



TOODOGGONE RIVER AREA
(94E)

By T. G. Schroeter

INTRODUCTION

The Toodoggone River area, which lies approximately 300 kilometres north of Smithers, hosts several significant precious metal deposits. Access into the area continued to be aircraft only, mainly from Smithers.

The writer spent a total of six days visiting key properties with the aim of examining the mineral deposit settings, mineralogy, and alteration patterns to extend earlier investigations in areas where diamond drilling was in progress. The data will be incorporated into a preliminary map of the Toodoggone area at a scale of 1:50 000 as part of a joint project with Andre Panteleyev and Larry Diakow, and should be available in January 1985.

For more detailed descriptions of the area the reader is referred to articles in previous publications of Geological Fieldwork.

WORK DONE

Work carried out by companies in the Toodoggone River area in 1984 included the following:

(1) SEREM INC.

Lawyers (Fig. 109, No. 37; Mineral Inventory 94E-66, 67, 74); 7 010.4 metres (23,000 feet) of diamond drilling in 45 holes.

An extensive development program by SEREM Inc. consisting of surface diamond drilling on the Amethyst Gold Breccia Zone (AGB, Mineral Inventory 94E-66), Cliff Creek Breccia Zone (Mineral Inventory 94E-67), Duke's Ridge Zone (Mineral Inventory 94E-74), and underground diamond drilling on the Amethyst Gold Breccia Zone during the summer of 1984, nearly doubled geological reserves on the Lawyers property; conservatively, reserves now exceed 1 million tons, grading approximately 7.27 grams per tonne (0.211 ounce per ton) gold and 254.2 grams per tonne (7.11 ounces per ton) silver. Company officials estimate that, to date, 20 per cent of known surface structures on the Lawyers property have been tested.

On the AGB Zone, with previously published reserves of 639 813 tonnes grading 7.27 grams per tonne gold and 254.2 grams per tonne silver, 13 underground holes were drilled on the West Zone confirming its existence in the hangingwall stratigraphy.

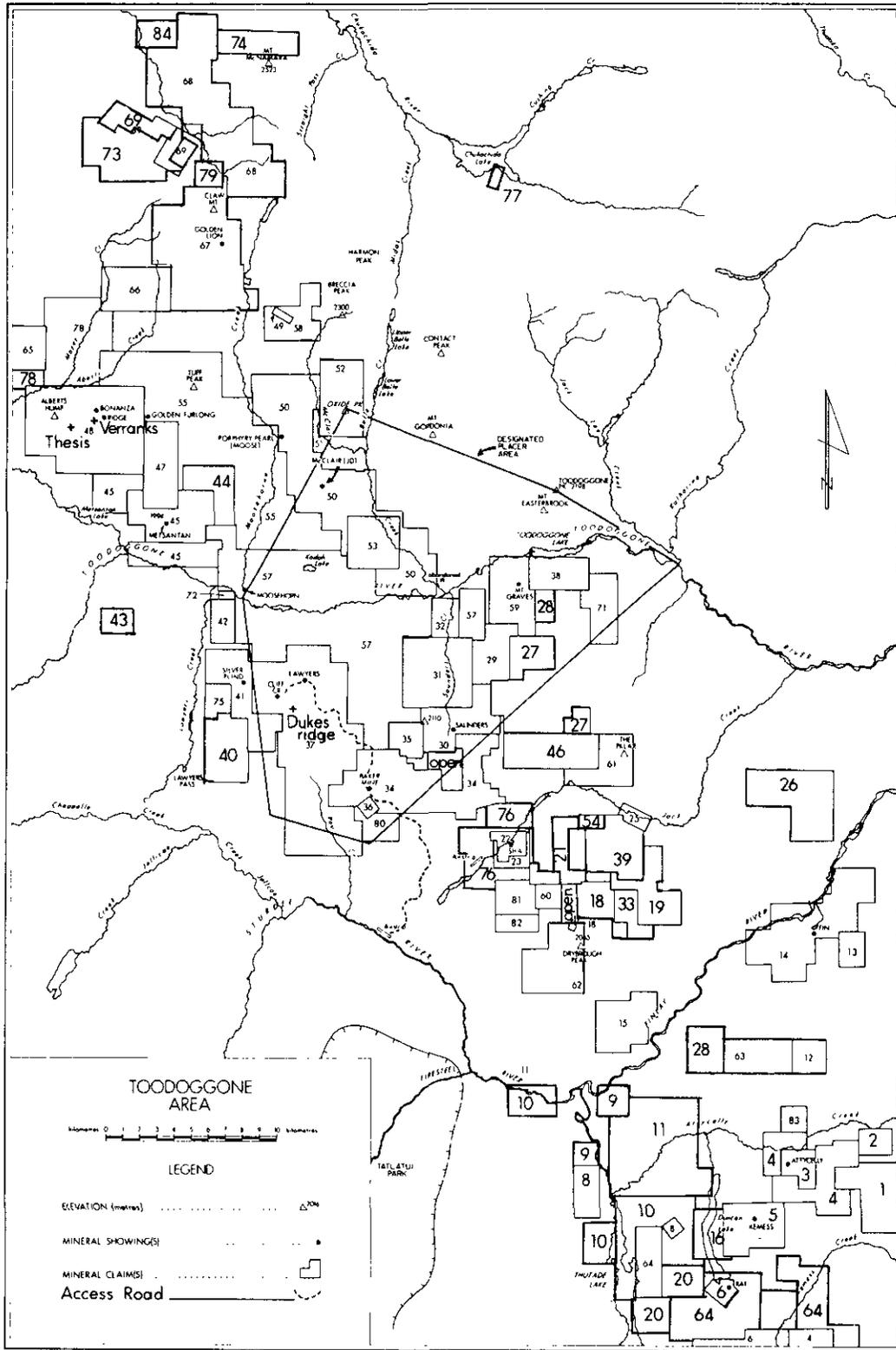


Figure 38. Toodoggone map-area.

Figure 109. Mineral properties, Toodoggone River area.

NO.	CLAIM NAME	MDI 94E	OPERATOR	NO.	CLAIM NAME	MDI 94E	OPERATOR
1	MESS 1-4	70	SEREM	44	PANT 1-3	...	Kidd Creek Mines
2	AUDREY 1,2	...	Inca Res.	45	METSANTAN 1-9	65	Lacana
3	AUDREY EAST, AUDREY WEST	22	Inca Res.	46	GOLDSTREAM 1, 2	...	C. Kowall
4	KEM 1-9	...	Inca Res.	47	METS 1, 2	...	Golden Rule Res.
5	NEW KEMESS 1, 2	21	Kennco	48	AL 1-8	78, 79, 85	Kidd Creek Mines
6	RAT	25	Cominco	49	HAR	53	Kennco
7	CROWN--GRANTED CLAIMS	12, 13, 14	Cominco	50	SCREE 1-3, MOOSE 1-3, JM, JD, JB, JR, McCLAIR 1-5, plus fractions	31, 32, 65	Kidd Creek Mines
8	FIRESTEEL	2	SEREM	51	GAS 1, 2	...	Kidd Creek Mines
9	FINA 1, 2	...	Asitka Res.	52	KIDVIEW, AMETHYST VALLEY	...	C. Kowall
10	LAKE 1-5	...	Pacific Ridge Res.	53	BELLE 1, 2	...	Golden Rule Res.
11	ARK 1-7	...	Ark Energy Corp.	54	MAY 1-3	...	P. Weishaupt
12	RICH	57	Golden Rule Res.	55	BERT, ERNIE, WINKLE, BULL, CHUTE, SURPRISE, GEROME, OSCAR FR., WANKLE FR., ANTOJNE LOUIS, TOUR, STURDEE, BIG BIRD, KADAH, SHODEE, RJ FR., JP FR.	80	Kidd Creek Mines
13	MEX	16	Cominco	56	SNAFU	...	Great Western Pet.
14	FIN 1-9	47, 48, 49	B. Pearson	57	GWP 1-43, DOUG'S BEAR	...	Great Western Pet.
15	GRACE 1-5	3, 4, 5	D. MacQuarrie	58	GORDON DAVIES 1, 2	53	Lacana
16	DUNCAN 1-4	...	Gunsteel Res. Corp.	59	GRAVES 1-7	87	Great Western Pet.
17	RN	...	Winderra Mines	60	DAWN	...	Newmont
18	GOTCH 1, 2	...	SEREM	61	HERCULES, ATLAS	24	SEREM
19	JOCK 1-5	8	Golden Rule Res.	62	STAR, ACA, PULL, SUN	58	SEREM
20	TUT 1, 2	...	Univex Mining Corp.	63	WRICH	82	SEREM
21	JOCK 1-5	8, 39	SEREM	64	RON 1-11	...	Pacific Ridge Res.
22	SHAS	50	C. Kowall	65	ADOO 1, 2	...	Newmont
23	SILVER REEF	...	J. Weishaupt	66	HUMP 1, 2	...	Newmont
24	DU	...	SEREM	67	GOLDEN LION 1-11	77	Newmont
25	BRENDA 1-8	...	A. Smallwood	68	LYNX 1-8	...	Newmont
26	NUB MTN.	88	SEREM	69	KRAB	46	UMEX
27	ARGUS 1-4, ARG 1	28, 29, 42	SEREM	70	SUN 1, 2	...	Kidd Creek Mines
28	AURO 1	7	Aurofina Res. Corp.	71	SUN 1, 2	...	Newmont
29	GWP 200	37	Great Western Pet.	72	KODAH 2	68	SEREM
30	GOLDEN NEIGHBOUR 1-4, JOLLY ROGERS, CAMP, CAMP FR.	...	Lacana	73	COPPER KING 1-5, NAMERA IV	...	Western Horizons
31	SAUNDERS	40	Golden Rule Res.	74	McNAMERA 1, 2	...	Great Western Pet.
32	GWP 43	...	Great Western Pet.	75	ASAP	...	Newmont
33	GOLDEN RING	...	Newmont	76	SHASTA 3-5	...	Newmont
34	CHAPPELLE	26	DuPont Explor.	77	VALRIE 1, 2	...	T. Pickell
35	PEL	...	DuPont Explor.	78	MOYEZ 1-4, CHUCK 1, 2	...	Newmont
36	CROWN--GRANTED CLAIMS	...	O. McDonald	79	SPAR MOUNTAIN	...	Newmont
37	NEW LAWYERS 1-4, LAW 1-3, BREEZE, ROAD 1-III, PERRY 1, 2, MASON, 1, 2, GTW 1-3, plus fractions	66, 67, 74	SEREM	80	CASTLE MTN., CASTLE MTN. FR.	...	C. Kowall
38	DUKE 1, 2	...	SEREM	81	FOGHORN	...	Dynamic Oil Co.
39	JAN 1-4	...	D. Park	82	LEGHORN	...	Kidd Creek Mines
40	SILVER CLOUD 1, 2	...	C. Kowall	83	AWESOME	...	Kidd Creek Mines
41	SILVER POND, SILVER CREEK, SILVER PEAK, SILVER GRIZZLY	69	St. Joe Canada	84	GUARD	...	Newmont
42	KODAH	17	SEREM				
43	GOLDEN STRANGER	...	Western Horizons				

The strike length of the Cliff Creek Breccia Zone is estimated to exceed 1.5 kilometres. Drilling including 19 holes in 1984, has tested about 200 metres of strike length near the northern end of the zone, where it is cut by a major northwesterly trending fault. In contrast to thin alteration haloes observed on veins in the AGB Zone, the Cliff Creek Zone has a significant clay alteration envelope around the ore zone; alteration extends for approximately 35 metres on each side of it.

The Duke's Ridge Zone has been traced by trenching, mapping, and limited diamond drilling along a total strike length of 1.2 kilometres. During 1984, 13 drill holes tested about 300 metres of strike length; the average width is 5 metres.

Trenching on the Marmot Lake occurrence, located 3 kilometres south along the structure which runs through the Cliff Creek Breccia Zone, confirmed the existence of significant mineralization; the occurrence was discovered in 1971 by Kennco.

The significant geologic difference between the Cliff Creek and Duke's Ridge Zones, and the AGB Zone is the host rock. The first two are hosted by megacrystic crystal tuffs and flows which are higher up in the stratigraphic section than the main host rocks at the AGB Zone which are quartzose andesitic and trachytic crystal tuffs. The basic ore mineralogy is the same for all three zones; fine-grained acanthite, electrum, native silver, and native gold in a predominantly quartz (±amethyst) gangue with minor amounts of carbonate.

A comprehensive feasibility study is scheduled to be carried out over the winter; a production decision may follow shortly thereafter.

(2) KIDD CREEK MINES LTD.

- (a) JD (PIT) (Fig. 109, No. 50; Mineral Inventory 94E-31, 32, and 65); 330 metres of surface drilling was completed in seven holes on the Gasp and Gumbo Zones. Five backhoe trenches were completed on the Woof Zone for a total of 130 metres.

Mineralization in the Gasp Zone consists of native gold, native silver, galena, sphalerite, chalcopyrite, and pyrite in steeply dipping quartz ±calcite veins that occur in andesitic flow rocks. The zone is associated with a silicified and clay-altered low-angle fault zone. Quartz-calcite veins, which range from less than 1 to 200 millimetres thick, occur in propylitic andesite in the footwall McClair Creek Formation (informal name). These veins occur in a northwest-trending zone which has been traced along a 150-metre strike length and across a width of approximately 20 metres.

The Gumbo Zone, which has been traced for 400 metres along strike, is associated with the shallow-dipping (thrust) fault which marks the contact between the (hangingwall) Tuff Peak Formation and the (footwall)

McClair Creek Formation (informal names). Zones of clay-quartz alteration (yellow clay) are intermixed with zones of intense silicification in andesite. Sulphides include disseminated pyrite (up to 10 per cent) and trace amounts of galena, sphalerite, and acanthite. Erratic gold and silver mineralization is associated with zones of intense silicification and occurs in propylitic footwall rocks cut by quartz-carbonate veinlets.

- (b) AL (RIDGE, BONANZA) (Fig. 109, No. 48; Mineral Inventory 94E-78, 79, 85); 1 211 metres of surface drilling was completed in 19 holes on Verrenass, Thesis II, Thesis III, and BV Zones. Approximately 40 backhoe trenches, totalling 2 012 lineal metres, were excavated; the majority are in the Thesis III and BV Zones.

Most mineralized zones (more than six in number) on the AL property consist either of structurally controlled, barite-gold mineralized alteration zones (for example, Verrenass, Thesis II, BV) or of silica-hematite-gold mineralized alteration zones (for example, Ridge, Thesis II, Golden Furlong (Fig. 109, No. 55; Mineral Inventory 94E-80). Host rocks consist of subhorizontal, dominately subaerial Jurassic andesitic to dacitic, or latitic ash flows, air-fall tuffs, and flows. Hydrothermal alteration is widespread and the volcanic rocks have undergone various degrees of diagenetic hematization. Zones of propylitic and argillic alteration also contain zeolites, chlorite, sericite and various clays (mainly dickite). Zones of silicification consist of quartz, alunite, dickite, barite, pyrite. Silica occurs in massive to banded to brecciated zones, and locally as veins.

The gold-silver mineralization is primarily associated with replacements of quartz-barite and quartz-hematite. It also occurs in drusy barite-quartz veins.

In the Verrenass Zone, argillic fiammé and plagioclase crystals in the silicified matrix of the host dacitic ash flow were leached prior to or during the influx of barite and gold-bearing solutions. Alteration minerals include quartz, sericite, hematite, dickite, montmorillonite, and barite. Sulphides include pyrite, native gold, and minor amounts of late-stage tennantite and secondary covellite. Gold-silver mineralization is erratic.

In the Thesis and BV Zones, native gold with replacement barite occurs in silicified zones that are flanked by zones of argillic alteration, similar to that at the Verrenass Zone. Gold-silver mineralization is erratic. Locally, brecciation is intense. The zones of Au-Ag mineralization and alteration apparently represent deposition in a high level epithermal system.

(3) NEWMONT EXPLORATION OF CANADA LTD.

- (a) Shas (Fig. 109, No. 22; Mineral Inventory 94E-50); 2 002.2 metres of diamond drilling was carried out in 19 holes; holes range from 33 to 197 metres in length.

A large (400 by 500 metre) zone of silicification in Toodoggone crystal tuffs hosts the mineralization, which consists of native silver, acanthite, electrum, tetrahedrite, pyrite, chalcopyrite, galena, and sphalerite. Three potential mineralized zones (Creek, Main, and Upper) have been located along a northerly trend for more than 500 metres. Drilling during 1984 was concentrated on the Creek Zone. The mineralized zones occur near a fault contact between (hangingwall) grey crystal to lithic tuff and (footwall) orange quartz-eye feldspar tuff. The 'stockwork' mineralization forms a network of quartz±calcite veinlets in a quartz-eye tuff unit. Better grades are associated with chalcedonic breccia zones; appreciable lengths of low grade mineralization are associated with quartz vein stockworks.

- (b) Golden Lion (Fig. 109, No. 67; Mineral Inventory 94E-77); 2 475 metres of diamond drilling was completed in 22 holes; holes range from 45 to 242 metres in length.

Three zones of mineralization (Zones 1, 2, and 3) were tested along a northwesterly trending strike length for a distance of 1 525 metres. Acanthite, chalcopyrite, galena, and sphalerite occur in a structurally complex quartz±barite vein system in host silicified Toodoggone dacitic tuffs. The zones are in close proximity to a major fault contact with Takla Group andesites. Assays up to 22 100 ppm (650 ounces per ton) silver have been recorded. Gold values are consistently low.

In Zone 3, a subvolcanic (crowded porphyry) intrusion cuts the sequence. The geological setting and mineralogy are similar to that of the Porphyry Pearl prospect, which is located near the junction of McClair and Moosehorn Creeks a few kilometres to the south. There, galena-sphalerite ±precious metals occur in a quartz veinlet stockwork. Potassic alteration exists both within the host rock matrix and in vein selvages; the host rock lacks quartz.

- (4) ST. JOE CANADA INC.
Silver Pond (Fig. 109, No. 41; Mineral Inventory 94E-69); 940 metres of lineal trenching was done.

The property adjoins SEREM's Lawyers property on the west. The Cloud Creek Zone (Mineral Inventory 94E-75) and the possible southwesterly extension of SEREM's Cliff Creek Breccia Zone were the main areas of interest. Host rocks include coarse pyroclastic rocks and flows of the Toodoggone volcanics.

- (5) PACIFIC RIDGE RESOURCES CORP.
Ron Claims (Fig. 109, No. 64); a small diamond-drill program was conducted to test a large (700 by 600 metres) sulphide system. Large faults have been located and may host significant precious metal zones. Barite float has been found.

- (6) ARK ENERGY LTD.
Ark Claims (Fig. 109, No. 11); soil sampling indicated a precious metal anomaly along a north-south fault zone.
- (7) DU PONT OF CANADA EXPLORATION LTD./COMINCO LTD.
Bill Claims; 1 848.4 metres of surface drilling was carried out in nine holes located primarily in the region of 1983 drilling.

Native gold mineralization occurs within quartz and arsenopyrite± carbonate veins, usually at the contacts of a quartz-muscovite schist in greenstone; mineralization commonly extends into the overlying or underlying greenstone. The predominate vein and structural orientations are now known to be nearly east-west; previously they were thought to be north-south. Several high grade but narrow drill intersections with gold values were encountered.

ACKNOWLEDGMENTS

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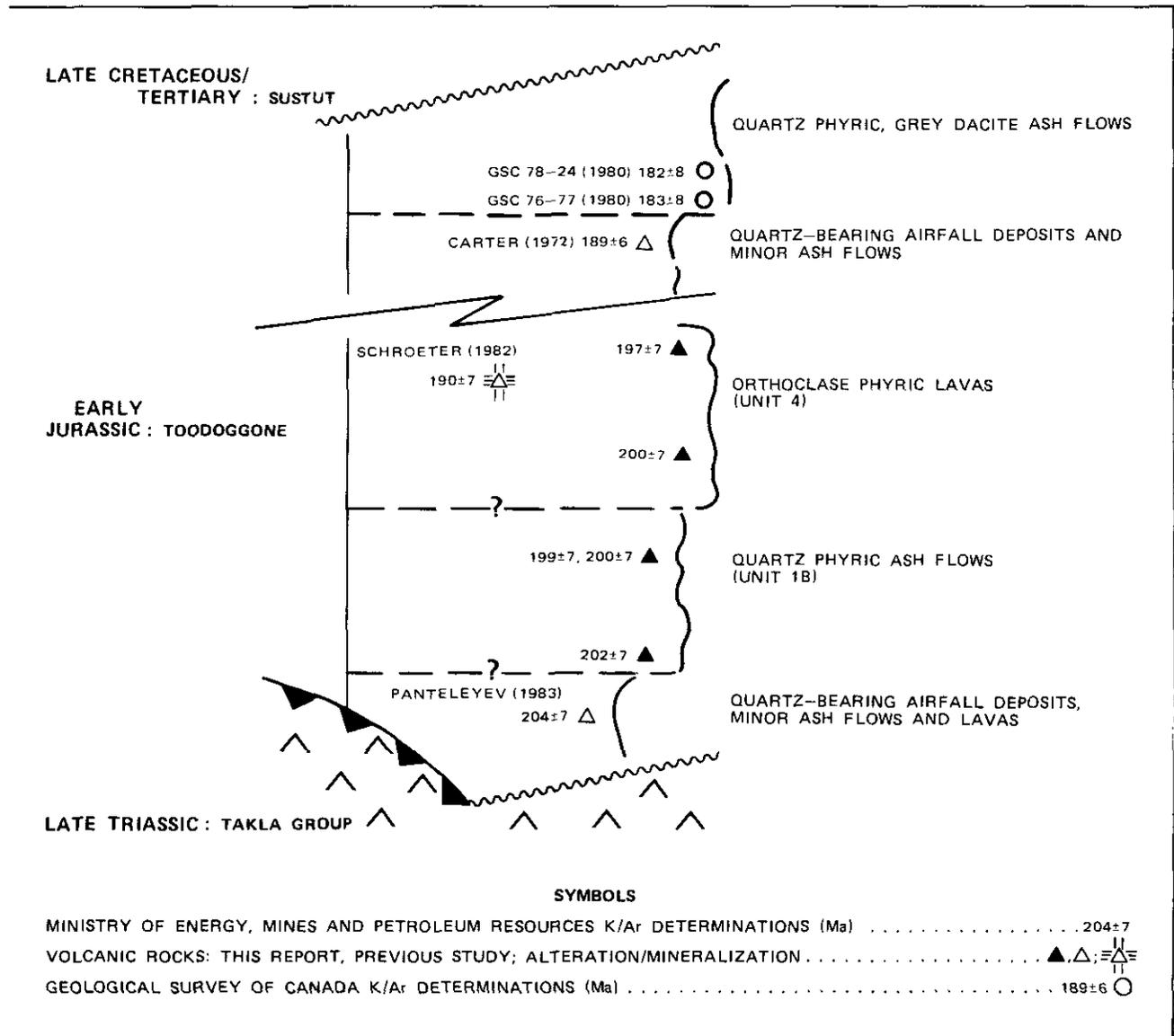


Figure 110. Schematic composite stratigraphic section illustrating the relative position of major Toodoggone lithologic units from which K/Ar radiometric dates have been obtained.