Miscellaneous Publication 92-1

Report on the Examination of Samples from Manitoba Energy and Mines

By J. Letendre (Monopros Limited)

Manitoba
Energy and Mines
Geological Services

1992

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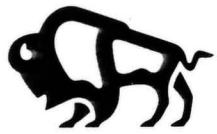

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Report on the Examination of Samples from Manitoba Energy and Mines

By J. Letendre (Monopros Limited)
Winnipeg, 1992

MONOPROS LIMITED

REPORT ON THE EXAMINATION OF SAMPLES FROM THE MANITOBA DEPARTMENT OF ENERGY AND MINES

MINERAL RESOURCES DIVISION
GEOLOGICAL SERVICES BRANCH

BY: J. Letendre
December, 1989

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SUMMARY

Mineral concentrates from 117 samples collected by the Geological Services Branch of the Manitoba Department of Energy and Mines, Mineral Resources Division, were examined for kimberlitic indicator minerals and diamonds.

No diamonds were found and eleven grains with kimberlitic affinities, four picro-ilmenites, one chromite and six garnets were identified. The electron microprobe chemical analyses for the grains examined are appended.

All material will be returned to the Geological Services Branch.

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INTRODUCTION

The Manitoba Department of Energy and Mines, Mineral Resources Division, Geological Services Branch has collected a number of sediment samples from four sections on the Nelson River (Figs. 1 and 2). Two kilogram splits as well as the -2.0+0.25mm portion of a further 600 grams split were made available for most till samples by the Geological Services Branch for examination for kimberlitic indicator minerals and diamonds. It was agreed by the Geological Services Branch that the samples would be washed, screened, dried and the -2.0+0.3mm size fraction separated using bromoform (specific gravity 2.9). The heavy mineral concentrates would then be optically sorted and the selected grains could be further investigated by electron microprobe, provided that all probed grains were returned and a copy of all the results was submitted together with details of the analysis carried out.

The till samples are very fine grained as over 70% of the material is finer than 300 microns. They were sent from the Geological Services Branch at Winnipeg in April 1989 and were transported to Thunder Bay by road.

PREPARATION

The sample bags were checked against the sample listings supplied by the Geological Services Branch and any discrepancies were noted (see Table 1).

The individual two kilogram samples consisting of untreated till material were prepared by Monopros employees for sorting first by manual desliming, an operation which required much care in order not to loose any of the +300 micron fraction. The remaining coarse material was then screened into +2.0mm; -2.0+1.0mm; -1.0+0.5mm; -0.5+0.3mm and -0.3mm fractions. The fractions were obtained by using 20 centimetre brass Tyler screens which were meticulously cleaned between samples. The +2.0mm and the -0.3mm fractions will be returned to the Geological Services Branch in Winnipeg along with the heavy mineral concentrates.

The -2.0+0.25mm material remaining after desliming of 600 gram samples, mostly of till, by Dominique Pare under contract with the Geological Services Branch, were screened as above using 7.5 centimetre brass Tyler screens which were also meticulously cleaned between samples. Notice that 18 samples are represented only by

FIGURE 1 LOCATION OF SECTIONS

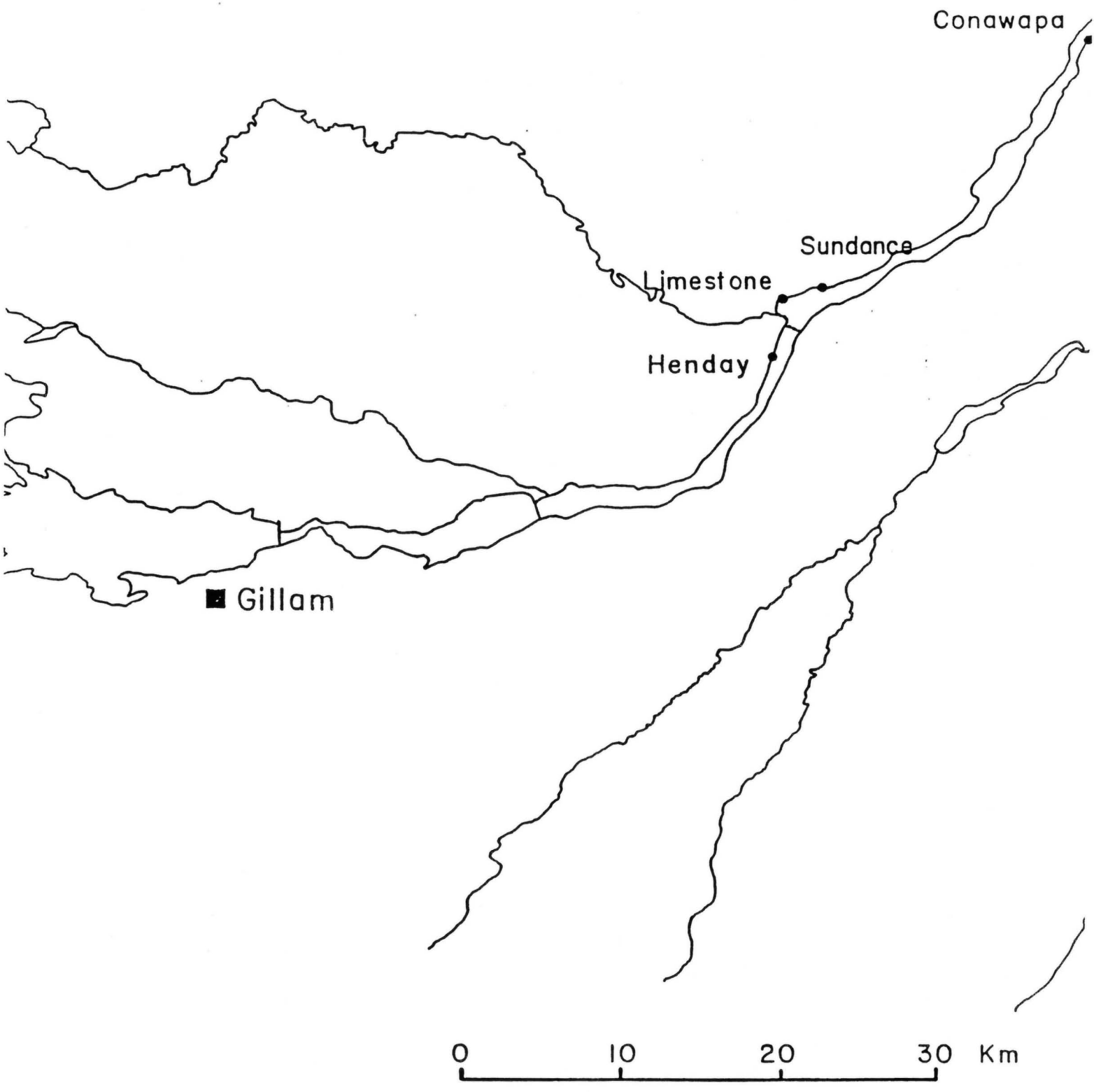


FIGURE 2

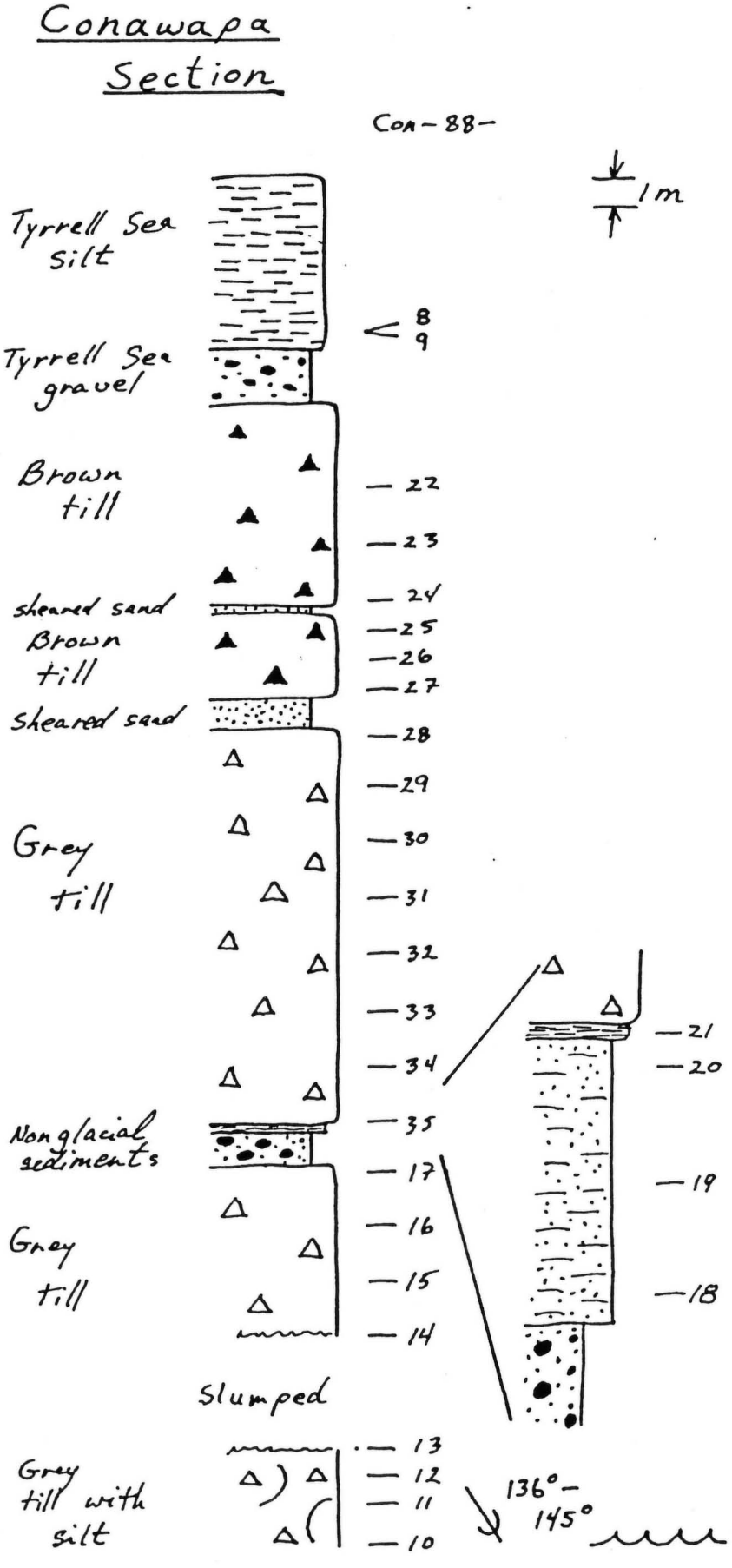

Conawapa Section
Con-88-
1m
Tyrrell Sea silt
Tyrrell Sea gravel
Brown till
sheared sand
Brown till
sheared sand
Grey till
Nonglacial sediments
Grey till
Slumped
Grey till with silt
8
9
22
23
24
25
26
27
28
29
30
31
32
33
34
35
17
16
15
14
13
12
11
10
21
20
19
18
136°-145°

FIGURE 3

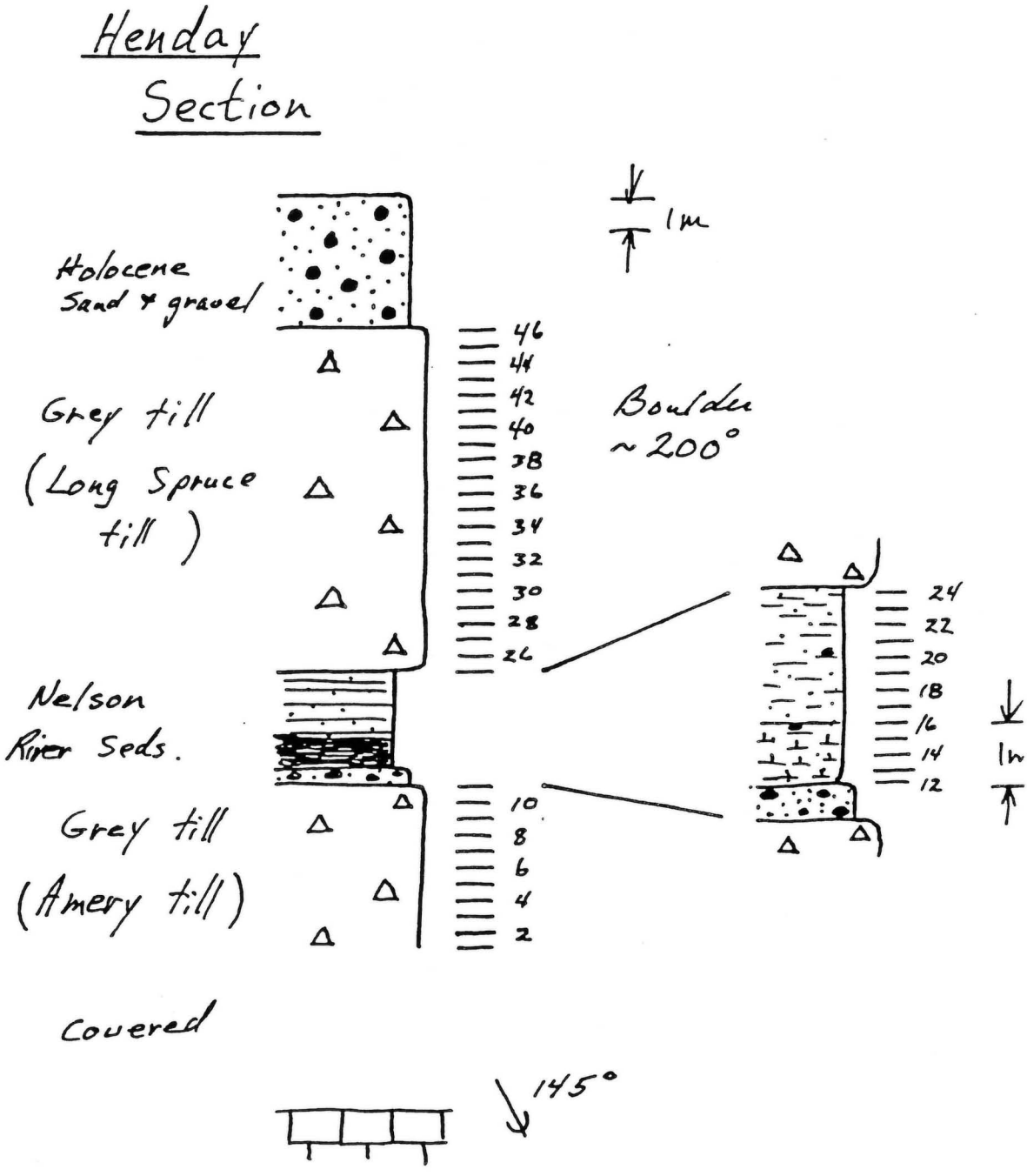

Henday
Section
1m
Holocene
Sand + gravel
Grey till
(Long Spruce
till)
Boulder
~200°
Nelson
River Seds.
Grey till
(Amery till)
Covered
145°
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
1m

FIGURE 4

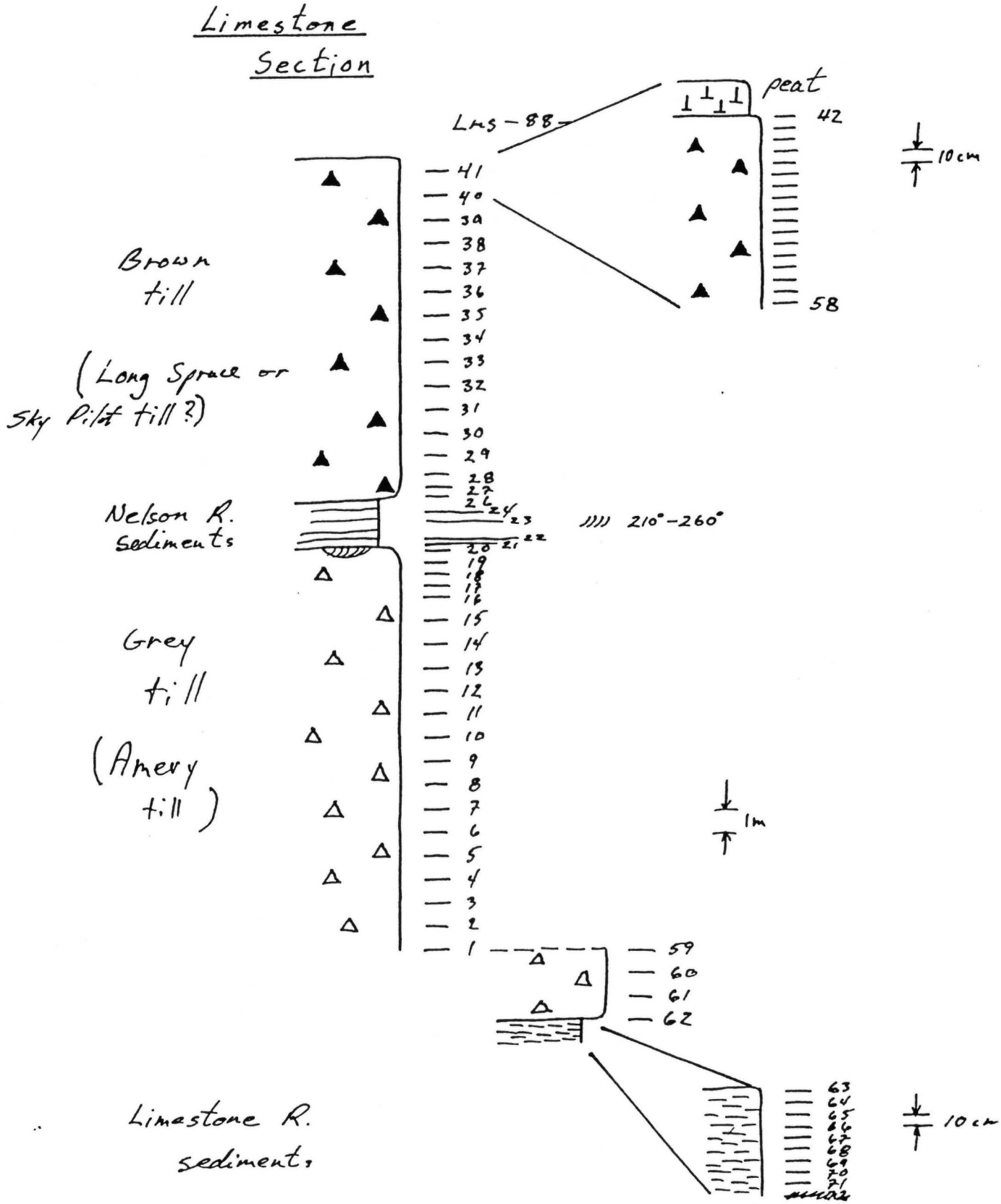
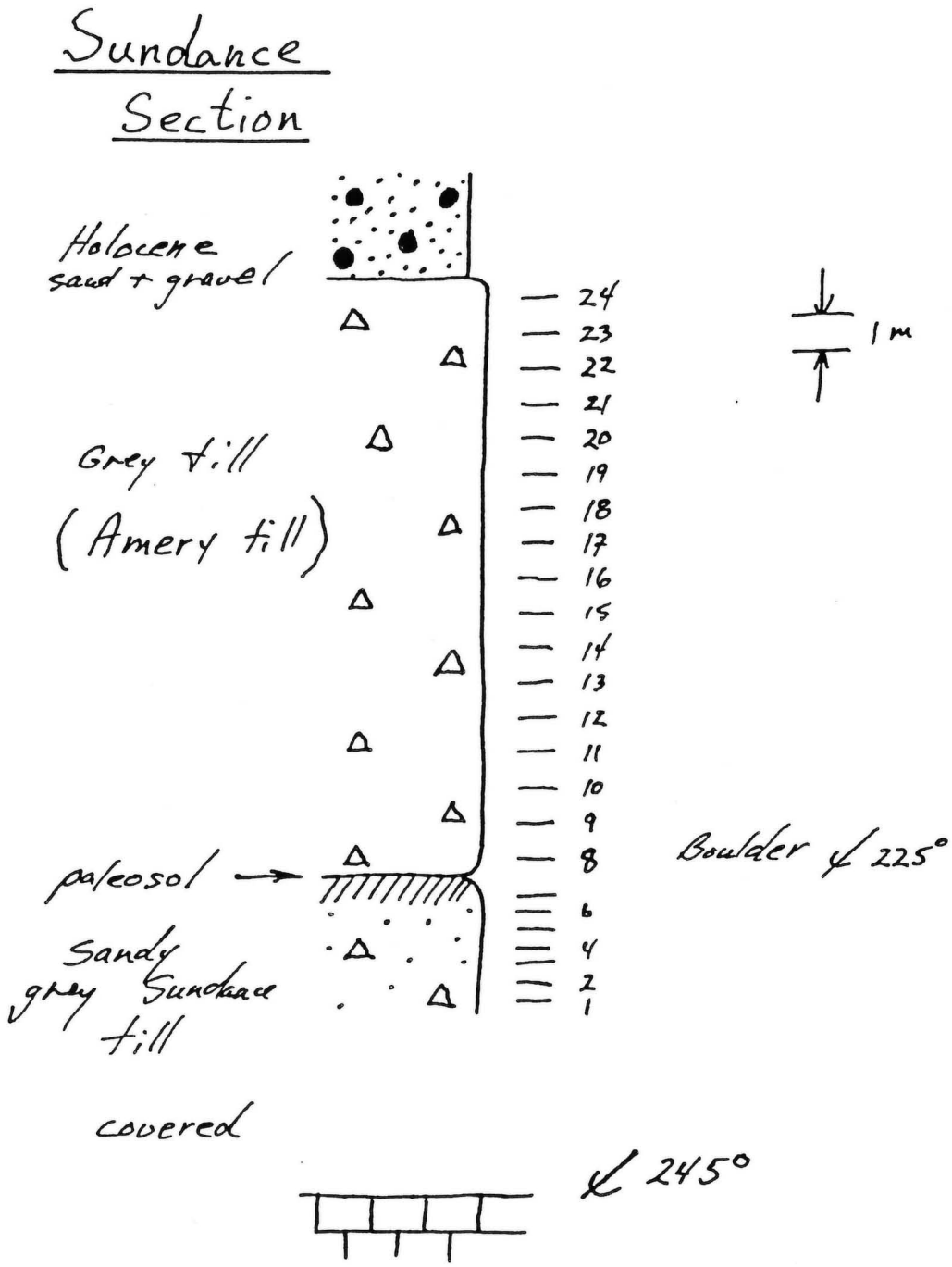

Limestone Section
peat
LMS-88
42
58
10cm
Brown till
(Long Spruce or Sky Pilot till?)
Nelson R. Sediments
210°-260°
Grey till
(Amery till)
1m
Limestone R. sediments
10cm

FIGURE 5


Sundance
Section
Holocene
sand + gravel
Grey till
(Amery till)
paleosol
Sandy
grey Sundance
till
covered
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
6
4
2
1
1 m
Boulder ∠ 225°
∠ 245°

the 600 gram split. The different fractions from both the 2.0 and 0.6 kilogram splits were then combined prior to separation of the heavy minerals by the heavy liquid method at the DeBeers Research Laboratories in Kimberley. Bromoform was used, with a specific gravity of 2.9. This final preparation of the samples took 40 hours to accomplish but a 99% weight reduction was realized.

METHOD

Sorting of the heavy mineral concentrates was performed by trained microscopists with assistants to carry out sample preparation, using Wild M3 and M5 stereo microscopes. All samples were examined for the presence of possible kimberlitic indicator minerals and diamonds. Kimberlitic indicator minerals were considered to be garnets, chromiferous diopsides, chromites and picro-ilmenites. A brief summary of the typical characteristics for kimberlite indicator minerals is given in Mosig (1980), Dawson and Stephens (1975; 1976) and Stephens and Dawson (1977).

Each size fraction was sorted separately; the minus 300 micron fraction was not examined as it was too fine for reliable results to be obtained.

Sorting commenced on July 7, and was completed on July 11, 1989. To ascertain sorter efficiency, 53% of the samples were checked and 19% were rechecked.

All the grains considered to have possible kimberlitic affinities after visual examination were then submitted for further examination by electron microprobe at the Anglo American Research Laboratories in Johannesburg, South Africa. The selected grains were set in resin on a probe mount and very carefully polished. The very fine size of the grains caused considerable polishing problems. The mount was then placed in an ARL SEMQ fully automated microprobe fitted with nine channels, and subjected to a 10 second analysis at 20 Kv and a sample current of 50 nano-amps. Interal standards were ilmenite, spinel, olivine, enstatite and diopside glasses. The mineral species were all probed routinely for manganese, aluminum, iron, silicon, titanium, calcium, chrome and magnesium. Sodium was also reported for "other mineral" analyses. After sorting, all the separate fractions for each sample were recombined.

RESULTS

A total of 117 samples were examined.

The sorters selected 12 possibly kimberlitic minerals from nine samples. Subsequent microprobe analysis indicated that only 11 grains have kimberlitic affinities; six garnets, four ilmenites and one chromite. The probe results are listed in Table 2 while the chemical analyses are shown in Tables 3 to 6. No diamonds were recovered.

All the samples will be returned to the Geological Services Branch, together with one microprobe mount containing 12 grains. Table 7 lists the sample number and grain locations for the mount.

J.P. Letendre
Field Manager
Thunder Bay, Ontario
January 8, 1990

JPL:it

Distribution:

MDEM	2
Monopros Toronto	1
Monopros Thunder Bay	1

REFERENCES

Dawson, J.B. and Stephens, W.E. 1975. Statistical classification of garnets from kimberlites and associated xenoliths. Journal of Geology: 83: 589-607.

Dawson, J.B. and Stephens, W.E. 1976. Statistical classification of garnets from kimberlites and associated xenoliths-addendum. Journal of Geology: 83: 589-607.

Mosig, R.W. 1980. Morphology of indicator minerals a guide to proximity of source. IN Glover, J.E. and Groves, D.E. (Eds) 1980. Kimberlites and Diamonds, The Geology Department and Extension Service, University of Western Australia Publication #5, pp 81-87.

Stephens, W.E. and Dawson, J.B. 1977. Statistical comparisons between pyroxenes from kimberlites and their associated Xenoliths. Journal of Geology: 85: 443-449.

TABLE 1

SECTION	SAMPLE NUMBER	2 KG SPLIT	-2.0+0.25mm size fraction from 600g split
CONAWAPA	CON 88-1	-	X *
	CON 88-2	-	X *
	CON 88-3	-	X *
	CON 88-10	X	X
	CON 88-11	X	X
	CON 88-12	X	X
	CON 88-13	X	X
	CON 88-14	X	X
	CON 88-15	X	X
	CON 88-16	X	X
	CON 88-17	X	X
	CON 88-22	X	X
	CON 88-23	X	X
	CON 88-24	X	X
	CON 88-25	X	X
	CON 88-26	X	X
	CON 88-27	X	X
	CON 88-28	X	X
	CON 88-29	X	X
	CON 88-30	X	X
	CON 88-31	X	X
	CON 88-32	X	X
	CON 88-33	X	X
	CON 88-34	X	X
	CON 88-35	X	X
HENDAY	HEN 88-1	X	X
	HEN 88-2	X	X
	HEN 88-3	X	X
	HEN 88-4	X	X
	HEN 88-5	X	X
	HEN 88-6	X	X
	HEN 88-7	X	X
	HEN 88-8	X	X
	HEN 88-9	X	X
	HEN 88-10	X	X
	HEN 88-11	X	X
	HEN 88-25	X	X
	HEN 88-26	X	X
	HEN 88-28	X	X
	HEN 88-30	X	X
	HEN 88-32	X	X
	HEN 88-34	X	X
	HEN 88-36	X	X
	HEN 88-38	X	X
	HEN 88-40	X	X
	HEN 88-42	X	X
	HEN 88-44	X	X
	HEN 88-46	X	X

SECTION	SAMPLE NUMBER	2 KG SPLIT	-2.0+0.25mm size fraction from 600g split	
LIMESTONE	LMS 88-1	X	X	
	LMS 88-2	X	X	
	LMS 88-3	X	X	
	LMS 88-4	X	X	
	LMS 88-5	X	X	
	LMS 88-6	X	X	
	LMS 88-7	X	X	
	LMS 88-8	X	X	
	LMS 88-9	X	X	
	LMS 88-10	X	X	
	LMS 88-11	X	X	
	LMS 88-12	X	X	
	LMS 88-13	X	X	
	LMS 88-14	X	X	
	LMS 88-15	X	X	
	LMS 88-16	X	X	
	LMS 88-17	X	X	
	LMS 88-18	X	X	
	LMS 88-19	X	X	
	LMS 88-20	X	X	
	LMS 88-21	-	X	*
	LMS 88-22	-	X	*
	LMS 88-23	-	X	*
	LMS 88-24	-	X	*
	LMS 88-25	-	X	*
	LMS 88-26	X	X	
	LMS 88-27	X	X	
	LMS 88-28	X	X	
	LMS 88-29	X	X	
	LMS 88-30	X	X	
	LMS 88-31	X	X	
	LMS 88-32	X	X	
	LMS 88-33	X	X	
	LMS 88-34	X	X	
	LMS 88-35	X	X	
	LMS 88-36	X	X	
	LMS 88-37	X	X	
	LMS 88-38	X	X	
	LMS 88-39	X	X	
	LMS 88-40	X	X	
	LMS 88-41	X	X	
	LMS 88-59	X	X	
	LMS 88-60	X	X	
	LMS 88-61	X	X	
	LMS 88-62	X	X	

SECTION	SAMPLE NUMBER	2 KG SPLIT	-2.0+0.25mm size fraction from 600g split
SUNDANCE	SUN 87-1	X	X
	SUN 87-2	X	X
	SUN 87-3	X	X
	SUN 87-4	X	X
	SUN 87-5	X	X
	SUN 87-6	X	X
	SUN 87-7	X	X
	SUN 87-8	X	X
	SUN 87-9	X	X
	SUN 87-10	X	X
	SUN 87-11	X	X
	SUN 87-12	X	X
	SUN 87-13	X	X
	SUN 87-14	X	X
	SUN 87-15	-	X *
	SUN 87-16	-	X *
	SUN 87-17	-	X *
	SUN 87-18	-	X *
	SUN 87-19	-	X *
	SUN 87-20	-	X *
	SUN 87-21	-	X *
	SUN 87-22	-	X *
	SUN 87-23	-	X *
	SUN 87-24	-	X *

N.B. * Not listed by Geological Services Branch

TABLE 2

RESULTS AFTER MICROPROBING

Sample Number	Size Fraction	No of Grains	Mineral	Kimberlitic Affinities
LMS 88-4	-0.5+0.3mm	1	Garnet	Yes
LMS 88-19	-1.0+0.5mm	1	Garnet	Yes
LMS 88-19	-0.5+0.3mm	1	Garnet	Yes
CON 88-16	-1.0+0.5mm	1	non defined	No
CON 88-16	-0.5+0.3mm	1	Garnet	Yes
CON 88-16	-0.5+0.3mm	1	Ilmenite	Yes
CON 88-23	-1.0+0.5mm	1	Chromite	Yes
CON 88-34	-0.5+0.3mm	1	Ilmenite	Yes
SUN 87-1	-0.5+0.3mm	1	Garnet	Yes
SUN 87-2	-0.5+0.3mm	1	Ilmenite	Yes
SUN 87-8	-0.5+03.mm	1	Ilmenite	Yes
SUN 87-10	-0.5+0.3mm	1	Garnet	Yes

GARNET DATA FILE : M89X679.G1 - CAN89053.G TABLE : 3 PAGE 1

	SAMPLE NAME	SIZE	SIO2	TIO2	AL203	CR2O3	FEO	MGO	MNO	CAO	TOTAL
1	ZMS88-4-1	0.3	42.04	0.83	19.05	2.01	8.73	22.55	0.29	4.70	100.20
2	ZMS88-19-2	0.5	41.54	0.59	19.11	2.54	7.50	23.43	0.17	4.76	99.64
3	ZMS88-19-3	0.3	39.59	0.26	19.93	0.03	23.36	10.19	0.32	6.17	99.85
4	CON88-16-5	0.3	40.80	0.41	20.12	5.28	5.53	21.26	0.21	4.67	98.28
5	SUN87-1-9	0.3	42.43	0.68	18.14	4.60	7.55	20.57	0.30	6.13	100.40
6	SUN87-10-12	0.3	42.33	0.37	17.95	5.87	6.94	22.26	0.34	5.50	101.56

ILMENITE DATA FILE : M89X679.I1 - CAN89053.I TABLE : 4 PAGE 1

	SAMPLE NAME	SIZE	SIO2	TIO2	AL2O3	CR2O3	FEOT	MGO	MNO	CAO	TOTAL	FEO	FE2O3	CTOTAL
1	CON88-16-6	0.3	0.00	51.35	0.30	0.74	35.26	10.48	0.41	0.04	98.58	27.10	9.07	99.49
2	CON88-34-8	0.3	0.02	50.44	0.52	0.27	36.26	11.11	0.26	0.05	98.93	25.41	12.06	100.14
3	SUN87-2-10	0.3	0.02	53.08	0.72	0.89	31.11	13.45	0.45	0.09	99.81	23.41	8.56	100.67
4	SUN87-8-11	0.3	0.05	48.01	0.54	0.59	34.76	10.66	0.20	0.03	94.84	24.08	11.87	96.03

CHROMITE DATA FILE : M89X679.S1 - CAN89053.S TABLE : 5 PAGE 1

	SAMPLE NAME	SIZE	SIO2	TIO2	AL2O3	CR2O3	FEOT	MGO	MNO	CAO	TOTAL	FEO	FE2O3	CTOTAL
1	CON88-23-7	0.5	0.00	0.06	12.41	56.07	21.88	10.37	0.72	0.03	101.54	18.06	4.25	101.97

OTHER MINERALS DATA FILE : M89X579.01 - CAN89053.0 TABLE : 6 PAGE 1

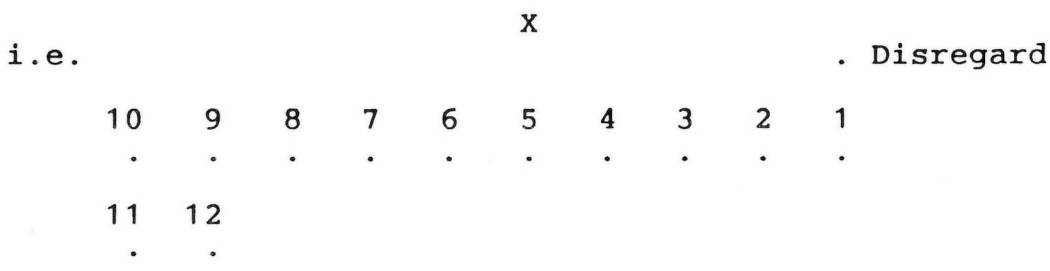
	SAMPLE NAME	SIZE	SIO2	TIO2	AL2O3	CR2O3	FEO	MGO	MNO	CAO	NA2O	TOTAL
1	CON88-16-4	0.5	0.02	2.77	20.26	24.10	31.62	13.68	0.17	0.05	0.00	92.67

TABLE 7

Mount code for grain analysis by Microprobe

NOTE: The top of the mount is marked with an X.

Grain positions are sequentially numbered in the first row from top right to top left; in the second row, the numbering runs from left to right. The grain in the upper right corner was placed there by error and is not in any way related to this report.



Grain #	Sample #	Mineral
1	LMS 88-4	Garnet
2	LMS 88-19	Garnet
3	LMS 88-19	Garnet
4	CON 88-16	Non defined
5	CON 88-16	Garnet
6	CON 88-16	Ilmenite
7	CON 88-23	Chromite
8	CON 88-34	Ilmenite
9	SUN 87-1	Garnet
10	SUN 87-2	Ilmenite
11	SUN 87-8	Ilmenite
12	SUN 87-10	Garnet

Consignor's reference CAN89/053
Laboratory reference M89/679

Number of mounts 1
Number of grains 12