SECTION ..... 3.10 AUGER DRILL LOGS

LOCALITY: CS7

HOLE NUMBER: ..... F1 to F30 (inclusive)

NUMBER OF HOLES: 30

TOTAL METREAGE: 179.9

NUMBER OF SAMPLES ASSAYED: 28

MAXIMUM URANIUM VALUE: 10 A1830 4-4.3 F22
A1833 2.1-3 F25
A1835 5.8-6.7 F26

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(~~s~~) Drilled: 15.11.73	Project: E.L.130 No. 2102	Locality: CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	C.P.M.		Sample No.	Assays (ppm)				Remarks
F1	120N 117W	0.0	0.3	Black Soil	0.0	1,200							On sample piles TV1 readings low and uniform.
		0.3	1.2	Laterite and clay	0.3	1,800							
					0.6	1,800							
					0.9	1,700							
					1.1	1,800							
		1.2	4.9	Yellowish to olive clay - weathered dolerite.				A1801 (4.0-4.9m)					

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 15.11.73	Project: E.L.130 No. 2102	Locality: CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	C.P.M.		Sample No.	Assays (ppm)				Remarks
F2	121N 080W	0.0	0.3	Soil	0.0	900							On sample piles TV1 readings low and uniform.
		0.3	1.5	Laterite and clay.	0.3 to 1.2	1,700 to 1,500							
		1.5	4.9	Grey brown to yellowish clay with very light green and light yellow brown ? mica schist fragments 1.5-3.0. Basal clay resembles weathered dolerite clay.	1.5 to 2.7	1,100 to 1,000							
					3.0	700							
					3.3	800		A1802 (4.0-4.9m)					

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 15.11.73	Project:	No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F3	CS 7 122 N 040 W	0.0	0.3	Soil, sandy	0.0	1000							
		0.3	1.5	Laterite & clay	0.3	1600							
					0.6	1800							
					0.9	1700							
					1.2	1700							
		1.5	3.3	Yellow-brown & light green weathered schist	1.5	1600		A1803 2.1 - 3.0					
		3.3	4.9	Yellow-brown to yellowish clay with light yellow, yellow-brown & very light green weathered mica schist fragments				A1804 4.0 - 4.9	L4				On sample piles TV 1 readings generally low with 20% increase for 1.2 to 2.1m sample.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 15.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U	Th			Remarks
F4	CS 7 117 N 000B/L	0.0	0.3	Sandy soil	0.0	1100							
		0.3	1.8	Laterite & clay	0.3	1800							
					0.6	2000							
					0.9	2000							
					1.2	1900							
					1.5	1800							
		1.8	3.0	Brown clay & weathered schist & 15% quartz	1.8	1700							
					1.9	1700							
								A1805 2.1 - 3.0					
		3.0	6.7	Grey to green grey quartz mica (? chloritic) & mica (? chloritic) schists & 0 to 5% quartz									
								A1806 5.8 - 6.7	4	16			On sample piles TV 1 readings 0.0 - 2.1 500 CPM 2.1 - 4.0 600 CPM 4.0 - 6.7 750 CPM

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 15.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F 5	CS 7 120 N 020 E	0.0	0.3	Sandy soil	0.0	1000							
		0.3	1.5	Laterite & clay	0.3 0.6 0.9 1.2 1.4	1700 2100 2100 2100 1500							
		1.5	4.9	Brown to slightly yellowish brown clay & ferruginous & yellow brown mica schist chips. Clay structureless in basal 2m.				A1807 4.0-4.9	L4				On sample piles readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 15.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F6	CS 7 120 N 040 E	0.0	0.3	Sandy soil	0.0	1000							
		0.3	2.1	Laterite & clay	0.3 0.6 0.9 1.1	2100 2500 2400 2200							
		2.1	4.9	Light yellow brown to light yellowish green mica schists, becoming clayey with depth				A1808 2.1 - 3.0					
		4.9	6.7	As above with some brown & green mica schists, but sample mainly structureless clay				A1809 5.8 - 6.7	4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 15.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F7	CS 7 120 N 060 E	0.0	0.3	Soil, rubble	0.0	1000							
		0.3	2.1	Lateritised quartz mica & mica schist & clay	0.3 0.6 to 1.5 1.8 1.9	1800 2200 to 2300 1500 1600							
		2.1	4.9	Yellow-brown to greenish-brown to green-grey & grey mica schist & minor quartz mica schist				A1810 4.0 - 4.9	L4				On sample piles TV 1 readings very low & uniform.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.11.73	Project: No.	Locality:	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F8	CS 7 120 N 081 E	0.0	0.3	Soil, Rubble	0.0	1000							
		0.3	3.0	Red-brown to deep reddish lateritised clay & laterite rubble	0.3 to 1.2 1.5 1.8 to 3.0	1900 to 2300 1600 1400 to 1200		A1811 2.1 - 3.0 A1812 2.1 - 3.0	6 4				
		3.0	6.7	Yellow-brown to brown clay with occasional fragments yellow-brown to green-brown to rarely grey-green mica & occasional quartz mica schist	3.3 3.7	1600 1800							On sample piles TV 1 reading low with 20% increase over 1.2 to 2.1 m sample.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5			Sample No.	Assays (ppm) U				Remarks
						CPM							
F9	CS 7 126 N 098 E	0.0	0.3	Soil & rubble	0.0	1200							
		0.3	1.2	Lateritic rubble	0.3	1800							
		1.2	3.0	Ferruginous clay & quartz mica schist	0.6 to 4.9	1900 to 2600	Peaks 1.2m	A1813 2.1 - 3.0					
		3.0	6.7	Purple brown to grey & purple mica & quartz mica schists, in part ferruginous	5.2	2200		A1814 5.8 - 6.7	L4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.11.73	Project: E.L.130 No. 2102	Locality: CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	C.P.M.		Sample No.	Assays (ppm)				Remarks
F10	121N 117E	0.0	0.3	Rubble	0.0	1,100							On sample piles TV1 readings low and uniform.
		0.3	1.2	Lateritic rubble	0.3 to	2,000 to							
		1.2	2.4	Lateritic clay and schist.	1.8	2,400							
					2.1 to	1,700 to							
		2.4	5.5	Purple brown (reddish at top weathered schist with 10% quartz.	4.0	2,200							
					4.2	2,200							
				Similar to F9				A1815 (4.0-5.5m)					

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.11.73	Project: E.L.130 No. 2102	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5 Depth	Radiomet. TV 5 CPM	Sample No.	Assays (ppm) U	Remarks
F11	CS 7 041 N 079 E	0.0	0.3	Rubble & soil	0.0	1500			
		0.3	1.2	Lateritic rubble & clay	0.3 0.6 0.9	3800 3500 2800			
		1.2	1.8	Yellow-brown, brown, red-brown mica & quartz mica schist, minor quartz			A1816 1.2 - 1.8	6	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5			Sample No.	Assays (ppm) U	Assays (ppm) Th			Remarks
						CPM	Peaks						
F12	CS 7 036 N 060 E	0.0	0.3	Rubble	0.0	1500							
		0.3	2.1	Lateritised & ferruginous schist	0.3 to 0.9	3100 to 3500	0.6m						
		2.1	6.7	Grey, green-grey, pink, brown, purple-brown weathered mica & quartz mica schist. Similar to F9 & F10.	1.2 to 2.7	2500 to 3100		A1817 2.1 - 3.0	4	8			
					3.0 to 3.6	3400 to 3700	3.6m						
					4.0	2900							
					4.3	2600							
					4.5	2500							
								A1818 5.8 - 6.7	14				On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM	Peaks	Sample No.	Assays (ppm) U				Remarks
F13	CS 7 079 S 003 E	0.0	0.3	Soil, sand	0.0	800							
		0.3	1.5	Lateritised & ferruginous schist	0.3 0.6 to 1.2	1400 1800 to 2200	1.2m						
		1.5	6.7	Yellow-brown clay with greenish & brown mica schist fragments & minor quartz	1.5 to 4.9 5.0	1000 to 1700 1000	3.3m	A1819 5.8 - 6.7	L4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 17.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM	Peaks	Sample No.	Assays (ppm) U				Remarks
F14	CS 7 081 S 020 E	0.0	0.3	Soil, sand	0.0	900							
		0.3	1.5	Lateritised & ferruginous schist	0.3 0.6 to 1.8	1600 2000 to 2500							
		1.5	6.7	Red-brown to brown & yellowish-brown clay with fragments brown to yellow-brown, & light green & purple-brown mica schist	2.1 to 3.0 3.3 3.5	3000 to 3400 2500 2600	3.0m	A1820 5.8 - 6.7	8				On sample piles TV 1 readings low & uniform

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CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 17.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5			Sample No.	Assays (ppm) U				Remarks
						CPM							
F15	CS 7 079 S 040 E	0.0	0.3	Soil, sand	0.0	900							
		0.3	1.2	Lateritised & ferruginous schist	0.3 0.6 0.9	1400 1600 1900							
		1.2	6.7	Brown to yellow-brown clay with some fragments greenish brown to light green, & red-brown mica schist & minor quartz	1.2 1.6	2100 1600		A1821 5.8 - 6.7	4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 17.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F16	CS 7 080 S 060 E	0.0	0.3	Soil, sand	0.0	800							
		0.3	1.2	Lateritised & ferruginous schist	0.3 0.6 0.9	1700 1700 2200		A1822 0.3 - 1.2					
		1.2	4.9	Red-brown clay & minor brown to greenish mica schist	1.2 1.5 1.8 2.1 2.4	2400 2700 2600 2500 2200		A1823 4.0 - 4.9	L4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5			Sample No.	Assays (ppm) U				Remarks
						CPM							
F17	CS 7 078 S 078 E	0.0	0.3	Sand, soil	0.0	800							
		0.3	2.1	Lateritic clay & rock fragments	0.3 0.6 0.9 1.2 1.5 1.8 to	1400 1300 2300 3000 2900 1700 to							
		2.1	8.6	Yellow-brown clay becoming brown below 7m. Rare schist fragments in clay - may be off rods. May be weathered dolerite or mica schists	4.3 4.6 to 7.3 7.6	2100 1400 to 1800 1400		A1824 7.6 - 8.6	4				On sample piles TV 1 readings very low & uniform TV 5 readings indicate lithology probably schists.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project:	No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F18	CS 7 078 S 100 E	0.0	0.3	Soil, sand	0.0	900							
		0.3	1.2	Yellow sand	0.3 0.6 to 4.9 5.2 to 6.1 6.5	1700 2000 to 2200 1000 to 1300 1200							
		1.2	8.6	Red-brown to brownish clay with fragments brown, red-brown & light green mica schist				A1825 7.6 - 8.6	L4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F19	CS 7 080 S 120 E	0.0	1.8	Yellow sand with pebbles at base	0.0 0.3 to 1.2 1.5	900 1400 to 1700 2000							
		1.8	4.0	Yellow-brown, brown & greenish mica schist	1.8 2.1 2.4 2.7 to	1900 1200 1000 600 to		A1826 2.1 - 3.0					
		4.0	8.6	Yellowish clay with rare fragments brown, yellow-brown & greenish-brown mica schist	5.8 6.1	800 800		A1827 7.6 - 8.6	4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F20	CS 7 080 S 140 E	0.0	1.5	Sand, minor soil	0.0 0.3 to 2.4 2.7 3.0 3.3 to 7.3 7.6	900 1700 to 2500 2600 1900 1500 to 1200 1300							
		1.5	8.6	Red-brown to deep red-brown clay with some purple-brown, brown & greenish weathered mica schist				A1828 7.6 - 8.6	4				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5			Sample No.	Assays (ppm) U				Remarks
						CPM	Peaks						
F21	CS 7 076 S 160 E	0.0	1.2	Sand, soil	0.0 0.3 to 0.9	900 2000 to 2200							
		1.2	6.4	Red-brown clay & firm weathered whitish, yellowish & rare purple brown & brown schist	1.2 to 2.7 3.0 to 5.2 5.4	2300 to 2800 1400 to 1700 1500	1.2m 2.1m	A1829 5.8 - 6.4	2				On sample piles TV 1 readings low & uniform with 20% increase over interval 1.2 to 3.0m.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F22	CS 7 079 S 181 E	0.0	2.7	Sand, minor soil	0.0 0.3 to 1.8 2.1 to 2.7	900 1900 to 2200 2600 to 2700							
		2.7	4.3	Red-brown sample, sandy with quartz fragments & fragments dark grey to dark purple-grey schists	2.9	3200		A1830 4.0 - 4.3	10				On sample piles TV 1 readings low & uniform

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CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U	Assays (ppm) Th			Remarks
F23	CS 7 079 S 200 E	0.0	2.4	Sand, minor soil	0.0 0.3 to 1.8 2.1 to 3.6 4.1	1100 2100 to 2600 2900 to 3500 3700							
		2.4	4.9	Lateritised Kombalgie Sandstone rubble and dark grey to purple-grey & dark red-brown mica & quartz mica schist				A1831 4.0 - 4.9	4	10			On sample piles TV 1 readings show steady increase with depth from 350 to 550 CPM

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.11.73 | Project: E.L.130 No. 2102 | Locality: EL 130 CS 7 | Azimuth: | Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5 Depth	Radiomet. TV 5 CPM	Sample No.	Assays (ppm) U	Assays (ppm) Th	Remarks
F24	CS 7 060 S 210 E	0.0	1.2	Sand, soil	0.0 0.3 0.6 0.9	900 2200 2200 2600				
		1.2	3.0	Red to purple brown clay with abundant fragments purple to dark grey quartz mica & mica schist, & 5 - 10% quartz	1.2 1.5 1.8	2800 3300 3200	A1832 2.1 - 3.0	4	14	On sample piles TV 1 readings uniform except for 2.1 - . On sample which [illegible] above other samples.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 23.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U	Th			Remarks
F25	CS 7 060 S 230 E	0.0	1.2	Sand & pebbles, minor soil	0.0 0.3 0.6 0.9	900 2000 2100 2200							
		1.2	3.0	Red-brown rubble of quartz, clay & grey quartz mica schist	1.3	2400		A1833 2.1 - 3.0	10	8			On sample piles TV 1 reading uniform except for 2.1 to 3.0m sample which reads 20% above other samples.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 23.11.73	Project: E.L.130 No. 2102	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5 Depth	Radiomet. TV 5 CPM	Sample No.	Assays (ppm) U	Remarks
F26	CS 7 060 S 250 E	0.0	2.4	Sand, minor soil	0.0 0.3 to 1.5 1.8 to 2.7 3.0	1100 2400 to 2800 3100 to 3900 4300			
		2.4	3.3	Lateritised quartz & schist rubble					
		3.3	4.9	Dark grey banded quartz mica & mica schist (as in outcrop)	3.3 3.6 4.0	4500 4000 4000	A1834 4.0 - 4.9	6	
		4.9	6.7	As above but also some light brown to white schist fragments. Sample light brown as against 3.3 - 4.9m sample being red to dark brown			A1835 5.8 - 6.7	10	On sample piles TV 1 readings show slight increase with depth

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 23.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F27	CS 7 041 S 040 E	0.0	0.3	Soil	0.0	1000							
		0.3	3.0	Red-brown clay with fragments brown to olive mica schist	0.3 0.6 0.9 1.2 to 3.0	2100 2400 2100 1000 to 1400							
		3.0	8.6	Brown to yellow-brown clay with fragments (numerous) of brown & green to brown mica schist, becoming more clayey with depth & containing yellow brown to brown & green fragments mica schist	3.3 to 4.0 4.3	1500 to 1800 2000		A1836 7.6 - 8.6	6				On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 23.11.73	Project: No.	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM	Peaks	Sample No.	Assays (ppm) U	Assays (ppm) Th			Remarks
F28	CS 7 036 S 020 E	0.0	0.3	Soil, sandy	0.0	1100							
		0.3	8.6	Slightly lateritic red-brown clay, generally featureless, with minor schist fragments	0.3 to 1.2 1.5 1.8 to 2.7 3.0 to 4.6 4.9	2300 to 2900 1800 2000 to 2700 3200 to 2800 2300	0.6m 3.0m 4.6m	A1837 7.6 - 8.6	6	10			On sample piles TV 1 readings slightly variable (± 10%) & low.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 23.11.73	Project: E.L.130 No. 2102	Locality: EL 130 CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5 Depth	Radiomet. TV 5 CPM	Sample No.	Assays (ppm) U	Remarks
F29	CS 7 040 S 001 W	0.0	0.3	Soil, sandy	0.0	900			
		0.3	3.0	Red-brown lateritic clay, featureless	0.3	1600			
					0.6	1900			
					0.7	2000			
							A1838 2.1 - 3.0	L4	On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 23.11.73	Project: E.L.130 No. 2102	Locality: CS 7	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. TV 5	CPM		Sample No.	Assays (ppm) U				Remarks
F30	040S 020W	0.0	0.3	Soil, Sandy	0.0	700							On sample piles TV1 readings low and uniform.
		0.3	1.8	Red brown clay, lateritic.	0.3 0.6 0.9 1.1	1,800 2,000 2,200 2,300							
		1.8	6.7	Brown to yellow brown clay with occasional soft greenish mica schist fragments.				A1839 (4.0 - 4.9m)	6				

NOTE: All dimensions are metric unless otherwise stated.

SECTION ..... 3.11 AUGER DRILL LOGS

LOCALITY:	Anomaly 24
HOLE NUMBER:	E1 to E44 (inclusive)
NUMBER OF HOLES:	44
TOTAL METREAGE:	211.0
NUMBER OF SAMPLES ASSAYED:	51
MAXIMUM URANIUM VALUE:	44 A1672 7.6-8.5 E22 55 A1694 2.1-3.0 E42

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Log by G. Winter

Date(s) Drilled: 14.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T TV-5	Sample No.	Assays (ppm) U	Remarks
E1	210N 020W	0.0	0.6	Rubble (schist, quartz) and sand, soil	0.3 0.6	6,000 6,000			
		0.6	2.4	Light brown mica schist	0.9 1.2	6,006 5,000			
		2.4	3.0	Off-white quartz - mica schist					Dry Hole - stopped due t hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER .....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 14.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M. TV-5	Sample No.	Assays (ppm) U	Remarks
E2	220N 030W	0.0	0.6	Rubble, sand, soil	0.3	8,800			
		0.6	1.5	Light brown mica schist (quartz-rich)	0.6	16,000			
					0.9	15,000			
					1.2	11,000	A1336 (1.5 - 3.3) GEOMHN	3	
		1.5	3.3	Brown quartz-mica schist	1.5	15,000			
		3.3	5.5	White quartz-rich schist, powdery	1.8	17,000			
					2.1	19,000			
					2.4	18,000			
					2.7	17,000			
					3.0	16,000			
					3.3	16,500			Dry Hole - stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 14.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T.C. TV-5	Sample No.	Assays (ppm) U	Remarks
E3	180N 030W	0.0	0.6	Rubble and soil	0.3	13,000	A1339 (0.0 - 1.5)	8	
		0.6	1.5	Brown weathered quartz-mica schist	0.6	18,500			
					0.9	17,500			
					1.2	17,000			
		1.5	5.2	White-fawn schist	1.5	16,500	A1340 (1.5 - 3.3)	4	
					1.8	16,000			
					2.1	16,500			
					2.4	18,000			
					2.7	18,000			
					3.0	17,000			
					3.3	9,000	A1341 (3.3 - 5.2)	5	
					3.6	8,000			
					4.0	7,500			
					4.3	7,000			
					4.6	6,500			
					4.9	6,000			
		5.2	8.8	Light brown (mica) schist	5.2	6,000			
					5.5	6,000			
					5.8	6,000			
					6.1	6,500			
							A1343 (7.0 - 8.8)	5	Dry Hole - stopped due to hard rock.
									GEOMIN

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.8.73 | Project: E.L. 130 No. 2102 | Locality: Anomaly 24 | Azimuth: - | Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.To TV-5	Sample No.	Assays (ppm) U	Remarks
E4	190N 030W	0.0	0.6	Rubble	0.3	12,000	A1344(0.0 - 1.5)	4	
		0.6	1.5	Brown quartz-mica schist	0.6	10,000			
					0.9	15,000			
					1.2	17,000			
		1.5	4.6	White-fawn schist	1.5	18,500	A1345(1.5 - 3.3)	6	
					1.8	19,000			
					2.1	18,000			
					2.4	18,000			
					2.7	19,000			
					3.0	19,500			
							A1345(3.3 - 4.6)	5	Dry Hole - stopped due to hard rock
									GEOMIN

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER .....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T. TV-5	Sample No.	Assays (ppm)	Remarks
E5	200N 030W	0.0	0.6	Soil and rubble	0.3	8,000			
		0.6	1.5	Brown micaceous schist	0.6	10,500			
					0.9	8,000			
					1.2	8,000			
		1.5	2.7	White schist, quartz-rich, powdery	1.5	7,500			
					1.8	7,800			Dry Hole - stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T. TV-5	Sample No.	Assays (ppm) U	Remarks
E6	210N 030E	0.0	0.6	Light brown quartz mica schist	0.3	17,000	A1349(0.0 - 1.5)	8	
		0.6	3.3	Yellow-brown mica schist, powdery	0.6	20,000			
					0.9	20,000			
					1.2	20,000			
					1.5	18,000	A1350(1.5 - 3.3)	6	
					1.8	18,000	GEOMIN		
					2.1	19,000			
					2.4	17,000			
					2.7	17,000			
					3.0	18,000			Dry hole, stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER .....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 16.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M. To TV-5	Sample No.	Assays (ppm)	Remarks
E7	210N 010W	0.0	0.6	Brown soil, weathered schist	0.3	4,000			
		0.6	1.8	Fawn-brown mica schist, powdery	0.6	4,500			
					0.9	4,700			
					1.2	4,000			Dry hole - stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 18.8.73 | Project: E.L. 130 No. 2102 | Locality: Anomaly | Azimuth: - | Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M. TV-5	Radiomet. Repeat TV-5	Sample No.	Assays (ppm) U	Remarks
E8	200N 020W	0.0	0.6	Soil, weathered schist rubble	0.3	6,000	6,000	A1352(0.0 - 1.5)	6	
		0.6	2.4	Light brown fine quartz mica schist	0.6	6,600	6,000			
					0.9	7,000	8,000			
					1.2	11,000	11,000			
					1.5	17,000	17,000	A1353(1.5 - 3.3)	12	
					1.8	17,000	17,000			
					2.1	17,000	17,000			
		2.4	4.3	Fawn schist, fine and powdery	2.4	18,000	18,000			
					2.7	18,000	18,000			
								A1354(3.3 - 4.3)	5	Dry hole - stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 18.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	C.P.M.T. TV-5	Repeat TV-5	Sample No.	Assays (ppm) U	Remarks
E9	190N 020W	0.0	0.6	Grey soil, rubble	0.3	16,000	16,000	A1356(0.0 - 1.5)	5	
		0.6	1.5	Green-brown schist, possibly chloritic	0.6	17,000	16,000			
					0.9	17,000	17,000			
					1.2	17,500	18,000			
		1.5	5.2	Fawn-brown mica schist (+ quartz?)	1.5	17,000	17,000	A1357(1.5-3.3)	4	
					1.8	18,500	18,000			
					2.1	18,500	18,500			
					2.4	18,500	17,500			
					2.7	17,000	18,000			
					3.0	18,000	18,000			
					3.3	19,000	18,000	A1358(3.3 - 5.2)	5	
					3.6	18,000	19,000	(GEOMIN)		
					4.0	18,500	21,000			Dry hole, stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 18.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	C.P.M.T. TV-5	Repeat TV-5	Sample No.	Assays (ppm) U				Remarks
E10	180N 020W	0.0	0.6	Soil, schist rubble	0.3	17,500	16,000	A1359(0.0 - 1.5)	5				
		0.6	3.6	Light brown to fawn powdery mica schist	0.6	17,000	17,000						
					0.9	17,000	16,500						
					1.2	18,000	17,500						
					1.5	19,000	18,000	A1360(1.5 - 3.3) (GEOMIN)	5				
					1.8	20,000	20,000						
					2.1	20,000	20,000						Dry hole - stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 20.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.To TV-5	Sample No.	Assays (ppm)	Remarks
E11	170N 020W	0.0	0.6	Soil and rubble	0.3	8,500			
		0.6	2.1	Fawn mica schist, powdery	0.6	9,000			
					0.9	7,500			Dry hole - stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 20.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T.o TV-5	Sample No.	Assays (ppm)	Remarks
E12	140N 025W	0.0	0.6	Brown soil, schist rubble	0.3	9,000			
		0.6	1.5	Brown (quartz) mica schist	0.6	9,000			
					0.9	14,000			
					1.2	17,000			
		1.5	3.3	Fawn micaceous schist	1.5	17,000			
					1.8	16,000			
					2.1	15,000			
					2.4	14,000			
					2.7	14,000			
		3.3	4.6	Light brown (quartz) mica schist					Dry hole, stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 20.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.To TV-5	Sample No.	Assays (ppm) U	Remarks
E13	135N 025W	0.0	0.6	Light brown quartz-mica schist	0.3	15,000	A1366(0.0 - 1.5)	9	
		0.6	4.3	Off-shite quartz - rich schist, powdery	0.6	11,000			
					0.9	13,000			
					1.2	14,000			
					1.5	15,000			
					1.8	15,000			
					2.1	15,000			
					2.4	16,000			
					2.7	16,000			
					3.0	15,000			
					3.3	13,000	A1368(3.3 - 5.2)	4	
					3.6	15,000			
					4.0	17,000			
		4.3	7.0	Light to medium grown quartz-mica schist	4.3	17,000			
					4.6	16,000			
					4.9	16,000			
					5.2	16,000			
					5.5	15,000			
					5.8	13,000			
					6.1	10,000			
					6.4	7,000			
					6.7	7,000			
		7.0	7.9	Partly quartz-mica schist, partly(?) schist-pegmatite transition zone	7.0	7,000	A1370(7.0 - 8.8) (GEOMIN)	5	
					7.3	4,500			
					7.6	4,500			
		7.9	8.8	Purple to brown rock, (?) schist-pegmatite transition	7.9	4,500			
					8.2	5,000			

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled:	Project: No.	Locality:	Azimuth:	Inclination:

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm)				Remarks
E13		9.8	10.0	Brown mica schist									Moist hole, stopped due to hard rock

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

...AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 20.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.Tb TV-5	Sample No.	Assays (ppm)	Remarks
E14	130N 025W	0.0	0.6	Light brown quartz mica schist	0.3	13,000			
		0.6	7.9	Brown to off-white quartz-mica schist, mostly powdery	0.6	14,000			
					0.9	15,000			
					1.2	16,000			
					1.5	15,000			
					1.8	16,000			
					2.1	15,000			
					2.4	16,000			
					2.7	17,000			
					3.0	17,000			
					3.3	17,000			
					3.6	18,000			
					4.0	18,000			
					4.3	18,000			
					4.6	17,000			
					4.9	17,000			
					5.2	16,000			
					5.5	14,000			
					5.8	12,000			
					6.1	11,000			
					6.4	8,000			
					6.7	6,500			
					7.0	8,000			
					7.3	7,500			
					7.6	6,500			
		7.9	8.8	Purple-brown soft rock, probably schist-pegmatite transition	7.9	5,000			
					8.2	4,000			

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled:	Project: No.	Locality:	Azimuth:	Inclination:

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm)				Remarks
E14		8.8	9.8	Brown and fawn quartz-mica schist									Moist hole, stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER
.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.Td TV-5	Sample No.	Assays (ppm)	Remarks
E15	230N 045W	0.0	0.6	Soil and rubble	0.3	6,000			
		0.6	1.5	Brown to fawn quartz-mica schist	0.6 0.9	5,000 5,000			Dry hole, stopped by hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 21.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.To TV-5	Sample No.	Assays (ppm)	Remarks
E16	235N 045W	0.0	0.6	Grey soil, schist rubble	0.3	16,000			
		0.6	3.6	Off-white to pink brown quartz mica schist, mostly powdery	0.6	12,000			
					0.9	7,000			
					1.2	8,000			
					1.5	8,500			
					1.8	8,000			
					2.1	5,500			Dry hole - stopped by hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 22.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T6 TV-5	Sample No.	Assays (ppm)	Remarks
E17	240N 045W	0.0	0.6	Grey soil, schist rubble	0.3	15,000			
		0.6	6.1	Off-white to brown and pink-brown powdery quartz-mica schist	0.6	16,000			
					0.9	16,500			
					1.2	18,000			
					1.5	18,000			
					1.8	17,500			
					2.1	16,500			
					2.4	16,500			
					2.7	15,500			
					3.0	6,500			
					3.3	6,500			
					3.6	8,000			
					4.0	7,000			
					4.3	7,500			Dry hole - stopped by hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 22.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T. TV-5	Sample No.	Assays (ppm)	Remarks
E18	245N 045W	0.0	0.6	Soil, weathered schist	0.3	5,000			
		0.6	6.4	Fawn to off-shire and light brown powdery quartz-mica schist	0.6	6,000			
					0.9	10,000			
					1.2	14,000			
					1.5	14,000			
					1.8	15,000			
					2.1	15,000			
					2.4	16,000			
					2.7	15,000			
					3.0	16,000			
					3.3	19,500			
					3.6	19,500			
					4.0	8,000			
					4.3	6,000			
					4.6	8,500			Dry hole, stopped by hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 22.8.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth: -	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. Depth	Radiomet. C.P.M.T. TV-5	Sample No.	Assays (ppm)	Remarks
E19	250N 045W	0.0	0.6	Rubble (mainly schist and quartz)	0.3	5,000			
		0.6	7.0	Light to medium brown powdery quartz, mica schist	0.6	6,000			
				0.6 - 1.5 Red-brown	0.9	6,000			
					1.2	11,500			
					1.5	16,000			
					1.8	14,000			
					2.1	12,000			
					2.4	15,000			
					2.7	17,000			
					3.0	19,000			
					3.3	20,000			
					3.6	20,500			
					4.0	19,000			
					4.3	19,000			
					4.6	19,000			
					4.9	15,000			Dry hole, stopped due to hard rock.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 31.10.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet. 1	Sample No.	Assays (ppm) U	Remarks
E20	130 N 015 W	0.0	0.3	Soil, rubble				
		0.3	4.0	Light grey to yellow-brown & white quartz mica schist & quartzite		A1668 3.0 - 4.0	8	
		4.0	6.7	Yellow-brown lateritised quartz mica schist		A1669 5.8 - 6.7	10	
		6.7	8.5	Light to dark grey quartz mica schist & minor quartz		A1670 7.6 - 8.5	8	

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 31.10.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E21	130 N 010 E	0.0	2.1	Lateritised quartz mica & mica schist, minor quartz				
		2.1	5.8	Slightly lateritised quartz mica schist & quartz, with dark grey thinly banded quartz mica schist towards base		A1671 4.9 - 5.8	12	On sample piles TV 1 readings low with minor peaks at 0.1 - 1.2 and 2.1 - 3.0m.

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 31.10.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U			Remarks
E22	210 N 021 E	0.0	1.2	Lateritised & ferruginous quartz mica schist						
		1.2	4.9	Lateritised & ferruginous purple brown to yellow-brown white & grey quartz mica & mica schist						
		4.9	8.5	Purple-brown to dark red-brown ferruginous quartz mica schist		A1672 7.6 - 8.5	44	4		On sample piles TV 1 readings show overall increase (40%) to base of hole

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 1.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E23	200 N 015 E	0.0	2.1	Lateritised & ferruginous quartz mica schist				
		2.1	4.0	Lateritised & ferruginous purple brown to yellow-brown quartz mica schist with some dark grey quartzite				
		4.0	8.5	Purple brown to grey green quartz mica schist and quartzite		A1673 7.6 - 8.5	10	On sample piles TV 1 readings show high over surface lateritic zone & then decrease to base of hole
				Muscovite metaquartzite, minor tourmaline & hematite		W2096 7.6 - 8.5		Petrology

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E24	480 N 220 W	0.0	1.5	Rubble				
		1.5	6.7	Red-brown clay with minor yellow-brown to purple brown quartz mica & mica schist		A1674 5.8 - 6.7	6	On sample piles TV 1 readings show low & show decrease downwards from surface

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

...AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm) U				Remarks
E25	480 N 200 W	0.0	1.2	Rubble									
		1.2	4.9	Red-brown clay with minor yellow-brown to brown & purple brown quartz mica schist & quartzite, & minor whitish clay				A1675 4.0 - 4.9	12				On sample piles TV 1 readings low & relatively uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Assays (ppm) Th	Remarks
E26	480 N 180 W	0.0	0.3	Rubble					
		0.3	3.0	Yellow-brown to pinkish sandy clay & white to yellowish quartzite with minor micaceous streaks		A1676 2.1 - 3.0	8	32	
		3.0	4.9	Pinkish brown sandy clay and yellow to white quartzite with minor mica, and 15% quartz		A1677 4.0 - 4.9	4	20	On sample piles TV 1 readings uniform except for 40% increase on sample 2.1 - 3.0m

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

...AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 8.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E27	480 N 160 W	0.0	0.3	Rubble				
		0.3	1.5	Sandy clay, quartz, quartzite & quartz mica schist		A1678 1.2 - 1.5	4	On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 8.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E28	480 N 140 W	0.0	0.3	Rubble				
		0.3	1.5	Sandy clay & brown to red-brown & yellow-brown quartzitic mica schist		A1679 1.2 - 1.5	L4	On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 10.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination:

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm) U				Remarks
E29	480 N 120 W	0.0	0.3	Rubble									
		0.3	4.6	Yellow-brown to purple-brown quartz mica & mica schist, generally slightly lateritised with 5% quartz and minor light grey to white clay				A1680 4.0 - 4.6	8				

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 10.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E30	210 N 000E	0.0	3.3	Yellow-brown to slightly reddish brown & purple-brown & very light grey quartz mica & mica schist, becomes more clayey with depth		A1681 3.0 - 3.3	24	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 10.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E31	210 N 040 E	0.0	0.3	Lateritised & ferruginous rubble				
		0.3	3.6	Yellow-brown to brown, some purple-brown & very light grey quartz mica & mica schist, & minor quartz		A1682 3.0 - 3.6	16	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 10.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E32	210 N 060 E	0.0	0.3	Lateritised & ferruginous rubble				
		0.3	1.2	Lateritised & ferruginous quartz mica schist				
		1.2	4.9	Yellow-brown to red-brown & occasionally very light grey quartz mica & mica schist, becoming clayier with depth		A1683 4.0 - 4.9	18	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 10.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E33	214 N 077 E	0.0	0.3	Rubble				
		0.3	2.4	Dark red-brown lateritised & ferruginous quartz mica schist & clay & laterite.				
		2.4	4.9	Red-brown to yellow-brown clay with very light grey clay, yellow brown mica & quartz mica schist & dark grey quartzite. Some green-grey mica schist 2.4 - 3.0		A1684 4.0 - 4.9	6	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 10.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm) U				Remarks
E34	280 N 079 E	0.0	0.3	Rubble									
		0.3	2.4	Red-brown to yellow-brown & purple-brown, minor grey to purple quartz mica & mica schist with 15% quartz in 1.2 - 2.1 in sample				A1685 2.1 - 2.4	18				On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 12.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E35	010 N 010 W	0.0	0.3	Soil, black				
		0.3	2.1	Slightly lateritic rubble & clay				
		2.1	4.6	Yellow-brown sample of quartz & slightly lateritic quartz mica schist grading to light grey quartz mica schist		A1686 3.0 - 4.0	14	
		4.6	6.7	Light grey quartz mica & mica schist & 10% quartz		A1687 5.8 - 6.7	10	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 12.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination:

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm) U				Remarks
E36	020 S 025 E	0.0	0.3	Soil									
		0.3	2.7	Red-brown lateritic then yellow-brown clayey sample with much quartz & mica rich schist				A1688 2.1 - 2.7	L4				On sample piles TV 1 readings decrease with depth

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 12.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination:

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm) U				Remarks
E37	020 S 098 E	0.0	0.3	Black soil									
		0.3	2.1	Red-brown rubble, clay & quartz, brown & grey quartz mica & mica schist									
		2.1	4.6	Yellow-brown clayey sample of lateritic quartz mica schist, quartz & minor grey quartz mica schist				A1689 4.0 - 4.6	6				On sample piles TV 1 readings decrease with depth

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 12.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.			Sample No.	Assays (ppm) U				Remarks
E38	300 N 064 E	0.0	0.3	Rubble									
		0.3	1.2	Yellow-brown to brown quartz mica schist, quartzitic schist & clay									
		1.2	3.0	Purple-brown to yellow-brown & minor mid-grey clayey quartz mica & mica schist minor quartz, and clay				A1690 2.1 - 3.0	20				On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 12.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E39	523 N 127 W	0.0	0.3	Rubble				
		0.3	1.2	Yellow-brown quartz & quartz mica schist				
		1.2	3.0	Yellow-brown & brown & light grey quartz mica & quartzitic schist with light yellow brown sandy clay, minor quartz		A1691a 2.1 - 3.0	8	
		3.0	4.9	Brown to yellow brown & some greenish grey quartz mica & quartzitic schist, 5 - 10% quartz, & pinkish brown sandy clay		A1691 4.0 - 4.9	6	On sample piles TV 1 readings show slight increase with depth

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

...AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 1.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E40	220 N 004 W	0.0	2.1	Slightly lateritic yellow-brown to reddish-brown quartz mica schist, 10% quartz & minor light grey quartzitic schist				
		2.1	3.0	As above and dark grey to black quartzitic schist (Micaceous graphitic metaquartzite, brecciated & silicified)		A1692 2.1 - 3.0 W2095	14	On sample piles TV 1 readings decrease with depth Rig broke down at 3.0m

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

.....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E41	280 N 101 E	0.0	0.3	Rubble				
		0.3	4.9	Yellow-brown to brown & purple brown lateritic mica & quartz mica schist with 10% quartz near base		A1693 4.0 - 4.9	14	On sample piles TV 1 readings uniform with slight increase in lateritic zone

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

....AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Assays (ppm) Th	Remarks
E42	259 N 090 E	0.0	0.3	Rubble					
		0.3	3.0	Yellow-brown to brown & minor purple brown & grey laterit-ised quartz mica schist, minor mica schist & quartz		A1694 2.1 - 3.0	55	6	On sample piles TV 1 readings show increase (40%) to base of hole

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

..AUGER.....DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E43	260 N 111 E	0.0	0.3	Rubble				
		0.3	2.1	Dark brown to dark red-brown ferruginous quartz mica & mica schist				
		2.1	4.9	Yellow-brown to brown very clayey mica & quartz mica schist		A1695 4.0 - 4.9	20	On sample piles TV 1 readings uniform

NOTE: All dimensions are metric unless otherwise stated.

CANADIAN SUPERIOR MINING (AUST.) PTY. LTD.

AUGER DRILLING LOG AND ASSAY SHEET

Date(s) Drilled: 7.11.73	Project: E.L. 130 No. 2102	Locality: Anomaly 24	Azimuth:	Inclination: 90°

Hole No.	Co-ordinates	Interval From	Interval To	Geology	Radiomet.	Sample No.	Assays (ppm) U	Remarks
E44	280 N 058 E	0.0	0.3	Rubble				
		0.3	2.1	Lateritised & ferruginous quartz mica & mica schist purple brown - brown-yellow brown				
		2.1	4.9	As above with clay and 10 - 5% quartz		A1696 4.0 - 4.9	14	On sample piles TV 1 readings low & uniform

NOTE: All dimensions are metric unless otherwise stated.

SECTION 4.1 Location of Samples (Petrology, Mineralogy and Assay

Sample No.	Locality	Coords	Hole No.	Depth
CS3-1/24	CS3	120N 00E	A1	7.3-7.6
CHCS3A	CS3	Costean 1		
CHCS3B	CS3	Costean 1		
CHCS1N	CS1 North	North East of CS1 Grid.		
W2001	CS2	330N 030 E	S	
W2002	CS2	300N 015 W	S	
W2003	CS2	305 N 015W	S	
W2004	CS2	150N 180E	S	
W2005	CS2	155N 185E	S	
W2006	CS2	030N 210E	S	
W2007	CS2	125N 200E	S	
W2008	CS2	255N 210E	S	
W2009	CS3	160N 010E	S	
W2010	CS3	100N 020W	S	
W2011	CS3	150N 030W	S	
W2012	CS3	080N 015E	S	
W2013	Anom 4-2 Traverse	15000 Ft. W	S	
W2014	Anom 24	170N 045W		
W2015	CS3	118N 032E	P1	10-13
W2016	CS3	118N 032E	P1	28-29
W2017	CS3	118N 032E	P1	46-47
W2018	CS3	118N 032E	P1	46-47
W2019	CS3 960 South	960S 261E	P6	15-20
W2020	CS3 960 South	960S 261E	P6	45-50
W2021	CS3 960 South	960S 261E	P6	29-30
W2022	CS3	118N 032E	P1	48-50
W2023	CS3	100N 350E	P12	4-5
W2024	CS3	100N 350E	P12	32-33
W2025	CS3	100N 350E	P12	34-37
W2026	CS3	090N 020E	P13	24-25
W2027	CS3	078N 380E	P16	43-45
W2028	CS2	130N 250E	P18	4-7

W2029	CS2	130N 250E	P18	4-7
W2030	CS2	130N 250E	P18	10-13
W2031	CS2	030N 270E	P20	32-36
W2032	CS2	305N 045E	P21	20-23
W2033	CS2	305N 045E	P21	34-35
W2034	CS2	305N 045E	P21	34-35
W2035	CS2	120N 211E	S	
W2036	CS2-3 2400N	2560N 360W	S	
W2037	CS2-3 2400N	2560N 360W	S	
W2038	CS2-3 2400N	2560N 360W	S	
W2039	CS2-3 2400N	2560N 360W	S	
W2040	CS2-3 2400N	2560N 360W	S	
W2041	CS1 North	2560N 240E	S	
W2042	CS2-3 1400N	1240N 238E	S	
W2043	CS3	098N 340E	S	
W2044	CS3	068N 340E	S	
W2045	CS2-3 2400N	2180N 300W	S	
W2046	CS2-3 2400N	2240N 330W	S	
W2047	CS2-3 2400N	2100N 190W	S	
W2048	CS2-3 2400N	2560N 360W	S	
W2049	CS3	098N 340E	S	
W2050	CS3	090N 345E	S	
W2051	Peninsular west of Ngara		S	
W2052	CS2	300N 015E	S	
W2053	Anom. 24	190N 040W	S	
W2054	Anom. 24	660N 090W	S	
W2055	Anom. 24	678N 159W	S	
W2056	Anom. 24	640N 132W	S	
W2057	Anom. 24	638N 123W	S	
W2058	Anom. 24	554N 216W	S	
W2059	Anom. 24	596N 224W	S	
W2060	Anom. 24	710N 160W	S	
W2061	Anom. 24	560N 135W	S	
W2062	Anom. 24	600N 147W	S	

W2063	Anom. 24	632N 228W	S	
W2064	Anom. 24	480N 106W	S	
W2065	Anom. 24	678N 252W	S	
W2066	Anom. 24	519N 132W	S	
W2067	CS4	042S 282W	S	
W2068	CS4	042N 332W	S	
W2069	CS4	080S 322W	S	
W2070	CS4	042S 200W	S	
W2071	CS4	076S 382W	S	
W2072	CS4	038S 283W	S	
W2073	CS4	040S 160W	S	
W2074	CS4	080N 480W	S	
W2075	CS4	040S 353W	S	
W2076	CS4	080N 470W	S	
W2077	CS4	075S 380W	S	
W2078	CS4	040S 358W	S	
W2079	CS4	035S 326W	S	
W2080	CS4	040S 325W	S	
W2081	CS3	116N 005E	P3	5-6
W2082	CS3	116N 005E	P3	6-7
W2083	CS3	116N 005E	P3	8-9
W2084	CS3	100N 005E	P7	8-9
W2085	CS3	090N 020E	P13	10-11
W2086	Not forwarded			
W2087	Anom. 24	290N 065E	S	
W2088	Anom. 24	290N 061E	S	
W2089	CS7	037N 136E	S	
W2090	CS7	008N 188E	S	
W2091	CS7	041S 128E	S	
W2092	CS7	030S 190E	S	
W2093	CS7	004S 175E	S	
W2094	CS7	Near W2090	S	
W2095	Anom. 24	220N 004W	E40	2.1-3.0
W2096	Anom. 24	200N 015E	E23	7.6-8.6

W2097	CS6	220N	180W	S
W2098	CS6	245N	200W	S
W2099	CS6	010S	000W	S
W2100	CS6	010S	010W	S
W2101	CS3 960 South	1077S	320E	A96 4.0-4.'

S denotes surface sample

SECTION 5.01 PETROLOGIST REPORT

LOCALITY....ANOMALY 4-2 TRAVERSE

A. 4-2 TRAVERSE

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~14th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
4-2 Traverse W 2013
15,000 ft W
Andesine——
Microgabbro.

Job No. ~~CMS 73/9/4~~ Date Received: ~~4/9/73~~

Reference ~~O.N. 0469~~

Sample No. ~~W 2013 Loc Bl~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12421

a. Hand Specimen:

Dark, fine medium crystalline igneous rock. K stain test positive in spots.

b. Microscopic:

This andesine-microgabbro is very similar to W 2001, and is almost certainly genetically related to it: it is more "basic" than W 2001 and lacks phenocrysts.

The major components are andesine, clinopyroxene and olivine. All are very fresh, with just occasional patches of serpentinised olivine. The fabric is subophitic to ophitic, ie. composed of large poikilitic areas of clinopyroxene with embedded, randomly orientated andesine laths. The andesine is calcic (An_{45}) clear and fresh. The pyroxene is most probably titanaugite, and the olivine contains lines of opaque inclusions.

Minor and accessory minerals are primary oxide opaques, small flakes of red brown biotite and small interstitial patches of K feldspar.

The fabric of the rock is typical of gabbros, and grainsizes approach those of gabbros. Thus W 2013 is distinctly coarser than W 2001; if the two samples are from the same intrusion, then the differences between them indicate some differentiation.

Very small (0.1mm) patches of sulphide occur in trace amounts.

H. W. Fender, M.Sc.

SECTION 5.02 PETROLOGIST REPORT

LOCALITY....CS1N AREA

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
W 2041
CSI NTH. 2560N 2405E
Altered Granophre.

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference O.N. 0698

Sample No. W 2041

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12880

a. Hand Specimen:

Structureless, medium grained siliceous rock. K feldspar stain reaction negative.

b. Microscopic:

This is an altered granophyre. The K stain reaction was negative because all the feldspar is sericitised.

Evidently the fresh rock was a hornblende granophyre, composed of acicular to prismatic hornblende crystals embedded in, and often forming nuclei for, patches of micrographically intergrown quartz and feldspar. Of these minerals, only quartz has survived.

The feldspar was replaced by fine flaky aggregates of sericite (illite-hydromuscovite) with faithful preservation of original textures and morphology (some feldspathic laths were also present).

The hornblende is represented by chlorite pseudomorphs, with iron oxide and anatase inclusions. A few semi-opaque Fe-Ti oxide inclusions have pleochroic haloes and are thus slightly radioactive. Some of the chlorite pseudomorphs were partly replaced by sericite, which is thus a younger phase.

The rock represents a minor intrusion (sill/dike) or a chilled contact from a larger intrusive body.

H. W. Fander, M.Sc.

SECTION 5.03 PETROLOGIST REPORT

LOCALITY....CS2-3, 960S AREA

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
C63 W 2019 P6 15-20
960S
Silicified Argillized Schist

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference O.N. 0660

Sample No. W 2019

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12646

a. Hand Specimen:

Fine streaky schist.

b. Microscopic:

This is a severely argillised, ferruginised schist; much of the original detail has been obliterated, making interpretation tentative.

It consists of fine, granular and mosaic quartz, embedded in, and partly replaced by a fine, cryptocrystalline mass of kaolinite and silica with associated hematite and goethite. These secondary minerals have evidently replaced all pre existing primary constituents except quartz. The silica/kaolinite material is not amorphous, however, it has a definite optic orientation, most probably inherited from the replaced mineral(s) judging from previous rocks these would have been micaceous.

The alteration was pervasive and intense, and is believed to be more than could be attributed to weathering. Rather, it was a low temperature hydrothermal phase affecting the whole of the rock. In addition, more superficial weathering and limonite staining is present.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2020 Pl 45-50
960S
Altered Andesine-Microgabbro.

Job No. CMS 23/10/13 Date Received: 10/10/73

Reference O.N. 0680

Sample No. W 2020

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12647

a. **Hand Specimen:**

Altered medium grained igneous rocks, with traces of sulphides.

b. **Microscopic:**

These chips (5 were mounted and sectioned) differ slightly in fabric, textures and composition, but on the whole were probably derived from different parts of the same intrusion; there is a correlatable resemblance with W 2017.

Although occasional laths of plagioclase are preserved (and in places are remarkably fresh) and minor residual clinopyroxene also occurs, most of the constituents are altered to the stage of being recognisable only by relict textures.

The rock chips are altered andesine-microgabbros composed of ophitic plates of (altered) pyroxene, with embedded andesine laths; late stage hornblende and biotite patches occur and are unaltered. Opaques have been leucoxenised, and the major constituents are the alteration products, such as sericite, chlorite, quartz and talc. Small chrysotile veins cut the rocks; there are patches of fine pyrite (secondary).

The variation in fabric and grainsize is probably due to representation of different parts of the intrusive. The intense and pervasive alteration, with excellent preservation of textural details, appears to be a characteristic of some of these igneous rocks in the area.

H. V. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2021 P 629-30
9605
Altered Ande-ine-Gabbro

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference O.N. 0690

Sample No. W 2021

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12648

a. Hand Specimen:

Altered medium grained igneous rocks, with traces of sulphide.

b. Microscopic:

These rocks are compositionally very similar to W 2020, but more coarsely crystalline; they are more appropriately classified as andesine-gabbros.

Their state of preservation is also better: substantial amounts of clinopyroxene are seen, intimately intergrown (almost in graphic fashion) with coarse andesine, whereby single crystals of andesine contain a number of pyroxene patches, groups of which are in optical continuity. This texture is unusual and distinctive.

However, much of the plagioclase is sericitised, and the pyroxene replaced by dense, fibrous, semi-isotropic ? amphibole. The opaques are leucoxenised, and often surrounded by biotite (this is primary however).

Small patches of quartz and K feldspar occur interstitially and represent a late primary felsic residual fraction (cp. W 2017).

If it is assumed that this rock is from the same intrusion as W 2020 then the body must be fairly substential, judging by the coarsening of the fabric/grainsize. Inferred compositional variations (eg. ? olivine in W 2017) could be due to layering, multiple/composite intrusion, or other factors.

H. V. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th December 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
W 2101
CS 3 S605 1077S 320E A96-40-49 Micaceous Argillaceous Aggregates.

Job No. CMS 73/12/13 Date Received: 10/12/73

Reference O.N. 0906

Sample No. W 2101

Nature of Sample: ~~Auger chips~~

DESCRIPTION **SECTION No.** 13169

a. Hand Specimen:

Soft, friable, fine grained argillaceous fragments.

b. Microscopic:

The rock fragments consist of fine sericite-kaolinite-chlorite aggregates. Unfortunately they have very little or no relict features which would assist in an interpretation regarding origin.

Generally, the various micaceous minerals occur as very fine flakes, randomly orientated sericite (probably illite) aggregates are occasionally present. Some of these show outlines vaguely suggestive of derivation from feldspar.

The textures and fabrics of the fragments in most cases strongly suggest weathered residual-detrital material, derived from a rock (but not directly representing it) which may very well have been of basic igneous composition. Occasional quartz fragments are also present, embedded in the micaceous minerals, and presumably have a different origin.

The fragments are discoloured by limonite staining.

Taking this sample in the context of W2020 and W2021, it may represent a finer grained contact rock or redistributed alteration products.

H. W. Fander, M.Sc.

SECTION 5.04 PETROLOGIST REPORT

LOCALITY....CS3 AREA

Central Mineralogical Services Pty. Ltd.

231 Magill Road
Maylands, S.A. 5069
Telephone ~~69 5659~~
42 5659

14th August 1973

Miss R. Rose,
Geochemical and Mineralogical Laboratories Pty. Ltd.,
P.O. Box 9,
RUSHCUTTERS BAY, N.S.W. 2011

REPORT CMS 73/8/10

YOUR REFERENCE: External Work Services Order No. 19722/ Day Book No. 1582

DATE RECEIVED: 13/8/73

SAMPLE No: C33 - 1/24

SUBMITTED BY: Miss R. Rose

WORK REQUESTED: Identification of U minerals.

H. W. Fander.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES

Date 14th August 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 - 1/24
Autunite. CS3 Auger 1. 24ft.

Job No. CMS 73/8/10 Date Received: 13/8/73

Reference DB 19722/1582

Sample No. CS3 - 1/24

Nature of Sample: Drill Sludge

DESCRIPTION **SECTION No.** -

a. Hand Specimen:

Fine, quartzose, argillaceous-micaceous material. Fluorescent grains.

b. Microscopic:

Portion of the sample was washed and de-slimed. The washed sample was found to be very slightly radioactive.

The treated sample was examined in UV light; it contains small particles which fluoresce yellow-green under both short- and long-wave UV sources, more strongly in long-wave UV.

A few fluorescent grains were picked out and examined more closely; they are quartz grains coated with very thin films of a secondary uranium mineral. Insufficient was present for an X-ray determination, but the optical properties of the mineral strongly indicate that it is autunite. (It is possible that the mineral is saḅugalite, an H-Al analogue of autunite, but autunite is more likely).

H. W. Fander, M.Sc.

Preview Press

Chan's

amdel
The Australian Mineral Development Laboratories
Flemington Street, Frewville, South Australia 5063
Phone 79 1662, telex AA82520

Please address all correspondence to the Director
In reply quote: MP 3/0/0

13 August 1973

The Manager,
Canadian Superior Mining (Aust) Pty Ltd,
2910 Australia Square Tower
SYDNEY NSW 2000

REPORT MP 427/74

YOUR REFERENCE:	Supply docket 0258 dated 24 July 1973.
MATERIAL:	Three hand specimens.
LOCALITY:	Not specified.
IDENTIFICATION:	CH001 to CH003 inclusive.
DATE RECEIVED:	26 July 1973.
WORK REQUIRED:	Analysis for uranium, petrographic description and identification of uranium minerals if present.

Investigation and Report by: R.S. Cooper.

Officer in Charge, Mineralogy-Petrology Section: Dr K.J. Henley.

for F. K. Hartley
Director

Copy to: Mr K.M. Chan,
C/- N.T. Petroleum Pty Ltd,
Dinah Beach Road,
DARWIN NT 5790

EXAMINATION OF THREE SCHISTS FOR POSSIBLE URANIUM MINERALIZATION

Samples CH001 and CH002, TS 30795 and 30796 respectively

Location:
Not given.

Rock Name:
Weathered quartz-mica schist.

Hand Specimen:
The two hand specimens are similar. They are both a weathered red-brown colour, fine-grained and schistose.

Uranium Analyses:

CH001	50 ppm	U
CH002	45 ppm	U

The uranium values were determined by an X-ray fluorescence technique. In our experience there is little possibility of identifying distinct uranium bearing mineral phases in a weathered rock unless the uranium content is at least 200 ppm.

Autoradiographs:
Autoradiographs were prepared by slabbing the two samples and placing smooth surfaces of the rocks against unexposed film for three days.

The autoradiograph of CH001 showed one area several centimetres long of very dispersed radioactivity and two small 'spots' presumably caused by small grains of a radioactive mineral. Neither occurrence of radioactivity was suitable for mineral identification to be undertaken. In the area of dispersed radioactivity the uranium was in insuffi ient quantities to be detected with the electron probe microanalyser. The 'spots' were too small for mineral identification to be attempted.

No radioactivity was detected in the autoradiograph of CH002.

Thin Section:

The two samples CH001 and CH002 consist essentially of quartz, phyllosilicates and iron oxide/hydroxides. The texture is irregular and appears to have been schistose but there has been some movement or flowage of the minerals during weathering.

The quartz occurs in single grains or aggregates of grains. The grains extinguish evenly and are polygonal to irregular in outline. The phyllosilicates which occur as small flakes form a matrix to the quartz grains.

There is more than one phyllosilicate present; some is definitely muscovite and some probably a clay mineral.

Iron oxide/hydroxide (principally goethite) occurs as a coating along fractures and cleavage planes in the rock, and also in the matrix where it appears to have partially replaced the phyllosilicates in places.

A few zircons are present and these may be responsible for the two 'spots' of radioactivity on the autoradiograph of CH001. Zircon (Hurlbut 1958) can contain up to 3% U and 13%Th although uranium and thorium contents are usually low.

These rocks are weathered metasediments which contain no detectable uranium mineralization.

Specimen CH003, TS 30797:

Location:

Not given.

Rock Name:

Quartz-sericite schist.

Hand Specimen Description:

This rock is grey-coloured, fine grained and strongly foliated.

Thin Section Description:

This is a metasedimentary rock with a foliated texture and it is composed mainly of quartz and sericite. The quartz has polygonal to irregular outlines and occurs in patches and as dispersed grains. The sericite occurs as fine flakes and is both intermingled with the quartz and concentrated along schistosity planes. Minor constituents of this rock include chlorite, iron oxides/hydroxides, a few zircons and traces of sphene (probably recrystallized

leucoxene). The presence of fine streaks of titanium oxide in the chlorite suggests that it replaced biotite which is an indication of retrogressive metamorphism.

This rock is a less weathered equivalent of specimens CH001 and CH002.

REFERENCES

HEINRICH, E.Wm. 1958 Mineralogy and Geology of Radioactive Raw Materials. McGraw-Hill, New York, 654 pages.

dk:3.

C53.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~14th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
C53 W 2009
160N 010E
Hematite—Muscovite—Quartz Schist

Job No. ~~CMS 73/9/c~~ Date Received: ~~4/9/73~~

Reference ~~O.N. 0489~~

Sample No. ~~W 2009 Lee Co 3~~

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12417

a. Hand Specimen:

Fine grained micaceous, quartzose schist. K stain reaction negative.

b. Microscopic:

This is a hematite-muscovite-quartz schist, and is distinct from the hematite metaquartzites described. It is a metasediment produced by regional metamorphism (greenschist facies).

The major constituents are quartz (60%), muscovite (30%) and hematite (10%). The quartz is quite fine, as polygonal grains averaging 0.1mm in size: although their shapes have been modified by metamorphism, they were originally subrounded. The muscovite occurs as small, well foliated and interleaved flakes, mainly responsible for the schistosity; some intergranular fine sericite is also present and no doubt represents recrystallized clay. Individual hematite crystals are exceedingly fine (<9μ), but they form short streaks and lenses.

Detrital grains of zircon are conspicuous, mainly because they are larger than the average grainsize of the rock, and green tourmaline also occurs.

The fabric is typical of regional metamorphic rocks, with some segregation of minerals, and lenses of quartz. There is no evidence of metasomatism.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th September 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2010
100N 020W
Hematite-Muscovite-Quartz Schist.

Job No. CMS 73/9/4 Date Received: 4/9/73

Reference O.N. 0489

Sample No. W 2010 Loc Co 3

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12418

a. Hand Specimen:

Brown fine grained quartz-mica schist. K stain reaction negative.

b. Microscopic:

Very similar to W 2009, though with more pronounced schistosity and well defined regional metamorphic fabric, this hematite-muscovite-quartz schist is probably a metasiltstone, assigned to the greenschist facies.

The quartz and muscovite have tended to segregate into more or less monomineralic layers, and the quartz forms small, thin but distinct lenses; quartz comprises about 55% and muscovite about 40% of the rock, hematite only 5%. The hematite is finely disseminated throughout, seldom forming insubstantial streaks. However, thin intergranular films of goethite are present and are mainly responsible for the overall colour of the rock.

Detrital heavy mineral grains are few and far between, comprising well rounded fine zircon, green tourmaline., leucoxene, opaques and secondary anatase; this is a slight distinction, probably not significant, from W 2009.

The rock is quite featureless. It has the typical appearance of a Proterozoic metasediment.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th September 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2011
150N 030W
Altered Quartz-Mica Schist

Job No. CMS 73/9/4 Date Received: 4/9/73

Reference O.B. 0489

Sample No. W 2011 Loc Co 3

Nature of Sample: Hand specimens

DESCRIPTION **SECTION No.** 12419

a. Hand Specimen:

Fine grained finely layered pale greenish micaceous schist. K stain reaction negative.

b. Microscopic:

This altered quartz-mica schist shows a number of features in common with some of the uraniferous rocks of parts of the Northern Territory. It may be slightly radioactive, but only a Geiger counter was available for checking, and gave a very low reading.

The rock consists in its present altered form, of lenses, layers and streaks of fairly fine mosaic quartz, alternating with layers of altered micaceous and possibly feldspathic material. These layers are composed of pale magnesian chlorite with embedded minute anatase crystals (these are formed from breakdown of biotite, and the chlorite represents altered biotite) and of very fine sericite aggregates. The sericite flakes have random orientation and thus the aggregates are post metamorphic. The alteration has been thorough and pervasive.

Detrital heavy minerals are fairly conspicuous and include relatively coarse zircon and green tourmaline and leucoxenic brown opaques (altered Fe-Ti mineral).

The unaltered metasediment was probably a quartz-biotite-muscovite schist, possibly with feldspar, and was a greenschist facies regional metasediment.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th September 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2012
080N 015E Sericitised Quartz—Mica Schist.

Job No. CMS 73/9/4 Date Received: 4/9/73

Reference G.N. 0489

Sample No. W 2012 Lee Co 3

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12420

a. Hand Specimen:

Pale quartz-mica schist. K stain reaction negative.

b. Microscopic:

This may be termed a sericitised quartz-mica schist, with some iron staining. It probably belongs to the same lithologic sequence as W2011 and has been affected by pervasive alteration, though differing in composition before (and therefore after) alteration.

The rock is composed of layers and thin lenses and semi continuous streaks of fairly fine mosaic quartz, and partings of sericitised mica (? muscovite); sericite also occurs as intergranular patches and films in the quartzose layers. The absence of chlorite (with leucoxene/anatase inclusions) implies that no biotite was present.

Very occasional small detrital zircon grains occur, but no tourmaline was detected. Minute rutile crystals have formed, and are thought to be genetically related to the introduction of metasomatic sericite. Ultrafine hematite is present and appears to be pre-metamorphic: the goethite iron staining is younger.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2015 P1 10-13
Quartz-Mica schist.

Job No. CMS 23/10/13 Date Received: 10/10/73

Reference O.N. 0680

Sample No. W 2015

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12642

a. Hand Specimen:

Fine grained micaceous schist.

b. Microscopic:

This is a fine grained quartz-mica schist. There is evidence of a post-metamorphic alteration/replacement phase of some of the mica, which is in the nature of a low-temperature hydrothermal phase.

The rock consists of alternating fine streaks of quartzose and micaceous material; these are of the order of 0.3mm thick and thus the rock is finely laminated.

The quartzose layers are made up principally of fine mosaic quartz with interstitial "sericite" (illite-hydromuscovite) flakes often with randomorientation.

The micaceous layers consist of finely flaky, interleaved hydromuscovite and pale, magnesian chlorite, often containing fine rutile needles. This chlorite may represent altered biotite. There are numerous small patches, lenses and irregular areas of fine, randomly orientated "sericite" replacing the micas; their textures imply post-metamorphic formation.

Occasional small (? authigenic) tourmaline grains and detrital heavy minerals (eg. zircon) occur. The rock belongs to the greenschist facies of regional metamorphism.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2016 P1 259
Altered Quartz-Sericite-Kaolinite Schists.

Job No. CM. 23/10/13 Date Received: 10/10/73

Reference O.N. 0690

Sample No. W 2016

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12643

a. Hand Specimen:

Pale, fine grained schists.

b. Microscopic:

Two of the three fragments mounted are very similar, and the third is different though probably of the same origin.

Two chips are quartz-sericite-? kaolinite schists, finely laminated. They consist of alternating fine streaks of mosaic quartz and foliated sericite and kaolinite. The kaolinite contains numerous inclusions of minute, well formed rutile crystals, probably indicating alteration of a phlogopitic mica (biotite would have produced chlorite). Some sericite is foliated, some shows random textures. In this respect, the rock is quite similar to W 2015: it has most probably undergone the same history, but was of slightly different composition.

The third chip is a metaquartzite breccia with relatively large patches of ultrafine kaolinite ( ) and small tufts of radiating talc flakes: fine rutile crystals are associated.

The kaolinite was identified on a tentative basis, by optical properties alone and not XRD at this stage. The occurrence of secondary sericite, rutile, kaolinite and talc strongly suggests a post metamorphic low temperature hydrothermal phase.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2017 Pi 46-7
Altered Oligoclase—MicroGabbro (Diabase)

Job No. ~~CMS 23/10/13~~ Date Received: ~~10/10/73~~

Reference ~~O.N. 0680~~

Sample No. ~~W 2017~~

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12644

a. Hand Specimen:

Fine grained, altered, ? basic igneous rock with occasional phenocrysts.

b. Microscopic:

There are minor variations in the textures and other features of the three chips sectioned, but these are overshadowed by the extensive alteration prevailing throughout.

The rocks were probably slightly porphyritic basalts grading into microgabbros ("diabase"), mainly the latter, judging largely from relict textures; thus the original rock was a minor intrusive (sill, dyke etc). The only surviving primary minerals are plagioclase (oligoclase), oxide opaques and accessory quartz. There is evidence of the former presence of pyroxene and minor olivine, represented by aggregates of chlorite-talc-serpentine aggregates, and fibrous pale actinolite.

Occasional phenocrysts are completely sericitised, but were probably plagioclase (judging from morphology).

The fabric is random, and is typical of medium grained basic igneous rocks. Small chrysotile veins cut the rock.

The original rock type was presumably a slightly oversaturated (quartzose) oligoclase-microgabbro (also known as hawaiite) and has a distinct resemblance to other basic intrusive in the N.T. uranium province.

H. W. Sander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2018 Pl 46-7
1. Altered Microgabbro
2. ? Greisenised GRanite
3. ? Altered Hornfels

Job No. CMS 23/10/13 Date Received: 10/10/73

Reference O.N. 0680

Sample No. W 2018

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12645

a. Hand Specimen:

Fine grained chloritic rocks one contains chalcopyrite patches.

b. Microscopic:

The three chips mounted are quite different and distinct.

One chip is a severely altered microgabbro, closely similar to W 2017 though even more strongly altered: much of the plagioclase has been argillised, but that which has survived is andesine or even labradorite. There is no sign of primary quartz, and thus this rock was presumably of normal gabbroic composition. It is cut by rather vague zones or veins of quartz-chlorite-sericite carrying patches of chalcopyrite.

Another chip has the overall characteristics of a greisenised grenite, or similar felsic igneous rock in which the feldspar was replaced by hydromuscovite, the quartz remaining intact. The chip is too small for more than a rather vague interpretation of this kind. Parts of the rock are schistose and almost entirely micaceous.

The third chip is a type of metaquartzite, evidently metasomatised: it may have been a quartz-biotite hornfels originally. The biotite is represented by small, randomly orientated chlorite flakes with leucoxene-rutile inclusions. Abundant finely aggregated sericite has formed throughout.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2022 P/4850
Altered Porphyritic Andesine-Microgabbro

Job No. CM. 73/10/13 Date Received 10/10/73

Reference O.n. 0660

Sample No. W 2022

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12649

a. Hand Specimen:

Altered medium grained igneous rock with occasional phenocrysts.

b. Microscopic:

The rock chips represent altered porphyritic microgabbros, petrogenetically very similar to W 2017 and W 2020. Undoubtedly they are from the same or related intrusive body, and hardly warrant a separate description.

Their textural and compositional features, and alteration characteristics, are broadly the same as those of the other rocks, with insignificant detailed differences.

(NB) Short descriptions such as this incur a reduced charge because of the shorter time involved.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2023 P12 45
Sericite-Metaquartzite

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference O.N. 0680

Sample No. W 2023

Nature of Sample: ~~Drill chips~~

DESCRIPTION **SECTION No.** 12650

a. Hand Specimen:

Finely granular quartzitic rock.

b. Microscopic:

The two chips mounted are best termed sericite-metaquartzites; their metamorphic grade is very low, barely beyond the "load metamorphism" stage.

The rocks show vague relict bedding and clastic textures of quartz grains. The original rock was an argillaceous, fine grained sandstone with coarser quartz grains. The clay has been recrystallized to fine sericite, which occurs as parallel streaks and lenses, as well as interstitial films. The "sericite" is probably illite. Fine hematite is fairly common throughout and may represent recrystallized primary ferruginous material.

Tourmaline crystals are present and show typical authigenic habit. Detrital heavy mineral grains (mainly zircon) are seen.

The rocks are fairly featureless in composition and fabric.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2024 P12 * 32-3
Serpentine-Chlorite Rock

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference O.N. 0600

Sample No. W 2024

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12651

a. Hand Specimen:

Yellow chloritic or serpentinuous rock with fine ? chrysotile veins.

b. Microscopic:

The rock consists almost entirely of a variety of chlorite, with occasional chrysotile veinlets and fine quartz. Unfortunetely there are no diagnostic textures or other features which would assist in interpretation.

The dominant mineral is a serpentinuous chlorite (XRD shows it to be an intermediate between serpentine and Mg-chlorite) which occurs as dense, matted flakes with random orientation (locally subparallel). Fine iron staining is present throughout causing the yellow colour in hand specimen. Irregular aggregates of fine leucoxene are present sporadically. Clastic features are entirely absent.

Although broadly this rock could be termed a "chlorite-schist", the term would be misleading in a sense. It is not a chlorite schist in the conventional sense, but rather is regarded as a chemically formed sediment (hydrated Mg-Al silicate), diagenetically recrystallized and perhaps incipiently metamorphosed: because of its incompetence it would yield very easily to slight movement.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 3rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2025 P12 347
Basalt-Diabase and Altered Schist.

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference O.N. 0686

Sample No. W 2025

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12652

a. Hand Specimen:

Fine grained altered igneous rocks, and one schist fragment.

b. Microscopic:

Four chips were sectioned and examined. Three of them are fine- to medium-grained, more or less altered, porphyritic basic igneous rocks very similar to those in this series already described.

They are all porphyritic, with sericitised feldspar phenocrysts set in a typical basaltic-doleritic (diabasic) groundmass varying from quite fresh to completely altered. The finer, basaltic textures probably indicate proximity to contacts.

The fourth fragment is an altered schist or hornfels: it may have been in the nature of a cordierite (or andalusite) schist or banded hornfels. It consists of fine quartz, foliated biotite-vermiculite, and numerous ovoid, poikiloblastic patches of sericite typical of altered cordierite or andalusite "knots", generally with a surrounding zone of magnesian chlorite. Fine leucoxene occurs as stringers of small aggregates. It is probably a greenschist facies regional metasediment.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2026 P 13 24-5
Quartz-sericite schist.

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference D.N. 0650

Sample No. W 2026

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12653

a. Hand Specimen:

Pale, fine grained schist.

b. Microscopic:

These are fine grained quartz-sericite schists; they are markedly laminated in part. They are similar to W 2015. The three chips mounted show some variations but have similar composition, origin and alteration.

They all consist of fine mosaic quartz and fine sericite, and pale chlorite. There is, as in W 2015, evidence of replacment of the micas by kaolinite-illite aggregates on a fine scale. It is quite possible that the chlorite is altered biotite. In one of the fragments, the micaceous laminations contain sericite pseudomorphs after a mineral such as cordierite-andalusite. Thus there may be a link with one of the fragments in W 2025.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2027 P1643-5
Quartz—Mica schists and Quartz Vein.

Job No. ~~CMS 73/10/13~~ Date Received: ~~10/10/73~~

Reference ~~O.N. 0680~~

Sample No. ~~W 2027~~

Nature of Sample: ~~Drill chips~~

DESCRIPTION **SECTION No.** 12654

a. Hand Specimen:

Schist and quartz fragments.

b. Microscopic:

Three of the four fragments examined are schists: they are most probably related to each other and to W 2015 and W 2026.

They consist of laminated quartz-mica schists, composed of fine quartz and interleaved fine sericite, chlorite and minor biotite. Two of the fragments contain patches or aggregates of biotite and/or "knots" of sericite (after ? cordierite-andalusite). The third is composed dominantly of hydromuscovite and biotite with very little quartz.

The fourth fragment is more massive vein quartz with patches of sericite and talc, chlorite and fine leucoxene. It may represent a vein cutting the schists, or some lens or segregation.

H. S. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2043
098N 340E
Hematitic Muscovite-Quartz Schist.

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference O.N. 0698

Sample No. W 204

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12882

a. Hand Specimen:

Silvery grey, fine grained micaceous schist.

b. Microscopic:

This rock very closely resembles W 2042 and hardly warrants a detailed description. It is a fresh, hematitic muscovite-quartz schist.

The only difference between this rock and W 2042 is in the mineral properties. This rock contains about 50% muscovite, 40% quartz and 10% hematite. Because of the greater percentage of muscovite, the fabric is more schistose, the mica forming fairly substantial continuous layers rather than the wispy lamellae in W 2042.

ASSAY: C 0.06%

H. W. Fander, M.Sc.

CS3.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. ~~CMS 73/11/2~~ Date Received: ~~2/11/73~~

Reference ~~J.N. 0698~~

Sample No. ~~W 2044~~

Nature of Sample: ~~Hand specimen~~

IDENTIFICATION
CS3 W 2044 068N 340E
~~2700N~~. ~~21800~~ ~~280W~~
Phosphatised Argillised Graphitic Quartz Schist.

DESCRIPTION **SECTION No.** 12883

a. Hand Specimen:

Dark, grey, finely banded schist.

b. Microscopic:

A heavily phosphatised argillised schist. The original rock was strongly micaceous but otherwise quite similar to the other schists. Its dark colour is due to the abundance of graphitic flakes.

Quartz grains and graphite flakes with schistose fabric, constitute the remaining metamorphic minerals. All micaceous material has been replaced by dense, cryptocrystalline to semi-amorphous intergrowths of a clay mineral and a phosphate. The general foliated nature of the rock and the micaceous textures have been preserved.

XRD investigation of this sample was hampered by the nearly amorphous character of the phosphate. However, the indications are that it may be an aluminophosphate (eg. crandallite, Ca-aluminophosphate). The results would require confirmation by P_2O_5 analysis.

Evidently the argillic-phosphatic phase is a metasomatic stage of post-metamorphic age.

ASSAY: C 0.08%

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th November 1972

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS3 W 2049
098N 340E
Graphitic Muscovite Quartz Schist.

Job No. CMS 72/11/2 Date Received: 2/11/72

Reference G.H. 0606

Sample No. W 2049

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 1288

a. Hand Specimen:

Dark grey strongly micaceous schist.

b. Microscopic:

This muscovite-quartz schist is virtually identical with W 2043, and a separate detailed description is not warranted.

The rock consists mainly of relatively coarse, foliated muscovite flakes, subordinate microgranular quartz, with flaky graphite and hematite. Small tourmaline crystals occur throughout, but are authigenic in origin, rather than post-metamorphic as in some schists.

ASSAY C 0.05%.

H. V. Funder, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 19th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
C83 W 2050
090N 345E
Metaquartzite with Schist Streaks

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference U.N. 0658

Sample No. W 2050

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12889

a. Hand Specimen:

Massive granular quartz with streaks of dark schist.

b. Microscopic:

This rock is a metaquartzite with thin inclusions of schist.

The bulk of the rock consists of coarse granular mosaic quartz with strain extinction. Relict sedimentary features, such as detrital grain outlines, are absent, and the quartz is evidently thoroughly recrystallized. Alternatively it may originally have been vein material or a product of metamorphic segregation.

The inclusions of schist are contorted streaks of foliated micas, some with graphite (hence their dark colour). They have subparallel orientation. However, there are also crosscutting veins and patches of fine sericite aggregates, evidently postmetamorphic in origin. This phase may be the same as the sericitisation stage in the fine schists.

H. V. Fender, M.Sc.

W2085
TS13112
P13.10-11

Fairly extensively sericitised fine grained quartz-mica schists, similar to W2084. The composition of the chips ranged from micaceous metaquartzites to quartz-muscovite-biotite schists. The micas are wholly replaced by aggregates of fine sericite (? illite). There are also argillic patches regarded as altered feldspar poikiloblasts. Thus the composition of the original rock was that of a quartz-feldspar-muscovite-biotite schist. Detrital heavy minerals include rutile, zircon and tourmaline, and fine secondary rutile has also formed, presumably from biotite.

In one chip, sericite/chlorite aggregates have replaced entire patches of schist; thus the phase is a low temperature metasomatic alteration which could be responsible for uranium mineralisation. It is pervasive and apparently widespread.

W2081-
W2085

CS3

These are described separately, because of the variations in rock types shown by the chips; most of these are very small, which limits the interpretation of the petrography to some extent.

W2081
P3. 5-6

Three chips were mounted and sectioned. One consists of mosaic quartz, quite strongly stressed and with veins and patches of pale chlorite. It is quite coarse grained and may represent vein material associated with the schists.

The other two chips are quartz-chlorite-sericite schists, though schistosity is not very pronounced. They consist of fine granular quartz and interstitial, almost colourless chlorite. This appears to be replacive, and contains small euhedral crystals of tourmaline and rutile. The chlorite replaces an earlier, probably metamorphic mineral (? biotite). It is most likely that any uranium mineralisation present (but not detected) would be associated with this phase, perhaps as brannerite or a similar U-Ti compound.

One rock chip is more definitely schistose, and contained kaolinised ? feldspar poikiloblasts.

W2082
TS13109
P3. 6-7

One chip consists of coarse mosaic quartz with patches of chlorite aggregates.

Another is a quartz-chlorite-sericite schist, in which fine, pale chlorite replaces the foliated, schistose mica. There are kaolinite/illite patches, quite possibly representing feldspar poikiloblasts. Thus the unaltered rock was probably a fine grained quartz-mica-feldspar schist.

A further chip is an altered mica schist, composed of vermiculite aggregates and kaolinite/illite patches. The original rock may have been a biotite-feldspar schist. The rock is unusual in that there is little or no quartz.

The quartz-chlorite-sericite schist can be correlated with W2081.

W2083
TS13110
P3. 8-9

These chips are sericitised quartz-mica schists. They are composed of fine grained, granular quartz and interstitial small aggregates of sericite (probably illite). Detrital heavy mineral grains (rutile, tourmaline, zircon) are present, and secondary rutile occurs in small chlorite patches which probably represent altered biotite. This rock broadly correlated with W2081.

W2084
TS13111
P7. 8-9

These are sericitised quartz-mica schists. They are fine grained and originally contained foliated biotite and muscovite. The biotite has vermiculite to represent it and the muscovite has been partly replaced by fine sericite aggregates. Some chlorite is also present, though variable in amount and distribution; it also represents altered biotite. There is some indication of argillised feldspar. Dark tourmaline grains appear to be of modified detrital origin. Detrital rutile and zircon grains also occur as well as apatite. No uranium minerals were detected.

SECTION 5.05 PETROLOGIST REPORT

LOCALITY....CS2-3, 1400N AREA

CS2-3. 1400N

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~13th November 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2-3 W 2042
1400N . 1240N 238E
Hematitic Quartz-Muscovite Schist.

Job No. ~~CMS 73/11/2~~ Date Received: ~~2/11/73~~

Reference ~~O.N. 0698~~

Sample No. ~~W 2042~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12661

a. Hand Specimen:

Grey fine grained quartzose, micaceous schist.

b. Microscopic:

A fresh, fine grained hematitic, quartz-muscovite schist, fairly featureless and contrasing with other schists in the absence of alteretion effects.

Microgranular quartz mosaics occasionally form small lenses, but are generally dispersed fairly evenly with little tendency for layering or bending. The muscovite too, is finely flaky, occurring as thin interleaved, undulose streaks. The hematite is intergrown with the muscovite, as small dense flakes imparting a grey mather than a brown or red colour to the rock. Some graphite could be present, masked by the hematite. Mineral proportions are approximately 60% quartz, 30% muscovite, 10% hematite.

Occasional detrital grains of zircon and tourmaline are present.

The rock is a low grade, regionally metamorphosed, fine grained argillaceous and quartzose sediment.

ASSAY: C 0·07%

H. W. Fender, M.Sc.

SECTION 5.06 PETROLOGIST REPORT

LOCALITY....CS2-3, 2400N AREA

CS2-3. 2400N

CENTRAL MINERALOGICAL SERVICES PTY. LTD. Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2-3 W 2036
2400N 2510N 360W
Quartz-Muscovite Schist.

Job No. ~~CMS 73/11/2~~ Date Received: ~~2/11/73~~

Reference ~~U.N. 0696~~

Sample No. ~~W 2036~~

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12875

a. Hand Specimen:

Finely laminated schistose rock.

b. Microscopic:

A fine grained quartz-muscovite schist, quite possibly grephitic. The contained opaques are very fine and a positive identification is not possible.

The major constituents are granular quartz (75%) and fine, foliated flakes of muscovite-hydromuscovite. The quartz occcurs as thin layers or laminae of interlocking small grains thickening to small lenses which occasionally contain poikiloblasts of altered ? feldspar.

The micaceous streaks are thin, composed of interleaved muscovite/hydromuscovite with numerous fine inclusions of opaques (iron oxide, ? graphite); these layers are generally iron stained.

There are small, post metamorphic "sericite" (probably illite) patches, representing an argillic alteration phase, though minor compared with the typical "pervasive" chlorite and sericite alteration elsewhere in the U province.

The original sediment was an argillaceous siltstone/sandstone, subjected to low grade (greenschist facies) rrgional metamorphism.

ASSAY: C 0.07%.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS23 W 2037
240°N 25°W 360W
Sericitised Graphitic Quartz - Mica Schist.

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference O.N. 0698

Sample No. W 2037

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12876

a. Hand Specimen:

Fine grained streaky schist, with brown spots prone to weathering.

b. Microscopic:

This is a thoroughly sericitised quartz-mica schist, probably originally a quartz-muscovite schist similar to W 2036. The brown spots seen in hand specimen consist of weathered material, and may have been feldspar.

The main mineral is quartz, forming mosaics and granular layers and coarser lenses. There are separated by streaks of altered mica, with very abundant inclusions of opaques, most probably graphite. The brown spots are altered poikiloblasts now composed of iron stained clay, and may have been feldspar.

Extremely fine sericite is very abundant, occurring as interstitial films, small patches of aggregates, and small flakes with random orientation. The sericite (probably illite) is post metamorphic, pervasive and replacive. It can only be inferred that it represents an argillic alteration phase, low temperature hydrothermal in nature, it appears to be a common phenomenon in this genral area.

ASSAY: C 0·10%.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CSZ-3 W 2038
2450N 2560N 360W
Altered Sericitic Metaquartzite.

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference O.N. 0606

Sample No. W 2038

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12677

a. Hand Specimen:

Grey, laminated, fine grained schist/metaquartzite.

b. Microscopic:

A sericitic metaquartzite, showing a late stage or post metamorphic hydrothermal phase. Detrital heavy minerals are relatively abundant (zircon, apatite).

The rock consists dominantly of mosaic quartz, stressed and generally fine but with coarser lenses and single crystals (probably coarser detrital material). Dark, parallel thin streaks of semi-emorphous ? phasphatic material, containing manyminute inclusions of hematite and possible graphite, are interspersed; these streaks are generally less than 0.2mm thick. The ? phosphatic material is believed to be secondary as it also occurs as crosscutting veinlets. In places, small radiating tuffs of apatite needles (or a related species of phosphate) have formed.

Tourmaline is relatively common, as small, ragged poikiloblastic crystals. Both tourmaline and the phosphatic phase, are associated with fine, secondary (hydrothermal) sericite which is very common interstitially.

The occurrence of phosphate is interesting in view of its frequent association with uranium (together with various forms of TiO_2 and sometimes rare earths).

ASSAY: C 0.08%.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2-3 W 2039
2400N 2560N 360W
Sericitised Quartz-Muscovite Schist.

Job No. ~~CMS 73/11/2~~ Date Received: ~~2/11/73~~

Reference ~~O.N. 3608~~

Sample No. ~~W 2039~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12878

a. Hand Specimen:

Fine grained micaceous, quartzose schist.

b. Microscopic:

A very extensively sericitised quartz-muscovite schist with abundant hematite.

The original rock was quite evidently a fine grained quartz-muscovite schist with hematite and leucoxene (this occurs as small platy pseudomorphs perhaps after ilmenite). However, very little muscovite has survived the bulk of it has been pseudomorphed by fine "sericite" aggregates, in a very thorough and pervasive fashion. The hematite is believed to be a metamorphic (ie. pemetamorphic constituent) although fine flakes also occur with sericite. It is possible that some graphite occurs but is masked by the hematite.

The occurrance of small tufts of subradiating needles of green tourmaline is of interest the tourmaline is post-metamorphic. Elsewhere, such tourmaline occurs in U mineralised rocks, with similar characteristics.

The presence of leucoxene could also be of significance in this connection.

Assay: C 0.08%

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
C523 W 2040
2400N. 2560N 360W
Sericitised Schist

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference G.N. 3600

Sample No. W 2040

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12879

a. Hand Specimen:

Pale, fine grained schistose rock.

b. Microscopic:

Similar in general terms to W 2039, this too is a sericitised schist. However, sericite predominates in some sections and hematite is not as abundant.

The original rock was dominantly argillaceous, and would have been metamorphosed to a phyllite or mica schist with subordinate quartz. The primary sediment was either grade or had thin intercalations of fine sandstone, preserved as metaquartzite bands. Apart from these, the bulk of the rock now consists of fine streaks and splinters of metamorphic quartz, embedded in random sericite (? illite) aggregates formed by low grade pervasive hydrothermal action. Fine earthy goethite occurs throughout and probably formed from hematite.

Almost undetectably small patches of fibrous radiating tourmaline occur interstitially to the coarser quartz grains. Their habit and mode of occurrence is the same as in W 2039 and the tourmaline is presumably contemporaneous with the pervasive sericitisation or argillic alteration.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS 2-3 W 2045
~~068N 3205~~ 2180W 2180W
Sericitised Graphitic Quartz-Muscovite Schist.

Job No. CMS 23/11/2 Date Received: 2/11/73

Reference O.N. 0698

Sample No. W 2045

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12884

a. Hand Specimen:

Fine grained pink and grey schist.

b. Microscopic:

This is a sericitised, graphitic quartz-muscovite schist, closely resembling W 2037 and W 2038, though phosphatic material is less common and tourmaline is apparently absent in comparison with W 2038.

However, basically the same processes have operated on the same rocks, ie. Low temperature hydrothermal alteration of a quartz-muscovite schist, with replacement of the muscovite by sericite and contemporaneous introduction of phosphatic matter.

The rock consists of fine streaks and slightly coarser lenses of microgranular quartz, with interstitial fine sericite replacing muscovite flakes. Streaks of fine graphite, and goethite (altered hematite) are common and were originally inclusions in muscovite (cp. W 2037).

Small poikiloblastic patches of altered material very probably represent feldspar patches, as has been proposed for W 2037. Thus the lithology of this rock is closely similar to W 2037; the mineralogy also resembles W 2038.

ASSAY: C 0.08%

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2-3 W 2046
2400N 2240N 310 W Phosphatised, Argillised Schist.

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference O.N. 0698

Sample No. W 2046

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12885

a. Hand Specimen:

Grey, graphitic, quartzose schist.

b. Microscopic:

A strongly phosphetised, argillised schist, with a variety of secondary minerals.

The unaltered rock was a graphitic quartz-muscovite schist but with some features of a microgneiss. Evidently some brecciation occurred during metamorphism, casting lenses of quartz fragments in a schistose host; this could be interpreted as two periods of metamorphism, but there is no evidence to this effect in other rocks.

The original micaceous material has been converted to fine aggregates of ? illite. Opaques occur throughout and include goethite, leucoxene and graphite: they are pre-metamorphic.

Apart from the argillic alteration, the rock has also been phosphatised. Numerous streeks and patches of semi-amorphous, cloudy phosphate occur, often brownish and with colloform textures. There are many fibrous radiating groups of fine apatite and irregular patches of a blue mineral tentatively identified as wauxite (a hydrated Fe-Al-phosphate). This phosphatic phase is clearly post-metamorphic and replacive.

ASSAY: C 0.08%.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 13th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS23 W 2047
2400N - 2100N 170 W
Sericitised, Graphitic Quartz-Mica Schist.

Job No. CMS 73/11/2 Date Received: 2/11/73

Reference S.N. 0698

Sample No. W 2047

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12886

a. Hand Specimen:

Pale, grey fine grained quartzose schist.

b. Microscopic:

This is a thoroughly sericitised, graphitic quartz-mica schist.

The rock very closely resembles W 2037 and W 2040, and does not require a separate, detailed description. The foliated fabric is preserved in the graphite and quartz, but all mica, representing 50-60% of the rock, has been replaced by sericite with random orientation. Occasional vague spots may represent altered, rudimentary feldspar.

ASSAY: C 0.07%.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 15th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2-3 W 2048
240N 256N 360W
Sericitised, Graphitic Quartz-Mica Schist.

Job No. CMS 73/11/2 Date Received: -/11/73

Reference J.N. Jobs

Sample No. W 2048

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12887

a. Hand Specimen:

Grey, fine grained, graphitic, quartzose schist.

b. Microscopic:

Closely similar to W 2036 and also W 2047, this is a graphitic sericitised quartz-mica schist.

It resembles those two rocks in all details, the fabric being more closely similar to W 2036, Minor muscovite has survived the pervasive sericitisation, and very occasional tourmaline crystals have formed across the foliations.

A more detailed description, since the details are given in the description of W 2036, W 2037 and W 2040 would be repetitive. This implies that the rocks are correlatable.

Assay: C 0.07%.

H. N. Fender, M.Sc.

SECTION 5.07 PETROLOGIST REPORT

LOCALITY....CS2 AREA

CSR

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~13th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
W 2001
CSR 330N 030E Porphyritic Andesine-Microgabbro.

Job No. ~~CMS 73/9/4~~ Date Received: ~~4/9/73~~

Reference ~~O.N. 0489~~

Sample No. ~~W 2001 LOC 052/052~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12409

a. Hand Specimen:

Dark grey porphyritic fine/medium grained igneous rock. K feldspar stain reaction positive in spots.

b. Microscopic:

This is a fairly fresh porphyritic, andesine - microgabbro (also termed dolerite or diabase, though "microgabbro" is preferable and less confusing).

The phenocrysts are partly sericitised calcic andesine, but the groundmass plagioclase (of later crystallization) is sodic andesine or even calcic oligoclase (and are fresh). A few fresh and serpentinised small crystals of olivine occur, but the bulk of the groundmass is composed of quite large ophitic plates of clinopyroxene (probably titanaugite - pigeonite) with embedded plagioclase laths. Thus plagioclase (45%) and pyroxene (45-50%) comprise the bulk of the rock.

Minor and accessory minerals include primary oxide opaques, small flakes of dark brown biotite, green chlorite, and interstitial patches of K feldspar and quartz: these represent crystallization of residual fluids according to Bowen's Reaction Series.

The presence of andesine (instead of the more "normal" labradorite) is not at all unusual; rocks of this composition are also known as hawaiites, especially when fine grained.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~13th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W2002
300N 015W
Folded Quartz-Muscovite Schist.

Job No. ~~CMS 73/9/4~~ Date Received: ~~4/9/73~~

Reference ~~O.N. 0489~~

Sample No. ~~W 2002~~

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12410

a. Hand Specimen:

Finely laminated, folded quartz-mica schist. K stain reaction negative.

b. Microscopic:

Essentially an iron stained quartz-muscovite schist, displaying major and minor folding (crenulation) ie. the folded layers are also crenulated.

The laminations consist of alternating quartz and foliated, interleaved muscovite: individual layers are from 0.2mm to 1.3mm thick, and are virtually monomineralic, ie. composed more or less entirely either of quartz or muscovite. The quartz occurs as mosaics of small equidiamensional crystals (average size = 0.1mm) and the muscovite is well foliated. Original detrital outlines of quartz grains are sometimes seen. Very occasional small detrital zircon grains are present and confirm the sedimentary origin of this rock.

The iron staining is practically confined to micaceous layers, because of their higher porosity/permeability. There are small goethite patches also, some of which occasionally show outlines suggestive of derivation from pyrite. Thus much of the iron staining may have been generated from within the rock itself. It is possible that other sulphides were present, but there is no mineralogical evidence of this.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~14th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2003
305W 015W
Laminated Micaceous Metaquartzite.

Job No. ~~CMS 73/9/4~~ Date Received: ~~4/9/73~~

Reference ~~D.N. 0489~~

Sample No. ~~W 2003 Loc CS 2~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12411

a. Hand Specimen:

Finely laminated quartz mica schist. K stain reaction negative.

b. Microscopic:

Although this rock gives the impression of being a schist, the style of metamorphism is much more thermal then regional ; the lamination is regarded as a primary feature. The original sediment was a finely laminated sandstone/argillite, or sandstone with argillaceous partings.

The detailed textures too, are more consistent with recrystallization under thermal conditions. The quartzose layers consist of quartz grains (with clastic textures) and interstitial, randomly orientated muscovite/hydromuscovite, and larger patches of quartz intergrown with mica in a fashion similar to graphic texture.

The micaceous layers consist of hydromuscovite flakes showing a variety of orientations, from subparallel to radiating. Some layers consist partly of fine kaolinite, probably representing altered feldspar but lacking relict features.

Fine detrital grains of zircon, rutile, leucoxene and opaques are scattered through the rock. In addition, some irregular rutile patches are most probably of metamorphic origin. Hematite flakes are also present, and the micaceous layers are iron stained.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th September 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CSL W 2004
150N 180E
Hydromuscovite Metequartzite.

Job No. CMS 73/9/4 Date Received: 4/9/73

Reference O.N. 0489

Sample No. W 2004 Loc Co 2

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12412

a. Hand Specimen:

Fine grained micaceous, quartzose rock. K stain reaction negative.

b. Microscopic:

This rock is quite similar to W 2003 except that laminations are quite inconspicuous in hand specimen, though clearly evident in thin section. Again, the style of the metamorphism is thermal rather than regional, more so in this rock than in W 2003.

The major components are quartz (70-75%) and pale greenish hydromuscovite (25-30%). Many of the quartz grains still have recognisable clastic shapes; others have been modified by quartz overgrowths.

The hydromuscovite occurs as interstitial randomly orientated flakes, and as occasional streaks or laminations representing thin argillaceous partings.

Very rare porphyroblasts of dark green tourmaline have developed; they are quite large but very open textured, ie. with numerous quartz inclusions.

Apart from detrital heavy mineral grains (zircon, opaques) typically hydrothermal rutile is conspicuous, no doubt belonging to the same phase as the tourmaline. Thus there is evidence of deuteric-hydrothermal activity as well as contact metamorphism. The rutile could occur as alluvial concentrates derived from this rock.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th September 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2005
155N 185E
Hematite-Metaquartzite ("Metajaspilite")

Job No. CMS 73/9/4 Date Received: 4/9/73

Reference O.N. 0489

Sample No. W 2005 Loc Cs 2

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12413

a. Hand Specimen:

Fine grained laminated quartzose, hematitic rock. K stain reaction negative.

b. Microscopic:

This is a hematite-metaquartzite or metajaspilite, quite possibly of chemical origin.

It is composed of alternating layers of hematite and quartz, sometimes with small illite-hydromuscovite flakes. Small groups of minute radiating needles of ? apatite (or an apatite group mineral) are common throughout; because of their extremely small individual size, they are difficult to identify with certainty. In fact all the components are fine grained; the hematite forms fine layers and streaks composed of aggregates of crystals only a few microns in size. The quartz too, is very fine, as microcrystalline mosaics, and may well be recrystallized chert; clastic textures are absent and some siliceous streaks are apparently isotropic.

Thus the original rock could well have been a finely layered ferruginous chert, with the cherty component dominating. This was subjected to mild (? contact) metamorphism and recrystallization with the formation of radiating and random ? apatite needles.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 14th September 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2006
030N 210E
Sericite Hematite-Metaquartzite.

Job No. CMS 73/9/4 Date Received: 4/9/73

Reference O.N. 0466

Sample No. W 2006 Loc Co 2

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12414

a. Hand Specimen:

Fine, streaky hematitic rock.

b. Microscopic:

This sericitic hematite-metaquartzite is similar to many respects to W 2005, though ? apatite is absent but metasomatic tourmeline occurs.

The rock is streaky on a fine scale; the streakiness is thought to be mainly an inherited primary feature, rather than true schistosity, although the presence of much more illite-hydromuscovite certainly contributes a schistose element to the fabric.

All the mineral components are fine grained; hematite individuals down to 5u form aggregates and stringers, and quartz is microcrystalline. The quartz tends to occur as small individual grains with interstitial illite-hydromuscovite flakes and patches of ultrafine kaolinite: this microfabric gives the quartz a much more clastic appearance, and perhaps this rock is in a sense transitional between W 2005 and W 2004.

The tourmaline occurs as small, poikiloblastic, irregular patches, metasomatic (ie. replacive) and post dating the recrystallization of the rock.

The rock may have been partly clastic partly chemical in origin; the evidence regarding the quartz is not clear.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~14th september 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2007
125N 2006
Sericitic Hematite-Metaquartzite.

Job No. ~~CM. 73/S/4~~ Date Received: ~~4/9/73~~

Reference ~~O.N. 0409~~

Sample No. ~~W 2007 Loc Co 2~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12415

a. Hand Specimen:

/Fine streaky hematitic rock.

b. Microscopic:

/ sericitic hematite-metaquartzite, similar to W 2006 though tourmaline is absent.

The fabric of the rock is more markedly metamorphic. For instance, the quartz, though fine, occurs as small tabular or slabby crystals, and was very probably of detrital, not chemical origin. The hematite, too, is coarser, ie. the aggregates and streaks are more substantial though individual flakes are minute. The sericite (illite-hydromuscovite) is randomly orientated as small interstitial flakes throughout, and occasional larger poikiloblastic patches: it gives the impression of being at least partly post metamorphic, especially the poikiloblasts, since they cut across the general fabric.

Perhaps in this series of rocks there is a gradual transition from a contact metamorphic to a regional metamorphic situation, with weak post metamorphic introduction of tourmaline, apatite and hydromica. In any case the metamorphic grades were quite low. Certainly the quartz (silica) and iron oxide components were primary (ie. pre-metamorphic).

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~14th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2008
255N 210E
Metasomatic Rock

Job No. ~~CMS 73/9/4~~ Date Received: ~~4/9/73~~

Reference ~~O.N. 0489~~

Sample No. ~~W 2908 Loc Co 2~~

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12416

a. Hand Specimen:

Fine grained micaceous crystalline rock. K stain reaction negative.

b. Microscopic:

This rock is very extensively metasomatised, and many original features have been obliterated. It is not known for certain, from the thin section examination, whether the rock was a sediment or a fine grained igneous rock (eg. aplite); the only probable primary mineral surviving is quartz, entirely lacking in diagnostic features.

The rock consists of small, clear quartz grains embedded in a mass of fine illite, kaolinite and hydromuscovite flakes (particularly the latter), with abundant small hematite flakes throughout. Sporadic patches of poikiloblastic green tourmaline occur, and fine "hydrothermal" rutile is relatively abundant throughout.

The rock is cut by small quartz—hematite veins.

Some of the hydromuscovite patches seem to be pseudomorphous after feldspar but this is conjectural. Obviously the field relationships will be decisive in the interpretation of this rock.

The style of the metasomatism is very similar to greisening.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2028 P18 47
P 18 4-7m
Chlorite-Sepiolite-Hematite Rock (sediment).

Job No. ~~CMS 23/10/13~~ Date Received: ~~10/10/73~~

Reference ~~O.N. 0669~~

Sample No. ~~W 2028~~

Nature of Sample: ~~Drill chips~~

DESCRIPTION **SECTION No.** 12655

a. Hand Specimen:

Soft argillaceous rock with iron oxide streaks.

b. Microscopic:

This is a rather strange rock, of unusual composition and uncertain origin. It is distinctly layered and is believed to be a chemically formed sediment, composed of sepiolite (hydrated Mg-aluminosilicate) or similar material, with thin streaks of iron oxide and lenses of leucoxene.

The sepiolite layers are intergrown with chlorite and illite, and have vague micro nodular textures suggestive of precipitation-coagulation. Some layers are virtually amorphous (some sepiolite is amorphous) others give well crystallized, with random or curved aggregates of flakes and radiating patches.

Clastic material is absent. The fine streaks of hematite with subparallel orientation are regarded as precipitated material, as are the thin small lenses of leucoxene.

The rock may ultimately have had a volcanic source, though there is no direct evidence of this: the inference is drawn mainly from its composition.

An XRD determination showed the presence of Mg-chlorite and illite the sepiolite is evidently amorphous.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2029
P 18 4-7m
Chlorite (magnesian)-Sepiolite-Hematite Rock

Job No. CMS 23/10/13 Date Received: 10/10/73

Reference O.N. 0680

Sample No. W 2029

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12656

a. Hand Specimen:

Soft, argillaceous, streaky rock with iron oxide.

b. Microscopic:

These chips closely resemble W 2028, in composition and fabric, W 2028 and are thus a chlorite-sepiolite hematite rock.

Extremely fine grained sepiolite (amorphous) and Mg-chlorite are intimately intergrown and form the bulk of the rock: any semblance of sedimentary features is absent, except possibly for the streaks of leucoxene and of hematite, which may reflect a depositional feature.

Equally igneous(in this sample) or metamorphic characteristics are entirely lacking and also in W 2028 the only logical explanation is one of chemical formation (deposition).

Mg-chlorites, sepiolites and montmorillonites are very closely related one interpretation of the source of this rock is a volcanic one, possibly basic-ultramafic.

The association of magnesian silicates and hematite is interesting: no iron occurs in the silicates despite intimate association with hematite. This reinforces the interpretation of the origin.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2030
P 18 No 13 Mg-chlorite-Sepiolite-(Talc)-Hematite Rocks.

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference C.N. 0680

Sample No. W 2030

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12057

a. Hand Specimen:

Green hematitic streaky rocks.

b. Microscopic:

One of the two fragments is practically identical with W 2029 and does not require a separate description.

The other is also very similar, with the addition of fine talc intergrown with the Mg-chlorite; this adds a further magnesian silicatephase to the assemblage. Thus three or four different magnesian silicates can apparently form and co-exist in the same rock. Certainly the circumstances of formation and composition of source material must have been similar in all these rocks.

Thus one rock is a Mg-chlorite-sepiolite-hematite rock, the other an Mg-chlorite-talc-sepiolite-hematite rock.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~23rd October 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2031
P20 32-36
Cherty, Chloritic Talcose Rocks (Chemical Sediment)

Job No. ~~CMS 5/-* 23/10/13~~ Date Received: ~~10/10/73~~

Reference ~~O.N. 0680~~

Sample No. ~~W 2031~~

Nature of Sample: ~~Drill chips~~

DESCRIPTION **SECTION No.** 12658

a. Hand Specimen:

Fine grained greenish micaceous rocks.

b. Microscopic:

These are interpreted as recrystallized impure cherts or cherty argillaceous rocks, and like W 2029 - W 2030, essentially of chemical formation.

The main difference between this rock and the previous ones is the occurrence of varying amounts of quartz, representing recrystallized chert. There are textural differences too, due to the more pronounced crystallization of the magnesian silicates. These are talc and magnesian/chlorite (with minor Fe). The talc occurs as small aggregates, the chlorite as well defined flakes with random or decussate fabric. Some parts of the rock contain small nodules of chlorite with talc borders, others are composed of talc (and/or fine hydromuscovite) flecks with interstitiel chlorite.

Small hematite crystals and minute anatase euhedra are scattered through the rock.

Thus the overall composition (with added silica) resembles that of the other rocks. Conditions of recrystallization were different, perhaps because of the presence of silica (-gel) in the system.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
C82 W 2032
P 21 203
Altered Porphyritic Microgabbros

Job No. ~~CMS 73/10/13~~ Date Received: ~~10/10/73~~

Reference ~~O.N. 0688~~

Sample No. ~~W 2032~~

Nature of Sample: ~~Drill chips~~

DESCRIPTION **SECTION No.** 12659

a. Hand Specimen:

Medium – coarse grained basic igneous rocks.

b. Microscopic:

On the whole, these are porphyritic microgabbros, though portions are sufficiently coarsely crystalline to be gabbros.

They are fairly extensively altered, originally consisting of ophitic clinopyroxene, andesine laths, oxide opaques, minor olivine and interstitial patches of micrographically intergrown quartz and K feldspar (residual felsic material).

The olivine is completely serpentinised and the pyroxene extensively uralitised. Plagioclase too, is partly saussuritised.

The rocks closely resemble the other gabbros/microgabbros (eg. W 2017 W 2021 etc) and are correlatable with those.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd October 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2033
P21 34-36
Oversaturated Hornblende-Diorite.

Job No. CMS 73/10/13 Date Received: 10/10/73

Reference O.N. 0680

Sample No. W 2033

Nature of Sample: Drill chips

DESCRIPTION **SECTION No.** 12660

a. Hand Specimen:

Coarsely crystalline ? basic igneous rocks, with minor K feldspar stain reaction.

b. Microscopic:

The two chips mounted are very similar. They are fairly severely altered, and appear to be oversaturated hornblende-diorites.

They consist of large laths or prismatic crystals of severely sericitised calcic oligoclase/sodic andesine, randomly orientated and intergrown with prismatic crystals of hornblende. The hornblende tends to be marginally poikilitic, and shows colour zoning reflecting variations in composition. Large, somewhat skeletal patches of oxide opaques are present, and scattered pyrite patches are seen.

There are numerous, quite substantial interstitial areas of micrographically intergrown quartz and microcline; many of these occur as overgrowths on plagioclase crystals. These patches represent residual felsic material which crystallized last. In this respect the rocks resemble the oversaturated gabbros described and the diorite is more probably genetically related to them, possibly as a more felsic differentiate.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~23rd October 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2034
P21 34-5.
Oversaturated Gabbro

Job No. ~~CMS 73/10/13~~ Date Received: ~~12/10/73~~

Reference ~~O.N. 0680~~

Sample No. ~~W 2034~~

Nature of Sample: ~~Drill chip~~

DESCRIPTION **SECTION No.** 12661

a. Hand Specimen:

Medium/coarse grained basic igneous rocks.

b. Microscopic:

These oversaturated gabbros closely resemble the gabbros and microgabbros described (eg. W 2017 W 2021) and a separate description is superfluous. They contain appreciable amounts of quartz/K feldspar intergrowths, and form a link between gabbros proper, and the diorite (W 2033). The plagioclase is andesine, as before, and provides a further genetic link.

Evidently these basic rocks are fairly extensive, both in distribution and in thickness. It is not at present known what significance they have or part they played (if any) in respect to the uranium mineralisation of the North Australian uranium province.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CS2 W 2035
C4. IRON 211E
Hematitic, silty Cordierite-MetaArgillite.

Job No. CMS 73.11.2 Date Received: 6.11.73

Reference O.N. 0670

Sample No. W 2035

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12874

a. Hand Specimen:

Banded ? metasiltstone, with small spots.

b. Microscopic:

A mildly metamorphosed silty argillite with hematite.

The metamorphism has been thermal rather than regional, causing recrystallization of clays and formation of small cordierite spots. Thus the metamorphic rock when fresh could be termed a cordierite-hornfels.

In its present state the rock consists of randomly orientated illite flakes (from clay), and small (silt sized) grains of quartz, with abundant fine hematite occurring as fine laminae. Small lenses of recrystallized quartz are also present along original bedding planes.

Small "spots" of cordierite (largely altered to quartz and mica), surrounded by zones of hydromuscovite, are randomly scattered through the rock, and are more abundant in quartzose layers. Very few, irregular patches of green tourmaline are also present.

The colour banding in hand specimen is due to alteration of hematite to goethite particularly along quartzose (cordieritic) layers.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 2nd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
CSR2 2052
300N 015E
Folded Quartz-Mica Schist.

Job No. CMS 73/11/26 Date Received: 15/11/73

Reference B.N. 973

Sample No. 2052

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12905

a. Hand Specimen:

Folded, pale brown grey quartzose schist.

b. Microscopic:

This is a folded, finely banded quartz-mica schist.

In contrast to the previous rock (2051) the micaceous layers appear to have been recrystallized rather than replaced by sericite.

The quartzose layers, comprising 65% of the sample, consist of granular to fine mosaic quartz, with intergranular films and areas containing hydromuscovite. They alternate with generally very thin (maximum 2mm, but generally 0.1-0.2mm) layers of hydromuscovite flakes, relatively coarse and with random orientation. Minor, comparatively coarse chlorite is also present. The micaceous layers are iron stained. They also contain rutile (authigenic) and detrital zircon, leucoxene and opaques. The chlorite may have originated from biotite.

It is thought that perhaps the micaceous layers may have recrystallized during or after folding. In any case, the grade of metamorphism is quite low, with minimal recrystallisation of primary clastic components.

H. W. Fander, M.Sc.

SECTION 5.08 PETROLOGIST REPORT

LOCALITY....CS4 AREA

All rocks were thin sectioned and examined. It was quickly established that the rocks within some groups showed great similarities. In order to avoid repetitive descriptions, and to save time, such rocks have been given group descriptions with appropriate detail for individual rocks where necessary.

W2067 - W2080 (TS13094 - 13107) CS4

This is a series of quite uniform quartz-sericite schists, generally ferruginised to some degree.

The rocks are fine grained, with moderately developed schistosity ranging into a microgneissic fabric. There is evidence that a post metamorphic phase of sericitisation operated. This infers that the rocks were originally schists of different composition, most probably quartz-muscovite schists with sporadic feldspar development.

The sericitisation phase was pervasive and could be regarded as a low temperature metasomatic event. It may be analogous to a chloritisation phase occurring in U mineralised rocks in Arnhem Land.

The original rocks were probably argillaceous siltstones, with sandsized quartz grains. Accessory (detrital) minerals are generally scarce, and comprise dark tourmaline (schorl) and metamict zircon.

Regardless of the obliterating effect of the sericitisation phase, the metamorphic grade of these rocks must have been low, certainly not beyond the greenschist facies.

Brief individual descriptions follow; it will be seen from these that differences between the rocks are very minor. Apart differences in hand specimens are due almost entirely to variations in ferruginisation.

H. W. Fander, M.Sc.

BRIEF PETROGRAPHY OF W2067 - W2080

CS4

W2067 042S 282W — Ferruginous quartz-sericite schist, fine grained. Granular quartz, fine interstitial sericite, fine earthy hematite-goethite (secondary). Very low grade metamorphism.

W2068 042N 332W — Iron stained, quartz-sericite schist; quartz occurs as small lenses, representing coarser clastic grains, with interstitial fine sericite. Light "limonite" staining throughout.

W2069 080S 322W — Fine grained quartz-sericite schist. Minor fine banding due to separate quartz and sericite (hydromuscovite) layers - sericite layers preferentially iron stained. Detrital green tourmaline occurs (also in W2067).

W2070 042S 200W — Quartz-sericite schist, with very fine sericite, abundant in parts. Light "limonite" staining throughout.

W2071 076S 382W — Ferruginous quartz-sericite schist, with small quartz lenses due to coarser clastic grains; closely similar to W2068 in particular. Fine earthy hematite throughout.

W2072 038S 283W — Sericite-quartz schist, with dominant fine sericite, subordinate micro-granular quartz, patchy and streaky limonite staining. "Sericite" is hydromuscovite.

W2073 040S 160W — Ferruginous quartz-sericite schist, with small quartz pods. Limonite staining throughout. Traces of detrital tourmaline.

W2074 080N 480W — Ferruginous quartz-sericite schist. Suggestion of possible feldspar poikiloblasts, now completely sericitised. Detrital metamict zircon relatively conspicuous. Lightly limonitised.

W2075 040S 353W — Ferruginous quartz-sericite schist; quite heavily limonitised. Some evidence of post metamorphic sericitisation. Very low grade metamorphism.

CS4 - Cont.

W2076 O8ON 47OW — Ferruginous quartz-sericite schist, with sericite pseudomorphs after ? feldspar poikiloblasts. Fabric irregular, more microgneissic than schistose.

W2077 O75S 38OW — Heavily ferruginised quartz-sericite schist, fine grained but with small quartz lenses. Abundant secondary fine earthy hematite.

W2078 O4OS 358W — Ferruginous quartz-sericite schist, irregular fabric. Fine goethite/hematite occurs throughout.

W2079 O35S 326W — Ferruginous quartz-sericite schist. Heavy goethite-hematite impregnation along some layers.

W2080 O4OS 325W — Lightly ferruginised quartz-sericite schist, with irregular fabric and suggestion of post metamorphic sericitisation. Occasional coarser quartz pods in fine grained host.

SECTION 5.09 PETROLOGIST REPORT

LOCALITY....CS6 AREA

W2097
22ON 18OW
W2098
245N 2OOW
W2099
O1OS OOOW
W2100
O1OS O1OW

The rocks in this group are all very similar, and also closely resemble the W2067 - 2080 CS4 suite. Differences in appearance in hand specimen are due to varying degrees of iron staining.

All are fine grained quartz-mica schists; the mica is muscovite or hydromuscovite. It generally forms thin, parallel streaks in micro-granular quartz and constitutes 20-40% of the rocks; the streaks are commonly less than 0.1mm thick and thus the rocks are very finely laminated. Where iron staining occurs (as in W2097, W2098), it has developed as intergranular films especially in the micaceous laminae.

W2099 and W2100 are not iron stained, but small hematite flakes have developed in W2100, as a metamorphic product. Small tourmaline crystals occur sporadically and are modified detrital grains. Leucoxene is widespread but fine, and some rutile has developed in places. Detrital zircon is also seen.

There is evidence in these rocks as in the earlier group (W2067 - 2080) of a sericitisation stage, replacing possible feldspar poikiloblasts and some mica. The evidence however, is not strong.

H. W. Fander, M.Sc.

SECTION 5.10 PETROLOGIST REPORT

LOCALITY CS7 AREA

W2089 - W2094 CS7

W2089 This group of rocks shows great similarities, with the exception of
037N 136E W2093. All are strongly kaolinised schists with graphite and hematite.
W2090
008N 188E The rocks are characterised by fine quartz, kaolinite, graphite and hematite. They have a schistose fabric, quite fine grained, and two
W2092 (W2091, W2092) contain "knots" or poikiloblasts of kaolinised ?
030S 190E cordierite.

The quartz is generally microgranular, and is embedded in fine aggregates of kaolinite (tending towards illite in places). These aggregates are believed to be replacive, representing metamorphic mica and ? feldspar.

The graphite is generally unevenly distributed, with alternating layers of more or less graphitic material; there is also some variation in
W2094 total graphite, W2094 containing the least . W2093 differs in this
Near respect in that graphite is absent, probably due to its destruction
W2090 during post metamprphic metasomatism.

The presence of hematite is apparently anomalous, but may well represent a post metamorphic phase. There are subparallel to cross cutting hematite veins in most of the rocks. It is believed that the hematite was introduced with kaolinite, as a low temperature metasomatic phase.

W2093 W2093 is a fine grained kaolinite rock with earthy goethite and small
004S 175E radiating needles of pale green tourmaline occurring throughout. Lenses of fine quartz are also common. The rock is evidently severely altered and was originally perhaps a mica schist.

W2091 W2091 is cut by a quartz vein containing radiating needles of blue
041S 128E green tourmaline and patches of kaolinite aggregates (altered feldspar). It is inferred that the vein was emplaced prior to the general kaolinisation.

CS2
The tourmalinisation phase is an interesting similarity with W2005 - W2007 (and W2038, 2039, 2040). The presence of ? cordierite and graphite (and hematite) also suggests some lithological similarities with that series (W2035 - W2050).
2400N; 2560N; 360W
CS2, CS3 - CS2-3 1400, 2400N

The occurrence of this particular form of tourmaline is of interest in that it is also seen in certain U mineralised rocks in the N.T. U province.

SECTION 5.11 PETROLOGIST REPORT

LOCALITY ANOMALY 24 AREA

Finniss 24

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~14th September 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
P24 W 2014
170N 045W
Brecciated Muscovite-Metaquartzite.

Job No. ~~CMS 73/9/4~~ Date Received: ~~4/9/73~~

Reference O.N. 0489

Sample No. W 2014 Loc 24

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12422

a. Hand Specimen:

Brecciated quartz with mica flakes. K stain reaction negative.

b. Microscopic:

This is actually a brecciated muscovite-metaquartzite, recemented with quartz.

The muscovite-metaquartzite is quite coarsely crystalline (for this type of rock), and is composed of polygonal patches ranging from 0.2mm to 1.5mm in size, forming mosaics. The muscovite flakes show strong parallel alignment and are embedded in quartz with reference to grain boundaries. Small goethite pseudomorphs after pyrite crystals occur sporadically. A few minute grains of ? zircon are present. No sedimentary features were detected: the rock is thoroughly recrystallized and therefore its origin is conjectural: it seems likely that it was a sediment.

The rock has been fairly extensively brecciated, with introduction of further quartz to cement the fragments. Apart from this, the rock is quite featureless.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A 24 2053
190N 040W
Folded Micaceous Metaquartzite.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference O.N. 0733

Sample No. 2053

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12986

a. Hand Specimen:

White quartzose schist, folded.

b. Microscopic:

Since coarse quartz dominates the composition of this rock, it is best termed a micaceous metaquartzite.

It consists of quite coarse mosaic quartz, strongly stressed. It is quite possible that the rock was metamorphosed twice, or at least that folding and some cataclastic action occurred after metamorphism, since the quartz was evidently stressed and fractured after metamorphic crystallization.

The quartz is a variety full of minute inclusions and bubbles, and on these grounds would be regarded as of igneous/pegmatitic origin.

Thin streaks and contorted flakes of muscovite are present, forming discontinuous, subparallel layers or partings. Iron staining tends to extend along these streaks. The folding of the rock is accentuated by the muscovite layers. There are no other notable features, and no detrital heavy minerals were detected.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2054
660N 090W
Micaceous Metaquartzite.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference C.N. 0733

Sample No. 2054

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12987

a. Hand Specimen:

Fine laminated quartz-mica schist.

b. Microscopic:

A micaceous metaquartzite, similar in some respects to 2053, but more folded.

Quartz forms coarse mosaics of rather "blocky" crystals, and constitutes over 90% of the rock. There are no relict clastic features (eg. detrital grain outlines) and the quartz is thoroughly recrystallized.

Small, thin (0/03-0.2mm) streaks of micaceous material, with parallel orientation, give the rock its schistosity. However, the mica (most probably hydromuscovite) does not show parallel orientation within the streaks, which are composed of small flakes of hydromuscovite often showing random orientation; they have a distinctly greenish colour and are faintly pleochroic.

Rough, relatively large detrital heavy mineral grains occur, and appear to be zircon, though almost metamict. Leucoxene patches are also present.

The observations suggest that the micaceous layers were modified or recrystallized after metamorphism.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2055
678N 159W
Soft-Pebble Argillaceous Siltstone.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference G.N. 0733

Sample No. 2055

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12986

a. Hand Specimen:

White, fine grained siliceous rock.

b. Microscopic:

This rock might be termed an intraformational breccia; the textural evidence indicates that most of the coarser fragments (perhaps all of them) were produced whilst they were still "plastic". The relationships are somewhat obscured by later, diagenetic recrystallization.

The rock as a whole is an argillaceous siltstone, composed of fine quartz and sericite (recrystallized clay), and containing fine mosaic quartz grains of various sizes and shapes. They range from 0.5mm to 2-3mm, and many have rounded or ovoid shapes suggestive of deformation whilst unconsolidated. They form more or less well defined layers and may represent original cherty material. Often the boundaries of the fragments merge into the host rock.

Fine goethite/hematite occurs throughout some portions of the rock. The matrix/cement of sericite is obviously recrystallized, but the rock is not considered to be metamorphosed beyond the "load"metamorphism stage.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2056
640N 132W
Quartz Breccia.

Job No. CMS 73/11/23 Date Received: 15/11/73

Reference G.N. 0733

Sample No. 2056

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12989

a. Hand Specimen:

White quartzose rock.

b. Microscopic:

Best termed a quartz breccia, but composed dominantly of vein-quartz and quartzite fragments, and therefore rather featureless and undiagnostic.

The rock consists of small and large, irregularly shaped fragments of mosaic quartz which is stressed and of variable grainsize and texture. Occasional fragments of micaceous metaquartzite (cp 2053) also occur and may correlate with other metaquartzites (2053, 2084).

Apparently this is a recemented fault breccia or similar rock the fragments merge with the vein-quartz matrix/cement. If the metaquartzite fragments can legitimately be correlated with 2053/2084, then this rock must be younger.

There are no sedimentary features.

H. V. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2057
638N 123W
Quartz-veined Sericite-Quartz Schist.

Job No. CMS 73/11/20 Date Received: 15/11/73

Reference O.N. 0733

Sample No. 2057

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12990

a. Hand Specimen:

Pale, fine grained, quartz-veined sediment.

b. Microscopic:

This is a sericite-quartz schist or recrystallized silty argillite, depending on the interpretation. The distinction has little practical significance; if metamorphism has occurred, it was of very low grade only.

The rock consists mainly of fine, limited sericite, with embedded fine (<0.06mm) quartz as individual grains and thin, discontinuous streaks. The "sericite" is actually hydromuscovite, apparently a common intermediate stage in the progressive conversion of clay to muscovite.

The rock is iron stained in parts, with fine irregular to globular patches of goethite. Quartz veins are very common throughout and have extensively silicified the rock. They also contain goethite, occasionally as pseudomorphs after pyrite.

There are no other features of note.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2058
554N 216W
Micaceous Metaquartzite.

Job No. CMS 73/11/28 Date Received: 15/11/23

Reference D.N. 0733

Sample No. 2058

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12991

a. Hand Specimen:

Pale quartzose rock with white mica.

b. Microscopic:

This is a micaceous metaquartzite and is very closely similar to 2053 and 2054.

Unlike 2053, it was not deformed after metamorphism. In this respect it resembles 2054 more closely. The quartz, constituting the bulk of the rock, is clear and rather blocky. However, the mica is quite well foliated muscovite, as in 2053. Undoubtedly the three rocks are lithologically very similar and could be correlated on this basis, though they are not very distinctive or specific.

A separate detailed description is not warranted.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~23rd November 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2059
596N 224W
Sericitised Quartz-Muscovite Schist.

Job No. CMS 23/11/28 Date Received: 15/11/23

Reference O.N. 0733

Sample No. 2059

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12992

a. Hand Specimen:

Pale greenish quartzose schist.

b. Microscopic:

This quartz-sericite schist, or sericitised quartz-muscovite schist, is virtually identical with 2051 in all details, and the same description applies.

The rock is an extensively sericitised rock, in which aggregates of fine, randomly orientated sericite flakes have almost completely replaced the muscovite which constituted foliated mica layers. Micas are more abundant in this rock than in 2051 and also have a greenish tinge. One relatively large, well rounded, altered zircon grain was seen.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~23rd November 1973~~

IDENTIFICATION
A24 2060
710 N 160W Quartz-Sericite Schist

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. ~~CMS 73/11/28~~ Date Received: ~~15/11/73~~

Reference O.N. 073?

Sample No. 2060

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12993

a. Hand Specimen:

White qua tzose ock.

b. Microscopic:

This is a <u>qua tz-sericite schist</u>, although the schistose fab ic is no longe dominant because of distruption and disturbance.

The rock closely resembles 2051 and 2059, and can be rega ded as a deformed version of either of those ocks. In parts, laye ing is easonably well defined, with alternating thin laye s of recrystallized (ie. metamorphic) quartz alternating with layers of se icite aggregates. In her parts, the fabric is distrubed, with qua tz masses and sericite patches.

This rock is otherwise featureless on the basis of its lithology it can be correlated with 2051 and 2059. The evidence fo the pre-existence of muscovite however, is much poorer it may not have reached that stage.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A29 2061
560N 125W
Sericitised Quartz-Muscovite Schist.

Job No. CMS 23/11/28 Date Received: 15/11/73

Reference C.N. 0735

Sample No. 2061

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12994

a. Hand Specimen: Pale green micaceous, quartzose schist.

The lithology (ie. fabric composition) of this rock is very similar to 2051, 2060, 2059, and it may be termed a sericitised quartz-muscovite schist.

b. Microscopic:

Sericite evidently pervasively replacing muscovite, is the major mineral (60%), with subordinate (40%) quartz. Banding or layering is reasonably well defined.

Fine leucoxene, authigenic rutile, and secondary iron oxide (iron staining) occur in the micaceous layers, and very occasional detrital zircon grains are seen.

All these similar rocks must have been similar sediments, ranging from argillites, silty argillites to argillaceous sandstones, and all subjected to very mild, presumably regional, metamorphism.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date ~~23rd November 1973~~

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2062
600N 147W
Sericitised Quartz-Muscovite Schist.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference O.N. 0733

Sample No. 2062

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12995

a. Hand Specimen:

Pale green micaceous schist.

b. Microscopic:

A sericitised muscovite schist which closely resembles 2061 and the other rocks. The micas are slightly coarser and more abundant, comprising 65-70% of the rock.

Apart from these insignificant differences, there is no meaningful distinction between this rock and the others, in either fabric or composition. A repetitive description is therefore unnecessary.

NB: As mentioned in a previous report, brief descriptions are charged at a reduced rate.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2063
632 N 228W
Quartz-Muscovite Schist.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference O.N. 073

Sample No. 2063

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12996

a. Hand Specimen:

Pale quartz-mica schist.

b. Microscopic:

A quartz-muscovite schist, appreciably but by no means completely sericitised. Its lithology is closely similar to that of the other schists described.

It consists of approximately equal amounts of quartz and muscovite as alternating layers the muscovite is incipiently or partly replaced by sericite flakes with random orientation.

The fabric of this rock is of a more pronounced metamorphic nature than the others of its type, with a tendency for the development of thin lenses of quartz. However, these minor differences are not very significant. It can be correlated with the other quartz-muscovite schists.

H. W. Fander, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2064
480N 106W
Quartz-Hydromuscovite Schist.

Job No. CMS 73/11/26 Date Received: 15/11/73

Reference O.N. 073

Sample No. 2064

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12297

a. Hand Specimen:

Pale, quartzose, micaceous schist.

b. Microscopic:

A quartz-hydromuscovite schist characterized by the development of relatively coarse flakes of hydromuscovite with random orientation.

This mineral occurs as patches and layers of well defined flakes; there is a suggestion of well defined flakes; there is a suggestion in some of the aggregates of replacement of pre-existing feldspar, which must have occurred as poikiloblastic patches.

The fabric of the rock is coarser than that of most of the other rocks which are quartz-sericite schists, but this is a minor point only.

Fine leucoxene and anatase grains are associated with the mica.

The original (metamorphic) rock is thought to have been a quartz-feldspar-muscovite schist or microgneiss, perhaps similar to some "basement" rocks elsewhere in this province, which was throughly sericitised by a pervasive, low temperature hydrothermal process.

H. W. Fender, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2065
519N 132W
Sericitised Quartz-Feldspar Mica Schist/ Microgneiss.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference O.N. 0733

Sample No. 2065

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12298

a. Hand Specimen:

Medium grained quartzose, micaceous schist.

b. Microscopic:

Virtually the same rock as 2064, with a coarser overall fabric but finer hydromuscovite.

The evidence for the former existence of feldspar is perhaps more definite in this rock than for 2064; there are fairly prominent pseudomorphous patches, generally slightly iron stained in a characteristic pattern, composed of sericite aggregates.

Small authigenic tourmaline needles and granular anatase crystals occur, and detrital heavy minerals (cloudy, rounded zircon) are seen. Fine hematite is also present.

It is conceivable that these sericitised schist sequences were the source of uranium mineralisation, released and extracted by the process of sericitisation and redeposited in more favourable rocks. The actual U bearing minerals may have been detrital and their residues are leucoxene-anatase (eg. brannerite, dissociated into its component of oxides). This is speculation, of course, but plausible.

H. W. Fandel, M.Sc.

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 23rd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
A24 2066
628 N 252 W
Brecciated Quartz-Sericite Schist

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference O.N. 0735

Sample No. 2066

Nature of Sample: Hand specimen

DESCRIPTION **SECTION No.** 12259

a. Hand Specimen:

Iron stained, fine quartzose rock.

b. Microscopic:

THis is a brecciated quartz-sericite schist, similar in lithology to the other schists. However, some synmetamorphic or post metamorphic brecciation has taken place.

It is quite likely that brecciation occurred during sericitisation, as a result of the mobilisation or fluidisation of the schist, with movement and collapse leading to brecciation and redistribution of components.

Thus the present rock consists of highly variable (interms of size - shape) fragments of quartz, quartz-sericite schist and sericite patches, in a sericitic matrix.

Iron staining is conspicuous throughout the micaceous parts of the rock, but is probably a weathering effect, ie. not related to the presence of any sulphides.

H. W. Fender, M.Sc.

W2087 A quartz-sericite schist with hematite. It is quite fine grained and
TS13113 consists of microgranular quartz and quite abundant (40-50%) fine "sericite"
A24 (hydromuscovite). This sericite occurs as small, generally randomly
290N 065E Orientated flakes unrelated to the general fabric of the rock. It is therefore recrystallized or even replacive, although this is based on the assumption that the original rock was a quartz-muscovite schist, as suggested by the overall fabric.

Fine hematite occurs throughout the rock and is closely associated with the sericite. Quartz veins traverse the rock, parallel and at various angles to the schistosity.

This rock resembles some of those in the W2051 - W2066 group, in a general way; there are no distinctive characteristics useful for more definite correlation.

W2088 This quartz-sericite schist is virtually identical with W2087 in all
TS13114 major respects. Its fabric is alittle coarser, and it contains slightly
290N 061E more quartz, but these are very minor differences. It is lightly fractured and very gently folded in places, and resembles the previous suite.

W2095 A brecciated, silicified and altered micaceous metaquartzite containing
TS13121 fine graphitic/subgraphitic carbonaceous matter.
220N 004W
E40.2.1-3.0 The unaltered rock was a muscovite-graphite metaquartzite or schist, with abundant dominant microgranular quartz and thin micaceous-carbonaceous streaks. It was brecciated and penetrated by mosaic quartz and patchy earthy goethite ("limonite"). The extensive silicification has disrupted the schistose fabric and replaced some components. There are no other noteworthy features.

W2096 The chips are muscovite-metaquartzites, very similar to W2053 but finer
TS13122 grained. The dominant mineral is quartz, as fine to medium grained
E23.7.6-8.6 mosaics, with generally small, parallel muscovite flakes and occasional
200N 015E streaks. Detrital tourmaline is relatively common in places. Fine hematite is sparingly present.

SECTION 5.12 PETROLOGIST REPORT

LOCALITY PENINSULA WEST OF NGARA

WEST OF NGARA

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 22nd November 1973

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

IDENTIFICATION
2051
Peninsular West of Ngara Sericitised Quartz-Muscovite Schist.

Job No. CMS 73/11/28 Date Received: 15/11/73

Reference O.N. 0233

Sample No. 2051

Nature of Sample: ~~Hand specimen~~

DESCRIPTION **SECTION No.** 12964

a. Hand Specimen:

Pale, quartzose, chloritic schist.

b. Microscopic:

A thoroughly sericitised quartz-muscovite schist, with distinctive characteristics.

The rock consists of thin ($\frac{1}{2}$-1mm) alternating layers of quartz and sericite, with minor foliated muscovite. The quartz layers are unusual in that they are composed of tabular slabs of quartz (in contrast to the usual mosaics and granular intergrowths common in schists). This tabular quartz must have formed under different conditions: it is a characteristic feature of some key rocks in this U province.

Very little muscovite remains; it is presumed to have been replaced by the sericite and chlorite which constitute the layers alternating with the quartz layers. The sericite (most probably illite-hydromuscovite) occurs as small, randomly orientated flakes, marginally replacing quartz and thus post metamorphic. Fine, almost colourless chlorite accompanies the sericite in places. The sericite has a greenish hue.

Iron staining is present as thin films of goethite. Detrital grains of leucoxene, opaques and zircon are scattered through the rock.

H. W. Fander, M.Sc.

amdel
The Australian Mineral Development Laboratories
Flemington Street, Frewville, South Australia 5063
Phone 79 1662, telex AA82520

Please address all correspondence to the Director
In reply quote: MP 3/753/0

22 November, 1973

Canadian Superior Mining (Aust) Pty Ltd.,
3303 Australia Square Tower,
SYDNEY, NSW 2000

REPORT MP 1792/74

YOUR REFERENCE:	Order No 619 dated 28/10/73
MATERIAL:	Three samples
IDENTIFICATION:	CHCS3A, CHCS3B and CHCS1N
DATE RECEIVED:	30/10/73
WORK REQUIRED:	Chemical analysis and petrographic description

Investigation and Report by: Dr R. Davy

Officer in Charge, Mineralogy/Petrology Section: Dr K. J. Henley

K.J. Henley

for F. R. Hartley
Director

c.c. Canadian Superior Mining (Aust) Pty Ltd.,
Private Mail Bag 57,
OENPELLIVIA,
Via DARWIN, NT 5791

DETERMINATION OF ROCK-TYPE AND SIMILARITIES BETWEEN SAMPLES CHCS3A,CHCS3B & CHCS1N

1. INTRODUCTION

Three samples were received from Canadian Superior Mining (Aust) Pty Ltd., on 31 October, 1973, for complete chemical analysis, identification of the major fractions and comments on the possible rock-types. The work was discussed in a telephone conversation between Dr Davy of Amdel and Mr Searl of Canadian Superior Mining on 31 October, and confirmed by telex from Dr Chan on 1 November.

Thin sections (TS 31326-8) were prepared and examined microscopically and half of each sample was chemically analysed.

2. RESULTS

Samples CHCS3A and CHCS1N both appear to have been sediments, metamorphosed and now weathered. CHCS3B appears to have been an igneous rock, possibly an amphibolite. These identifications are only tentative since the rocks are very badly weathered and we have no reference fresh rocks for comparative purposes. Our interpretation is consistent with our knowledge of the rocks of this area. No uraniferous minerals were noted. The phyllosilicates have only been identified optically. If more accurate identification is required, we will be happy to carry out X-ray diffraction analysis of the phyllosilicates at an additional cost of approximately $15-25 per sample.

2.1. Analytical Results

The analytical results are given in Tables 1 and 2.

2.2. Petrography

Sample: CHCS3A: TS 31326:

Rock Name:
Weathered metasediment

Hand Specimen:
A pale grey-green, crumbly, rather schistose rock.

Thin Section:
An optical estimate of the constituents gives the following:

	%
Quartz	80
Muscovite	5
Clay	5
Chlorite	10
Rutile	1
Zircon	Trace
?Zeolite	Trace

The rock is composed of recrystallized, equant quartz grains, either single or in aggregates, separated by zones and intergranular areas of wispy muscovite and authigenic clay and chlorite. Quartz varies in diameter from 0.03 to 0.3 mm and triple point junctions are common where grains abut, indicating recrystallization.

A vein of colourless ?zeolite cuts the rock. No bedding or foliation is readily apparent in the thin section, though in hand specimen the rock has a schistose appearance.

The rock is probably a metasediment (metasiltstone) which has been weathered, although the variable grain size of the quartz suggests that much of it may be of metasomatic origin.

Sample: CHCS3B: TS 31327:

Rock Name:
Weathered ?amphibolite

Hand Specimen:
A very crumbly rock, rather mottled from pale buff to pale green.

Thin Section:
An optical estimate of the constituents gives the following:

	%
Sericite	45
Chlorite) Clay)	40
Limonite/goethite	10
Quartz	2-5

The rock consists of elongate patches of sericite flakes in a matrix of clay/chlorite with limonite in irregular patches and along the cleavage planes of the sericite. Locally areas of granular quartz are present. The rock displays traces of a schistose texture defined by the orientation of the elongate patches of sericite and of the individual sericite flakes themselves. In places vague ?pseudomorphs up to 2 mm in size are present of a mineral with a good cleavage. The pseudomorphs possibly represent replaced ferromagnesian minerals - amphibole or pyroxene - and now consist of clay/chlorite with subparallel lines of red-brown opaques. Quartz appears to be wholly secondary in origin.

The rock was probably once massive and coarse-grained but it has been subjected to later shearing and the breakdown of the former minerals into 'prisms' elongate parallel to the foliation. In these areas the opaques also parallel the foliation, in contrast to the more massive areas where individual opaque grains have a random orientation.

The nature of the original rock is now largely obscured by effect of weathering. However, primary quartz appears to have been absent and the most likely possibility is that the rock was of igneous origin - consisting mainly of feldspar and/or ferromagnesian minerals.

Sample: CHCS1N: TS 31328:

Rock Name:
Weathered quartz-biotite-muscovite schist

Hand Specimen:
A yellowish-grey, soft, friable rock with a weakly defined schistose texture.

Thin Section:
An optical estimate of the constituents gives the following:

	%
Quartz	40
Brownish clay/chlorite/sericite	40
Muscovite	10
Degraded biotite	10
Tourmaline	Trace-1
Opaques	Trace-1

The rock consists mainly of discrete grains of quartz and flakes of muscovite and degraded biotite embedded in a matrix of pale brown clay/sericite. The rock has a well-defined schistosity with alternating zones rich in quartz and sub-parallel muscovite/biotite. Quartz forms sub-equant grains in the range 0.1 to 0.5 mm in diameter. Where quartz grains are in contact, triple point junctions indicate recrystallization has occurred but generally the quartz grains are separated by intergranular clay/chlorite/sericite. Coarse (up to 0.6 mm long) flakes of muscovite and degraded biotite containing exsolved opaques parallel the foliation and appear to be remnants of the original schist.

The origins of this rock are thought to be more certain than either CHCS1N or CHCS3A. The rock was originally a quartz-muscovite-biotite schist, probably containing feldspar. Subsequent weathering has caused degradation of the biotite, replacement of the feldspar by clay/chlorite/sericite and introduction of clay/chlorite/sericite into intergranular sites between quartz grains.

jey:

TABLE 1: CHEMICAL ANALYSES OF THE THREE SAMPLES

	CHCS3A	CHCS3B	CHCS1N
% SiO_2	69	57	58
% Al_2O_3	13.5	18.3	14.9
% Fe_2O_3	0.8	3.5	3.8
% CaO	0.20	0.17	0.80
% MgO	4.8	6.0	4.2
% Na_2O	0.05	0.05	0.10
% K_2O	0.85	1.25	0.90
% MnO	0.02	0.03	0.04
% TiO_2	0.52	0.77	0.40
% P_2O_5	0.10	0.10	0.10
% Cr_2O_3	<0.1	<0.1	<0.1
% V_2O_5	<0.05	<0.05	<0.05
% L.O.I.	8.1	12.0	15.9
% Total	98.0	99.2	99.2
ppm U	15	95	<3

TABLE 2: SEMI-QUANTITATIVE EMISSION SPECTROGRAPHIC ANALYSES OF THE THREE SAMPLES

(Results in ppm unless otherwise stated. Detection limit in brackets)

	CHCS3A	CHCS3B	CHCS1N		CHCS3A	CHCS3B	CHCS1N
Co (5)	x	x	10	Ir (2)	x	x	x
Ni (5)	50	80	80	Rh (2)	x	x	x
Cr (20)	100	80	50	Ru (2)	x	x	x
V (10)	80	50	100	Cu (0.5)	30	80	50
W (50)	x	x	x	Pb (1)	20	80	10
Mo (3)	x	x	x	Zn (20)	x	x	x
Mn (10)	10	20	100	Sn (1)	5	10	1
Ta (100)	x	x	x	Cd (3)	x	x	x
Nb (20)	x	x	x	Bi (1)	x	x	x
Be (1)	3	5	1	Ag (0.1)	0.1	0.1	0.1
Th (100)	x	x	x	Au (3)	x	x	x
Pt (10)	x	x	x	Ga (1)	30	100	10
Pd (10)	x	x	x	Ge (1)	x	1	x
Os (10)	x	x	x	As (50)	x	x	x
				Sb (30	x	x	x

Results are semi-quantitative. Elements apparently present in concentrations of economic interest should be redetermined by an appropriate accurate analytical technique. x = Not detected at limit quoted.

SECTION 6.2 ASSAY RESULTS OF SURFACE SAMPLES

Sample No.	C%	Ni	U	Cr	Cu	Pb	Zn	Ag	Co
CS5-001	0.04	600	L4	1500	32	8	25	L1	40
CS5-002			6						
CS5-003			L4						
CS5-004			L4						
CS5-005			4						
CS1-001	0.04	1700	4	1650	42	18	40	L1	40
CS6-001	0.08	-	4	-	-	-	-	-	-
CS6-002	1.25	-	L4	-	-	-	-	-	-

N.B. Carbon in percentage all other elements in p.p.m.

SECTION 7.1 Aboriginal Sites on E.L.130

Located during flight with Mr. K.S. Cook of McIntyre during 1972. Locations marked on map and given to Mr. G. Winter of Canadian Superior 1973.

Site 1 Barramundi - Namarnkol - Pandanus trees

2 Fish - Makali - Escarpment Face

3 Crocodile - Yakiwenj - Rock near Escarp. Base

4 Young Girls - Andalk - Billabong

5 Turkey - Benuk - Rock

6 Duck - Ngalmandjurrka - Rock

7 Barramundi - Namarnkol - Rock

8 Two Headed Snake - Lyabiyul - 2 Hills

9 Mt. Borradaile

10 Devil - Namorrodo Uyumarrunj - Banyan Tree

Peter J. Carroll