

Data Repository Figures:

Figure DR-1: Composite image of representative detrital zircon and monazite grains from foreland basin sandstones. The zircon grains images are taken under cathodoluminescent illumination and the monazites were imaged in back-scattered SEM mode. Circled areas are analyzed spots with numbers that correspond to analyses in Tables DR-4 and 5. KF in monazite in DR1g is potassium feldspar.

Figure DR-2: U-Pb Concordia plots for pebbles in Mill Creek.

TABLES (all to be placed in the Data Repository)

Table DR-1: Sm-Nd data for foreland samples.

Table DR-2: Trace element geochemistry.

Table DR-3: Table of point count results.

Table DR-4: U-Pb SHRIMP zircon results.

Table DR-5: U-Pb SHRIMP monazite results.

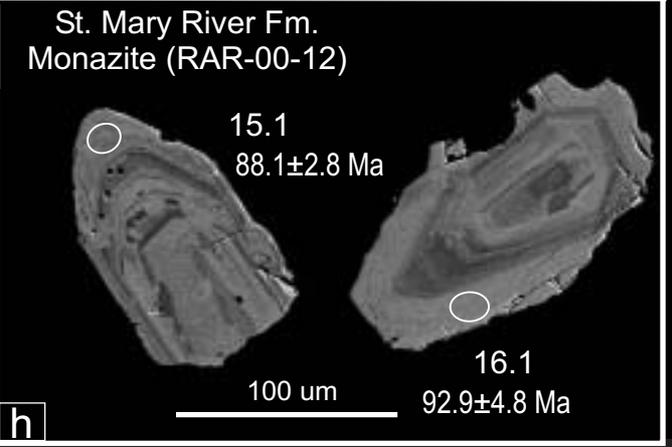
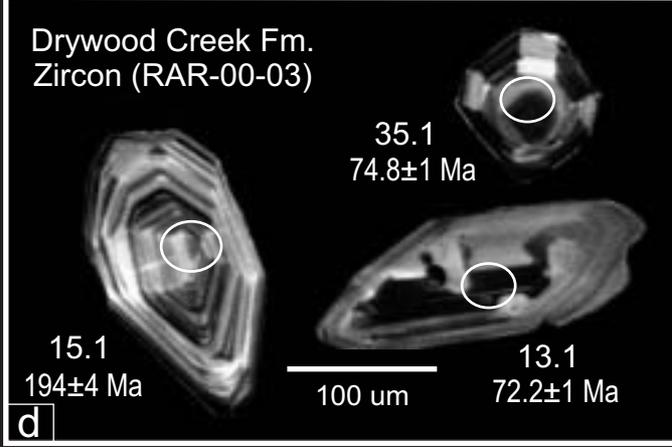
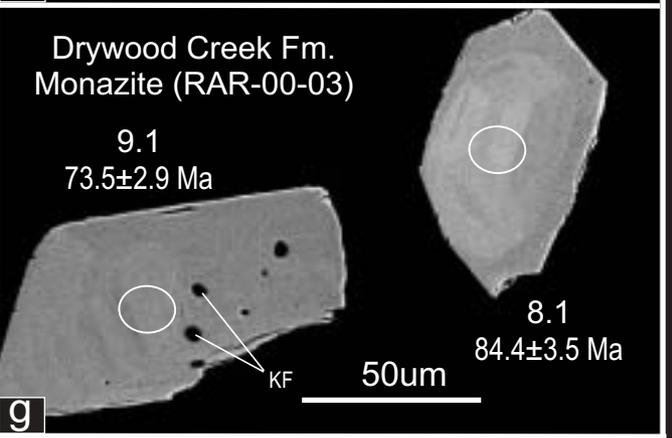
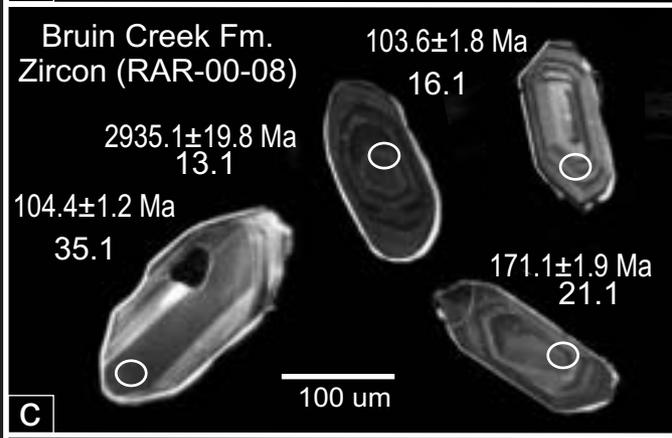
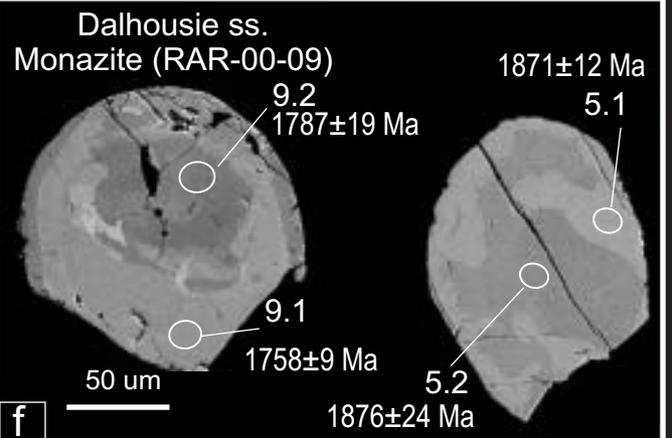
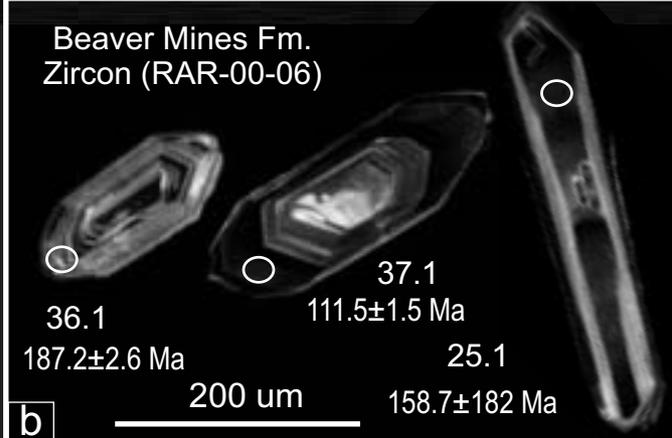
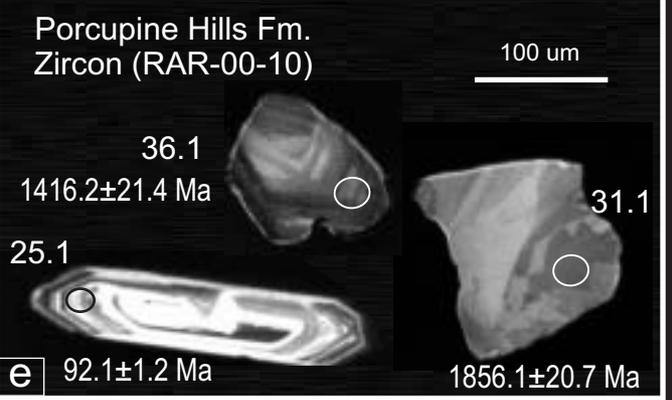
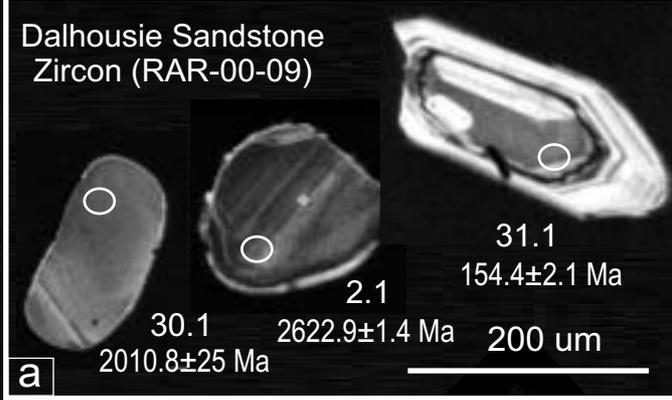
Table DR-6: U-Pb TIMS results for Blairmore cobbles.

Table DR-7: Petrography of clasts analyzed from the igneous pebble conglomerate in the Mill Creek Formation.

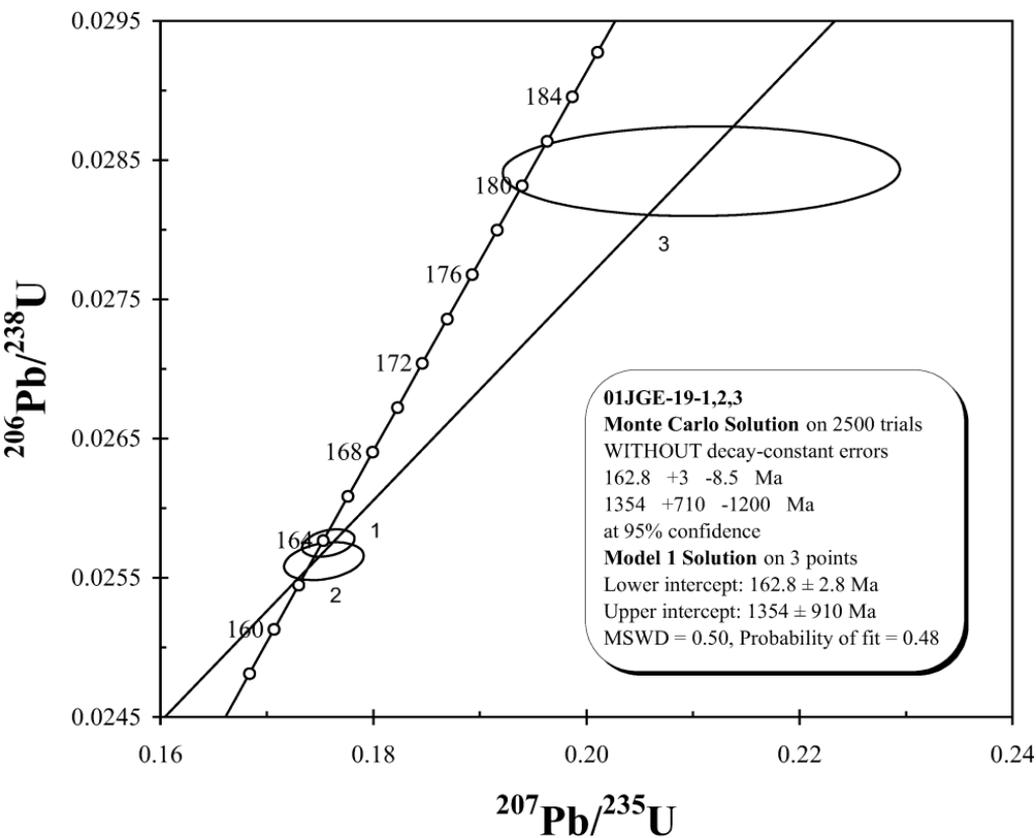
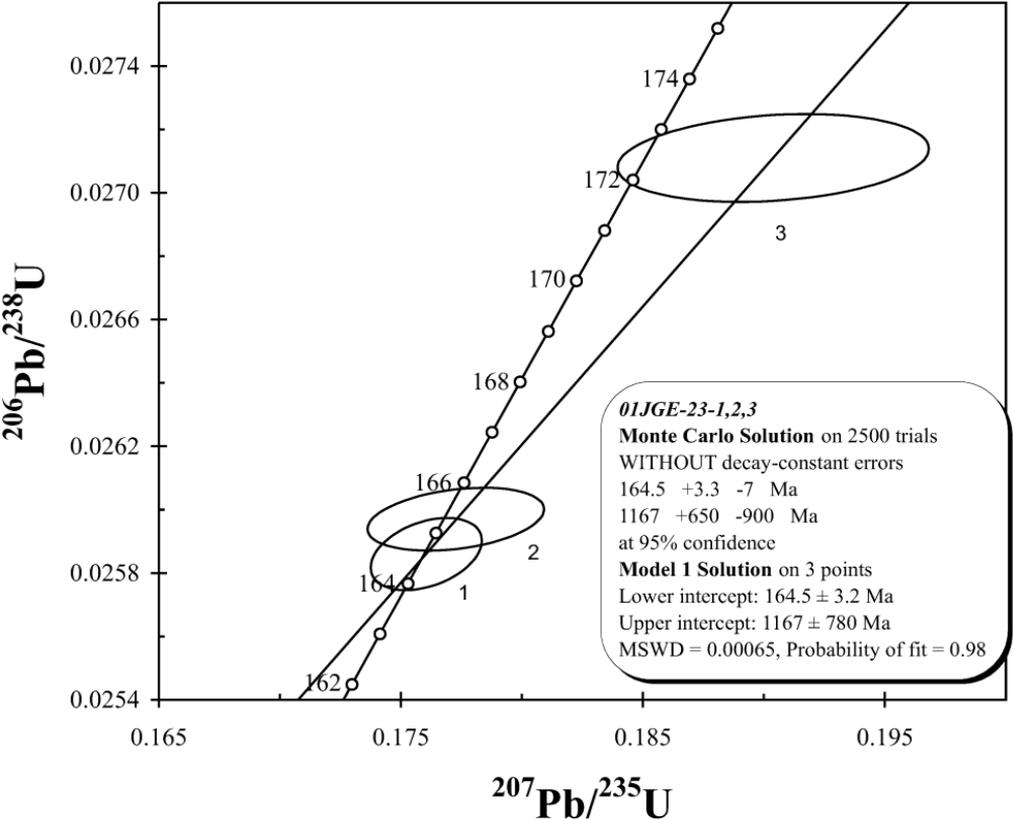
Table DR-8: Location data for all samples analyzed in this study.

REFERENCES CITED

Stern, R.A., and Berman, R.G., 2001, Monazite U-Pb and Th-Pb geochronology by ion microprobe, with an application to in situ dating of an Archean metasedimentary rocks: *Chemical Geology*, v. 172, p. 113–130, doi: 10.1016/S0009-2541(00)00239-4.



Ross et al. Fig. DR1



Ross et al. Figure DR-2

**Table DR-1: Sm-Nd isotopic data from Alberta Foreland sequence  
(Ross et al., GSA Bull. 2004)**

Sample	Formation or Group	Age (Ma) <sup>1</sup>	Sm (ppm) <sup>2</sup>	Nd (ppm) <sup>2</sup>	<sup>147</sup> Sm/ <sup>144</sup> Nd see note <sup>3</sup>	<sup>143</sup> Nd/ <sup>144</sup> Nd ± 2 sigma	Eps. Nd today	Eps. Nd at Age	T <sub>DM</sub> Ga
<b>Crowsnest traverse</b>									
01-JGE-15	Fernie	206	4.64	23.09	0.1215	0.512179 ± 8	-8.9	-7.0	1.42
01-JGE-9A*	Fernie	152	6.55	36.16	0.1095	0.512181 ± 7	-8.9	-7.2	1.26
01-JGE-9B*	Fernie	152	3.87	20.79	0.1125	0.512175 ± 6	-9.0	-7.4	1.31
01-JGE-10	Morrissey	150	3.83	20.36	0.1137	0.512111 ± 6	-10.3	-8.7	1.42
01-JGE-14	Mist Mountain	144	4.02	20.43	0.1188	0.512111 ± 6	-10.3	-8.9	1.50
01-JGE-17	Cadomin	115	1.84	11.53	0.0962	0.512152 ± 7	-9.5	-8.0	1.16
00-JG-12	Dalhousie	115	2.41	13.21	0.1103	0.512087 ± 7	-10.7	-9.5	1.41
00-JG-13	Dalhousie	115	5.78	31.05	0.1126	0.511918 ± 7	-14.1	-12.8	1.69
01-JGE-24A	Beaver Mines	107	4.57	21.85	0.1264	0.512426 ± 5	-4.1	-3.2	1.08
01-JGE-24B	Beaver Mines	107	3.63	17.04	0.1288	0.512589 ± 7	-1.0	0.0	0.83
duplicate			3.59	16.86	0.1289	0.512591 ± 8	-0.9	0.0	0.82
01-JGE-25A	Beaver Mines	107	4.81	23.63	0.1232	0.512597 ± 7	-0.8	0.2	0.76
01-JGE-25B	Beaver Mines	107	3.38	17.14	0.1192	0.512638 ± 5	0.0	1.1	0.67
00-JG-8A	Beaver Mines	107	5.01	24.94	0.1213	0.512267 ± 6	-7.2	-6.2	1.28
00-JG-8B	Beaver Mines	107	2.44	12.03	0.1226	0.512570 ± 6	-1.3	-0.3	0.80
00-JG-9	Beaver Mines	107	4.53	24.10	0.1136	0.512034 ± 7	-11.8	-10.6	1.53
00-JG-10A	Mill Creek	104	5.95	32.04	0.1122	0.512058 ± 7	-11.3	-10.2	1.48
duplicate			5.91	31.85	0.1121	0.512027 ± 5	-11.9	-10.8	1.52
00-JG-10B	Mill Creek	104	3.03	15.63	0.1172	0.512051 ± 7	-11.5	-10.4	1.56
00-JG-11A	Mill Creek	103	5.49	30.01	0.1107	0.512048 ± 5	-11.5	-10.4	1.47
00-JG-11B	Mill Creek	103	3.65	19.31	0.1142	0.512018 ± 7	-12.1	-11.0	1.57
01-JGE-18	Mill Creek	103	3.79	15.58	0.1469	0.512648 ± 7	0.2	0.9	0.91
duplicate			3.82	15.81	0.1462	0.512664 ± 7	0.5	1.2	0.87
01-JGE-19	Mill Creek clast	103	4.30	21.66	0.1199	0.512764 ± 5	2.5	3.5	0.48
01-JGE-20	Mill Creek clast	103	2.77	8.63	0.1940	0.513036 ± 5	7.8	7.9	0.22
01-JGE-21	Mill Creek clast	103	4.72	22.51	0.1267	0.512878 ± 8	4.7	5.6	0.32
01-JGE-22	Mill Creek clast	103	3.26	18.37	0.1074	0.512337 ± 6	-5.9	-4.7	1.02
01-JGE-23	Mill Creek clast	103	5.58	26.62	0.1267	0.512757 ± 6	2.3	3.3	0.52
01-JGE-16A	Cardium	92	3.75	19.97	0.1135	0.511934 ± 7	-13.7	-12.8	1.68
01-JGE-16B	Cardium	92	3.73	19.85	0.1135	0.511917 ± 5	-14.1	-13.1	1.71
00-JG-1	Wapiabi	85	5.08	27.67	0.1109	0.511961 ± 8	-13.2	-12.3	1.60
00-JG-2A	Telegraph Creek	84	4.80	26.91	0.1078	0.512059 ± 6	-11.3	-10.4	1.41
00-JG-2B	Telegraph Creek	84	3.96	20.34	0.1178	0.512076 ± 6	-11.0	-10.1	1.53
00-JG-3A	Virgelle	83	4.51	24.39	0.1118	0.512129 ± 7	-9.9	-9.0	1.36
00-JG-3B	Virgelle	83	4.30	24.90	0.1043	0.512155 ± 6	-9.4	-8.4	1.24
duplicate			4.30	24.40	0.1065	0.512174 ± 6	-9.1	-8.1	1.23
00-JG-7A	Milk River	82	5.56	29.01	0.1159	0.512107 ± 6	-10.4	-9.5	1.46
00-JG-7B	Milk River	82	4.59	23.51	0.1181	0.512079 ± 6	-10.9	-10.1	1.53
00-JG-6A	Pakowki	81	4.81	25.43	0.1143	0.512076 ± 6	-11.0	-10.1	1.48
00-JG-6B	Pakowki	81	3.64	18.99	0.1160	0.512066 ± 7	-11.1	-10.3	1.52
00-JG-19A	Connelly Creek	78	5.86	29.86	0.1186	0.512112 ± 8	-10.2	-9.5	1.49
00-JG-19B	Connelly Creek	78	3.04	15.57	0.1180	0.512121 ± 5	-10.1	-9.3	1.46
00-JG-5A	Lundbreck	77	5.57	28.77	0.1171	0.511989 ± 6	-12.7	-11.9	1.66
00-JG-5B	Lundbreck	77	4.06	21.40	0.1147	0.512012 ± 5	-12.2	-11.4	1.58
00-JG-4A	Drywood Creek	75	5.87	31.24	0.1136	0.511992 ± 6	-12.6	-11.8	1.60
00-JG-4B	Drywood Creek	75	2.65	13.07	0.1228	0.512495 ± 6	-2.8	-2.1	0.93

duplicate			2.62	13.01	0.1220	0.512552 ± 6	-1.7	-1.0	0.82
01-JGE-27	Bearpaw	73	4.61	22.61	0.1232	0.512368 ± 6	-5.3	-4.6	1.14
01-JGE-26	St. Mary River	69	4.07	19.80	0.1243	0.512421 ± 6	-4.2	-3.6	1.06
00-JG-18A	St. Mary River	68	5.62	28.86	0.1177	0.512022 ± 6	-12.0	-11.3	1.62
00-JG-18B	St. Mary River	68	3.83	19.77	0.1172	0.511996 ± 7	-12.5	-11.8	1.65
00-JG-17	St. Mary River	68	5.03	26.14	0.1163	0.511969 ± 7	-13.1	-12.4	1.68
00-JG-16A	Willow Creek	67	4.61	23.65	0.1179	0.512143 ± 6	-9.7	-9.0	1.43
00-JG-16B	Willow Creek	67	3.74	18.68	0.1210	0.512210 ± 5	-8.4	-7.7	1.37
00-JG-20A	Willow Creek	66	5.86	30.07	0.1178	0.512144 ± 9	-9.6	-9.0	1.43
00-JG-20B	Willow Creek	66	2.92	16.04	0.1102	0.512116 ± 5	-10.2	-9.5	1.36
00-JG-14A	Porcupine Hills	63	3.34	17.40	0.1160	0.512071 ± 6	-11.1	-10.4	1.51
00-JG-14B	Porcupine Hills	63	2.33	12.55	0.1123	0.512163 ± 7	-9.3	-8.6	1.32
00-JG-15A	Porcupine Hills	63	4.95	25.95	0.1154	0.512028 ± 6	-11.9	-11.3	1.57
00-JG-15B	Porcupine Hills	63	3.66	19.11	0.1157	0.512063 ± 6	-11.2	-10.6	1.52

### Highwood traverse

93-NB-29A <sup>4</sup>	Elk	137	5.01	26.17	0.1157	0.511967 ± 6	-13.1	-11.6	1.67
93-NB-29B <sup>4</sup>	Elk	137	2.55	13.14	0.1171	0.511982 ± 6	-12.8	-11.4	1.67
93-NB-28A <sup>4</sup>	Gladstone	113	5.99	28.12	0.1288	0.512373 ± 7	-5.2	-4.2	1.20
93-NB-28B <sup>4</sup>	Gladstone	113	2.64	12.65	0.1264	0.512509 ± 8	-2.5	-1.5	0.94
01-JGE-28A	Beaver Mines	107	3.85	18.68	0.1246	0.512536 ± 5	-2.0	-1.0	0.88
01-JGE-28B	Beaver Mines	107	4.00	19.87	0.1218	0.512578 ± 6	-1.2	-0.1	0.78
01-JGE-29A	Mill Creek	103	5.32	30.01	0.1071	0.511907 ± 5	-14.3	-13.1	1.62
01-JGE-29B	Mill Creek	103	3.44	18.19	0.1144	0.512120 ± 5	-10.1	-9.0	1.42
01-JGE-1	Mill Creek	103	4.55	25.75	0.1069	0.512003 ± 6	-12.4	-11.2	1.48
duplicate			4.56	25.65	0.1076	0.512017 ± 5	-12.1	-11.0	1.47
01-JGE-2	Mill Creek clast	103	2.49	12.51	0.1204	0.512470 ± 5	-3.3	-2.3	0.94
01-JGE-3	Mill Creek clast	103	3.89	17.88	0.1315	0.512152 ± 6	-9.5	-8.6	1.65
01-JGE-4	Blackstone	95	5.60	29.11	0.1162	0.512006 ± 7	-12.3	-11.4	1.62
01-JGE-5	Blackstone	95	5.38	27.13	0.1199	0.512012 ± 6	-12.2	-11.3	1.67
01-JGE-30B	Blackstone	95	4.90	22.20	0.1333	0.512092 ± 6	-10.6	-9.9	1.80
01-JGE-35A	Cardium	92	4.05	18.34	0.1337	0.512018 ± 6	-12.1	-11.4	1.95
01-JGE-35B	Cardium	92	3.12	18.28	0.1031	0.511967 ± 6	-13.1	-12.0	1.48
93-NB-30 <sup>4</sup>	Wapiabi	85	5.78	31.83	0.1097	0.512536 ± 5	-13.8	-12.9	1.63
93-NB-31 <sup>4</sup>	Belly River	84	2.34	12.07	0.1174	0.512562 ± 6	-1.5	-0.6	0.77
01-JGE-34A	Milk River	83	4.05	20.31	0.1207	0.512447 ± 6	-3.7	-2.9	0.98
01-JGE-34B	Milk River	83	2.32	11.35	0.1236	0.512565 ± 5	-1.4	-0.7	0.82
01-JGE-32A	St. Mary River	68	4.45	22.66	0.1188	0.512424 ± 5	-4.2	-3.5	1.00
duplicate			4.45	22.65	0.1189	0.512432 ± 5	-4.0	-3.3	0.99
01-JGE-32B	St. Mary River	68	3.20	16.81	0.1151	0.512490 ± 5	-2.9	-2.2	0.86
01-JGE-33A	Willow Creek	67	3.61	18.84	0.1159	0.512241 ± 7	-7.8	-7.1	1.25
01-JGE-33B	Willow Creek	67	3.10	15.97	0.1173	0.512300 ± 7	-6.6	-5.9	1.17
01-JGE-36A	Paskapoo	58	4.65	24.72	0.1138	0.512082 ± 6	-10.8	-10.2	1.46
duplicate			4.62	24.57	0.1137	0.512095 ± 7	-10.6	-10.0	1.44
01-JGE-36B	Paskapoo	58	3.30	17.02	0.1170	0.512160 ± 6	-9.3	-8.7	1.39

<sup>1</sup> Age assignments are from references listed below.

<sup>2</sup> Errors on Sm and Nd ppm values are 1% at two sigma.

<sup>3</sup> Errors on <sup>147</sup>Sm/<sup>144</sup>Nd are 0.4% at two sigma.

\*Samples with A and B designation represent sandstone (A)-shale (B) pairs.

<sup>4</sup> Sample numbers beginning 93-NB are from our previous work in Boghossian et al. (1996).

**Table DR-2: Alberta Foreland sequence Trace Element data (Ross et al., GSA Bu**

<b>Sample</b>	01-JGE-14	00-JG-13	93-NB-28A	93-NB-28B	00-JG-8A	00-JG-8B	00-JG-9
<b>Formation</b>	Mist Mtn	Dalhousie	Gladstone	Gladstone	Beaver Mines	Beaver Mines	Beaver Mines
<b>Age Ma</b>	144	115	113	113	107	107	107
Li	14.5	29.9	46.7	27.3	50.5	15.6	49.4
Sc	4.07	6.45	7.8	8.67	17.5	11.6	13.5
V	106	239	191	112	196	81.9	254
Rb	22.5	57.2	22.3	27.3	53.6	24.4	21.2
Sr	54.9	71.6	50.0	112	141	519	106
Y	19.1	20.3	24.9	12.8	20.8	12.5	18.1
Zr	389	179	164	59.4	120	47.0	146
Nb	9.95	11.4	9.6	5.46	12.3	6.00	13.9
Mo	0.46	0.49	3.9	1.13	1.49	1.32	7.81
Cs	1.57	4.84	3.5	1.18	4.30	1.02	6.95
Ba	729	469	501	834	769	1614	522
La	22.7	26.6	27.5	16.2	21.5	12.2	18.5
Ce	42.4	48.6	52.2	26.8	43.1	21.8	38.7
Pr	5.18	6.26	6.1	3.16	5.44	2.68	5.27
Nd	20.3	25.9	26.4	13.1	22.3	11.6	22.5
Sm	3.83	4.59	5.5	2.71	4.25	2.22	4.34
Eu	0.84	0.96	1.3	0.77	1.05	0.70	0.98
Gd	3.57	4.29	5.3	2.66	4.40	2.46	3.97
Tb	0.5	0.64	0.7	0.36	0.60	0.29	0.56
Dy	3.04	4.38	4.5	2.29	3.93	1.81	3.57
Ho	0.6	0.85	0.9	0.45	0.80	0.36	0.71
Er	1.79	2.76	2.6	1.36	2.40	1.21	2.16
Yb	2.02	3.08	2.8	1.50	2.39	1.15	2.27
Lu	0.31	0.45	0.4	0.21	0.36	0.16	0.33
Hf	10.14	4.93	5.4	1.99	3.58	1.62	4.35
Ta	0.66	0.28	0.8	0.40	0.81	0.39	0.91
Tl	0.33	0.93	0.5	0.26	0.61	0.25	1.36
Pb	7.91	8.14	17.1	7.28	15.5	6.91	28.0
Bi	0.06	0.24	0.2	0.08	0.24	0.07	0.32
Th	4.01	9.03	2.8	3.37	6.62	2.68	7.40
U	1.86	4.25	2.3	1.69	3.29	1.01	12.6
B	35.5	39.4	46.7	20.5	27.7	11.2	38.3
Cr	57.6	124	89.6	41.1	86.5	42.1	81.1
Ni	6.39	8.40	52.9	21.0	61.2	19.0	44.7
Cu	13.5	10.2	66.2	15.8	61.9	12.5	35.8
Zn	73.4	12.3	158	55.1	125	49.3	138
As	2.40	7.16	13.5	7.26	11.5	13.1	27.6
Sn	4.34	2.71	1.2	2.03	2.45	1.73	3.70
Sb	0.66	1.29	2.1	1.22	1.99	1.12	3.26

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Sample	01-JGE-24A	01-JGE-24B	00-JG-10A	00-JG-10B	01-JGE-1	01-JGE-18	00-JG-11A
Formation	Beaver Mines	Beaver Mines	Mill Creek				
Age Ma	107	107	104	104	103	103	103
Li	45.6	30.8	93.2	21.8	33.3	24.5	52.9
Sc	12.2	12.0	13.2	4.55	8.30	16.0	12.6
V	188	167	165	106	108	184	141
Rb	48.2	19.6	114	19.9	45.9	27.8	102
Sr	103	167	78.6	35.5	153	495	98.7
Y	17.8	13.0	23.2	13.2	12.5	17.6	18.5
Zr	109	79.6	132	82.4	121	68.0	144
Nb	9.44	7.37	13.5	6.79	15.2	5.02	14.1
Mo	2.28	1.23	1.69	0.23	0.57	0.76	0.46
Cs	3.89	0.91	9.68	1.21	4.28	0.80	7.98
Ba	583	407	456	134	921	1038	484
La	17.7	10.8	34.9	18.8	22.3	8.38	31.0
Ce	33.2	21.4	65.4	34.4	43.2	17.6	59.8
Pr	4.41	2.73	8.52	4.36	5.33	2.58	7.00
Nd	18.0	12.3	34.5	17.5	21.2	12.6	26.8
Sm	3.50	2.57	6.04	3.23	3.83	3.18	5.03
Eu	0.91	0.80	1.34	0.68	0.82	0.86	0.99
Gd	3.61	2.59	5.90	2.82	3.27	3.54	4.28
Tb	0.49	0.36	0.75	0.35	0.43	0.50	0.57
Dy	3.25	2.32	4.63	2.10	2.63	3.03	3.67
Ho	0.65	0.48	0.92	0.41	0.51	0.62	0.74
Er	2.07	1.44	2.86	1.19	1.63	1.82	2.30
Yb	2.03	1.50	2.89	1.19	1.69	1.71	2.46
Lu	0.30	0.23	0.45	0.17	0.25	0.25	0.36
Hf	3.47	2.40	5.71	2.24	4.01	2.13	4.24
Ta	0.49	0.47	1.14	0.34	0.88	0.27	0.95
Tl	0.51	0.24	1.13	0.21	0.67	0.29	1.03
Pb	12.9	7.01	20.3	5.86	14.40	2.98	46.6
Bi	0.20	0.08	0.25	0.03	0.23	0.08	0.44
Th	4.58	2.68	11.0	3.63	7.21	2.25	10.5
U	4.79	1.70	4.19	1.82	2.77	2.43	5.93
B	31.9	21.8	31.8	8.51	29.8	14.1	52.6
Cr	88.1	89.2	87.5	29.2	52.7	29.6	69.4
Ni	50.7	32.0	53.0	15.8	19.0	13.4	35.9
Cu	68.8	23.3	33.6	7.43	18.4	59.6	33.2
Zn	111	70.2	131	58.5	79.4	62.2	122
As	14.4	5.75	3.38	4.60	10.2	11.0	10.3
Sn	1.36	1.61	3.12	2.00	2.46	1.73	3.61
Sb	2.48	1.39	1.26	0.80	0.93	0.69	2.15

<b>Sample Formation Age Ma</b>	01-JGE-5 Blackstone 95	01-JGE-16A Cardium 92	93-NB-30 Wapiabi 85	00-JG-1 Wapiabi 85	93-NB-31 Belly River 84	00-JG-2A Milk River 84	00-JG-3B Milk River 83
Li	54.0	32.3	80.8	51.8	21.7	40.8	11.8
Sc	9.14	6.18	10.8	12.3	7.60	11.7	4.10
V	133	145	294	252	107	110	43.3
Rb	47.3	46.2	85.6	29.8	11.3	97.0	29.2
Sr	73.9	76.6	89.6	158	240	161	214
Y	19.5	13.0	17.5	12.7	8.50	17.5	13.9
Zr	169	97.0	155	112	77.9	144	248
Nb	13.5	9.61	18.1	14.6	5.84	15.4	14.6
Mo	1.09	0.69	1.36	22.2	1.34	1.34	0.84
Cs	4.59	3.10	6.46	6.08	0.37	6.48	0.43
Ba	440	818	1126	1057	919	431	697
La	23.2	20.9	28.9	11.5	9.50	34.4	33.5
Ce	46.7	39.2	54.7	23.9	21.6	62.9	60.1
Pr	5.85	4.89	6.69	3.44	2.17	6.85	6.54
Nd	24.9	19.4	27.1	14.7	8.9	25.3	24.4
Sm	4.73	3.53	4.74	3.12	1.75	4.41	4.17
Eu	1.02	0.75	1.01	0.71	0.56	0.93	0.94
Gd	4.89	3.24	4.27	3.11	1.76	3.76	3.48
Tb	0.64	0.42	0.56	0.45	0.22	0.52	0.43
Dy	3.81	2.51	3.47	2.83	1.45	3.03	2.58
Ho	0.73	0.49	0.70	0.57	0.29	0.6	0.5
Er	2.18	1.43	2.13	1.77	0.90	1.84	1.42
Yb	2.21	1.39	2.40	1.84	0.91	2.03	1.64
Lu	0.32	0.21	0.35	0.27	0.12	0.3	0.24
Hf	5.55	3.39	4.78	3.40	2.21	4.7	7.61
Ta	0.77	0.66	1.10	0.92	0.33	1.2	1.23
Tl	0.54	0.39	0.84	1.18	0.12	0.63	0.32
Pb	12.3	12.2	15.2	18.8	7.24	32.1	8.84
Bi	0.14	0.10	0.24	0.28	0.07	0.63	0.09
Th	8.18	5.95	8.30	5.48	2.27	9.64	6.41
U	2.93	2.20	3.47	5.46	1.36	3.46	2.14
B	54.9	46.0	89.0	89.5	83.1	46.8	9.63
Cr	86.1	58.3	126	97.3	51.1	46.5	19.9
Ni	37.1	21.1	44.7	47.1	26.3	20.6	8.37
Cu	14.9	11.4	30.5	31.2	11.6	25.6	3.73
Zn	108	75.4	134	128	51.3	97.1	57.5
As	5.51	4.61	17.5	13.8	10.2	12.4	8.97
Sn	1.97	3.06	3.30	3.25	1.30	3.32	2.39
Sb	0.40	0.60	0.94	1.77	0.87	0.92	0.59

<b>Sample Formation Age Ma</b>	00-JG-7A Milk River 82	00-JG-6A Pakowki 81	00-JG-19A Connelly Ck 78	00-JG-5A Lundbreck 77	00-JG-4A Drywood Ck 75	00-JG-4B Drywood Ck 75	01-JGE-27 Bearpaw 73
Li	28.2	32.7	48.7	31.4	35.3	36.9	30.6
Sc	11.5	12.5	22.5	10.9	11.8	5.37	11.9
V	99.2	122	256	72.8	119	72.4	108
Rb	118	59.7	58.7	91.2	108	14.0	28.5
Sr	135	149	173	127	84.9	107	157
Y	20.4	19.3	36.2	24.2	22.1	9.3	18.4
Zr	100	111	252	191	129	68.6	118
Nb	13.7	13.0	22.3	12.9	13.9	6.53	9.47
Mo	0.78	1.33	1.93	1.60	1.13	0.40	1.40
Cs	9.55	6.91	6.83	5.08	9.05	0.81	2.20
Ba	349	408	537	356	414	313	367
La	31.2	25.7	26.2	33.4	34.3	9.35	14.7
Ce	61.3	55.0	52.3	65.5	63.9	21.8	30.4
Pr	7.10	6.20	7.02	7.3	7.37	2.35	3.68
Nd	27.8	24.8	30.0	28.8	29.9	10.0	15.5
Sm	5.31	4.74	6.08	5.48	5.44	1.92	3.39
Eu	1.09	1.02	1.38	1.01	1.11	0.56	0.81
Gd	4.67	4.40	5.89	4.8	5.08	1.91	3.41
Tb	0.61	0.58	0.78	0.7	0.71	0.23	0.48
Dy	3.85	3.58	4.78	4.27	4.37	1.47	2.98
Ho	0.72	0.72	0.96	0.86	0.83	0.29	0.59
Er	2.15	2.11	2.92	2.57	2.47	0.88	1.78
Yb	2.17	2.16	2.87	2.92	2.66	0.90	1.92
Lu	0.30	0.32	0.44	0.43	0.37	0.14	0.28
Hf	3.47	4.35	5.67	6.5	4.79	1.94	3.31
Ta	0.96	0.92	1.00	1.09	1.02	0.34	0.66
Tl	0.95	0.72	0.83	0.53	0.91	0.15	0.44
Pb	22.3	22.3	17.8	16.7	22.4	7.88	18.0
Bi	0.46	0.45	0.30	0.48	0.44	0.06	0.19
Th	10.8	8.95	7.62	9.81	10.3	2.35	5.89
U	5.67	2.84	2.48	2.81	2.88	1.07	2.40
B	44.4	37.3	38.2	20.5	37.8	9.94	21.3
Cr	50.6	61.5	80.5	48.4	73.3	47.8	72.7
Ni	23.2	29.4	34.6	22.6	27.1	28.1	48.1
Cu	23.6	30.5	32.0	24.6	30.2	13.5	32.2
Zn	108	104	105	68.6	98.7	51.0	87.8
As	11.6	3.89	4.20	4.44	3.54	2.66	12.8
Sn	3.53	3.38	3.00	5.31	3.77	1.70	2.33
Sb	1.68	0.72	0.95	0.69	1.14	0.54	1.52

<b>Sample Formation Age Ma</b>	00-JG-18A St. Mary R. 68	00-JG-20A Willow Ck 66	00-JG-15A Porcupine Hls 63	01-JGE-36A Paskapoo 58
Li	30.4	33.9	42.2	25.2
Sc	11.2	11.2	13.3	11.5
V	64.9	117	121	129
Rb	161	62.8	91.7	89.7
Sr	117	148	137	183
Y	22.3	24.5	22.2	19.4
Zr	106	133	124	96
Nb	14.0	13.2	12.0	10.5
Mo	0.30	0.98	0.80	0.56
Cs	9.89	6.12	7.00	4.54
Ba	528	572	427	530
La	32.5	29.5	31.6	29.8
Ce	65.2	59.1	58.0	51.6
Pr	7.51	7.62	6.62	6.04
Nd	30.2	30.9	25.7	23.9
Sm	5.44	5.59	4.76	4.50
Eu	0.98	1.30	0.99	0.99
Gd	5.08	5.70	4.29	4.10
Tb	0.67	0.71	0.61	0.52
Dy	4.15	3.87	3.77	3.44
Ho	0.80	0.78	0.75	0.67
Er	2.44	2.27	2.29	1.96
Yb	2.76	2.21	2.45	1.94
Lu	0.41	0.32	0.36	0.29
Hf	4.10	4.69	4.12	3.30
Ta	0.97	0.85	0.93	0.49
Tl	0.92	0.77	0.74	0.80
Pb	24.2	15.9	18.0	14.4
Bi	0.52	0.25	0.29	0.24
Th	10.7	8.52	8.98	9.24
U	2.82	2.73	3.20	3.46
B	32.9	33.1	38.9	44.5
Cr	42.9	58.0	66.0	85.4
Ni	20.2	31.3	71.2	31.4
Cu	21.7	40.3	28.4	22.5
Zn	70.5	93.7	131	96.8
As	13.0	13.0	4.08	1.65
Sn	5.78	3.03	1.59	1.65
Sb	1.87	1.56	1.51	1.05

Sample	SY-2	SY-2	LKSD-4	LKSD-4	Sco-1	Sco-1
	standard	recommended values	standard	recommended values	standard	recommended values
Li	103	95	14.9	12		
Sc	8.93	7	7.69	7		
V	50.5	50	53.0	49		
Rb	226	217	26.0	28		
Sr	274	271	120	110		
Y	118	128	20.7	23	22.8	26
Zr	304	280	72.9	105	171	160
Nb	29.7	29	5.14	9	12.1	11
Mo	0.90	1.8	2.60	n/a		
Cs	2.62	2.4	1.42	1.7		
Ba	444	460	322	330		
La	71.6	75	23.8	26	30.9	29.5
Ce	163	175	38.5	48	57.6	62
Pr	19.2	18.8	6.18	n/a	6.47	6.6
Nd	78.2	73	25.9	25	25.6	26
Sm	15.9	16.1	4.66	5	4.93	5.3
Eu	2.55	2.42	1.11	1.1	1.08	1.19
Gd	17.7	17	4.51	n/a	4.49	4.6
Tb	2.81	2.5	0.58	1.2	0.62	0.7
Dy	19.9	18	3.54	3.7	3.83	4.2
Ho	4.43	3.8	0.69	n/a	0.75	0.97
Er	14.7	12.4	2.07	n/a	2.21	2.5
Yb	18.7	17	2.03	2	2.44	2.27
Lu	3.04	2.7	0.30	0.5	0.35	0.34
Hf	10.0	7.7	2.10	2.8	4.89	4.6
Ta	1.72	2.01	0.26	0.4	0.85	0.92
Tl	1.58	1.5	0.61	n/a		
Pb	95.5	85	97.0	91		
Bi	0.14	2	0.54	n/a		
Th	394	379	4.51	5.1		
U	286	284	29.7	31		
B	57.78	88	18.09	22		
Cr	7.88	9.5	32.49	33		
Ni	9.50	9.9	35.56	31		
Cu	3.25	5.2	30.14	31		
Zn	232.07	248	170.16	194		
As	18.17	17.3	14.49	16		
Sn	6.49	5.7	6.47	5		
Sb	0.29	0.25	1.82	1.7		

Recommended values are from

Govindaraju, K. 1994. Geostandards Newsletter 18: p. 1-158.

**Table DR-3: Point-count results, Alberta foreland sandstones  
Ross et al, GSA Bulletin, 2004**

Sample	Formation or Group	Age (Ma)	Eps. Nd at Age	Qm	Qp	Qpt	Qss	silt	Q total
01-JGE-9B	Fernie	152	-7.4	346	25	1	1	0	373
01-JGE-10	Morrissey	150	-8.7	265	16	1	1	0	283
01-JGE-14	Mist Mtn	144	-8.9	284	34	5	1	0	324
01-JGE-17	Cadomin	115	-8.0	224	21	1	13	4	263
00-JG-12	Dalhousie	115	-9.5	148	19	1	21	0	189
00-JG-8B	Beaver Mines	107	-0.3	102	25	2	2	0	131
01-JGE-24B	Beaver Mines	107	0.0	98	26	5	2	0	131
01-JGE-25B	Beaver Mines	107	1.1	139	34	2	0	0	175
01-JGE-28B	Beaver Mines	107	-0.1	32	22	1	1	0	56
00-JG-10B	Mill Creek	104	-10.4	284	37	3	13	0	337
00-JG-11B	Mill Creek	103	-11.0	133	24	15	4	0	176
01-JGE-1	Mill Creek	103	-11.2	95	17	3	1	0	116
01-JGE-18	Mill Creek	103	1.0	102	20	5	1	0	128
01-JGE-29B	Mill Creek	103	-9.0	95	17	4	13	4	133
01-JGE-16B	Cardium	92	-13.1	274	13	5	0	1	293
01-JGE-34B	Milk River	83	-0.7	130	16	3	2	0	151
00-JG-7B	Milk River	82	-10.1	194	17	1	0	0	212
00-JG-3B	Milk River	79	-8.4	146	13	0	1	0	160
00-JG-19B	Connelly Creek	78	-9.3	194	43	0	0	0	237
00-JG-5B	Lundbreck	77	-11.4	207	17	1	3	0	228
00-JG-4B	Drywood Creek	75	-2.1	103	40	14	0	0	157
00-JG-18B	St. Mary River	68	-11.8	162	24	1	8	0	195
00-JG-16B	Willow Creek	67	-7.7	136	22	9	12	1	179
01-JGE-33B	Willow Creek	67	-5.9	136	17	6	11	0	170
00-JG-20B	Willow Creek	66	-9.5	178	18	7	13	0	216
00-JG-14B	Porcupine Hills	63	-8.6	172	17	3	5	1	197
01-JGE-36B	Paskapoo	58	-8.7	269	13	0	0	0	282

Sample	K-spar	K-spar	Plag	F	Phyllite	Schist	Lmet	Lv	Lv	Lv	Lv	Lv	Lv
		mym\rm		total			total	lath	microlitic	felsic	vitric	mafic	total
01-JGE-9B	0	0	37	37	1	0	2	0	0	1	8	0	9
01-JGE-10	0	0	10	10	2	0	3	0	0	10	8	0	18
01-JGE-14	0	0	0	0	6	1	12	0	1	3	2	0	6
01-JGE-17	0	0	0	0	0	0	1	0	0	1	0	0	1
00-JG-12	0	0	0	0	0	0	1	2	0	0	3	0	5
00-JG-8B	10	0	133	143	9	0	11	20	11	14	36	26	107
01-JGE-24B	0	0	143	143	3	11	19	6	8	19	6	11	50
01-JGE-25B	23	0	144	167	7	7	16	5	4	10	14	4	37
01-JGE-28B	3	0	280	283	1	4	6	11	2	19	6	8	46
00-JG-10B	0	0	0	0	5	2	10	0	1	21	7	0	29
00-JG-11B	0	0	51	51	19	22	56	0	1	10	9	0	20
01-JGE-1	32	0	68	100	53	31	87	0	11	40	16	1	68
01-JGE-18	37	0	109	146	7	7	19	10	1	11	15	15	52
01-JGE-29B	0	0	61	61	9	9	22	2	8	15	13	0	38
01-JGE-16B	0	0	18	18	2	3	10	0	0	3	1	0	4
01-JGE-34B	21	0	147	168	2	0	5	13	4	11	16	4	48
00-JG-7B	3	0	159	162	1	3	5	0	1	12	3	3	19
00-JG-3B	42	1	161	204	2	9	11	3	2	9	9	6	29
00-JG-19B	0	0	76	76	2	2	4	1	0	13	6	1	21
00-JG-5B	25	0	114	139	5	13	19	0	0	12	11	1	24
00-JG-4B	0	0	164	164	2	4	20	6	4	12	13	9	44
00-JG-18B	42	0	61	103	10	9	20	4	0	64	16	0	84
00-JG-16B	5	0	27	32	5	10	24	1	0	21	10	10	42
01-JGE-33B	40	0	71	111	4	7	17	50	4	14	18	0	86
00-JG-20B	1	0	32	33	5	3	15	5	2	19	13	1	40
00-JG-14B	23	0	12	35	2	6	11	0	3	17	8	4	32
01-JGE-36B	2	0	39	41	0	0	0	2	1	6	9	0	18

<b>Sample</b>	Limestone	Shale/ mudstone	Chert	<b>Lsed total</b>	Apatite	Chlorite	Musc	Biot	Cpx+ Czs	<b>Access. total</b>
01-JGE-9B	6	16	3	26	0	0	3	0	2	5
01-JGE-10	32	51	53	137	0	0	0	0	1	1
01-JGE-14	1	63	47	112	0	0	0	0	2	2
01-JGE-17	0	3	183	203	0	0	0	0	0	0
00-JG-12	3	6	247	277	0	0	0	0	0	0
00-JG-8B	2	13	20	37	0	0	7	0	18	25
01-JGE-24B	0	31	54	87	0	4	2	0	21	27
01-JGE-25B	1	10	29	40	0	1	0	1	0	2
01-JGE-28B	3	15	38	57	0	0	2	0	2	4
00-JG-10B	2	14	55	84	4	0	0	0	1	5
00-JG-11B	15	107	35	161	0	0	1	0	2	3
01-JGE-1	2	34	34	71	0	1	4	3	1	9
01-JGE-18	0	40	42	83	0	0	0	4	24	28
01-JGE-29B	1	21	170	209	10	0	1	0	0	11
01-JGE-16B	8	62	55	126	0	0	1	0	3	4
01-JGE-34B	1	28	49	80	0	1	1	0	0	2
00-JG-7B	19	19	5	43	0	0	2	6	2	10
00-JG-3B	12	15	8	36	0	0	0	10	0	10
00-JG-19B	51	36	21	108	0	0	2	0	2	4
00-JG-5B	4	8	3	18	0	0	2	18	4	24
00-JG-4B	19	31	26	76	0	0	1	0	2	3
00-JG-18B	12	17	14	51	0	0	5	0	0	5
00-JG-16B	36	63	77	189	0	1	1	2	1	5
01-JGE-33B	0	14	46	71	0	1	3	2	6	12
00-JG-20B	33	21	95	162	0	0	0	2	2	4
00-JG-14B	50	11	115	182	0	0	0	1	0	1
01-JGE-36B	32	37	36	105	0	0	1	1	0	2

Sample	Qm	Ft	Lt	Qm%	Ft%	Lt%	Qt	Ft	Lt	Qt%	Ft%	Lt%
01-JGE-9B	346	37	63	0.776	0.083	0.141	376	37	33	0.843	0.083	0.074
01-JGE-10	265	10	175	0.589	0.022	0.389	336	10	104	0.747	0.022	0.231
01-JGE-14	284	0	169	0.627	0.000	0.373	371	0	82	0.819	0.000	0.181
01-JGE-17	224	0	227	0.497	0.000	0.503	442	0	9	0.980	0.000	0.020
00-JG-12	148	0	303	0.328	0.000	0.672	436	0	15	0.967	0.000	0.033
00-JG-8B	102	143	182	0.239	0.335	0.426	151	143	133	0.354	0.335	0.311
01-JGE-24B	98	143	187	0.229	0.334	0.437	185	143	100	0.432	0.334	0.234
01-JGE-25B	139	167	129	0.320	0.384	0.297	204	167	64	0.469	0.384	0.147
01-JGE-28B	32	283	132	0.072	0.633	0.295	94	283	70	0.210	0.633	0.157
00-JG-10B	284	0	163	0.635	0.000	0.365	392	0	55	0.877	0.000	0.123
00-JG-11B	133	51	276	0.289	0.111	0.600	211	51	198	0.459	0.111	0.430
01-JGE-1	95	100	246	0.215	0.227	0.558	150	100	191	0.340	0.227	0.433
01-JGE-18	102	146	179	0.239	0.342	0.419	170	146	111	0.398	0.342	0.260
01-JGE-29B	95	61	290	0.213	0.137	0.650	299	61	86	0.670	0.137	0.193
01-JGE-16B	274	18	158	0.609	0.040	0.351	347	18	85	0.771	0.040	0.189
01-JGE-34B	130	168	152	0.289	0.373	0.338	200	168	82	0.444	0.373	0.182
00-JG-7B	194	162	85	0.440	0.367	0.193	217	162	62	0.492	0.367	0.141
00-JG-3B	146	204	89	0.333	0.465	0.203	168	204	67	0.383	0.465	0.153
00-JG-19B	194	76	176	0.435	0.170	0.395	258	76	112	0.578	0.170	0.251
00-JG-5B	207	139	79	0.487	0.327	0.186	231	139	55	0.544	0.327	0.129
00-JG-4B	103	164	194	0.223	0.356	0.421	183	164	114	0.397	0.356	0.247
00-JG-18B	162	103	180	0.364	0.231	0.404	209	103	133	0.470	0.231	0.299
00-JG-16B	136	32	286	0.300	0.070	0.630	256	32	166	0.564	0.070	0.366
01-JGE-33B	136	111	197	0.306	0.250	0.444	216	111	117	0.486	0.250	0.264
00-JG-20B	178	33	242	0.393	0.073	0.534	311	33	109	0.687	0.073	0.241
00-JG-14B	172	35	245	0.381	0.077	0.542	312	35	105	0.690	0.077	0.232
01-JGE-36B	269	41	136	0.603	0.092	0.305	318	41	87	0.713	0.092	0.195

Sample	Qm%	Plag%	K-spar%	Lmet%	Lvolc%	Lsed%	Points counted
01-JGE-9B	0.903	0.097	0.000	0.054	0.243	0.703	452
01-JGE-10	0.964	0.036	0.000	0.019	0.114	0.867	452
01-JGE-14	1.000	0.000	0.000	0.092	0.046	0.862	456
01-JGE-17	1.000	0.000	0.000	0.005	0.005	0.990	468
00-JG-12	1.000	0.000	0.000	0.004	0.018	0.979	472
00-JG-8B	0.416	0.543	0.041	0.071	0.690	0.239	454
01-JGE-24B	0.407	0.593	0.000	0.122	0.321	0.558	457
01-JGE-25B	0.454	0.471	0.075	0.172	0.398	0.430	437
01-JGE-28B	0.102	0.889	0.010	0.055	0.422	0.523	452
00-JG-10B	1.000	0.000	0.000	0.081	0.236	0.683	465
00-JG-11B	0.723	0.277	0.000	0.236	0.084	0.679	467
01-JGE-1	0.487	0.349	0.164	0.385	0.301	0.314	451
01-JGE-18	0.411	0.440	0.149	0.123	0.338	0.539	456
01-JGE-29B	0.609	0.391	0.000	0.082	0.141	0.777	474
01-JGE-16B	0.938	0.062	0.000	0.071	0.029	0.900	455
01-JGE-34B	0.436	0.493	0.070	0.038	0.361	0.602	454
00-JG-7B	0.545	0.447	0.008	0.075	0.284	0.642	451
00-JG-3B	0.417	0.460	0.123	0.145	0.382	0.474	450
00-JG-19B	0.719	0.281	0.000	0.030	0.158	0.812	450
00-JG-5B	0.598	0.329	0.072	0.311	0.393	0.295	452
00-JG-4B	0.386	0.614	0.000	0.143	0.314	0.543	464
00-JG-18B	0.611	0.230	0.158	0.129	0.542	0.329	458
00-JG-16B	0.810	0.161	0.030	0.094	0.165	0.741	471
01-JGE-33B	0.551	0.287	0.162	0.098	0.494	0.408	467
00-JG-20B	0.844	0.152	0.005	0.069	0.184	0.747	470
00-JG-14B	0.831	0.058	0.111	0.049	0.142	0.809	458
01-JGE-36B	0.868	0.126	0.006	0.000	0.146	0.854	448

Table DR-4

Ion microprobe (SHRIMP II) U-Th-Pb data for zircons from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	<sup>204</sup> Pb	f <sub>206c</sub>	<sup>206</sup> Pb/ <sup>238</sup> U		<sup>207</sup> Pb/ <sup>235</sup> U		<sup>207</sup> Pb/ <sup>206</sup> Pb		Apparent Age		Conc.
	ppm	ppm		ppm	ppb	(%)		±1σ		±1σ		±1σ	(Ma, ±1σ)	(%)	
<b>RAR-00-10 Porcupine Hills Formation</b>															
21.1	203	194	0.989	172	1	0.022	0.64302	0.01323	23.2253	0.5136	0.26196	0.00156	3258.5	9.4	98.2
38.1	68	56	0.853	41	0	0.017	0.49286	0.00656	12.4426	0.1940	0.18310	0.00121	2681.1	11.0	96.3
4.1	186	72	0.402	102	1	0.011	0.49288	0.00609	12.0130	0.1675	0.17677	0.00090	2622.8	8.5	98.5
17.1	561	157	0.290	286	2	0.016	0.47667	0.00497	10.7825	0.1171	0.16406	0.00033	2497.9	3.4	100.6
22.1	173	77	0.461	74	1	0.044	0.38971	0.00487	7.6219	0.1114	0.14185	0.00088	2249.9	10.7	94.3
7.1	105	54	0.532	42	0	0.017	0.36379	0.00465	6.4854	0.0930	0.12930	0.00066	2088.4	9.0	95.8
16.1	69	30	0.442	23	0	0.017	0.30605	0.00509	5.1687	0.1132	0.12249	0.00151	1992.8	22.0	86.4
20.1	394	154	0.404	148	1	0.008	0.35044	0.00366	5.8780	0.0696	0.12165	0.00053	1980.6	7.8	97.8
24.1	97	82	0.869	30	3	0.253	0.26083	0.00770	4.2752	0.1509	0.11888	0.00190	1939.4	28.9	77.0
35.1	81	51	0.650	30	0	0.017	0.32620	0.00466	5.2877	0.0879	0.11757	0.00081	1919.5	12.4	94.8
26.1	121	44	0.378	42	5	0.259	0.32928	0.00354	5.3068	0.0864	0.11689	0.00128	1909.1	19.8	96.1
23.1	57	36	0.644	22	5	0.526	0.34260	0.00558	5.4589	0.1749	0.11556	0.00296	1888.6	46.9	100.6
31.1	77	86	1.148	31	2	0.185	0.32222	0.00356	5.0422	0.0849	0.11349	0.00129	1856.1	20.7	97.0
6.1	136	86	0.654	48	3	0.135	0.31559	0.00363	4.9207	0.0722	0.11308	0.00088	1849.6	14.1	95.6
34.1	178	81	0.469	58	3	0.109	0.30935	0.00369	4.7928	0.0729	0.11237	0.00091	1838.0	14.7	94.5
8.1	164	86	0.541	57	0	0.017	0.31982	0.00388	4.9545	0.0677	0.11235	0.00056	1837.8	9.0	97.3
30.1	551	211	0.396	184	1	0.017	0.31621	0.00335	4.7678	0.0607	0.10935	0.00064	1788.7	10.6	99.0
14.1	671	165	0.253	212	2	0.017	0.30943	0.00324	4.6574	0.0505	0.10916	0.00019	1785.5	3.2	97.3
19.1	69	43	0.653	24	3	0.255	0.32221	0.00360	4.8484	0.0669	0.10913	0.00075	1785.0	12.5	100.9
29.1	32	14	0.462	11	1	0.268	0.30601	0.00346	4.5954	0.0957	0.10892	0.00176	1781.4	29.7	96.6
1.1	548	165	0.312	179	2	0.019	0.31586	0.00329	4.7322	0.0547	0.10866	0.00042	1777.0	7.1	99.6
37.1	662	168	0.263	217	2	0.023	0.32296	0.00342	4.8195	0.0651	0.10823	0.00078	1769.9	13.1	101.9
13.1	146	104	0.735	52	0	0.017	0.31233	0.00523	4.6347	0.1005	0.10762	0.00128	1759.6	21.8	99.6
10.1	257	56	0.226	80	1	0.014	0.30900	0.00365	4.5779	0.0595	0.10745	0.00044	1756.6	7.5	98.8
39.1	127	79	0.643	40	0	0.017	0.28336	0.00321	3.9290	0.0716	0.10056	0.00130	1634.5	24.2	98.4
36.1	176	59	0.346	44	4	0.204	0.24319	0.00279	3.0030	0.0509	0.08956	0.00100	1416.2	21.4	99.1
27.1	197	108	0.566	48	1	0.063	0.22636	0.00248	2.7267	0.0384	0.08736	0.00066	1368.5	14.6	96.1
40.1	95	60	0.651	18	4	0.546	0.16933	0.00201	1.7011	0.0422	0.07286	0.00148	1010.1	41.9	99.8
33.1	494	165	0.345	13	7	1.049	0.02666	0.00031	0.15875	0.01125	0.04319	0.00296	170.8	1.9 †	-
28.1	823	959	1.204	27	0	0.031	0.02665	0.00037	0.18347	0.00558	0.04994	0.00127	169.4	2.3 †	-
3.1	68	21	0.326	2	2	1.912	0.02587	0.00088	0.14122	0.01730	0.03960	0.00449	166.5	5.6 †	-
5.1	179	102	0.592	5	3	1.294	0.02518	0.00037	0.14151	0.01776	0.04075	0.00500	161.9	2.2 †	-
9.1	338	45	0.139	8	0	0.048	0.02456	0.00038	0.16732	0.00621	0.04942	0.00158	156.3	2.4 †	-
15.1	113	49	0.447	2	2	1.543	0.01782	0.00026	0.08583	0.02079	0.03493	0.00838	115.7	1.3 †	-
32.1	1275	669	0.542	21	4	0.379	0.01614	0.00032	0.10423	0.00613	0.04684	0.00248	103.4	2.0 †	-
2.1	124	23	0.194	2	3	3.113	0.01546	0.00065	0.06988	0.01070	0.03277	0.00466	100.7	4.2 †	-
25.1	753	299	0.411	11	3	0.581	0.01430	0.00019	0.08436	0.00340	0.04278	0.00156	92.1	1.2 †	-
12.1	235	157	0.692	4	1	0.759	0.01422	0.00018	0.08234	0.00200	0.04199	0.00080	91.7	1.2 †	-
29.2	1227	69	0.058	16	239	22.31	0.01372	0.00032	0.08111	0.02502	0.04287	0.01306	88.4	1.4 †	-
18.1	1289	178	0.143	14	1	0.097	0.01171	0.00015	0.07799	0.00296	0.04828	0.00165	75.0	1.0 †	-
11.1	464	150	0.334	5	2	0.624	0.01127	0.00016	0.06535	0.00533	0.04207	0.00330	72.7	1.1 †	-
<b>RAR-00-12 St. Mary River Formation</b>															
12.1	411	18	0.046	173	1	0.009	0.41942	0.00477	8.8170	0.1128	0.15247	0.00070	2373.8	7.9	95.1
37.1	382	572	1.548	174	1	0.017	0.33803	0.00448	5.3719	0.0772	0.11526	0.00047	1883.9	7.4	99.6
20.1	24	21	0.888	9	0	0.017	0.30751	0.01046	4.8790	0.2001	0.11507	0.00219	1881.1	34.7	91.9
32.1	154	101	0.681	58	2	0.069	0.33380	0.00488	5.2549	0.1069	0.11418	0.00142	1866.9	22.6	99.5
31.1	73	32	0.457	25	0	0.017	0.32260	0.00486	5.0380	0.0921	0.11326	0.00098	1852.4	15.7	97.3
33.1	134	94	0.722	49	1	0.053	0.32219	0.00470	4.9765	0.0872	0.11202	0.00090	1832.5	14.7	98.2
42.1	103	46	0.464	36	0	0.004	0.32802	0.00464	5.0533	0.0953	0.11173	0.00121	1827.7	19.8	100.1
24.1	87	57	0.675	30	0	0.017	0.30292	0.00443	4.5880	0.0841	0.10985	0.00103	1796.9	17.1	94.9
41.1	225	99	0.456	78	2	0.062	0.32164	0.00433	4.8183	0.0730	0.10865	0.00060	1776.9	10.0	101.2
28.1	375	91	0.250	119	1	0.017	0.31414	0.00407	4.6973	0.0666	0.10845	0.00047	1773.5	8.0	99.3
11.1	603	145	0.249	186	3	0.037	0.30890	0.00326	4.6069	0.0511	0.10817	0.00025	1768.8	4.2	98.1
14.1	151	115	0.786	53	2	0.088	0.30499	0.00325	4.5121	0.0604	0.10730	0.00073	1754.0	12.6	97.8

Table DR-4

Ion microprobe (SHRIMP II) U-Th-Pb data for zircons from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	<sup>204</sup> Pb	f <sub>206c</sub>	<sup>206</sup> Pb/ <sup>238</sup> U			<sup>207</sup> Pb/ <sup>235</sup> U			Apparent Age		Conc.
	ppm	ppm		ppm	ppb	(%)		±1σ		±1σ		±1σ	(Ma, ±1σ)	(%)	
15.1	381	182	0.494	124	4	0.063	0.30155	0.00311	4.3849	0.0503	0.10546	0.00041	1722.4	7.2	98.6
19.1	61	31	0.524	21	1	0.118	0.31065	0.00459	4.4993	0.1303	0.10504	0.00243	1715.1	43.1	101.7
39.1	322	84	0.269	55	2	0.075	0.16855	0.00283	2.1079	0.0450	0.09071	0.00102	1440.4	21.7	69.7
13.1	1341	730	0.562	291	65	0.478	0.20334	0.00326	2.5066	0.0429	0.08940	0.00039	1412.8	8.4	84.5
29.1	173	120	0.714	3	3	1.936	0.01560	0.00032	0.06781	0.01977	0.03153	0.00909	101.7	1.8 †	-
40.1	351	146	0.429	5	1	0.529	0.01454	0.00025	0.08594	0.01166	0.04285	0.00567	93.6	1.5 †	-
8.1	186	137	0.763	3	2	1.140	0.01448	0.00212	0.09720	0.02871	0.04870	0.01163	92.6	13.4 †	-
30.1	283	96	0.352	4	0	0.017	0.01412	0.00031	0.09146	0.00469	0.04698	0.00205	90.5	2.0 †	-
2.1	626	247	0.407	9	0	0.017	0.01373	0.00018	0.09933	0.00210	0.05246	0.00078	87.4	1.2 †	-
35.1	136	74	0.560	2	3	3.369	0.01228	0.00029	0.03500	0.02113	0.02066	0.01241	81.2	1.6 †	-
38.1	459	228	0.512	6	0	0.055	0.01260	0.00019	0.08185	0.00651	0.04712	0.00359	80.8	1.2 †	-
44.1	512	179	0.361	6	2	0.511	0.01230	0.00020	0.07635	0.00605	0.04503	0.00341	79.0	1.2 †	-
27.1	271	127	0.483	3	2	1.148	0.01216	0.00023	0.06891	0.01320	0.04109	0.00774	78.5	1.3 †	-
18.1	183	78	0.441	2	2	1.754	0.01212	0.00021	0.06735	0.01435	0.04030	0.00847	78.3	1.2 †	-
45.1	340	198	0.601	4	1	0.473	0.01189	0.00023	0.06819	0.00954	0.04160	0.00566	76.7	1.4 †	-
43.1	780	551	0.730	10	0	0.072	0.01189	0.00017	0.07754	0.00332	0.04731	0.00183	76.2	1.0 †	-
36.1	184	89	0.497	2	0	0.017	0.01174	0.00021	0.07925	0.00378	0.04896	0.00206	75.1	1.3 †	-
7.1	453	374	0.852	6	4	1.528	0.01153	0.00012	0.05958	0.00260	0.03746	0.00154	74.8	0.8 †	-
3.1	118	77	0.673	2	0	0.017	0.01172	0.00028	0.08813	0.01256	0.05454	0.00749	74.5	1.9 †	-
1.1	74	67	0.932	1	0	0.017	0.01183	0.00032	0.10753	0.00551	0.06594	0.00265	74.2	2.0 †	-
16.1	2073	1141	0.569	25	0	0.005	0.01151	0.00014	0.07808	0.00197	0.04919	0.00101	73.6	0.9 †	-
17.1	297	178	0.618	4	0	0.047	0.01154	0.00027	0.08751	0.01051	0.05498	0.00631	73.3	1.7 †	-
22.1	205	87	0.440	2	0	0.017	0.01152	0.00023	0.08621	0.00506	0.05430	0.00286	73.2	1.5 †	-
6.1	390	327	0.865	5	1	0.264	0.01146	0.00014	0.08024	0.00564	0.05080	0.00343	73.2	0.9 †	-
9.1	366	230	0.649	5	0	0.219	0.01137	0.00014	0.08229	0.00536	0.05249	0.00327	72.5	0.9 †	-
34.1	218	112	0.531	3	0	0.387	0.01119	0.00021	0.07144	0.01089	0.04629	0.00689	71.8	1.2 †	-
25.1	111	65	0.601	1	3	4.364	0.01065	0.00072	0.03279	0.08217	0.02233	0.05575	70.2	1.6 †	-
21.1	204	119	0.602	2	2	1.759	0.01076	0.00026	0.05143	0.01834	0.03466	0.01223	70.0	1.4 †	-
4.1	140	78	0.578	2	2	2.808	0.01075	0.00018	0.05201	0.01594	0.03511	0.01067	69.9	0.9 †	-
26.1	181	70	0.402	2	1	0.578	0.01091	0.00027	0.07314	0.01702	0.04860	0.01110	69.8	1.5 †	-
10.1	264	137	0.536	3	1	0.874	0.01077	0.00019	0.06624	0.00687	0.04462	0.00446	69.3	1.2 †	-
5.1	205	97	0.489	2	5	4.733	0.01039	0.00027	0.05021	0.01269	0.03505	0.00870	67.6	1.6 †	-
23.1	243	140	0.595	3	1	0.829	0.01030	0.00021	0.06139	0.01335	0.04324	0.00925	66.4	1.2 †	-
<b>RAR-00-03 Drywood Creek Formation</b>															
31.1	243	173	0.736	110	8	0.158	0.41435	0.00467	10.0187	0.1361	0.17536	0.00110	2609.5	10.5	85.6
30.1	226	65	0.297	120	0	0.007	0.49264	0.00525	11.6088	0.2290	0.17091	0.00262	2566.5	25.8	100.6
28.1	315	140	0.459	111	0	0.003	0.32969	0.00340	5.1693	0.0547	0.11371	0.00016	1859.6	2.5	98.8
29.1	466	86	0.190	146	2	0.034	0.31218	0.00398	4.7206	0.0707	0.10967	0.00071	1793.9	11.8	97.6
17.1	88	22	0.260	28	4	0.310	0.31374	0.00443	4.6924	0.1004	0.10847	0.00156	1773.9	26.6	99.2
10.1	93	48	0.528	24	1	0.076	0.24357	0.00284	3.0168	0.0664	0.08983	0.00155	1421.9	33.3	98.8
9.1	137	56	0.422	34	1	0.075	0.24033	0.00395	2.9767	0.1044	0.08983	0.00260	1421.9	56.5	97.6
15.1	182	90	0.513	48	4	0.176	0.24626	0.00268	3.0298	0.0445	0.08923	0.00077	1409.1	16.6	100.7
21.1	340	168	0.511	11	0	0.017	0.03133	0.00050	0.22293	0.00601	0.05160	0.00102	198.5	3.1 †	-
1.1	154	37	0.252	5	1	0.254	0.03046	0.00056	0.20508	0.00870	0.04883	0.00176	193.7	3.5 †	-
38.1	622	300	0.498	17	2	0.196	0.02629	0.00040	0.18097	0.01211	0.04993	0.00316	167.2	2.5 †	-
18.1	105	58	0.569	3	0	0.249	0.02502	0.00048	0.17731	0.01035	0.05140	0.00271	158.9	3.0 †	-
32.1	469	282	0.622	12	3	0.463	0.02463	0.00028	0.16121	0.00659	0.04747	0.00180	157.2	1.8 †	-
25.1	420	117	0.287	7	1	0.136	0.01807	0.00026	0.12457	0.00548	0.05000	0.00199	115.2	1.7 †	-
16.1	557	237	0.439	8	2	0.394	0.01464	0.00019	0.09205	0.00348	0.04561	0.00154	93.9	1.2 †	-
24.1	1791	611	0.353	22	0	0.015	0.01216	0.00016	0.08242	0.00208	0.04917	0.00098	77.8	1.0 †	-
36.1	451	235	0.538	6	1	0.461	0.01201	0.00024	0.06911	0.00400	0.04175	0.00216	77.5	1.5 †	-
40.1	552	70	0.131	6	0	0.017	0.01208	0.00016	0.08122	0.00190	0.04877	0.00085	77.3	1.0 †	-
3.1	871	350	0.416	11	0	0.051	0.01203	0.00076	0.07992	0.00824	0.04820	0.00355	77.0	4.9 †	-
23.1	881	209	0.245	10	0	0.053	0.01192	0.00014	0.07943	0.00507	0.04833	0.00296	76.3	0.9 †	-
19.1	513	166	0.334	6	4	1.463	0.01174	0.00013	0.06356	0.00546	0.03927	0.00329	76.0	0.8 †	-

Table DR-4

Ion microprobe (SHRIMP II) U-Th-Pb data for zircons from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	<sup>204</sup> Pb	f206c	<sup>206</sup> Pb/ <sup>238</sup> U			<sup>207</sup> Pb/ <sup>235</sup> U			Apparent Age		Conc.	
	ppm	ppm		ppm	ppb	(%)		±1σ		±1σ		±1σ	(Ma, ±1σ)	(%)		
26.1	386	220	0.589	5	2	0.972	0.01175	0.00022	0.06896	0.00807	0.04256	0.00482	75.8	1.4 †	-	
27.1	143	44	0.320	2	0	0.061	0.01181	0.00020	0.08463	0.01659	0.05199	0.01004	75.3	1.0 †	-	
35.1	706	425	0.623	9	1	0.256	0.01167	0.00015	0.07638	0.00514	0.04746	0.00305	74.8	1.0 †	-	
22.1	2967	847	0.295	34	3	0.159	0.01165	0.00014	0.07474	0.00150	0.04654	0.00067	74.7	0.9 †	-	
8.1	603	220	0.377	7	1	0.236	0.01168	0.00034	0.07890	0.00480	0.04901	0.00243	74.7	2.2 †	-	
37.1	264	90	0.352	3	1	0.631	0.01164	0.00017	0.07484	0.01008	0.04664	0.00616	74.7	1.0 †	-	
2.1	805	259	0.332	9	2	0.392	0.01161	0.00014	0.07189	0.00682	0.04493	0.00416	74.6	0.8 †	-	
33.1	407	107	0.273	5	0	0.017	0.01169	0.00013	0.08596	0.00222	0.05333	0.00116	74.4	0.8 †	-	
39.1	640	481	0.777	8	1	0.145	0.01157	0.00018	0.07544	0.00477	0.04730	0.00281	74.2	1.1 †	-	
14.1	392	91	0.240	4	3	1.364	0.01149	0.00018	0.07111	0.01483	0.04488	0.00925	73.9	0.9 †	-	
6.1	534	283	0.547	6	3	0.942	0.01142	0.00020	0.06367	0.01221	0.04044	0.00763	73.8	1.1 †	-	
20.1	493	138	0.289	5	3	1.080	0.01139	0.00020	0.06146	0.00700	0.03914	0.00432	73.7	1.2 †	-	
11.1	571	187	0.338	6	2	0.621	0.01143	0.00014	0.06624	0.00316	0.04205	0.00188	73.7	0.9 †	-	
12.1	108	27	0.259	1	2	2.968	0.01137	0.00019	0.06719	0.00987	0.04285	0.00616	73.3	1.1 †	-	
34.1	79	37	0.483	1	0	0.017	0.01160	0.00019	0.10049	0.00594	0.06282	0.00344	73.0	1.3 †	-	
13.1	164	70	0.440	2	0	0.100	0.01135	0.00015	0.08359	0.00977	0.05344	0.00612	72.2	1.0 †	-	
5.1	310	86	0.288	3	1	0.577	0.01118	0.00015	0.07247	0.00769	0.04702	0.00487	71.7	0.9 †	-	
7.1	114	48	0.435	1	1	2.275	0.01088	0.00042	0.06455	0.01536	0.04301	0.00989	70.2	2.6 †	-	
4.1	486	271	0.576	5	1	0.411	0.00949	0.00035	0.06030	0.00672	0.04606	0.00465	61.0	2.2 †	-	
<b>RAR-00-08 Bruin Creek Member</b>																
13.1	97	48	0.515	63	3	0.096	0.55808	0.00807	16.4567	0.3293	0.21387	0.00260	2935.1	19.8	97.4	
4.1	143	69	0.495	78	2	0.054	0.48211	0.00858	11.6583	0.2675	0.17538	0.00218	2609.7	20.9	97.2	
1.1	122	84	0.710	71	1	0.017	0.49390	0.00585	11.9006	0.1516	0.17476	0.00060	2603.7	5.7	99.4	
40.1	15	6	0.394	5	0	0.085	0.31843	0.00999	5.0635	0.3411	0.11533	0.00644	1885.0	104.1	94.5	
32.1	79	53	0.693	28	3	0.256	0.31347	0.00443	4.9153	0.1253	0.11372	0.00222	1859.7	35.7	94.5	
31.1	125	105	0.865	48	2	0.078	0.32628	0.00428	5.1111	0.0803	0.11361	0.00082	1857.9	13.0	98.0	
36.1	299	119	0.410	84	11	0.287	0.26507	0.00358	4.1389	0.0614	0.11324	0.00053	1852.1	8.5	81.8	
38.1	141	69	0.504	48	3	0.149	0.31479	0.00392	4.8184	0.0765	0.11101	0.00093	1816.1	15.3	97.1	
34.1	271	78	0.296	86	1	0.017	0.30956	0.00352	4.7311	0.0572	0.11084	0.00033	1813.3	5.4	95.9	
30.1	147	56	0.392	47	0	0.018	0.30231	0.00393	4.6052	0.0642	0.11048	0.00040	1807.3	6.6	94.2	
3.1	195	149	0.789	71	2	0.050	0.31442	0.00371	4.7349	0.0673	0.10922	0.00072	1786.4	12.1	98.7	
2.1	192	95	0.513	65	4	0.123	0.31068	0.00360	4.6735	0.1016	0.10910	0.00186	1784.5	31.4	97.7	
17.1	258	47	0.189	72	11	0.291	0.28473	0.00311	4.2802	0.0542	0.10903	0.00056	1783.2	9.5	90.6	
11.1	218	130	0.615	76	2	0.063	0.31156	0.00502	4.6744	0.0800	0.10882	0.00044	1779.7	7.5	98.2	
12.1	84	45	0.554	29	4	0.278	0.31097	0.00333	4.6552	0.0754	0.10857	0.00118	1775.6	20.0	98.3	
15.1	44	50	1.185	17	1	0.113	0.30296	0.00438	4.5352	0.1318	0.10857	0.00255	1775.5	43.5	96.1	
5.1	384	39	0.104	113	2	0.042	0.30168	0.00337	4.4827	0.0520	0.10777	0.00022	1762.0	3.7	96.5	
33.1	306	73	0.245	98	5	0.095	0.31712	0.00361	4.7025	0.0586	0.10755	0.00041	1758.3	7.0	101.0	
10.1	187	24	0.131	38	2	0.114	0.21075	0.00219	2.4383	0.0325	0.08391	0.00060	1290.4	14.0	95.5	
6.1	170	69	0.421	34	0	0.017	0.19508	0.00240	2.1046	0.0408	0.07824	0.00106	1153.1	27.1	99.6	
26.1	57	47	0.850	5	0	0.017	0.07422	0.00549	0.66622	0.06211	0.06510	0.00314	456.8	32.8 †	-	
19.1	121	71	0.608	4	0	0.149	0.02715	0.00057	0.19865	0.02229	0.05306	0.00571	172.0	3.4 †	-	
23.1	781	179	0.236	20	1	0.059	0.02697	0.00031	0.18816	0.00454	0.05059	0.00101	171.4	1.9 †	-	
21.1	481	149	0.320	13	2	0.241	0.02690	0.00030	0.18521	0.00728	0.04993	0.00181	171.1	1.9 †	-	
29.1	418	195	0.482	11	2	0.334	0.02633	0.00029	0.16997	0.01090	0.04682	0.00290	168.0	1.7 †	-	
27.1	829	256	0.319	21	0	0.017	0.02602	0.00033	0.17402	0.00355	0.04850	0.00070	165.8	2.1 †	-	
24.1	312	70	0.233	6	0	0.043	0.02083	0.00025	0.15845	0.01407	0.05517	0.00477	131.9	1.4 †	-	
8.1	847	284	0.346	16	1	0.088	0.01872	0.00020	0.12926	0.00438	0.05007	0.00154	119.4	1.3 †	-	
9.1	174	96	0.570	3	2	1.055	0.01819	0.00023	0.11158	0.01316	0.04448	0.00515	116.8	1.3 †	-	
22.1	1355	226	0.172	23	0	0.017	0.01794	0.00023	0.12287	0.00347	0.04968	0.00116	114.4	1.5 †	-	
7.1	336	61	0.189	6	0	0.007	0.01740	0.00082	0.12089	0.00769	0.05039	0.00187	110.9	5.2 †	-	
18.1	349	145	0.428	6	1	0.439	0.01670	0.00023	0.10740	0.00866	0.04665	0.00363	106.9	1.4 †	-	
28.1	1581	1192	0.779	29	2	0.183	0.01657	0.00019	0.10878	0.00223	0.04762	0.00074	106.0	1.2 †	-	
25.1	191	98	0.531	3	2	1.512	0.01625	0.00027	0.08546	0.01315	0.03815	0.00576	105.1	1.6 †	-	
35.1	510	321	0.651	9	0	0.070	0.01640	0.00019	0.11682	0.00879	0.05166	0.00377	104.4	1.2 †	-	

Table DR-4

Ion microprobe (SHRIMP II) U-Th-Pb data for zircons from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	<sup>204</sup> Pb	f206c							Apparent Age		Conc.	
	ppm	ppm		ppm	ppb	(%)	<sup>206</sup> Pb/ <sup>238</sup> U	±1σ	<sup>207</sup> Pb/ <sup>235</sup> U	±1σ	<sup>207</sup> Pb/ <sup>206</sup> Pb	±1σ	(Ma, ±1σ)		(%)	
37.1	287	149	0.538	5	2	0.766	0.01624	0.00018	0.10566	0.00174	0.04719	0.00051	104.0	1.2 †	-	
14.1	173	29	0.175	3	3	1.788	0.01607	0.00027	0.08498	0.01828	0.03835	0.00814	104.0	1.4 †	-	
16.1	348	335	0.994	7	0	0.144	0.01620	0.00029	0.10693	0.00853	0.04787	0.00362	103.6	1.8 †	-	
20.1	213	49	0.239	3	2	0.945	0.01591	0.00022	0.09225	0.00456	0.04206	0.00193	102.4	1.4 †	-	
39.1	188	67	0.367	3	3	2.109	0.01579	0.00028	0.08258	0.00794	0.03793	0.00350	102.2	1.8 †	-	
<b>RAR-00-06 Beaver Mines Formation</b>																
20.1	171	111	0.675	97	3	0.062	0.48378	0.00529	11.6630	0.1365	0.17485	0.00053	2604.6	5.0	97.7	
31.1	196	178	0.936	94	8	0.211	0.38473	0.00419	8.4868	0.1043	0.15999	0.00072	2455.5	7.7	85.5	
23.1	293	139	0.490	110	1	0.025	0.34477	0.00456	5.6610	0.1011	0.11909	0.00125	1942.6	18.8	98.3	
4.1	352	194	0.570	128	1	0.011	0.32965	0.00472	5.2214	0.0829	0.11488	0.00061	1878.0	9.5	97.8	
9.1	240	2	0.009	40	2	0.099	0.17909	0.00235	1.7897	0.0283	0.07248	0.00054	999.4	15.1	106.3	
13.1	20	5	0.278	1	1	1.489	0.03805	0.00094	0.19092	0.07856	0.03639	0.01484	244.8	4.5	-	
16.1	101	54	0.556	4	1	0.546	0.03414	0.00062	0.24634	0.01503	0.05233	0.00293	215.9	3.8	-	
39.1	158	63	0.409	5	1	0.259	0.03066	0.00049	0.21206	0.01815	0.05016	0.00412	194.7	3.0	-	
19.1	244	103	0.436	8	0	0.017	0.03077	0.00062	0.22849	0.00732	0.05385	0.00121	194.5	3.9	-	
15.1	335	115	0.354	10	2	0.439	0.02976	0.00095	0.20365	0.01198	0.04964	0.00227	189.1	5.9	-	
36.1	252	76	0.310	7	2	0.550	0.02938	0.00041	0.19211	0.01101	0.04743	0.00255	187.2	2.6	-	
8.1	123	49	0.409	4	2	1.314	0.02848	0.00066	0.18929	0.00803	0.04820	0.00157	181.4	4.2	-	
6.1	88	41	0.487	2	2	1.337	0.02753	0.00043	0.13628	0.03180	0.03590	0.00829	177.9	2.3	-	
21.1	227	159	0.724	7	3	1.069	0.02709	0.00030	0.15630	0.00631	0.04185	0.00157	173.8	1.9	-	
14.1	71	31	0.451	2	2	2.210	0.02682	0.00039	0.14670	0.01523	0.03967	0.00401	172.6	2.4	-	
12.1	41	11	0.275	1	0	0.017	0.02719	0.00064	0.21037	0.01055	0.05612	0.00233	171.6	4.0	-	
18.1	212	132	0.645	6	1	0.180	0.02684	0.00045	0.18332	0.00946	0.04953	0.00232	170.8	2.8	-	
22.1	139	71	0.526	4	1	0.779	0.02662	0.00035	0.17792	0.01315	0.04848	0.00345	169.5	2.1	-	
35.1	582	264	0.469	16	1	0.099	0.02651	0.00060	0.18122	0.01129	0.04959	0.00274	168.6	3.8	-	
29.1	63	37	0.598	2	0	0.075	0.02639	0.00045	0.18510	0.02450	0.05087	0.00657	167.6	2.6	-	
1.1	441	77	0.181	11	0	0.017	0.02577	0.00033	0.17510	0.00375	0.04928	0.00077	164.0	2.1	-	
38.1	228	148	0.670	6	2	0.629	0.02541	0.00042	0.15749	0.00985	0.04495	0.00262	162.6	2.7	-	
25.1	264	173	0.678	7	1	0.197	0.02502	0.00029	0.18173	0.00659	0.05267	0.00174	158.7	1.8	-	
24.1	299	178	0.613	8	0	0.103	0.02466	0.00027	0.17378	0.00880	0.05111	0.00246	156.7	1.7	-	
27.1	119	61	0.534	3	0	0.324	0.02421	0.00030	0.15856	0.01301	0.04750	0.00378	154.5	1.8	-	
7.1	258	164	0.656	7	1	0.344	0.02424	0.00027	0.17285	0.00837	0.05171	0.00236	154.0	1.8	-	
26.1	114	57	0.516	3	0	0.017	0.02406	0.00048	0.16374	0.00640	0.04936	0.00155	153.2	3.0	-	
2.1	49	19	0.402	1	0	0.200	0.02374	0.00121	0.19094	0.03028	0.05834	0.00840	149.6	7.5	-	
10.1	327	93	0.294	6	33	10.113	0.01827	0.00037	0.15979	0.03072	0.06344	0.01197	114.6	1.7	-	
11.1	452	133	0.303	8	1	0.311	0.01768	0.00031	0.11711	0.01048	0.04804	0.00411	113.0	1.9	-	
37.1	595	126	0.218	10	0	0.017	0.01744	0.00023	0.11488	0.00192	0.04777	0.00042	111.5	1.5	-	
5.1	103	35	0.348	2	1	0.934	0.01727	0.00050	0.10826	0.00902	0.04548	0.00339	110.7	3.2	-	
28.1	364	98	0.279	6	0	0.017	0.01743	0.00139	0.12997	0.01328	0.05408	0.00296	110.6	8.8	-	
40.1	404	102	0.261	7	3	0.886	0.01696	0.00041	0.09554	0.00511	0.04085	0.00184	109.4	2.6	-	
17.1	328	179	0.565	6	1	0.515	0.01695	0.00022	0.10137	0.00855	0.04337	0.00354	109.0	1.4	-	
30.1	161	20	0.128	2	2	1.686	0.01667	0.00023	0.06696	0.00640	0.02914	0.00271	108.9	1.5	-	
34.1	309	73	0.244	5	0	0.017	0.01691	0.00024	0.10906	0.00334	0.04678	0.00119	108.3	1.5	-	
33.1	346	94	0.283	6	1	0.192	0.01684	0.00020	0.11842	0.00782	0.05099	0.00324	107.3	1.3	-	
32.1	247	39	0.164	4	1	0.468	0.01664	0.00020	0.10669	0.00865	0.04650	0.00366	106.6	1.2	-	
3.1	136	57	0.433	2	0	0.017	0.01577	0.00139	0.11797	0.01207	0.05426	0.00226	100.1	8.8	-	
<b>RAR-00-09 Dalhousie sandstone</b>																
26.1	63	52	0.849	40	2	0.137	0.52205	0.00803	13.4206	0.2687	0.18645	0.00206	2711.1	18.3	99.9	
34.1	85	82	0.998	54	0	0.019	0.50752	0.00775	12.8153	0.2477	0.18314	0.00185	2681.5	16.8	98.7	
2.1	157	76	0.502	81	1	0.025	0.45836	0.00559	11.1726	0.1376	0.17678	0.00014	2622.9	1.4	92.7	
30.1	52	43	0.842	23	3	0.326	0.37994	0.00822	6.4821	0.1774	0.12374	0.00177	2010.8	25.5	103.2	
19.1	191	129	0.700	76	3	0.083	0.35039	0.00385	5.8709	0.0759	0.12152	0.00068	1978.7	10.0	97.9	
29.1	65	78	1.242	28	1	0.063	0.33768	0.00737	5.5813	0.1480	0.11987	0.00151	1954.3	22.7	96.0	
37.1	108	73	0.699	42	3	0.155	0.34171	0.00370	5.6326	0.0779	0.11955	0.00088	1949.5	13.2	97.2	

Table DR-4

Ion microprobe (SHRIMP II) U-Th-Pb data for zircons from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	<sup>204</sup> Pb	<i>f</i> 206c	<sup>206</sup> Pb/ <sup>238</sup> U		<sup>207</sup> Pb/ <sup>235</sup> U		<sup>207</sup> Pb/ <sup>206</sup> Pb		Apparent Age		Conc.
	ppm	ppm		ppm	ppb	(%)		±1σ		±1σ		±1σ	(Ma, ±1σ)	(%)	
27.1	125	81	0.668	48	0	0.010	0.34023	0.00365	5.5784	0.0956	0.11891	0.00144	1940.0	21.8	97.3
6.1	302	176	0.603	116	0	0.002	0.34587	0.00374	5.6637	0.0678	0.11877	0.00048	1937.7	7.2	98.8
32.1	62	74	1.228	26	0	0.017	0.33615	0.00418	5.4949	0.0935	0.11856	0.00121	1934.6	18.3	96.6
10.1	113	102	0.937	47	0	0.017	0.34763	0.00430	5.6609	0.0817	0.11811	0.00072	1927.8	10.9	99.8
36.1	114	56	0.505	42	1	0.054	0.33707	0.00393	5.4632	0.0682	0.11755	0.00039	1919.3	5.9	97.6
4.1	78	21	0.277	27	0	0.017	0.32863	0.00392	5.3140	0.0846	0.11728	0.00107	1915.1	16.5	95.6
15.1	69	53	0.793	27	1	0.129	0.33708	0.00445	5.4079	0.1107	0.11636	0.00164	1901.0	25.5	98.5
40.1	116	97	0.865	46	2	0.121	0.33594	0.00365	5.3789	0.0935	0.11613	0.00143	1897.4	22.2	98.4
1.1	125	68	0.559	45	0	0.024	0.32441	0.00389	5.1553	0.0682	0.11525	0.00049	1883.9	7.7	96.1
8.1	379	168	0.458	132	1	0.018	0.32353	0.00348	5.0823	0.0623	0.11393	0.00053	1863.1	8.5	97.0
5.1	126	51	0.416	44	3	0.123	0.32566	0.00357	5.1067	0.0661	0.11373	0.00064	1859.8	10.3	97.7
13.1	268	102	0.393	94	2	0.048	0.33520	0.00375	5.2237	0.0650	0.11302	0.00047	1848.6	7.6	100.8
28.1	26	39	1.577	11	2	0.494	0.31162	0.00553	4.8422	0.1259	0.11270	0.00191	1843.4	30.9	94.9
9.1	128	73	0.584	47	2	0.115	0.32788	0.00465	5.0919	0.0941	0.11263	0.00115	1842.3	18.6	99.2
8.2	73	96	1.365	31	3	0.249	0.33201	0.00524	5.1284	0.0952	0.11203	0.00089	1832.6	14.5	100.8
3.1	36	8	0.246	12	0	0.016	0.32857	0.00438	5.0594	0.1129	0.11168	0.00182	1826.9	29.9	100.2
35.1	50	35	0.716	18	1	0.149	0.32617	0.00596	5.0129	0.1382	0.11147	0.00206	1823.5	34.0	99.8
39.1	98	60	0.631	34	4	0.244	0.31548	0.00385	4.8320	0.1203	0.11109	0.00225	1817.3	37.2	97.3
16.1	247	101	0.425	82	0	0.007	0.31022	0.00333	4.6719	0.0604	0.10923	0.00066	1786.6	11.0	97.5
25.1	365	238	0.672	128	2	0.027	0.31190	0.00388	4.6956	0.0654	0.10919	0.00053	1785.9	8.9	98.0
22.1	339	147	0.448	112	2	0.044	0.30932	0.00333	4.6565	0.0537	0.10918	0.00033	1785.8	5.5	97.3
33.1	563	76	0.139	162	1	0.016	0.29152	0.00530	4.3730	0.0829	0.10880	0.00039	1779.4	6.5	92.7
38.1	101	65	0.663	34	2	0.151	0.30595	0.00502	4.5763	0.1684	0.10849	0.00336	1774.1	57.6	97.0
18.1	28	9	0.333	9	0	0.109	0.32422	0.00424	4.8306	0.1063	0.10806	0.00174	1767.0	29.7	102.5
24.1	554	9	0.016	164	3	0.033	0.30914	0.00319	4.5664	0.0507	0.10713	0.00033	1751.1	5.6	99.2
11.1	1002	9	0.009	119	9	0.137	0.12555	0.00129	1.6697	0.0197	0.09646	0.00044	1556.7	8.7	49.0
20.1	51	57	1.147	13	0	0.002	0.20824	0.00292	2.3899	0.0973	0.08324	0.00304	1274.8	72.8	95.7
7.1	348	172	0.511	44	3	0.126	0.12151	0.00161	1.0331	0.0219	0.06166	0.00093	741.1	9.3	-
14.1	261	87	0.345	20	11	1.148	0.07563	0.00078	0.54728	0.02550	0.05249	0.00232	472.1	4.8	-
12.1	243	178	0.753	7	2	0.669	0.02576	0.00059	0.16053	0.00930	0.04519	0.00228	164.8	3.7	-
21.1	838	438	0.539	23	0	0.040	0.02589	0.00031	0.18969	0.00313	0.05314	0.00052	164.1	2.0	-
23.1	275	221	0.831	8	0	0.017	0.02576	0.00040	0.18511	0.00416	0.05212	0.00076	163.4	2.5	-
31.1	370	195	0.544	10	2	0.474	0.02450	0.00034	0.19544	0.00895	0.05786	0.00243	154.4	2.1	-
17.1	406	98	0.250	9	1	0.193	0.02350	0.00032	0.15422	0.01349	0.04759	0.00403	150.0	1.9	-

\* = radiogenic Pb; *f*206c = percentage of common <sup>206</sup>Pb in the total measured <sup>206</sup>Pb; Conc. = concordance = 100\*(<sup>206</sup>Pb/<sup>238</sup>U age)/(<sup>207</sup>Pb/<sup>206</sup>Pb age).

Uncertainties reported at 1σ (absolute), calculated by numerical propagation of all known sources of error. Data corrected according to procedures outlined

Apparent ages are <sup>207</sup>Pb/<sup>206</sup>Pb ages calculated using the <sup>204</sup>Pb-method of common Pb correction, except (†) where ages are <sup>206</sup>Pb/<sup>238</sup>U ages based on the <sup>207</sup>P

Table DR-5

Ion microprobe (SHRIMP II) U-Th-Pb data for detrital monazites from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	$^{204}\text{Pb}/^{206}\text{Pb}$	$^{208}\text{Pb}/^{206}\text{Pb}$ <sup>§</sup>	$^{206}\text{Pb}/^{238}\text{U}$ <sup>§</sup>	$\pm 1\sigma$	$^{207}\text{Pb}/^{235}\text{U}$ <sup>§</sup>	$\pm 1\sigma$	$^{207}\text{Pb}/^{206}\text{Pb}$ <sup>§</sup>	$\pm 1\sigma$	Apparent Age		Conc. (%)
	ppm	ppm		ppm									(Ma, $\pm 1\sigma$ )		
<b>RAR-00-10 Porcupine Hills Formation</b>															
14.1	1155	#####	86.7	11610	1.99E-04	23.811	0.46412	0.00776	10.9557	0.2848	0.17120	0.00307	2545.0	31.9	96.4
18.1	6405	26936	4.2	6229	1.37E-05	1.153	0.48560	0.00549	11.1653	0.1332	0.16676	0.00044	2523.7	4.8	101.1
18.2	4220	68845	16.3	9543	3.25E-05	4.449	0.46537	0.00569	10.5814	0.1439	0.16491	0.00076	2502.5	8.2	98.4
18.3	4116	55252	13.4	7986	4.55E-05	3.740	0.45782	0.00617	10.0463	0.1583	0.15915	0.00106	2440.6	11.6	99.5
14.2	3551	#####	29.7	11646	5.68E-05	8.551	0.39057	0.00511	7.7008	0.1144	0.14300	0.00080	2255.1	10.7	94.2
9.1	5036	59480	11.8	6627	3.88E-05	3.445	0.33360	0.00486	5.2491	0.0816	0.11412	0.00044	1857.9	7.8	99.8
11.2	1328	72972	54.9	5948	1.70E-04	15.590	0.30942	0.00486	4.8145	0.0906	0.11285	0.00097	1809.2	22.2	95.9
16.1	1785	75919	42.5	6749	1.19E-04	12.813	0.31340	0.00700	4.8341	0.1402	0.11187	0.00178	1804.2	30.8	97.3
2.1	1815	69361	38.2	6011	1.19E-04	11.087	0.31351	0.00568	4.7554	0.1152	0.11001	0.00154	1773.3	29.9	99.0
6.1	6887	60729	8.8	7153	2.44E-05	2.626	0.32155	0.00378	4.8086	0.0676	0.10846	0.00069	1768.3	12.1	101.6
4.2	1273	76299	59.9	6456	1.98E-04	17.466	0.31493	0.00466	4.7934	0.0839	0.11039	0.00085	1762.0	20.1	99.9
17.1	629	64910	103.2	5481	2.07E-04	30.064	0.32242	0.00653	4.9026	0.1210	0.11028	0.00130	1758.0	40.3	102.2
4.1	1256	70655	56.2	6054	1.71E-04	16.688	0.31247	0.00489	4.6957	0.0903	0.10899	0.00102	1744.1	24.6	100.3
25.1	1447	59605	41.2	5236	8.71E-05	12.193	0.31400	0.00896	4.6650	0.1890	0.10775	0.00274	1741.9	48.5	101.0
11.1	916	#####	137.9	9903	4.86E-04	40.182	0.30216	0.01187	4.7028	0.2669	0.11288	0.00410	1739.1	78.9	97.3
5.1	1030	#####	99.2	8450	2.77E-04	28.537	0.31914	0.00651	4.8364	0.1164	0.10991	0.00115	1735.8	27.1	102.5
10.1	687	74277	108.2	6171	2.75E-04	31.969	0.31342	0.00993	4.7043	0.2137	0.10886	0.00314	1717.8	58.7	102.0
12.1	788	64059	81.2	5364	3.27E-04	23.151	0.32364	0.01506	4.8479	0.3302	0.10864	0.00481	1701.7	90.8	105.8
7.1	103	60650	588.4	4865	1.86E-03	162.460	0.33284	0.01388	5.3969	0.2788	0.11760	0.00302	1479.4	142.1	122.4
13.1	3072	#####	33.3	6948	1.07E-04	9.831	0.23910	0.00806	2.9817	0.1250	0.09044	0.00190	1404.0	43.9	98.3
3.1	1983	27016	13.6	645	2.66E-04	4.296	0.07043	0.00111	0.53300	0.01419	0.05488	0.00108	439.2	6.7 †	-
21.1	273	48200	176.6	209	1.76E-02	42.890	0.02055	0.00086	0.37619	0.02850	0.13279	0.00772	117.2	5.0 †	-
19.1	105	32081	306.6	125	1.95E-02	64.311	0.02135	0.00138	0.49400	0.05438	0.16782	0.01369	115.8	7.8 †	-
20.1	467	69458	148.9	306	1.06E-02	41.354	0.01806	0.00081	0.23215	0.01865	0.09322	0.00573	108.9	4.9 †	-
24.1	142	33063	233.5	132	1.04E-02	55.506	0.01911	0.00160	0.56055	0.07704	0.21277	0.02109	96.8	8.7 †	-
8.1	171	37261	218.4	133	1.12E-02	53.655	0.01666	0.00115	0.32742	0.04291	0.14253	0.01468	93.9	6.7 †	-
22.1	1972	64192	32.6	263	3.74E-03	9.648	0.01467	0.00049	0.11918	0.00809	0.05893	0.00326	92.6	3.1 †	-
13.2	17635	93583	5.3	636	4.29E-04	1.932	0.01411	0.00059	0.10227	0.00692	0.05258	0.00253	89.8	3.8 †	-
15.1	85	22541	264.6	93	2.51E-02	57.109	0.02215	0.00215	1.07988	0.26339	0.35360	0.07491	87.0	15.8 †	-
22.2	1639	89529	54.6	344	2.90E-03	16.485	0.01393	0.00030	0.13110	0.01149	0.06828	0.00562	86.9	2.0 †	-
23.1	106	32687	307.3	117	1.64E-02	69.420	0.01816	0.00143	0.66277	0.08608	0.26471	0.02484	84.4	7.5 †	-
1.1	153	35163	229.2	127	2.47E-02	64.808	0.01481	0.00083	0.35009	0.03870	0.17148	0.01519	79.9	4.8 †	-
<b>RAR-00-12 St. Mary River Formation</b>															
19.1	6605	39052	5.9	5547	1.57E-05	1.718	0.34316	0.00804	5.4020	0.1794	0.11417	0.00237	1863.6	38.2	102.0
14.1	12632	68628	5.4	6845	3.47E-05	1.620	0.23182	0.00396	2.7708	0.0645	0.08669	0.00119	1343.1	27.2	100.0
12.1	6737	48066	7.1	3156	5.47E-05	1.839	0.18548	0.00209	2.1764	0.0278	0.08510	0.00040	1300.9	14.1	84.3
13.1	2763	56682	20.5	437	8.31E-04	6.116	0.02567	0.00042	0.1853	0.0087	0.05237	0.00219	162.7	2.7 †	-
21.1	188	43699	231.9	160	1.90E-02	49.022	0.01996	0.00114	0.4928	0.0584	0.17908	0.01734	106.5	6.7 †	-
16.1	201	40782	202.7	135	1.88E-02	47.694	0.01628	0.00080	0.2985	0.0324	0.13300	0.01205	92.9	4.8 †	-
2.1	1319	45095	34.2	176	2.04E-03	9.753	0.01438	0.00055	0.1424	0.0087	0.07184	0.00313	89.3	3.4 †	-
9.1	16274	60564	3.7	438	4.63E-04	1.221	0.01388	0.00016	0.1007	0.0025	0.05258	0.00107	88.4	1.0 †	-
15.1	724	50078	69.2	181	8.41E-03	18.955	0.01475	0.00046	0.2057	0.0135	0.10113	0.00545	88.1	2.8 †	-
10.1	3476	57572	16.6	239	1.07E-03	4.785	0.01374	0.00028	0.1031	0.0041	0.05445	0.00172	87.2	1.8 †	-
5.1	206	41398	200.7	136	1.09E-02	46.612	0.01614	0.00153	0.3866	0.0474	0.17378	0.01152	86.9	8.3 †	-
11.1	3255	52187	16.0	231	1.77E-03	5.088	0.01360	0.00022	0.1057	0.0039	0.05639	0.00173	86.1	1.4 †	-
17.1	819	51763	63.2	184	3.87E-03	17.557	0.01407	0.00064	0.1799	0.0154	0.09268	0.00621	85.0	3.9 †	-
6.1	199	38483	193.2	129	2.03E-02	44.433	0.01682	0.00101	0.5077	0.0477	0.21886	0.01424	84.4	5.4 †	-
4.1	533	51182	96.1	170	1.44E-02	26.261	0.01391	0.00045	0.1787	0.0123	0.09320	0.00531	83.9	2.8 †	-
3.1	6109	32324	5.3	188	8.54E-04	1.700	0.01315	0.00024	0.1014	0.0034	0.05590	0.00146	83.4	1.5 †	-
22.1	3523	52015	14.8	232	1.05E-03	4.751	0.01323	0.00022	0.1145	0.0055	0.06274	0.00268	83.2	1.4 †	-
7.1	116	30101	258.4	105	8.84E-03	55.803	0.01837	0.00117	0.7114	0.0754	0.28084	0.02168	83.1	6.2 †	-
23.1	7390	#####	17.8	554	1.87E-03	5.784	0.01287	0.00018	0.0985	0.0029	0.05552	0.00132	81.6	1.2 †	-
8.1	6033	52368	8.7	253	6.79E-04	2.787	0.01277	0.00018	0.0958	0.0027	0.05443	0.00125	81.1	1.1 †	-
18.1	4759	65090	13.7	276	5.21E-04	4.239	0.01274	0.00020	0.0990	0.0033	0.05639	0.00155	80.7	1.3 †	-
20.1	7061	58078	8.2	286	2.86E-04	2.687	0.01256	0.00018	0.0929	0.0078	0.05364	0.00436	79.8	1.2 †	-
1.1	904	54194	59.9	193	5.65E-03	18.689	0.01265	0.00034	0.1614	0.0094	0.09250	0.00446	76.5	2.1 †	-

Table DR-5

Ion microprobe (SHRIMP II) U-Th-Pb data for detrital monazites from Cordilleran (Alberta) foreland sandstones.

Spot	[U]	[Th]	Th/U	[Pb*]	$^{204}\text{Pb}/^{206}\text{Pb}$	$^{208}\text{Pb}/^{206}\text{Pb}$ §	$^{206}\text{Pb}/^{238}\text{U}$ §	$\pm 1\sigma$	$^{207}\text{Pb}/^{235}\text{U}$ §	$\pm 1\sigma$	$^{207}\text{Pb}/^{206}\text{Pb}$ §	$\pm 1\sigma$	Apparent Age		Conc.
	ppm	ppm		ppm									(Ma, $\pm 1\sigma$ )	(%)	
<b><i>RAR-00-03 Drywood Creek Formation</i></b>															
3.1	2439	53769	22.0	297	1.16E-03	6.618	0.01847	0.00033	0.1413	0.0050	0.05547	0.00154	116.9	2.1 †	-
7.1	226	48305	213.4	161	2.26E-02	36.737	0.02244	0.00124	0.9120	0.0790	0.29475	0.01772	98.8	6.3 †	-
5.1	360	68485	190.4	220	1.15E-02	44.203	0.01577	0.00062	0.2610	0.0202	0.12004	0.00745	91.7	3.7 †	-
10.1	136	43997	324.6	151	1.62E-02	69.736	0.01840	0.00120	0.6121	0.0656	0.24122	0.01866	89.0	6.4 †	-
4.1	310	54550	176.2	184	1.07E-02	46.171	0.01469	0.00055	0.2148	0.0201	0.10607	0.00861	87.1	3.4 †	-
8.1	408	74460	182.4	245	1.07E-02	47.694	0.01426	0.00057	0.2125	0.0175	0.10804	0.00727	84.4	3.5 †	-
6.1	267	53464	200.5	181	6.58E-03	52.748	0.01467	0.00069	0.2674	0.0250	0.13214	0.00993	84.0	4.1 †	-
11.1	2312	69419	30.0	246	2.50E-03	8.410	0.01318	0.00031	0.1277	0.0058	0.07026	0.00254	82.0	1.9 †	-
6.2	391	70956	181.5	224	1.22E-02	47.516	0.01379	0.00065	0.2445	0.0206	0.12864	0.00821	79.3	3.9 †	-
2.1	349	59577	170.5	189	9.80E-03	45.191	0.01365	0.00057	0.2449	0.0203	0.13012	0.00868	78.3	3.4 †	-
1.1	394	66144	167.8	213	1.34E-02	47.382	0.01308	0.00051	0.2043	0.0195	0.11330	0.00931	76.8	3.2 †	-
9.1	608	58122	95.5	187	1.25E-02	28.005	0.01253	0.00049	0.1985	0.0144	0.11488	0.00651	73.5	2.9 †	-
<b><i>RAR-00-09 Dalhousie sandstone</i></b>															
7.1	4722	42776	9.1	7803	2.71E-05	2.512	0.51765	0.00838	12.8687	0.2728	0.18030	0.00213	2652.6	20.1	101.4
8.1	16910	42272	2.5	11924	6.13E-06	0.714	0.43951	0.00461	8.8736	0.0967	0.14643	0.00028	2303.7	3.7	101.9
6.1	3536	50431	14.3	6077	6.73E-05	4.119	0.37862	0.00482	6.6775	0.0983	0.12791	0.00076	2057.3	11.3	100.5
1.1	13588	61585	4.5	9892	2.02E-05	1.298	0.34885	0.00378	5.6955	0.0679	0.11841	0.00045	1928.4	7.0	100.0
5.2	11778	47747	4.1	7905	1.24E-05	1.178	0.33905	0.00499	5.3727	0.1114	0.11493	0.00148	1876.2	23.6	100.3
5.1	4833	56612	11.7	6336	7.76E-06	3.413	0.33455	0.00375	5.2826	0.0711	0.11452	0.00071	1870.7	11.6	99.4
2.1	12017	33586	2.8	6617	1.21E-05	0.818	0.33080	0.00350	5.0934	0.0567	0.11167	0.00027	1824.2	4.5	101.0
9.2	10585	61614	5.8	8343	3.50E-05	1.742	0.31994	0.00480	4.8405	0.0928	0.10973	0.00112	1787.2	18.9	100.1
4.1	3397	67392	19.8	6299	7.37E-05	5.795	0.31014	0.00391	4.7089	0.0647	0.11012	0.00045	1785.2	8.6	97.5
4.2	3839	#####	28.1	9584	8.43E-05	8.277	0.30705	0.00374	4.6167	0.0632	0.10905	0.00053	1764.8	10.9	97.7
9.1	6641	99311	15.0	9924	5.18E-05	4.488	0.30853	0.00348	4.6038	0.0580	0.10822	0.00048	1758.0	8.8	98.5
3.1	1517	60228	39.7	5218	1.07E-04	11.179	0.32309	0.00452	4.8272	0.0807	0.10836	0.00082	1747.9	19.1	103.1
11.1	2111	69738	33.0	6214	1.14E-04	9.714	0.31409	0.00420	4.6788	0.0723	0.10804	0.00067	1740.8	13.8	101.0
10.1	9187	77004	8.4	8660	3.39E-05	2.439	0.30756	0.00347	4.4925	0.0556	0.10594	0.00041	1722.9	8.5	100.3

\* = radiogenic Pb; § = measured isotopic ratios, uncorrected for common Pb; Conc. = concordance =  $100 * (^{206}\text{Pb}/^{238}\text{U age}) / (^{207}\text{Pb}/^{206}\text{Pb age})$ .Uncertainties reported at  $1\sigma$  (absolute), calculated by numerical propagation of all known sources of error.

Data corrected according to procedures outlined in Stern (1997), and Stern and Berman (2001).

Apparent ages are  $^{207}\text{Pb}/^{206}\text{Pb}$  ages calculated using the  $^{204}\text{Pb}$ -method of common Pb correction, except (†) where ages are  $^{206}\text{Pb}/^{238}\text{U}$  ages based on the  $^{207}\text{Pb}$ -method.

**Table DR-6. U-Pb Data for Igneous Cobbles**

Description <sup>♦</sup>	Weight (μg)	U (ppm)	Th (ppm)	Pb (ppm)	Th/U	TCPb (pg)	<sup>206</sup> Pb/ <sup>204</sup> Pb	<sup>206</sup> Pb/ <sup>238</sup> U	<sup>207</sup> Pb/ <sup>235</sup> U	<sup>207</sup> Pb/ <sup>206</sup> Pb	Model Ages (Ma)			%Disc
											<sup>206</sup> Pb/ <sup>238</sup> U	<sup>207</sup> Pb/ <sup>235</sup> U	<sup>207</sup> Pb/ <sup>206</sup> Pb	
<b>01JGE-19</b>														
1 z, lt tan s/mottled square frag 3NM (1)*	5	249	126	7	0.51	4	570	0.02562±6	0.1754±15	0.04963±41	163.1±0.3	164.1±1.3	177.8±19.3	8.4
2 z, lt tan s/mottled irreg frag 3NM (1)	8	343	153	10	0.45	9	523	0.02575±4	0.1758±10	0.04951±27	163.9±0.3	164.4±0.9	172.1±12.5	4.8
3 z, lt tan irreg frag 3NM (1)	16	148	37	11	0.25	99	60	0.02842±13	0.2108±76	0.05380±195	180.6±0.8	194.2±6.4	362.6±79.8	50.9
<b>01JGE-20</b>														
1 z, lt tan prisms 5M (4)	11	269	50	9	0.18	4	1537	0.03269±5	0.22928±95	0.05087±19	207.36±0.3	209.61±0.8	234.92±8.8	11.9
2 z, large blocky col frag 5M (1)	11	206	47	10	0.23	38	143	0.03489±26	0.24541±37	0.05101±77	221.11±1.6	222.84±3.0	241.13±34.3	8.5
3 z, large blocky col frag 5M (1)	9	165	29	35	0.18	265	28	0.02954±10	0.24202±43	0.05943±1059	187.66±6.5	220.07±35	582.72±100.0	68.8
<b>01JGE-22</b>														
1 z, large lt yell prism 5NM (1)	7	391	193	15	0.50	13	475	0.03218±5	0.22433±11	0.05056±25	204.18±0.3	205.51±1.0	220.86±11.5	7.7
2 z, lt yell prism 5NM (1)	8	393	67	17	0.17	25	273	0.03318±19	0.27026±69	0.05907±141	210.43±1.2	242.90±5.5	569.74±51.3	64.1
3 z, lt tan euh prism 5NM (10)	11	520	73	80	0.14	635	39	0.04011±63	0.35018±19	0.06333±373	253.49±3.9	304.86±14.1	719.17±100.0	66.0
<b>01JGE-23</b>														
1 z, sm col ang frag 10NM (1)*	4	783	287	22	0.37	10	512	0.02586±5	0.1761±9	0.04938±24	164.6±0.3	164.7±0.8	165.8±11.5	0.8
2 z, sm col ang frag 10NM (1)*	4	341	126	9	0.37	3	756	0.02597±4	0.1773±15	0.04950±40	165.3±0.3	165.7±1.3	171.7±18.7	3.8
3 z, lg pr tip xs incl 10NM (1)	10	334	126	13	0.38	41	155	0.02711±6	0.1904±26	0.05093±69	172.4±0.4	177.0±2.2	237.8±30.8	27.9

♦ col: colorless euh : euhedral frags : fragments incl : inclusions irreg: irregular lg : large M : degrees magnetic fraction NM : degrees non-magnetic fraction  
 pr : prismatic sub : subhedral z : zircon mineral (x#) : number of grains \* : no chemistry

All errors reported to 1 sigma.

**Table DR-7: Petrography of cobbles from channels in Mill Creek Fm,  
Alberta Foreland sequence.  
Ross et al., GSA Bulletin 2004**

**Bruin Channel**

- 01-JGE-2 Intermediate-felsic porphyry. Phenocrysts 30% of rock, consist of ~60% plagioclase (oligoclase), ~25% K-feldspar, ~15% quartz. Fine groundmass appears to be similar assemblage. Magnetite, probably primary in part, associated with apatite. No primary mafic silicates, but may have been ~2%. Calcite alteration in mafic spots and in plagioclase.
- 01-JGE-3 Felsic porphyry. Phenocrysts 30% of rock, consist of K-feldspar ~50%, quartz ~40%, former mafic minerals <10%. Fine groundmass is feldspar-quartz. Heavy alteration of K-feldspar to zeolitic fibrous material, and mafic minerals to chlorite and opaque minerals. Calcite veins crosscut texture, and overall rock contains >5% calcite.

**Crowsnest Channel**

- 01-JGE-19 Granodiorite. Plagioclase (oligoclase) ~40%, K-feldspar ~30%, quartz ~25%, altered mafic minerals ~5%. Has weakly-developed granophyric texture between quartz and feldspars. Primary opaque phases associated with apatite. Mafic minerals appear to have been hornblende and/or biotite, now altered to chlorite, epidote and secondary opaque phase.
- 01-JGE-20 Granodiorite. Plagioclase (oligoclase) ~40%, K-feldspar ~20%, quartz ~25%, altered mafic mineral ~10%, primary magnetite <5%. Weakly developed granophyric texture between quartz and feldspars. Mafic mineral appears to have been hornblende, now altered to chlorite and epidote.
- 01-JGE-21 Granophyric granodiorite. Plagioclase (oligoclase) ~30%, K-feldspar ~30%, quartz ~30%, altered mafic mineral ~5%, minor opaque phases. Granophyric intergrowth of quartz and K-feldspar abundant. Mafic mineral altered to epidote and secondary opaque phase.
- 01-JGE-22 Hypabyssal intermediate-felsic porphyry. Phenocrysts 25% of rock, are all plagioclase (oligoclase). Groundmass is of medium grain size, 0.5-1 mm, and consists of about equal proportions of plagioclase, K-feldspar and quartz. Accessory titanite and fine needles of apatite. Mafic mineral altered to epidote and an opaque phase.
- 01-JGE-23 Felsic porphyry. Phenocrysts 20% of rock, are ~50% quartz, ~50% plagioclase (oligoclase). Fine groundmass consists of feldspars and quartz. Apparent primary opaque phase is associated with apatite. Mafic mineral <5%, now altered to chlorite, epidote and an opaque phase. Minor quartz veins crosscut texture.

**Table DR-8: Sample locations for Alberta foreland sequence  
(Ross et al., GSA Bull. 2004)**

Sample (Zircon sample)	Formation or Group	Sub-unit where defined	Lithology	NTS map sheet	UTM Zone 11
<b>Crowsnest traverse</b>					
01-JGE-15	Fernie	Red Deer	shale	Crowsnest 82G-10	663400E 5502750N
01-JGE-9A	Fernie	Passage Beds	shale	Upper Flathead 82G-7	66900E 5485100N
01-JGE-9B	Fernie	Passage Beds	sandstone	Upper Flathead 82G-7	66900E 5485100N
01-JGE-10	Morrissey		sandstone	Upper Flathead 82G-7	66900E 5485100N
01-JGE-14	Mist Mountain		sandstone	Upper Flathead 82G-7	66900E 5485100N
01-JGE-17	Cadomin		sandstone	Upper Flathead 82G-7	66900E 5485100N
00-JG-12 (RAR-00-09)	Dalhousie		sandstone	Blairmore 82G-9	690000E 5494990N
00-JG-13	Dalhousie		shale	Blairmore 82G-9	690000E 5494990N
01-JGE-24A	Beaver Mines		mudstone	Blairmore 82G-9	689750E 5495350N
01-JGE-24B	Beaver Mines		sandstone	Blairmore 82G-9	689750E 5495350N
01-JGE-25A	Beaver Mines		mudstone	Blairmore 82G-9	689750E 5495350N
01-JGE-25B	Beaver Mines		sandstone	Blairmore 82G-9	689750E 5495350N
00-JG-8A	Beaver Mines		shale	Beaver Mines 82G-8	248775E 5480300N
00-JG-8B (RAR-00-06)	Beaver Mines		sandstone	Beaver Mines 82G-8	248775E 5480300N
00-JG-9	Beaver Mines		shale	Beaver Mines 82G-8	248770E 5480280N
00-JG-10A	Mill Creek	Lynx Creek	shale	Beaver Mines 82G-8	248760E 5480270N
00-JG-10B	Mill Creek	Lynx Creek	sandstone	Beaver Mines 82G-8	248760E 5480270N
00-JG-11A	Mill Creek	Bruin Creek	shale	Beaver Mines 82G-8	248750E 5480250N
00-JG-11B (RAR-00-8)	Mill Creek	Bruin Creek	sandstone	Beaver Mines 82G-8	248750E 5480250N
01-JGE-18	Mill Creek	Bruin Creek	ss matrix	Blairmore 82G-9	688300E 5497300N
01-JGE-19	Mill Creek	Bruin Creek	cobble	Blairmore 82G-9	688300E 5497300N
01-JGE-20	Mill Creek	Bruin Creek	cobble	Blairmore 82G-9	688300E 5497300N
01-JGE-21	Mill Creek	Bruin Creek	cobble	Blairmore 82G-9	688300E 5497300N
01-JGE-22	Mill Creek	Bruin Creek	cobble	Blairmore 82G-9	688300E 5497300N
01-JGE-23	Mill Creek	Bruin Creek	cobble	Blairmore 82G-9	688300E 5497300N
01-JGE-16A	Cardium		siltstone	Crowsnest 82G-10	676800E 5500920N
01-JGE-16B	Cardium		sandstone	Crowsnest 82G-10	676800E 5500920N
00-JG-1	Wapiabi		shale	Blairmore 82G-9	702800E 5496350N
00-JG-2A	Milk River	Telegraph Creek	siltstone	Blairmore 82G-9	703000E 5496400N
00-JG-2B	Milk River	Telegraph Creek	sandstone	Blairmore 82G-9	703000E 5496400N
00-JG-3A	Milk River	Virgelle	siltstone	Blairmore 82G-9	703150E 5496500N
00-JG-3B	Milk River	Virgelle	sandstone	Blairmore 82G-9	703150E 5496500N
00-JG-7A	Milk River	Deadhorse Coulee	shale	Maycroft 82G-16	699200E 5525350N
00-JG-7B	Milk River	Deadhorse Coulee	sandstone	Maycroft 82G-16	699200E 5525350N
00-JG-6A	Pakowki		shale	Maycroft 82G-16	699150E 5525350N
00-JG-6B	Pakowki		sandstone	Maycroft 82G-16	699150E 5525350N
00-JG-19A	Connelly Creek		shale	Maycroft 82G-16	702350E 5521880N
00-JG-19B	Connelly Creek		sandstone	Maycroft 82G-16	702350E 5521880N
00-JG-5A	Lundbreck		shale	Maycroft 82G-16	703280E 5520880N
00-JG-5B	Lundbreck		sandstone	Maycroft 82G-16	703280E 5520880N
00-JG-4A	Drywood Creek		shale	Maycroft 82G-16	703180E 5520950N
00-JG-4B (RAR-00-03)	Drywood Creek		sandstone	Maycroft 82G-16	703180E 5520950N
01-JGE-27	Bearpaw		shale	Blairmore 82G-9	706010E 5497400N
01-JGE-26	St. Mary River		shale	Blairmore 82G-9	706010E 5497400N

00-JG-18A	St. Mary River		siltstone	Maycroft 82G-16	706850E 5519650N
00-JG-18B (RAR-00-12)	St. Mary River		sandstone	Maycroft 82G-16	706850E 5519650N
00-JG-17	St. Mary River		siltstone	Maycroft 82G-16	707350E 5519650N
00-JG-16A	Willow Creek		mudstone	Maycroft 82G-16	707450E 5519650N
00-JG-16B	Willow Creek		sandstone	Maycroft 82G-16	707450E 5519650N
00-JG-20A	Willow Creek		shale	Maycroft 82G-16	706250E 5538050N
00-JG-20B	Willow Creek		sandstone	Maycroft 82G-16	706250E 5538050N
00-JG-14A	Porcupine Hills		siltstone	Brocket 82H/12	288650E 5496150N
00-JG-14B (RAR-00-10)	Porcupine Hills		sandstone	Brocket 82H/12	288650E 5496150N
00-JG-15A	Porcupine Hills		shale	Brocket 82H/12	288100E 5496750N
00-JG-15B	Porcupine Hills		sandstone	Brocket 82H/12	288100E 5496750N

### Highwood traverse

93-NB-29A <sup>2</sup>	Elk		shale		
93-NB-29B <sup>2</sup>	Elk		sandstone		
93-NB-28A <sup>2</sup>	Gladstone		shale		
93-NB-28B <sup>2</sup>	Gladstone		sandstone		
01-JGE-28A	Beaver Mines		shale	Turner Valley 82J-9	691750E 560400N
01-JGE-28B	Beaver Mines		sandstone	Turner Valley 82J-9	691750E 560400N
01-JGE-29A	Mill Creek	Bruin Creek	shale	Turner Valley 82J-9	691200E 5604200N
01-JGE-29B	Mill Creek	Bruin Creek	sandstone	Turner Valley 82J-9	691200E 5604200N
01-JGE-1	Mill Creek	Bruin Creek	ss matrix	Langford Creek 82J-1	685320E 5543010N
01-JGE-2	Mill Creek	Bruin Creek	cobble	Langford Creek 82J-1	685320E 5543010N
01-JGE-3	Mill Creek	Bruin Creek	cobble	Langford Creek 82J-1	685320E 5543010N
01-JGE-4	Blackstone		shale	Langford Creek 82J-1	685300E 5543020N
01-JGE-5	Blackstone		shale	Langford Creek 82J-1	685290E 5543030N
01-JGE-30B	Blackstone		sandstone	Turner Valley 82J-9	690900E 5604500N
01-JGE-35A	Cardium	Ram	siltstone	Turner Valley 82J-9	692800E 5616500N
01-JGE-35B	Cardium	Ram	sandstone	Turner Valley 82J-9	692800E 5616500N
93-NB-30 <sup>2</sup>	Wapiabi		shale		
93-NB-31 <sup>2</sup>	Belly River		sandstone		
01-JGE-34A	Milk River	Virgelle(?)	mudstone	Turner Valley 82J-9	693800E 5617650N
01-JGE-34B	Milk River	Virgelle(?)	sandstone	Turner Valley 82J-9	693800E 5617650N
01-JGE-32A	St.Mary River		mudstone	Turner Valley 82J-9	698700E 5598250N
01-JGE-32B	St. Mary River		sandstone	Turner Valley 82J-9	698700E 5598250N
01-JGE-33A	Willow Creek		mudchips	Turner Valley 82J-9	696100E 5620600N
01-JGE-33B	Willow Creek		sandstone	Turner Valley 82J-9	696100E 5620600N
01-JGE-36A	Paskapoo		siltstone	Calgary 820-1	678320E 5673300N
01-JGE-36B	Paskapoo		sandstone	Calgary 820-1	678320E 5673300N

<sup>2</sup>Sample numbers beginning 93-NB are from our previous work in Boghossian et al. (1996).