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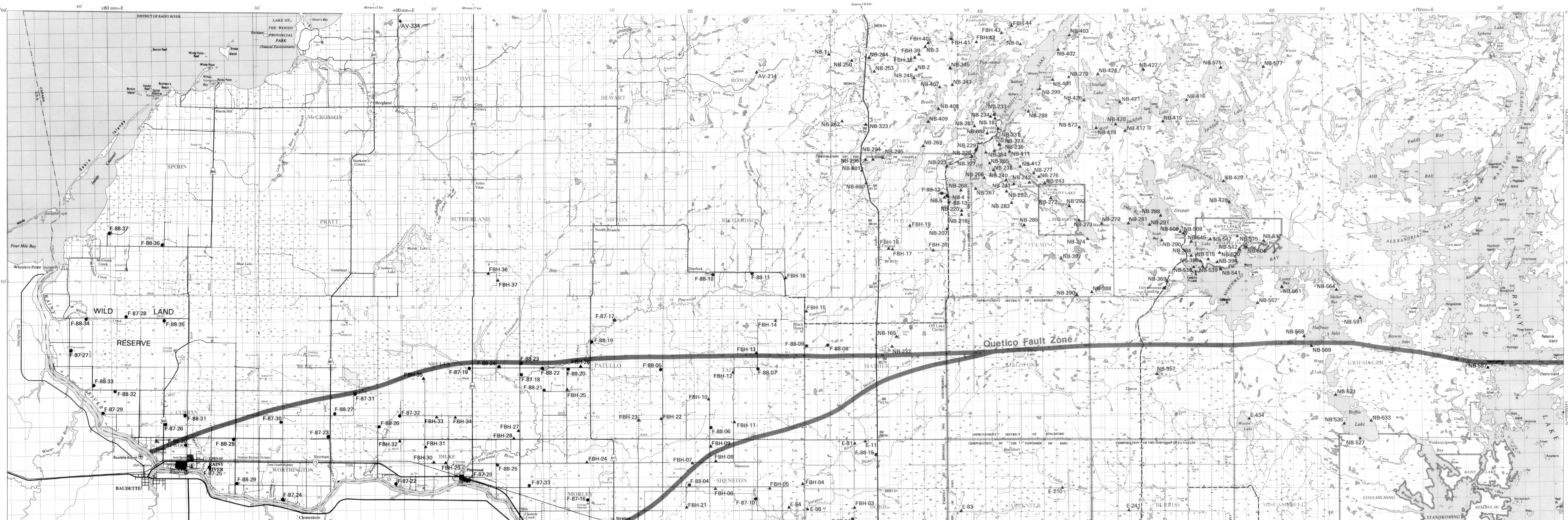
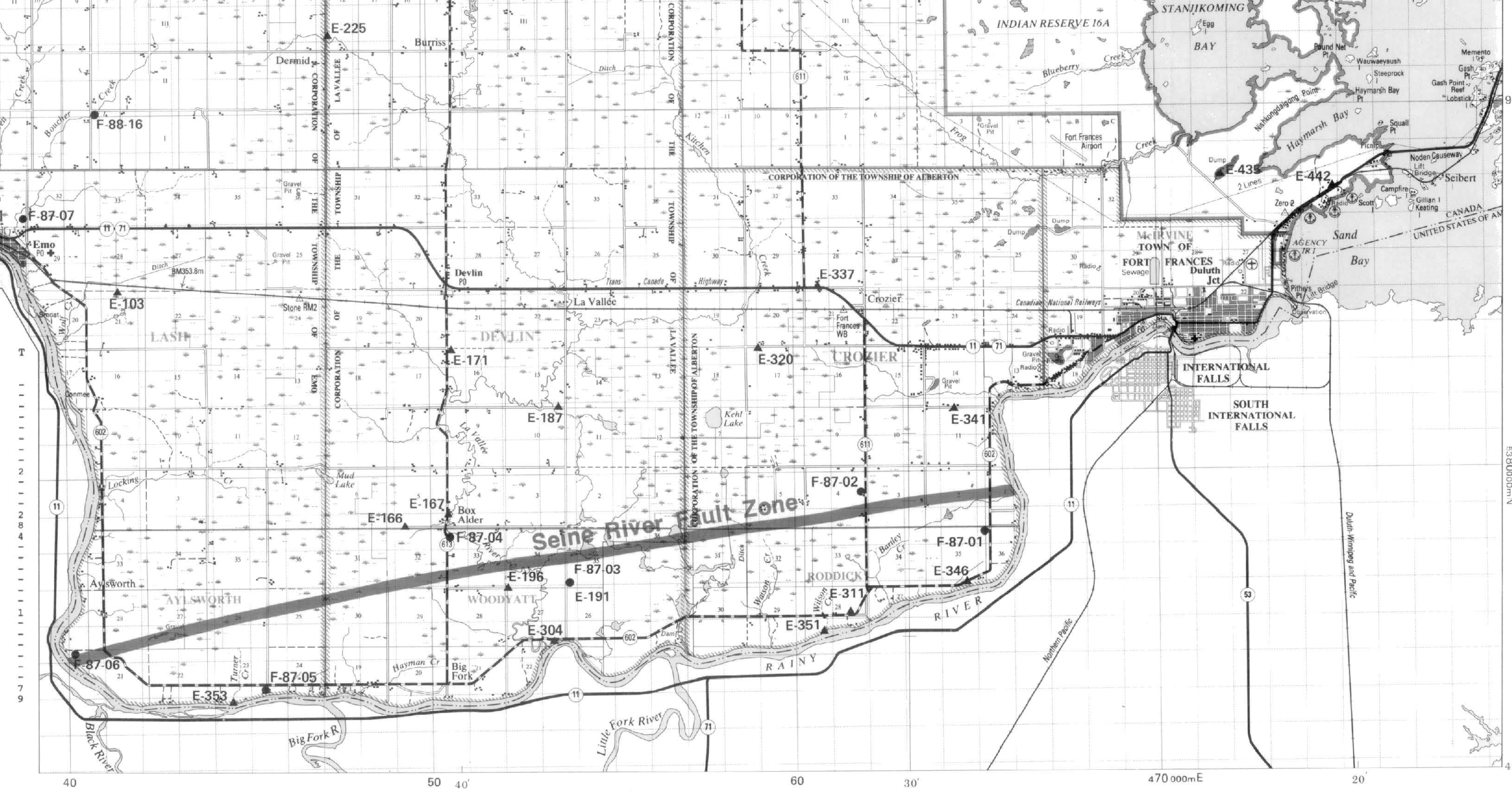




Ministry of Northern Development and Mines — Mines and Minerals Division
Ontario

Ontario Geological Survey
MAP P.3140
Geological Series - Preliminary Map

Gold Grains in Rotasonic Drill Core and Surface Samples (1987-1988)

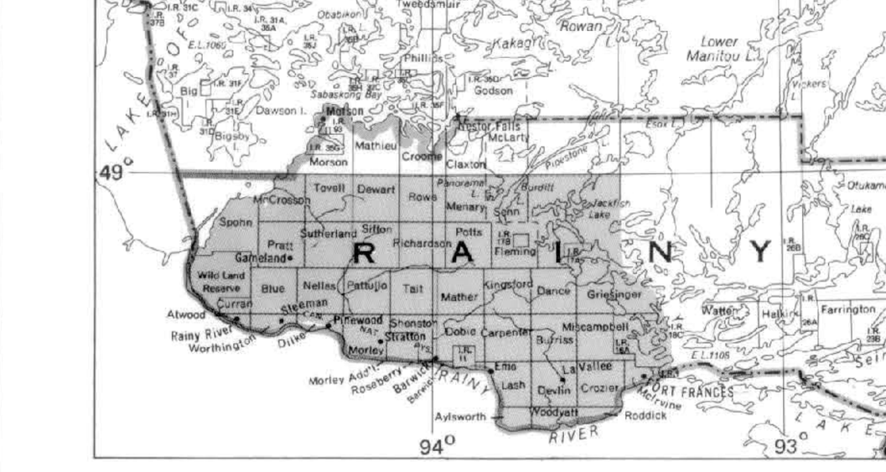
Fort Frances-Rainy River Area
District of Rainy River

Scale 1:100 000

Kilometres 1 0 2 4 6 Kilometres

Miles 1 0 1 2 3 4 Miles

NTS References: 52 D/9,10,15,16; 52 C/11,12,13,14
ODM-GSC Aeromagnetic Maps: 1167G, 1175G
ODM Geological Compilation Map: 2443



LOCATION MAP — Scale: 1:1 584 000 or 1 inch to 25 miles

LEGEND

● F-87-27 Rotasonic drill hole locations (1987-1988)

▲ FBH 24 Surface test pit locations (1987-1988) (including hand dug test pits and backhoe trenches)

Fault Zone

SOURCES OF INFORMATION

Base maps from Maps 52C/NW and 52D/NE of the National Topographic Series.

Metric conversion factor: 1 foot = 0.3048 m

CREDITS

Geology by A.F. Bajc, 1987 and 1988.
Data compiled by A.F. Bajc. Drafting and layout by B. Aikman.

Every possible effort has been made to ensure the accuracy of the information presented on this map; however, the Ontario Ministry of Northern Development and Mines does not assume any liability for errors that may occur. Users may wish to verify critical information.

This project is part of the five year Canada/Ontario 1985 Mineral Development Agreement (COMDA), a subsidiary agreement to the Economic and Regional Development Agreement (ERDA) signed by the governments of Canada and Ontario.

Issued 1988.

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form.

Bajc, A.F.
1988: Gold Grains in Rotasonic Drill Core and Surface Samples (1987-1988) Fort Frances-Rainy River Area, District of Rainy River; Ontario Geological Survey, Map P.3140, Geological Series - Preliminary Map, scale 1:100 000. Geology 1987, 1988.

KEY TO TABLES

Material Type: "NE" refers to northeastern derived drift.
"W" refers to western derived drift.

Gold Grains: "A" refers to abraded gold grains.
"I" refers to irregular gold grains.
"D" refers to delicate gold grains.
"T" refers to the total number of gold grains.

Native Copper: "P" refers to native copper being present.

BOREHOLE SAMPLES

Hole Number	Sample Number	Material Type	Sample Interval (m)	Gold Grains A	I	D	T	Native Copper
F-87-01	01	Till-W	1.5-3.1	-	-	-	-	-
	02	Till-W	3.1-4.6	-	-	-	-	-
	03	Till-W	4.6-7.6	-	-	-	-	-
	04	Till-W	7.6-10.7	-	-	-	-	-
	05	Till-W	10.7-13.7	-	-	-	-	-
	06	Till-W	13.7-16.8	-	-	-	-	-
	07	Till-W	21.3-24.4	-	-	-	-	-
	08	Till-W	24.4-27.4	-	-	-	-	-
	09	Till-W	27.4-30.5	-	-	-	-	-
	10	Till-W	31.1-32.0	-	-	-	-	-
	11	Till-NE	32.6-33.4	-	-	-	-	-
F-87-02	01	Till-W	3.1-6.1	-	-	-	-	-
	02	Till-W	6.1-9.1	-	-	-	-	-
	03	Till-W	11.3-13.7	-	-	-	-	-
	04	Till-W	14.6-16.3	-	-	-	-	-
	05	Till-NE	20.7-23.8	-	-	-	-	-
F-87-03	01	Till-W	4.6-7.6	-	-	-	-	-
	02	Till-W	7.6-10.7	-	-	-	-	-
	03	Till-W	10.7-13.4	-	-	-	-	-
F-87-04	01	Till-W	7.0-10.1	-	-	-	-	-
	02	Till-W	10.1-13.1	-	-	-	-	-
	03	Till-W	16.2-19.2	-	-	-	-	-
	04	Till-W	23.8-25.3	-	-	-	-	-
	05	Till-W	28.4-31.4	-	-	-	-	-
	07	Sand-NE	34.1-36.3	-	-	-	-	-
F-87-05	01	Till-W	4.6-7.6	-	-	-	-	-
	02	Till-W	9.5-11.0	-	-	-	-	-
	03	Sand-NE	32.0-41.2	-	1	-	1	-
F-87-06	01	Till-W	6.1-9.1	-	-	-	-	-
	02	Till-W	9.1-12.2	-	-	-	-	-
	03	Till-W	12.2-15.2	-	-	-	-	-
	04	Till-NE	21.3-22.6	-	-	-	-	-
	05	Till-NE	22.6-23.5	-	-	-	-	-
	06	Till-NE	23.5-24.5	-	-	-	-	-
F-87-07	01	Till-W	4.1-7.6	-	-	-	-	-
	02	Till-W	10.7-13.7	-	-	-	-	-
	04	Till-W	22.9-25.9	-	-	-	-	-
	06	Till-NE	34.4-35.4	-	-	-	-	P
F-87-08	01	Till-W	4.6-7.6	-	-	-	-	-
	03	Till-W	10.7-13.7	-	-	-	-	-
	05	Till-W	16.8-19.8	-	-	-	-	-
	07	Till-W	22.9-25.9	-	-	-	-	-
	09	Sand-NE	41.2-53.3	2	-	-	2	-
	10	Till-NE	54.6-55.5	-	-	-	-	-
	11	Till-NE	52.4-53.7	-	1	-	1	-
F-87-09	01	Till-W	3.1-4.6	-	-	-	-	-
	02	Till-W	6.1-7.6	-	-	-	-	-
	03	Till-NE	12.5-13.7	-	-	-	-	-
F-87-10	02	Till-W	3.7-4.3	-	-	-	-	-
F-87-11	01	Till-W	4.6-7.6	-	-	-	-	-
	03	Till-W	10.7-13.7	-	-	-	-	-
	04	Till-W	13.7-15.4	-	-	-	-	-
	06	Till-NE	23.5-25.8	1	-	-	1	-
	08	Till-NE	22.9-23.5	-	-	-	-	-
F-87-12	02	Till-W	7.6-10.2	-	-	-	-	-
	03	Sand-NE	16.8-27.0	-	-	-	-	-
	04	Till-NE	27.0-27.6	1	-	-	1	-
F-87-13	02	Till-W	9.1-12.2	-	-	-	-	-
	04	Till-W	15.2-17.2	-	-	-	-	-
F-87-14	02	Till-W	4.6-7.6	-	-	-	-	-
	04	Till-W	10.7-13.7	-	-	-	-	-
	06	Till-W	16.8-19.8	-	-	-	-	-
	08	Till-W	22.1-24.4	-	-	-	-	-
	09	Till-NE	32.6-34.4	4	-	-	4	-
	10	Till-NE	34.4-36.3	4	1	-	5	-
	11	Till-NE	36.3-38.1	2	-	-	2	-
F-87-15	01	Till-W	10.7-14.9	-	-	-	-	-
	02	Till-W	15.4-16.2	-	-	-	-	-
F-87-16			No Samples					
F-87-17	01	Till-W	8.7-10.4	-	-	-	-	-
	04	Till-W	13.0-16.5	-	-	-	-	-
	05	Till-NE	26.8-29.0	-	-	-	-	-
F-87-18	02	Till-W	33.5-35.1	-	-	-	-	P
	03	Till-W	35.1-36.7	2	1	-	3	-
F-87-19	01	Till-W	9.1-11.0	-	-	-	-	-
	03	Sand-W	13.1-17.2	2	-	1	3	P
	05	Till-W	31.9-32.5	-	-	-	-	-
	06	Till-NE	33.4-34.3	6	-	-	6	P
F-87-20	02	Till-W	9.1-12.2	-	-	-	-	-
	04	Till-NE	28.4-30.8	-	1	-	1	P
F-87-21	02	Till-W	6.1-9.1	-	1	-	1	-
	04	Till-W	12.2-13.7	-	-	-	-	-
	06	Till-W	22.9-25.6	-	-	-	-	-
	07	Till-NE	29.0-32.0	-	1	-	1	-
	08	Till-NE	32.0-32.6	2	-	-	2	-
F-87-22	02	Till-W	6.1-9.1	-	-	-	-	-
	04	Till-W	12.2-15.2	-	-	-	-	-
	06	Till-NE	21.0-23.5	-	-	-	-	P
	07	Till-NE	23.5-24.4	1	1	-	2	P
	08	Till-NE	24.4-25.6	-	1	1	2	P
	09	Till-NE	25.6-27.1	2	-	-	2	P
	10	Till-NE	27.1-28.7	-	-	-	-	P
	11	Till-NE	28.7-30.3	-	-	-	-	-
F-87-23	02	Till-W	6.1-9.1	-	-	-	-	-
	04	Till-W	12.2-15.2	-	-	-	-	-
	06	Till-W	18.3-21.3	-	-	-	-	-
	08	Till-W	24.4-27.4	-	-	-	-	-
	10	Till-NE	34.9-36.6	1	-	-	1	P
	11	Till-NE	36.6-38.1	-	-	-	-	-
	12	Till-NE	38.1-39.3	-	-	-	-	-
	13	Till-NE	39.3-40.5	-	-	-	-	-
	14	Till-NE	40.5-41.2	-	-	-	-	-
F-87-24	02	Till-W	6.1-9.1	-	-	-	-	-
	04	Till-W	12.2-14.6	-	-	-	-	-
	05	Till-W	14.8-18.3	-	-	-	-	-
	07	Till-W	21.3-24.4	-	-	-	-	-
	09	Till-W	27.4-29.3	-	-	-	-	P
	10	Till-NE	30.9-32.0	1	-	-	1	-
	11	Till-NE	32.0-33.2	1	-	-	1	-
F-87-25	02	Till-W	6.1-9.6	-	-	-	-	-
	04	Till-W	13.7-17.5	1	-	-	1	-
	06	Till-NE	22.0-22.9	-	-	-	-	-
	07	Sand-NE	23.5-32.9	-	-	-	-	-
	08	Till-NE	32.9-33.5	-	-	-	-	-
	09	Till-NE	33.5-40.2	-	-	-	-	-
	12	Till-NE	40.2-40.5 & 41.9-42.2	4	-	-	4	-
F-87-26	02	Till-W	6.1-9.1	-	-	-	-	-
	03	Till-W	9.1-11.7	-	-	-	-	-
	05	Sand-NE	11.9-25.3	4	-	-	4	-
	06	Till-W	25.3-26.7	-	-	-	-	P
	07	Till-NE	26.7-27.6	2	1	-	3	-
	08	Till-NE	27.6-28.4	-	-	-	-	-
F-87-27	02	Till-W	6.1-9.1	-	-	-	-	-
	07	Till-NE	23.8-25.3	2	-	1	3	-
	08	Till-NE	25.3-26.5	1	-	-	1	-
	09	Till-NE	26.5-27.6	2	-	-	2	-
	10	Till-NE	27.6-28.7	-	-	-	-	-
	11	Till-NE	28.7-29.6	3	1	-	4	P
	12	Till-NE	30.0-31.1	2	-	-	2	-
	13	Till-NE	31.1-32.6	3	-	-	3	-
	14	Till-NE	32.6-33.5	2	-	-	2	-
	15	Till-NE	33.5-34.8	5	-	-	5	-
	16	Till-NE	34.8-36.3	1	1	-	2	-
	18	Till-NE	36.3-38.1	8	3	-	11	-
F-87-28	03	Till-NE	14.6-16.5	5	2	-	7	-
	04	Till-NE	16.5-18.8	-	-	-	-	-
	05	Till-NE	18.8-20.4	7	-	-	7	-
	06	Till-NE	20.4-22.6	8	1	-	9	-
	07	Till-NE	22.6-24.4	3	-	-	3	-
	08	Till-NE	24.4-25.9	7	1	-	8	-
	09	Till-NE	25.9-27.4	3	2	-	5	-
	10	Till-NE	27.4-29.0	1	1	-	2	-
	11	Till-NE	29.0-30.0	-	-	-	-	-
	12	Till-NE	30.0-30.6	3	-	-	3	-
F-87-29	03	Till-W	9.6-11.0	-	-	-	-	-
	04	Till-W	13.7-14.9	-	-	-	-	P
	07	Till-NE	24.8-25.9	1	2	-	3	-
	08	Till-NE	27.9-28.7	2	3	-	5	-
	09	Till-NE	28.7-30.3	6	-	-	6	-
	10	Till-NE	30.3-31.4	3	-	-	3	-
	11	Till-NE	31.4-32.9	10	-	-	10	-
F-87-30	02	Till-W	5.2-7.8	-	-	-	-	-
	06	Sand-NE	19.8-33.2	-	-	-	-	-
F-87-31	03	Sand-NE	14.6-22.9	-	-	-	-	-
	04	Sand-NE	22.9-38.1	-	-	-	-	-
	05	Till-NE	41.5-43.0	-	-	-	-	-
	06	Till-NE	43.0-44.5	-	-	-	-	-
F-87-32	02	Till-W	8.5-11.4	-	-	-	-	-
	05	Till-NE	20.7-22.9	-	-	-	-	-
	06	Till-NE	22.9-23.9	-	-	-	-	-
	07	Till-NE	23.9-24.4	-	-	-	-	-
F-87-33	01	Till-W	15.5-18.3	-	-	-	-	-
	03	Till-W	21.3-24.8	-	-	-	-	-
	05	Till-W	27.4-30.5	-	-	-	-	-
	07	Till-W	33.5-36.6	-	-	-	-	-
	09	Till-W	39.9-41.8	-	-	-	-	-
	13	Till-NE	56.5-57.6	-	-	-	-	-
	14	Till-NE	57.6-57.9	1	1	-	2	-
F-87-34	02	Till-W	3.1-5.0	4	-	-	4	-
	04	Till-W	7.6-10.2	1	1	-	2	-
	05	Till-NE	11.7-12.8	-	-	-	-	-
	06	Till-NE	12.8-13.4	-	-	-	-	-
	07	Till-NE	13.4-14.8	1	-	-	1	P
F-88-01	06	Till-NE	42.0-43.0	1	-	-	1	P
	07	Till-NE	43.0-44.3	1	1	-	2	P
F-88-02	03	Till-NE	17.8-18.5	3	-	-	3	-
	04	Till-NE	19.6-21.1	1	-	-	1	-
F-88-03			No Samples					
F-88-04	03	Till-NE	31.0-32.0	10	-	-	10	-
	04	Till-NE	32.0-33.2	8	-	-	8	-
F-88-05	02	Till-NE	5.7-6.3	8	5	1	14	-
F-88-06	03	Till-NE	16.0-16.7	6	-	-	6	-
	04	Sand-NE	17.0-17.4	-	-	-	-	-
	05	Till-NE	17.4-17.6	2	-	1	3	-
F-88-07	03	Till-NE	17.6-18.0	11	-	1	12	P
	04	Till-NE	18.6-19.9	2	1	-	3	-
	05	Sand-NE	19.9-21.0	-	-	-	-	-
	06	Till-NE	23.0-24.6	2	-	-	2	-
	07	Till-NE	24.6-25.8	-	-	-	-	-
F-88-08	03	Till-NE	12.9-14.2	2	-	-	2	-
	04	Sand-NE	14.2-14.9	4	-	-	4	-
	05	Till-NE	14.9-15.7	-	-	-	-	-
F-88-09	01	Till-NE	14.2-16.0	2	-	-	2	-
	02	Till-NE	16.0-17.5	1	3	-	4	-
	03	Till-NE	17.5-19.1	3	-	-	3	-
F-88-10	03	Till-NE	15.5-17.0	4	-	-	4	-
	04	Till-NE	17.0-18.5	5	-	-	5	-
	05	Till-NE	18.5-19.8	4	-	-	4	-
	06	Sand-NE	19.8-22.8	3	4	-	7	-
	07	Till-NE	22.8-25.4	6	1	1	8	-
	08	Till-NE	25.4-27.8	4	2	-	6	-
	09	Sand-NE	27.8-32.0	7	4	2	13	-
	10	Till-NE	32.0-33.4	6	-	-	6	-
F-88-11	04	Till-NE	16.7-18.4	16	10	6	32	P
	05	Till-NE	18.4-20.2	12	28	11	51	P
	06	Till-NE	20.2-22.5	14	26	30	70	P
	07	Till-NE	22.5-23.7	7	21	21	49	P
F-88-12	01	Till-NE	12.1-12.8	-	-	-	-	-
F-88-13	01	Till-NE	0.3-2.0	-	-	-	-	-
	02	Till-NE	2.0-3.8	-	4	-	4	-
	03	Till-NE	3.8-5.2	-	3	2	5	-
	04	Till-NE	5.2-6.6	1	3	1	5	-
	05	Till-NE	6.6-8.0	2	3	2	7	-
	06	Till-NE	8.0-9.0	2	-	-	2	-
F-88-14	03	Till-NE	21.8-22.2	1	1	-	2	P
F-88-15	03	Sand-NE	17.0-24.5	2	-	-	2	-
	04	Till-NE	24.5-24.6	-	-	-	-	-
F-88-16	05	Till-NE	39.5-39.8	-	-	-	-	-
F-88-17	03	Sand-NE	30.0-31.2	-	-	-	-	-
	04	Till-NE	31.2-31.5	1	-	-	1	-
F-88-18	04	Till-NE	36.0-37.0	6	-	-	6	P
	05	Till-NE	37.0-38.0	5	-	-	5	P
F-88-19	01	Till-NE	14.8-16.8	1	5	2	8	P
	02	Till-NE	16.8-19.0	1	6	1	8	P
	03	Till-NE	19.0-21.2	1	1	-	2	P
F-88-20	01	Till-NE	17.5-20.0	1	4	-	5	P
	02	Till-NE	20.0-21.5	1	7	1	9	P
	03	Till-NE	21.5-23.0	1	1	1	3	P
F-88-21	01	Till-NE	9.4-10.4	-	-	-	-	-
F-88-22	01	Till-NE	26.3-27.3	2	2	-	4	P
F-88-23	01	Till-NE	26.5-27.7	-	-	-	-	P
	02	Till-NE	27.7-29.0	-	-	-	-	-
	03	Till-NE	29.0-32.0	-	-	-	-	-
	04	Till-NE	32.0-33.5	1	4	-	5	P
	05	Till-NE	33.5-35.5	2	-	-	2	P
	06	Till-NE	35.5-36.5	-	-	-	-	-
F-88-24	01	Till-NE	34.4-36.0	1	3	-	4	P
	02	Till-NE	36.0-36.9	3	1	-	4	P
F-88-25	03	Till-NE	34.8-37.6	1	1	1	3	P
F-88-26	04	Till-NE	19.9-21.6	-	-	-	-	-
F-88-27	03	Till-NE	24.0-25.0	-	-	-	-	-
F-88-28	03	Till-NE	20.5-21.5	-	-	-	-	-
F-88-29	04	Till-NE	34.3-35.1	-	-	-	-	-
	05	Till-NE	35.1-36.2	1	3	-	4	P
	06	Till-NE	36.2-37.7	3	-	-	3	P
F-88-30	05	Till-NE	28.4-30.2	-	-	-	-	-
F-88-31	05	Till-NE	27.5-29.2	5	5	1	11	P
	06	Sand-NE	29.2-31.0	1	1	-	2	-
	07	Till-NE	31.0-31.4	-	-	-	-	-
F-88-32	04	Till-NE	18.3-19.0	-	-	-	-	-
	05	Till-NE	19.0-19.5	-	-	-	-	-
	06	Sand-NE	19.5-22.4	-	-	-	-	-
F-88-33	06	Sand-NE	19.6-23.4	6	5	-	11	-
	07	Till-NE	23.4-23.9	-	-	-	-	-
	08	Sand-NE	23.9-24.6	-	-	-	-	-
	09	Till-NE	24.6-25.2	-	-	-	-	-
	13	Sand-U	31.4-35.5	1	1	-	2	-
	14	Sand-U	35.5-39.3	-	-	-	-	-
	15	Sand-U	39.3-42.5	1	-	-	1	-
	16	Sand-U	44.0-49.8	-	-	-	-	-
	18	Sand-U	50.0-52.3	-	-	-	-	-
F-88-34	04	Till-NE	16.5-17.6	-	-	-	-	-
	05	Till-NE	17.6-18.8	-	-	-	-	-
	06	Till-NE	18.8-20.0	2	2	-	4	-
	07	Till-NE	20.0-21.2	7	1	-	8	-
	08	Till-NE	21.2-23.0	9	-	-	9	-
	09	Till-NE	23.0-24.8	10	2	-	12	-
	10	Till-NE	24.8-26.6	7	-	-	7	-
	11	Till-NE	26.6-28.4	5	-	-	5	-
	12	Till-NE	28.4-30.1	1	-	-	1	-
	13	Till-NE	30.1-32.0	-	-	-	-	-
	14	Sand-NE	32.0-33.7	-	-	-	-	-
	15	Till-NE	33.7-37.6	7	-	-	7	-
	16	Till-NE	37.6-40.0	7	-	-	7	-
	17	Till-NE	40.8-42.0	2	2	-	4	-
	18	Till-NE	42.0-42.7	3	2	-	5	-
F-88-35	04	Till-NE	7.6-8.9	7	-	-	7	-
	05	Till-NE	9.9-12.0	13	1	-	14	-
	06	Till-NE	12.0-14.0	4	-	-	4	-
	07	Till-NE	14.4-15.9	3	-	-	3	-
	08	Till-NE	15.9-17.3	7	-	-	7	-
	09	Till-NE	17.3-20.8	4	-	-	4	-
	10	Till-NE	20.8-24.0	-	-	-	-	-
	11	Till-NE	24.0-25.5	1	-	-	1	P
	12	Till-NE	25.5-27.0	5	-	-	5	P
	13	Till-NE	27.0-28.5	8	-	-	8	P
	14	Till-NE	28.5-30.0	2	-	-	2	P
F-88-36	01	Sand-NE	5.0-14.0	9	-	-	9	P
	02	Till-NE	16.4-16.7	4	2	-	6	P
F-88-37	01	Sand-NE	2.5-4.5	6	-	1	7	P
	02	Till-NE	4.5-7.0	1	1	4	6	P
	03	Till-NE	7.0-8.4	5	-	-	5	-
	04	Till-NE	8.4-9.7	2	-	1	3	-
	05	Till-NE	9.7-11.0	7	-	-	7	-
	06	Sand-NE	12.0-17.5	-	-	-	-	-
	07	Sand-NE	17.5-20.0	3	-	-	3	-
	08	Sand-NE	20.0-29.0	3	-	-	3	-
	09	Sand-NE	29.0-38.0	-	-	-	-	-
	10	Till-NE	39.3-40.0	7	-	-	7	-
	11	Sand-NE	40.0-44.4	5	-	-	5	-

SURFACE TEST PIT SAMPLES

Sample Number	Material Type	Gold Grains A	I	D	T
AV-214	Till-NE	-	-	-	-
AV-334	Till-NE	7	3	-	10
E-11	Till-W	-	-	-	-
E-31A	Till-W	3	-	-	3
E-31B	Till-W	-	-	-	-
E-47	Till-W	-	-	-	-
E-54	Till-W	-	-	-	-
E-56	Till-W	-	-	-	-
E-83	Till-W	-	-	-	-
E-103	Till-W	-	-	-	-
E-166	Till-W	-	-	-	-
E-167	Till-W	-	-	-	-
E-171	Till-W	-	-	-	-
E-187	Till-W	-	-	-	-
E-191	Till-W	-	-	-	-
E-196	Till-W	-	-	-	-
E-210	Till-W	-	-	-	-
E-225	Till-W	-	-	-	-
E-231	Till-W	-	-	-	-
E-241	Till-W	-	-	-	-
E-304	Till-W	-	-	-	-
E-311	Till-W	-	-	-	-
E-320	Till-W	-	-	-	-
E-337A	Till-W	-	-	-	-
E-337B	Till-NE	-	-	-	-
E-341	Till-W	-	-	-	-
E-346	Till-W	-	-	-	-
E-351	Till-W	-	-	-	-
E-353	Till-W	-	-	-	-
E-434	Till-NE	-	-	-	-
E-435B	Till-W	-	-	-	-
E-442	Till-NE	-	-	-	-
NB-1	Till-NE	1	-	-	1
NB-2	Till-NE	9	1	-	10
NB-3	Till-NE	3	-	-	3
NB-4G	Till-NE	8	-	-	8
NB-4R	Till-NE	4	1	-	5
NB-5L	Till-NE	-	-	-	-
NB-9	Till-NE	-	2	1	3
NB-18	Till-NE	3	5	2	10
NB-165B	Till-NE	-	-	-	-
NB-207	Till-NE	-	-	-	-
NB-218	Till-NE	1	-	1	2
NB-220	Till-NE	-	-	-	-
NB-223	Till-NE	-	-	-	-
NB-227	Till-NE	1	1	4	6
NB-228	Till-NE	2	1	3	6
NB-229	Till-NE	-	-	-	-
NB-231	Till-NE	-	-	-	-
NB-232A	Till-W	1	-	-	1
NB-232B	Till-NE	-	-	-	-
NB-233	Till-NE	-	-	-	-
NB-234	Till-NE	-	-	-	-
NB-236	Till-NE	1	1	-	2
NB-238	Till-NE	-	-	-	-
NB-240	Till-NE	1	-	-	1
NB-241	Till-NE	-	-	-	-
NB-242	Till-NE	-	-	-	-
NB-243	Till-NE	-	-	-	-
NB-244	Till-NE	-	1	-	1
NB-248	Till-NE	-	-	-	-
NB-250	Till-NE	1	-	-	1
NB-253	Till-NE	-	-	-	-
NB-262	Till-NE	1	-	-	1
NB-264	Till-NE	2	1	2	5
NB-265	Till-NE	1	-	1	2
NB-266	Till-NE	1	-	-	1
NB-267	Till-NE	1	1	6	8
NB-268	Till-NE	1	1	1	3
NB-269	Till-NE	1	-	-	1
NB-270	Till-NE	-	-	-	-
NB-271	Till-NE	2	1	1	4
NB-272	Till-NE	-	-	-	-
NB-273	Till-NE	-	-	-	-
NB-274	Till-NE	-	-	-	-
NB-276	Till-NE	-	-	-	-
NB-277	Till-NE	-	-	-	-
NB-279	Till-NE	-	-	-	-
NB-281	Till-NE	-	-	-	-
NB-282	Till-NE	2	1	-	3
NB-283	Till-NE	-	-	-	-
NB-285	Till-NE	-	-	-	-
NB-287	Till-NE	3	1	-	4
NB-288	Till-NE	-	-	-	-
NB-290	Till-NE	-	-	-	-
NB-291	Till-NE	-	-	-	-
NB-292	Till-NE	-	-	-	-
NB-294	Till-NE	3	2	1	6
NB-295	Till-NE	2	-	1	3
NB-296	Till-NE	-	-	-	-
NB-298	Till-NE	-	-	-	-
NB-299	Till-NE	-	-	-	-
NB-323	Till-NE	-	-	-	-
NB-343	Till-NE	5	-	-	5
NB-345	Till-NE	-	-	-	-
NB-357	Till-NE	-	-	-	-
NB-369	Till-NE	-	-	-	-
NB-384	Till-NE	-	-	-	-
NB-386	Till-NE	-	-	-	-
NB-388	Till-NE	-	-	-	-
NB-390	Till-NE	-	-	-	-
NB-394	Till-NE	1	-	1	2
NB-397	Till-NE	-	-	-	-
NB-401	Till-NE	-	-	-	-
NB-402	Till-NE	-	-	-	-
NB-403	Till-NE	3	-	1	4
NB-407	Till-NE	2	-	-	2
NB-408	Till-NE	-	-	-	-
NB-409	Till-NE	-	-	-	-
NB-411	Till-NE	-	-	-	-
NB-412	Till-NE	-	-	-	-
NB-415	Till-NE	-	-	-	-
NB-416	Till-NE	-	-	-	-
NB-417	Till-NE	-	-	-	-
NB-418	Till-NE	-	-	-	-
NB-420	Till-NE	-	-	-	-
NB-421	Till-NE	-	-	-	-
NB-424	Till-NE	-	-	-	-
NB-426	Till-NE	1	1	-	2
NB-427	Till-NE	2	-	-	2
NB-428	Till-NE	-	-	-	-
NB-429	Till-NE	-	-	-	-
NB-504	Till-NE	-	-	-	-
NB-508	Till-NE	-	-	-	-
NB-509	Till-NE	-	-	-	-
NB-512	Till-NE	-	-	-	-
NB-515	Till-NE	-	-	-	-
NB-517	Till-NE	-	-	-	-
NB-518	Till-NE	-	-	-	-
NB-520	Till-NE	-	-	-	-
NB-523	Till-NE	2	-	-	2
NB-527	Till-NE	-	-	-	-
NB-533	Till-NE	-	-	-	-
NB-535	Till-NE	-	-	-	-
NB-538	Till-NE	-	2	-	2
NB-539	Till-NE	7	1	-	8
NB-541	Till-NE	2	1	1	4
NB-545	Till-NE	-	-	-	-
NB-547	Till-NE	-	-	-	-
NB-557	Till-NE	-	-	-	-
NB-561	Till-NE	-	-	-	-
NB-564	Till-NE	-	-	-	-
NB-568	Till-NE	-	-	-	-
NB-569	Till-NE	1	-	-	1
NB-573	Till-NE	-	-	-	-
NB-575	Till-NE	-	-	-	-
NB-577	Till-NE	-	-	-	-
NB-587	Till-NE	-	-	-	-
NB-591	Till-NE	-	-	-	-
NB-600	Till-NE	-	-	-	-
NB-601	Till-NE	3	3	1	7
NB-602	Till-NE	2	4	3	9

BACKHOE TRENCH SAMPLES

Sample Number	Material Type	Gold Grains A	I	D	T
FBH-01-01	Till-W	1	1	1	3
FBH-02	No Samples				
FBH-03-01	Till-NE	-	-	-	-
FBH-04	No Samples				
FBH-05-01	Till-NE	-	-	-	-
FBH-05-02	Till-NE	-	-	-	-
FBH-06-01	Till-NE	-	-	-	-
FBH-06-02	Till-W	-	-	-	-
FBH-07	No Samples				
FBH-08-01	Till-NE	6	-	-	6
FBH-08-02	Till-NE	1	1	1	3
FBH-09-01	Till-NE	2	-	-	2
FBH-09-02	Till-NE	7	1	-	8
FBH-10-01	Till-NE	-	-	-	-
FBH-11	No Samples				
FBH-12-01	Till-NE	13	4	1	18
FBH-13-01	Till-NE	11	1	1	13
FBH-14-01	Till-NE	1	3	-	4
FBH-14-02	Till-NE	7	3	-	10
FBH-15-01	Till-NE	-	-	-	-
FBH-16	No Samples				
FBH-17-01	Till-NE	8	3	3	14
FBH-17-02	Till-NE	6	2	1	9
FBH-18-01	Till-NE	6	-	-	6
FBH-18-02	Till-NE	9	2	5	16
FBH-19-01	Till-NE	3	1	-	4
FBH-19-02	Till-NE	3	1	-	4
FBH-20-01	Till-NE	-	-	-	-
FBH-21-01	Till-NE	4	-	-	4
FBH-22-01	Till-NE	8	7	1	16
FBH-23-01	Till-NE	59	12	10	81
FBH-24-01	Till-NE	14	4	4	22
FBH-25-01	Till-NE	9	2	4	15
FBH-25-02	Till-NE	10	2	1	13
FBH-26-01	Till-NE	9	-	-	9
FBH-27	No Samples				
FBH-28	No Samples				
FBH-29	No Samples				
FBH-30	No Samples				
FBH-31-01	Till-NE	2	1	2	5
FBH-32	No Samples				
FBH-33-01	Till-NE	5	2	-	7
FBH-34-01 & FBH-35-01	Till-NE	13	2	4	19
FBH-36-01	Till-NE	8	1	2	11
FBH-37-01	Till-NE	6	-	1	7
FBH-38-01	Till-NE	3	1	1	5
FBH-39-01	Till-NE	-	-	-	-
FBH-40-01	Till-NE	3	1	-	4
FBH-41-01	Till-NE	6	2	-	8
FBH-42-01	Till-NE	8	1	-	9
FBH-43	No Samples				
FBH-44-01	Till-NE	-	-	-	-

MARGINAL NOTES

Introduction:

The Fort Frances-Rainy River area has experienced very little mineral exploration activity over the past few decades. Part of the reason for this is that the Precambrian bedrock surface is mantled to a large degree by thick glacial deposits (up to 60 m) thus preventing a clear understanding of the distribution of Precambrian rock types and their mineral potential.

Mapping of the Quaternary deposits (Bajc and Gray 1987), (Bajc and White in press); and (Bajc, White, and Gray in press) reveals two glacial packages of sediments over most of the map area. The lower package is derived from a southwesterly flowing ice mass (Labradorean glacier) and forms an even and continuous drift mantle over the entire map area. Deposits of coarse textured till, glaciofluvial sand and gravel, and glaciolacustrine sand, silt, and clay were laid down during this ice advance and retreat. A subsequent advance of ice from the west (Keewatin glacier) resulted in the deposition of the upper glacial package which is found in the western and southeastern quadrants of the map area (Figure 1). The northeastern quadrant was unaffected by this glacial advance. The upper glacial package consists primarily of fine-textured till and glaciolacustrine sand, silt, and clay.

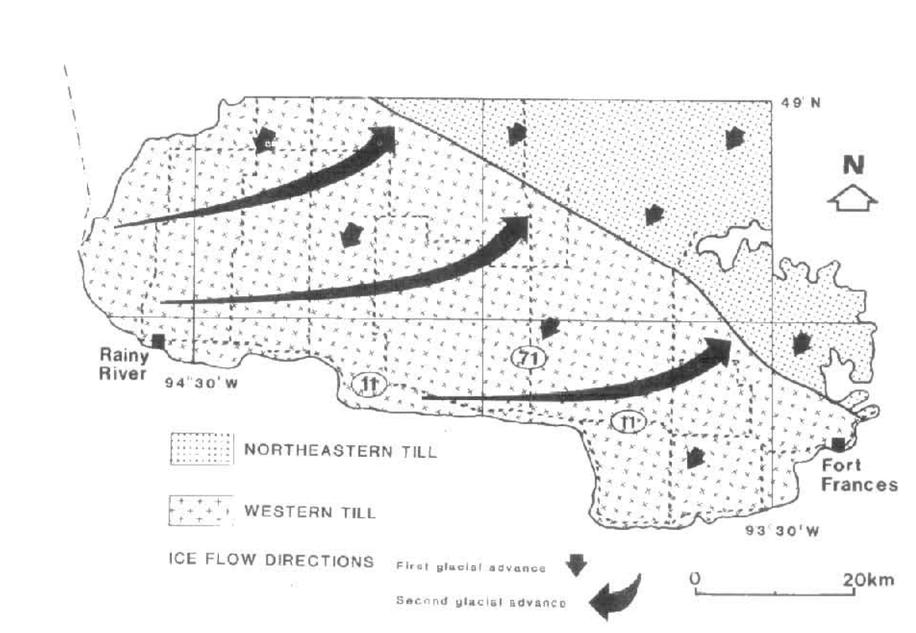


Figure 1: Map showing the distribution of surface tills and their associated ice flow directions within the study area. The outer limit of western derived till follows a northwest-southeast transect across the map area. Older, northeastern derived till and associated sediments are found at depth southwest of this line.

The map accompanying this text presents the location of samples collected during an investigation of the Quaternary geology of the Fort Frances-Rainy River area together with preliminary information on the number and surface morphology of visible gold grains in these samples.

Sample Collection and Processing

A regional till sampling program was undertaken in conjunction with the Quaternary geology mapping which was initiated during the summer of 1986. Samples of till were taken as part of the regular mapping routine along road cut, river bank exposures, from borrow pits, and from hand dug test pits which range in depth from 0.75 to 1.0 m. Additional samples were obtained by deep overburden (rotasonic) drilling and backhoe trenching during the 1987 and 1988 field season. A total of 491 samples of till and glaciofluvial sediment, consisting of 193 surface samples (surface exposures, testpits, and backhoe trenches) and 298 rotasonic drill core samples, were collected for heavy mineral concentration.

Till samples obtained from surface exposures (test pits, and backhoe trenches) were usually taken from the till- bedrock interface or from depths as great as possible. On occasion, till samples were taken from more than one stratigraphic horizon because more than one facies, or a considerable thickness of till was present. In low-lying areas, till was often capped by a thin veneer of glaciolacustrine sand, silt, or clay. Sampling of the rotasonic core was undertaken on a stratigraphic basis rather than on a fixed interval. During the 1987 rotasonic drilling program, the upper, western derived till was sampled over a 3 m interval, where possible, and the lower, northeastern derived till was sampled over a 1.5 m interval. Glaciofluvial sand was sampled over intervals of up to 15 m. During the 1988 rotasonic drilling program, upper, western derived till was not sampled for heavy mineral concentration and gold grain counts, due to its poor reflectance of local bedrock.

Samples obtained from rotasonic drill core and surface exposures weighed approximately 6-10 kg each. Heavy minerals were concentrated and removed from samples by passing them over a shaker table. While on the shaker table, a preliminary count of gold grains was completed. Samples in which gold grains were observed were further refined by a secondary panning procedure on the table heavy mineral concentrate to obtain exact grain counts. At this stage in the processing, the size and shape of gold grains were recorded before they were returned to the heavy mineral concentrate.

Interpretation of Gold Grain Data

The presence of significant numbers of gold grains in the heavy mineral fraction is of interest in exploration because they are a direct indication of mineralization. Where several adjacent (vertical) till samples from drill core yield gold grain counts exceeding the regional background value, it is likely that the source is nearby in the "up ice" direction. High counts of visible gold grains are particularly significant when they occur in till samples taken directly above bedrock (drill or surface samples) indicating an immediate proximity to the mineralization. Gold grains occurring in glaciofluvial samples are generally more difficult to trace to a source due to their erratic distribution and greater distance of transport.

The shape and surface morphology of the gold grains may be used to suggest a distance of transport by glacial processes (Averill et al 1986). This is accomplished by assigning the grains to one of three categories based on appearance.

1) Grains classified as delicate are characterized by primary crystal faces, pitted leaf surfaces, and intact ragged leaf edges. The transport distance of such gold grains is usually less than 100 m.

2) Irregularly shaped gold grains have been transported between 100 and 1000 m. The surfaces of these gold grains are pitted, with the grains either retaining their gross primary shape or having become curled.

3) Abraded gold grains have generally travelled in excess of 1000 m, and have polished surfaces. These grains have a spindled shape or have been reduced to smaller sized grains.

In the Fort Frances-Rainy River area, only 8% of the upper, western derived till samples contain gold grains whereas 56% of the lower, northeastern derived drift samples contain gold. Background gold grain values are 0 to 1 and 0 to 5 grains per 6-10 kg sample for the upper and lower drift packages, respectively.

The tables accompanying this map make it possible to: 1) outline a partial stratigraphic section for each drill hole; 2) determine the type of material sampled (e.g. till or sand); 3) ascertain the approximate distance of transport of the gold grains on the basis of their shape; and 4) determine whether high gold grain values are present in a series of adjacent samples.

Large numbers of abraded native copper grains reaching dimensions exceeding 1 mm were recovered from many of the northeastern derived borehole samples. As of yet, the significance and origin of this native copper is not clearly understood. Supergene enrichment of a base metal occurrence(s) may well be responsible for the formation of this mineral. (Glen Johns, Geologist, Ontario Geological Survey, pers. comm.).

An awareness and understanding of several factors is necessary for the interpretation of the meaning and value of the visible gold grain and native copper numbers. Quaternary history and stratigraphy are of paramount importance. During drilling, the most frequent stratigraphic sequence encountered was, from top to bottom: glaciolacustrine deposits; silty till of western provenance; glaciolacustrine deposits; glaciofluvial sand and gravel; sandy till of northeastern provenance; bedrock. The upper till is very calcareous and contains an abundance of distally derived clasts from Manitoba to the west (e.g. limestone, dolostone, shale, siltstone, and lignite). The lower till contains little carbonate and abundant locally derived lithologies in the pebble fraction. Ice flow associated with the lower till sheet is to the southwest (205-215° Az). This lower, northeastern derived till sheet is the prime sampling medium for a drift prospecting program.

Several boreholes encountered older sediments beneath the lower northeastern-derived till sheet. These subtill sediments consist of either stratified glaciofluvial sand and gravel (F-87-21; F-87-27; F-88-18; and F-88-33) or laminated lacustrine sand, silt, and clay (F-87-31; F-88-05) or weathered till of apparent northeastern provenance (F-87-23). Both the stratified sands and gravels and the laminated lacustrine sediments are probably intimately associated with the southwesterly advancing ice sheet. The nature and stratigraphic significance of the older, weathered till of northeastern provenance is poorly understood because of its infrequent occurrence.

A detailed discussion and assessment of other factors affecting the interpretation of gold grain data will be contained in future Ontario Geological Survey publications. These publications will also detail how such information may be effectively used in exploration for gold and base metal mineralization. The preliminary information contained herein on gold grains and native copper occurrences will be supplemented by additional mineralogical work and detailed geochemical data when it becomes available.

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