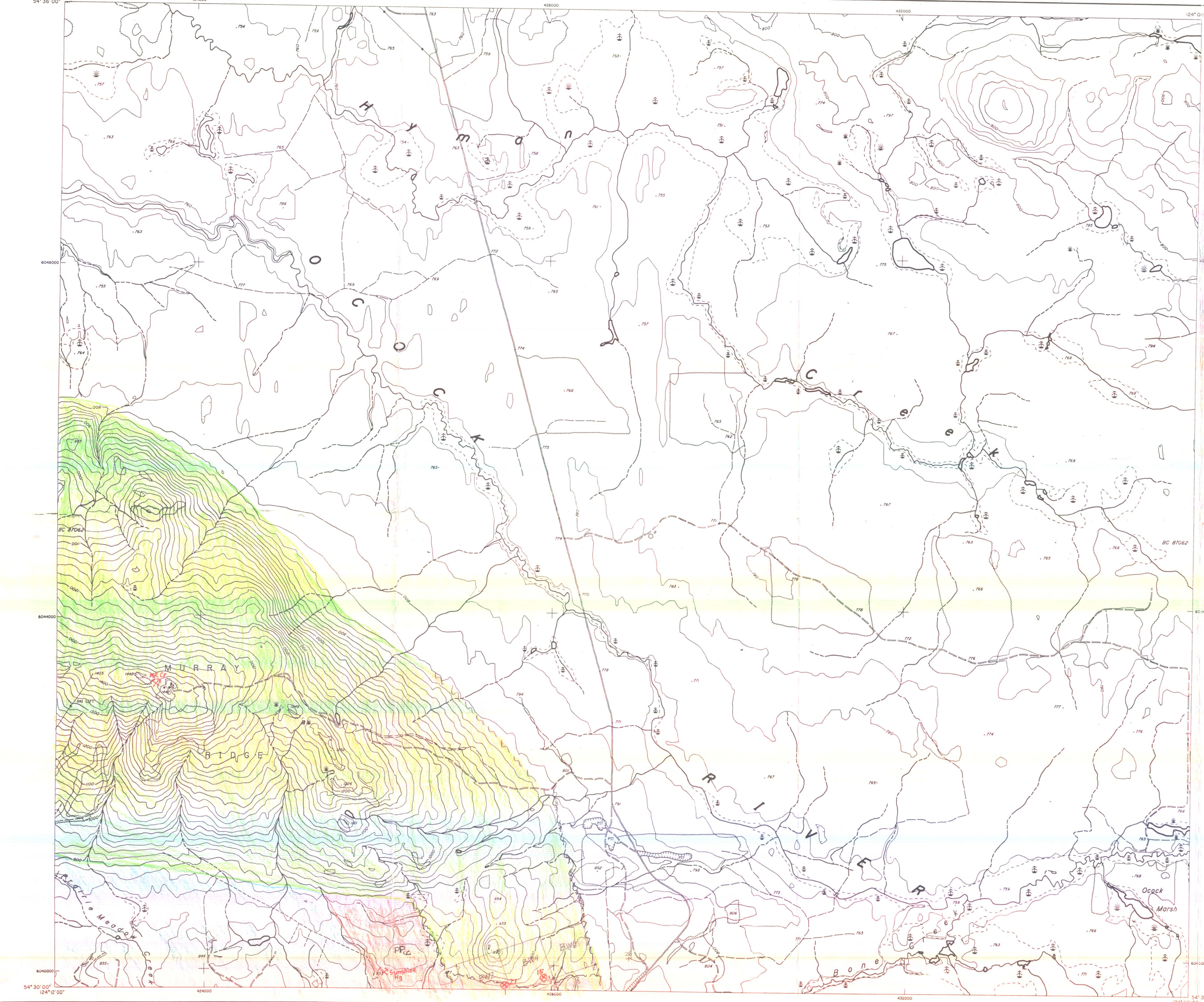
Land District:
Land Title Dist.:
Latest Plan No.: Date:

SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES

Contours generated from Digital Elevation Model.
Contour interval 20 metres.
Elevations in metres above Mean Sea Level.

DIGITAL DATA AVAILABLE			
PLANIMETRY	☒	CONTOUR	☒
CADASTRAL	☐	DEM	☒

93K.050 DIGITAL



LEGEND

Transportation

Road, paved
Road, gravel
Road, rough
Trail/Cutline/Seismic line
Railway, single track
Railway, double track
Railway, multiple track
Railway, abandoned
Wall, retaining
Cut/Fill
Bridge, to scale, symbolized
Tunnel, to scale, symbolized

Landmark features

Building, to scale, symbolized
Built up area
Fence
Transmission line
Tower

Drainage and related features

Coastline/River/Stream, definite
Coastline/River/Stream, indefinite
River/Stream, intermittent
River/Stream, split
Lake, definite
Lake, indefinite
Dyke
Flooded land
Swamp/Marsh
Beaver dam
Dock/Wharf/Pier, symbolized
Island, symbolized
Water level ± 206

Relief features

Contour, index, definite (200)
Contour, intermediate, definite
Contour, intermediate, indefinite
Contour, intermediate, depression
Spot height (492 •)

Vegetation

Wooded area

Control data

Control point, horizontal, permanently marked △ 86HI234
Control point, vertical, permanently marked ⊙ 86HA456

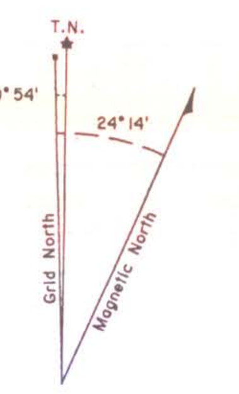
Cadastral

Surveys of Federal and Provincial Crown Land
Sub-division of Provincial Crown Land
Rights-of-way:
Township
District lot/Township section/Indian reserve
Mineral claim/Coal or Phosphate licence
Rights-of-way, transportation
1/4 section/Foreshore lot/Subdivision/ Right-of-way, utilities
Cadastral tie

'For complete reference to symbols, see "Specifications and Guidelines for Digital Baseline Mapping at 1:20 000" published by the Ministry of Environment, Lands, and Parks.

Notes

Digital data and additional copies of this map are available through MAPS-BC, Surveys and Resource Mapping Branch, Ministry of Environment, Lands, and Parks, Parliament Buildings, Victoria B.C. V8V 1X4.



Approximate Mean Declination 1994
for Centre of Map
Decreasing 13.3' Annually

93K.069	93K.070	93J.061
93K.059	**93K.060**	93J.051
93K.049	93K.050	93J.041

Adjoining Sheet Index in the British Columbia Geographic System.

00-04 (2)

This map was produced in 1994, for the B.C. Ministry of Environment, Lands & Parks, Surveys & Resource Mapping Branch, under it's Terrain Resource Information Management initiative., from 1: 70 000 scale aerial photography flown in July, 1987.

OF BRITISH COLUMBIA
Environment, Lands, Parks
Resource Mapping Branch

Universal Transverse Mercator Projection
North American Datum - NAD83
UTM Zone 10

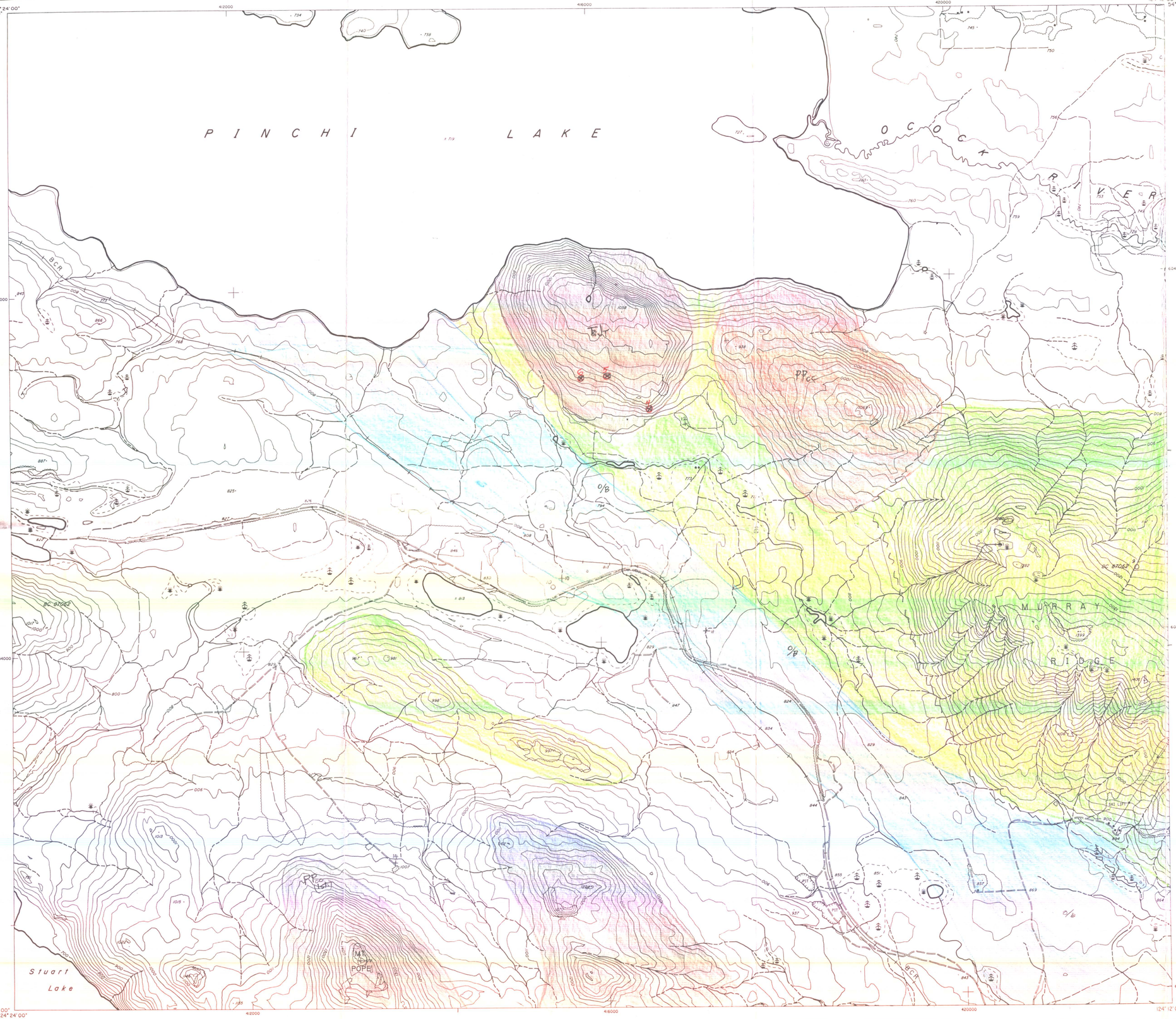
Land District:
Land Title Dist.:
Latest Plan No. Date:

SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES

Contours generated from Digital Elevation Model.
Contour interval 20 metres.
Elevations in metres above Mean Sea Level.

DIGITAL DATA AVAILABLE			
PLANIMETRY	☒	CONTOUR	☒
CADASTRAL	☐	DEM	☒

93K.060 DIGITAL



LEGEND

Transportation

- Road, paved
- Road, gravel
- Road, rough
- Trail/Cutline/Seismic line
- Railway, single track
- Railway, double track
- Railway, multiple track
- Railway, abandoned
- Wall, retaining
- Cut/Fill
- Bridge, to scale, symbolized
- Tunnel, to scale, symbolized

Landmark features

- Building, to scale, symbolized
- Built up area
- Fence
- Transmission line
- Tower

Drainage and related features

- Coastline/River/Stream, definite
- Coastline/River/Stream, indefinite
- River/Stream, intermittent
- River/Stream, split
- Lake, definite
- Lake, indefinite
- Dyke
- Flooded land
- Swamp/Marsh
- Beaver dam
- Dock/Wharf/Pier, symbolized
- Island, symbolized
- Water level ± 206

Relief features

- Contour, index, definite 200
- Contour, intermediate, definite
- Contour, intermediate, indefinite
- Contour, intermediate, depression
- Spot height 492+

Vegetation

- Wooded area

Control data

- Control point, horizotal, permanently marked △ 86HIZ34
- Control point, vertical, permanently marked ○ 86HA456

Cadastral

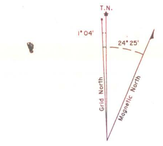
Surveys of Federal and Provincial Crown Land
Sub-division of Provincial Crown Land
Rights-of-way:

- Township
- District lot/Township section/Indian reserve
- Mineral claim/Coal or Phosphate licence
- Rights-of-way, transportation
- 1/4 section/Foreshore lot/Subdivision/ Rights-of-way, utilities
- Cadastral tie

For complete reference to symbols, see "Specifications and Guidelines for Digital Baseline Mapping at 1:20 000" published by the Ministry of Environment, Lands, and Parks.

Notes

Digital data and additional copies of this map are available through MAPS-BC, Surveys and Resource Mapping Branch, Ministry of Environment, Lands, and Parks, Parliament Buildings, Victoria B.C. V8V 1X4.



Approximate Mean Declination 1994
for Centre of Map
Decreasing 13.4' Annually

93K.068	93K.069	93K.070
93K.058	93K.059	93K.060
93K.048	93K.049	93K.050

Adjoining Sheet Index in the British Columbia Geographic System.

00-09 (3)

This map was produced in 1994, for the B.C. Ministry of Environment, Lands & Parks, Surveys & Resource Mapping Branch, under it's Terrain Resource Information Management Initiative, from 1:70 000 scale aerial photography flown in August, 1987.

OF BRITISH COLUMBIA
Environment, Lands, Parks
Resource Mapping Branch

Universal Transverse Mercator Projection
North American Datum - NAD83
UTM Zone 10

Land District:
Land Title Dist.:
Latest Plan No.: Date:

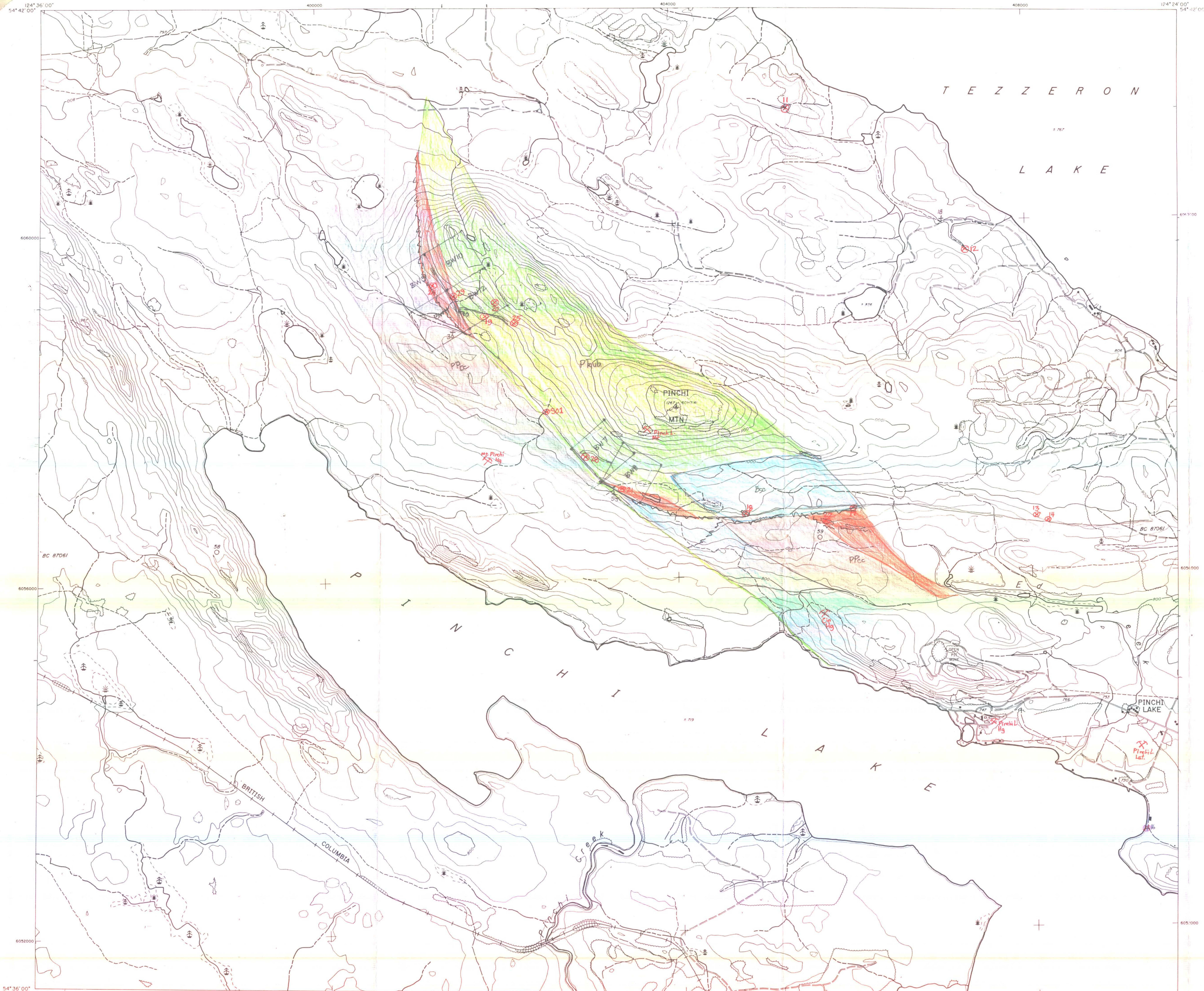
SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES

Contours generated from Digital Elevation Model.
Contour interval 20 metres.
Elevations in metres above Mean Sea Level.

DIGITAL DATA AVAILABLE

PLANIMETRY	☒	CONTOUR	☒
CADASTRAL	☐	DEM	☒

93K.059 DIGITAL



LEGEND

Transportation

- Road, paved
- Road, gravel
- Road, rough
- Trail/Cutline/Seismic line
- Railway, single track
- Railway, double track
- Railway, multiple track
- Railway, abandoned
- Wall, retaining
- Cut/Fill
- Bridge, to scale, symbolized
- Tunnel, to scale, symbolized

Landmark features

- Building, to scale, symbolized
- Built up area
- Fence
- Transmission line
- Tower

Drainage and related features

- Coastline/River/Stream, definite
- Coastline/River/Stream, indefinite
- River/Stream, intermittent
- River/Stream, split
- Lake, definite
- Lake, indefinite
- Dyke
- Flooded land
- Swamp/Marsh
- Beaver dam
- Dock/Wharf/Pier, symbolized
- Island, symbolized
- Water level ± 206

Relief features

- Contour, index, definite 200
- Contour, intermediate, definite
- Contour, intermediate, indefinite
- Contour, intermediate, depression
- Spot height 492 ·

Vegetation

- Wooded area

Control data

- Control point, horizotal, permanently marked △ 86H1234
- Control point, vertical, permanently marked ⊙ 86HA456

Cadastral

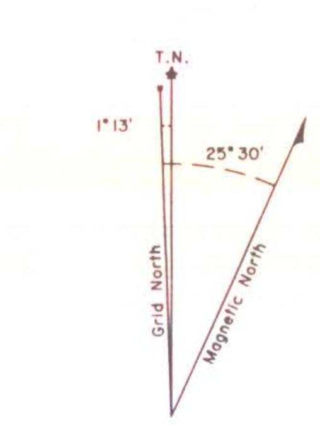
Surveys of Federal and Provincial Crown Land
Sub-division of Provincial Crown Land
Rights-of-way:

- Township
- District lot/Township section/Indian reserve
- Mineral claim/Coal or Phosphate licence
- Rights-of-way, transportation
- 1/4 section/Foreshore lot/Subdivision/Rights-of-way, utilites
- Cadastral tie

For complete reference to symbols, see "Specifications and Guidelines for Digital Baseline Mapping at 1:20 000" published by the Ministry of Crown Lands.

Notes

Digital data and additional copies of this map are available through MAPS-BC, Surveys and Resource Mapping Branch, Ministry of Crown Lands, Parliament Buildings, Victoria B.C. V8V 1X4



Approximate Mean Declination 1990
for Centre of Map
Decreasing 11.6' Annually

93K.077	93K.078	93K.079
93K.067	93K.068	93K.069
93K.057	93K.058	93K.059

Adjoining Sheet Index in the British Columbia Geographic System.

00-04 (4)

This map was produced in 1990 for the B.C. Ministry of Crown Lands, under its Terrain Resource Information Management (TRIM) initiative, by the Digital Mapping Group Limited (DMG), from 1:70 000 scale aerial photography flown in August, 1987.

F BRITISH COLUMBIA
own Lands
source Mapping Branch

Universal Transverse Mercator Projection
North American Datum - NAD83
UTM Zone 10

Land District:
Land Title Dist.:
Latest Plan No.: Date:

SCALE 1:20 000
200 0 200 400 600 800 1000 1200 1400
METRES

Contours generated from Digital Elevation Model.
Contour interval 20 metres.
Elevations in metres above Mean Sea Level.

DIGITAL DATA AVAILABLE			
PLANIMETRY	☒	CONTOUR	☒
CADASTRAL	☐	DEM	☒

93K.068 DIGITAL