LOG NO: 1006	RD.
ACTION:	
FILE NO:	

GEOCHEMICAL REPORT

RAINIER-WIDOW PROPERTY

FILMED

owner: Battle Mountain (Canada) Inc.
2910 - 390 Bay Street
Toronto, Ontario M5H 2Y2

operator: Battle Mountain (Canada) Inc.
2910 - 390 Bay Street
Toronto, Ontario M5H 2Y2

mining division: Nanaimo

location: approximately 40 km WSW of Port McNeill, B.C.
NTS: 92L/6
latitude: 50 deg. 20 min. N
longitude: 127 deg. 15 min. W

authors: M.E. Caron (geologist)
S.J. Hoffman (geochemist)

date: October 2, 1989

GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,151

SUMMARY

The collection of 170 soil samples on the Rainier-Widow property has outlined a 100 X 500 m. Au anomaly in an area underlain by andesitic volcanics of the Bonanza Group. This anomaly does not appear to have related anomalous pathfinder element levels. Current field work is not sufficient to fully characterize the nature of the Au anomaly but a bedrock source appears to be indicated.

RECOMMENDATIONS

The indicated 100 X 500 m. Au soil anomaly should be fully investigated through additional field work, consisting of the following:

1. detailed geologic mapping of the property at an appropriate scale, perhaps 1:2500.
2. additional soil sampling on cut and picketed grid lines, followed by multi-element analysis to aid in anomaly interpretation and definition.
3. completion of a ground magnetometer survey along the above noted grid lines.

TABLE OF CONTENTS

INTRODUCTION

Field work carried out on this property during 1989 consisted of the collection of 170 'B' horizon soil samples, along both grid lines and existing logging roads. The intent of this field program was to identify obvious soil anomalies as well as to establish the validity of specific field and laboratory techniques in use. Six man days were spent in the field devoted to sample collection. Samples were collected along 4.25 km of flagged grid line and access road.

LOCATION AND ACCESS

The Rainier-Widow property is located approximately 40 km WSW of Port McNeill, B.C., a short distance south of the historic Merry Widow and Kingfisher iron (magnetite) mines. The property is located on NTS sheet 92L/6 within the Nainaimo mining division at latitude 50 deg. 20 min. N and longitude 127 deg. 15 min. W. Access is achieved via all season gravel logging roads maintained by MacMillan Bloedel from either Port McNeill or Port Alice. Access along Rainier Creek as well as along the ridge between Rainier and Merry Widow Creeks is achieved through the use of steep, rough service logging roads.

LAND STATUS

The Rainier-Widow property consists of one 20-unit MGS claim and sixteen 2-post claims, as follows:

claim name	record #	units	record date	location date	expiry date
Rainier	3031	20	07/11/88	07/10/88	07/11/90
Widow 1	3132	1	10/05/88	09/15/88	09/15/90
Widow 2	3133	1	10/05/88	09/15/88	09/15/90
Widow 3	3134	1	10/05/88	09/15/88	09/15/90
Widow 4	3135	1	10/05/88	09/15/88	09/15/90
Widow 5	3136	1	10/05/88	09/15/88	09/15/90
Widow 6	3137	1	10/05/88	09/15/88	09/15/90
Widow 7	3138	1	10/05/88	09/16/88	09/16/90
Widow 8	3139	1	10/05/88	09/16/88	09/16/90
Widow 9	3140	1	10/05/88	09/16/88	09/16/90
Widow 10	3141	1	10/05/88	09/16/88	09/16/90
Widow 11	3142	1	10/05/88	09/16/88	09/16/90
Widow 12	3143	1	10/05/88	09/16/88	09/16/90
Widow 13	3144	1	10/05/88	09/16/88	09/16/90
Widow 14	3145	1	10/05/88	09/16/88	09/16/90
Widow 15	3146	1	10/05/88	09/16/88	09/16/90
Widow 16	3147	1	10/05/88	09/16/88	09/16/90

All of the above claims are owned by Battle Mountain (Canada) Inc., 2910-390 Bay Street, Toronto, Ontario M5H 2Y2.

GEOLOGY

The Rainier-Widow property is underlain by limestone of the Upper Triassic Quatsino Formation as well as by thin bedded argillite, tuffaceous argillite, black carbonaceous limestone, tuffs, agglomerates and flows of the Upper Triassic Bonanza Group. These volcaniclastic and sedimentary rocks are intruded by monzonite of the Cretaceous Coast Intrusions. The monzonite body has a more mafic diorite to gabbro border phase which is in direct contact with the older Bonanza and Quatsino rocks.

GEOCHEMISTRY - SOIL SURVEY, 1989

Sample Collection

Samples were collected at a 50 metre interval along topofil lines on 50 or 100 m spaced lines in the west or along logging roads in the east (Fig. 3). Soil samples are from the top of the `B' horizon at 20 to 40 cm depths. All sample sites were marked by plastic flagging tape.

Approximately 0.5 kg of soil were taken at each station, avoiding large pebbles, and placed in a wet strength, 8 by 24 cm Kraft paper envelope numbered on site. Samples were not prepared in the field. They were submitted to Bondar Clegg in Vancouver for a 9 element analysis determined by ICP following an aqua regia digestion. Gold was determined following a 10 gm fire assay fusion preconcentration - atomic absorption determination. Analytical methods are summarized in Appendix 1 and a list of data are provided in Appendix 2.

Method of Data Evaluation

The procedure used to interpret the histograms of Fig. 4 is found in Appendix 3. This strategy enables selection of appropriate intervals which are then used to size-code the geochemical data for presentation on maps of Fig. 5. The open circle represents lowest values for the survey; size coding of remaining data reflects increasing larger values as the "dots" increase in size. The largest concentrations of the survey are highlighted by a value notation.

Description of Results

1. Au (Fig. 5A)

   Most Au values are less than 5 ppb. Six anomalies are defined to exceed a 15 ppb threshold, reaching maximum values of 60 to 300 ppb. The largest anomaly, No. 1, trends northeastward along a ridge underlain by andesitic volcanics of the Bonanza group. The zone is over 600 m. long and averages about 200 m. wide and is open in the northwest and southwest. Anomalies 3 and 6 lie immediately downslope and may be related to zone 1. Anomaly 2 is on the south side of a creek and may also be related to the same bedrock feature that controls anomaly 1.

   Anomaly 2 and zones 4 and 5 in the east are not fully defined. Anomaly 4 is a homogeneous, seven point, feature along a major river valley. It is underlain by calcareous units of the Bonanza group. The possibility that the anomaly relates to river aluminum needs to be considered.

2. <u>As (Fig. 5B)</u>

As backgrounds are much higher in the east than in the west. The major Au anomaly is not As-rich, but As zones 1 and 2, which are high contrast anomalies, lie at lower elevations.

Road traverses in the east indicate As to be generally enhanced associated with calcareous units of the Bonanza Group (zones 4, 5 and 6). A comparable As-enriched zone, no. 3, is underlain by andesitic units of the Bonanza. Only Au anomaly 4 has an As accompaniment.

3. <u>Cu (Fig. C)</u>

The distribution of Cu appears to be controlled by underlying geology and, with the exception of Au anomaly 4 which is associated with the highest Cu values of the survey at 150 to 175 ppm, Cu enhancement does not correlate with Au.

Fluctuation of Cu concentrations in the east is homogeneous and parallels that of As. By contrast, fluctuations of Cu levels over the grid area in the west is noisy, suggesting sampling difficulties are adversely affecting the Cu distribution.

4. Ag (Fig. 5D)

All Ag values are at detection limits of 1 ppm or less.

5. Pb (Fig. 5E)

The Pb distribution is unusually noisy. Anomalies exceeding 15 ppm generally are represented by two point features. Zones 1 and 2 and several isolated points, ranging from 25 to 50 ppm define a band about 500 m. along a road which correlates with Cu and As enhancements suggest an underlying geologic control.

6. Zn (Fig. 5F)

A major difference in background Zn values is seen over the grid area in the west compared to the road traverses in the east. Almost all Zn values are less than 50 ppm in the west, with one anomalous zone (no. 1) which correlates with Mo zone 3 and As, zone 1. The area is not Au-rich and is underlain by andesitic volcanics. Zn values within zones 2 and 3 are similar at 125 to 500 ppm, and appear related to the same rock type.

Zn anomalies 4 and 5, and high background values of 125 to 175 ppm correlate with calcareous volcanics. Anomalies 4 and 5 are associated with Au zone 4.

7. W (Fig. 5G)

W values are either at or below a detection limit of 10 ppm, or are at 30 to 50 ppm values associated with the zone of highest Pb values. Even within W zone 1, the anomaly is heterogeneous.

8. Mo (Fig. 5H)

The Mo distribution is also noisy, with maximum values of 10 to 20 ppm often erratically distributed beside values less than 2 ppm. This suggests a sampling or analytical parameter is strongly influencing the Mo distribution.

Mo backgrounds are heterogeneously enhanced over two broad zones about 500 m. across. Zone 1 is underlain by Bonanza volcanics and zone 2, although underlain by calcareous units of the Bonanza, lies within 200 m. downslope of Bonanza volcanic units. The anomaly may thus reflect downslope dispersion. Mo does not correlate with Au.

9. Co (Fig. 5I)

Co, like As and Cu, is homogeneously distributed in the east but heterogeneously displayed in the west. Co follows Zn in the east, and perhaps correlates with Zn anomaly 1 in the west. A maximum values of 557 ppm in the west is highly unusual, and may relate to a Co occurrence.

10. Bi (Fig. 5J)

The Bi distribution follows Zn, Co, Cu, and As in the east, with several erratically high values. Bi enhancement also follows these elements over the eastern portion of the grid area. The large number of high Bi values is an unusual finding in the absence of significant anomalies for other elements.

Discussion of Results

A program of limited soil sampling was conducted on behalf of the Rainier-Widow project. The work identified several Au anomalies, which in general are not accompanied by anomalous concentrations of Au pathfinder elements (As, Bi, Mo, W) or base metals (Cu, Pb, Zn). One anomaly in particular is over 500 m. long where values are 50 to 300 ppb. The zone likely lies in a thin overburden environment along a ridge and should be evaluated in greater detail. Continued soil sampling is warranted to better define anomalous zones prior to conducting detailed follow-up.

Several concerns are suggested by the data. Major differences are seen in the degree of homogeneity over the western grid as compared to the eastern road traverses. High quality soil sampling is anticipated along roads where roadcuts make identification of the proper horizon straightforward. In the west soil pits had to be excavated and it is likely heterogeneity was introduced at the sampling stage. If Fe and Mn data were available, they would probably show that the erratic distributions of many of the pathfinder and base metal elements relate to scavenging by these soil components. It is also likely many of the low values are due to sampling of leached soil which would also be apparent in Fe and Mn data.

Besides sampling, the method of analysis appears to have introduced severe artifacts into the data. Detection limits for many of the elements, notably As, Pb, W, Mo, Co and Bi are too high and are contributing either to systematic line variations (As) or to the erratic element distribution. Enhanced values of W, Mo and Bi should not be considered accurate without confirmatory work if they are to be used to initiate follow-up.

Conclusions

A significant, moderate intensity, Au anomaly over 500 m. long has been identified in an area underlain by Bonanza volcanics. Several other Au zones have been defined, but additional sampling is recommended to fully outline all Au-rich zones prior to conducting detailed follow-up.

Recommendations

1. Continued soil sampling is warranted to fully outline anomalous zones. A 50 x 100 m. soil grid is appropriate at this stage.

2. The western soil grid should be augmented by additional lines, using the sample density recommended above. The

existing grid would benefit from resampling.

3. The laboratory of choice uses an aqua regia digestion prior to ICP analysis. They do not appear to provide high quality data and should be changed. The use of multi-element analysis, including determination of Fe and Mn amongst other elements important to determining sampling quality (Ca, Sr, Al) will provide significant benefits to the program.

4. Limited follow-up using mapping/prospecting techniques should accompany the work recommended in (2) above. Other followup recommendations would best await completion of preliminary follow-up.

Summary

One large Au anomaly has been defined in an area underlain by andesitic volcanics of the Bonanza group. The zone is over 500 m. long and averages 100 m. wide where values exceed 15 ppb to maxima of 200 to 300 ppb. It lies along a ridge, but is not accompanied by anomalous levels of normal Au pathfinder elements or base metals. Three other Au anomalies were identified in regional roadside sampling, but these require more work to fully appreciate their location.

Soil data have been adversely affected by sampling noise over a grid area to the west. This limits the ability of the data to define trends which would be useful to an interpretation. The analytical methodology is also not the most appropriate. Although data for 10 elements are available, distributions of several of these, such as W and Bi are not believable. Higher quality sampling and a change of laboratory are indicated for future applications.

APPENDIX 1

Sample Preparation and Analytical Procedures

1. Bondar Clegg

SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Sample preparation for soil samples: The field material is dried at approximately 35 degrees C. for about 36 hours. Excessively wet samples require an extended drying period. The dried material is then screened through an 80 mesh sieve. The -80 mesh material is then homogenized and bagged.

Procedure for geochemical gold analysis: A prepared sample of 30 grams is mixed with a flux which is composed mainly of lead oxide. The proportions of the flux components are adjusted depending on the nature of the sample. Silver is added to help collect the gold. The samples are fused at 1950 degrees F. until a clear melt is obtained. The lead button which contains the precious metals is then separated from the slag. Heating in the cupellation furnace separates the lead from the precious metals. The precious metal beads that remain are transferred to test tubes and dissolved with aqua-regia and the resulting solution is analyzed using Atomic Absorption or a Plasma Emission Spectrograph by comparing the readings of these solutions with readings of standard solutions. To prevent contamination, test tubes and cupels are used only once so there is no possibility of cross contamination. The fusion crucibles are cleared before re-use by discarding any which contained high samples. During the analysis, a blank solution is run between each sample to ensure that there is no carry-over.

APPENDIX 2

List of Geochemical Data

SELECTION # 1

SAMPLE TYPE(S)	ALL
BEDROCK TYPE(S)	ALL
SOIL HORIZON(S)	ALL
SAMPLE TEXTURE(S)	ALL
OVERBURDEN ORIGIN(S)	ALL
LABORATORY-SIZE FRACTION-EXTRACTION(S)	ALL
PAIR STATUS	ALL

REC#		SMPL# UTM-E UTM-N		MO	CU	PB	ZN	NI	U	MN	FE	AG
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360	5089103B	110180B8N6263745577589	92L06	.5	46	15	120					.25
361	5089103B	110181B8N6263255577588	92L06	4	27	2.5	116					.25
362	5089103B	110182B8N6262745577586	92L06	4	26	2.5	154					.25
363	5089103B	110183B8N6262255577587	92L06	3	43	7	109					.25
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369	5089103B	110006B8N6260285577505	92L06	3	86	2.5	207					.25
370	5089103B	110007B8N6260785577516	92L06	4	55	2.5	134					.25
371	5089103B	110008B8N6261265577507	92L06	5	59	13	245					.25
372	5089103B	110009B8N6261725577491	92L06	3	61	33	290					.25
373	5089103B	110010B8N6262165577470	92L06	.5	85	14	392					.25
374	5089103B	110011B8N6262665577451	92L06	3	173	10	157					.25
375	5089103B	110012B8N6263185577440	92L06	3	156	6	161					.25
376	5089103B	110013B8N6263645577431	92L06	2	148	19	213					.25
377	5089103B	110014B8N6264135577431	92L06	3	160	10	190					.25
378	5089103B	110015B8N6261975577458	92L06	2	95	9	153					.25
379	5089103B	110016B8N6261805577429	92L06	1	61	17	132					.25
380	5089103B	110017B8N6261505577388	92L06	2	66	2.5	116					.25
381	5089103B	110018B8N6261215577344	92L06	5	60	2.5	119					.25
382	5089103B	110019B8N6260965577303	92L06	5	47	2.5	110					.25
383	5089103B	110020B8N6260695577259	92L06	7	61	2.5	134					.25
384	5089103B	110021B8N6260425577217	92L06	3	45	2.5	124					.25
385	5089103B	110022B8N6260195577169	92L06	2	53	21	152					.25
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388	5089103B	110025B8N6259375577040	92L06	3	83	17	181					.25
389	5089103B	110026B8N6259165576995	92L06	1	78	2.5	176					.25
390	5089103B	110027B8N6258935576950	92L06	5	45	2.5	132					.25
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393	5089103B	110030B8N6258745576802	92L06	4	34	2.5	168					.25
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454	5089103B	110096B8N6235245577624		92L06	.5	8	7	65	.25
455	5089103B	110097B8N6234765577628		92L06	.5	7	2.5	11	.25
456	5089103B	110098B8N6233735577629		92L06	1	11	2.5	33	.25
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465	5089103B	110112B8N6240965577181		92L06	.5	158	2.5	43	.25
466	5089103B	110113B8N6240615577186		92L06	.5	48	2.5	51	.25
467	5089103B	110114B8N6240215577182		92L06	2	23	2.5	29	.25
468	5089103B	110115B8N6244025577538		92L06	22	48	11	86	.25
469	5089103B	110116B8N6243565577538		92L06	2	22	9	360	.25
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471	5089103B	110089	6238725577629	92L06					
472	5089103B	110092	6237255577629	92L06					
473	5089103B	110104	6244045577181	92L06					
474	5089103B	110117	6243115577537	92L06	2	40	14	51	.25
475	5089103B	110118	6242655577538	92L06					
476	5089103B	110119	6242175577538	92L06	.5	4	24	15	.25
477	5089103B	110120	6241695577539	92L06	.5	16	22	40	.25
478	5089103B	110121	6241355577537	92L06	.5	55	2.5	45	.25
479	5089103B	110122	6240985577538	92L06	.5	7	12	27	.25
480	5089103B	110123	6240485577537	92L06	.5	34	2.5	31	0.7
481	5089103B	110124	6239985577536	92L06	.5	42	2.5	24	.25
482	5089103B	110125	6239475577537	92L06	.5	34	29	53	.25
483	5089103B	110126	6238955577537	92L06	.5	24	2.5	21	.25
484	5089103B	110127	6238445577535	92L06	.5	14	2.5	18	.25
485	5089103B	110128	6237945577536	92L06	.5	46	2.5	44	.25
486	5089103B	110141	6243995577767	92L06	.5	7	2.5	29	.25
487	5089103B	110142	6243485577766	92L06	.5	3	6	9	.25
488	5089103B	110143	6242985577766	92L06	.5	15	2.5	19	.25
489	5089103B	110144	6242495577767	92L06	3	22	7	27	.25
490	5089103B	110145	6241975577767	92L06	.5	51	11	99	.25
491	5089103B	110146	6241485577768	92L06	2	18	2.5	15	.25
492	5089103B	110147	6240985577765	92L06	5	30	2.5	21	.25
493	5089103B	110148	6240475577766	92L06	5	100	2.5	62	0.6
494	5089103B	110149	6239985577764	92L06	6	29	5	31	.25
495	5089103B	110150	6239445577766	92L06	11	28	7	46	.25
496	5089103B	110151	6238935577764	92L06	.5	63	13	35	.25
497	5089103B	110152	6238475577765	92L06	2	105	2.5	81	.25
498	5089103B	110153	6237965577766	92L06	15	21	12	65	.25

499	5089103B	110154	6237475577765	92L06	.5	6	2.5	33	.25
500	5089103B	110155	6236975577764	92L06	8	8	2.5	36	.25
501	5089103B	110156	6236475577764	92L06	4	3	2.5	19	.25
502	5089103B	110157	6235965577764	92L06	2	6	5	24	.25
503	5089103B	110158	6235455577764	92L06	.5	38	107	395	.25
504	5089103B	110159	6234955577762	92L06	1	4	6	26	.25
505	5089103B	110160	6234695577764	92L06	.5	6	6	28	.25
506	5089103B	110161	6253735577495	92L06	3	14	2.5	34	.25
507	5089103B	110162	6253295577476	92L06	3	21	6	61	.25
508	5089103B	110163	6252855577449	92L06	5	28	2.5	75	.25
509	5089103B	110164	6252395577420	92L06	17	30	31	97	.25
510	5089103B	110165	6251985577388	92L06	8	34	2.5	374	.25
511	5089103B	110166	6251755577341	92L06	13	57	42	236	.25
512	5089103B	110167	6251585577293	92L06	4	27	6	72	.25
513	5089103B	110168	6251445577252	92L06	6	32	8	79	.25
514	5089103B	110169	6251595577349	92L06	6	65	14	165	.25
515	5089103B	110170	6251295577312	92L06	8	48	50	188	.25
516	5089103B	110171	6251075577271	92L06	4	58	13	137	.25
517	5089103B	110172	6250795577226	92L06	7	48	50	156	.25
518	5089103B	110173	6250455577189	92L06	4	42	10	128	.25
519	5089103B	110174	6250145577151	92L06	7	40	48	115	.25
520	5089103B	110175	6249785577113	92L06	7	26	59	110	.25
521	5089103B	110176	6249415577077	92L06	7	39	11	160	.25
522	5089103B	110177	6249075577040	92L06	9	66	13	282	.25
523	5089103B	110129	6258455577350	92L06	3	29	6	102	.25
524	5089103B	110130	6258395577402	92L06					
525	5089103B	110131	6258345577453	92L06	3	33	6	140	.25
526	5089103B	110132	6258115577474	92L06	4	30	8	153	.25
527	5089103B	110133	6257585577472	92L06	12	39	14	354	.25
528	5089103B	110134	6257105577492	92L06	4	31	2.5	270	.25
529	5089103B	110135	6256645577510	92L06	2	43	2.5	348	.25
530	5089103B	110136	6256165577525	92L06	10	49	15	141	.25
531	5089103B	110137	6255695577532	92L06	3	29	7	68	.25
532	5089103B	110138	6255195577531	92L06	.5	26	2.5	62	.25
533	5089103B	110139	6254675577526	92L06	3	23	11	59	.25

REC#	SMPL#	CO	AU	AU?	AS	HG	SB	SN	W	F	TH	CD	BI	V	BA	SR	SI	AL	CA	MG	NA	K	AE1	AE2	TI
358	110178	24	36		86				5				10												
359	110179	21	18		66				5				6												
360	110180	12	2.5		48				5				6												
361	110181	12	2.5		75				5				8												
362	110182	14	2.5		60				5				10												
363	110183	9	2.5		75				5				7												
364	110001	11	2.5		95				5				8												
365	110002	15	2.5		115				5				10												
366	110003	7	18		110				5				9												
367	110004	12	7		37				5				5												
368	110005	7	6		28				5				7												
369	110006	28	13		29				5				5												
370	110007	20	2.5		141				5				8												
371	110008	27	12		69				5				9												
372	110009	42	6		102				5				21												

373	110010	31	20	124	5	21
374	110011	23	16	97	5	9
375	110012	23	67	93	5	11
376	110013	29	18	100	5	19
377	110014	24	38	84	5	8
378	110015	23	54	39	5	4
379	110016	24	2.5	139	5	20
380	110017	19	5	270	5	9
381	110018	12	2.5	85	5	6
382	110019	9	2.5	89	5	8
383	110020	9	2.5	68	5	7
384	110021	13	2.5	110	5	7
385	110022	13	2.5	2.5	5	24
386	110023	19	2.5	88	5	9
387	110024	13	2.5	70	5	7
388	110025	26	2.5	2.5	5	10
389	110026	24	2.5	64	5	8
390	110027	20	2.5	99	5	10
391	110028	20	2.5	101	5	8
392	110029	24	9	114	5	9
393	110030	26	2.5	63	5	9
394	110031	14	2.5	23	5	7
395	110032	13	10	12	5	23
396	110033	13	2.5	2.5	5	8
397	110034	18	2.5	26	5	9
398	110035	19	7	34	5	9
399	110036	6	6	28	5	6
400	110037	6	2.5	28	5	6
401	110038	12	2.5	105	5	9
402	110039	10	10	57	5	7
403	110040	11	79	59	5	8
404	110041	15	40	34	5	5
405	110042	14	12	33	5	8
406	110043	6	12	69	5	5
407	110044	14	2.5	18	5	8
408	110045	17	10	32	5	8
409	110046	21	2.5	95	5	10
410	110047	19	2.5	76	5	5
411	110048	16	2.5	66	5	7
412	110049	2	88	52	5	1
413	110050	12	2.5	50	5	8
414	110051	18	2.5	72	5	8
415	110052	23	7	111	5	11
416	110053	11	6	154	5	9
417	110054	12	2.5	72	5	12
418	110055	16	2.5	40	5	7
419	110056	40	2.5	95	5	9
420	110057	6	26	22	5	4
421	110058	2	36	36	5	1
422	110059	16	2.5	47	5	5
423	110060	2	66	31	5	1

424	110061	4	30	6	5	7
425	110062	5	39	8	5	5
426	110063	12	53	58	28	15
427	110064	3	220	10	5	3
428	110065	24	86	88	5	9
429	110066	6	2.5	8	5	3
430	110067	58	23	20	5	5
431	110068	557	2.5	16	5	5
432	110069	10	6	10	5	4
433	110070	.5	2.5	49	5	1
434	110071	8	2.5	5	5	4
435	110072	4	2.5	11	5	3
436	110073	1	2.5	34	5	1
437	110075	6	2.5	17	5	2
438	110078	19	5	232	5	12
439	110079	11	55	96	5	9
440	110080	14	122	46	5	7
441	110081	3	123	8	5	2
442	110082	13	2.5	2.5	5	13
443	110083	8	16	23	5	9
444	110084	11	11	19	5	8
445	110085	6	2.5	8	5	4
446	110086	10	15	10	5	8
447	110087	11	2.5	2.5	5	7
448	110088	5	17	2.5	5	5
449	110090	3	7	6	5	6
450	110091	1	2.5	2.5	5	3
451	110093	4	2.5	7	5	6
452	110094	7	2.5	17	5	5
453	110095	17	2.5	2.5	5	10
454	110096	3	2.5	18	5	5
455	110097	2	2.5	2.5	5	4
456	110098	9	2.5	2.5	5	6
457	110099	3	2.5	2.5	5	8
458	110105	.5	8	2.5	5	7
459	110106	.5	2.5	27	5	1
460	110107	4	2.5	26	5	3
461	110108	13	18	44	5	8
462	110109	9	150	37	5	8
463	110110	7	96	27	5	8
464	110111	16	10	43	5	6
465	110112	7	2.5	2.5	5	7
466	110113	14	2.5	26	5	6
467	110114	5	2.5	30	5	6
468	110115	24	2.5	105	5	20
469	110116	16	2.5	88	5	9
470	110074					
471	110089					
472	110092					
473	110104					
474	110117	40	2.5	118	5	8

475	110118					
476	110119	2	2.5	16	5	1
477	110120	63	8	39	5	6
478	110121	8	320	56	5	11
479	110122	3	2.5	13	5	1
480	110123	43	145	29	5	9
481	110124	7	14	32	5	6
482	110125	20	2.5	27	5	8
483	110126	16	2.5	34	5	4
484	110127	2	2.5	11	5	7
485	110128	6	2.5	54	5	7
486	110141	.5	2.5	42	5	1
487	110142	.5	65	2.5	5	1
488	110143	3	13	10	5	4
489	110144	3	2.5	20	5	4
490	110145	18	9	14	5	8
491	110146	5	21	7	5	9
492	110147	5	2.5	42	5	7
493	110148	57	7	122	5	7
494	110149	14	2.5	68	5	8
495	110150	18	41	96	5	7
496	110151	11	2.5	17	5	6
497	110152	25	2.5	25	5	9
498	110153	8	2.5	32	5	8
499	110154	1	2.5	27	5	2
500	110155	6	2.5	40	5	7
501	110156	.5	2.5	10	5	1
502	110157	12	2.5	17	5	4
503	110158	22	2.5	69	5	8
504	110159	.5	2.5	10	5	4
505	110160	.5	2.5	40	5	1
506	110161	5	2.5	2.5	5	8
507	110162	11	2.5	20	5	10
508	110163	12	2.5	2.5	5	10
509	110164	12	2.5	58	28	15
510	110165	14	2.5	33	5	10
511	110166	24	6	88	5	9
512	110167	11	2.5	16	5	10
513	110168	13	2.5	45	5	12
514	110169	15	2.5	60	5	11
515	110170	20	2.5	689	42	16
516	110171	29	2.5	119	5	12
517	110172	13	7	184	30	1
518	110173	22	2.5	84	5	11
519	110174	7	2.5	2.5	34	19
520	110175	11	2.5	2.5	49	32
521	110176	19	2.5	51	5	11
522	110177	26	2.5	74	5	10
523	110129	12	6	66	5	10
524	110130					
525	110131	17	2.5	24	5	9

526	110132	11	7	81	5	10
527	110133	32	2.5	75	5	10
528	110134	35	2.5	89	5	11
529	110135	30	2.5	106	5	26
530	110136	25	11	81	5	11
531	110137	14	6	82	5	10
532	110138	10	2.5	39	5	8
533	110139	5	2.5	23	5	14

REC#	SMPL#	P	LA	AE3	B	CR	AE5	AE6	GRIDE	GRIDN
358	110178									
359	110179									
360	110180									
361	110181									
362	110182									
363	110183									
364	110001									
365	110002									
366	110003									
367	110004									
368	110005									
369	110006									
370	110007									
371	110008									
372	110009									
373	110010									
374	110011									
375	110012									
376	110013									
377	110014									
378	110015									
379	110016									
380	110017									
381	110018									
382	110019									
383	110020									
384	110021									
385	110022									
386	110023									
387	110024									
388	110025									
389	110026									
390	110027									
391	110028									
392	110029									
393	110030									
394	110031									
395	110032									
396	110033									
397	110034									
398	110035									
399	110036									

APPENDIX 3

Method of Histogram Interpretation

RULES FOR CHOICE OF SIZE CODING OR CONTOURING INTERVALS

(1) Examine both arithmetic and logarithmic histograms for each geochemical survey. Choose the histogram which most closely approximates a normal (or lognormal) distribution. If several populations are present on the histogram, subjectively divide the data into a series of (overlapping ?) normal or lognormal distributions. Always avoid interpreting histograms which are strongly skewed. Portions of arithmetic or logarithmic histograms may be chosen over specific metal concentration intervals, if this allows for the best portrayal of the data in graphical form.

(2) Choose, as two of the coding intervals, points which represent between 90% and 95%, and 95% and 97.5% of the data; two different numbers. These choices highlight from 1 in 10 to 1 in 20 samples which are considered slightly anomalous and definately anomalous, respectively. These limits are optimistic in that the two categories are defined to be anomalous regardless of the distribution of values on the remainder of the histogram. A rigorous statistical approach would suggest that only values above the 97.5 percentile should be considered anomalous. Choice of any of the above percentiles is entirely subjective and meant to highlight the highest values of the survey.

(3) Divide the remaining portion of the histogram into recognizable populations. The dividing point of each of these populations is chosen as a coding interval. Artifacts introduced as a consequence of detection limit considerations are ignored. These artificial breaks in the histogram can be recognized by referring to the laboratory reports and scanning data results.

(4) For each population, choose one or two numbers which correspond to the 90% and 95% cumulative frequencies for that population (1 in 10 and 1 in 20 samples for that population). These will also be used to represent anomalous conditions for each population. Coding intervals can be no closer than 2X the detection limit for each element being considered.

(5) A maximum of six numbers can be chosen to plot symbol maps. This number is dictated by the ability to present data in graphical form with sufficiently different symbol sizes for them to be easily distinguishable, particularly if maps are to be reduced. The seven defined concentration classes are normally sufficient to represent geochemical data on a map. More intervals can be chosen if data are to be contoured. Avoid choosing arithmetic intervals without considering rules (1) and (4).

(6) Maps plotted using the preceeding instructions might result in two areas being distinguished from each other by a relatively uniform density of symbol sizes, yet only poor contrast anomalies are indicated. Difference between the two areas, A and B, might be due to underlying geology, overburden character, soils etc. Whatever the cause, the data are not well displayed. If the underlying control distinguishing A and B can be recognized, the data can be divided and re-interpreted following steps (1) to (5). Two sets of maps can be drawn, or both sets of interpreted data can be plotted on a single map. For such superimposed geochemical maps, symbol sizes lose their absolute meaning but assume a more important stance, that of reflecting anomalous conditions regardless of the underlying control. To illustrate, consider the case where A and B are areas underlain by very different geology. Anomalous conditions for low background rock types might be concentrations which are much lower than average values for the high background rock types. Nevertheless, anomalies defined in each area are considered significant. Reliance on absolute concentrations can be misleading in such cases.

APPENDIX 4

Statement of Qualifications

S. J. Hoffman

M. E. Caron

CERTIFICATE OF AUTHOR

List of Qualifications - S.J. Hoffman

BSc 1969 - McGill University (Hons., Geology and Chemistry)

MSc 1972 - The University of British Columbia (Geochemistry)

PhD 1976 - The University of British Columbia (Geochemistry)

List of Publications (to January 1989)

2 - Theses (unpublished)

14 - Scientific papers in referred journals (3 in the last 3 years)

1 - Published Geochemical Manual (report writing)

1 - Unpublished Manual - Organization of a Geochemical Symposium

2 - Book (Reviews in Economic Geology - Volume 3, Writing Geochemical Reports)

2 - Scientific papers in unreferred journals

1 - Scientific paper in preparation

List of Memberships

1. Member Geological Association of Canada, since 1967; Fellow since 1986
2. Canadian Institute of Mining and Metallurgy, since 1973
3. Association of Exploration Geochemists, since 1973
4. American Society of Agronomy, since 1973
5. Geochemical Society, since 1983
6. International Association of Geochemistry and Cosmochemistry, since 1986

Other Organizations

1. Association of Exploration Geochemists council member of symposium committee chairman, 1980-1986, 1988-1990 president (1987-1988)
2. Lecturer, B.C. Department of Mines Prospecting Course, (1977-1987), B.C. & Yukon Chamber of Mines (1987,1988), Northwest Mining Association (1979, 1985, 1988), Brokers Course
(1984, 1985)
3. Chairman, GOLD-81 and GEOEXPO/86 Symposia

Stan Hoff

CERTIFICATE OF AUTHOR

List of Qualifications - M.E. Caron

B.Sc. 1974 - University of British Columbia (Hons., Geology)

List of Publications

B.Sc. thesis - University of British Columbia (unpublished)

Relevant Experience

1974 to 1985 - field geologist, Duval Corporation, extensive exploration work in the western and southeastern United States.

1985 to 1989 - senior geologist, Battle Mountain Gold Company, exploration carried out primarily in Nevada and British Columbia.

APPENDIX 5

Statement of Costs

STATEMENT OF COSTS

Geochemistry: 170 samples @ $16.59 each =	$2,820.30
Salaries:	
F.J. Andersen: 3 days @ $125.00/day =	375.00
G.L. Dawson: 3 days @ $155/day =	465.00
Vehicle costs:	
rental: $3,000.00/month X 3 days =	100.00
fuel =	63.00
total: =	$3,823.30

FIGURE 1

Location and Access

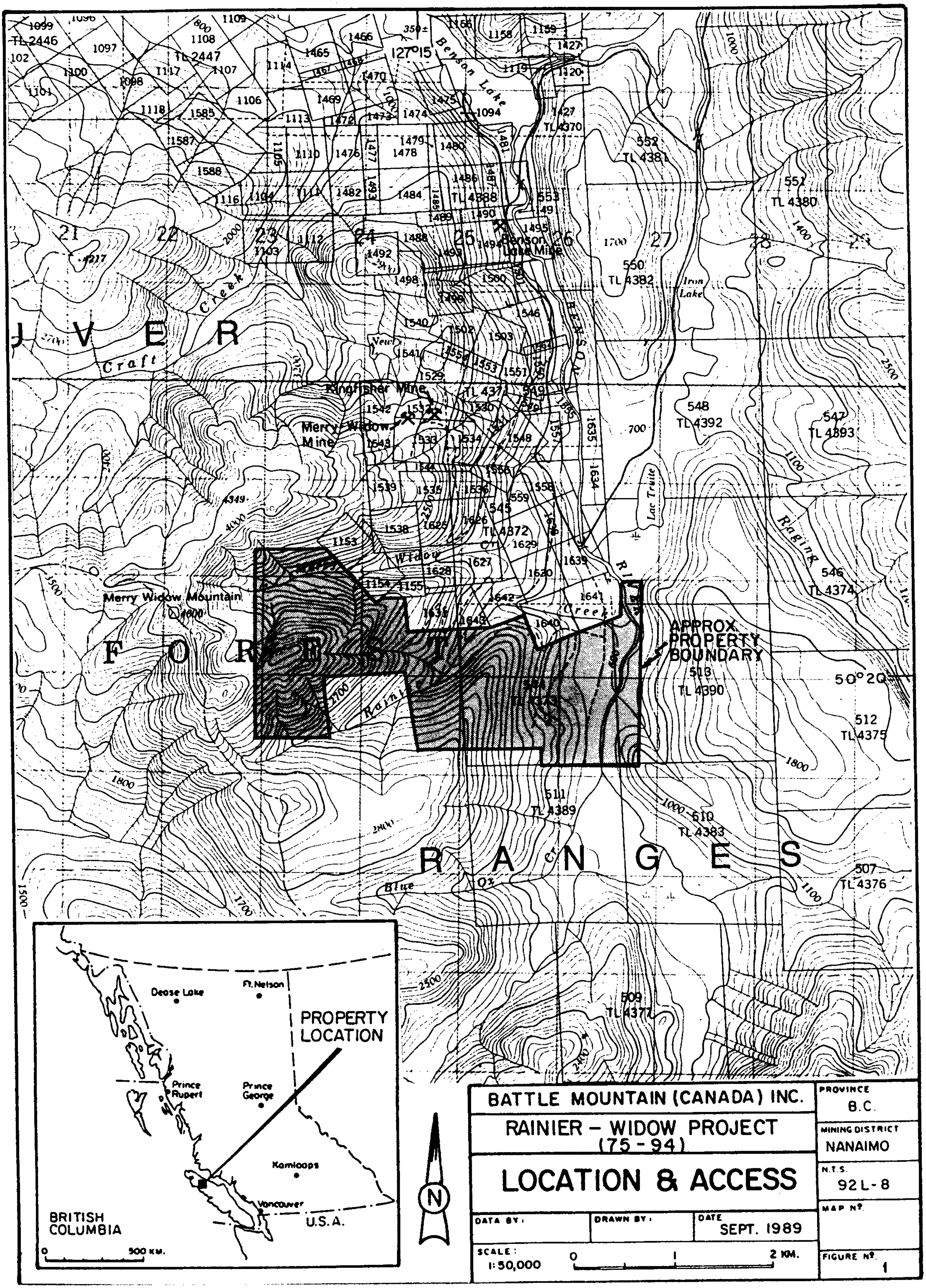
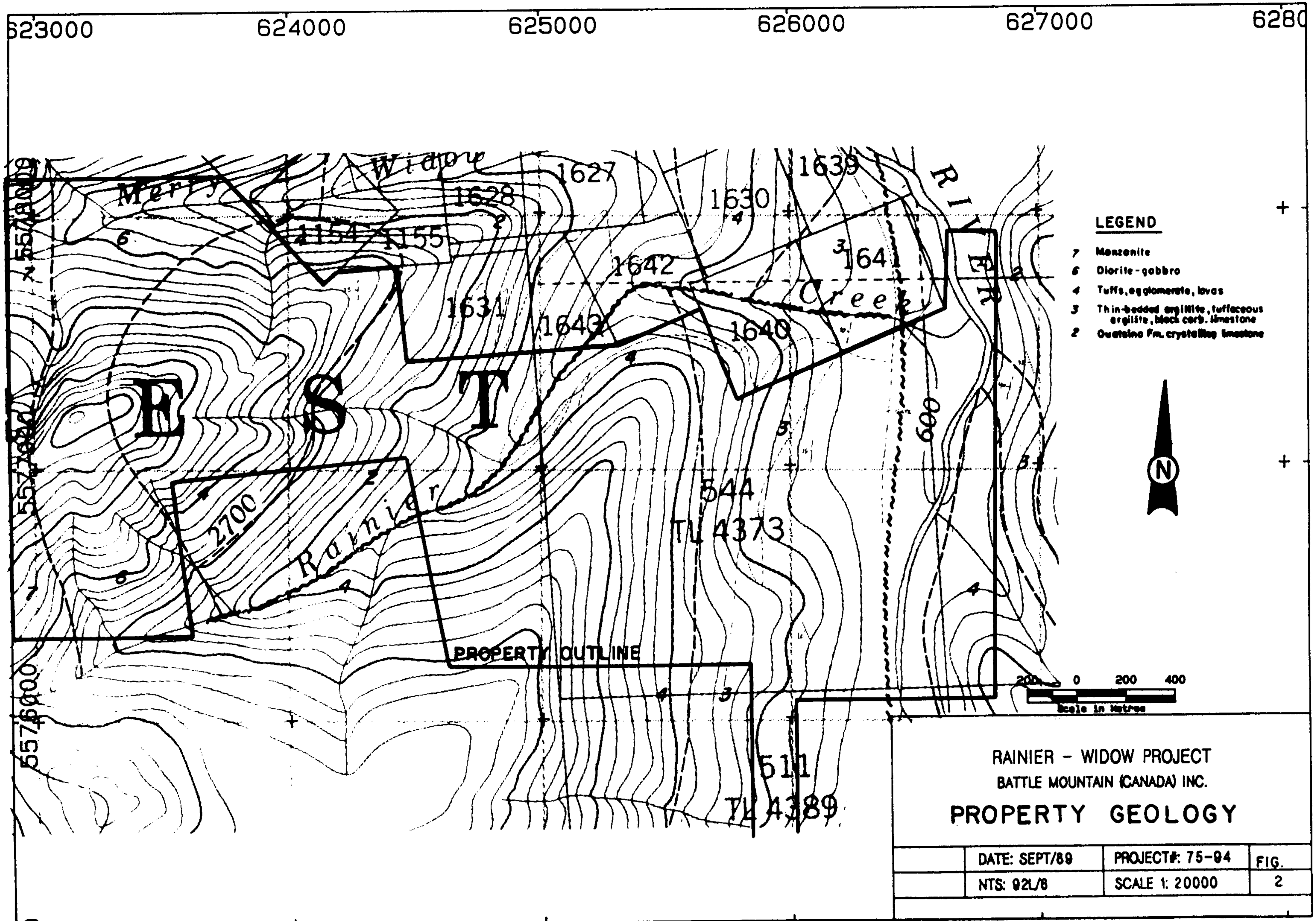

BATTLE MOUNTAIN (CANADA) INC.
RAINIER - WIDOW PROJECT
(75 - 94)
LOCATION & ACCESS
PROVINCE
B.C.
MINING DISTRICT
NANAIMO
N.T.S.
92 L - 8
MAP No.
DATA BY:
DRAWN BY:
DATE
SEPT. 1989
SCALE:
1:50,000
0
1
2 KM.
FIGURE No.
1
PROPERTY LOCATION
BRITISH COLUMBIA
U.S.A.
Dease Lake
Ft. Nelson
Prince Rupert
Prince George
Kamloops
Vancouver
0
500 KM.
APPROX. PROPERTY BOUNDARY
Merry Widow Mountain
Merry Widow Mine
Kingfisher Mine
Benson Lake Mine
Benson Lake
Iron Lake
Lac Truite
Craft
Creek
Widow
Raging
Blue
Ox
Cr.
50°20'
F O R E S T
R A N G E S
TL 4390
TL 4389
TL 4383
TL 4392
TL 4393
TL 4374
TL 4375
TL 4376
TL 4377
TL 4380
TL 4381
TL 4382
TL 4370
TL 4372

FIGURE 2

Geology



RAINIER - WIDOW PROJECT

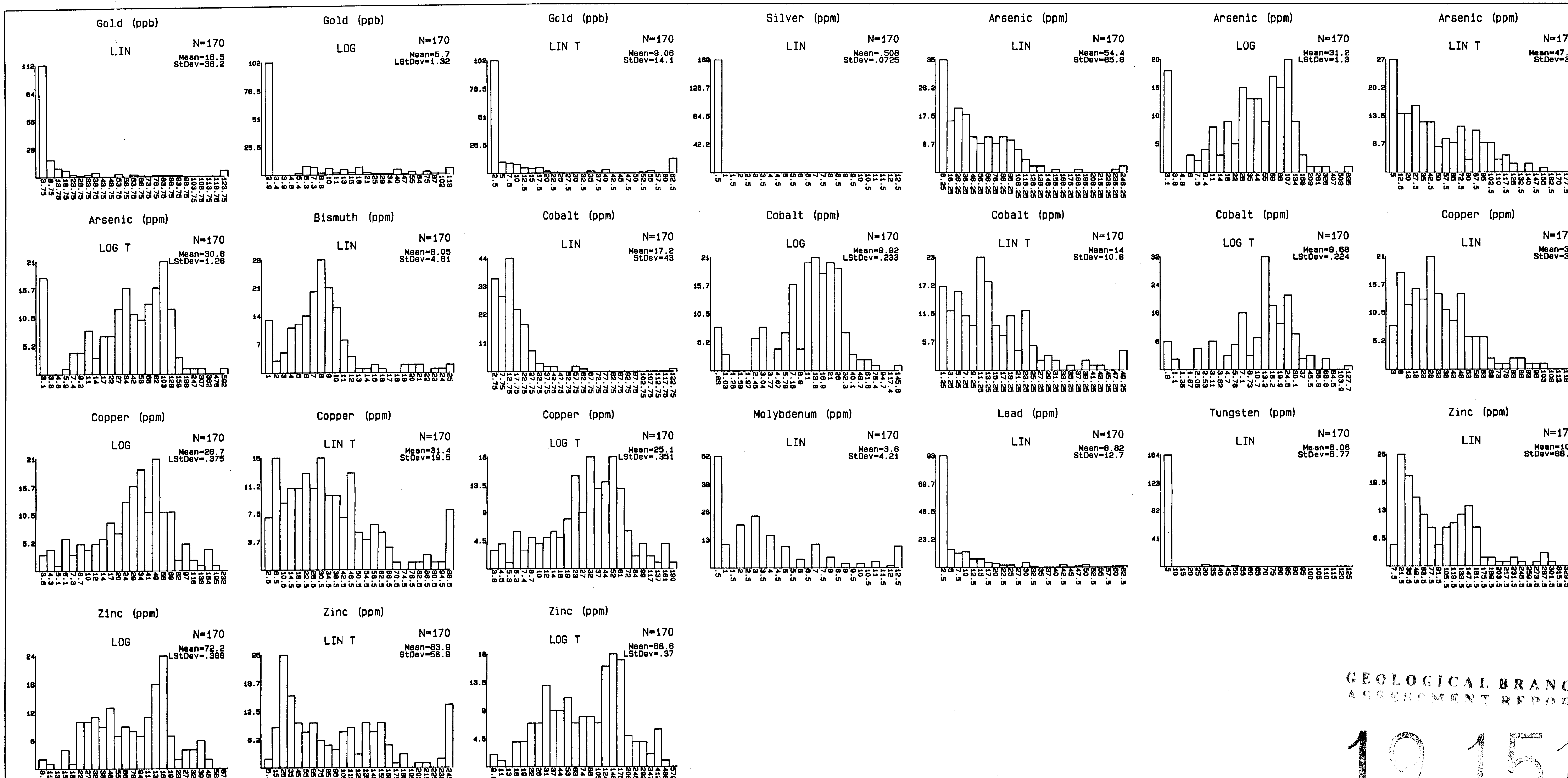
BATTLE MOUNTAIN (CANADA) INC.

PROPERTY GEOLOGY

DATE: SEPT/89	PROJECT#: 75-94	FIG.
NTS: 92L/8	SCALE 1: 20000	2

FIGURE 3

Sample Location



GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,151

DISTRIBUTION HISTOGRAMS

LIN = LINEAR
LOG = LOGARITHMIC
LINT= TRUNCATED LINEAR
LOGT= TRUNCATED LOGARITHMIC

SAMPLE SELECTION CRITERIA:

SAMPLE TYPE	ALL
PROPERTY CODE	B
LSE CODE	ALL
OB ORIGIN	ALL
SAMPLE TEXTURE	ALL
SOIL HORIZON	ALL
BEDROCK GEOLOGY	ALL
NORTH LIMIT	NONE
SOUTH LIMIT	NONE
EAST LIMIT	NONE
WEST LIMIT	NONE

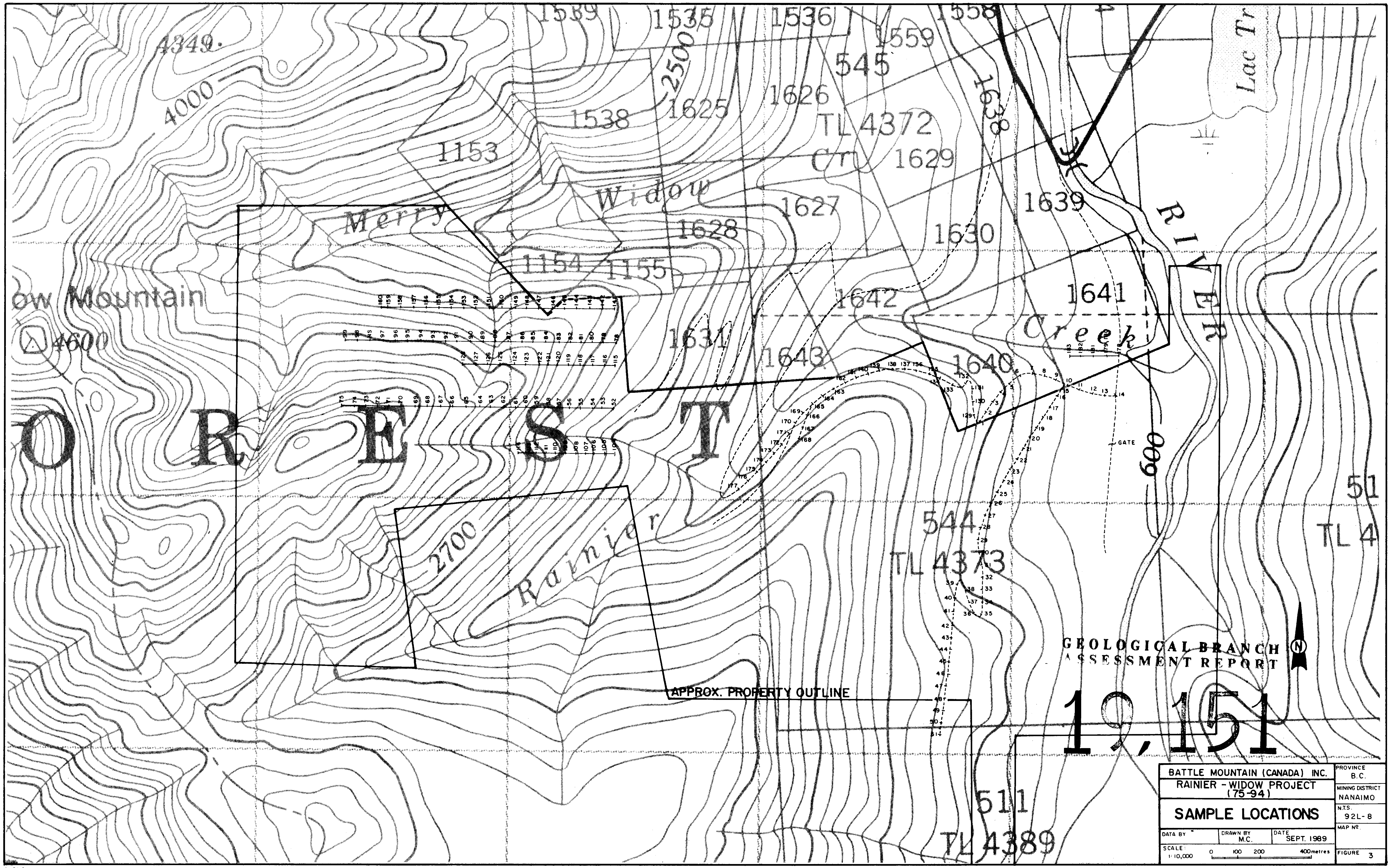
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
HISTOGRAMS

DATE: SEPT/89	PROJECT#: 75-94
NTS: 92L/6	

FIG. Nº. 4

FIGURE 4

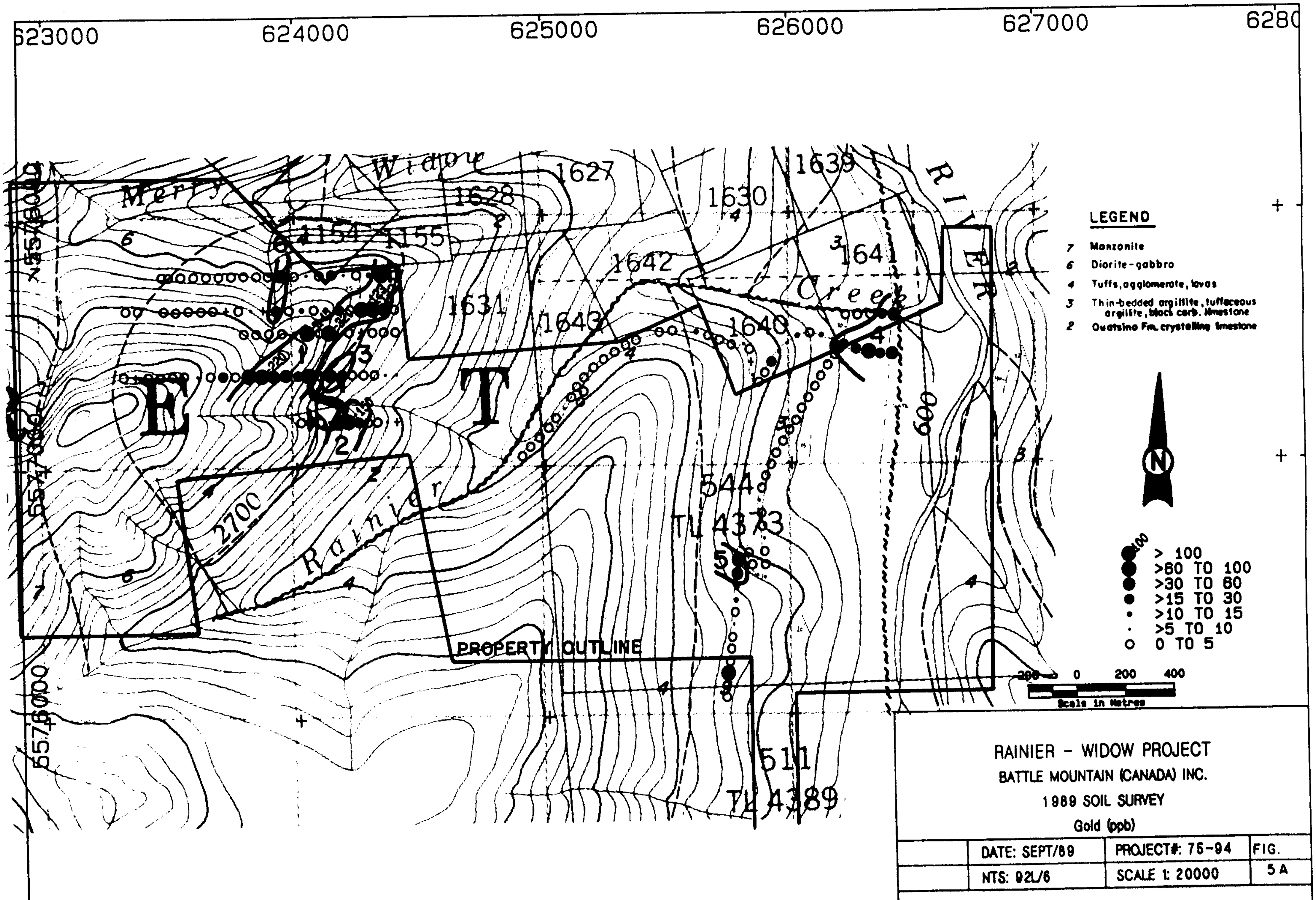
Histograms - Soils

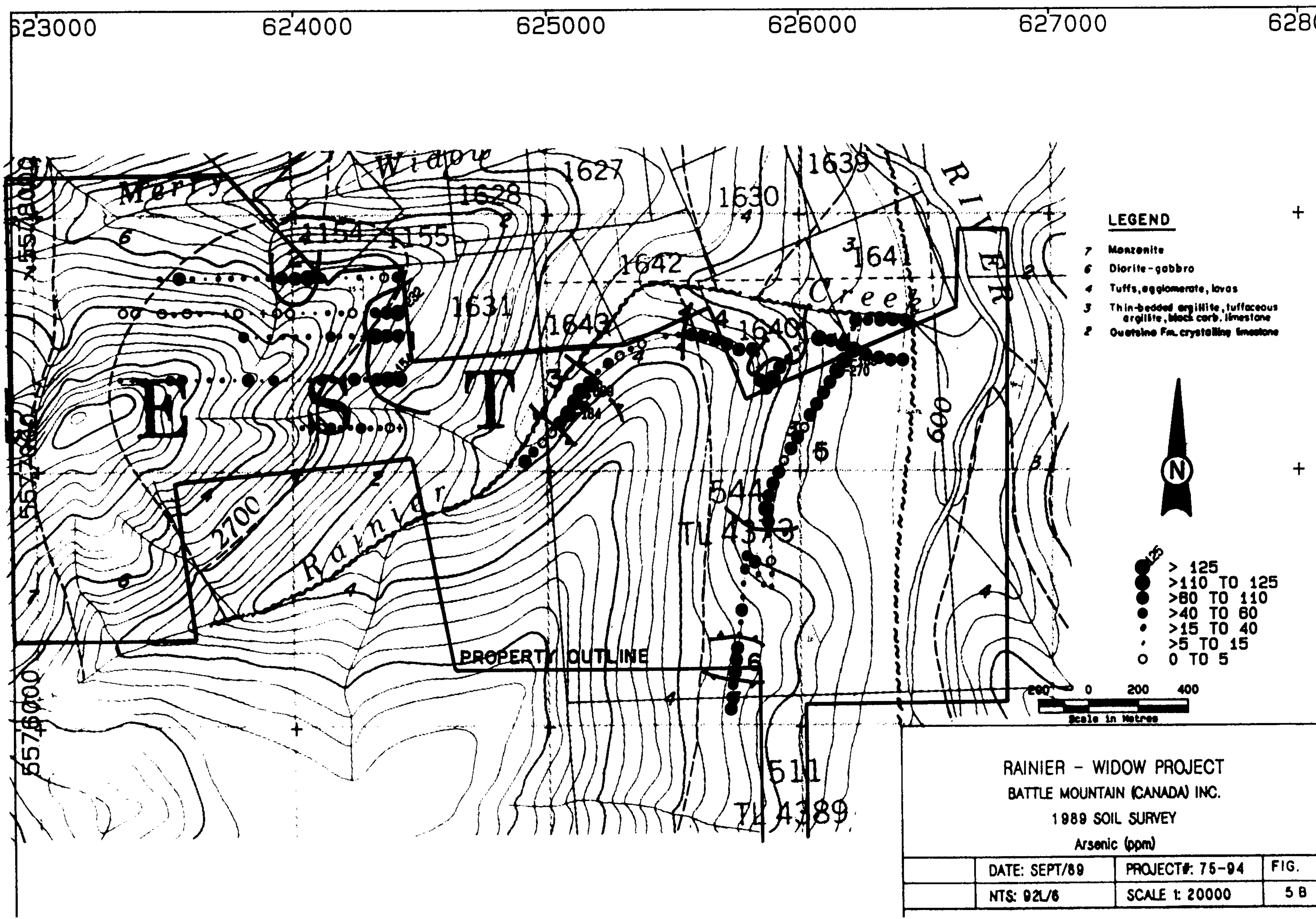


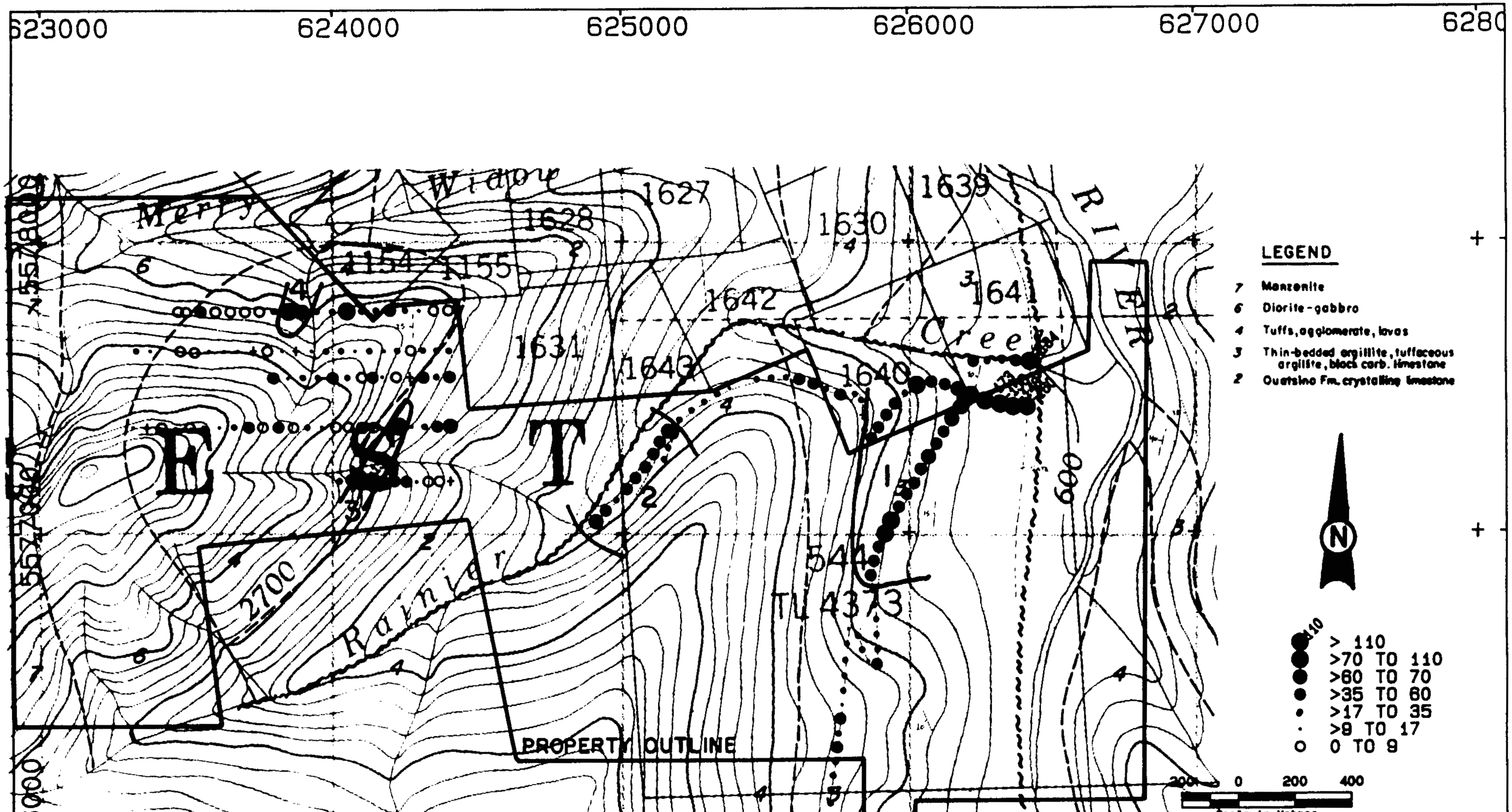
ow Mountain
4600
4349
4000
2500
2700
600
Merry
Widow
Cr
Rainier
Creek
RIVER
Lac Tr
O R E S T
1539
1535
1536
1558
1559
545
1626
1625
1538
1153
TL 4372
1629
1639
1627
1628
1630
1638
1154
1155
1641
1642
1631
1643
1640
544
TL 4373
51
TL 4
511
TL 4389
GATE
APPROX. PROPERTY OUTLINE
GEOLOGICAL BRANCH
ASSESSMENT REPORT
19,151
BATTLE MOUNTAIN (CANADA) INC.
RAINIER - WIDOW PROJECT
(75-94)
SAMPLE LOCATIONS
DATA BY
DRAWN BY M.C.
DATE SEPT. 1989
SCALE: 1:10,000
0 100 200 400metres
PROVINCE B.C.
MINING DISTRICT NANAIMO
N.T.S. 92L-8
MAP Nº.
FIGURE 3
CHONG

Figure 5A - J

Soil Sample Anomaly Maps

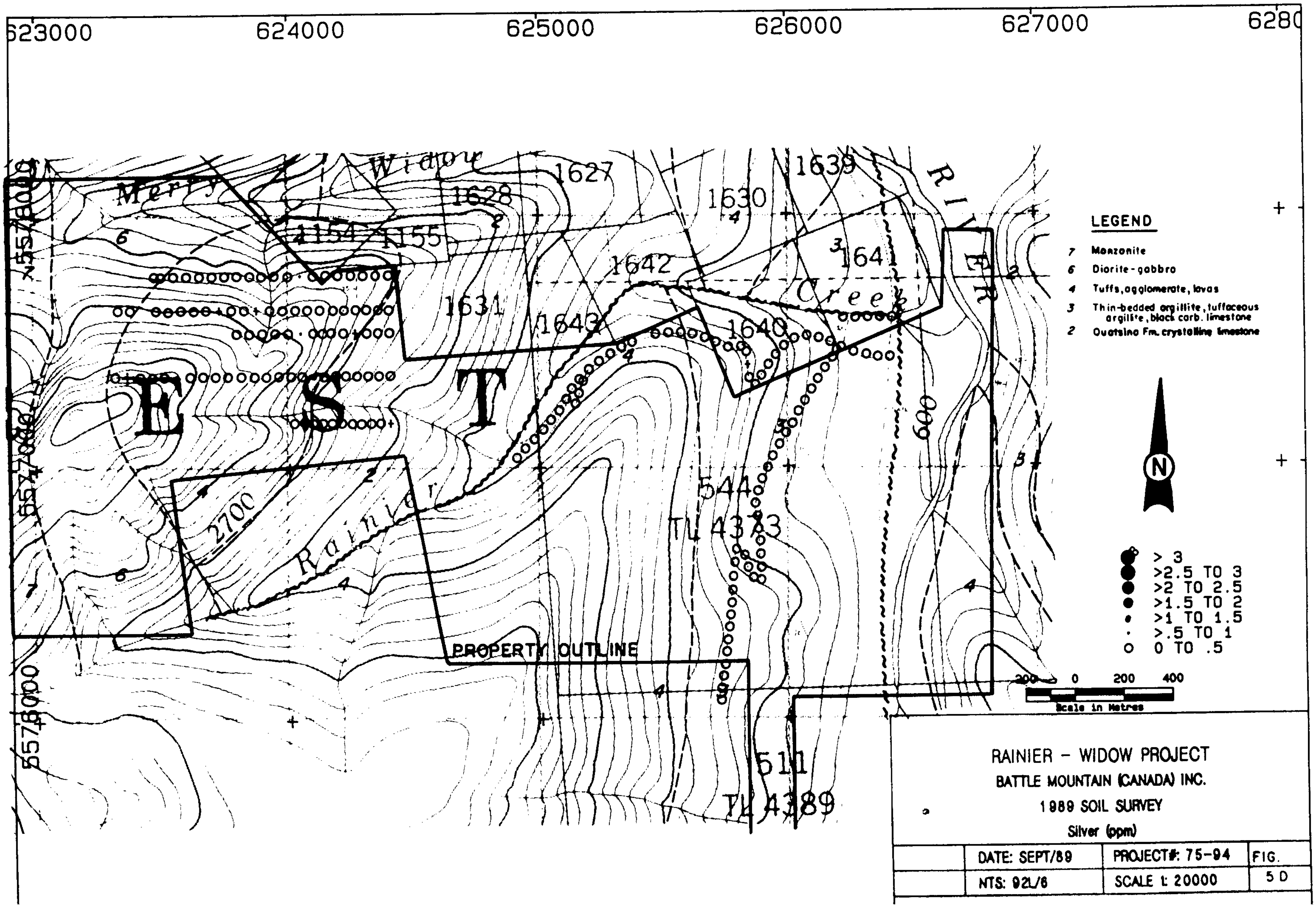

623000
624000
625000
626000
627000
Merry
Widow
Creek
Rainier
RIVER
PROPERTY OUTLINE
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
N
> 100
>60 TO 100
>30 TO 60
>15 TO 30
>10 TO 15
>5 TO 10
0 TO 5
200 0 200 400
Scale in Metres
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Gold (ppb)
DATE: SEPT/89
PROJECT#: 75-94
FIG. 5 A
NTS: 92L/6
SCALE 1: 20000


623000
624000
625000
626000
627000
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
N
> 125
>110 TO 125
>60 TO 110
>40 TO 60
>15 TO 40
>5 TO 15
0 TO 5
200 0 200 400
Scale in Metres
PROPERTY OUTLINE
Merry
Widow
Rainier
Creek
RIVER
E S T
1627
1628
1630
1639
1154
1155
1642
1641
1631
1643
1640
2700
544
TL 4373
511
TL 4389
600
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Arsenic (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG.
NTS: 92L/6
SCALE 1: 20000
5 B

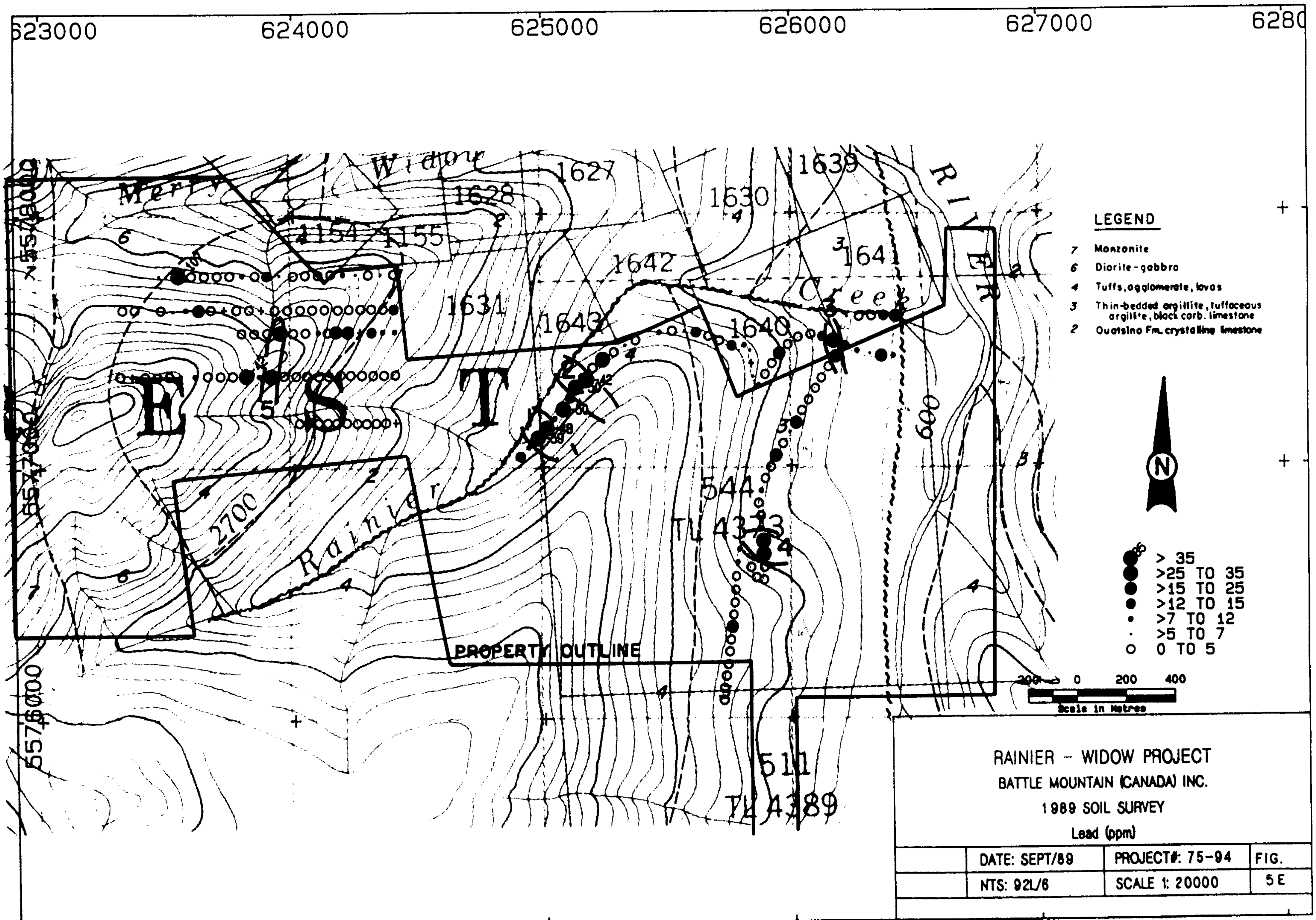


RAINIER – WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Copper (ppm)

DATE: SEPT/89	PROJECT#: 75-94	FIG.
NTS: 92L/6	SCALE 1: 20000	5C



623000
624000
625000
626000
627000
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
> 3
>2.5 TO 3
>2 TO 2.5
>1.5 TO 2
>1 TO 1.5
>.5 TO 1
0 TO .5
200 0 200 400
Scale in Metres
N
Merry
Widow
RIVER
Creek
Rainier
E S T
PROPERTY OUTLINE
1627
1628
1630
1639
1154
1155
1642
1641
1631
1643
1640
2700
544
TL 4373
511
TL 4389
600
5578000
5577000
5576000
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Silver (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG. 5D
NTS: 92L/6
SCALE 1: 20000


623000
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Widow
Merry
Creek
RIVER
Rainier
EST
PROPERTY OUTLINE
1627
1628
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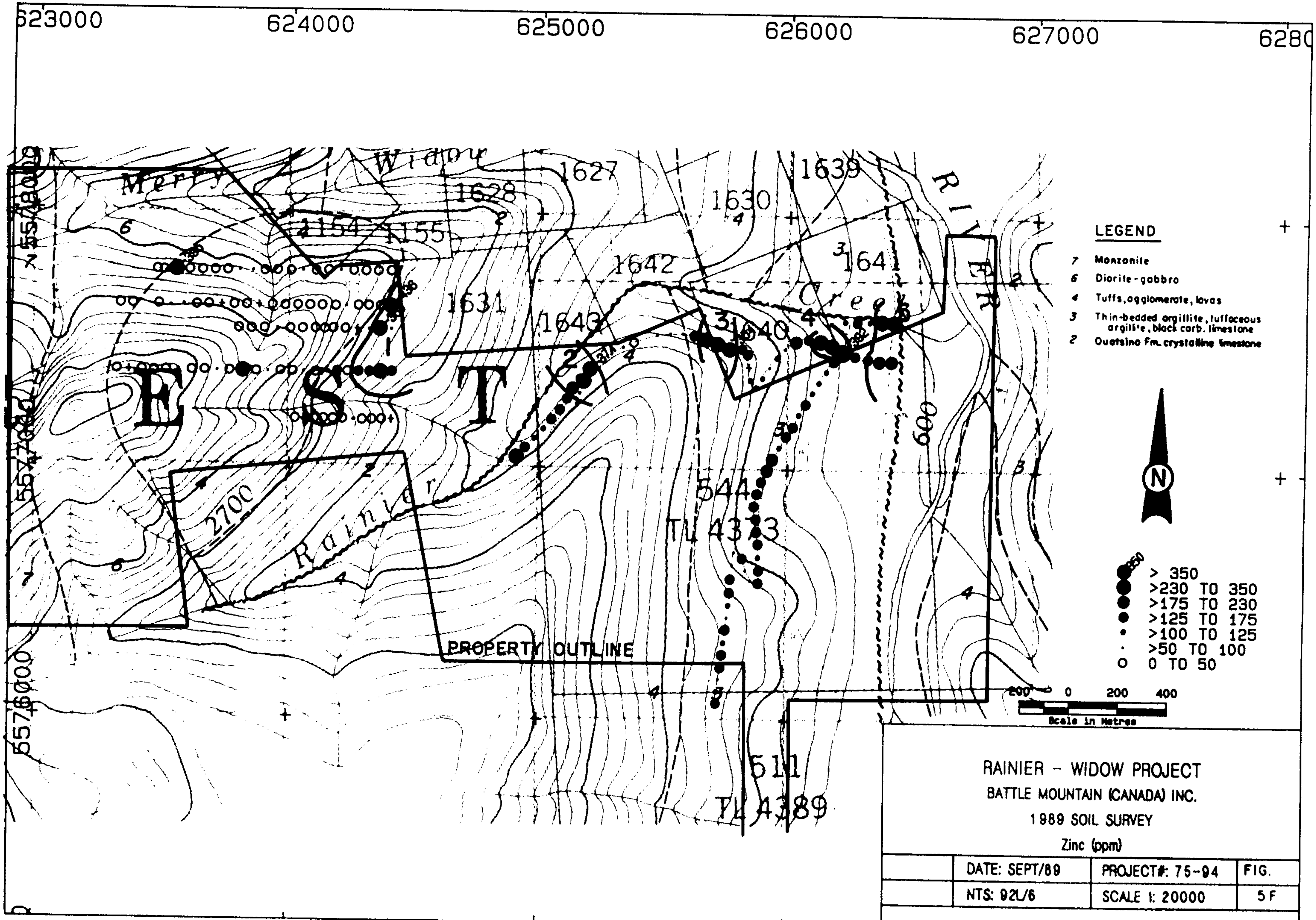
1630
1154
1155
1642
1641
1631
1643
1640
2700
544
TL 4313
511
TL 4389
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
N
> 35
>25 TO 35
>15 TO 25
>12 TO 15
>7 TO 12
>5 TO 7
0 TO 5
200 0 200 400
Scale in Metres
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Lead (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG.
NTS: 92L/6
SCALE 1: 20000
5E


623000
624000
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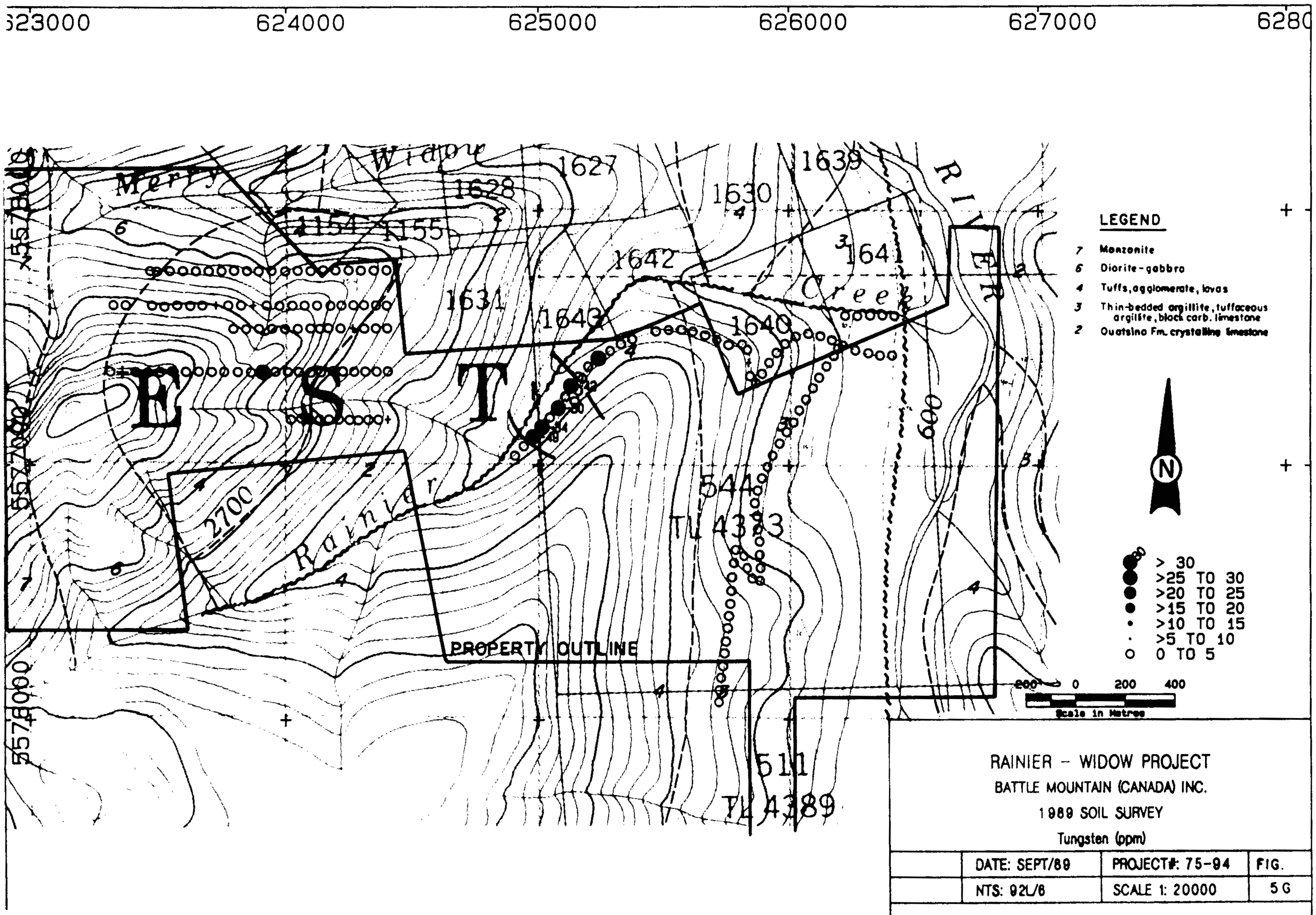
627000
Merry
Widow
Rainier
Creek
RIVER
PROPERTY OUTLINE
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
N
> 350
>230 TO 350
>175 TO 230
>125 TO 175
>100 TO 125
>50 TO 100
0 TO 50
200 0 200 400
Scale in Metres
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Zinc (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG. 5F
NTS: 92L/6
SCALE 1: 20000


623000
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5578000
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Merry
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Rainier
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RIVER
1627
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1643
1640
2700
544
TL 4373
511
TL 4389
600
E
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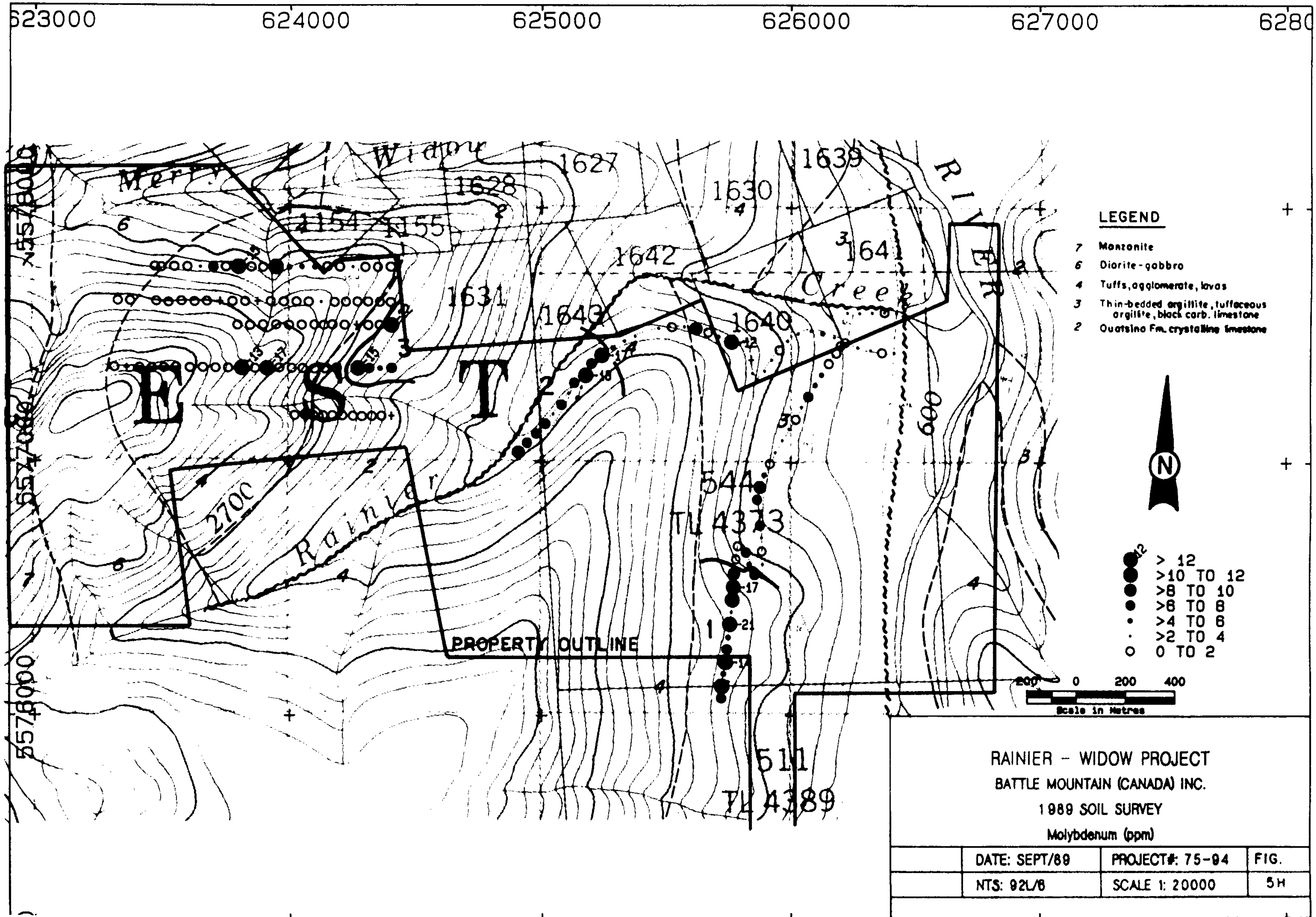
T
PROPERTY OUTLINE
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
N
> 30
>25 TO 30
>20 TO 25
>15 TO 20
>10 TO 15
>5 TO 10
0 TO 5
200 0 200 400
Scale in Metres
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Tungsten (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG. 5G
NTS: 92L/6
SCALE 1: 20000



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Rainier
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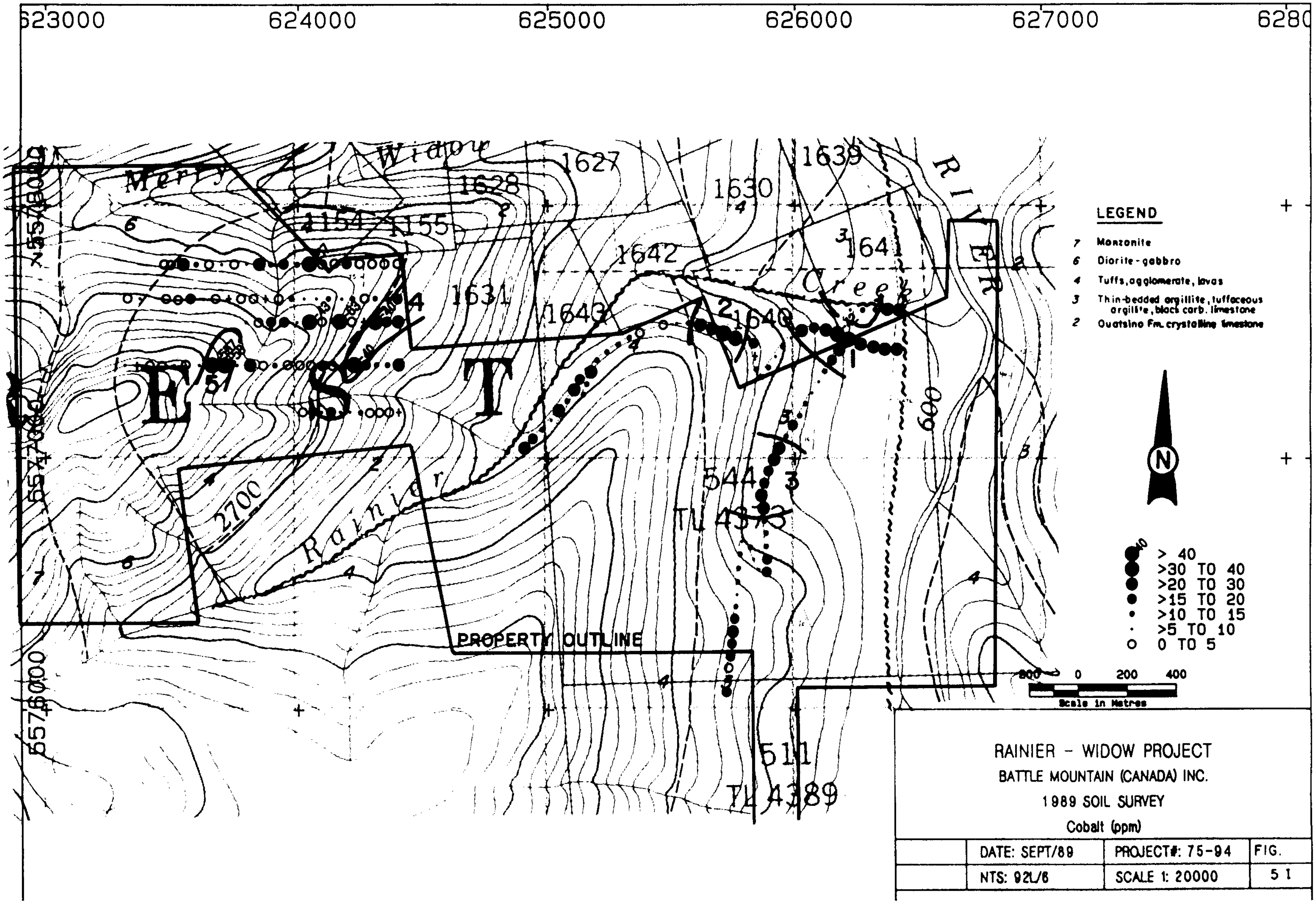
1154
1155
1642
1641
1631
1643
1640
2700
544
TL 4373
511
TL 4389
600
PROPERTY OUTLINE
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
N
> 12
>10 TO 12
>8 TO 10
>6 TO 8
>4 TO 6
>2 TO 4
0 TO 2
200 0 200 400
Scale in Metres
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Molybdenum (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG. 5H
NTS: 92L/6
SCALE 1: 20000



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5576000
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Widow
Rainier
Creek
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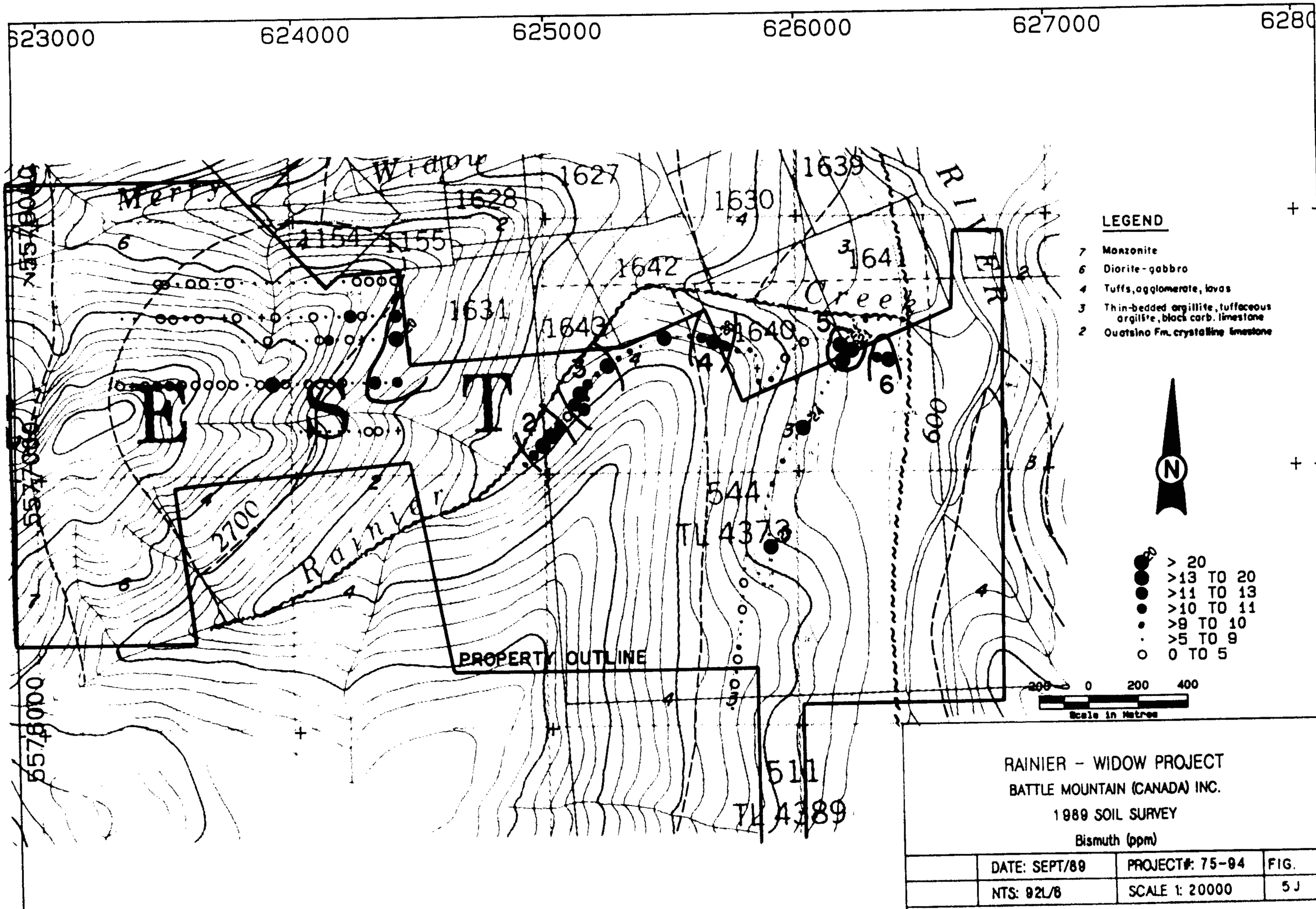
1154
1155
1642
1641
1631
1643
1640
2700
544
TL 4373
511
TL 4389
600
PROPERTY OUTLINE
LEGEND
7 Monzonite
6 Diorite-gabbro
4 Tuffs, agglomerate, lavas
3 Thin-bedded argillite, tuffaceous argillite, black carb. limestone
2 Quatsino Fm. crystalline limestone
> 40
>30 TO 40
>20 TO 30
>15 TO 20
>10 TO 15
>5 TO 10
0 TO 5
N
200 0 200 400
Scale in Metres
RAINIER - WIDOW PROJECT
BATTLE MOUNTAIN (CANADA) INC.
1989 SOIL SURVEY
Cobalt (ppm)
DATE: SEPT/89
PROJECT#: 75-94
FIG.
NTS: 92L/6
SCALE 1: 20000
5 I



RAINIER - WIDOW PROJECT BATTLE MOUNTAIN (CANADA) INC. 1989 SOIL SURVEY Bismuth (ppm)		
DATE: SEPT/89	PROJECT#: 75-94	FIG.
NTS: 92L/6	SCALE 1: 20000	5 J