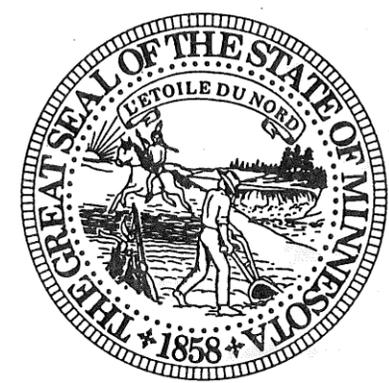




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Regional Survey of Buried Glacial Drift Geochemistry over Archean Terrane in Northern Minnesota



Minnesota Department of Natural Resources
Division of Minerals
Hibbing, Minnesota

Report 252
Part II (of II)

1988

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Regional Survey of Buried Glacial Drift Geochemistry over Archean Terrane in Northern Minnesota

By

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A

Legislative Commission on Minnesota Resources Project

Minnesota Department of Natural Resources
Division of Minerals
Hibbing, Minnesota

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Part II (of II)

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OVERBURDEN DRILLING MANAGEMENT LIMITED - LABORATORY SAMPLE LOG

ABBREVIATIONS

CLAST:
 SIZE OF CLAST:
 G: GRANULES
 P: PEBBLES
 C: COBBLES
 BL: BOULDER CHIPS
 BK: BEDROCK CHIPS

% CLAST COMPOSITION
 V/S VOLCANICS AND SEDIMENTS
 GR GRANITICS
 LS LIMESTONE
 OT OTHER LITHOLOGIES (REFER TO FOOTNOTES BELOW)
 TR ONLY TRACE PRESENT
 NA NOT APPLICABLE

MATRIX:
 S/U SORTED OR UNSORTED
 SD SAND | Y YES FRACTION PRESENT | F: FINE
 ST SILT | N FRACTION NOT PRESENT | M: MEDIUM
 CY CLAY | | C: COARSE

COLOR:
 B: BEIGE
 GY: GREY
 GB: GREY BEIGE
 GN: GREEN
 GG: GREY GREEN
 BN: BROWN
 BK: BLACK
 OC: OCHRE
 PK: PINK
 OE: ORANGE

DESCRIPTION:
 BLD: BOULDER CHIPS
 BDK: BEDROCK CHIPS

NUMBER OF GRAINS:
 T: NUMBER FOUND ON SHAKING TABLE
 P: NUMBER FOUND AFTER PANNING

THICKNESS:
 C: CALCULATED THICKNESS OF GRAIN
 M: ACTUAL MEASURED THICKNESS OF GRAIN

FOOTNOTES:
 A BRITTY CLAY LUMPS PRESENT
 B SMOOTH CLAY LUMPS PRESENT
 C ORGANICS PRESENT
 D SAMPLE HIGHLY OXIDIZED

Appendix 8-0B. Abbreviations used in graphic lithology logs.

AMOUNT	AMT
ANGULAR	ANG
APPARENTLY	APAR
BLACK	BLK
CALCAREOUS	CALC
COARSE-GRAINED	CGR
COBBLES	COBS
CONTAMINATION	CONT
CRYSTALLINE	XYLINE
DESCRIPTION	DESC
FEET	FT
FINE-GRAINED	FGR
GRANULES	GNL
GRAVEL	GVL
GREEN	GRN
HEAVY MINERAL CONCENTRATE	HMC
HOMOGENEOUS	HOMOG
INCH	IN
INCLUDING	INCL
LAMINAE	LAM
LIMESTONE AND/OR DOLOMITE AND/OR WHITE CHERT	LS
LITHOLOGY	LITH
MEDIUM-GRAINED	MGR
METASEDIMENT	MS
METAVOLCANIC	MV
MINOR	MR
MODERATE(LY)	MOD
OCCASIONAL	OCC
OXIDIZED	OX
PEBBLES	PEBS
PROBABLE(LY)	PROB
REDUCED	REDU
ROCK	RX
ROUNDED	RND
SAMPLE NUMBER	SN
SECONDARY	SEC
SEDIMENT	SED
SEVERAL	SEV
SHALE	SH
SILT CLAY FRACTION	S/C
SAMPLE INTERVAL	SL
SLIGHTLY	SM
SMALL	SUBRN
SUB ROUNDED	SUBAN
SUB ANGULAR	TRANS
TRANSITION	UNOX
UNOXIDIZED	V
VERY	VOLC
VOLCANIC	W/
WITH	

Appendix 8-0C. Abbreviations used on sample information and analyse sheet.

LEGEND

ST = Sample interval length (feet)
 D = Drilling method for this hole:
 S = Rotasonic
 M = Mud Rotary
 A = Air Rotary
 G = Area name: L = Little Fork
 O = Orr
 FORTY = Forty acre location, i.e. SE 1/4-NW1/4
 LEGAL DESC = Section-Township(N)-Range(W)
 COUNTY: K = Koochiching
 SL = St. Louis
 DRIFT TYPE: DML = Des Moines Lobe
 RL = Rainy Lobe
 ASSAY FTG = Assayed Footage Composite,
 for HMC or bedrock
 GOLD GRAINS = # of gold grains counted by ODM in
 Heavy Mineral Concentrate
 WT (g) HMC FEED = Feed weight (grams) for heavy
 mineral concentrate sample
 WT (g) +10 FEED = Weight (grams) of +10 mesh in feed
 weight
 WT (g) NONMAG = Weight (grams) of nonmagnetic
 heavy mineral conc from feed
 WT (g) MAG = Weight (grams) of magnetic heavy
 mineral conc from feed
 WT (g) -63uM = Weight (grams) of -63 micron screen
 fraction
 WT (g) -63 FEED = Weight (grams) of feed for -63
 micron screening
 WT % -63uM = Wt% -63 micron fraction, dry screen
 from feed
 WT % +10 = Wt% +10 mesh fraction from HMC flowsheet
 WT % SAND = Wt% by difference of -63um and +10 mesh

 REMARKS = SI Sample Interval of -63um

 WT g/kg = Weight of this fraction divided wt of
 feed in kg x 1000
 -1 (in Master File only) = Analysis not performed on
 this sample
 -2 (in Master File only) = Not applicable for this
 sample
 Sample Number Suffix (example 18B08R)
 R = Replicate split of same sample number
 S = An analytical standard sample: Lab result
 V = An analytical standard sample: certified
 values
 C = Recleaned the +10M fraction that was found
 to contain silty-clay lumps
 A or B = Two separate samples if extremely large
 sample wt, i.e. mudpit

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Appendix 8-1A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-101

Drilling Completion Date 12/19/85

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SE $\frac{1}{4}$ -16-157N-25W

County Koochiching

Quadrangle Lindford 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1141 ft.

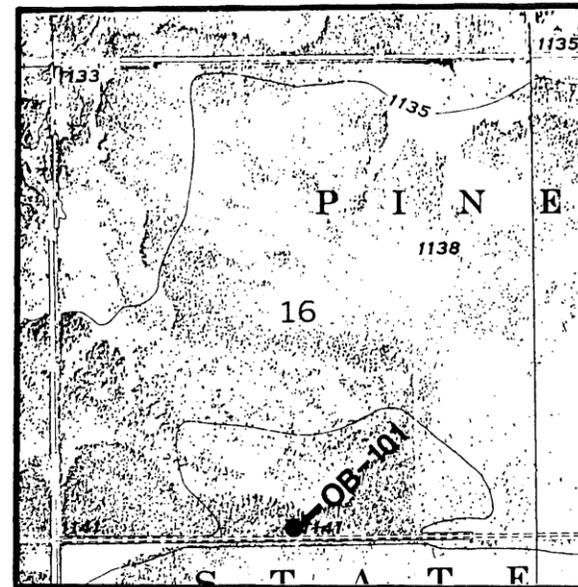
Total Depth 135 ft.

Elevation, Top of Precambrian Bedrock 1015 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	FEED	TABLE CONC	M. I. CONCENTRATIONS	NON MAG	NO. V.G.		CALC PPB	CLAST				MATRIX								
									SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY					
									V/S	GR	LS	OT					SD	CY				
16933	17.9	1.7	16.2	99.6	88.2	11.4	9.1	2.3	0	NA	P	50	40	10	NA	U	Y	Y	Y	B	B	TILL
-938CP	19.3	1.4	17.9	91.8	80.4	11.4	6.3	5.1	0	NA	P	60	20	20	NA	U	Y	Y	Y	B	B	TILL
-940CP	12.6	1.4	11.2	100.6	86.4	14.2	11.2	3.0	0	NA	P	50	40	10	NA	U	Y	Y	Y	B	B	TILL
-941	7.1	1.0	6.1	112.4	98.5	13.9	11.1	2.8	0	NA	P	50	40	10	NA	U	Y	Y	Y	B	B	TILL
-942	8.8	0.6	8.2	136.9	123.9	13.0	10.5	2.5	0	NA	P	50	40	10	NA	U	Y	Y	Y	B	B	TILL
-944CP	19.6	0.4	19.2	183.6	181.1	2.5	2.0	0.5	0	NA	P	50	40	10	NA	U	Y	Y	Y	B	B	TILL
-945	13.9	0.5	13.4	322.5	291.7	30.8	26.1	4.7	0	NA	P	55	35	10	NA	U	Y	Y	Y	B	B	TILL
-946	6.8	0.9	5.9	132.7	115.4	17.3	16.2	1.1	0	NA	P	40	60	NA	NA	U	Y	Y	Y	B	B	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-3	Organic Sediments			
3-125	Des Moines Lobe Gl. Drift	G	A, B, C	
125-126	Rainy Lobe Gl. Drift	G	A, B, C	
126-135	Bedrock	G, H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Garnet Schist

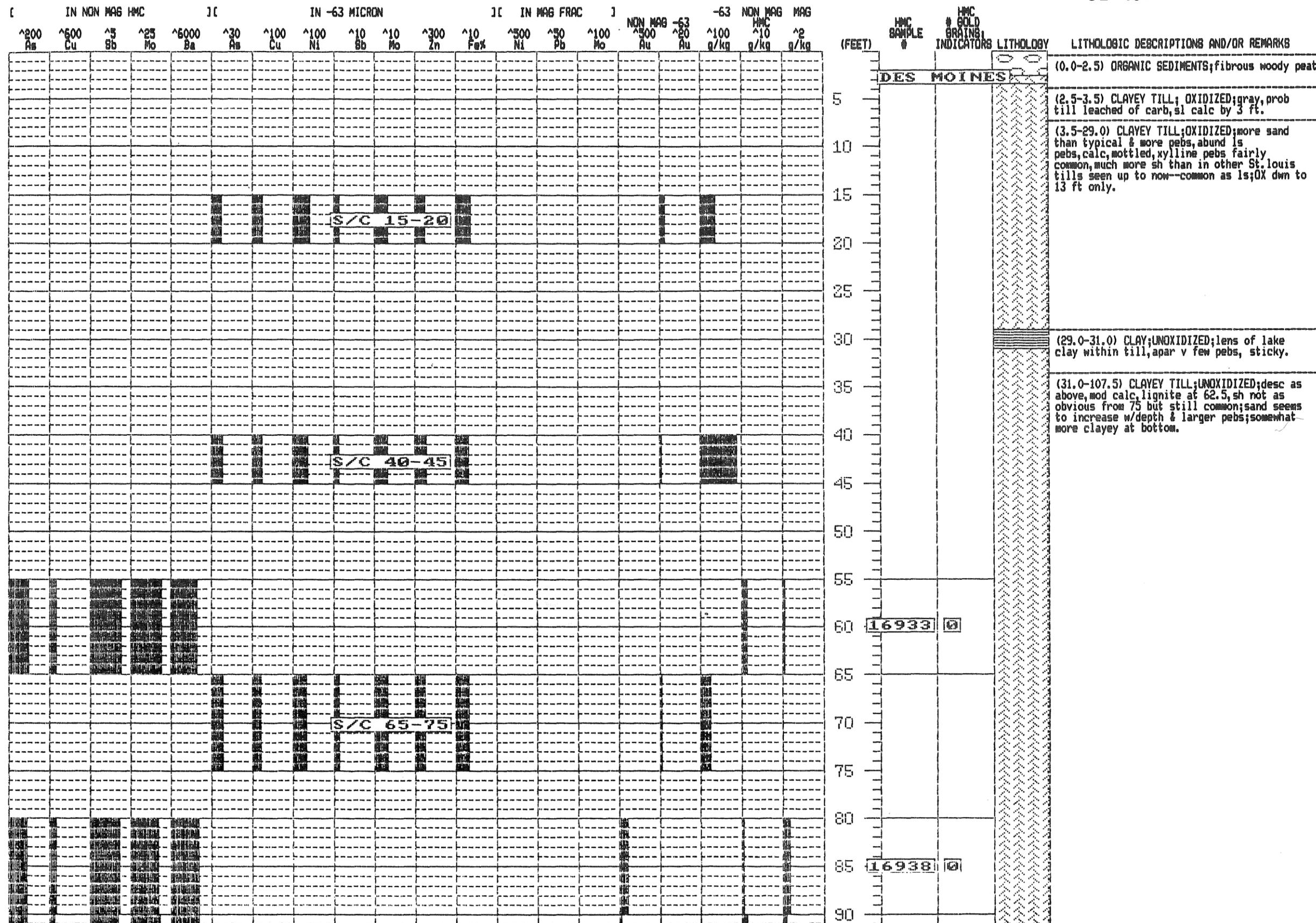
Thin Section Description (or number): #19700 at 131 ft. Biotite-bearing amphibolite. Estimated mode (volume %): Hornblende, 50; Biotite, 12; Quartz, 18; Plagioclase, 20; Apatite, Tr; Opaque oxides, Tr. Foliation defined by crudely oriented hornblende and biotite. Overall, rock is fresh with good granoblastic texture. Biotite is quite fresh but locally shows incipient alteration to chlorite and opaque oxides. Plagioclase (oligoclase) is typically well twinned and fresh. Plagioclase is most heavily sericitized in the same areas where biotite is most altered. Hornblende is pleochroic from pale yellowish-green to green, and is anhedral with few prism faces. Core description notes garnet-biotite schist. No garnets were seen in this thin section, but this rock type would be compatible with a garnet schist and may represent a garnet-poor interval.

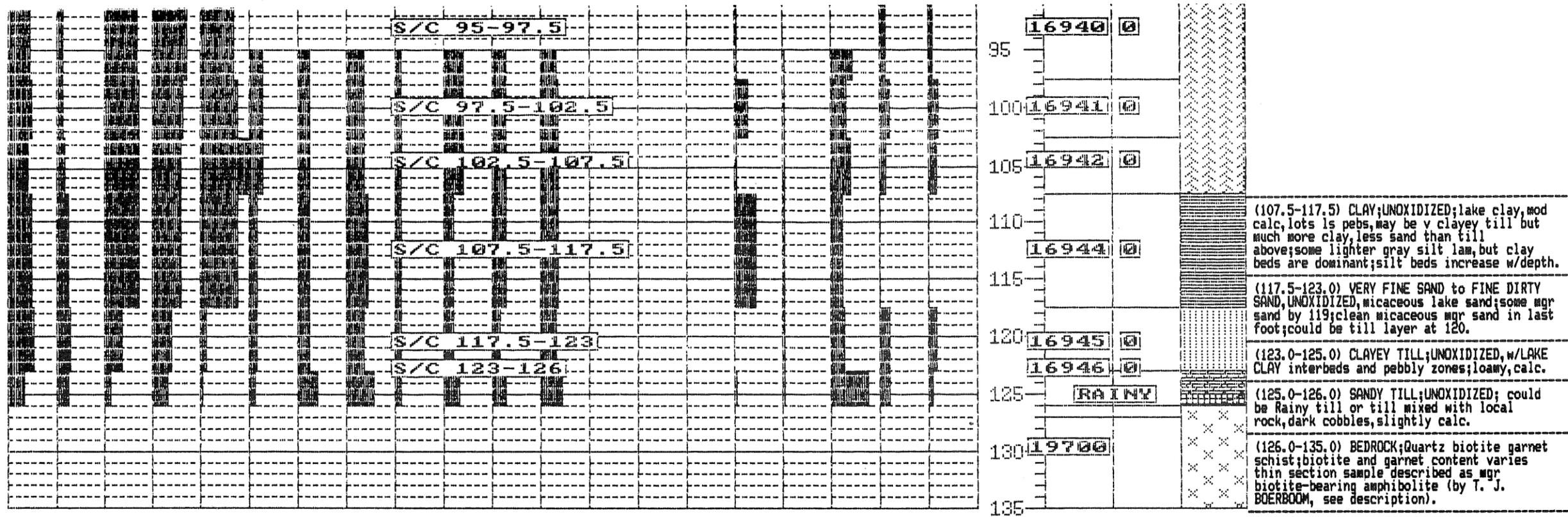
(by T. Boerboom, MGS)

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS				NON MAG	CALC V.G. ASSAY PPB	REMARKS
				ABRADED T	IRREGULAR P	DELICATE T	P TOTAL			
16933	N	NO VISIBLE GOLD								
-938	N	NO VISIBLE GOLD								
-940	N	NO VISIBLE GOLD								
-941	N	NO VISIBLE GOLD								
-942	N	NO VISIBLE GOLD								
-944	N	NO VISIBLE GOLD								
-945	N	NO VISIBLE GOLD								
-946	N	NO VISIBLE GOLD								





MASTER FILE

Appendix 8-1C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT % -63um	WT % +10	WT % SAND	REMARKS
16929	101	15-20	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	15.4	422.0	4	-1	-1	
16930	101	25-30	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16931	101	40-45	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	22.3	252.0	9	-1	-1	
16932	101	55-60	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16933	101	60-65	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL	55-65	0.0	17900.0	1700.0	9.1	2.3	-1.0	-1.0	-1.0	-1	9	-1	
16934	101	65-70	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16935	101	70-75	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	34.6	1363.0	3	-1	-1	SIL(-63)=65-75
16936	101	75-80	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16937	101	80-85	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16938	101	85-90	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL	80-90	0.0	19300.0	1400.0	6.3	5.1	-1.0	-1.0	-1.0	-1	7	-1	
16939	101	90-95	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16940	101	95-97.5	2.5 S L SW-SE 16 157 25	K	DML. CLAYEY TILL	90-97.5	0.0	12600.0	1400.0	11.2	3.0	63.2	1484.0	4	11	85		
16941	101	97.5-102.5	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL	97.5-102.5	0.0	7100.0	1000.0	11.1	2.8	34.7	1105.0	3	14	83		
13830R	101	97.5-102.5	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL			-1.0	-1.0	-1.0	-1.0	-1.0	27.0	676.0	4	-1	-1	
16942	101	102.5-107.5	5. S L SW-SE 16 157 25	K	DML. CLAYEY TILL	102.5-107.5	0.0	8800.0	600.0	10.5	2.5	37.7	975.0	4	7	89		
16943	101	107.5-112.5	5. S L SW-SE 16 157 25	K	DML CLAY: GLACIAL LK			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16944	101	112.5-117.5	5. S L SW-SE 16 157 25	K	DML CLAY: GLACIAL LK	107.5-117.5	0.0	19600.0	400.0	2.0	0.5	44.1	1826.0	2	2	96	SIL(-63)=107.5-117.5	
16945	101	117.5-123	5.5 S L SW-SE 16 157 25	K	DML. F. TO V.F. SAND	117.5-123	0.0	13900.0	500.0	26.1	4.7	26.9	1016.0	3	4	93		
16946	101	123-126	3. S L SW-SE 16 157 25	K	DML. CLAYEY TILL	123-126	0.0	6800.0	900.0	16.2	1.1	45.6	605.0	8	13	79	AF OVERLAPS RAINY	
13850	101	125-126	1. S L SW-SE 16 157 25	K	RL. SANDY GVL. TILL			-1.0	-1.0	-1.0	-1.0	-1.0	23.1	318.0	7	-1	-1	
19700	101	127-135	8.0 S L SW-SE 16 157 25	K	BEDROCK	127-135	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
																												g/kg	WEIGHT
16938	91	0.14	520	660	6900	23.20	54	130	97	290	0	88	-10	17	0.5	0	-10	3.7	4000	331	160	8	-10	11	-2	120.0	21.4	0	12.00
16944	230	0.09	727	640	7400	26.40	83	160	150	270	0	92	-10	15	1.0	0	-10	3.5	4600	406	140	-4	-10	14	-2	140.0	21.8	0	2.57
16933	10	0.14	477	610	6700	24.10	55	110	84	270	0	92	-10	19	0.5	0	-10	3.9	3700	273	140	8	-10	21	-2	100.0	16.4	1	7.23
16940	26	0.11	457	630	6900	23.00	53	120	80	270	0	88	-12	18	2.0	0	-10	3.4	4100	293	160	6	-10	8	-2	100.0	20.6	1	9.14
16941	140	0.11	522	760	7200	22.90	51	95	78	270	0	94	23	16	0.5	0	-10	3.7	4500	317	160	8	-10	33	-2	110.0	22.0	2	8.41
16942	-22	0.10	512	660	6500	23.30	55	130	96	290	0	83	10	15	0.5	0	-10	3.6	5600	310	160	8	-10	5	-2	110.0	21.6	1	8.07
16945	-5	0.28	1410	390	10000	26.40	160	230	160	170	0	100	-10	10	0.5	0	-10	1.8	700	851	120	9	-10	43	-2	200.0	51.3	2	19.30
16946	-23	0.12	540	180	15000	22.90	110	270	140	120	0	62	-10	8	0.5	0	-10	-0.5	-300	343	39	-2	-10	16	-2	92.0	20.4	2	11.70

-63µM ANALYSIS (PPM)

SAMPLE NUMBER	AU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
	PPB				%																	g/kg
13830R	-1	130	79	550	3.0	17	33	22	79	9	2	3	-0.5	1	8	-1	-1	1	13	-1	3	39.9
13850	-1	150	170	560	4.3	25	58	38	91	5	-1	2	-0.5	-1	5	-1	-1	2	13	-1	2	72.6
16944	-1	120	120	590	3.6	23	42	25	79	5	-1	2	-0.5	-1	1	-1	-1	-1	19	-1	2	24.2
16929	-2	120	89	560	3.5	20	39	25	77	7	-1	3	-0.5	-1	1	-1	-1	-1	20	-1	3	36.5
16931	1	120	83	580	3.2	19	34	22	86	9	-1	3	-0.5	-1	1	-1	-1	-1	17	-1	3	88.5
16935	1	110	76	590	3.2	18	33	21	77	9	2	3	-0.5	-1	1	-1	-1	-1	16	-1	3	25.4
16940	-1	130	82	650	3.4	20	37	24	87	9	1	4	-0.5	-1	1	-1	-1	1	17	-1	4	42.6
16941	1	130	80	660	3.5	20	37	24	88	9	-1	4	-0.5	-1	1	-1	-1	-1	16	-1	3	31.4
16942	-1	130	83	650	3.5	21	35	23	88	9	2	4	-0.5	-1	1	-1	-1	1	19	-1	3	38.7
16945	-1	92	110	500	3.3	23	37	25	54	5	-1	2	-0.5	-1	-1	-1	-1	-1	15	-1	-1	26.5
16946	-1	120	150	640	4.4	28	57	38	83	4	-1	3	-0.5	-1	1	-1	-1	2	19	-1	2	75.4

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MD	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
	PPB													%										%										
19700	-5	0.3	-1.0	550	10.0	-10	74.0	4.0	140	28	-2	4	-100	4.4	34	-0.5	-2	78	53	5.00	16.0	-10	-5	2.50	-1.0	-20	1.0	7.7	-200	-2	1.8	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SiO2	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
									%			%	%					%								%	
19700	67	19	66	799	1.1	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0.0	0	0.00	0

Appendix 8-2A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-102

Drilling Completion Date 12/20/85

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -12-156N-25W

County Koochiching

Quadrangle Lindford SE 7.5

Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1164 ft.

Total Depth 191 ft.

Elevation, Top of Precambrian Bedrock 980.5 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-1	Organic Sediments			
1-159	Des Moines Lobe Gl. Drift	G	A,B,C	
159-183.5	Rainy Lobe Gl. Drift	G	A,B,C	A = Au & W
183.5-191	Bedrock	G,H	I	

A = -63 microns fraction E = Skeletonized Grab Sample
 B = Heavy Minerals, Nonmag in Core Box
 C = Heavy Minerals, Mag F = Interval Cuttings in Bucket
 D = Sluice Box Composite G = Core
 H = Thin Section
 I = (Bedrock or Drift)
 Split of "Wholerock"
 Sample

BEDROCK

Principal Rock Type: Biotite Paragneiss

Thin Section Description (or number): #19701 at 185'. Biotite paragneiss. Estimated mode [excluding quartz vein] (volume %): Quartz, 20; Plagioclase, 52; Biotite, 27; Chlorite, 1; Sulfides, Tr; Opaque oxides, Tr; Apatite, Tr; Zircon, Tr. Fresh, well-foliated (defined by biotite); feldspar only weakly sericitized. Plagioclase is albitic in composition, possibly bordering on oligoclase. No K-feldspar detected without stain. Biotite is dark brown and is interlayered with chlorite and opaque oxides due to slight retrograde metamorphism. Rutilated quartz vein subparallel to foliation is only weakly recrystallized and strained. Irregular blebs of sulfides (pyrite) are disseminated throughout rock. Layering defined by grain-size variations; mode remains constant. (by T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. NET)			WEIGHT (GRAMS DRY)			AU	DESCRIPTION								CLASS						
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC				CLAST				MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL		NON MAG	NO. MAG	CALC V.G. PPB	SIZE	%	S/U	SD	ST		CY	COLOR				
17037	18.7	1.7	17.0	92.4	68.0	24.4	18.1	6.3	1	21	P	15	55	30	NA	U	Y	Y	Y	BN	BN	TILL
-043CP	27.9	2.6	25.3	186.7	161.3	25.4	23.7	1.7	2	138	P	15	45	40	NA	U	Y	Y	Y	BN	BN	TILL
-049CP	14.8	1.1	13.7	91.3	75.7	15.6	12.3	3.3	0	NA	P	25	35	40	NA	U	Y	Y	Y	BN	BN	TILL
-050	7.5	0.6	6.9	92.9	86.4	6.5	5.1	1.4	1	294	P	35	25	40	NA	U	Y	Y	Y	BN	BN	TILL
-051	6.6	0.4	6.2	89.6	84.1	5.5	4.2	1.3	0	NA	P	35	25	40	NA	U	Y	Y	Y	BN	BN	TILL
-053	12.3	2.2	10.1	232.2	170.6	61.6	50.6	11.0	0	NA	P	35	60	5	NA	U	Y	Y	Y	B	B	TILL
-054	13.1	1.7	11.4	119.6	58.7	60.9	48.0	12.9	1	60	P	35	60	5	NA	U	Y	Y	Y	B	B	TILL
-055	12.3	1.3	11.0	252.9	186.8	66.1	52.9	13.2	1	93	P	35	55	10	NA	U	Y	Y	Y	B	B	TILL
-056	10.8	1.8	9.0	240.8	190.0	50.8	40.6	10.2	0	NA	P	40	55	5	NA	U	Y	Y	Y	B	B	TILL
-057	11.2	0.6	10.6	192.4	133.0	59.4	46.6	12.8	0	NA	P	40	60	TR	NA	S	M	Y	Y	B	B	SAND

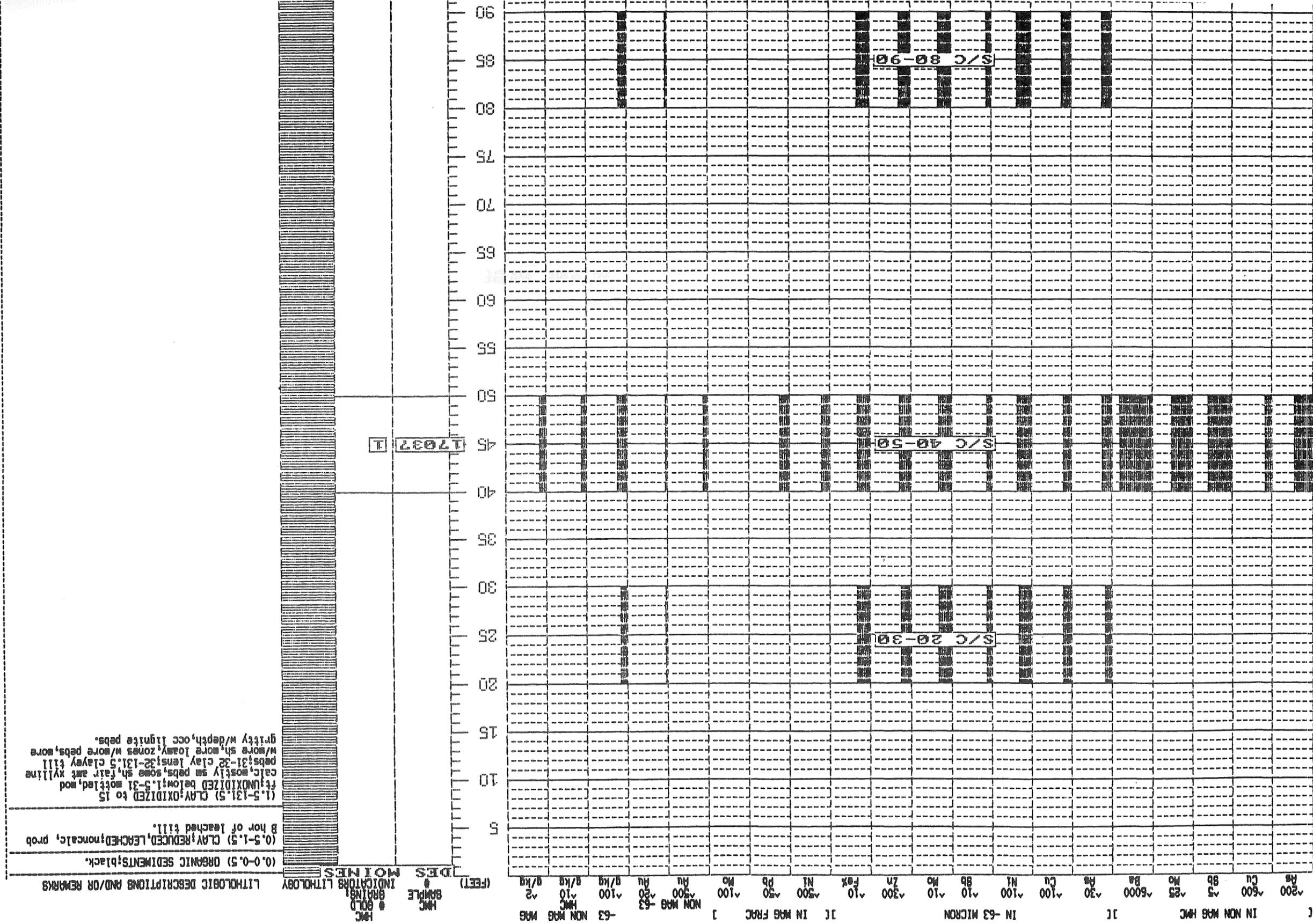
GOLD CLASSIFICATION

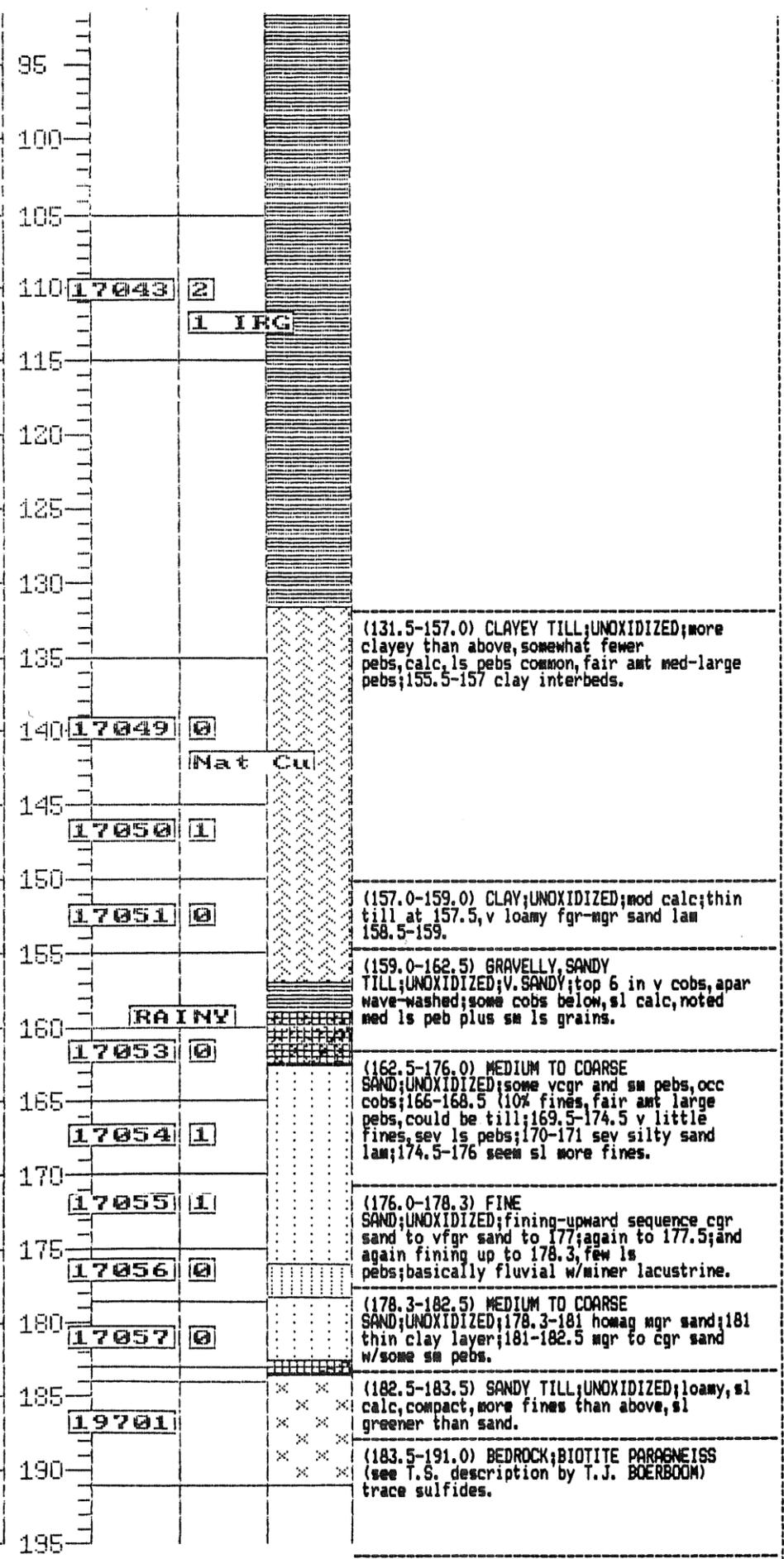
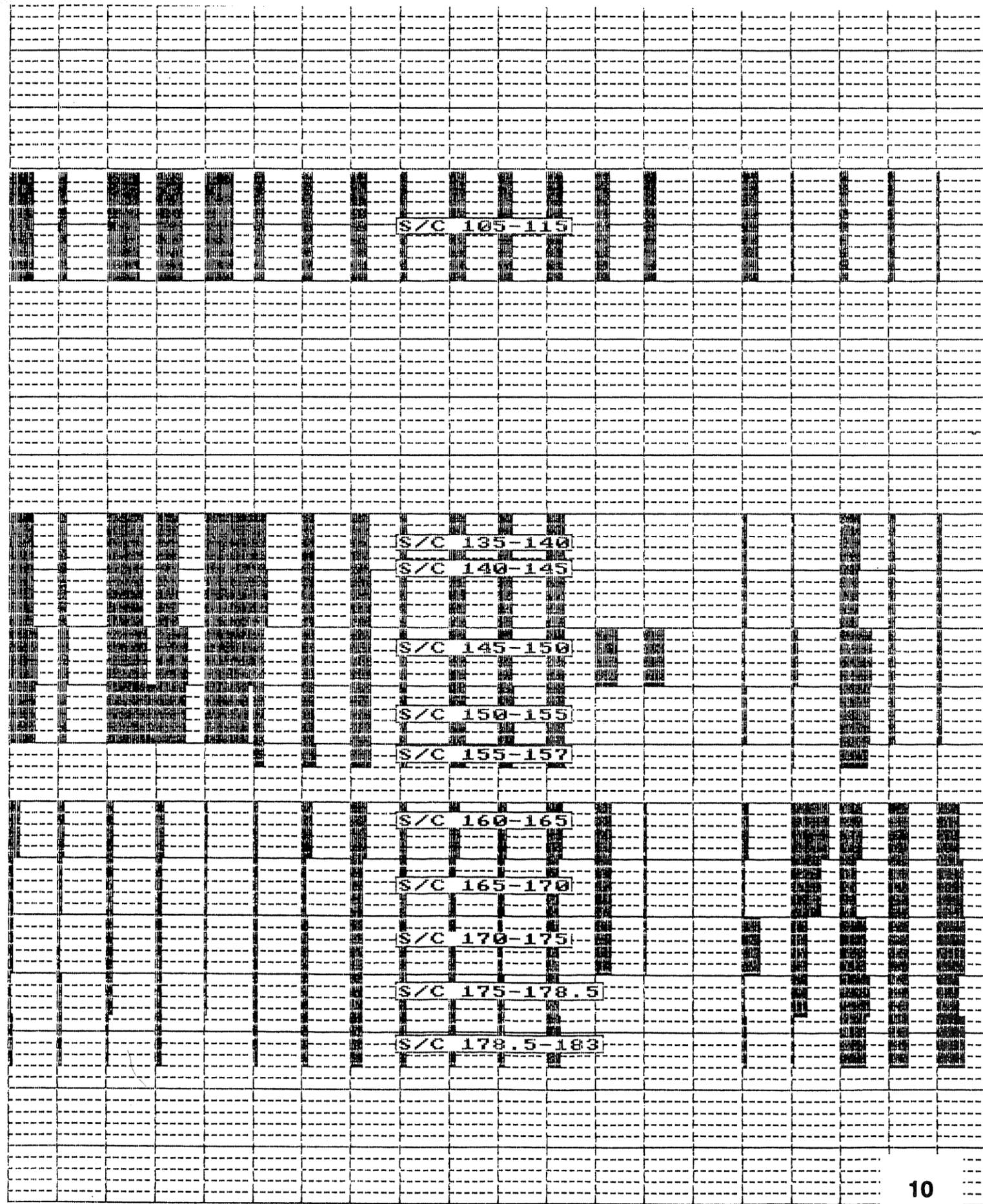
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE # PANNED	Y/W	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS		
				T	P	T	P	T	P					
17037	N	50 X 75	13 C	1							1			
											TOTAL	1	18.1	21
-043CP	N	50 X 75 100 X 150	13 C 25 C	1							1			
											TOTAL	2	23.7	138
-047CP	N	NO VISIBLE GOLD											1 GRAIN FRESH COPPER (50X125)	
-050	N	100 X 100	20 C	1							1			
											TOTAL	1	5.1	294
-051	N	NO VISIBLE GOLD												
-053	N	NO VISIBLE GOLD												
-054	N	75 X 175	25 C	1							1			
											TOTAL	1	48.0	60
-055	N	150 X 150	29 C	1							1			
											TOTAL	1	52.9	93
-056	N	NO VISIBLE GOLD												
-057	N	NO VISIBLE GOLD												

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MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
17034	102	20-25	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17035	102	25-30	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	28.5	1919.0		1	-1	-1	SI[-63]=20-30
17035R	102	25-30	5.0 S L SW-SW 12 156 25 K	DML. CLAYEY TILL		0	0	0	0	0	0	0	0	0	0	0	
17036	102	40-45	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17037	102	45-50	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL	40-50	1.0	18700.0	1700.0	18.1	6.3	35.6	1541.0		2	9	89	SI[-63]=40-50
17038	102	60-65	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17039	102	65-70	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17040	102	80-85	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17041	102	85-90	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.7	1229.0		2	-1	-1	SI[-63]=80-90
17042	102	105-110	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17043	102	110-115	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL	105-115	2.0	27900.0	2600.0	23.7	1.7	38.8	2778.0		1	9	90	SI[-63]=105-115
17044	102	115-120	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17045	102	120-125	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17046	102	125-130	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17047	102	130-135	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
17048	102	135-140	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.8	607.0		4	-1	-1	
17049	102	140-145	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL	135-145	0.0	14800.0	1100.0	12.3	3.3	22.4	621.0		4	7	89	
17050	102	145-150	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL	145-150	1.0	7500.0	600.0	5.1	1.4	35.0	547.0		6	8	86	
17051	102	150-155	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL	150-155	0.0	6500.0	400.0	4.2	1.3	25.0	421.0		6	6	88	
13831R	102	150-155	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	23.8	569.0		4	-1	-1	
17052	102	155-157	5. S L SW-SW 12 156 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	20.4	368.0		6	-1	-1	
17053	102	160-165	5. S L SW-SW 12 156 25 K	RL. SANDY GVL. TILL	160-165	0.0	12300.0	2200.0	50.6	11.0	40.9	911.0		4	18	78	
17054	102	165-170	5. S L SW-SW 12 156 25 K	RL. MED. TO C. SAND	165-170	1.0	13100.0	1700.0	48.0	12.9	39.7	1174.0		3	13	84	
17055	102	170-175	5. S L SW-SW 12 156 25 K	RL. MED. TO C. SAND	170-175	1.0	12300.0	1300.0	52.9	13.2	51.5	999.0		5	11	84	
13832R	102	170-175	5. S L SW-SW 12 156 25 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	25.6	1096.0		2	-1	-1	
17056	102	175-178.5	3.5 S L SW-SW 12 156 25 K	RL. SILTY SAND	175-178.5	0.0	10800.0	1800.0	40.6	10.2	47.2	810.0		6	17	77	
17057	102	178.5-183	4.5 S L SW-SW 12 156 25 K	RL. MED. TO C. SAND	178.5-183	0.0	11200.0	600.0	46.6	12.8	45.8	852.0		5	5	90	
17058	102	183-183.5	0.5 S L SW-SW 12 156 25 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
19701	102	184-191	7.0 S L SW-SW 12 156 25 K	BEDROCK	184-191	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg WEIGHT
17037	64	0.12	647	870	7200	26.10	87	100	90	240	0	89	-16	13	0.5	0	-10	3.1	4700	271	200	7	-10	30	-2	150.0	20.9	1 13.90
17043	160	0.13	554	680	7800	27.00	94	120	94	240	0	95	-14	13	0.5	0	-10	3.3	3400	237	160	8	-10	17	-2	130.0	16.3	1 18.00
17049	34	0.14	560	760	7300	26.40	86	110	100	310	0	92	-10	11	0.5	0	-10	3.7	6500	246	150	11	-10	19	-2	120.0	21.1	1 9.44
17050	22	0.14	548	800	8900	29.50	90	130	120	270	0	110	-11	16	0.5	0	-10	4.0	8400	225	140	6	-10	17	-2	120.0	17.7	1 4.25
17051	37	0.12	557	810	7100	31.50	91	130	100	360	0	100	-15	15	0.5	0	-10	4.9	5300	236	150	5	-10	30	-2	120.0	18.9	1 4.38
17053	67	0.30	546	420	8800	23.50	100	160	63	120	0	40	-10	4	-0.5	0	-10	-0.5	-300	358	69	6	210	30	-2	110.0	11.2	4 38.50
17054	-23	0.29	341	530	9600	23.30	72	110	36	130	0	16	-10	3	-0.5	0	-10	-0.5	-200	200	85	8	-10	23	-2	60.0	13.7	4 35.90
17055	190	0.24	307	470	9000	21.40	64	110	32	140	0	13	-10	3	-0.5	0	-10	-0.5	-200	178	74	7	-10	21	-2	52.0	13.2	4 39.80
17056	-24	0.42	352	480	9500	21.50	63	100	37	140	0	11	-10	3	-0.5	0	-10	-0.5	-200	197	87	7	-10	21	-2	58.0	12.6	4 30.10
17057	46	0.30	434	510	8300	21.30	67	110	42	140	0	17	-14	3	-0.5	0	-10	-0.2	-100	255	95	8	-10	26	-2	76.0	14.1	4 35.70

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
17037	0.830	2.30	1500	110	15	200	-1	-1	-0.5	12	0.3
17043	0.710	2.00	1300	150	15	200	-1	-1	-0.5	11	0.1
17050	0.500	2.00	1400	230	13	210	-1	-1	0.5	19	0.2
17053	1.700	1.70	1000	160	24	330	-1	-1	-0.5	-1	0.9
17054	1.200	1.70	1200	170	20	370	-1	-1	-0.5	-1	1.0
17055	1.300	1.70	1100	170	19	380	-1	1	-0.5	-1	1.1

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13831R	-1	140	91	570	3.2	18	38	26	90	9	-1	3	-0.5	-1	1	-1	-1	1	14	-1	3	41.8
13832R	-1	71	77	410	2.5	15	24	17	37	7	-1	1	-0.5	-1	2	-1	-1	2	7	-1	-1	23.4
17035	0	0	51	0	0.0	0	0	0	69	6	1	2	-0.5	1	1	-1	0	-1	0	0	0	14.9
17035R	-1	120	74	500	3.2	17	32	20	74	5	-1	3	-0.5	-1	2	-1	-1	-1	13	-1	2	0.0
17037	-1	120	81	560	3.3	19	35	21	83	7	-1	3	-0.5	-1	1	-1	-1	-1	15	-1	3	23.1
17041	-1	120	79	590	3.3	19	35	22	82	7	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	18.5
17043	-1	120	82	560	3.1	18	33	20	79	6	-1	3	-0.5	-1	1	-1	-1	-1	15	-1	3	14.0
17048	-1	130	87	630	3.5	20	37	23	79	7	1	3	-0.5	-1	2	-1	-1	-1	19	-1	3	40.9
17049	-1	140	84	640	3.7	20	38	24	87	8	-1	3	-0.5	-1	1	-1	-1	-1	16	-1	3	36.1
17050	2	130	82	660	3.6	21	39	25	87	6	-1	3	-0.5	-1	2	-1	-1	-1	19	-1	3	64.0
17051	1	140	89	660	3.7	21	40	25	92	6	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	59.4
17052	-1	140	90	640	3.7	21	41	26	89	6	-1	3	-0.5	-1	2	-1	-1	1	25	-1	3	55.4
17053	15	71	89	520	3.4	21	33	18	51	3	-1	2	-0.5	-1	1	-1	-1	8	15	-1	1	44.9
17054	12	65	69	440	2.6	16	23	9	34	2	-1	1	-0.5	-1	1	-1	-1	2	14	-1	1	33.8
17055	6	65	67	390	2.4	15	22	12	30	2	-1	1	-0.5	-1	-1	-1	-1	2	11	-1	-1	51.6
17056	6	67	61	400	2.6	16	25	11	33	2	-1	1	-0.5	-1	-1	-1	-1	2	12	-1	-1	58.3
17057	-1	72	79	410	2.7	17	25	12	38	2	-1	1	-0.5	-1	1	-1	-1	2	11	-1	1	53.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
19701	-5	-0.2	-1.0	710	-5.0	-10	53.0	3.0	150	18	2	4	-100	4.2	29	-0.5	-2	91	75	4.10	13.0	-10	-5	2.70	-1.0	-20	-1.0	6.9	-200	-2	2.1	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FeO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
19701	62	26	72	460	1.5	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0

Appendix 8-3A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-103

Drilling Completion Date 12/20/85

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -NW $\frac{1}{4}$ -19-69N-26W

County Koochiching

Quadrangle Littlefork NW 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1111 ft.

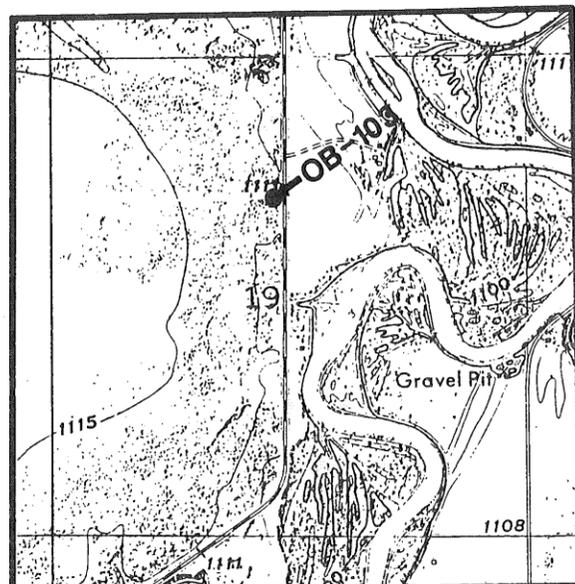
Total Depth 124 ft.

Elevation, Top of Precambrian Bedrock 989 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-65	No Core			
65-119.5	Des Moines Lobe Gl. Drift	G	A,B,C	
119.5-122	Rainy Lobe Gl. Drift	G	A,B,C	B = Au & As
122-124	Bedrock	G,H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Biotite Gneiss

Thin Section Description (or number): #19702 at 123 ft. Biotite gneiss. Estimated mode (volume %): Plagioclase (oligoclase?), 50; Quartz, 40; Biotite, 9; Muscovite, 1; Zircon, Tr; Apatite, Tr; Cordierite(?), Tr. Well-foliated rock (defined by biotite and muscovite) with clean, fresh, granoblastic quartz and feldspar. Well-twinned plagioclase has a refractive index greater than or equal to quartz; and therefore, oligoclase is approximate composition. Moderate iron staining is present along grain boundaries and fractures. Minor amounts of fine-grained clay minerals or chlorite, plus dusty hydrous Fe-oxides pseudomorph an earlier mineral, possibly epidote. Rock apparently lacks K-feldspar. (by T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. NET)			WEIGHT (GRAMS DRY)			AU			DESCRIPTION						CLASS						
	TABLE	+10	SPLIT	M.I.	CONC.	NON	NO.	CALC	SIZE	%	S/U	SD	ST	CY	COLOR							
										V/S		GR		LS		OT		SD		CY		
16912	9.0	0.6	8.4	107.5	100.1	7.4	5.0	2.4	0	NA	P	5	20	75	NA	S	F	Y	N	B	NA	SAND
-914	11.1	0.0	11.1	67.2	66.9	0.3	0.2	0.1	0	NA	TR	NA	NA	NA	NA	S	N	Y	Y	NA	B	SILT&CL
-915	3.3	0.4	2.9	204.3	192.8	11.5	9.5	2.0	0	NA	P	30	70	NA	NA	U	Y	Y	Y	GB	GB	TILL
-916	3.9	1.4	2.5	145.9	133.2	12.7	10.8	1.9	1	139	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL

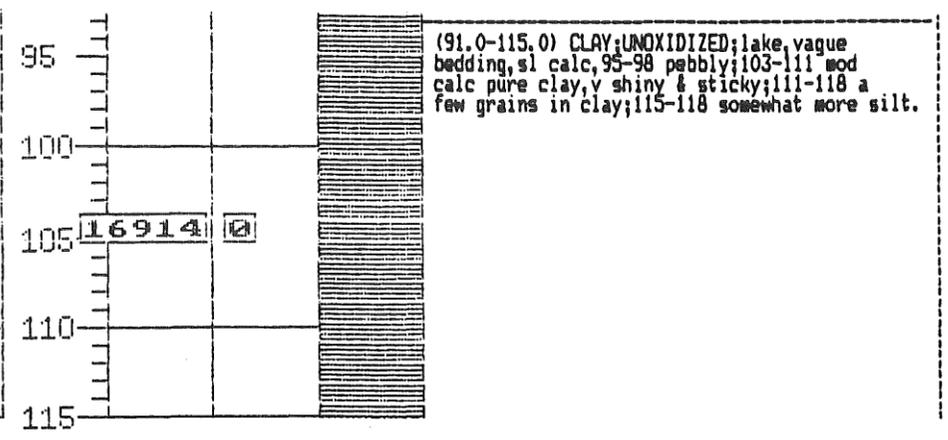
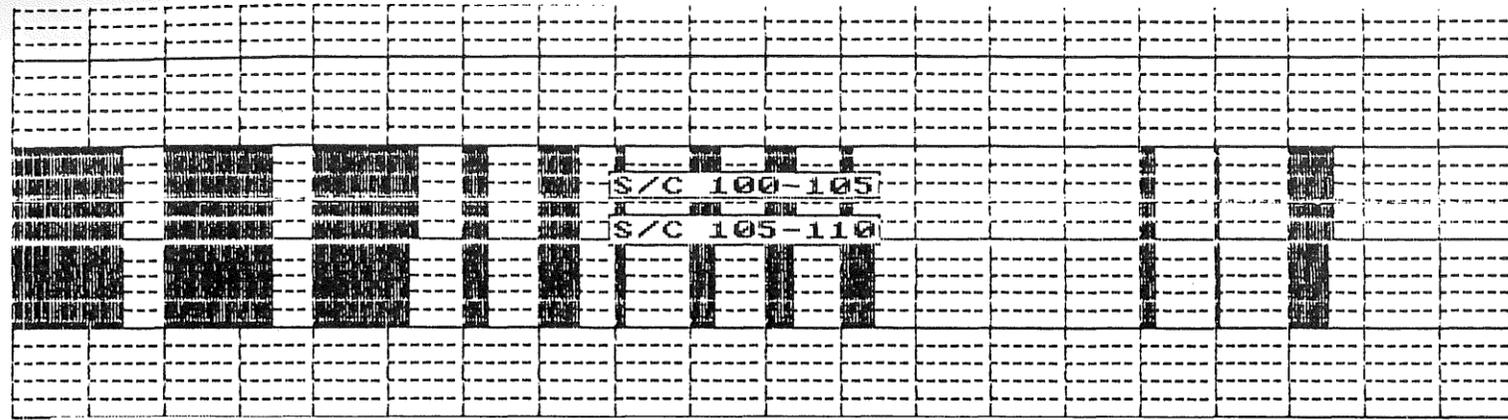
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

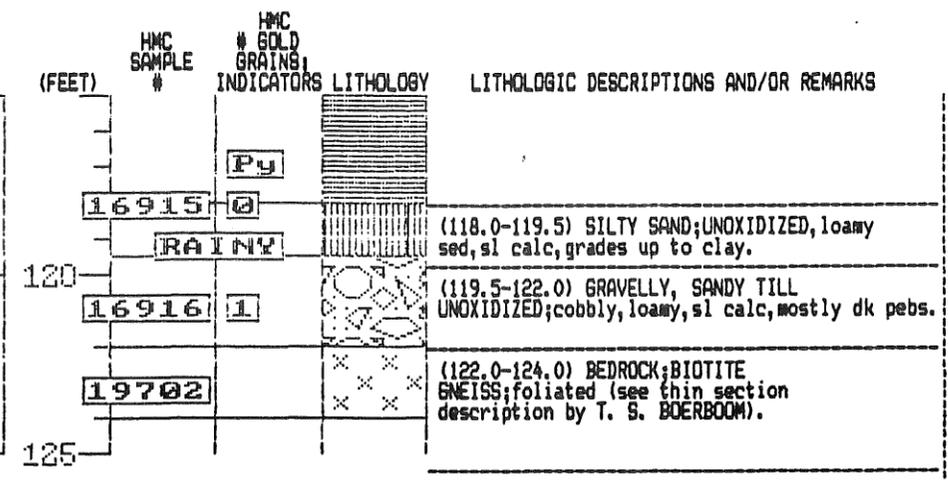
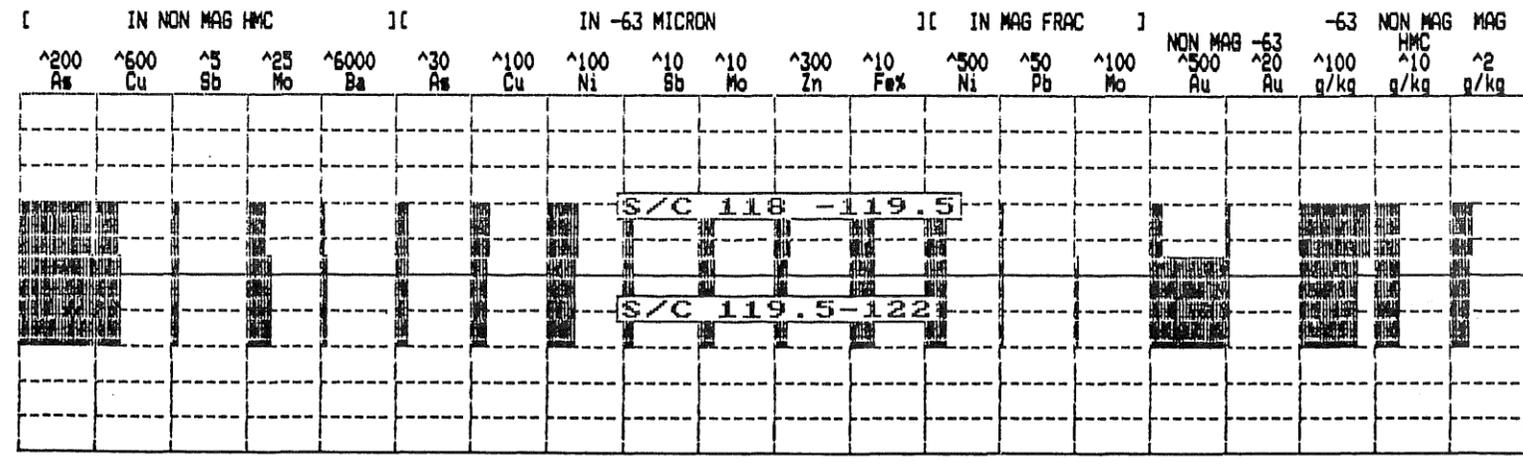
NUMBER OF GRAINS

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				T	P	T	P	T	P				TOTAL GMS
16912	N												
-914	N												
-915	Y											EST. 5% PYRITE	
-916	N	100 X 100	20 C							1			
TOTAL										1	10.8	139	

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SUMMARY OF G. MEYER LOG OB-103, ROTASONIC CORE



MASTER FILE

Appendix 8-3C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT % -63um	WT % +10	WT % SAND	REMARKS	
16908	103	65-70	5. S L SE-NW 19 69 26 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16909	103	70-75	5. S L SE-NW 19 69 26 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16910	103	75-80	5. S L SE-NW 19 69 26 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	35.9	793.0	5	-1	-1		SI[-63]=70-80	
16910R	103	75-80	5.0 S L SE-NW 19 69 26 K		DML. CLAYEY TILL		0	0	0	0	0	0	0	0	0	0	0		
16911	103	80-85	5. S L SE-NW 19 69 26 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	23.8	635.0	4	-1	-1			
13833R	103	80-85	5. S L SE-NW 19 69 26 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	23.7	319.0	7	-1	-1			
16912	103	85-91	6. S L SE-NW 19 69 26 K		DML. CLAYEY TILL	80-91	0.0	9000.0	600.0	5.0	2.4	19.2	432.0	4	7	89			
16913	103	100-105	5. S L SE-NW 19 69 26 K		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	20.9	347.0	6	-1	-1			
16914	103	105-110	5. S L SE-NW 19 69 26 K		DML CLAY: GLACIAL LK	100-110	0.0	11100.0	0.0	0.2	0.1	18.4	353.0	5	0	95			
16915	103	118-119.5	1.5 S L SE-NW 19 69 26 K		DML. SILT	118-119.5	0.0	3300.0	400.0	9.5	2.0	24.8	272.0	9	12	79			
16916	103	119.5-122	2.5 S L SE-NW 19 69 26 K		RL. SANDY GVL. TILL	119.5-122	1.0	3900.0	1400.0	10.8	1.9	16.9	219.0	8	36	56			
19702	103	122-124	2.0 S L SE-NW 19 69 26 K		BEDROCK	122-124	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16914	100	0.18	1140	870	6800	38.20	140	150	270	300	0	230	-34	11	0.5	0	200	10.0	17000	614	210	-9	-10	570	-2	160.0	43.0	0	0.21
16912	110	0.15	852	640	6300	25.40	62	100	110	230	0	77	-10	13	0.5	0	-10	1.9	1600	464	290	10	10	36	-2	190.0	35.1	1	5.06
16915	79	0.21	310	280	11000	20.40	140	220	160	120	0	180	-10	6	-0.5	0	-10	-0.4	-300	140	60	4	-10	16	-2	32.0	11.1	3	7.28
16916	730	0.24	554	300	11000	21.40	140	230	180	160	0	210	11	8	-0.5	0	-10	-0.4	500	309	74	3	-10	33	-2	65.0	16.6	3	8.16

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16912	1.400	1.60	980	180	21	200	-1	-1	-0.5	-1	0.3
16915	1.700	1.70	1000	150	51	190	-1	-1	-0.5	-1	0.6
16916	1.600	1.70	1200	150	28	200	-1	2	-0.5	-1	0.5

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13833R	2	140	90	480	3.2	17	36	23	81	5	-1	3	-0.5	-1	1	-1	-1	-1	12	-1	3	74.3
16914	1	160	120	700	4.5	26	52	33	110	8	-1	3	-0.5	1	2	-1	-1	1	22	-1	4	52.1
16910	-1	130	91	610	3.7	21	39	24	80	25	-1	3	-0.5	16	1	-1	-1	-1	18	-1	3	45.3
16910R	0	0	58	0	0.0	0	0	0	74	6	-1	3	-0.5	1	2	2	0	-1	0	0	0	0.0
16911	-1	140	92	550	3.6	20	39	23	82	5	-1	4	-0.5	1	2	1	-1	1	18	-1	3	37.5
16912	-1	150	94	570	3.8	21	41	26	90	11	-1	4	-0.5	1	2	-1	-1	1	19	-1	4	44.4
16913	-1	190	120	640	1.6	26	52	33	120	12	1	4	-0.5	1	2	-1	-1	1	22	-1	4	60.2
16915	1	77	120	530	3.3	21	38	22	56	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	-1	91.2
16916	-1	74	100	530	3.3	23	34	20	49	5	-1	2	-0.5	-1	-1	-1	-1	6	17	-1	2	77.2

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
19702	-5	-0.2	1.0	500	6.0	-10	68.0	2.0	57	15	-2	2	-100	2.4	30	-0.5	-2	-50	50	4.30	8.5	-10	-5	2.50	-1.0	-20	-1.0	5.4	-200	-2	1.9	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SIO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
19702	26	18	57	259	0.6	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-104

Drilling Completion Date 12/18/85

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -16-68N-26W

County Koochiching

Quadrangle Littlefork NW 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1148 ft.

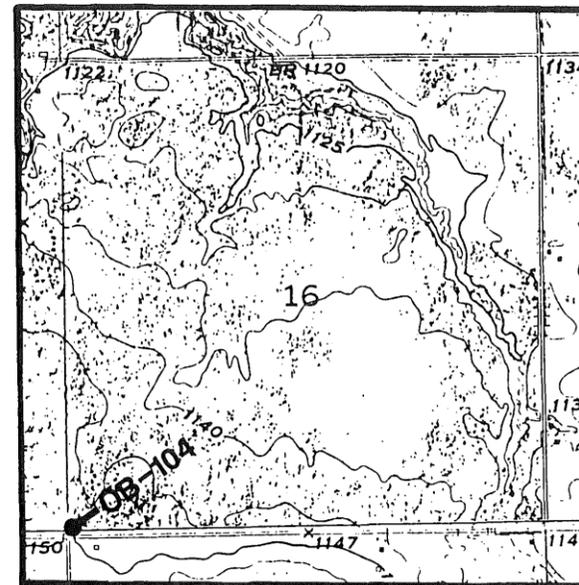
Total Depth 96 ft.

Elevation, Top of Precambrian Bedrock 1059 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-81	Des Moines Lobe Gl. Drift	G	A,B,C	
81-89	Rainy Lobe Gl. Drift	G	A,B,C	B = Au
89-96	Bedrock	G,H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Biotite Paragneiss with Granitic Segregation

Thin Section Description (or number): #19703 at 89.5 ft. Biotite paragneiss with granitic segregation. Estimated mode (volume %), granitic layer and paragneiss layer, respectively: Microcline, 30/--; Plagioclase, 40/50; Quartz, 15/35; Biotite, 15/15; Calcite, Tr/Tr; Zircon, Tr/Tr; Chlorite, Tr/Tr; Apatite, Tr/Tr; Metamict-epidote/allanite (? deep-red clay mineral), Tr/Tr; Pyrite, Tr/Tr; Sphene, --/Tr. Subhedral, fresh and well-foliated biotite commonly contains dark pleochroic haloes due to abundant inclusions of small zircons. Coarser-grained (1 to 3 mm) granitic layer contains clean and fresh tartan-twinned orthoclase; plagioclase in both layers is poorly twinned, sericitized, and apparently albitized (refractive index less than quartz). Minor myrmekitic plagioclase/quartz intergrowths occur in granitic fraction of rock. Rock contains abundant very fine semi-opaque dusty material which is microscopically unresolvable, but is probably a Ca-Fe aluminosilicate. (by T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

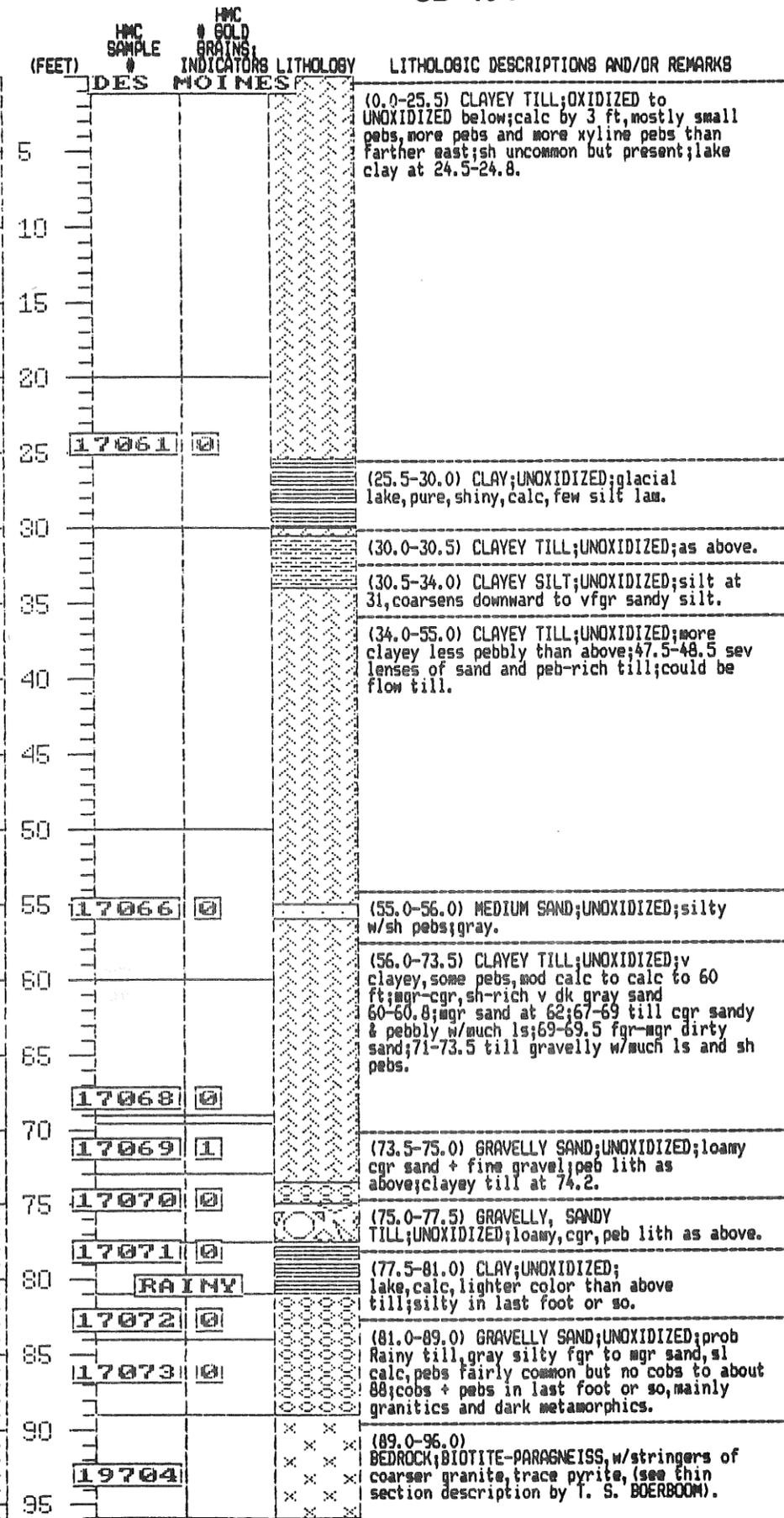
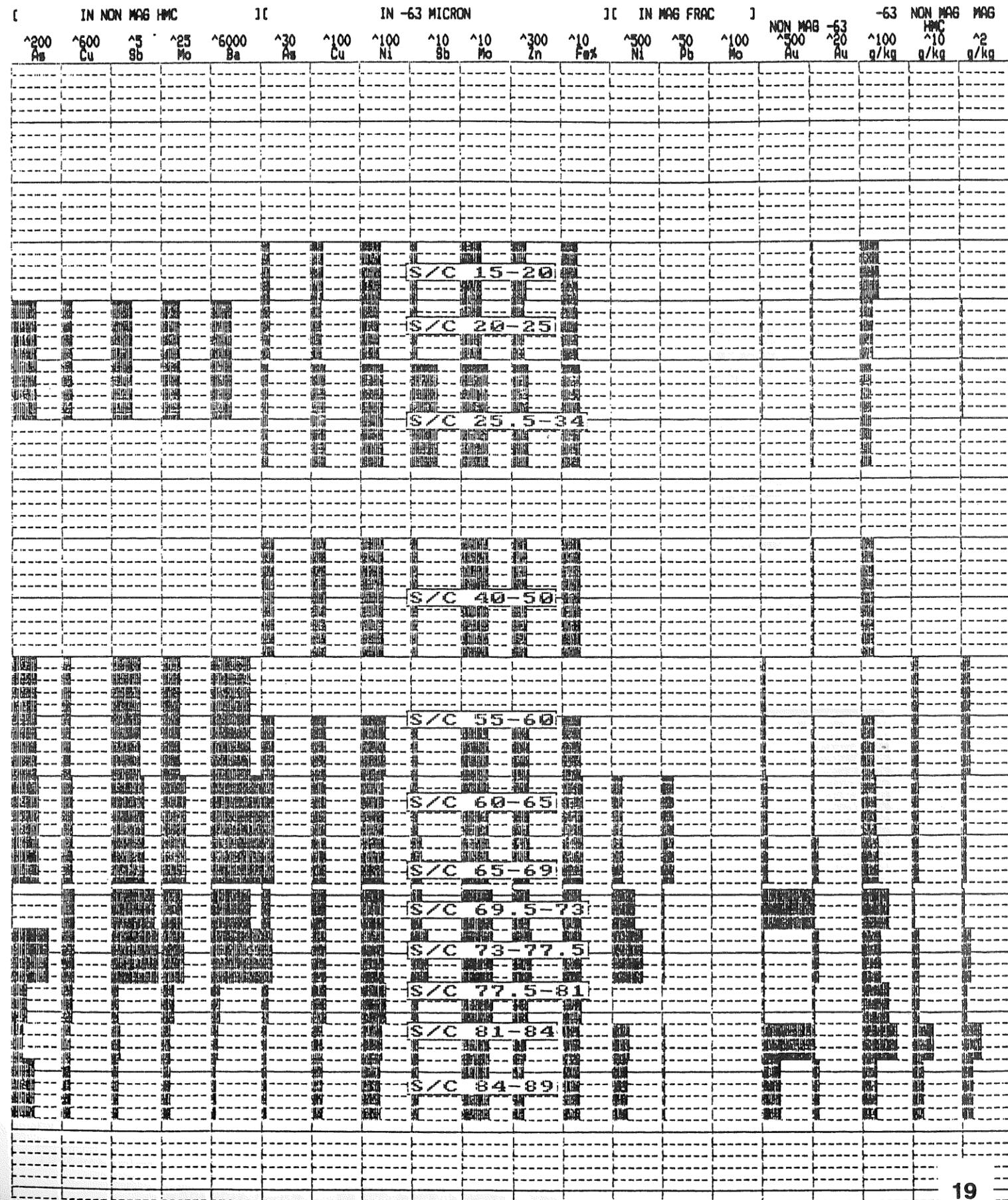
SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					CLAST			MATRIX										
				TABLE CONC	M.I. CONC	NON MAG	NO. V.G.		NO. CALC PPB	SIZE	%	S/U	SD	ST	CY	COLOR						
17061	17.0	0.8	16.2	80.3	76.5	3.8	2.5	1.3	0	NA	P	15	20	65	NA	U	Y	Y	Y	B	B	TILL
-066CP	15.9	0.9	15.0	81.2	61.6	19.6	14.7	4.9	0	NA	P	15	15	70	NA	S	M	Y	Y	B	B	SAND
-068CP	19.1	1.2	17.9	88.0	73.6	14.4	11.3	3.1	0	NA	P	45	10	45	NA	S	M	Y	Y	B	B	SAND
-069	5.2	1.0	4.2	52.4	49.3	3.1	2.5	0.6	1	1157	P	30	10	60	NA	U	Y	Y	Y	B	B	TILL
-070	7.1	2.8	4.3	76.2	64.6	11.6	9.8	1.8	0	NA	P	30	20	50	NA	U	Y	Y	Y	B	B	TILL
-071	7.5	0.6	6.9	88.1	79.3	8.8	7.5	1.3	0	NA	P	50	25	25	I	U	Y	Y	Y	B	B	TILL
-072	5.2	0.8	4.4	97.4	74.4	23.0	19.6	3.4	0	NA	P	60	40	TR	NA	U	Y	Y	Y	B	B	TILL
17073	7.7	1.6	6.1	132.2	114.7	17.5	14.2	3.3	0	NA	P	60	40	TR	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	ABRADED				IRREGULAR				DELICATE				NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P	T	P	TOTAL GMS						
17061	N																	
-066CP	N																	
-068CP	N																	
-069	N	100 X	150	25	C	1								1				
TOTAL															1	2.5	1157	
-070	N																	
-071	N																	
-072	N																	
-073	N																	



MASTER FILE

Appendix 8-4C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G	FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
17059	104	15-20	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	28.0	805.0	3	-1	-1		
17060	104	20-25	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	26.5	1177.0	2	-1	-1		
17061	104	25.5-30	4.5	S L SW-SW 16 68 26	K DML. CLAYEY TILL	20-30	0.0	17000.0	800.0	2.5	1.3	-1.0	-1.0	-1	5	-1		
17062	104	30.5-34	3.5	S L SW-SW 16 68 26	K DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	23.5	1122.0	2	-1	-1	SI[-63]=25.5-34	
17062R	104	30.5-34	3.5	S L SW-SW 16 68 26	K DML CLAY: GLACIAL LK		0	0	0	0	0	0	0	0	0	0	0	
17063	104	40-45	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
17064	104	45-50	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.6	952.0	2	-1	-1	SI[-63]=40-50	
17065	104	50-55	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
17066	104	55-60	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL	50-60	0.0	15900.0	900.0	14.7	4.9	19.0	745.0	3	6	91		
17067	104	60-65	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.7	857.0	3	-1	-1		
13834R	104	60-65	5.	S L SW-SW 16 68 26	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	21.1	967.0	2	-1	-1		
17068	104	65-69	4.	S L SW-SW 16 68 26	K DML. CLAYEY TILL	60-69	0.0	19100.0	1200.0	11.3	3.1	20.2	623.0	3	6	91		
17069	104	69.5-73	3.5	S L SW-SW 16 68 26	K DML. CLAYEY TILL	69.5-73	1.0	5200.0	1000.0	2.5	0.6	28.8	573.0	5	19	76		
17069R	104	69.5-73	3.5	S L SW-SW 16 68 26	K DML. CLAYEY TILL		0	0	0	0	0	0	0	0	0	0		
17070	104	73-77.5	4.5	S L SW-SW 16 68 26	K DML. CLAYEY TILL	73-77.5	0.0	7100.0	2800.0	9.8	1.8	23.5	664.0	4	39	57		
17071	104	77.5-81	3.5	S L SW-SW 16 68 26	K DML CLAY: GLACIAL LK	77.5-81	0.0	7500.0	600.0	7.5	1.3	31.8	590.0	5	8	87		
17072	104	81-84	3.	S L SW-SW 16 68 26	K RL. SILTY SAND	81-84	0.0	5200.0	800.0	19.6	3.4	38.6	553.0	7	15	78		
17073	104	84-89	5.	S L SW-SW 16 68 26	K RL. F. TO V.F. SAND	84-89	0.0	7700.0	1600.0	14.2	3.3	22.5	821.0	3	21	76		
13835R	104	84-89	5.	S L SW-SW 16 68 26	K RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	25.3	727.0	4	-1	-1		
19703	104	89-90	1.0	S L SW-SW 16 68 26	K BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
19704	104	90-96	6.0	S L SW-SW 16 68 26	K BEDROCK	89-96	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
17061	-25	0.13	859	720	7200	29.00	80	130	120	280	0	97	-19	9	0.5	0	-10	2.1	2400	463	210	11	30	60	-2	200.0	28.7	0	2.83
17069	3400	0.12	490	520	6500	27.40	80	120	150	400	0	3	-10	10	-0.5	0	-10	4.3	4600	266	130	15	-10	55	-2	96.0	16.5	0	2.71
17066	45	0.10	583	880	7300	27.80	99	120	94	310	0	97	-10	9	0.5	0	-10	2.9	4500	264	110	6	-10	31	-2	130.0	16.6	1	11.60
17068	60	0.09	498	650	6600	28.20	99	110	110	280	0	100	-18	12	0.5	0	-10	3.2	12000	225	120	4	-10	22	-2	110.0	15.6	1	8.49
17070	-16	0.08	290	310	5700	34.20	88	150	140	220	0	140	-10	11	2.0	0	-10	4.5	5600	163	44	2	-10	50	-2	85.0	9.4	1	7.73
17071	-24	0.16	528	360	10000	25.00	130	200	110	140	0	55	18	6	0.5	0	-10	0.7	1000	275	56	-3	-10	17	-2	94.0	14.3	1	5.58
17072	1100	0.20	558	290	11000	22.90	140	220	100	120	0	40	-10	4	0.5	0	-10	0.8	600	310	56	-3	-10	21	-2	97.0	15.2	4	15.10
17073	180	0.23	617	310	12000	26.10	170	230	97	110	0	84	-10	4	-0.5	0	-10	0.6	500	343	68	7	-10	40	-2	110.0	22.7	2	10.80

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
17069	1.100	1.70	67	220	30	320	-1	-1	-0.5	-1	0.1
17068	0.760	2.00	1300	100	17	200	-1	-1	-0.5	11	0.2
17070	1.700	1.70	800	310	27	210	-1	-1	-0.5	-1	0.3
17072	1.700	1.70	1100	170	31	300	-1	-1	-0.5	-1	0.7
17073	1.700	1.70	1000	150	27	270	-1	-1	-0.5	-1	0.4

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13834R	-1	150	100	580	3.6	20	42	28	100	7	-1	3	-0.5	-1	2	-1	-1	1	16	-1	3	21.8
13835R	-1	99	110	530	3.4	22	41	28	65	3	-1	2	-0.5	-1	1	-1	-1	5	14	-1	2	36.2
17069	-1	140	69	640	3.8	21	43	27	95	5	-1	6	-0.5	1	3	2	-1	1	17	-1	3	50.3
17059	1	150	78	580	3.4	20	38	23	83	5	-1	4	-0.5	-1	2	1	-1	1	16	-1	3	34.8
17060	1	120	76	540	3.3	18	35	20	73	5	-1	4	-0.5	-1	2	1	-1	1	14	-1	3	22.5
17062	1	130	110	620	3.6	22	44	26	91	4	-1	5	-0.5	1	3	5	-1	1	18	-1	3	20.9
17062R	0	0	83	0	0.0	0	0	0	85	5	-1	2	-0.5	1	1	-1	0	-1	0	0	0	0.0
17064	-1	160	90	650	3.8	21	42	27	90	7	-1	5	-0.5	-1	3	1	-1	1	19	-1	4	23.7
17066	-1	170	96	610	3.8	22	47	27	100	7	-1	5	-0.5	-1	3	1	-1	2	18	-1	3	25.5
17067	1	170	89	630	3.9	22	45	28	100	7	1	5	-0.5	1	3	-1	-1	-1	3	-1	-1	28.8
17068	2	150	88	660	4.0	23	45	28	98	7	-1	5	-0.5	1	3	2	-1	1	19	-1	3	32.4
17069R	0	0	73	0	0.0	0	0	0	92	7	1	3	-0.5	1	1	-1	0	1	0	0	0	0.0
17070	2	140	88	630	3.8	21	44	27	110	6	-1	6	-0.5	1	3	3	-1	2	16	-1	3	35.4
17071	1	120	100	590	3.7	21	46	26	88	4	-1	6	-0.5	-1	3	1	-1	1	18	-1	3	53.9
17072	1	98	92	530	3.4	20	39	21	69	3	-1	5	-0.5	1	2	1	-1	2	17	-1	3	69.8
17073	2	87	97	470	3.2	20	36	20	60	3	-1	5	-0.5	1	2	1	-1	5	18	-1	3	27.4

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
19704	-5	-0.2	-1.0	1200	6.0	-10	84.0	3.0	91	22	-2	5	-100	3.8	47	-0.5	-2	61	80	5.70	11.0	-10	8	2.70	-1.0	-20	-1.0	13.0	-200	-2	2.2	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
19704	65	23	68	650	1.5	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0.0	0	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-105

Drilling Completion Date 12/14/85

LOCATION (see map at right)

S-T-R SE $\frac{1}{2}$ -SW $\frac{1}{2}$ -28-68N-25W

County Koochiching

Quadrangle Littlefork SE 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1187 ft.

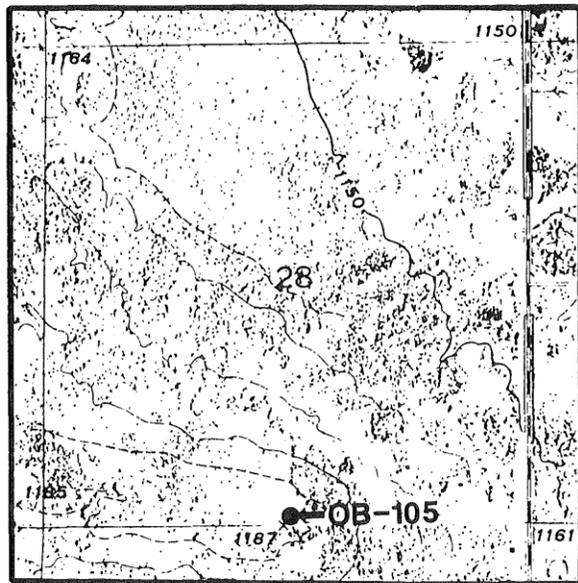
Total Depth 63 ft.

Elevation, Top of Precambrian Bedrock 1131 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS							
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC				NO. V.G.	CALC PPB	CLAST			MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG			NO. MAG	SIZE	%	S/U	SD		ST	CY	COLOR				
17003CP	25.5	0.0	25.5	201.1	87.5	113.6	85.6	28.0	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND
-005CP	25.9	0.8	25.1	555.1	399.6	155.5	125.4	30.1	0	NA	G	20	80	NA	NA	S	F/M	Y	Y	B	B	SAND
-007CP	24.3	1.1	23.2	469.8	304.4	165.4	134.4	31.0	0	NA	P	20	80	NA	NA	U	Y	Y	Y	B	B	TILL
-008	12.6	0.9	11.7	264.8	122.0	142.8	123.0	19.8	0	NA	P	30	70	NA	NA	U	Y	Y	Y	GB	GB	TILL
-010CP	22.7	1.5	21.2	356.0	203.5	152.5	138.1	14.4	0	NA	P	50	50	NA	NA	U	Y	Y	Y	GB	GB	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-18	Des Moines Lobe Gl. Drift	G		
18-56	Rainy Lobe Gl. Drift	G	A, B, C	A = Cu, Zn, Mo
56-63	Bedrock	G, H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite

E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core

H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: 56-58 ft. & 61.5-63 ft. Tonalitic Hornblende Biotite Gneiss and 58-61.5 Tonalite

Thin Section Description (or number): #13870 at 58 ft.; #13871 at 63 ft. #13870; Tonalite (probably an intrusive mass within biotite paragneiss or schist-rich migmatite). Estimated mode (volume %): Plagioclase, 50; Quartz, 18; Biotite, 30; K-feldspar(?), Tr; Zircon, Tr; Apatite, Tr to l; Epidote, Tr; Calcite, Tr; Garnet, Tr; Opaques (pyrite), Tr to l. Medium- to coarse-grained igneous rock which consists almost entirely of biotite, plagioclase, and quartz. No preferred orientations are visible. Rare, small, round garnets are included in plagioclase. #13871; Tonalitic hornblende-biotite gneiss. Estimated mode (volume %): Plagioclase (albite), 40; Quartz, 35; Hornblende, 4; Biotite, 20; Chlorite, Tr; Apatite, Tr to l; Zircon, Tr; Opaques (pyrite), 1. Well-oriented biotite and hornblende define foliation. Rock is medium-grained (up to 1 mm) quartz and well-twinned plagioclase feldspar are clean and granoblastic. Zircons are relatively abundant. Hornblende is patchily altered to grayish-green chlorite. (by T. Boerboom, MGS)

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS		
					ABRADED		IRREGULAR		DELICATE						
					T	P	T	P	T	P				TOTAL	GMS
17003	N														NO VISIBLE GOLD
-005	N														NO VISIBLE GOLD
-007	N														NO VISIBLE GOLD
-008	N														NO VISIBLE GOLD
-010	N														NO VISIBLE GOLD

MASTER FILE

Appendix 8-5C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
17000	105	10.5-15	4.5 S L SE-SW 28 68 25 K		DML. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	33.3	737.0	5	-1	-1		
17001	105	15-18	3. S L SE-SW 28 68 25 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	21.1	436.0	5	-1	-1		
17002	105	20-25	5. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
17003	105	25-30	5. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND	20-30	0.0	25500.0	0.0	85.6	28.0	31.9	1329.0	2	0	98		SIC(-63)=20-30
17004	105	30-35	5. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
17005	105	35-41	6. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND	30-41	0.0	25900.0	800.0	125.4	30.1	19.5	1460.0	1	3	96		SIC(-63)=30-41
17006	105	41-46	5. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	18.6	590.0	3	-1	-1		
17006R	105	41-46	5.0 S L SE-SW 28 68 25 K		RL. MED. TO C. SAND		0	0	0	0	0	0	0	0	0	0		
17007	105	46-51	5. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND	41-51	0.0	24300.0	1100.0	134.4	31.0	38.5	746.0	5	5	90		
17008	105	51-56	5. S L SE-SW 28 68 25 K		RL. MED. TO C. SAND	51-56	0.0	12600.0	900.0	123.0	19.8	42.1	861.0	5	7	88		
17009	105	55	-2.0 S L SE-SW 28 68 25 K		RL. UNCLASS. SLUFF		-1.0	-1.0	-1.0	-1.0	-1.0	18.9	486.0	4	-1	-1		SLUFF MAT'L
17009R	105	55	-2.0 S L SE-SW 28 68 25 K		RL. UNCLASS. SLUFF		0	0	0	0	0	0	0	0	0	0		
17010	105	55	-2.0 S L SE-SW 28 68 25 K		RL. UNCLASS. SLUFF	55	0.0	22700.0	1500.0	138.1	14.4	19.0	476.0	4	7	89		SLUFF MAT'L
17010R	105	55	-2.0 S L SE-SW 28 68 25 K		RL. UNCLASS. SLUFF		0	0	0	0	0	0	0	0	0	0		
13870	105	56-63	7.0 S L SE-SW 28 68 25 K		BEDROCK	56-63	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
17003	44	0.18	255	390	9300	18.30	41	93	24	130	0	-2	-10	5	-0.5	0	-10	-0.3	400	148	60	6	-10	14	-2	39.0	7.1	3	74.50
17005	26	0.18	163	320	9500	17.10	43	96	25	130	0	-2	-10	5	-0.5	0	-10	-0.3	-300	91	28	6	-10	15	-2	23.0	3.8	5	95.60
17007	72	0.19	188	370	8900	20.10	68	120	42	120	0	-4	-10	5	-0.5	0	-10	-0.4	400	109	34	6	-10	15	-2	28.0	6.1	6	102.00
17008	-18	0.22	200	340	8300	19.50	90	150	63	130	0	9	-10	4	-0.5	0	-10	-0.4	-200	115	40	5	-10	16	-2	29.0	9.0	10	83.30
17010	18	0.25	142	300	8700	17.60	74	140	58	130	0	-4	-10	4	-0.5	0	-10	0.5	-100	75	21	4	-10	17	-2	16.0	3.3	6	105.00

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
17010	1.600	6.50	1100	140	30	410	-1	-1	-0.5	14	0.6

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
17000	6	90	98	540	3.5	21	39	29	71	4	-1	4	-0.5	-1	2	1	-1	5	21	-1	2	45.2
17001	-1	130	88	550	3.3	19	40	27	120	5	-1	4	-0.5	1	2	1	-1	3	22	-1	3	48.4
17003	-1	75	95	300	3.1	21	30	20	65	2	-1	3	-0.5	-1	2	-1	-1	2	18	-1	1	24.0
17005	-1	90	120	370	4.0	25	45	43	170	4	-1	6	-0.5	1	2	1	-1	3	26	-1	1	13.4
17006	-1	100	130	520	4.8	37	65	76	550	5	-1	9	-0.5	-1	2	-1	-1	3	26	-1	2	31.5
17006R	0	0	120	0	0.0	0	0	0	560	7	2	9	-0.5	-1	1	-1	0	2	0	0	0	0.0
17007	-1	63	81	440	2.4	17	27	15	31	2	-1	-1	-0.5	-1	-1	-1	-1	-1	11	-1	-1	51.6
17008	-1	64	84	450	2.5	17	27	15	32	2	-1	2	-0.5	-1	1	-1	-1	1	12	-1	-1	48.9
17009	-1	78	130	470	3.3	22	40	44	270	4	-1	12	-0.5	1	2	-1	-1	3	15	-1	-1	38.9
17009R	0	0	110	0	0.0	0	0	0	290	5	1	9	-0.5	1	1	-1	0	2	0	0	0	0.0
17010	-1	75	220	520	4.1	23	53	53	92	4	1	30	-0.5	-1	2	-1	-1	3	19	-1	-1	39.9
17010R	0	0	190	0	0.0	0	0	0	110	5	-1	22	-0.5	1	2	-1	0	3	0	0	0	0.0

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13870	-8	-0.2	-1.1	0	0.0	0	50.0	0.0	260	24	0	2	-50	4.9	33	0.0	0	0	0	0.00	0.0	-5	-2	2.60	0.0	0	0.0	6.5	0	-3	1.8	0	200	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SIO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13870	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-320	0	0	-3	580	-2.2	0	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-106

Drilling Completion Date 12/16/85

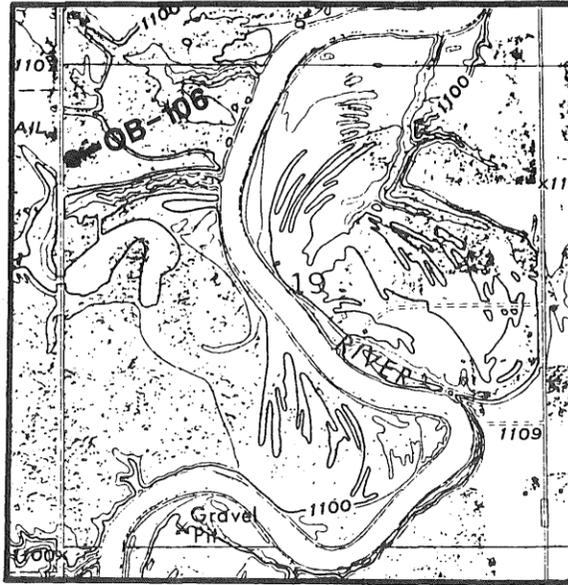
LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -NW $\frac{1}{4}$ -19-69N-25W

County Koochiching

Quadrangle Littlefork 7.5

Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1107 ft.

Total Depth 114 ft.

Elevation, Top of Precambrian Bedrock 999 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-98.5	Des Moines Lobe Gl. Drift	G	A, B, C	
98.5-108	Rainy Lobe Gl. Drift	G	A, B, C	
108-114	Bedrock	G, H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Schist

Thin Section Description (or number): #19705 at 108 ft. Hornblende-biotite-chlorite schist (retrograded amphibolite); fabric suggestive of shear followed by neocrystallization. Estimated mode (volume %), Present assemblage: Chlorite, 68; Biotite, 5; Hornblende, 17; Sericite, 7; Calcite, 1; Quartz, 1; Opaques (leucoxene), 1; Apatite, Tr to 1. "Premetamorphic" assemblage: Plagioclase (now sericite), 8 to 12; Hornblende, 80 to 85; Biotite, 5; Quartz, 1. Prior to heavy retrograde metamorphism, rock was apparently very rich in hornblende and biotite, with subordinate plagioclase and quartz. Hornblende is heavily altered to pale greenish-yellow chlorite, granular dusty opaques, sphene, and leucoxene; alteration occurs incipiently along cleavage planes and ranges to complete replacement. Biotite is red-brown and fresh, and appears to have grown after an earlier phase of retrograde metamorphism. The biotite books are typically rimmed by a fine, dusty, opaque material (Fe-oxides?). Plagioclase is completely altered to sericite and fine-grained muscovite. Calcite is most abundant where chlorite replacement of hornblende is most pervasive. (by T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

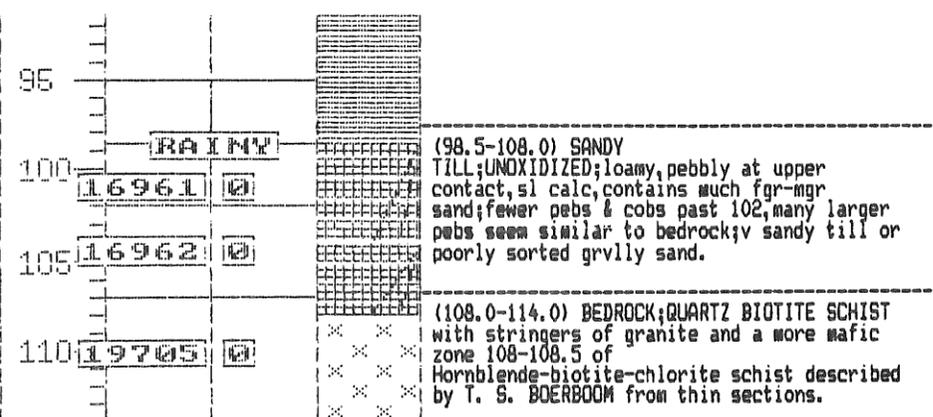
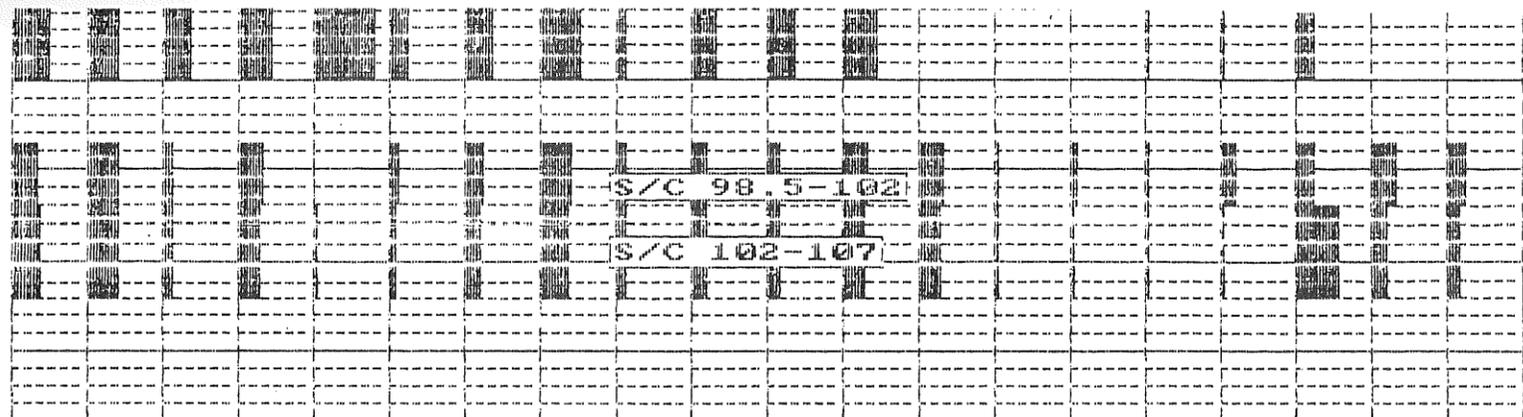
OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. NET)			WEIGHT (GRAMS DRY)			AU		DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	TABLE FEED	TABLE CONC	M. I. CONC			NO. V.G.	CALC PPB	CLAST				MATRIX								
					M.I. LIGHTS	CONC. TOTAL	NON MAG			SIZE	%	S/U	SD	ST	CY	COLOR						
16954CP	7.5	0.4	7.1	146.3	144.3	2.0	1.4	0.6	0	NA	P	30	30	40	NA	U	Y	Y	Y	B	B	TILL
-957CP	4.9	0.0	4.9	233.6	232.2	1.4	0.9	0.5	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
-958	7.9	0.4	7.5	55.7	52.8	2.9	1.9	1.0	0	NA	P	50	35	15	NA	U	Y	Y	Y	B	B	TILL
960CP	11.9	0.0	11.9	33.6	33.4	0.2	0.1	0.1	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND
-961	9.8	1.6	8.2	278.2	248.9	29.3	24.5	4.8	0	NA	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL
-962	14.0	2.3	11.7	197.5	162.9	34.6	29.8	4.8	0	NA	P	10	90	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS								NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				ABRADED		IRREGULAR		DELICATE		TOTAL GMS					
				T	P	T	P	T	P						
16954	N														NO VISIBLE GOLD
-957	N														NO VISIBLE GOLD
-958	N														NO VISIBLE GOLD
-960	N														NO VISIBLE GOLD
-961	N														NO VISIBLE GOLD
-962	N														NO VISIBLE GOLD



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
16947	106	14.5-19.5	5. S L SW-NW 19 69 25 K	DML. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	15.6	640.0	2	-1	-1		
16948	106	30-35	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16949	106	35-40	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.9	911.0	3	-1	-1	SIC(-63)=30-40	
16950	106	40-45	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16951	106	45-50	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16952	106	50-55	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.7	766.0	3	-1	-1	SIC(-63)=45-55	
16953	106	55-60	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16954	106	60-65	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL	55-65	0.0	7500.0	400.0	1.4	0.6	21.4	589.0	4	5	91	SIC(-63)=55-65	
16955	106	65-70	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	21.5	244.0	9	-1	-1		
16956	106	70-75	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
13836R	106	70-75	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	20.6	556.0	4	-1	-1		
16957	106	75-77	2. S L SW-NW 19 69 25 K	DML. CLAYEY TILL	70-77	0.0	4900.0	0.0	0.9	0.5	21.6	392.0	6	0	94	SIC(-63)=70-77	
16958	106	77-82	5. S L SW-NW 19 69 25 K	DML. CLAYEY TILL	77-82	0.0	7900.0	400.0	1.9	1.0	20.5	782.0	3	5	92		
16959	106	85-90	5. S L SW-NW 19 69 25 K	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16960	106	90-95	5. S L SW-NW 19 69 25 K	DML CLAY: GLACIAL LK	85-95	0.0	11900.0	0.0	0.1	0.1	20.4	927.0	2	0	98	SIC(-63)=85-95	
16961	106	98.5-102	3.5 S L SW-NW 19 69 25 K	RL. SANDY GVL. TILL	98.5-102	0.0	9800.0	1600.0	24.5	4.8	23.4	958.0	2	16	82		
16962	106	102-107	5. S L SW-NW 19 69 25 K	RL. SANDY GVL. TILL	102-107	0.0	14000.0	2300.0	29.8	4.8	73.6	1306.0	6	16	78		
13837R	106	102-107	5. S L SW-NW 19 69 25 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	38.2	780.0	5	-1	-1		
19705	106	107-114	7.0 S L SW-NW 19 69 25 K	BEDROCK	107-114	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg WEIGHT
16954	-33	0.16	1070	800	5700	31.70	88	100	130	360	0	96	-27	21	0.5	0	-10	3.3	3300	640	300	6	40	17	-2	200.0	29.2	0 1.53
16957	73	0.12	1010	740	6200	30.70	89	110	170	240	0	130	-27	15	0.5	0	-10	3.8	4200	616	320	15	-10	21	-2	180.0	38.0	0 1.01
16958	30	0.08	997	800	5900	29.40	94	100	120	200	0	180	-20	13	0.5	0	-10	3.8	1100	538	280	11	-10	37	-2	160.0	32.2	0 1.94
16960	23	0.29	972	750	7400	27.80	110	140	230	270	0	92	-20	11	-0.5	0	-10	1.9	4800	473	180	7	-10	47	-2	210.0	32.5	0 0.11
16961	-28	0.27	1250	290	9700	24.70	310	340	250	140	0	64	-10	8	0.5	0	-10	-0.6	-100	735	110	6	10	28	-2	150.0	42.3	3 19.00
16962	17	0.26	1080	230	10000	21.70	280	340	240	120	0	74	-24	7	0.5	0	-10	-0.6	-300	657	100	5	170	15	-2	140.0	34.4	2 22.00

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16958	1.200	1.30	1200	120	24	200	-1	8	-0.5	-1	0.1
16961	1.200	1.60	1500	160	38	170	-1	7	-0.5	-1	0.5
16962	1.500	1.60	1500	140	26	130	-1	3	-0.5	-1	0.3

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
16947	-2	73	68	940	2.8	15	25	21	79	7	-1	3	-0.5	-1	-1	-1	-1	1	21	-1	3	24.4
16949	1	150	96	640	3.9	23	42	28	93	5	-1	4	-0.5	-1	2	-1	-1	1	21	-1	4	25.1
16952	-1	160	97	610	3.9	23	44	28	94	10	-1	5	-0.5	-1	2	1	-1	1	21	-1	4	29.6
16954	-1	160	96	560	3.6	21	40	26	93	9	-1	5	-0.5	-1	2	-1	-1	1	21	-1	4	36.3
16955	1	170	93	580	3.6	22	43	27	88	7	-1	4	-0.5	1	2	-1	-1	1	21	-1	4	88.1
13836R	-1	180	98	580	3.8	21	44	28	99	9	1	4	-0.5	-1	2	-1	-1	1	14	-1	3	37.1
16957	-1	160	91	530	3.5	21	40	25	92	9	-1	4	-0.5	1	2	-1	-1	1	22	-1	4	55.1
16958	2	120	77	540	3.0	18	35	21	77	5	-1	3	-0.5	-1	2	-1	-1	1	19	-1	4	26.2
16960	-1	150	120	590	4.3	26	53	34	110	7	-1	3	-0.5	1	2	-1	-1	1	22	-1	3	22.0
16961	4	81	110	500	3.2	22	39	23	48	4	-1	2	-0.5	-1	1	-1	-1	1	12	-1	-1	24.4
16962	1	80	120	410	2.9	21	37	21	44	3	-1	2	-0.5	-1	1	-1	-1	5	11	-1	-1	56.4
13837R	-1	83	120	520	3.3	22	39	23	47	3	-1	1	-0.5	-1	1	-1	-1	3	9	-1	-1	49.0

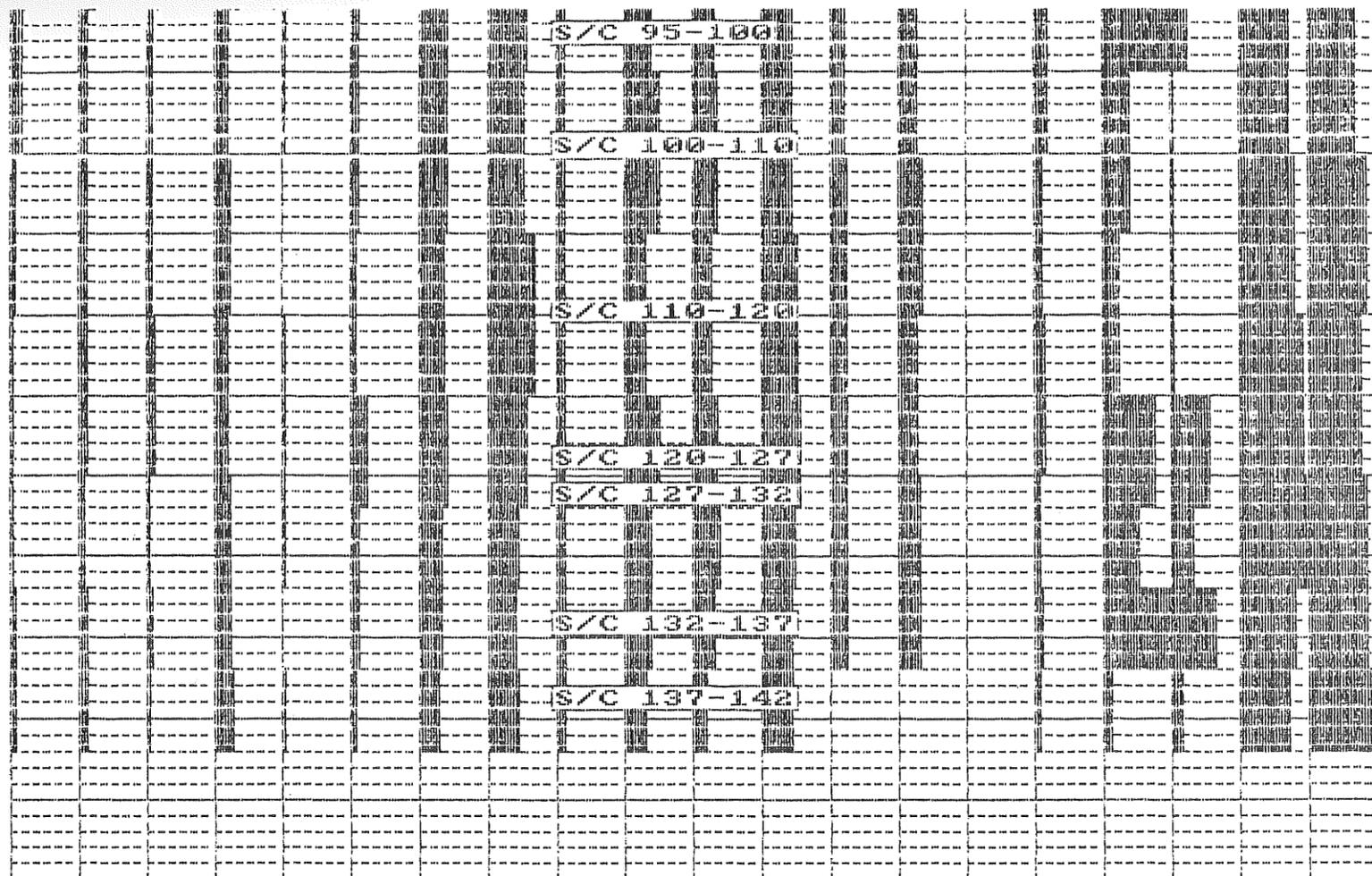
BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
19705	-5	-0.2	-1.0	580	-5.0	-10	90.0	3.0	160	23	3	4	-100	3.8	36	-0.5	-2	73	55	3.60	15.0	-10	5	2.60	-1.0	-20	-1.0	9.0	-200	-2	3.0	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SID2 %	S %	CL	K	CA	FED %	NIR	SR	NB	MDR	BAR	TAR	BI	LOI %	FE	
19705	42	21	67	464	1.3	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0

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100	16982	1	(97.0-102.0) COARSE SAND; UNOXIDIZED; gray.
105			(102.0-115.0) MEDIUM SAND; UNOXIDIZED; noncalc, gray, v uniform.
110	16984	9	
		Py	
115			(115.0-121.0) MEDIUM TO COARSE SAND; UNOXIDIZED; 115-117 only cgr sand; gray.
120	16986	5	
		Py	
125	16988	7	(121.0-132.0) FINE TO MEDIUM SAND; UNOXIDIZED; gray.
		Py	
130		2 IRG	
135	16989	2	(132.0-142.0) MEDIUM SAND; UNOXIDIZED; gray; 138-142 fgr to mgr.
140	16990	0	
145	19707		(142.0-150.0) BEDROCK; BIOTITE PARAGNEISS LEUCOCRATIC, TONALITIC SEGREGATION; sulfide-rich veinlet at 142.5 (see thin section description by T. S. BOERBOOM).
150			

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
16970	107	30-35	5. S L NE-SE 29 68 24 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16971	107	35-40	5. S L NE-SE 29 68 24 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16972	107	40-45	5. S L NE-SE 29 68 24 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16973	107	45-48.5	3.5 S L NE-SE 29 68 24 K	DML. CLAYEY TILL	40-48.5	0.0	12100.0	500.0	3.1	1.4	40.2	1173.0	3	4	93	SI[-63]=40-48.5	
16974	107	50-55	5. S L NE-SE 29 68 24 K	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16975	107	65-70	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	6.5	434.0	2	-1	-1		
16976	107	70-75	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16977	107	75-80	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	20.4	896.0	2	-1	-1	SI[-63]=70-80	
16978	107	80-84	4. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16979	107	84-89	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	8.1	820.0	1	-1	-1	SI[-63]=80-89	
16980	107	90-95	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	4.4	652.0	1	-1	-1		
16981	107	95-100	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	15.7	619.0	3	-1	-1		
16982	107	100-105	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND	95-105	1.0	29800.0	0.0	199.3	41.5	-1.0	-1.0	-1.0	-1	0	-1	
16983	107	105-110	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	5.8	1549.0	0	-1	-1	SI[-63]=100-110	
16984	107	110-115	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND	105-115	9.0	27900.0	0.0	214.2	46.7	-1.0	-1.0	-1.0	-1	0	-1	
16985	107	115-120	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	5.6	1196.0	0	-1	-1	SI[-63]=110-120	
16986	107	120-125	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND	115-125	5.0	16200.0	200.0	145.7	24.8	-1.0	-1.0	-1.0	-1	1	-1	
16987	107	125-127	2. S L NE-SE 29 68 24 K	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	39.3	714.0	6	-1	-1	SI[-63]=120-127	
16988	107	127-132	5. S L NE-SE 29 68 24 K	RL. F. TO V.F. SAND	125-132	7.0	16100.0	0.0	155.7	27.3	19.7	611.0	3	0	97		
16989	107	132-137	5. S L NE-SE 29 68 24 K	RL. MED. TO C. SAND	132-137	2.0	23700.0	0.0	180.1	40.4	57.5	898.0	6	0	94		
16990	107	137-142	5. S L NE-SE 29 68 24 K	RL. F. TO V.F. SAND	137-142	0.0	15400.0	0.0	113.1	29.3	19.8	1159.0	2	0	98		
19706	107	142-143	1.0 S L NE-SE 29 68 24 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
19707	107	143-150	7.0 S L NE-SE 29 68 24 K	BEDROCK	142-150	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg WEIGHT
16973	10	0.14	798	660	6500	24.60	65	110	100	210	0	72	-22	15	0.5	0	-10	1.9	2500	437	260	7	80	15	-2	170.0	27.7	0 3.63
16982	110	0.26	202	360	9900	24.60	100	140	65	120	0	30	-11	5	-0.5	0	-10	-0.4	-300	120	49	6	-10	12	-2	33.0	12.4	7 146.00
16984	60	0.28	214	320	9600	21.00	86	130	61	130	0	15	-10	6	-0.5	0	-10	-0.4	100	116	50	4	-10	12	-2	29.0	9.6	8 158.00
16986	84	0.26	161	330	8800	19.10	72	130	60	140	0	11	-10	5	-0.5	0	-10	0.7	-300	94	40	4	-10	15	-2	25.0	6.1	9 106.00
16988	48	0.34	183	300	8400	17.10	63	130	56	140	0	11	-10	6	-0.5	0	-10	-0.3	-200	107	48	6	-10	16	-2	27.0	5.7	10 110.00
16989	60	0.24	255	320	9700	18.30	71	140	70	150	0	16	-10	6	-0.5	0	-10	0.4	100	135	65	5	-10	19	-2	35.0	6.2	8 130.00
16990	39	0.21	270	340	10000	18.90	79	130	65	130	0	13	-10	7	-0.5	0	-10	-0.3	-200	153	71	6	-10	11	-2	39.0	8.7	7 87.00

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16982	1.000	5.30	1000	110	26	340	-1	-1	0.5	13	1.4
16984	0.880	5.80	1300	130	30	380	-1	-1	0.5	18	1.7
16986	0.880	5.50	1300	130	24	410	-1	-1	0.5	14	1.5
16988	1.100	6.00	1500	130	21	460	-1	-1	-0.5	16	1.7
16989	0.860	5.30	1400	130	22	390	-1	-1	0.5	16	1.7

-63µM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
16973	-1	120	66	460	2.9	17	32	20	70	5	-1	3	-0.5	-1	1	-1	-1	-1	14	-1	2	34.3
16975	4	140	110	560	3.9	24	48	35	97	5	-1	3	-0.5	1	2	-1	-1	2	21	-1	2	15.0
16977	3	170	110	600	4.1	24	48	32	100	7	-1	4	-0.5	1	2	1	-1	1	19	-1	3	22.8
16979	-3	120	120	570	3.8	22	47	47	280	9	1	8	-0.5	1	2	1	-1	2	23	-1	3	10.0
16980	-7	88	110	530	3.8	24	46	43	240	5	-1	5	-0.5	1	1	-1	-1	2	16	-1	-1	6.8
16981	1100	100	140	590	4.5	30	56	41	95	4	-1	4	-0.5	1	2	-1	-1	3	18	-1	-1	25.4
16983	8	100	140	670	4.5	29	53	39	110	4	-1	5	-0.5	-1	1	-1	-1	2	22	-1	-1	3.8
16985	-5	110	180	810	5.0	35	69	37	89	3	-1	3	-0.5	-1	2	-1	-1	1	18	-1	-1	4.7
16987	15	140	180	800	5.7	38	54	39	110	7	-1	5	-0.5	-1	2	-1	-1	2	19	-1	2	55.0
16988	-10	120	150	690	4.7	32	45	31	120	4	-1	4	-0.5	1	2	-1	-1	2	16	-1	-1	32.2
16989	150	100	120	650	4.4	29	41	32	96	4	-1	4	-0.5	-1	2	-1	-1	2	16	-1	-1	64.0
16990	-2	100	120	690	4.3	29	45	28	66	3	-1	3	-0.5	-1	1	-1	-1	2	16	-1	-1	17.1

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
19707	-5	-0.2	-1.0	640	11.0	-10	58.0	4.0	150	22	-2	5	-100	3.4	25	-0.5	-2	72	71	4.40	12.0	-10	-5	2.30	-1.0	-20	-1.0	7.1	-200	-2	2.1	-5	-200	540

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
19707	52	25	70	492	1.0	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0.00	0

Appendix 8-8A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-108

Drilling Completion Date 12/18/85

LOCATION (see map at right)

S-T-R NW¼-NE¼-16-69N-24W

County Koochiching

Quadrangle Ericzburg NW 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1117 ft.

Total Depth 142 ft.

Elevation, Top of

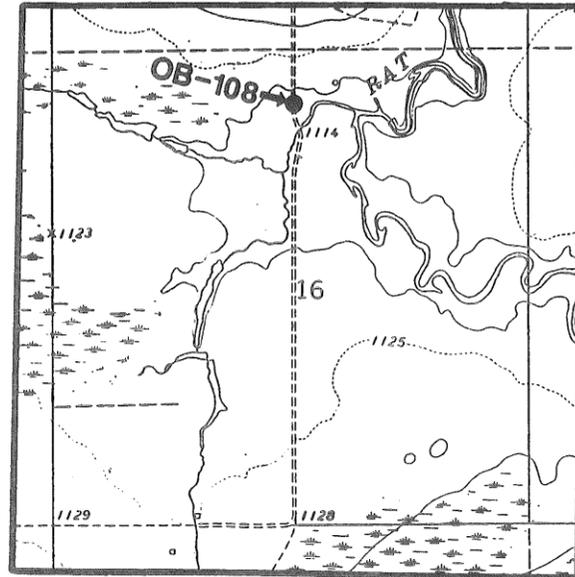
Precambrian Bedrock 985.5 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection

Method Core: Sleeved & Boxed



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU			DESCRIPTION						CLASS						
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC			NO.	CALC	PPB	CLAST			MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL				NON MAG	MAG	V.G.	SIZE	%	S/U		SD	ST	CY	COLOR		
16898CP	15.2	0.5	14.7	108.1	103.2	4.9	3.2	1.7	0	NA	P	40	30	30	NA	U	Y	Y	Y	B	B	TILL
-899	7.6	0.4	7.2	124.0	108.5	15.5	10.3	5.2	0	NA	P	10	20	70	NA	S	F	Y	Y	B	B	SAND
-900	8.7	0.3	8.4	101.6	98.3	3.3	1.2	2.1	0	NA	P	15	10	75	NA	S	F	Y	Y	B	B	SAND
-901	7.0	0.0	7.0	214.6	167.0	47.6	42.0	5.6	0	NA	TR	NA	NA	NA	NA	S	M	Y	Y	B	B	SAND
-903CP	21.4	4.6	16.8	289.4	204.3	85.1	70.9	14.2	1	BB	P	70	30	TR	NA	U	Y	Y	Y	B	B	TILL
-905CP	16.0	4.7	11.3	231.5	142.6	88.9	76.4	12.5	0	NA	P	60	40	NA	NA	U	Y	Y	Y	B	B	TILL
-906	9.7	3.0	6.7	279.8	235.5	44.3	37.4	6.9	0	NA	P	30	70	NA	NA	U	Y	Y	Y	GB	GB	TILL
-907	7.0	5.0	2.0	181.1	158.3	22.8	19.2	3.6	1	I	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-93	Des Moines Lobe Gl. Drift	G	A,B,C	
93-131.5	Rainy Lobe Gl. Drift	G	A,B,C	
131.5-142	Bedrock	G,H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Tonalite grading toward granodiorite

Thin Section Description (or number): #19708 at 132 ft. Compare with #19709. Tonalite grading toward granodiorite. Estimated mode (volume %): Plagioclase, 68; Quartz, 20; Microcline, 7; Biotite (green), 4; Epidote, Tr to l; Apatite, Tr; Muscovite, Tr; Calcite, Tr; Chlorite, Tr; Opaques, Tr; Zircon, Tr; Sphene, Tr. Nonfoliated, medium-grained igneous rock. Plagioclase is patchily saussuritized (sericite + calcite ± epidote). Minor quartz myrmekite in plagioclase. Biotite is green and slightly altered to chlorite, forms ragged decussate masses interstitial to feldspar grains. (by T. Boerboom, MGS)

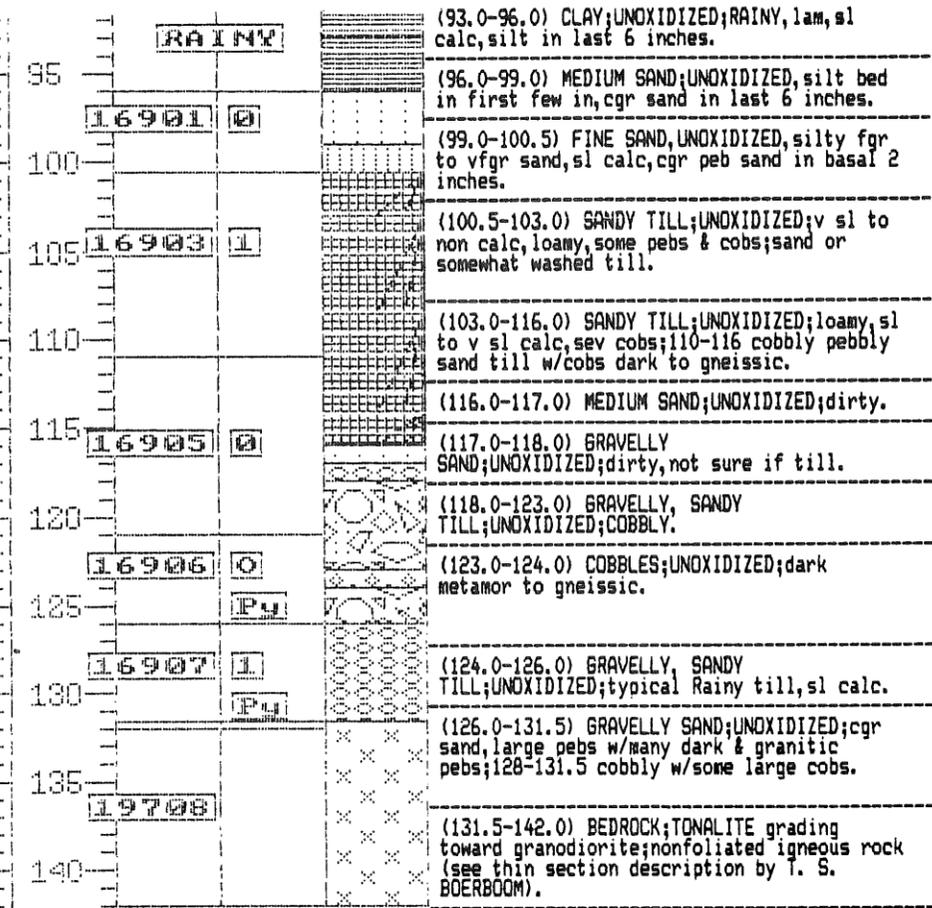
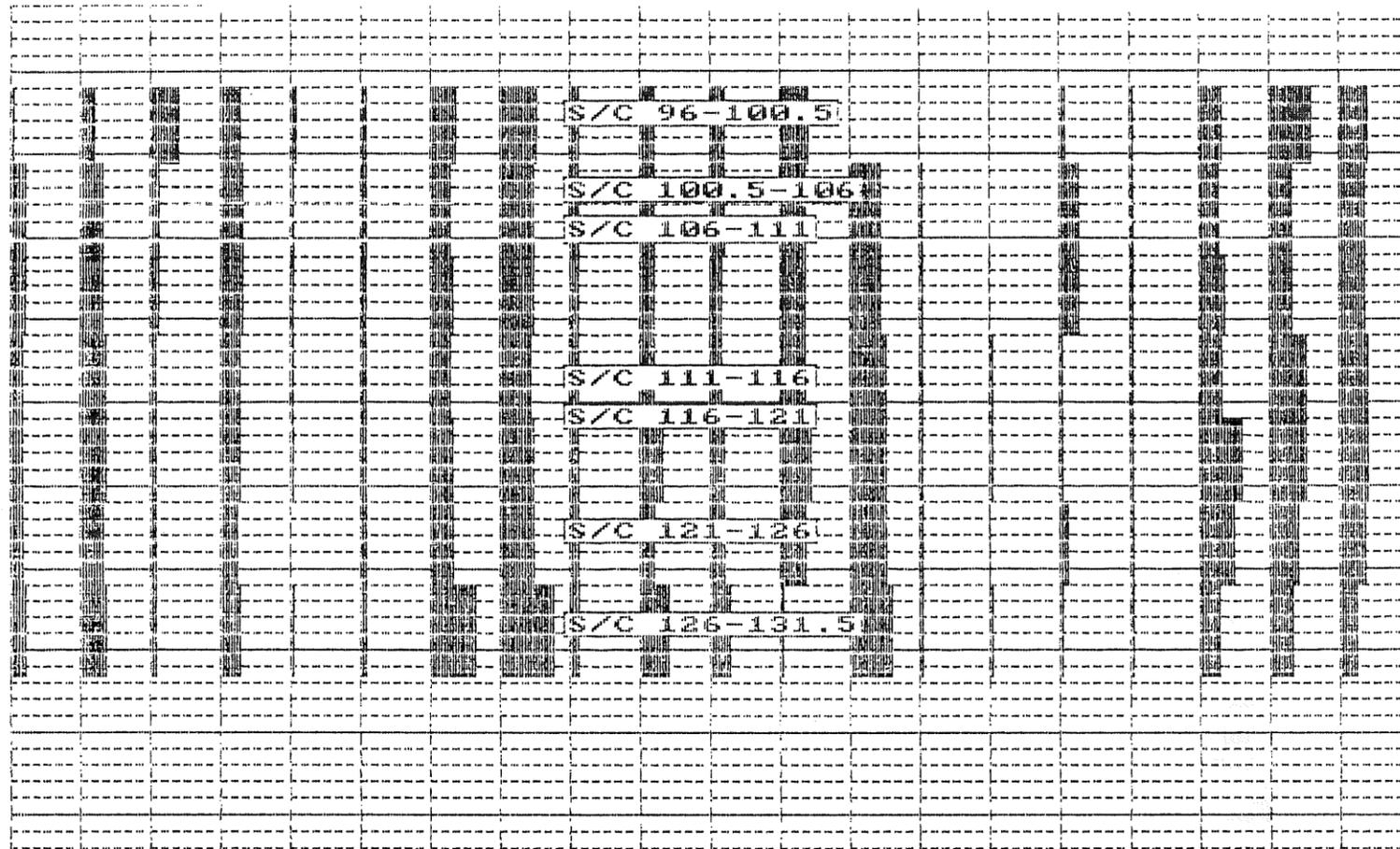
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS
					ABRADED		IRREGULAR		DELICATE		TOTAL		GMS	PPB			
					T	P	T	P	T	P	T	P					
16898	N		NO VISIBLE GOLD														
-899	N		NO VISIBLE GOLD														
-900	N		NO VISIBLE GOLD														
-901	N		NO VISIBLE GOLD														
-903	N		125 X 200	31 C	1							1					
												TOTAL	1	70.9	88		
-905	N		NO VISIBLE GOLD														
-906	Y		NO VISIBLE GOLD														EST. 10% PYRITE
-907	Y		25 X 25	5 C	1							1					EST. 10% PYRITE COATING ON GRAIN
												TOTAL	1	19.2	1		

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IN NON MAG HMC					IN -63 MICRON					IN MAG FRAC					NON MAG -63		-63 NON MAG MAG		HMC SAMPLE #	HMC # GOLD BRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS		
^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 HMC g/kg					^2 g/kg	
																					DES MOINES	(0.0-1.0) FILL;org & sandy loam full of ls pebs.		
																						5		(1.0-7.8) SILTY CLAY;OXIDIZED;sev in mgr sand at 1,1-4 silt,non calc w/some vfgr sand,also clayey;4-6.5 Fe-stained silty clay,v sl calc;6.5-7.8 silt loam to 7,then silty clay,v sl calc.
																						10		(7.8-12.0) CLAY;OXIDIZED;w/little sand,mod calc to 10;10-12 obscure bedding,some large secondary carb nodules,mottled,calc.
																						15		(12.0-76.0) CLAYEY TILL;OXIDIZED to 15,UNOXIDIZED below;v clayey,some ls pebs,mottled & banded to 15;no sm pebs noted,good horiz jointing by 40 ft.
																						20		
																						25		
																						30		
																						35		
																						40		
																						45		
																						50		
																						55		
																						60		
																						65		
																						70		
																						75	16898	(76.0-84.0) MEDIUM TO COARSE SAND;UNOXIDIZED;ls-rich,76-77 silty;77-79 w/layers of clay,some sm pebs;79-83 silty,83-84 w/layers of clay (till layers?).
																						80	16899	
																						85	16900	(84.0-90.5) CLAYEY TILL;UNOXIDIZED;as from 84-90.5 v clayey,calc,pebs mostly ls.
																						90		(90.5-93.0) CLAY;UNOXIDIZED;lake sed,shiny,mod calc,sl darker than above;92-92.5 some grains.



MASTER FILE

Appendix 8-8C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS	
16888	108	6-11	5. S L NW-NE 16 69 24 K		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16889	108	26-31	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16890	108	31-36	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16891	108	36-41	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16892	108	41-46	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16893	108	46-51	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16894	108	51-56	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16895	108	56-61	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	20.1	1106.0			2	-1	-1	SIC-633=51-61
16896	108	61-66	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16897	108	66-71	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	19.1	1343.0			1	-1	-1	SIC-633=61-71
16897R	108	66-71	5.0 S L NW-NE 16 69 24 K		DML. CLAYEY TILL		0	0	0	0	0	0	0	0	0	0	0	0	
16898	108	71-76	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL	66-76	0.0	15200.0	500.0	3.2	1.7	17.0	830.0			2	3	95	
16899	108	76-81	5. S L NW-NE 16 69 24 K		DML. MED. TO C. SAND	76-81	0.0	7600.0	400.0	10.3	5.2	15.0	643.0			2	5	93	
16900	108	84-89	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL	84-89	0.0	8700.0	300.0	1.2	2.1	23.2	613.0			4	3	93	
13838R	108	84-89	5. S L NW-NE 16 69 24 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.0	506.0			4	-1	-1	
16901	108	96-100.5	4.5 S L NW-NE 16 69 24 K		RL. MED. TO C. SAND	96-100.5	0.0	7000.0	0.0	42.0	5.6	23.4	728.0			3	0	97	
16902	108	100.5-106	5.5 S L NW-NE 16 69 24 K		RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	32.5	1188.0			3	-1	-1	
16903	108	106-111	5. S L NW-NE 16 69 24 K		RL. SANDY GVL. TILL	100.5-111	1.0	21400.0	4600.0	70.9	14.2	24.0	695.0			3	21	76	
16904	108	111-116	5. S L NW-NE 16 69 24 K		RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	27.2	842.0			3	-1	-1	
16905	108	116-121	5. S L NW-NE 16 69 24 K		RL. SANDY GVL. TILL	111-121	0.0	16000.0	4700.0	76.4	12.5	23.1	353.0			6	29	65	
16906	108	121-126	5. S L NW-NE 16 69 24 K		RL. SANDY GVL. TILL	121-126	0.0	9700.0	3000.0	37.4	6.9	34.8	719.0			5	31	64	
16907	108	126-131.5	5.5 S L NW-NE 16 69 24 K		RL. GVL. SAND	126-131.5	1.0	7000.0	5000.0	19.2	3.6	17.7	630.0			3	71	26	
19708	108	132-142	10.0 S L NW-NE 16 69 24 K		BEDROCK	132-142	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16898	-32	-0.05	780	540	7000	30.20	83	220	150	210	0	110	-19	21	-0.5	0	-10	1.7	3300	35	200	-1	-10	27	-2	170.0	19.5	0	3.16
16899	120	-0.05	704	650	6700	32.50	130	120	110	250	0	95	-11	20	-0.5	0	-10	1.7	2200	331	140	8	-10	37	-2	180.0	17.7	1	7.42
16900	-38	0.10	864	680	6400	29.40	81	120	130	300	0	110	-20	27	-0.5	0	-10	2.2	2200	434	210	10	-10	39	-2	200.0	23.3	0	2.52
16901	33	0.18	301	290	7700	19.60	130	200	120	120	0	11	13	7	-0.5	0	-10	2.0	500	149	33	4	-10	23	-2	30.0	7.0	6	30.80
16903	140	0.18	333	210	8500	21.50	190	280	200	120	0	37	-14	8	-0.5	0	-10	0.5	300	192	48	5	10	21	-2	41.0	11.4	3	51.50
16905	-19	0.21	297	220	9000	20.20	190	310	220	120	0	28	-10	7	-0.5	0	-10	-0.4	200	180	42	4	-10	18	-2	40.0	9.0	5	51.80
16906	54	0.32	489	320	8900	27.90	250	290	180	130	0	34	-10	6	-0.5	0	-10	0.4	100	278	62	5	-10	22	-2	61.0	14.6	4	26.90
16907	-16	0.24	187	200	9800	19.60	170	280	210	100	0	37	-10	7	0.5	0	-10	-0.4	-300	107	21	6	-10	13	-2	22.0	6.1	3	14.50

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16900	0.410	1.30	1100	150	24	200	-1	4	-0.5	-1	0.2
16903	1.300	1.70	1800	230	45	260	-1	-1	-0.5	-1	0.7
16905	1.300	1.70	1800	270	78	280	-1	2	-0.5	-1	0.8
16906	1.600	1.70	1700	260	37	310	-1	1	-0.5	-1	0.7
16907	1.700	1.70	1100	310	120	270	-1	3	-0.5	-1	0.5

-63µm ANALYSIS (PPM)

SAMPLE NUMBER	AU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
	PPB				%																	g/kg
16895	-1	150	98	630	4.1	25	49	30	99	9	-1	4	-0.5	1	2	-1	-1	1	21	-1	4	18.2
16897	1	160	98	640	0.0	23	44	28	92	9	1	4	-0.5	16	2	-1	-1	1	16	-1	3	14.2
16897R	0	0	68	0	0.0	0	0	0	88	7	1	3	-0.5	1	2	-1	0	1	0	0	0	0.0
16898	-1	170	98	630	4.2	23	46	29	98	10	2	4	-0.5	1	2	-1	-1	1	18	-1	3	20.5
16899	1	160	98	620	3.9	23	45	28	96	10	2	4	-0.5	1	2	-1	-1	1	20	-1	3	24.9
16900	-1	180	100	670	4.3	25	48	31	110	11	3	4	-0.5	1	2	-1	-1	1	17	-1	3	37.8
13838R	-1	190	110	590	3.9	21	47	30	100	9	1	5	-0.5	-1	2	-1	-1	1	15	-1	3	43.5
16901	-1	91	120	570	3.9	27	52	35	60	3	-1	2	-0.5	-1	-1	-1	-1	1	11	-1	-1	32.1
16902	-1	86	120	620	3.7	25	47	28	55	2	-1	2	-0.5	-1	1	-1	-1	-1	17	-1	-1	27.4
16903	-1	92	120	610	3.8	25	48	31	54	2	-1	2	-0.5	-1	1	-1	-1	-1	13	-1	1	34.5
16904	-1	83	120	620	3.6	25	45	29	47	2	-1	2	-0.5	-1	1	-1	-1	2	15	-1	1	32.3
16905	-1	84	130	710	4.4	26	46	31	63	2	-1	3	-0.5	1	-1	-1	-1	3	24	-1	4	58.8
16906	-1	87	120	640	3.7	26	47	31	57	3	-1	2	-0.5	1	-1	-1	-1	3	14	-1	-1	48.4
16907	-1	110	170	740	0.5	34	75	63	85	3	-1	4	-0.5	1	1	-1	-1	6	17	-1	1	28.1

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
	PPB												%	%									%	%										
19708	-5	-0.2	-1.0	1900	-5.0	-10	120.0	1.0	-50	-10	-2	3	-100	1.4	56	-0.5	-2	-50	30	5.90	6.2	-10	-5	3.40	-1.0	-20	-1.0	5.8	-200	-2	0.6	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SIO2	S	CL	K	CA	FEO	NIR	SR	NB	MOR	BAR	TAR	BI	LDI	FE
									%			%	%					%							%		
19708	20	15	42	302	1.2	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0.0	0	0.00	0

Appendix 8-9A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-109

Drilling Completion Date 12/17/85

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SE $\frac{1}{4}$ -16-69N-23W

County Koochiching

Quadrangle Ericzburg 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1158 ft.

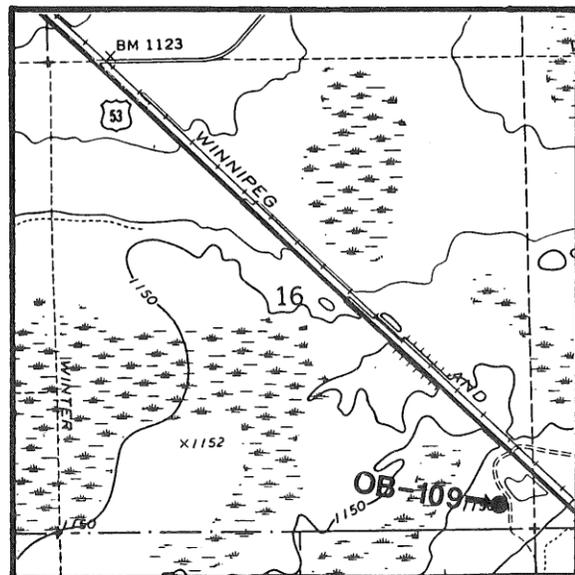
Total Depth 51 ft.

Elevation, Top of Precambrian Bedrock 1113 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS							
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC		NON MAG	NO. V.G.	CALC PPB	CLAST			MATRIX										
				TABLE CONC	M.I. LIGHTS				CONC. TOTAL	SIZE	%	S/U	SD	ST		CY	COLOR					
16965CP	22.1	0.6	21.5	126.8	123.1	3.7	2.5	1.2	0	NA	P	5	50	45	NA	U	Y	Y	Y	B	B	TILL
-967CP	26.4	0.5	25.9	92.2	89.3	2.9	2.0	0.9	0	NA	P	5	10	85	NA	S	F/M	Y	Y	B	B	SAND&CLAY
-968	12.2	0.5	11.7	178.5	171.4	7.1	5.0	2.1	0	NA	P	5	10	85	NA	S	F/M	Y	Y	B	B	SAND&CLAY
-969	10.1	0.3	9.8	83.2	81.3	1.9	1.5	0.4	0	NA	P	5	10	85	NA	S	F/M	Y	Y	B	B	SAND&CLAY

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-45	Des Moines Lobe Gl. Drift	G	A,B,C	
45-51	Bedrock	G,H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Sillimanite-Bearing Hornblende-Biotite Paragneiss

Thin Section Description (or number): #13872 at 50.5 ft. Sillimanite-bearing hornblende-biotite paragneiss. Estimated mode (volume %): Plagioclase, 38; Quartz, 35; Biotite, 18; Hornblende, 7; Calcite, Tr to l; Apatite, Tr to l; Sillimanite, Tr; Opaques (pyrite), 1; Zircon, Tr. Rock is medium-grained (up to 1 mm), sillimanite-bearing gneiss. Biotite and hornblende are well foliated; quartz and twinned plagioclase are clean and granoblastic. Small amounts of sillimanite occur within plagioclase grains, and calcite occurs as a clean, granoblastic mineral of similar habit to quartz and feldspar. (by T. Boerboom, MGS)

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
					T	P	T	P	T	P			
16965	N												NO VISIBLE GOLD
-967	N												NO VISIBLE GOLD
-968	N												NO VISIBLE GOLD
-969	N												NO VISIBLE GOLD

MASTER FILE

Appendix 8-9C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY	GOLD GRAINS	WT (g) HMC FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT % -63uM	WT % +10	WT % SAND	REMARKS
16963	109	10-15	5. S L SE-SE 16 69 23 K		DML. CLAYEY TILL	FT6	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16964	109	15-20	5. S L SE-SE 16 69 23 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16965	109	20-24	4. S L SE-SE 16 69 23 K		DML. CLAYEY TILL	15-24	0.0	22100.0	600.0	2.5	1.2	21.1	725.0	3	3	94	
16966	109	25-30	5. S L SE-SE 16 69 23 K		DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	20.8	871.0	2	-1	-1	
16967	109	30-35	5. S L SE-SE 16 69 23 K		DML. CLAYEY TILL	25-35	0.0	26400.0	500.0	2.0	0.9	23.9	954.0	3	2	95	
16968	109	35-40	5. S L SE-SE 16 69 23 K		DML. CLAYEY TILL	35-40	0.0	12200.0	500.0	5.0	2.1	35.2	771.0	5	4	91	
16969	109	40-45	5. S L SE-SE 16 69 23 K		DML. CLAYEY TILL	40-45	0.0	10100.0	300.0	1.5	0.4	24.1	779.0	3	3	94	
13872	109	45-51	6.0 S L SE-SE 16 69 23 K		BEDROCK	45-51	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16965	-27	0.14	1150	880	7400	23.30	45	74	73	220	0	41	-29	11	-0.5	0	-10	2.0	2700	631	310	14	10	13	-2	250.0	31.1	0	2.68
16967	14	0.09	816	690	6900	24.80	64	100	140	360	0	86	-10	13	0.5	0	-10	1.9	2000	448	250	10	10	39	-2	180.0	23.0	0	2.33
16968	21	0.12	782	700	6700	30.00	83	110	110	340	0	120	-15	13	0.5	0	-10	3.0	2500	448	270	10	10	37	-2	230.0	27.9	0	5.21
16969	29	0.10	779	840	6100	28.90	85	160	120	510	0	110	-14	21	0.5	0	-10	4.4	1600	557	310	10	-10	31	-2	170.0	29.2	0	1.59

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
16965	-1	160	92	610	3.9	22	46	29	98	10	-1	5	-0.5	1	2	1	-1	1	16	-1	3	29.1
16966	-1	150	93	560	3.5	21	42	27	97	7	-1	5	-0.5	1	2	1	-1	1	16	-1	3	23.9
16967	-1	160	93	570	3.8	22	43	26	96	10	-1	4	-0.5	1	2	1	-1	1	15	-1	3	25.1
16968	-1	110	75	510	2.9	18	39	20	74	5	1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	45.7
16969	-1	180	92	580	3.8	22	45	28	99	9	1	4	-0.5	1	2	1	-1	1	15	-1	3	30.9

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13872	-8	0.4	1.1	0	0.0	0	58.0	0.0	280	23	0	3	-50	4.2	33	0.0	0	0	0	0.00	0.0	-5	-2	2.50	0.0	0	0.0	8.4	0	-3	4.5	0	200	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13872	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-20	0	0	-1	620	-2.3	0	0.00	0

MASTER FILE

Appendix 8-10C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	BOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
16991	110	10-15	5. S L NW-SE 12 68 24	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
16992	110	15-20	5. S L NW-SE 12 68 24	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.3	437.0	5	-1	-1		
16993	110	20-25	5. S L NW-SE 12 68 24	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16994	110	25-27.5	2.5 S L NW-SE 12 68 24	K DML. CLAYEY TILL	20-27.5	0.0	11400.0	700.0	5.3	2.0	25.7	872.0	3	6	91	SI[-63]=20-27.5	
16995	110	27.5-32.5	5. S L NW-SE 12 68 24	K DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.1	1048.0	2	-1	-1		
16996	110	32.5-37.5	5. S L NW-SE 12 68 24	K DML CLAY: GLACIAL LK	27.5-37.5	0.0	20400.0	1000.0	4.6	2.4	26.8	1058.0	3	5	92		
16997	110	37.5-42	4.5 S L NW-SE 12 68 24	K RL. CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	21.9	600.0	4	-1	-1		
16998	110	42-47	5. S L NW-SE 12 68 24	K RL. SANDY GVL. TILL	42-47	0.0	7200.0	2200.0	18.2	5.9	51.1	726.0	7	31	62		
16999	110	47-52	5. S L NW-SE 12 68 24	K RL. SANDY GVL. TILL	47-52	1.0	11900.0	2900.0	25.5	8.3	47.3	909.0	5	24	71		
13839R	110	47-52	5. S L NW-SE 12 68 24	K RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	31.6	796.0	4	-1	-1		
19709	110	52.5-60	7.5 S L NW-SE 12 68 24	K BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
19710	110	60-64	4.0 S L NW-SE 12 68 24	K BEDROCK	52.5-64	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16994	70	0.16	672	540	8700	24.70	88	120	150	210	0	58	-10	13	0.5	0	-10	1.2	1500	382	190	10	40	18	15	140.0	24.6	0	3.99
16996	-29	0.11	851	660	7600	25.30	150	140	180	200	0	110	-10	13	0.5	0	-10	1.5	2200	340	190	7	80	18	-2	180.0	24.4	0	4.74
16998	140	0.15	663	330	12000	19.90	240	210	190	120	0	41	-16	8	-0.5	0	-10	0.6	200	280	88	10	-10	18	-2	120.0	16.5	3	13.30
16999	100	0.08	542	280	12000	22.70	230	270	240	130	0	240	-18	8	0.5	0	-10	-0.7	-800	258	83	7	40	29	-2	110.0	17.1	2	19.10

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16994	1.300	1.60	1300	160	90	230	-1	68	-0.5	-1	0.2
16998	1.400	1.70	750	110	27	230	-1	3	-0.5	-1	0.8
16999	1.200	1.70	780	110	27	220	-1	12	-0.5	-1	0.7

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
16992	-1	160	100	520	3.7	21	43	26	93	9	1	4	-0.5	1	2	1	-1	1	22	-1	4	51.0
16994	-1	150	97	520	3.5	21	41	26	92	9	-1	4	-0.5	1	2	1	-1	2	23	-1	4	29.5
16995	-1	140	86	640	4.1	24	45	28	93	9	-1	4	-0.5	-1	2	1	-1	1	21	-1	4	21.1
16996	-1	100	82	590	3.5	21	39	24	80	5	-1	4	-0.5	-1	2	1	-1	1	20	-1	4	25.3
16997	-1	110	110	550	4.1	25	50	36	87	4	-1	3	-0.5	-1	2	1	-1	1	24	-1	3	36.5
16998	4	95	80	480	3.5	22	37	27	75	4	-1	3	-0.5	1	2	1	-1	2	22	-1	2	70.4
16999	7	110	110	600	4.3	26	47	47	140	3	2	4	-0.5	-1	2	1	-1	3	22	-1	4	52.0
13839R	-1	120	130	280	4.3	23	47	52	170	5	-1	7	-0.5	-1	2	-1	-1	2	14	-1	3	39.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
19710	-5	-0.2	-1.0	670	-5.0	-10	76.0	3.0	120	31	-2	4	-100	4.6	30	-0.5	-2	65	110	6.40	13.0	-10	-5	1.60	-1.0	-20	-1.0	7.9	-200	-2	1.9	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
19710	57	20	72	542	1.3	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	0	0

APPENDIX 8-11A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10102

Drilling Completion Date 9/23/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -27-157N-25W

County Koochiching

Quadrangle Lindford 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1148 ft.

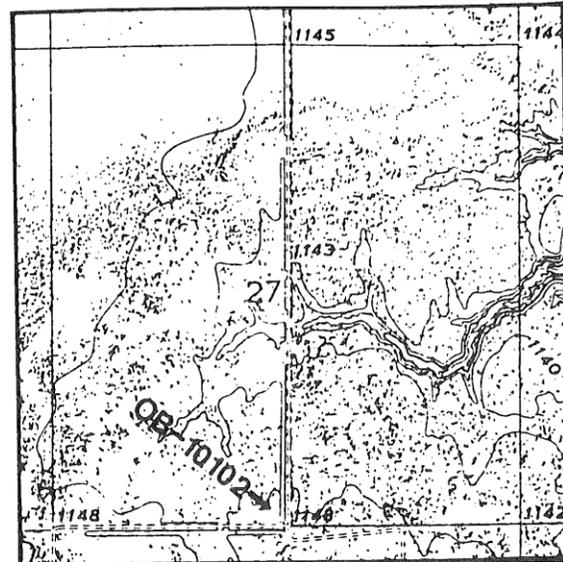
Total Depth 142 ft.

Elevation, Top of Precambrian Bedrock 1011.5 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-119	Des Moines Lobe Gl. Drift			
119-136.5	Rainy Lobe Gl. Drift	E, F	A, B, C	A = Ag, Au, Sb, Pb B = Ni
136.5-142	Bedrock	E, F	I	F = W

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Schist

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE	+10 SPLIT	CHIPS	TABLE	M.I. CONC	CONC	NON MAG		NO. V.G.	CLAST					MATRIX							
			M. I. CONC						CLAST					MATRIX								
									SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY					
									V/S	GR	LS	OT										
18872	9.4	0.6	8.8	363.4	261.6	101.8	86.5	15.3	1	4	P	5	95	NA	NA	S	F	Y	Y	B	B	SAND
18873	10.9	0.8	10.1	256.4	147.4	109.0	95.2	13.8	1	40	P	10	90	NA	NA	S	F	Y	Y	B	B	SAND

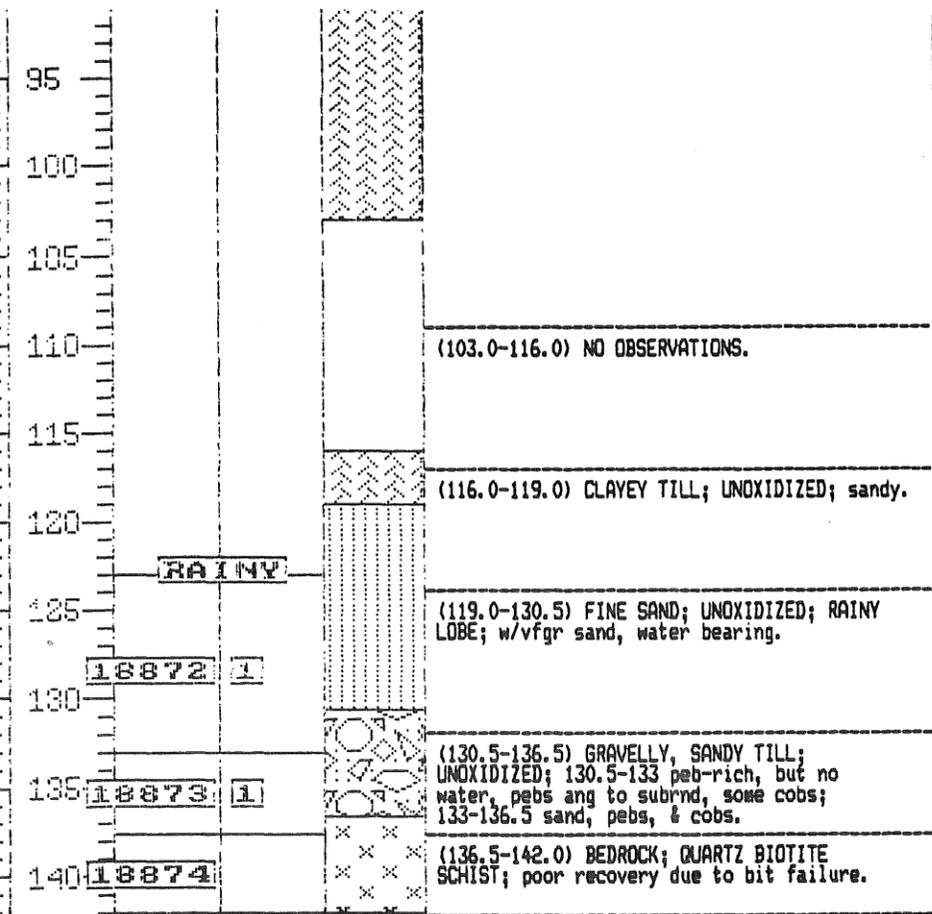
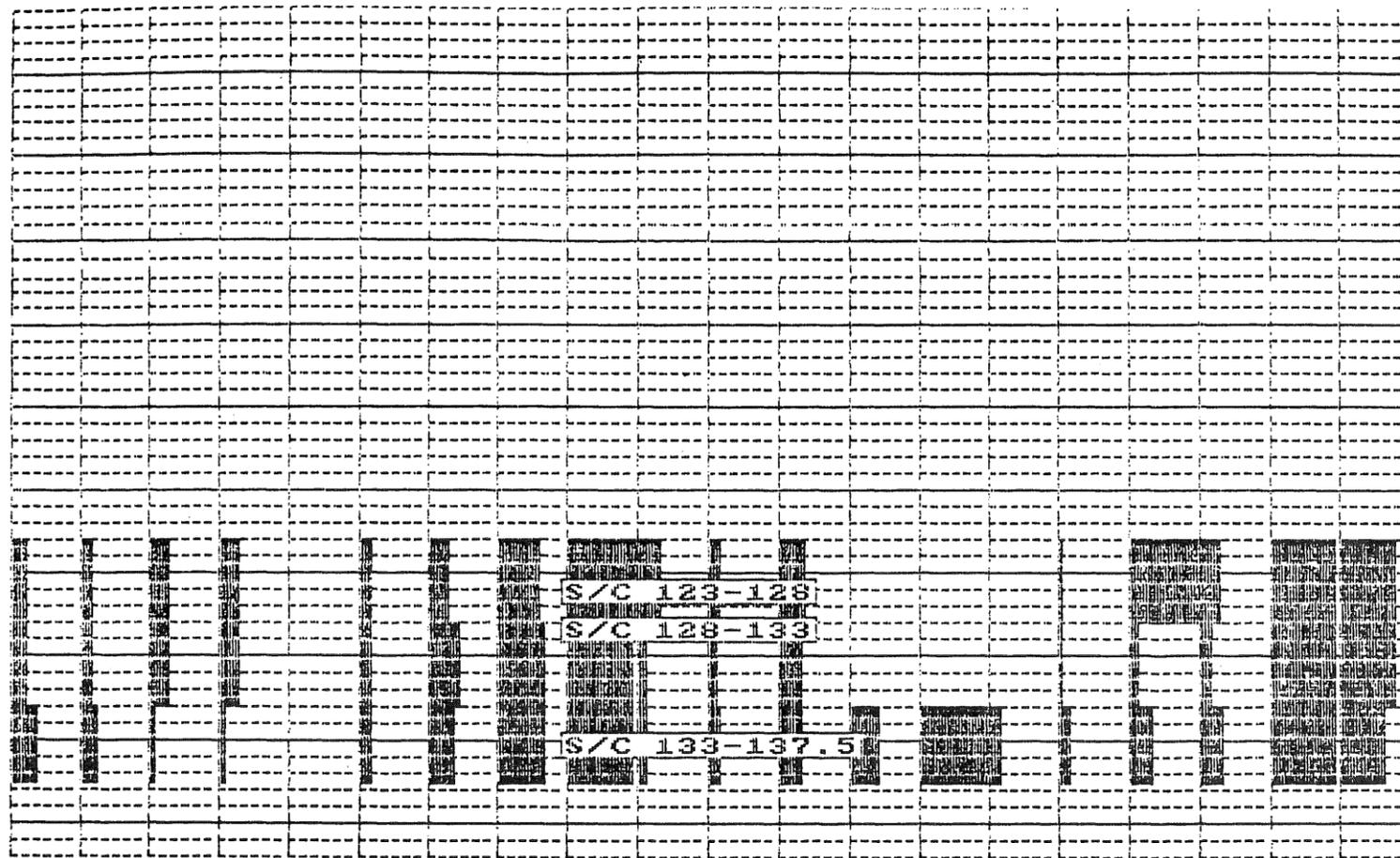
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED				IRREGULAR				DELICATE				NON MAG	CALC V.G. ASSAY	REMARKS
					T	P	T	P	T	P	T	P	TOTAL	GMS	PPB				
18872	N		50 X	75	13	C	1									1			
																1	86.5	4	
18873	N		125 X	150	27	C	1									1			
																1	95.2	40	

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MASTER FILE

Appendix 8-11C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18871	10102	123-128	5.0 A L SE-SW 27 157 25	K RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	48.0	1830.0	3	-1	-1		
18872	10102	128-133	5.0 A L SE-SW 27 157 25	K RL. GVL. SAND	123-133	1.0	9400.0	600.0	86.5	15.3	32.4	2002.0	2	6	92		
18873	10102	133-137.5	4.5 A L SE-SW 27 157 25	K RL. GVL. SAND	133-137.5	1.0	10900.0	800.0	95.2	13.8	82.2	2641.0	3	7	90		
18874	10102	137.5-142	4.5 A L SE-SW 27 157 25	K BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18872	-17	-0.50	1010	410	1120	24.00	160	170	88	-200	56	41	-10	-7	0.6	-5	-200	1.4	-100	590	120	9	-24	22	0	147.0	35.0	9	68.19
18873	79	-0.54	1190	310	1910	30.00	280	420	154	-200	52	72	-10	-2	0.4	-11	-200	0.4	-100	692	96	7	-26	35	0	198.0	37.0	9	76.02

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18873	0.383	4.10	2721	194	54	309	-5	16	-0.5	266	1.3

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18871	23	69	69	823	3.44	23	61	29	45	-5	-5	1	2.7	-1	-10	13	-10	-10	45	9	-10	26.2
18872	2	75	63	694	3.10	25	67	43	41	-5	-5	1	2.7	-1	-10	9	-10	-10	43	5	-10	16.2
18873	6	71	63	720	3.04	21	67	35	47	-5	-5	1	1.7	-1	-10	9	-10	-10	41	-2	-10	31.1

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA %	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18874	-2	0.1	-0.5	940	2.0	-5	41.0	4.2	320	71	-1	4	-50	4.2	25	-0.2	5	95	75	3.60	11.0	-5	-2	3.11	0.6	-10	-0.5	5.1	-100	588	2.1	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
18874	39	5	74	410	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-10105

Drilling Completion Date 10/7/87

LOCATION (see map at right)

S-T-R SE 1/4-NE 1/4-36-157N-25W

County Koochiching

Quadrangle Lindford S.E. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1155 ft.

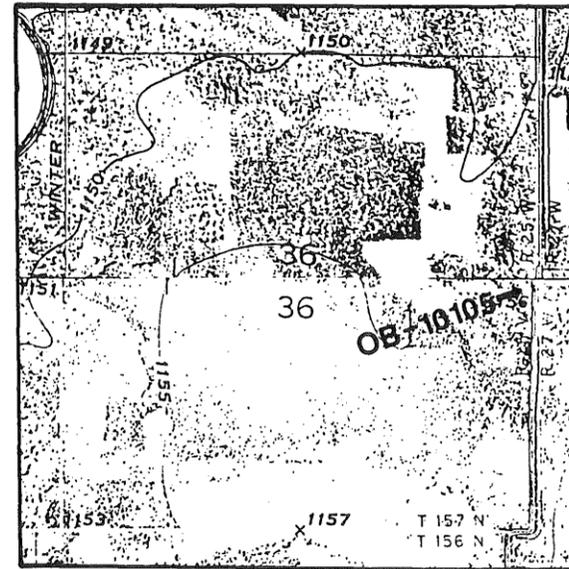
Total Depth 193 ft.

Elevation, Top of Precambrian Bedrock 965 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS				
	TABLE +10 SPLIT	TABLE CHIPS	TABLE FEED	M. I. CONC				CLAST			MATRIX											
				CONC	NON MAG	NO. MAG		NO. V.G.	SIZE	%	S/U	SD	ST	CY	COLOR							
18875	5.6	0.0	5.6	91.5	70.6	20.9	16.8	4.1	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND
18876	7.5	0.0	7.5	216.8	114.8	102.0	86.7	15.3	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND
18877	9.0	0.0	9.0	222.3	104.3	118.0	100.3	17.7	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND
18878	8.4	0.0	8.4	248.8	150.1	98.7	88.0	10.7	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND
18879	12.1	3.8	8.3	252.1	156.0	96.1	81.6	14.5	1	B	P	10	90	NA	NA	U	Y	Y	Y	B	B	TILL
18881	10.6	2.4	8.2	210.5	117.8	92.7	79.2	13.5	4	228	P	5	95	NA	NA	U	Y	Y	Y	B	B	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-6	Organic Sediments			
6-145	Des Moines Lobe Gl. Drift			
145-190	Rainy Lobe Gl. Drift	E, F	A, B, C	A = Au, Ag, Sb B = Au, Sn
190-193	Bedrock			

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

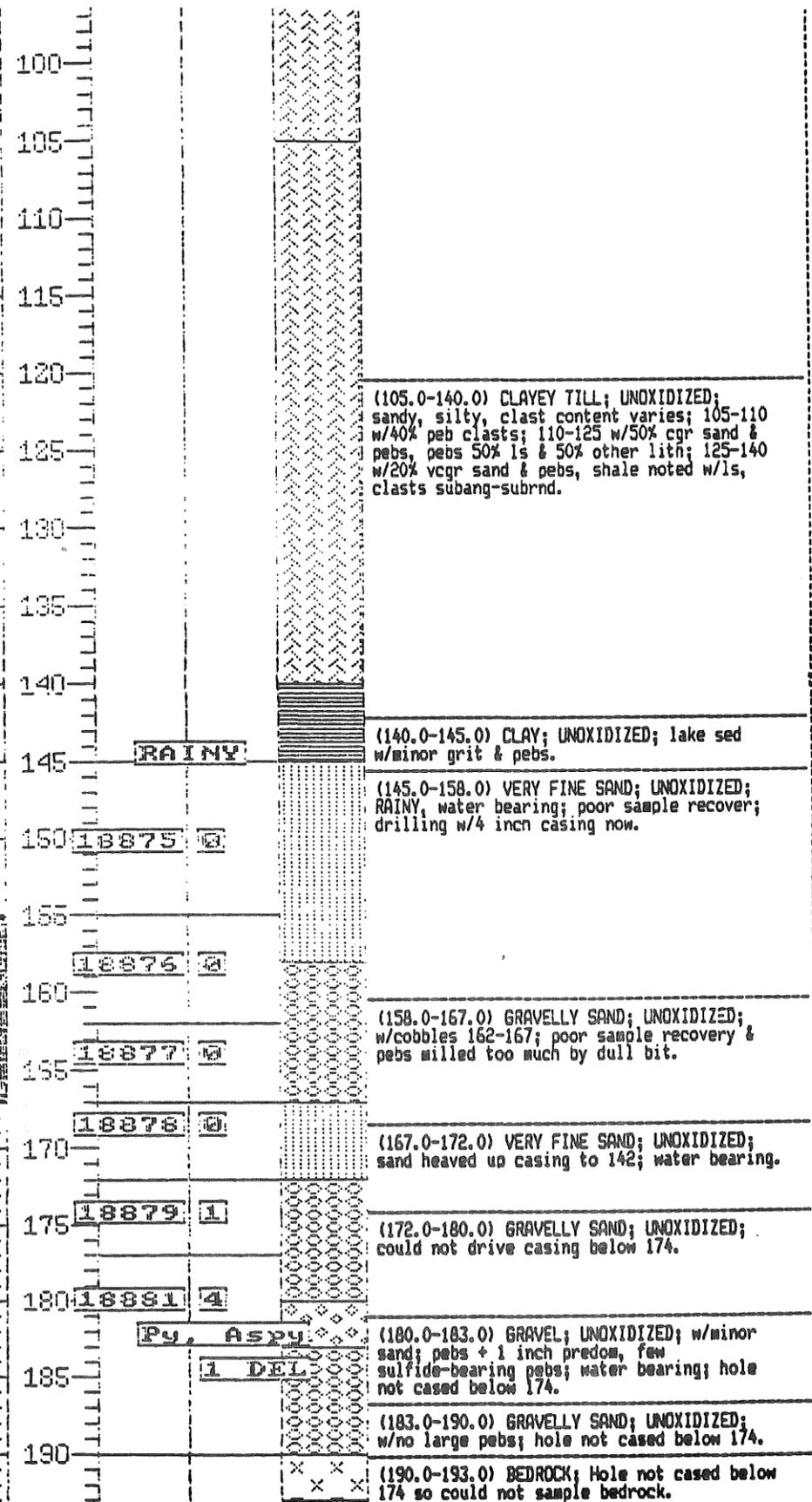
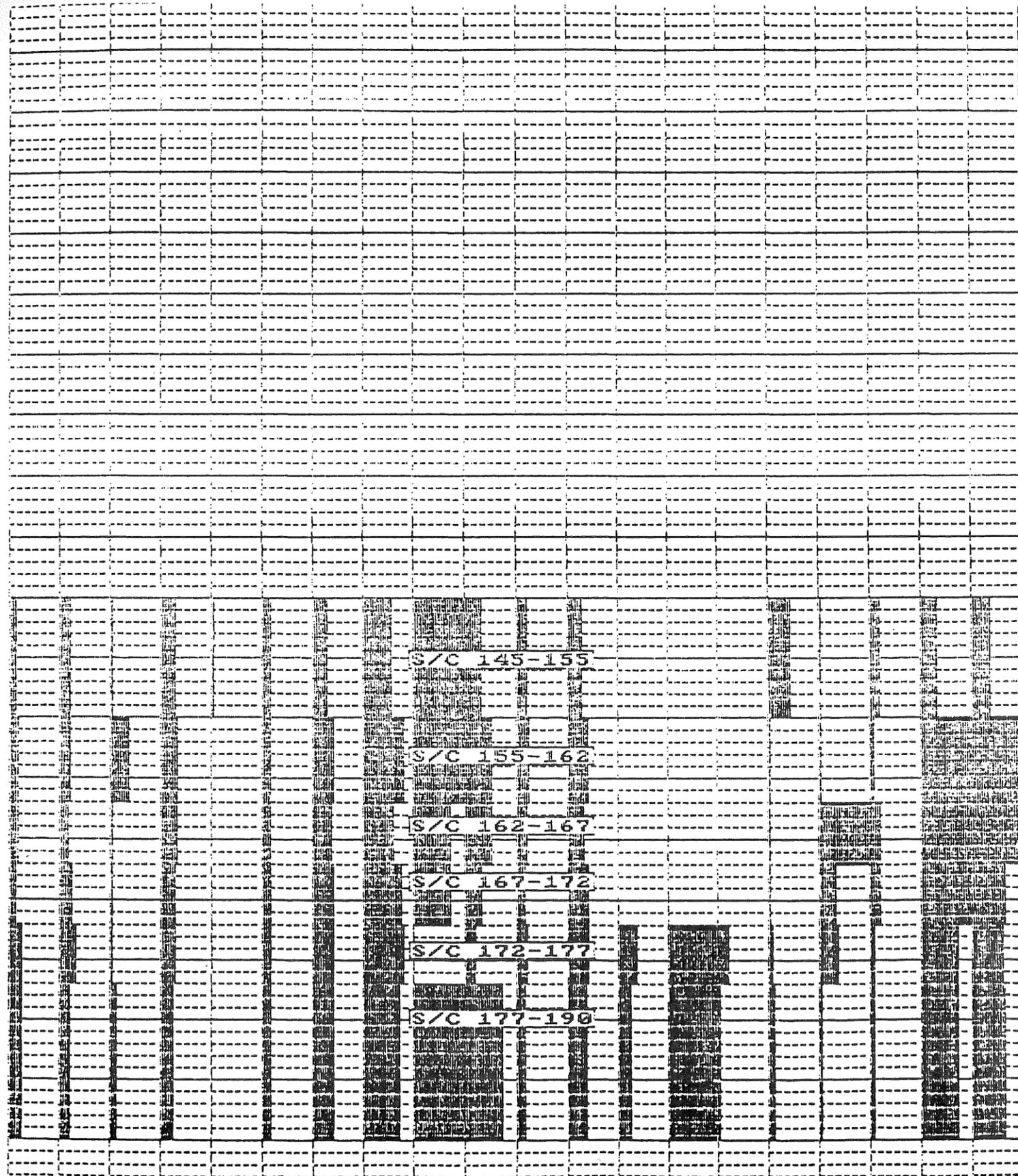
Principal Rock Type: No Sample

Thin Section Description:

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										REMARKS										
				ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY													
				T	P	T	P	T	P			TOTAL	GMS		PPB									
18875	N																							
18876	N																							
18877	N																							
18878	N																							
18879	N	75 X 75	15 C																					
18881	Y	25 X 75 75 X 125 125 X 175 150 X 250	10 C 20 C 29 C 38 C																					EST. 10% PYRITE 0.1% ARSENOPYRITE PHOTO MICROGRAPH FILM REFERENCE #146 AVAILABLE



MASTER FILE

Appendix 8-12C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18875	10105	145-155	10.0 A L SE-NE 36 157 25	K RL. F. TO V.F. SAND	145-155	0.0	5600.0	0.0	16.8	4.1	28.6	1516.0	2	0	98		
18876	10105	155-162	7.0 A L SE-NE 36 157 25	K RL. GVL. SAND	155-162	0.0	7500.0	0.0	86.7	15.3	14.3	1767.0	1	0	99		
18877	10105	162-167	5.0 A L SE-NE 36 157 25	K RL. GVL. SAND	162-167	0.0	9000.0	0.0	100.3	17.7	29.0	1476.0	2	0	98		
18878	10105	167-172	5.0 A L SE-NE 36 157 25	K RL. F. TO V.F. SAND	167-172	0.0	8400.0	0.0	88.0	10.7	32.2	1570.0	2	0	98		
18879	10105	172-177	5.0 A L SE-NE 36 157 25	K RL. GVL. SAND	172-177	1.0	12100.0	3800.0	81.6	14.5	15.2	2196.0	1	31	68		
18881	10105	177-190	13.0 A L SE-NE 36 157 25	K RL. GVL. SAND	177-190	4.0	10600.0	2400.0	79.2	13.5	23.8	2399.0	1	23	76		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

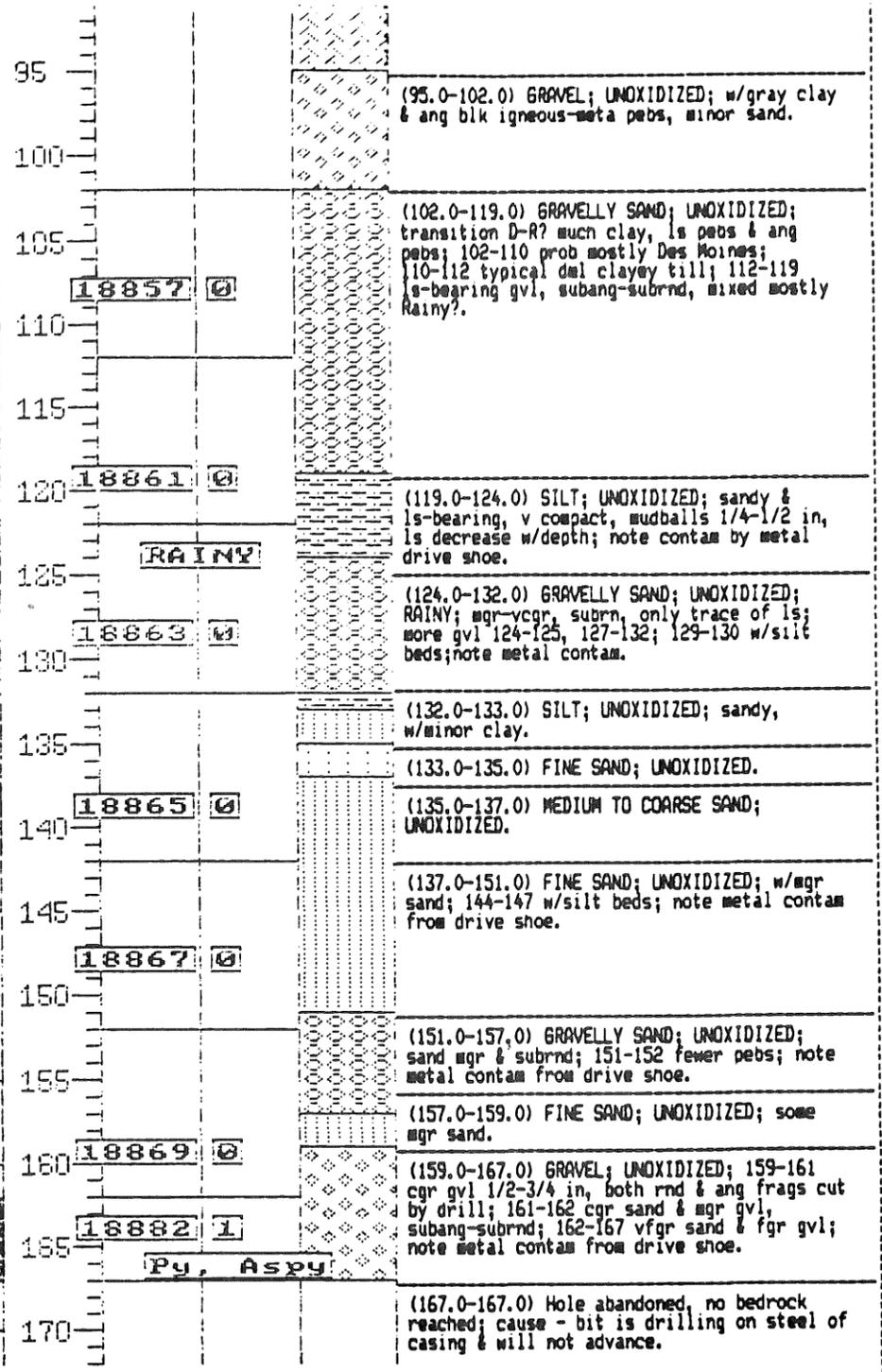
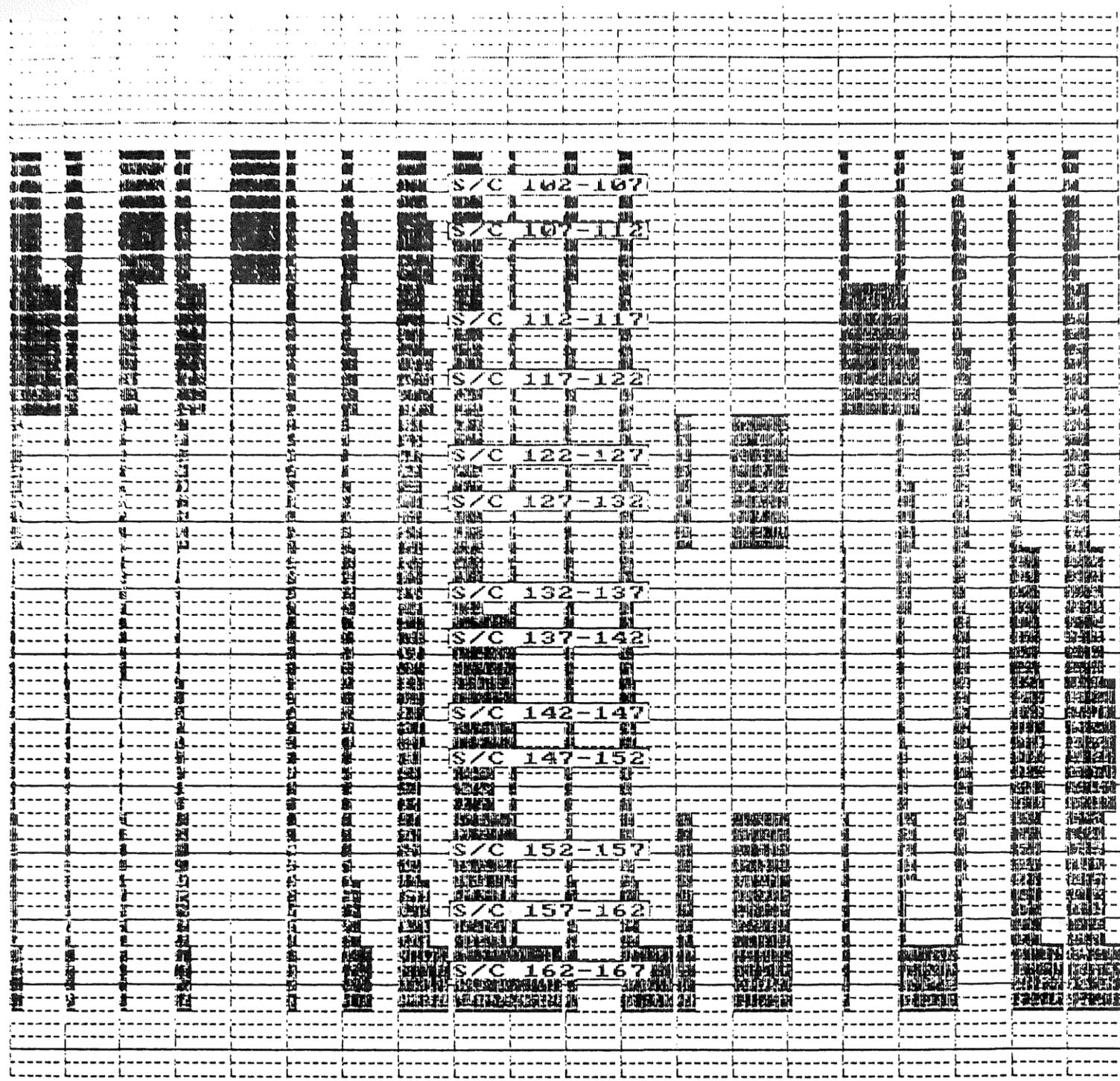
SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18875	220	-0.60	1090	330	1856	25.00	170	280	108	-200	65	27	-10	-7	0.2	-14	390	-0.2	-200	565	86	5	-30	30	0	166.0	34.0	3	11.95
18876	28	-0.59	1180	350	1396	26.00	220	270	116	-200	42	30	-21	-8	-0.2	-11	730	1.9	-100	736	99	7	-28	26	0	189.0	41.0	12	67.61
18877	-17	0.85	1100	300	1272	25.00	210	230	106	-200	56	28	-10	-8	0.4	-5	-200	-0.2	-100	640	87	6	-26	58	0	165.0	37.0	11	79.71
18878	-18	-0.49	960	190	1968	21.00	190	300	152	-200	106	24	-10	-7	0.4	-5	300	-0.2	-100	557	86	6	-24	30	0	163.0	34.0	10	70.20
18879	49	-0.37	560	270	1862	25.00	240	360	186	200	134	51	-10	-7	0.2	-5	-200	-0.2	-100	320	56	6	25	24	0	105.0	19.0	7	66.06
18881	68	0.43	530	340	2210	25.00	190	260	109	-200	117	47	-10	-6	0.2	-5	-200	0.5	-100	260	60	7	-22	19	0	85.5	16.0	7	61.74

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18879	0.906	4.68	1748	183	90	270	-5	18	-0.5	240	1.2
18881	0.721	4.75	1668	129	40	296	-5	4	-0.5	228	1.3

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18875	1	44	49	616	2.84	15	55	29	57	-5	14	3	0.9	-1	-10	11	13	-10	47	-2	-10	18.9
18876	1	83	67	855	3.99	23	81	39	77	-5	-5	5	2.3	-1	-10	15	-10	-10	57	3	-10	8.1
18877	40	55	55	748	3.08	19	61	35	57	-5	-5	5	1.7	-1	-10	7	-10	21	47	-2	-10	19.6
18878	6	89	75	1002	3.92	29	75	39	51	-5	5	3	3.7	-1	-10	7	-10	13	49	7	19	20.5
18879	7	95	80	1000	4.00	27	80	41	55	-5	-5	2	1.0	-1	-10	5	-10	10	45	5	-10	6.9
18881	1	69	77	841	3.62	23	73	39	47	-5	-5	5	2.3	-1	-10	17	-10	51	47	5	-10	9.9



MASTER FILE

Appendix 8-13C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63µM	WT (g) -63FEED	WT % -63µM	WT % +10	WT % SAND	REMARKS
18856	10202	102-107	5. A L SW-SW 36 156 25 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	36.9	1763.0	2	-1	-1		
18857	10202	107-112	5. A L SW-SW 36 156 25 K	RL. GVL. SAND	102-112	0.0	9200.0	2800.0	9.9	5.7	31.1	1365.0	2	30	68		
18858	10202	112	-2.0 A L SW-SW 36 156 25 K	RL. UNCLASS. SLUFF		-1.0	-1.0	-1.0	-1.0	-1.0	26.2	1531.0	2	-1	-1	SLUFF MAT'L	
18859	10202	112-117	5. A L SW-SW 36 156 25 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	27.4	1749.0	2	-1	-1		
18861	10202	117-122	5. A L SW-SW 36 156 25 K	RL. SILTY SAND	112-122	0.0	8600.0	2500.0	9.9	7.4	45.4	1489.0	3	29	68		
18862	10202	122-127	5. A L SW-SW 36 156 25 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	47.8	1742.0	3	-1	-1		
18863	10202	127-132	5. A L SW-SW 36 156 25 K	RL. GVL. SAND	122-132	0.0	11400.0	2800.0	22.3	9.7	47.5	1610.0	3	25	72		
18864	10202	132-137	5. A L SW-SW 36 156 25 K	RL. SILTY SAND		-1.0	-1.0	-1.0	-1.0	-1.0	29.1	1541.0	2	-1	-1		
18865	10202	137-142	5. A L SW-SW 36 156 25 K	RL. F. TO V.F. SAND	132-142	0.0	10200.0	0.0	52.3	14.1	69.2	2518.0	3	0	97		
18866	10202	142-147	5. A L SW-SW 36 156 25 K	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	44.4	1508.0	3	-1	-1		
18867	10202	147-152	5.0 A L SW-SW 36 156 25 K	RL. MED. TO C. SAND	142-152	0.0	10000.0	1200.0	61.0	17.8	68.1	2089.0	3	12	85		
18868	10202	152-157	5.0 A L SW-SW 36 156 25 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	34.2	1703.0	2	-1	-1		
18869	10202	157-162	5.0 A L SW-SW 36 156 25 K	RL. SANDY GVL. TILL	152-162	0.0	11600.0	1600.0	55.0	15.8	17.9	1492.0	1	14	85		
18882	10202	162-167	5.0 A L SW-SW 36 156 25 K	RL. GVL. SAND	162-167	1.0	6900.0	600.0	58.7	23.9	10.1	1956.0	1	9	90		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18857	72	-0.65	950	1000	2124	30.00	190	180	183	-200	83	111	-25	7	0.9	-15	-520	4.1	5200	530	334	14	69	47	0	286.0	41.0	1	7.21
18861	772	-1.20	2470	790	2538	36.00	260	290	136	-200	49	181	-37	-14	1.0	-22	-720	1.5	-330	1530	261	22	-49	51	0	761.0	47.0	1	6.74
18863	28	-0.45	780	530	870	22.00	120	120	48	-200	26	41	-10	-6	-0.2	-11	-200	0.6	270	410	130	12	-24	22	0	189.0	20.0	2	16.92
18865	34	0.40	360	460	740	20.00	90	93	26	-200	20	17	-10	-2	-0.2	-5	-200	0.5	-100	150	99	9	-16	8	0	70.6	12.0	5	39.84
18867	-13	0.31	400	480	462	20.00	84	87	38	-200	14	16	-10	-4	-0.2	-5	-200	0.3	-100	210	110	10	-16	8	0	75.2	10.0	6	46.88
18869	55	0.60	840	470	1098	22.00	110	160	38	-200	24	23	-10	-6	-0.2	-5	-200	0.5	-100	490	91	12	-20	26	0	199.0	15.0	5	41.75
18882	52	-0.55	1070	460	2484	25.00	120	170	88	-200	34	38	-10	-7	-0.2	-5	-200	0.6	-100	654	65	9	42	22	0	285.0	15.0	9	46.62

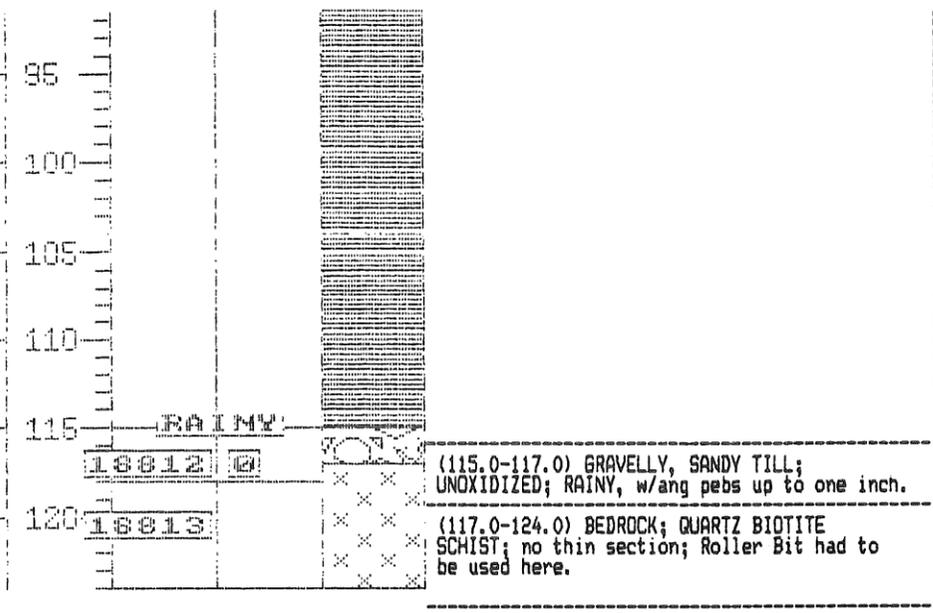
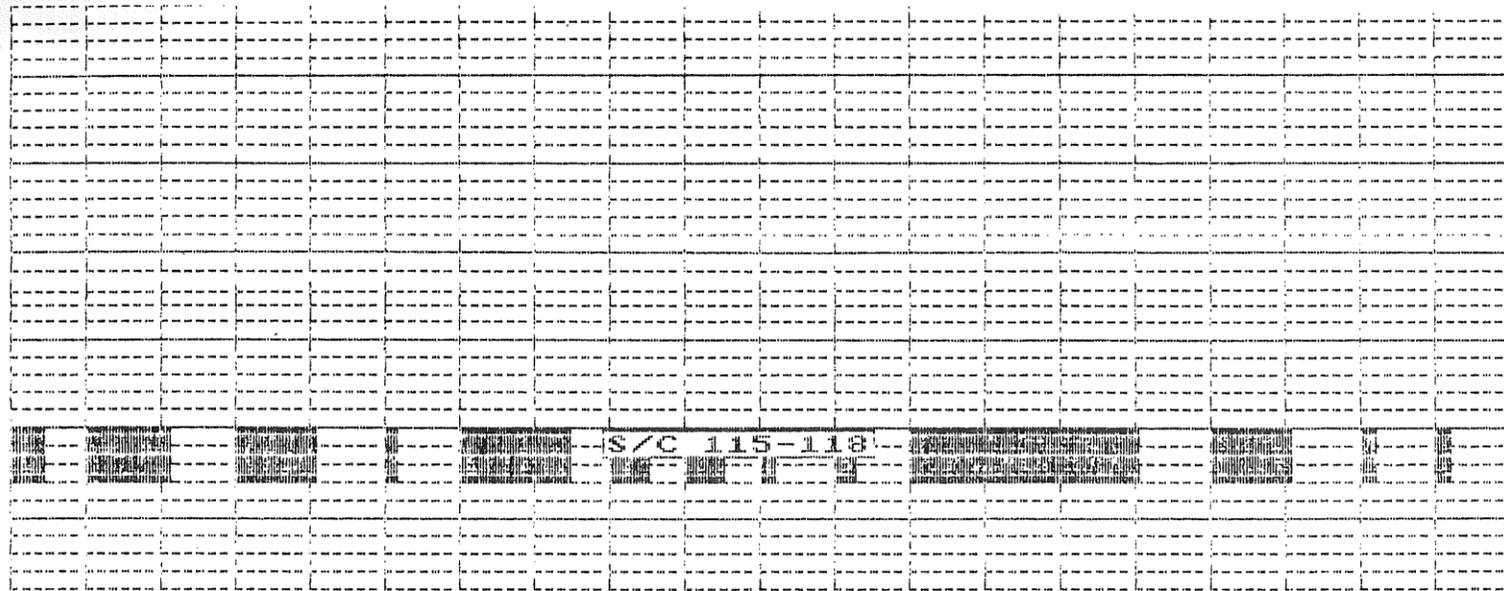
MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18863	0.599	5.93	1791	145	28	418	-5	3	-0.5	233	0.9
18869	0.712	6.66	1656	142	26	430	-5	2	-0.5	227	1.4
18882	0.429	4.65	1008	157	120	298	-5	7	-0.5	253	3.5

-63µM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18856	3	82	33	549	2.24	11	53	21	71	-5	-5	1	-0.5	-1	-10	-5	-10	-10	35	-2	-10	20.9
18857	3	100	47	549	2.46	15	63	27	77	-5	-5	1	-0.5	-1	-10	-5	-10	-10	37	-2	-10	22.8
18858	28	58	-1	569	2.62	13	57	21	51	-5	45	1	-0.5	-1	-10	-5	-10	-10	105	-2	-10	17.1
18859	4	52	43	455	2.12	9	47	17	41	-5	-5	1	-0.5	-1	-10	-5	-10	-10	27	-2	-10	15.7
18861	8	62	43	539	2.56	13	63	27	61	-5	-5	1	-0.5	-1	-10	-5	-10	-10	37	-2	-10	30.5
18862	2	59	43	445	2.04	13	43	13	35	-5	8	1	0.5	-1	-10	-5	-10	-10	29	-2	-10	27.4
18863	6	66	49	483	2.28	13	45	15	41	-5	-5	1	0.5	-1	-10	-5	-10	-10	29	5	-10	29.5
18864	5	64	45	529	2.48	15	45	23	47	-5	-5	1	0.9	-1	-10	5	-10	-10	41	-2	-10	18.9
18865	2	63	61	539	2.58	15	47	21	47	-5	-5	1	0.9	-1	-10	15	-10	-10	49	-2	-10	27.5
18866	2	61	61	571	2.62	17	47	21	49	-5	-5	1	2.7	-1	-10	11	-10	-10	47	-2	-10	29.4
18867	3	59	49	471	2.16	15	39	17	39	-5	-5	1	1.5	-1	-10	7	-10	-10	41	5	-10	32.6
18868	6	51	51	499	2.36	13	39	15	37	-5	-5	1	1.5	-1	-10	13	-10	-10	37	-2	-10	20.1
18869	2	61	59	612	3.00	17	55	33	57	-5	-5	1	1.5	-1	-10	9	-10	-10	43	7	-10	12.0
18882	75	103	77	1496	9.09	23	87	51	59	-5	-5	9	1.7	-1	-10	19	-10	352	53	-2	-10	5.2

IN NON MAG HMC				IN -63 MICRON							IN MAG FRAC				-63 NON MAG		MAG		HMC SAMPLE #	HMC BOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS			
^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg					^2 g/kg		
																								(0.0-5.0) CLAYEY TILL; OXIDIZED to 5 ft.	
																						5			(5.0-78.0) CLAYEY TILL; UNOXIDIZED; w/ls pbs; 30-37 w/more sand; 37-38 w/more pbs; 38-49 more clayey w/depth; 49-55 w/more pbs; 55-71 more sandy & more ls pbs; 71-78 more clayey w/depth.
																						10			
																						15			
																						20			
																						25			
																						30			
																						35			
																						40			
																						45			
																						50			
																						55			
																						60			
																						65			
																						70			
																						75			
																						80			(78.0-115.0) CLAY; UNOXIDIZED; lake sed; 80-85 w/some ls pbs; 95-100 w/some ls gnl; 115 w/ang ls gnl & pbs.
																						85			
																						90			



MASTER FILE

Appendix 8-14C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18812	10303	115-118	3. A L SW-SW 31 69 26 K	AL. SANDY GVL. TILL	115-118	0.0	11100.0	3600.0	19.1	4.9	22.7	3384.0	1	32	67		
18813	10303	118-124	6. A L SW-SW 31 69 26 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg WEIGHT
18812	-28	-1.00	3620	300	859	30.00	580	650	1039	-200	40	91	-24	50	3.0	-13	-740	0.6	580	2150	99	4	120	89	0	903.0	186.0	2 12.76

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18812	1.500	3.84	1530	1210	532	181	1	150	0.6	244	0.4

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18812	89	50	45	485	2.72	15	47	105	55	5	-5	5	0.9	-1	-10	-5	-10	11	51	5	-10	6.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	Y3	ZNR	ZR
18813	-2	-0.1	1.1	830	22.0	-5	63.0	7.0	320	30	-1	3	-50	5.7	41	0.2	-1	95	110	5.50	18.0	-5	-2	2.63	0.7	-10	0.7	10.0	-100	4	2.9	-2	110	280

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18813	42	4	94	360	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-15A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10304

Drilling Completion Date 7/9/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -4-69N-26W

County Koochiching

Quadrangle Littlefork N.W. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1103 ft.

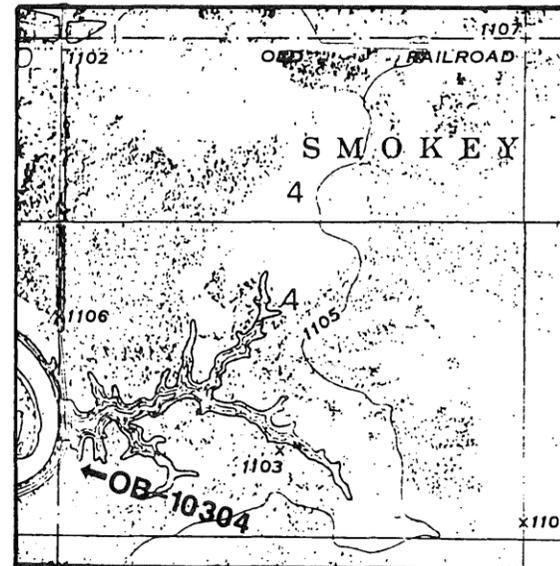
Total Depth 142 ft.

Elevation, Top of Precambrian Bedrock 967 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-2	Organic Sediments			
2-136	Rainy Lobe Gl. Drift	E, F	A, B, C	A = Au B = As
136-142	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Metasediment w/Stringers on Monzonite

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

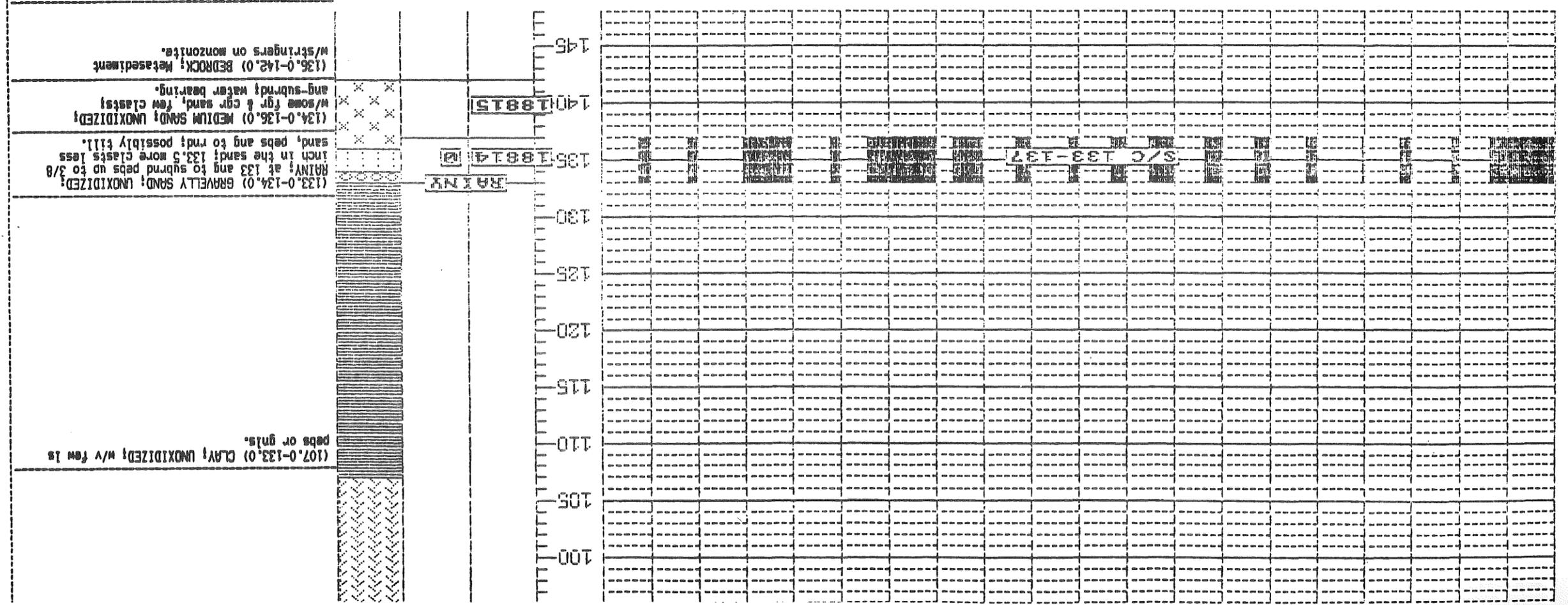
SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)		AU	DESCRIPTION						CLASS										
	M. I. CONC		CLAST			MATRIX																
	TABLE	+10	TABLE	TABLE	M.I.	CONC.	NON	NO.	CALC	SIZE	%	S/U	SD	ST	CY	COLOR						
	SPLIT	CHIPS	FEED	CONC	LIGHTS	TOTAL	MAG	MAG	V.G.	PPB	V/S	GR	LS	OT	SD	CY						
18814	10.2	1.9	8.3	254.5	226.0	28.5	23.3	5.2	0	NA	CP	5	95	NA	NA	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON	CALC	V.G.	REMARKS
					T	P	T	P	T	P				
18814	N													NO VISIBLE GOLD



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18814	10304	133-137	4.0 A L SW-SW 4 69 26	K	RL. SANDY GVL. TILL	133-137	0.0	10200.0	1900.0	23.3	5.2	11.4	3258.0	0	19	81		
18815	10304	137-142	5. A L SW-SW 4 69 26	K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-15C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	Zn2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18814	100	0.53	340	290	1318	24.00	180	170	204	400	80	245	-10	6	1.2	-5	-300	0.8	160	150	72	6	29	22	0	34.0	11.0	2	16.58

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18814	0.612	6.26	2131	312	79	233	-1	42	-0.5	252	0.5

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18814	154	76	57	642	3.02	17	35	31	59	7	-5	3	-0.5	-1	-10	-5	-10	-10	27	9	-10	3.5

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18815	-2	0.1	-0.5	1300	3.5	-5	7.6	4.5	110	-5	-1	2	-50	1.3	7	-0.2	-1	-20	59	1.00	1.9	-5	-2	4.50	-0.5	-10	-0.5	1.1	-100	3	0.9	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SIO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18815	4	3	47	180	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

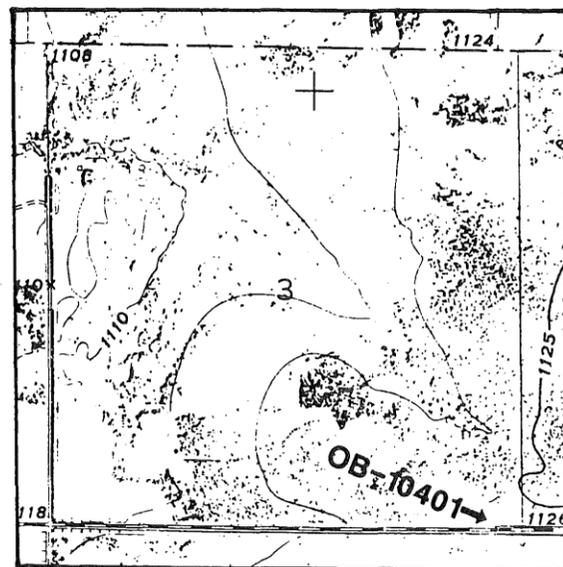
Appendix 8-16A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10401
 Drilling Completion Date 6/18/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SE $\frac{1}{4}$ -3-68N-26W
 County Koochiching
 Quadrangle Littlefork N.W. 7.5
 Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1122 ft.
 Total Depth 186 ft.
 Elevation, Top of Precambrian Bedrock 945 ft.
 Drilling Method Air Rotary
 Sample Diameter 6 inch
 Sample Collection Method Slurry: Splitter & Buckets

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-9.5	Organic Sediments			
9.5-117	Des Moines Lobe Gl. Drift			
117-177	Rainy Lobe Gl. Drift	E,F	A,B,C	A = Cu,As,Sb B = Cu
177-186	Bedrock	E,F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz-Biotite-Schist

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS					
	TABLE	+10 SPLIT	CHIPS	TABLE	M.I. CONC.	NON MAG	NO. V.G.		CALC PPB	CLAST				MATRIX								
		FEED	CONC	LIGHTS	TOTAL	MAG	MAG		SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY					
									V/S	GR	LS	OT										
18774	9.5	0.8	8.7	132.4	103.1	29.3	22.4	6.9	0	NA	P	60	40	TR	NA	U	Y	Y	Y	B	B	TILL
18776	8.7	0.6	8.1	164.6	101.4	63.2	51.1	12.1	0	NA	CP	70	30	TR	NA	U	Y	Y	Y	GB	GB	TILL
18778	9.6	0.7	8.9	207.3	186.2	21.1	15.2	5.9	0	NA	P	70	30	TR	NA	U	Y	Y	Y	B	B	TILL
18783	7.8	2.1	5.7	190.1	137.6	52.5	44.7	7.8	0	NA	CP	55	45	TR	NA	U	Y	Y	Y	GB	GB	TILL
18784	8.3	2.5	5.8	148.4	124.3	24.1	22.3	1.8	1	347	C	NA	100	NA	NA	U	Y	Y	Y	GY	GY	TILL

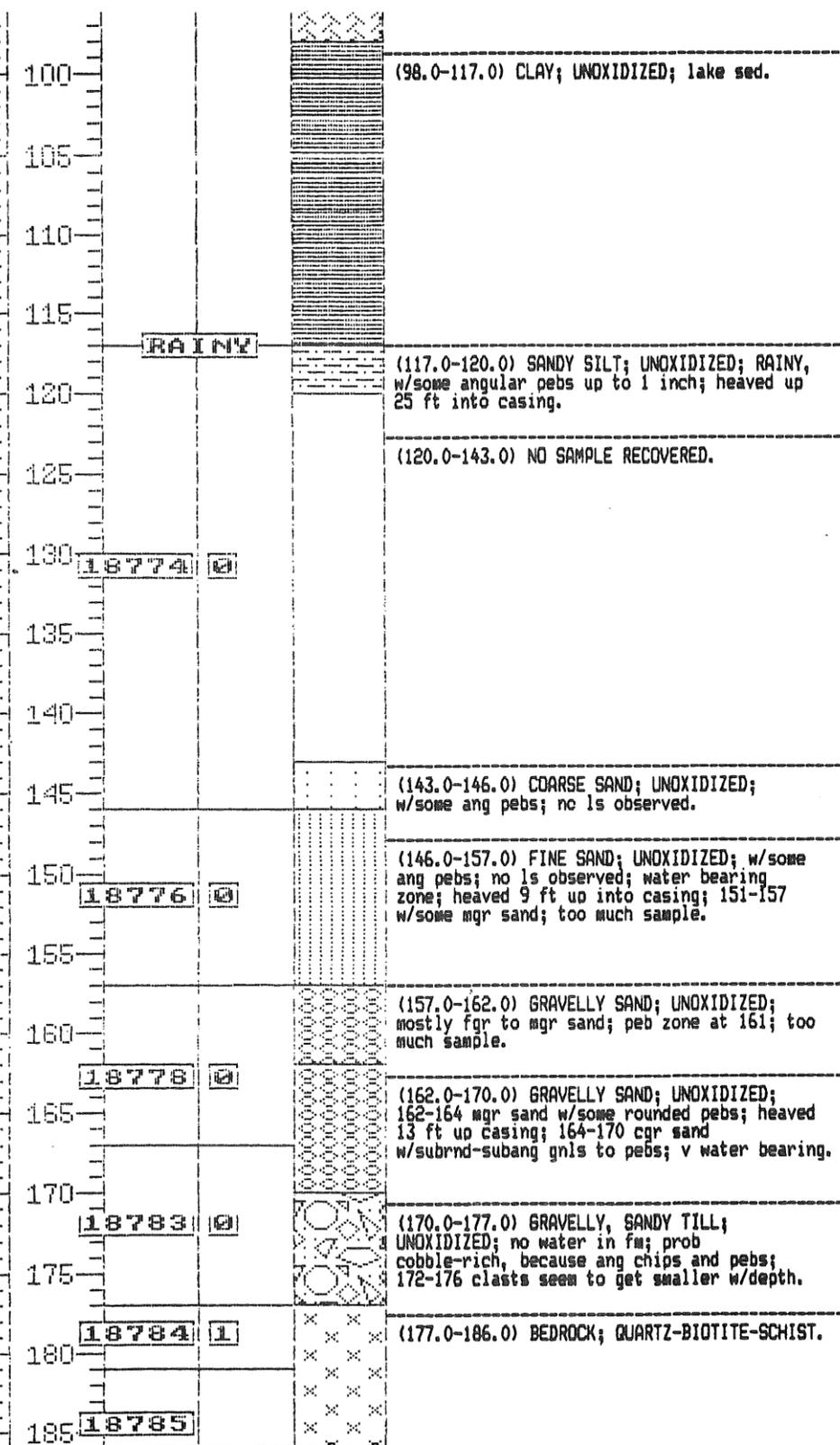
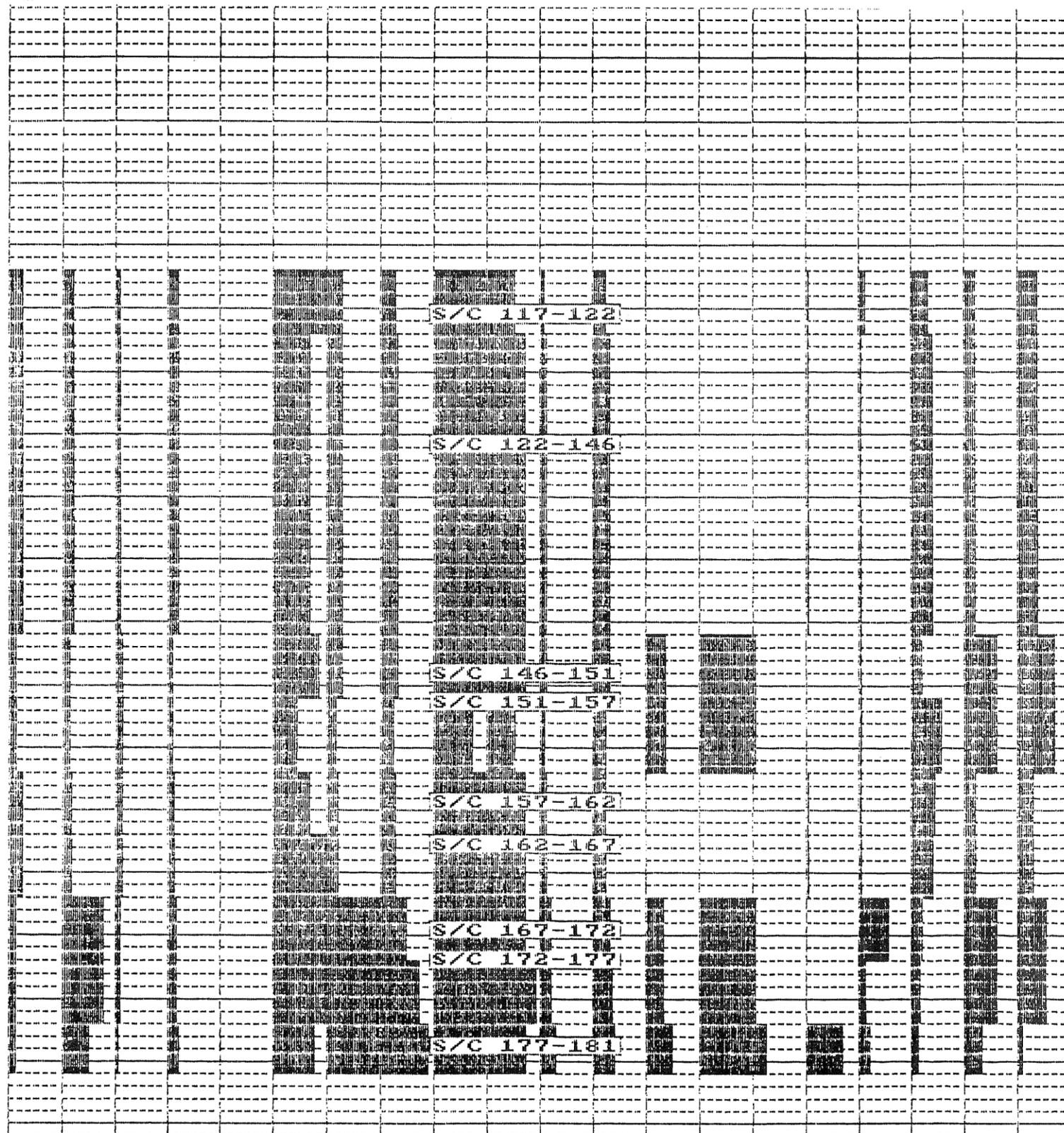
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS	
					T	P	T	P	T	P				TOTAL GMS
18774	N													
18776	N													
18778	N													
18783	N													
18784	N		125 X 225	34 C	1						1	22.3	347	

AVAILABLE PHOTO MICROGRAPH FILM REFERENCE #144

IN NON MAG HMC						IN -63 MICRON						IN MAG FRAC			-63 NON MAG MAG			HMC SAMPLE #	HMC GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS			
^200 Ag	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 Ag	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	NON MAG ^500 Au	-63 ^20 Au	^100 q/kg					HMC ^10 q/kg	MAG ^2 q/kg	
																					5		(0.0-9.5) ORGANIC SEDIMENTS.	
																						10	DES MOINES	(9.5-18.0) CLAY; OXIDIZED to 17; UNOXIDIZED below; lake sed.
																						20		(18.0-28.0) CLAYEY TILL, UNOXIDIZED; w/sand & ls pebs.
																						30		(28.0-30.0) GRAVELLY SAND; UNOXIDIZED; mostly ls gnis.
																						35		(30.0-98.0) CLAYEY TILL; UNOXIDIZED; 30-32 w/more clay; 32-34 w/many 1/2 inch ls pebs; 43-45 w/many 1/2 inch ls pebs; 60-65 w/many gnis & 1/2 inch ls pebs; 65-98 less gritty.
																						40		
																						45		
																						50		
																						55		
																						60		
																						65		
																						70		
																						75		
																						80		
																						85		
																						90		
																						95		



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18773	10401	117-122	5. A L SE-SE 3 68 26 K	RL. SILTY SAND		-1.0	-1.0	-1.0	-1.0	-1.0	53.8	1653.0	3	-1	-1		
18774	10401	122-146	24. A L SE-SE 3 68 26 K	RL. MED. TO C. SAND	117-146	0.0	9500.0	800.0	22.4	6.9	69.8	1741.0	4	8	88		
18775	10401	146-151	5. A L SE-SE 3 68 26 K	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	47.9	2541.0	2	-1	-1		
18776	10401	151-157	6. A L SE-SE 3 68 26 K	RL. F. TO V.F. SAND	146-157	0.0	8700.0	600.0	51.1	12.1	164.1	2913.0	6	7	87		
18777	10401	157-162	5. A L SE-SE 3 68 26 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	137.4	3072.0	4	-1	-1		
18778	10401	162-167	5. A L SE-SE 3 68 26 K	RL. GVL. SAND	157-167	0.0	9600.0	700.0	15.2	5.9	118.0	2932.0	4	7	89		
18779	10401	167-172	5. A L SE-SE 3 68 26 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	67.5	3430.0	2	-1	-1		
18783	10401	172-177	5. A L SE-SE 3 68 26 K	RL. SANDY GVL. TILL	167-177	0.0	7800.0	2100.0	44.7	7.8	40.6	2587.0	2	27	71		
18784	10401	177-181	4. A L SE-SE 3 68 26 K	RL. SANDY GVL. TILL	177-181	1.0	8300.0	2500.0	22.3	1.8	25.9	1997.0	1	30	69		
18785	10401	181-186	5. A L SE-SE 3 68 26 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-16C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY	
																													g/kg	WEIGHT
18774	-12	0.39	1420	420	599	24.00	190	140	109	-200	20	50	-10	-5	1.5	-5	-370	0.4	-100	767	150	8	-17	15	0	201.0	44.0	2	15.66	
18776	10	0.72	580	360	329	19.00	120	130	65	-200	18	24	-10	2	1.3	-5	-200	0.5	-100	270	120	8	-10	8	0	68.9	19.0	6	35.88	
18778	-12	0.65	740	500	464	25.00	210	190	99	210	30	46	-10	3	1.4	-5	-270	0.5	-100	370	170	10	-18	17	0	119.0	23.0	2	10.22	
18783	-5	0.38	1090	370	631	25.00	150	130	462	-200	25	23	-10	-4	0.9	-5	-280	0.4	-100	604	75	6	-14	27	0	180.0	47.0	6	30.81	
18784	350	-0.44	1560	270	1175	31.00	78	120	288	-200	18	22	-10	-5	1.2	-5	-400	-0.2	-100	878	48	1	-22	27	0	257.0	72.2	3	14.28	

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT
											g/kg
18776	0.519	5.95	3098	175	23	319	-1	3	-0.5	329	1.4
18783	0.718	7.89	2455	160	31	325	-1	3	-0.5	236	1.0
18784	0.445	0.00	0	244	134	171	0	22	-0.5	362	0.2

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
																						g/kg
18773	2	105	51	545	2.39	15	29	29	29	31	-5	5	-0.5	-1	15	13	-10	-10	30	5	-10	32.5
18774	-1	88	59	633	3.11	15	31	29	35	21	-5	7	-0.5	-1	-10	11	-10	-10	43	-2	-10	40.1
18775	-1	105	51	619	3.27	15	33	29	39	25	-5	7	-0.5	-1	-10	11	-10	-10	39	3	-10	18.9
18776	-1	95	53	511	2.39	13	25	15	25	13	-5	5	-0.5	-1	-10	7	-10	-10	30	5	-10	56.3
18777	-1	101	59	523	2.51	13	27	19	31	21	-5	7	-0.5	-1	-10	19	-10	-10	30	9	-10	44.7
18778	1	99	55	523	2.49	13	27	21	31	29	-5	7	-0.5	-1	-10	11	-10	-10	72	-2	-10	40.2
18779	11	119	67	593	3.15	19	47	201	65	45	-5	7	-0.5	-1	-10	11	14	-10	57	3	-10	19.7
18783	2	192	75	861	3.79	25	73	457	63	43	-5	9	-0.5	9	-10	15	-10	-10	72	-2	-10	15.7
18784	4	174	97	841	4.07	33	89	119	89	23	-5	7	-0.5	4	-10	13	-10	-10	68	9	-10	13.0

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18785	-2	0.1	1.1	1100	9.1	-5	35.0	1.6	170	9	-1	-1	-50	2.5	19	-0.2	2	-20	41	5.10	3.5	-5	-2	4.57	-0.5	-10	0.8	0.9	-100	35	0.6	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SiO2	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
									%		%	%	%				%	%	%						%		
18785	18	5	54	205	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-10403

Drilling Completion Date 8/19/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -19-68N-26W

County Koochiching

Quadrangle Littlefork S.W. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1160 ft.

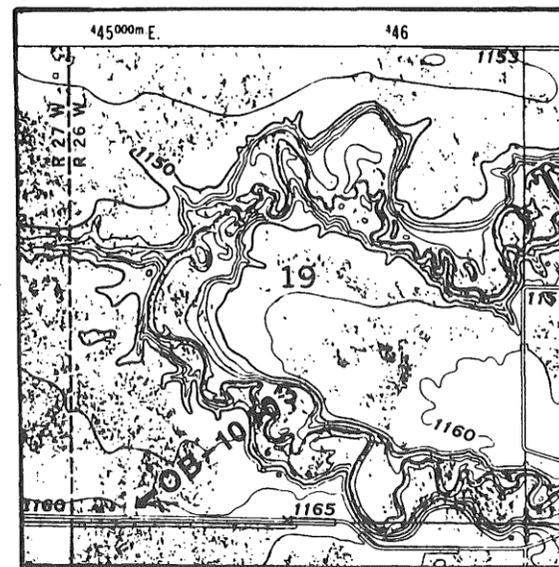
Total Depth 104 ft.

Elevation, Top of Precambrian Bedrock 1062 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-2	Organic Sediments			
2-92	Des Moines Lobe Gl. Drift			
92-98	Rainy Lobe	E, F	A, B, C	B = Sn
98-104	Bedrock	E, F	I	C = Cu, Ni

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Schist w/Tonalite Segregation 100-103 ft.

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

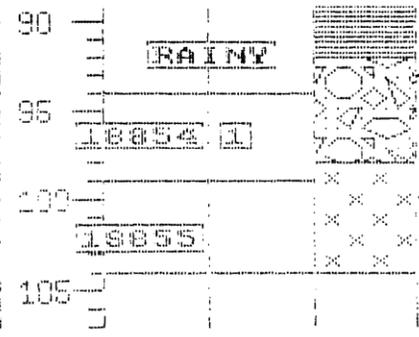
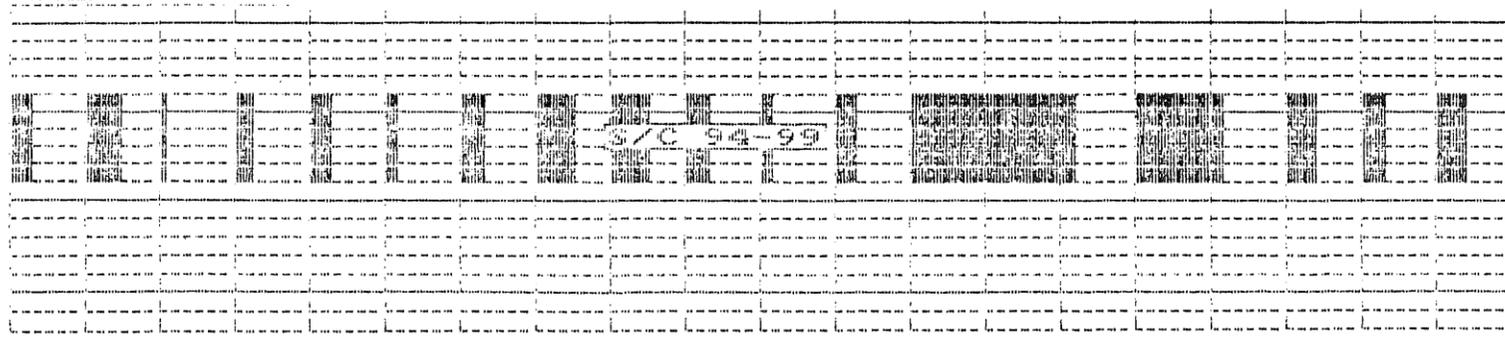
SAMPLE NO.	WEIGHT (KG. NET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS							
			M. I. CONC						CLAST			MATRIX										
	TABLE	+10	TABLE	TABLE	M.I.	CONC.	NON	NO.	CALC	SIZE	%	S/U	SD	ST	CY	COLOR						
	SPLIT	CHIPS	FEED	CONC	LIGHTS	TOTAL	MAG	MAG	V.G.	PPB	V/S	GR	LS	OT		SD	CY					
18854	9.5	1.8	7.7	153.1	113.0	40.1	32.5	7.6	1	89	P	20	80	NA	NA	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY	REMARKS
					T	P	T	P	T	P			
18854	N		100 X 150	25	C	1						1	
												1	



(92.0-98.0) GRAVELLY, SANDY TILL;
 UNOXIDIZED; RAINY LOBE; 92-95 w/minor sm ls
 grns, other grns of granitic & ms subang;
 95-98 w/cobs and gravel of metaseds and
 +-4% ls.

(98.0-104.0) BEDROCK; QUARTZ BIOTITE SCHIST
 w/TONALITE segregation 100-103; no sulfides
 noted; SCHIST: 65-70% Q, 10-20% plag, 15-20%
 biotite; TONALITE: 75-80% plag, +-15%
 biotite, +-10% Q.

MASTER FILE

Appendix 8-17C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18854	10403	94-99	5. A L SW-SW 19 68 26	K RL. SANDY GVL. TILL	94-99	1.0	9500.0	1800.0	32.5	7.6	92.2	2209.0	4	19	77		
18855	10403	99-104	5. A L SW-SW 19 68 26	K BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg	WEIGHT
18854	1260	0.66	740	390	1542	26.00	310	310	295	270	43	58	-10	6	0.6	-12	410	0.4	1600	400	92	6	120	21	0	102.0	31.0	3	24.86

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18854	1.350	3.85	1852	540	428	306	-5	18	-0.5	247	0.8

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18854	3	69	45	632	2.76	17	53	31	53	-5	14	3	0.5	-1	-10	5	-10	63	39	-2	-10	41.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18855	-2	-0.1	-0.5	1600	18.0	-5	36.0	3.6	150	10	-1	-1	-50	2.6	19	-0.2	2	30	72	4.50	6.5	-5	-2	4.19	-0.5	-10	0.7	1.9	-100	4	1.4	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	M6	AL %	SI02 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18855	10	5	54	270	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-10404

Drilling Completion Date 9/3/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -NW $\frac{1}{4}$ -8-68N-26W

County Koochiching

Quadrangle Littlefork N.W. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1125 ft.

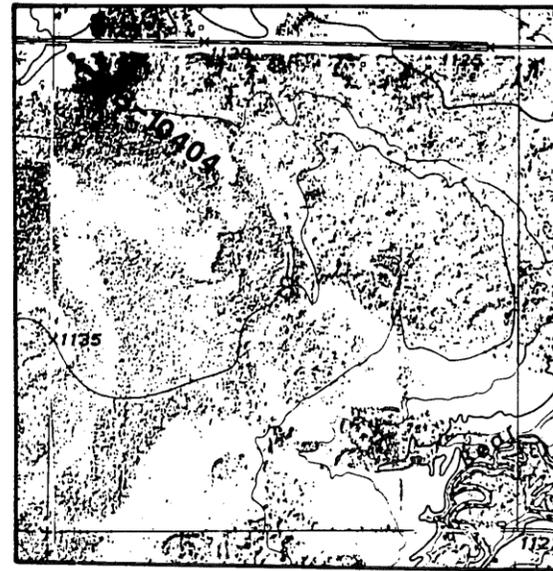
Total Depth 141 ft.

Elevation, Top of Precambrian Bedrock 989.5 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



No samples obtained for heavy mineral concentration.

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

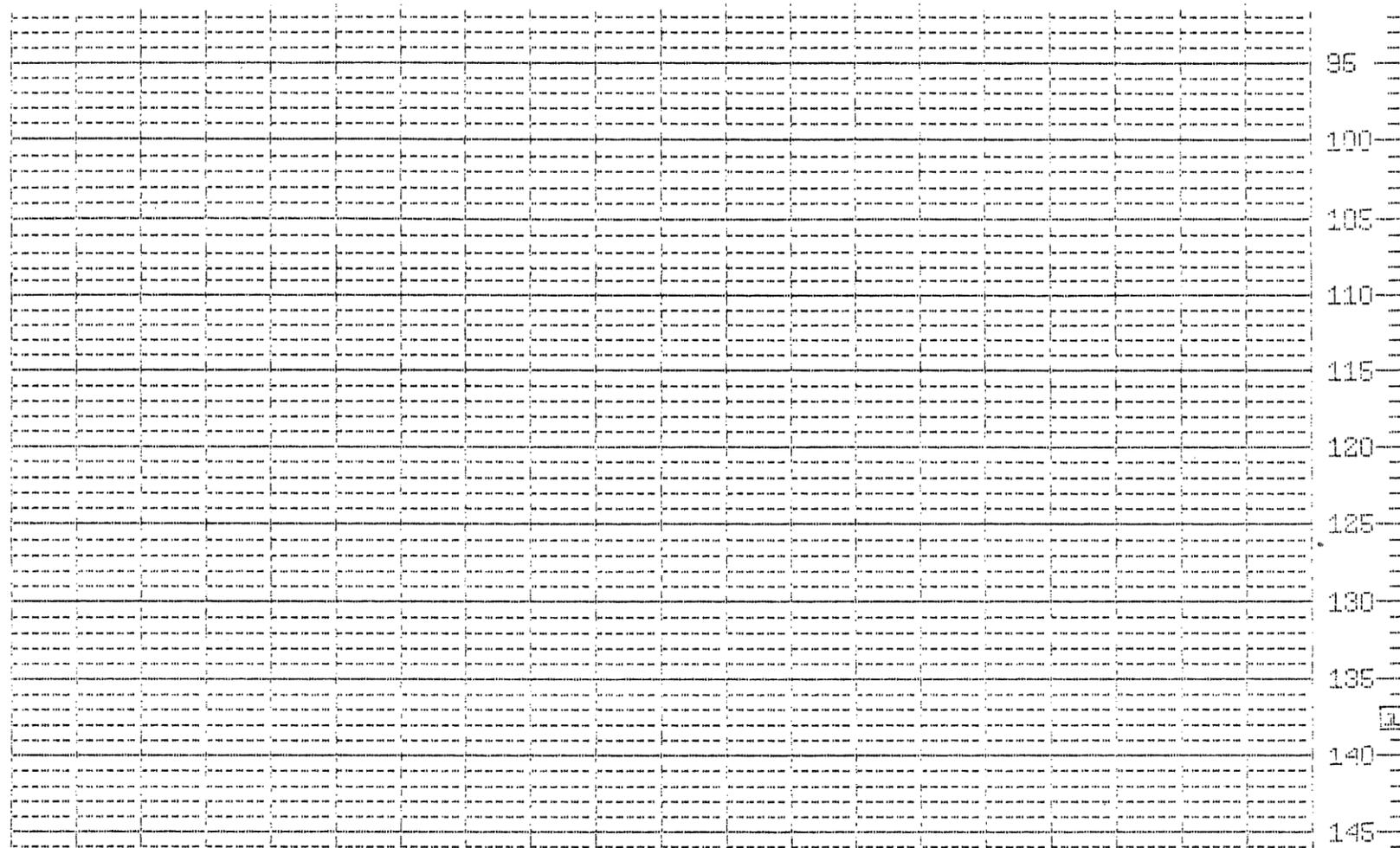
<u>Interval Feet</u>	<u>Interpretation</u>	<u>Library Samples Available</u>	<u>Subsamples Tested</u>	<u>Significant Geochem Samples</u>
0-63	No Observations			
63-135.5	Des Moines Lobe Gl. Drift			
135.5-141	Bedrock	E,F	I	

A = -63 microns fraction	E = Skeletonized Grab Sample in Core Box	H = Thin Section
B = Heavy Minerals, Nonmag	F = Interval Cuttings in Bucket	I = (Bedrock or Drift) Split of "Wholerock" Sample
C = Heavy Minerals, Mag	G = Core	
D = Sluice Box Composite		

BEDROCK

Principal Rock Type: 135.5-137 ft. Quartz-Muscovite Schist;
137-141 ft. Quartz Biotite Schist

Thin Section Description:



(82.0-114.0) CLAY; UNOXIDIZED; lake sediment; v soft & this drill method reduces it to a thick soup; 100-107 w/minor vcgr sand & gnl.

(114.0-125.0) CLAYEY TILL; UNOXIDIZED; w/some vcgr sand and pebs; pebs approx 50% ls and 50% meta-ign; pebs up to 1/2-3/4 inch; and ang-subang.

(125.0-135.0) CLAY; UNOXIDIZED; silty lake sediments; w/some pebs.

(135.0-135.5) GRAVEL; UNOXIDIZED; prob only 3-4 inches thick; w/some clay.

(135.5-141.0) BEDROCK; 135.5-137 QUARTZ-MUSCOVITE SCHIST; 137-141 QUARTZ-BIOTITE SCHIST; w/10% plagioclase feldspar, 2% other mafic silicates, and trace dissem sulfides w/biotite.

MASTER FILE

Appendix 8-18C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18870	10404	136-141	5.0 A L NW-NW 8 68 26 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18870	-2	-0.1	-0.5	1100	2.9	-5	96.0	4.4	230	25	-1	4	-50	4.8	53	0.2	-1	65	79	8.20	14.0	-5	-2	2.64	0.6	-10	0.8	20.6	-100	4	2.8	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MDR	BAR	TAR	BI	LDI	FE	
18870	30	5	86	330	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-19A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10501

Drilling Completion Date 6/3/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NW $\frac{1}{4}$ -2-68N-25W

County Koochiching

Quadrangle Littlefork 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1125 ft.

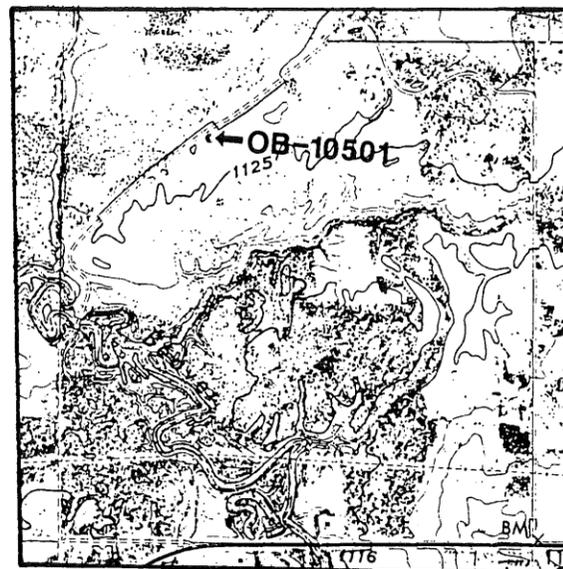
Total Depth 85 ft.

Elevation, Top of Precambrian Bedrock 1044 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS						
	TABLE	+10 SPLIT	CHIPS	TABLE	M.I. CONC	NON MAG	CONC	NON MAG	NO. V.G.	CALC PPB	CLAST			MATRIX								
											SIZE	%	S/U	SD	ST	CY	COLOR					
											V/S	GR	LS	OT	SD CY							
18763	12.1	3.1	9.0	304.8	244.5	60.3	44.9	15.4	3	277	P	50	50	TR	NA	S	C	Y	N	B	NA	GRAVEL
18765	10.7	5.2	5.5	174.3	118.5	55.8	38.6	17.2	1	17	P	45	55	NA	NA	U	Y	Y	Y	B	B	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-62	Des Moines Lobe Gl. Drift			
62-81	Rainy Lobe Gl. Drift	E, F	A, B, C	A = Au, W B = Au, W, Ag
81-85	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Paragneiss

Thin Section Description:

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	ABRADED				IRREGULAR				DELICATE				NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P	T	P	T	P	TOTAL GMS				
18763	Y	25 X 50	8 C		1										1		EST. 5% PYRITE PHOTO MICROGRAPH FILM REFERENCE #144 AVAILABLE	
		100 X 150	25 C		1									1				
		175 X 200	36 C		1									1				
														3	44.9	277		
18765	N	75 X 75	15 C		1									1				
														1	38.6	17		

MASTER FILE

Appendix 8-19C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18762	10501	62-71	9. A L NE-NW 2 68 25 K	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	10.6	1782.0	1	-1	-1		
18763	10501	62-71	9. A L NE-NW 2 68 25 K	REDRILLED	62-71	3.0	12100.0	3100.0	44.9	15.4	-1.0	-1.0	-1	25	-1	REDRILLED	
18764	10501	71-76	5. A L NE-NW 2 68 25 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	27.4	1892.0	1	-1	-1		
18765	10501	76-81	5. A L NE-NW 2 68 25 K	RL. SANDY GVL. TILL	71-81	1.0	10700.0	5200.0	38.6	17.2	73.8	2032.0	4	49	47		
18766	10501	81.5-85	3.5 A L NE-NW 2 68 25 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18763	30	0.34	200	370	1270	26.00	230	170	91	-200	44	82	-10	8	2.0	-5	-200	0.7	370	100	33	8	22	27	0	35.0	6.7	4	31.57
18765	71	0.28	380	460	360	26.00	210	140	73	-200	54	64	-10	3	1.9	-5	230	0.6	-100	180	92	11	466	17	0	57.1	12.0	4	27.29

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18763	0.926	7.59	2393	194	30	383	2	3	-0.5	233	1.3
18765	0.550	8.09	2777	196	18	355	1	6	-0.5	262	1.6

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18762	122	126	61	675	4.03	15	41	39	93	-5	-5	3	-0.5	-1	35	-5	-10	-10	19	-2	-10	5.9
18764	15	104	63	643	3.47	19	43	43	53	-5	-5	5	-0.5	-1	-10	7	-10	91	26	3	-10	14.5
18765	5	113	65	621	3.07	15	31	27	33	9	-5	3	-0.5	-1	-10	-5	-10	45	10	-2	-10	36.3

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18766	-2	0.3	1.6	260	-2.0	-5	18.0	1.0	210	54	-1	3	-50	7.6	11	0.2	-1	110	22	3.30	30.1	-5	-2	1.70	-0.5	-10	0.9	1.7	-100	115	0.4	-2	-100	330

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
18766	82	5	46	200	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-20A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10503

Drilling Completion Date 7/24/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -19-68N-25W

County Koochiching

Quadrangle Littlefork S.E. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1210 ft.

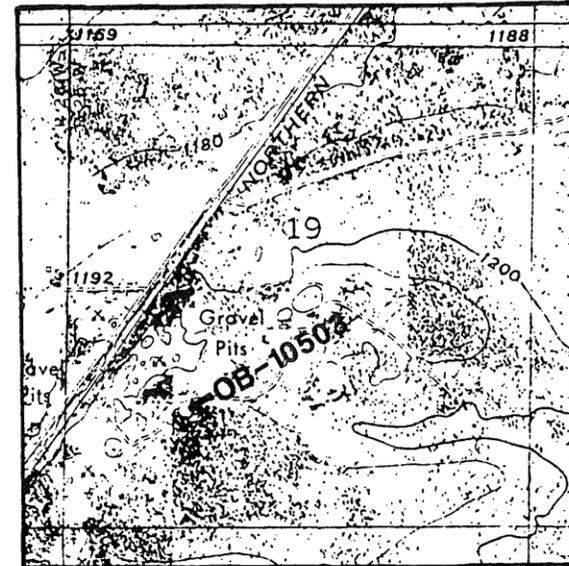
Total Depth 77 ft.

Elevation, Top of Precambrian Bedrock 1139 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-71	Rainy Lobe Gl. Drift	E, F	A, B, C	
71-77	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Gneiss

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT
 (SEE LEGEND IN APPENDIX)
 OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU		DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	FEED	H. I. CONC			NO. V.G.	CALC PPB	CLAST				MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL			NON MAG	MAG	NO. V.G.	PPB	SIZE	%	S/U	SD		ST	CY	COLOR		
18824	9.4	0.5	8.9	218.0	155.6	62.4	49.7	12.7	0	NA	P	0	100	NA	C	U	Y	Y	Y	B	B	TILL
18826	10.8	0.4	10.4	206.5	129.4	77.1	60.3	16.8	0	NA	P	5	95	NA	C	U	Y	Y	Y	B	B	TILL
18828	10.1	0.6	9.5	158.8	102.7	56.1	43.1	13.0	0	NA	P	5	95	NA	NA	U	Y	Y	Y	B	B	TILL
18830	8.0	4.5	3.5	100.9	79.9	21.0	16.2	4.8	0	NA	P	20	80	NA	NA	U	Y	Y	Y	B	B	TILL
18832	7.2	1.9	5.3	127.0	98.6	28.4	21.9	6.5	0	NA	P	15	85	NA	NA	U	Y	Y	Y	B	B	TILL
18834	9.1	5.2	3.9	97.8	74.2	23.6	17.9	5.7	0	NA	P	20	80	NA	NA	S	CM	Y	N	B	NA	GRAVEL
18836	11.2	5.8	5.4	153.6	100.4	53.2	41.4	11.8	1	51	P	60	40	NA	NA	U	Y	Y	Y	GB	GB	TILL
18837	11.0	5.2	5.8	231.5	189.4	42.1	34.1	8.0	2	399	PC	5	95	NA	NA	S	M	Y	Y	GY	GY	GRAVEL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS				NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				T	P	T	P				
18824	N										
18826	N										
18828	N										
18830	N										
18832	N										
18834	N										
18836	N	100 X	125	22	C	1		1		PHOTO MICROGRAPH AVAILABLE FILM REFERENCE #144	
								1	41.4	51	
18837	Y	25 X	25	5	C	1		1		EST. 10% PYRITE 100 GRAINS ARSENOPYRITE PHOTO MICROGRAPH AVAILABLE	
		175 X	250	40	C	1		2	34.1	399	FILM REFERENCE #144 and #145

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IN NON MAG HMC					IN -63 MICRON					IN MAG FRAC					NON MAG -63			NON MAG MAG			HMC SAMPLE #	HMC GOLD INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
^200 Ag	^600 Cu	^5 Bb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Bb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	(FEET)				
								S/C 0-5													RAINY	(0.0-10.0) MEDIUM TO COARSE SAND; RAINY LOBE; gravel pit area w/surface disturbance; 6 inches top organics.		
								S/C 5-10													18824			
								S/C 10-15													10	(10.0-15.0) MEDIUM SAND; w/some cgr sand & pebs.		
								S/C 15-20													15	18826	(15.0-22.0) FINE SAND; rounded.	
								S/C 20-25													20			
								S/C 25-30													25	18828	(22.0-23.0) SILTY CLAY. (23.0-28.0) GRAVELLY SAND; cgr sand w/pebs.	
								S/C 30-35													30		(28.0-40.0) GRAVEL; 28-29 pebs up to 3/4 inch & subang; 29-40 cobs of granite and schist, schist mostly ang to subang; sand is cgr, angular.	
								S/C 35-40													35	18830		
								S/C 40-45													40			
								S/C 45-50													45	18832	(40.0-52.0) COARSE SAND; much less gravel than above.	
								S/C 50-55													50			
								S/C 55-60													55	18834	(52.0-62.0) GRAVEL; much cgr sand 52-53; then little sand; water is tan color down to 62-oxidation??.	
								S/C 60-65													60		(62.0-63.0) SILTY SAND; w/some cgr sand; water is gray color now.	
								S/C 65-70													65	18836	(63.0-71.0) GRAVEL; a few ls gnl/pebs noted; far too much sample came out and lots of water from formation.	

MASTER FILE

Appendix 8-20C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18823	10503	0-5	5. A L SE-SW 19 68 25 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	52.3	1648.0	3	-1	-1		
18824	10503	5-10	5. A L SE-SW 19 68 25 K	RL. MED. TO C. SAND	0-10	0.0	9400.0	500.0	49.7	12.7	52.9	1928.0	3	5	92		
18825	10503	10-15	5. A L SE-SW 19 68 25 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	41.3	1992.0	2	-1	-1		
18826	10503	15-20	5. A L SE-SW 19 68 25 K	RL. F. TO V.F. SAND	10-20	0.0	10800.0	400.0	60.3	16.8	62.2	2999.0	2	4	94		
18827	10503	20-25	5. A L SE-SW 19 68 25 K	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	127.6	2288.0	6	-1	-1		
18828	10503	25-30	5. A L SE-SW 19 68 25 K	RL. GRAVEL	20-30	0.0	10100.0	600.0	43.1	13.0	48.7	2543.0	2	6	92		
18829	10503	30-35	5. A L SE-SW 19 68 25 K	RL. GRAVEL		-1.0	-1.0	-1.0	-1.0	-1.0	30.9	2188.0	1	-1	-1		
18830	10503	35-40	5. A L SE-SW 19 68 25 K	RL. GRAVEL	30-40	0.0	8000.0	4500.0	16.2	4.8	50.2	2810.0	2	56	42		
18831	10503	40-45	5. A L SE-SW 19 68 25 K	RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	31.5	1855.0	2	-1	-1		
18832	10503	45-50	5. A L SE-SW 19 68 25 K	RL. MED. TO C. SAND	40-50	0.0	7200.0	1900.0	21.9	6.5	23.8	2027.0	1	26	73		
18833	10503	50-55	5. A L SE-SW 19 68 25 K	RL. GRAVEL		-1.0	-1.0	-1.0	-1.0	-1.0	44.8	3372.0	1	-1	-1		
18834	10503	55-60	5. A L SE-SW 19 68 25 K	RL. GRAVEL	50-60	0.0	9100.0	5200.0	17.9	5.7	23.1	2893.0	1	57	42		
18835	10503	60-65	5. A L SE-SW 19 68 25 K	RL. GRAVEL		-1.0	-1.0	-1.0	-1.0	-1.0	57.1	3318.0	2	-1	-1		
18836	10503	65-70	5. A L SE-SW 19 68 25 K	RL. GRAVEL	60-70	1.0	11200.0	5800.0	41.4	11.8	3.7	3921.0	0	52	48		
18837	10503	70-72	2. A L SE-SW 19 68 25 K	RL. GRAVEL	70-72	2.0	11000.0	5200.0	34.1	8.0	29.3	2929.0	1	47	52		
18838	10503	72-77	5. A L SE-SW 19 68 25 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18824	-5	0.30	330	440	298	21.00	75	79	22	-200	16	4	-10	-2	0.4	-5	-200	0.4	-100	170	63	7	-11	6	0	51.9	10.0	5	35.34
18826	-5	0.41	420	440	228	21.00	70	97	11	-200	10	5	-10	-2	0.3	-5	-200	0.4	-100	220	66	7	-10	5	0	64.7	12.0	6	43.41
18828	62	0.52	710	490	345	21.00	62	-50	13	-200	11	5	-10	-2	0.5	-5	-200	0.4	-100	390	120	8	-13	8	0	113.0	23.0	4	31.14
18830	-12	-0.35	590	440	284	25.00	130	66	81	-200	23	8	-10	7	0.7	-5	-200	0.4	140	300	67	8	54	11	0	94.6	16.0	2	10.90
18832	-11	0.28	530	430	301	23.00	100	77	40	-200	10	6	-10	4	0.4	-5	-200	0.4	-100	270	66	11	-17	7	0	90.8	16.0	3	15.03
18834	31	-0.33	600	400	210	21.00	100	130	32	-200	14	6	-10	-2	0.7	-5	-200	0.4	-100	310	79	11	23	4	0	111.0	20.0	2	12.72
18836	47	-0.23	370	380	374	21.00	150	160	68	-200	127	38	-10	2	0.6	-5	-200	0.6	-100	200	71	9	-14	10	0	66.9	14.0	4	28.16
18837	1360	-0.31	710	320	478	22.00	240	270	258	-200	43	33	-10	5	1.7	-5	-200	0.5	-100	380	76	6	-15	20	0	132.0	18.0	3	25.05

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18836	0.702	7.21	2633	216	40	307	2	10	-0.5	224	1.1
18837	1.110	6.26	2016	185	45	231	-1	7	-0.5	197	0.7

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18823	-1	76	59	598	3.28	17	45	29	57	13	-5	-1	-0.5	-1	-10	-5	-10	-10	21	5	-10	31.7
18824	4	61	63	606	3.36	17	43	37	65	-5	-5	1	-0.5	-1	-10	-5	-10	-10	25	9	-10	27.4
18825	-1	51	57	579	3.02	13	37	29	53	-5	-5	1	-0.5	6	-10	-5	-10	-10	15	3	-10	20.7
18826	17	51	57	531	2.80	15	39	37	59	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	7	-2	-10	20.7
18827	-1	54	63	598	3.04	15	35	31	59	-5	5	1	-0.5	-1	-10	-5	-10	-10	25	11	-10	55.8
18828	20	56	59	597	2.90	13	35	59	61	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	3	-10	19.2
18829	3	48	55	575	3.34	17	47	53	73	-5	-5	5	-0.5	-1	-10	-5	-10	43	15	5	-10	14.1
18830	-1	52	57	600	3.36	17	51	57	63	-5	-5	1	-0.5	6	-10	-5	-10	23	13	-2	-10	17.9
18831	-1	68	75	728	3.99	19	53	57	-1	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	7	11	-10	17.0
18832	-1	64	65	734	3.46	19	63	59	63	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	-2	-10	11.7
18833	-1	70	73	1144	4.01	23	59	67	71	-5	-5	1	-0.5	-1	-10	-5	-10	-10	7	3	-10	13.3
18834	-1	61	63	762	3.48	17	45	53	55	-5	-5	1	-0.5	-1	-10	-5	-10	-10	17	3	-10	8.0
18835	-1	72	69	660	3.54	17	43	41	53	-5	-5	1	-0.5	-1	-10	-5	-10	-10	17	5	-10	17.2
18836	3	78	47	447	2.36	13	45	35	15	-5	-5	1	-0.5	-1	-10	-5	-10	-10	-5	3	-10	0.9
18837	26	67	83	587	3.76	23	61	77	71	-5	-5	3	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	10.0

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18838	-2	-0.1	-0.5	1300	-2.0	-5	59.0	2.6	240	22	-1	3	-50	3.9	32	-0.2	3	95	91	5.30	10.0	-5	-2	2.92	0.6	-10	-0.5	10.0	-100	3	1.8	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SIO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18838	29	5	87	335	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-21A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10505
 Drilling Completion Date 6/27/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{2}$ -SE $\frac{1}{2}$ -26-68N-25W
 County Koochiching
 Quadrangle Littlefork S.E. 7.5
 Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1140 ft.
 Total Depth 72.5 ft
 Elevation, Top of
 Precambrian Bedrock 1073 ft.
 Drilling Method Air Rotary
 Sample Diameter 6 inch
 Sample Collection
 Method Slurry: Splitter & Buckets

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

<u>Interval Feet</u>	<u>Interpre- tation</u>	<u>Library Samples Available</u>	<u>Subsamples Tested</u>	<u>Significant Geochem Samples</u>
0-5	Organic Sediments			
5-67	Des Moines Lobe Gl. Drift			
67-72.5	Bedrock	E, F	I	

A = -63 microns fraction E = Skeletonized Grab Sample H = Thin Section
 B = Heavy Minerals, Nonmag in Core Box I = (Bedrock or Drift)
 C = Heavy Minerals, Mag F = Interval Cuttings in Bucket Split of "Wholerock"
 D = Sluice Box Composite G = Core Sample

BEDROCK

Principal Rock Type: Quartz Biotite Paragneiss

Thin Section Description:

No samples obtained for heavy mineral concentration.

MASTER FILE

Appendix 8-21C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD BRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18811	10505	67-72.5	5.5 A L SE-SE 26 68 25	K BEDROCK			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18811	-2	-0.1	0.7	640	3.7	-5	34.0	2.9	280	18	-1	3	-50	3.4	20	-0.2	1	49	65	3.40	10.0	-5	-2	2.66	-0.5	-10	-0.5	4.6	-100	5	1.7	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FEQ %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18811	24	5	62	320	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-10601

Drilling Completion Date 7/21/87

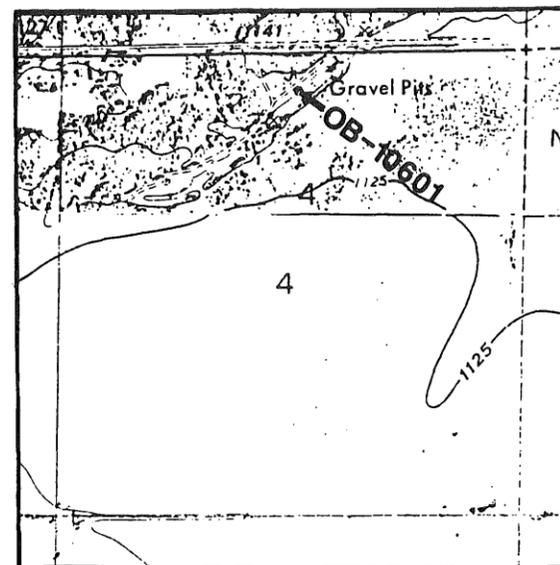
LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NW $\frac{1}{4}$ -4-69N-25W

County Koochiching

Quadrangle Pelland 7.5

Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1138 ft.

Total Depth 50 ft.

Elevation, Top of Precambrian Bedrock 1094.5 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-32.5	Des Moines Lobe Gl. Drift			
32.5-43.5	Rainy Lobe Gl. Drift	E, F	A, B, C	B = As
43.5-50	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Metagraywacke w/possible Tonalite Stringers

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)		AU	DESCRIPTION										CLASS						
	TABLE	+10 SPLIT	TABLE	M.I. CONC.		CLAST					MATRIX											
						CHIPS	FEED	CONC	LIGHTS	TOTAL	NON MAG	NO. MAG	CALC V.G.	PPB	SIZE		%	S/U	SD	ST	CY	COLOR
18819	8.9	2.5	6.4	188.3	147.3	41.0	32.6	8.4	0	NA	P	80	20	NA	C	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED						NON MAG	CALC V.G. ASSAY	REMARKS	
					T	P	T	P	T	P				TOTAL
18819	N													NO VISIBLE GOLD

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18818	10601	35-40	5. A L NE-NW 4 69 25 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	47.2	2053.0	2	-1	-1		
18819	10601	40-45	5. A L NE-NW 4 69 25 K	RL. SANDY GVL. TILL	35-45	0.0	8900.0	2500.0	32.6	8.4	78.3	2805.0	3	28	69		
18822	10601	45-50	5. A L NE-NW 4 69 25 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-22C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
																												g/kg	WEIGHT
18819	23	0.43	410	300	419	22.00	220	210	161	210	77	177	-10	12	0.8	-5	-200	0.7	-100	190	100	9	53	23	0	45.0	13.0	4	22.79

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT
											g/kg
18819	0.534	4.35	2846	382	89	230	-1	46	-0.5	221	0.9

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
																						g/kg
18818	8	81	65	610	2.98	17	45	35	63	-5	-5	3	-0.5	-1	-10	-5	-10	-10	27	-2	-10	23.0
18819	3	74	65	668	3.22	19	47	45	73	11	-5	1	0.7	-1	-10	5	-10	-10	33	11	-10	27.9

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18822	-2	0.1	0.8	640	3.8	-5	44.0	4.4	150	18	-1	3	-50	3.4	27	-0.2	3	59	77	4.20	10.0	-5	-2	2.60	0.8	-10	-0.5	7.1	-100	3	2.8	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SIO2	S	CL	K	CA	FEO	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
18822	33	7	71	390	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-23A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10602

Drilling Completion Date 6/25/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -SW $\frac{1}{4}$ -25-69N-25W

County Koochiching

Quadrangle Ericksburg N.W. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1137 ft.

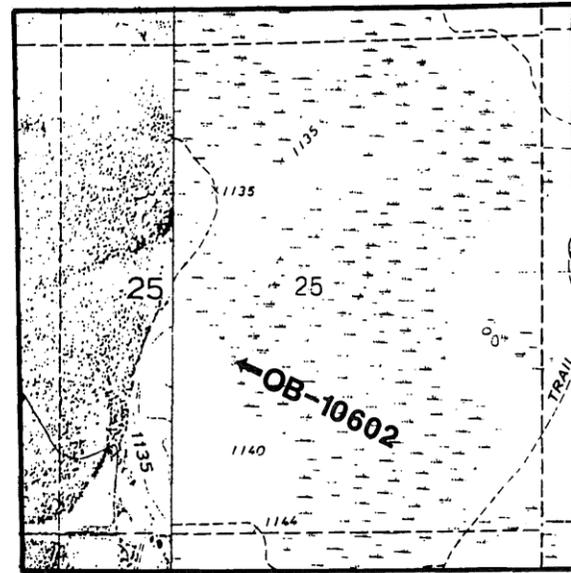
Total Depth 73 ft.

Elevation, Top of Precambrian Bedrock 1070 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-50	Des Moines Lobe Gl. Drift			
50-67	Rainy Lobe Gl. Drift	E, F	A, B, C	A = Au
67-73	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Schist

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION					CLASS								
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC			NO. V.G.	CALC PPB	CLAST			MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL			NON MAG	MAG	SIZE	%	S/U		SD	ST	CY	COLOR				
18806	4.7	0.0	4.7	121.7	61.6	60.1	52.7	7.4	0	NA	TR	NA	NA	NA	NA	S	MF	Y	N	B	NA	SAND
18808	8.0	1.3	6.7	135.3	80.6	54.7	42.6	12.1	1	3289	CP	2	98	NA	NA	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED						NON MAG	CALC V.G. ASSAY	REMARKS	
					T	P	T	P	T	P				TOTAL GMS
18806	N													
18808	N		325 X	650	79	C	1					1	42.6	3289

AVAILABLE PHOTO MICROGRAPH FILM REFERENCE #144

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED +10FEED	WT (g) NONMAG	WT (g) MAG -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18806	10602	52-62	10. A L NE-SW 25 69 25 K	RL. MED. TO C. SAND	52-62	0.0	4700.0	0.0	52.7	7.4	172.7	2710.0	6	0	94
18807	10602	62-67	5. A L NE-SW 25 69 25 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	52.3	2330.0	2	-1	-1
18808	10602	67-68	1. A L NE-SW 25 69 25 K	BEDROCK	62-68	1.0	8000.0	1300.0	42.6	12.1	76.0	2454.0	3	16	81
18809	10602	68-73	5. A L NE-SW 25 69 25 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18806	25	0.46	470	270	616	22.00	200	190	179	-200	38	23	-10	4	1.1	-5	-200	0.4	-100	240	74	7	-11	15	0	50.9	15.0	11	37.07
18808	2840	0.23	340	410	365	23.00	210	180	99	220	18	27	-10	6	0.6	-5	-200	0.5	-100	170	77	8	110	15	0	46.0	15.0	5	25.66

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18808	0.653	7.72	2790	252	49	382	-1	3	-0.5	289	1.5

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18806	99	68	63	712	2.98	19	39	45	61	-5	-5	1	0.9	-1	-10	-5	-10	-10	35	11	-10	63.7
18807	41	71	69	662	3.14	17	37	37	59	7	-5	1	1.1	-1	-10	5	-10	-10	33	11	-10	22.4
18808	175	67	59	640	3.04	15	51	33	53	-5	-5	1	0.5	1	-10	-5	-10	39	39	11	-10	31.0

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	CU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SD	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18809	-2	0.2	-0.5	760	-2.0	-5	45.0	3.3	270	25	-1	4	-50	4.5	28	-0.2	-1	73	69	3.90	12.0	-5	-2	2.63	0.6	-10	0.6	6.8	-100	7	2.5	-2	-100	210

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	DOB %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	AB	MOR	BAR	TAR	BI	LOI %	FE
18809	34	6	80	420	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-24A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10603

Drilling Completion Date 6/10/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -30-69N-25W

County Koochiching

Quadrangle Littlefork 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1102 ft.

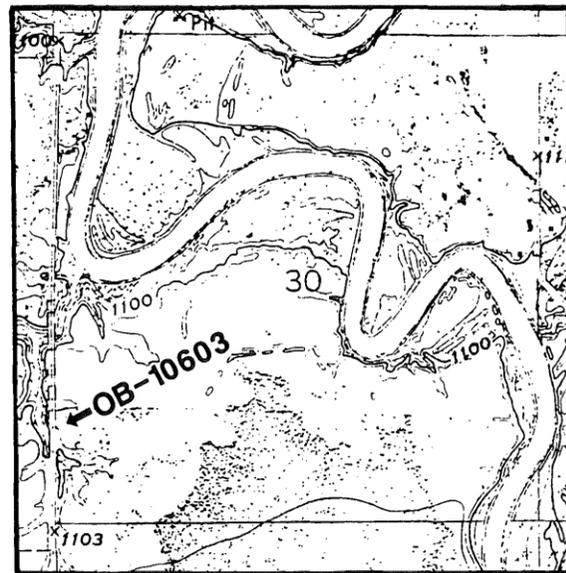
Total Depth 100 ft.

Elevation, Top of Precambrian Bedrock 1003 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-95	Des Moines Lobe Gl. Drift			
95-99	Rainy Lobe Gl. Drift	E,F	A,B,C	A = Au B = Cu,Zn,La
99-100	Bedrock	E,F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Quartz Biotite Schist

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)			AU	DESCRIPTION						CLASS								
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC				CLAST			MATRIX											
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL		NON MAG	NO. MAG	CALC V.G.	PPB	SIZE	%		S/U SD	ST CY	COLOR					
18816	7.4	2.2	5.2	162.6	130.9	31.7	25.5	6.2	1	3	CP	80	20	NA	NA	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS
				ABRADED		IRREGULAR		DELICATE		TOTAL		GMS				
				T	P	T	P	T	P	T	P					
18816	Y	25 X 50	8 C		1							1	25.5	3	EST. 10% PYRITE 200 GRAINS ARSENOPYRITE	

MASTER FILE

Appendix 8-24C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18816	10603	95-100	5.0 A L SW-SW 30 69 25 K	RL. SANDY GVL. TILL	95-100	1.0	7400.0	2200.0	25.5	6.2	22.2	2551.0	1	30	69		
18817	10603	100-104	4.0 A L SW-SW 30 69 25 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg	WEIGHT
18816	27	0.71	2600	260	745	24.00	380	310	534	-200	45	120	-10	-7	1.7	-5	-500	-0.2	-100	1440	98	5	51	30	0	346.0	103.0	3	17.66

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18816	0.998	3.42	1605	282	183	120	-1	65	-0.5	199	0.8

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18816	82	71	63	565	3.14	17	49	57	61	-5	-5	3	0.5	-1	-10	-5	-10	-10	27	9	-10	8.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18817	-2	-0.1	1.1	520	7.4	-5	36.0	4.8	250	18	-1	3	-50	3.4	24	-0.2	2	66	74	3.50	10.0	-5	-2	2.61	1.2	-10	-0.5	5.2	-100	24	2.4	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18817	24	5	70	335	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-25A. DRILL HOLE SUMMARY SHEET

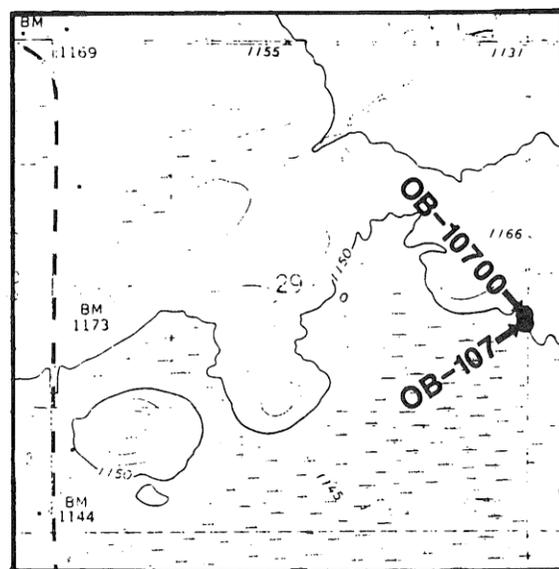
IDENTIFICATION

DNR Drill Hole Number OB-10700
 Drilling Completion Date 6/24/87

LOCATION (see map at right)
 S-T-R NE $\frac{1}{4}$ -SE $\frac{1}{4}$ -29-68N-24W
 County Koochiching
 Quadrangle Ericzburg S.W. 7.5
 Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1148 ft.
 Total Depth 147 ft.
 Elevation, Top of Precambrian Bedrock 1005 ft.
 Drilling Method Air Rotary
 Sample Diameter 6 inch
 Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-62	No Observations			
62-143	Rainy Lobe Gl. Drift	E, F	A, B, C	A = Au, Mo, Cd, W, Pb
143-147	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Biotite Paragneiss

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS							
			M. I. CONC						CLAST			MATRIX										
	TABLE	+10 SPLIT	TABLE CHIPS	TABLE FEED	TABLE CONC	M.I. CONC	NON LIGHTS	NON MAG	NO. MAG	CALC V.G.	PPB	SIZE	%	S/U	SD	ST	CY	COLOR				
												V/S	GR	LS	OT			SD	CY			
18789	7.4	0.0	7.4	186.2	141.0	45.2	36.5	8.7	0	NA	TR	NA	NA	NA	NA	S	CM	Y	N	B	NA	SAND
18791	5.4	0.2	5.2	114.4	83.6	30.8	26.1	4.7	0	NA	P	40	60	NA	NA	S	CM	Y	N	B	NA	SAND
18793	8.5	0.0	8.5	290.0	218.9	71.1	59.4	11.7	0	NA	TR	NA	NA	NA	NA	S	CM	Y	N	B	NA	SAND
18795	10.5	0.0	10.5	242.6	153.1	89.5	74.9	14.6	0	NA	TR	NA	NA	NA	NA	S	CM	Y	N	B	NA	SAND
18797	9.5	0.0	9.5	213.5	100.2	113.3	88.6	24.7	0	NA	TR	NA	NA	NA	NA	S	MF	Y	N	B	NA	SAND
18799	5.3	0.0	5.3	137.6	73.4	64.2	48.1	16.1	0	NA	TR	NA	NA	NA	NA	S	MF	Y	N	B	NA	SAND
18803	6.5	0.0	6.5	168.4	90.5	77.9	63.3	14.6	0	NA	TR	NA	NA	NA	NA	S	MF	Y	N	B	NA	SAND
18804	7.2	0.6	6.6	166.2	109.0	57.2	45.2	12.0	0	NA	C	1	99	NA	NA	U	Y	Y	Y	GB	GB	TILL

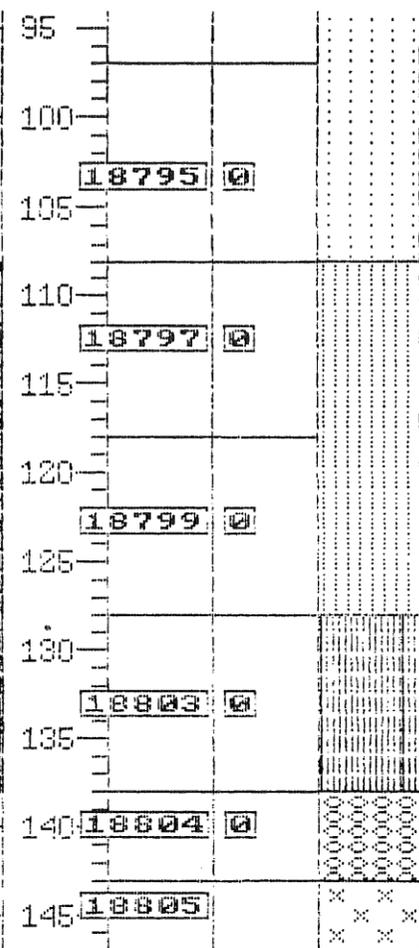
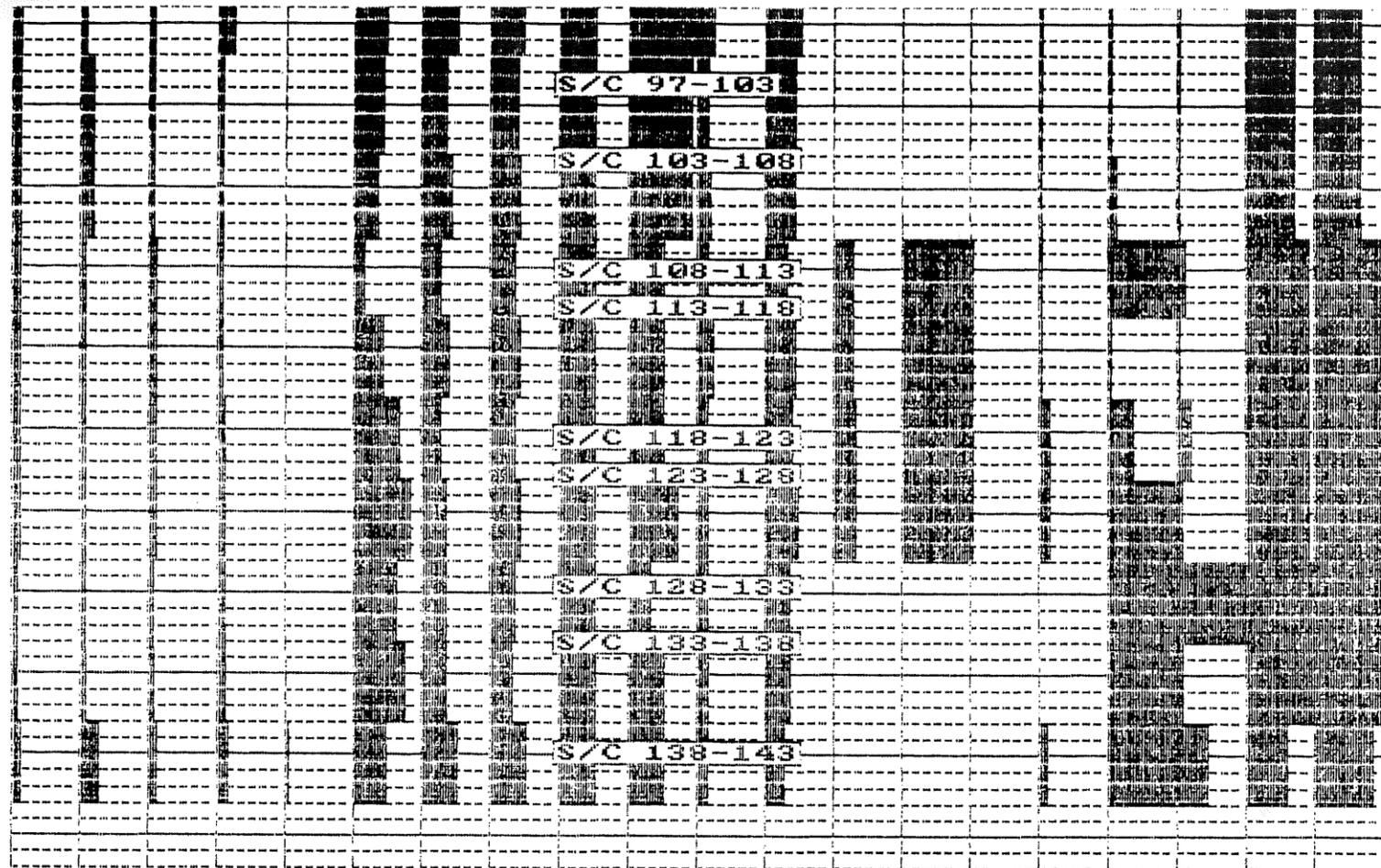
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABGRADED				IRREGULAR				DELICATE				NON MAG	CALC V.G. ASSAY PPB	REMARKS					
					T	P	T	P	T	P	T	P	T	P	TOTAL	GMS								
18789	N																							
18791	N																							
18793	N																							
18795	N																							
18797	N																							
18799	N																							
18803	N																							
18804	N																							

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(108.0-128.0) FINE SAND; UNOXIDIZED; grains subrounded; problem w/heaving up info casing; 118-128 w/vfgr sand.

(128.0-138.0) SILTY SAND; UNOXIDIZED.

(138.0-143.0) GRAVELLY SAND; UNOXIDIZED; subangular; water-bearing at 140; 138-141 more sand & less gravel; 141-143 more gravel.

(143.0-147.0) BEDROCK, BIOTITE PARAGNEISS; see also OB-107 Rotasonic Core summary log, drilled at same site.

MASTER FILE

Appendix 8-25C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18788	10700	62-67	5. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	3.1	2730.0	0	-1	-1		
18789	10700	67-72	5. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND	62-72	0.0	7400.0	0.0	36.5	8.7	2.4	2003.0	0	0	100		
18790	10700	72-77	5. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	2.2	2229.0	0	-1	-1		
18791	10700	77-87	10. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND	72-87	0.0	5400.0	200.0	26.1	4.7	6.6	2194.0	0	4	56		
18792	10700	87-92	5. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	22.6	2204.0	1	-1	-1		
18793	10700	92-97	5. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND	87-97	0.0	8500.0	0.0	59.4	11.7	8.7	2498.0	0	0	100		
18794	10700	97-103	6. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	10.9	2266.0	0	-1	-1		
18795	10700	103-108	5. A L NE-SE 29 68 24 K		RL. MED. TO C. SAND	97-108	0.0	10500.0	0.0	74.9	14.6	11.4	2597.0	0	0	100		
18796	10700	108-113	5. A L NE-SE 29 68 24 K		RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	31.3	2630.0	1	-1	-1		
18797	10700	113-118	5. A L NE-SE 29 68 24 K		RL. F. TO V.F. SAND	108-118	0.0	9500.0	0.0	88.6	24.7	11.5	1966.0	1	0	99		
18798	10700	118-123	5. A L NE-SE 29 68 24 K		RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	46.7	2492.0	2	-1	-1		
18799	10700	123-128	5. A L NE-SE 29 68 24 K		RL. F. TO V.F. SAND	118-128	0.0	5300.0	0.0	48.1	16.1	17.0	2340.0	1	0	99		
18802	10700	128-133	5. A L NE-SE 29 68 24 K		RL. SILTY SAND		-1.0	-1.0	-1.0	-1.0	-1.0	28.6	2311.0	1	-1	-1		
18803	10700	133-138	5. A L NE-SE 29 68 24 K		RL. SILTY SAND	128-138	0.0	6500.0	0.0	63.3	14.6	20.2	2291.0	1	0	99		
18804	10700	138-143	5. A L NE-SE 29 68 24 K		RL. GVL. SAND	138-143	0.0	7200.0	600.0	45.2	12.0	101.7	2401.0	4	8	88		
18805	10700	143-147	4. A L NE-SE 29 68 24 K		BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18789	-5	0.29	180	310	490	22.00	130	120	54	-200	19	24	-10	4	1.2	-5	-200	0.4	-100	89	41	6	-11	10	0	29.0	6.3	5	25.62
18791	-5	0.21	160	340	468	22.00	120	140	43	-200	27	27	-10	6	0.9	-5	210	0.5	-100	70	26	5	-14	6	0	24.0	3.2	5	17.82
18793	29	0.24	200	330	405	23.00	120	120	43	-200	28	22	-10	6	1.1	-5	-200	0.4	-100	92	34	7	-11	8	0	25.0	6.6	7	42.65
18795	27	0.28	190	320	438	21.00	120	110	116	-200	28	21	-10	2	0.6	-5	-200	0.4	-100	87	33	5	-9	8	0	24.0	6.1	7	52.43
18797	11	0.34	310	360	340	22.00	120	85	52	-200	17	25	-10	2	0.4	-5	-200	0.5	-100	140	77	9	-9	5	0	39.0	12.0	9	63.16
18799	73	0.40	380	420	372	24.00	120	120	52	-200	20	21	-10	3	0.2	-5	-200	0.6	-100	190	110	10	-11	8	0	27.0	14.0	9	34.34
18803	-5	0.41	340	390	364	22.00	110	100	38	-200	24	17	-10	3	0.8	-5	-200	0.4	-100	170	87	8	-10	7	0	44.0	12.0	10	45.39
18804	56	-0.34	1260	390	408	23.00	220	210	156	-200	25	21	-10	-4	0.8	-5	-200	0.5	130	729	120	9	21	16	0	245.0	25.0	6	31.83

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MG0 %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18797	0.466	8.99	2785	150	12	361	-1	2	-0.5	340	2.6
18799	0.481	8.11	2948	162	11	385	-1	3	-0.5	324	3.0

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
	PPB				%																	g/kg
18788	2	142	65	785	4.37	19	47	63	69	29	-5	7	-0.5	3	-10	9	-10	-10	61	9	-10	1.1
18789	-10	118	63	973	6.29	17	45	65	99	25	-5	13	-0.5	16	-10	7	10	41	59	-2	-10	1.2
18790	-10	92	55	853	5.13	17	41	61	73	19	-5	9	-0.5	7	-10	-5	-10	97	41	-2	-10	1.0
18791	-1	101	69	1213	10.00	15	47	97	123	23	19	47	-0.5	53	-10	5	-10	-10	70	-2	-10	3.0
18792	-1	104	63	1077	7.83	17	51	81	93	19	-5	23	-0.5	39	-10	7	-10	23	59	-2	-10	10.3
18793	-1	106	65	853	5.37	17	47	51	75	15	-5	11	-0.5	17	-10	5	-10	53	32	-2	-10	3.5
18794	-1	124	61	761	4.33	17	41	37	53	13	-5	9	-0.5	83	29	-5	-10	27	24	3	-10	4.8
18795	2	154	63	761	4.27	15	43	45	61	11	-5	9	-0.5	13	-10	-5	-10	33	21	-2	-10	4.4
18796	39	138	59	655	3.39	13	35	27	47	5	15	5	-0.5	-1	31	-5	-10	-10	15	-2	-10	11.9
18797	-1	178	89	875	4.57	21	45	41	69	13	-5	5	-0.5	-1	-10	-5	-10	-10	24	-2	-10	5.8
18798	7	184	75	755	4.03	19	35	29	47	21	-5	5	-0.5	-1	-10	-5	-10	-10	30	-2	-10	18.7
18799	105	133	91	905	4.99	23	43	37	53	25	-5	7	0.5	3	-10	-5	-10	-10	26	-2	-10	7.3
18802	42	165	73	747	3.67	17	37	35	49	19	-5	3	-0.5	-1	-10	-5	12	-10	21	-2	-10	12.4
18803	66	146	67	731	3.67	17	33	37	51	23	-5	5	-0.5	2	-10	-5	-10	-10	32	-2	-10	8.8
18804	83	72	59	509	2.98	15	53	53	49	15	-5	5	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	42.4

SEDROCK ANALYSIS (PPM)

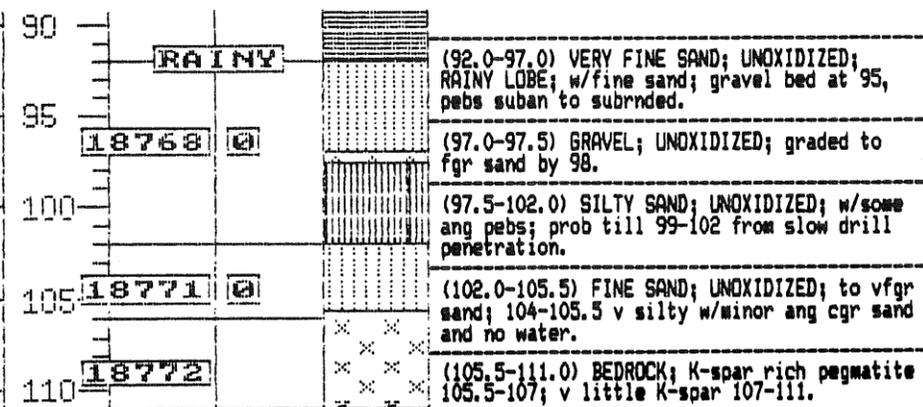
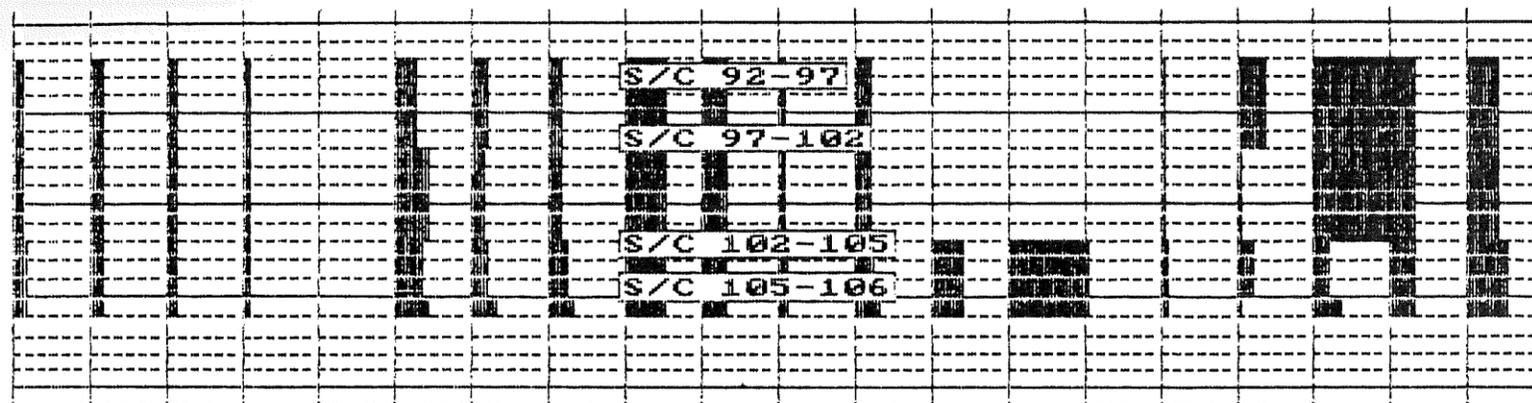
SAMPLE NUMBER	AL	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	FF	IR	FE	LA	LU	MO	NI	RB	SM	SO	SE	AER	NA	TR	TE	TB	TF	SN	W	U	YE	ZNR	ZR
	PPB													%										%										
18805	-2	0.1	-0.5	750	5.5	-5	47.0	4.4	340	23	-1	3	-50	4.0	27	-0.2	2	61	81	4.10	12.0	-5	-2	2.61	1.0	-10	-0.5	6.6	-100	12	1.2	-2	-100	-200

SEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SIO2	S	CL	K	CA	FED	NIR	SR	NB	MCR	BAR	TAR	BI	LOI	FE
									%			%	%					%								%	
18805	35	5	70	390	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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IN NON MAG HMC						IN -63 MICRON						IN MAG FRAC						NON MAG -63			-63 NON MAG MAG			HMC SAMPLE #	HMC # GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
^200 Au	^600 Cu	^5 Sb	^25 Mo	^5000 Ba	^30 Ag	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	(FEET)	DES MOINES						
																					5						
																							(0.0-8.0) CLAY; OXIDIZED; lake sediment; 6 inches clayey fill at 5-5.5.				
																						10					
																							(8.0-19.0) CLAYEY TILL; OXIDIZED; 14-15.5 w/more grit and cgr; more sand w/depth; gradual change 12-19 to UNOXIDIZED.				
																						15					
																						20					
																						25					
																						30					
																						35					
																						40					
																							(19.0-59.0) CLAYEY TILL; UNOXIDIZED; 19-23 sandy; 26-33 decreasing sand, some pebs up to 3/4 inch; 56-59 v clayey, trans to lake clay.				
																						45					
																						50					
																						55					
																						60					
																						65					
																						70					
																						75					
																						80					
																							(59.0-92.0) CLAY; UNOXIDIZED; lake sed; at 66 some sand; at 70 vcgr sand, mostly ls; 84-89 w/some ls gnls & pebs; 90 w/wood fragments.				
																						85					



MASTER FILE

Appendix 8-26C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D & FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18767	10704	92-97	5. A L SW-SW 17 68 24	K RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	214.8	1174.0	18	-1	-1		
18768	10704	97-102	5. A L SW-SW 17 68 24	K RL. GVL. SAND	92-102	0.0	9500.0	400.0	28.0	7.2	284.8	2130.0	13	4	83		
18769	10704	102-105	3. A L SW-SW 17 68 24	K RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	57.8	2739.0	2	-1	-1		
18771	10704	105-106	1. A L SW-SW 17 68 24	K RL. SANDY GVL. TILL	102-106	0.0	8100.0	500.0	27.4	7.9	79.2	2133.0	4	7	89		
18772	10704	106-111	5. A L SW-SW 17 68 24	K BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	DE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18768	15	0.35	730	340	395	20.00	120	130	94	210	28	27	-10	-2	1.0	-5	210	0.5	-100	390	140	8	24	11	0	94.5	23.0	3	20.16
18771	32	0.25	740	370	408	23.00	160	140	102	230	30	31	-10	-2	1.4	-5	210	0.5	-100	390	140	9	85	11	0	105.0	22.0	3	19.37

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	%G	T102	CR	NI	CU	ZN	SE	YO	AG	PB	WT g/kg
18771	0.328	5.74	3223	197	14	406	2	3	-0.5	350	1.0

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18767	7	87	39	423	1.91	9	17	19	29	9	-5	3	-0.5	-1	199	-5	-10	-10	15	3	-10	183.0
18768	1	95	37	477	2.07	9	17	17	25	13	-5	3	-0.5	-1	-10	5	-10	-10	17	5	-10	133.7
18769	4	98	41	545	2.37	11	23	21	31	11	-5	3	-0.5	-1	-10	5	-10	-10	17	-2	-10	21.1
18771	-1	125	51	629	3.03	17	31	33	39	13	-5	3	-0.5	-1	-10	-5	-10	47	17	5	-10	37.1

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	DE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18772	4	0.2	1.9	800	2.9	-5	83.0	5.1	330	32	1	5	-50	5.3	52	0.2	-1	99	110	7.10	18.0	-5	-2	2.20	1.1	-10	0.8	11.0	-100	3	3.1	-2	120	400

BEDROCK ANALYSIS (PPM) CONTINUED

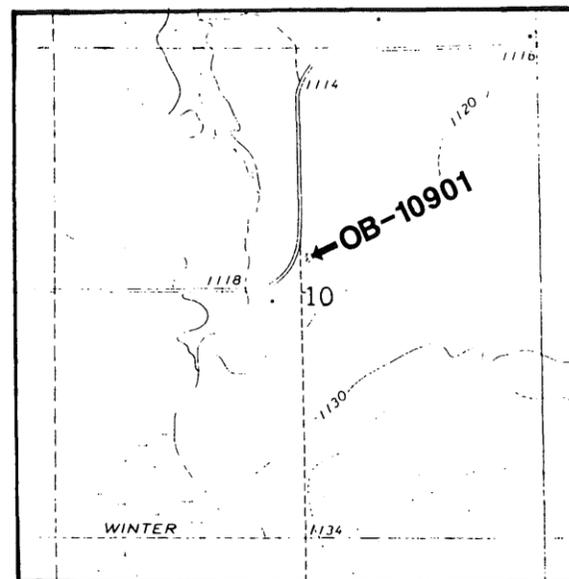
SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SIO2	S	CL	K	CA	FED	NIR	SR	NB	MGR	BAR	TAR	BI	LOI	FE
18772	15	4	126	250	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-10901
 Drilling Completion Date 7/30/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -NE $\frac{1}{4}$ -10-69N-23W
 County Koochiching
 Quadrangle Ericzburg 7.5
 Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1118 ft.
 Total Depth 140 ft.
 Elevation, Top of Precambrian Bedrock 984 ft.
 Drilling Method Air Rotary
 Sample Diameter 6 inch
 Sample Collection Method Slurry: Splitter & Buckets

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-10	Organic Sediments			
10-113	Des Moines Lobe Gl. Drift			
113-134	Rainy Lobe Gl. Drift	E,F	A,B,C	A = Au B = Au
134-140	Bedrock	E,F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Metagraywacke

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

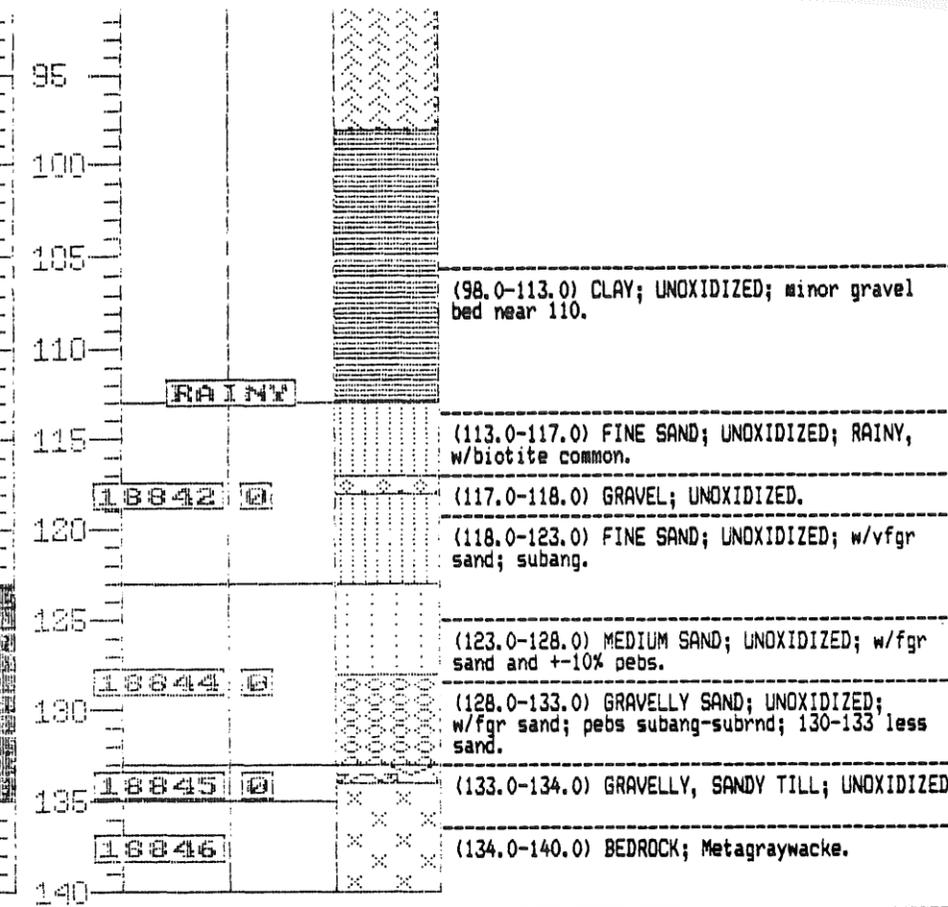
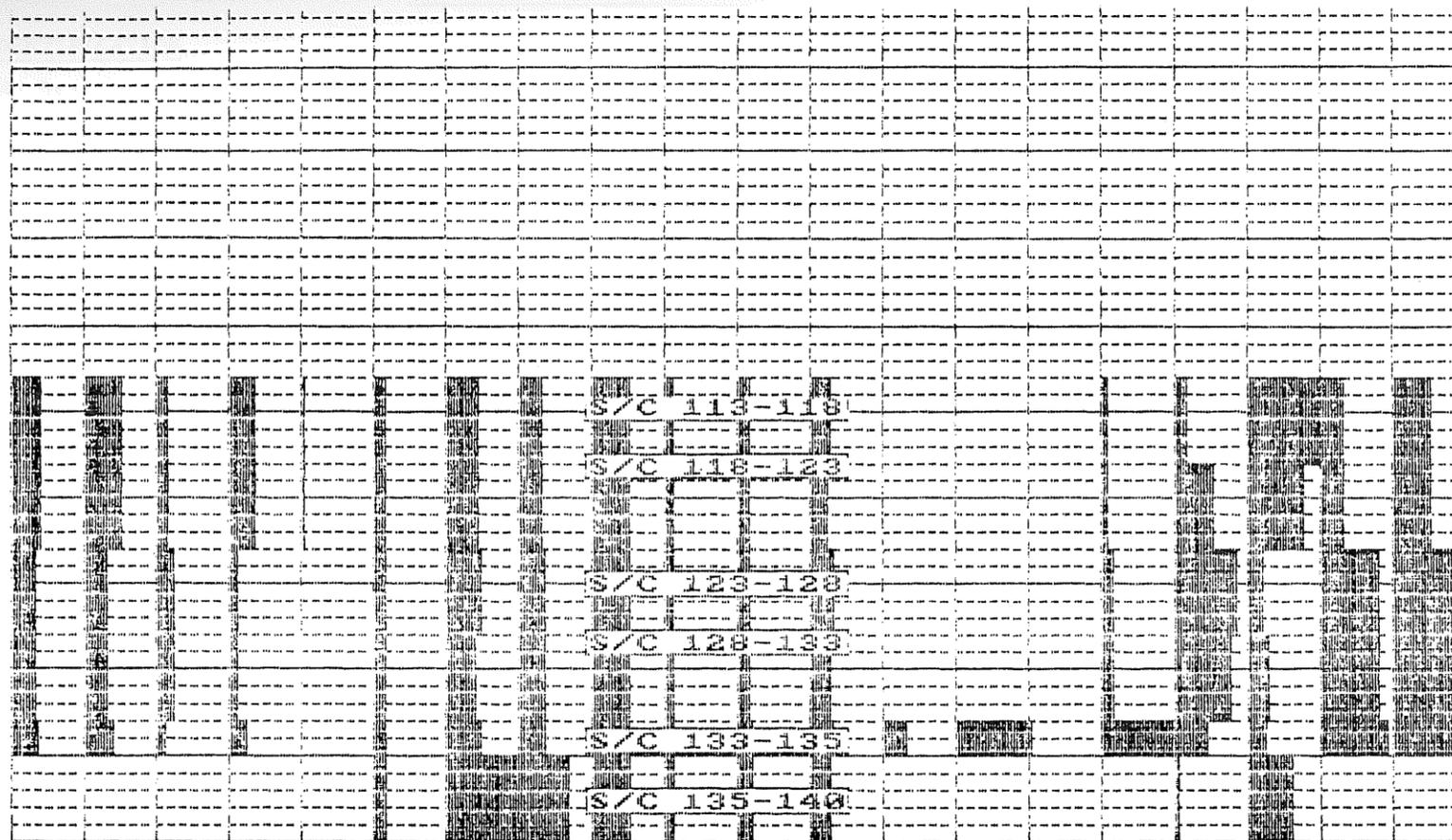
SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)						AU	DESCRIPTION								CLASS			
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC			NO. MAG	CALC V.G.	PPB		CLAST				MATRIX							
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL					NON MAG	NO. MAG	SIZE	%	S/U	SD	ST	CY		COLOR		
18842	9.1	0.2	8.9	58.8	26.4	32.4	23.6	8.8	0	NA	P	5	95	NA	NA	S	FM	Y	Y	G	G	SAND
18844	7.4	0.7	6.7	150.4	72.2	78.2	62.4	15.8	0	NA	P	5	95	NA	NA	S	FM	Y	Y	G	G	SAND
18845	9.4	1.3	8.1	239.6	139.5	100.1	80.3	19.8	0	NA	P	10	90	NA	NA	U	Y	Y	Y	G	G	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P			
18842	N											NO VISIBLE GOLD
18844	N											NO VISIBLE GOLD
18845	N											NO VISIBLE GOLD



MASTER FILE

Appendix 8-27C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D S FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18839	10901	113-118	5. A L SW-NE 10 69 23 K	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	200.8	2037.0	10	-1	-1		
18842	10901	118-123	5. A L SW-NE 10 69 23 K	RL. F. TO V.F. SAND	113-123	0.0	9100.0	200.0	23.6	8.8	214.8	2891.0	7	2	91		
18843	10901	123-128	5. A L SW-NE 10 69 23 K	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	60.7	2773.0	2	-1	-1		
18844	10901	128-133	5. A L SW-NE 10 69 23 K	RL. BVL. SAND	123-133	0.0	7400.0	700.0	62.4	15.8	100.7	3633.0	3	9	88		
18845	10901	133-135	2. A L SW-NE 10 69 23 K	RL. BVL. SAND	133-135	0.0	3400.0	1300.0	80.3	19.8	94.5	4099.0	2	14	84		
18846	10901	135-140	5. A L SW-NE 10 69 23 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	99.3	1676.0	6	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	DE	CR	MN	FE	CO	NI	CU	ZN	ZNE	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18842	43	-0.59	900	360	874	26.00	280	260	315	-200	80	82	-22	-9	0.5	-15	-470	0.9	-230	512	190	13	-31	35	0	166.0	40.0	3	17.90
18844	84	-0.29	390	220	1156	24.00	220	200	203	-200	71	61	-10	3	0.6	-5	-200	1.2	-100	180	86	10	-24	20	0	56.3	18.0	8	47.60
18845	1800	-0.27	320	250	1634	26.00	240	220	233	-200	65	68	-10	-6	0.5	-5	-200	0.7	-100	150	66	10	-23	22	0	44.0	15.0	9	61.22

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	YGO %	TI02 %	CR	VI	CU	ZN	SE	MO	AG	PB	WT g/kg
18845	0.567	3.20	1974	170	86	306	-5	4	-0.5	255	2.1

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18839	3	56	55	600	2.72	13	33	45	47	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	11	5	-10	98.6
18842	10	51	47	557	2.54	11	31	43	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	-5	3	-10	74.3
18843	17	64	59	620	3.00	13	35	47	47	-5	-5	1	-0.5	-1	-10	-5	-10	-10	5	-2	-10	21.9
18844	15	52	51	551	2.72	13	35	41	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	5	-2	-10	27.7
18845	9	71	57	606	3.06	15	37	47	55	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	-2	-10	23.1
18846	-1	54	51	447	2.96	33	69	103	63	-5	-5	1	-0.5	-1	-10	-5	-10	45	21	3	-10	59.2

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18846	-2	0.2	0.7	1200	4.0	-5	80.0	4.4	220	25	-1	4	-50	4.2	41	-0.2	2	89	94	5.90	9.1	-5	-2	3.39	0.6	-10	-0.5	7.7	-100	27	2.6	-2	-100	230

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18846	29	4	86	410	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

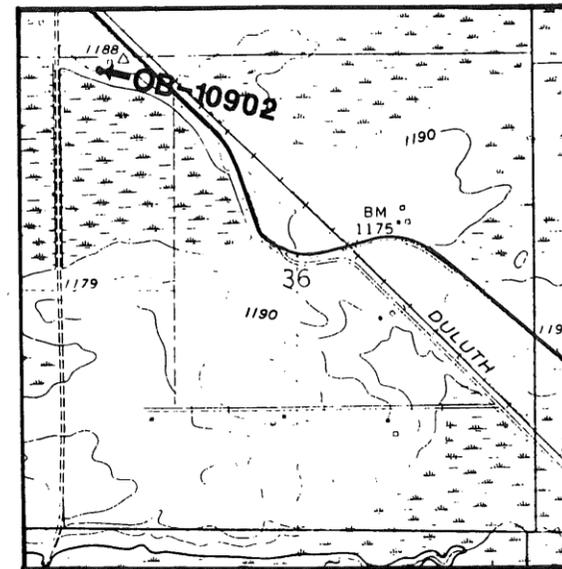
Appendix 8-28A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-10902
 Drilling Completion Date 8/3/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -NW $\frac{1}{4}$ -36-69N-23W
 County Koochiching
 Quadrangle Ray 7.5
 Regional Survey Area Littlefork



HOLE PARAMETERS

Surface Elevation 1175 ft.
 Total Depth 62.5 ft.
 Elevation, Top of Precambrian Bedrock 118.5 ft.
 Drilling Method Air Rotary
 Sample Diameter 6 inch
 Sample Collection Method Slurry: Splitter & Buckets

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-9	Organic Sediments			
9-56	Des Moines Lobe Gl. Drift			
56-56.5	Rainy Lobe	E,F	A,B,C	
56.5-62.5	Bedrock	E,F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Granitic Migmatite

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION				CLASS	
	TABLE	+10 SPLIT	TABLE	M.I. CONC.	NON MAG	CONC. TOTAL		NO. V.G.	CALC PPB	CLAST SIZE	MATRIX S/U SD ST CY COLOR		
18847	12.8	2.9	9.9	117.0	88.4	28.6	18.1	10.5	0	NA	P 1 99	NA NA U Y Y Y G 6	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P			
18847	N											NO VISIBLE GOLD

MASTER FILE

Appendix 8-28C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D 3 FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS	
18847	10902	56-57.5	1.5 A L NW-NW 36 69 23 K		RL. SANDY BVL. TILL	56-57.5	0.0	12800.0	2900.0	18.1	10.5	-1.0	-1.0	-1.0	-1.0	-1	23	-1	
18848	10902	57.5-62.5	5. A L NW-NW 36 69 23 K		BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg	WEIGHT
18847	120	-0.57	1080	330	818	27.00	170	98	155	300	84	79	-10	-7	0.2	-14	-410	-0.2	-210	591	170	16	110	25	0	230.0	36.0	1	13.16

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18847	0.326	2.93	677	56	32	243	-5	-1	-0.5	260	0.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18848	-2	-0.1	-0.5	1900	-2.0	-5	130.0	4.0	150	25	2	4	-50	3.8	63	-0.2	-1	120	100	11.00	7.0	-5	-2	2.75	0.6	-10	1.0	10.0	-100	13	2.4	-2	-100	330

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18848	4	4	66	320	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-29A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-11006

Drilling Completion Date 8/6/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -SE $\frac{1}{4}$ -9-68N-24W

County Koochiching

Quadrangle Ericzburg N.W. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1158 ft.

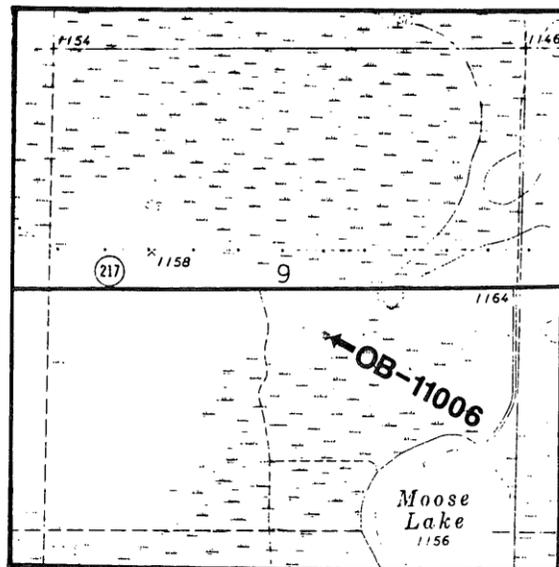
Total Depth 51 ft.

Elevation, Top of Precambrian Bedrock 1113 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-8	Organic Sediments			
8-39	Des Moines Lobe Gl. Drift			
39-45	Rainy Lobe Gl. Drift	E, F	A, B, C	B = As
45-51	Bedrock	E, F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Schist-Rich Migmatite

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					CLAST				MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG		NO. MAG	CALC V.G. PPB	SIZE	%	S/U	SD	ST	CY		COLOR				
18851	9.7	4.2	5.5	65.2	42.6	22.6	14.5	8.1	0	NA	P	10	90	NA	NA	U	Y	Y	Y	B	B	TILL
18852	10.4	2.4	8.0	160.7	113.5	47.2	36.8	10.4	0	NA	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS								NON MAG	CALC V.G. ASSAY PPB	REMARKS										
				T	P	T	P	T	P	T	P				TOTAL GMS									
18851	N																							
18852	N																							

MASTER FILE

Appendix 8-29C.

SAMPLE NUMBER	DR	SAMPLE NUMBER	INTERVAL	ST 0 6 FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT % -63uM	WT % +10	WT % SAND	REMARKS
18851		11006	39-44	5. A L NW-SE 9 68 24	K	RL. SANDY GVL. TILL	39-44	0.0	9700.0	4200.0	14.5	8.1	19.0	2362.0		1	43	56	
18852		11006	44-46	2. A L NW-SE 9 68 24	K	RL. SANDY GVL. TILL	44-46	0.0	10400.0	2400.0	36.8	10.4	72.5	2284.0		3	23	74	
18853		11006	46-51	5. A L NW-SE 9 68 24	K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	100.3	2351.0		4	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU	NA	DE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
	PPB	%																										g/kg	WEIGHT
18851	99	-0.34	*10	440	1044	25.00	230	130	166	-200	22	105	-10	-6	-0.2	-11	-200	0.9	340	210	84	9	140	18	0	92.8	13.0	1	11.18
18852	120	-0.35	620	330	1134	26.00	260	340	194	-200	49	30	-10	-5	0.2	-11	-200	0.5	-100	330	79	9	57	20	0	52.8	19.0	4	28.28

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO	TIO2	CR	NI	CU	ZN	SE	MO	AG	PB	WT
	%	%									g/kg
18852	0.601	5.54	1755	218	98	370	-5	3	-0.5	244	1.0

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
	PPB				%																	g/kg
18851	1	99	73	690	3.76	15	59	45	67	-5	10	1	-0.5	-1	-10	-5	-10	13	11	5	-10	8.0
18852	-1	67	57	696	2.88	15	45	41	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	31.7
18853	-1	64	69	1257	3.78	31	111	123	63	5	-5	3	-0.5	-1	-10	-5	-10	-10	15	3	-10	42.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
	PPB													%									%											
18853	-2	-0.1	-0.5	460	6.2	-5	59.0	2.8	230	30	-1	4	-50	5.0	30	-0.2	-1	93	84	5.50	17.0	-5	-2	2.66	0.6	-10	0.7	5.3	-100	-1	1.1	-2	-100	260

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SiO2	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
									%			%	%					%								%	
18853	41	4	82	180	-0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-11102

Drilling Completion Date 8/4/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -SW $\frac{1}{4}$ -36-68N-23W

County Koochiching

Quadrangle Ray S.W. 7.5

Regional Survey Area Littlefork

HOLE PARAMETERS

Surface Elevation 1213 ft.

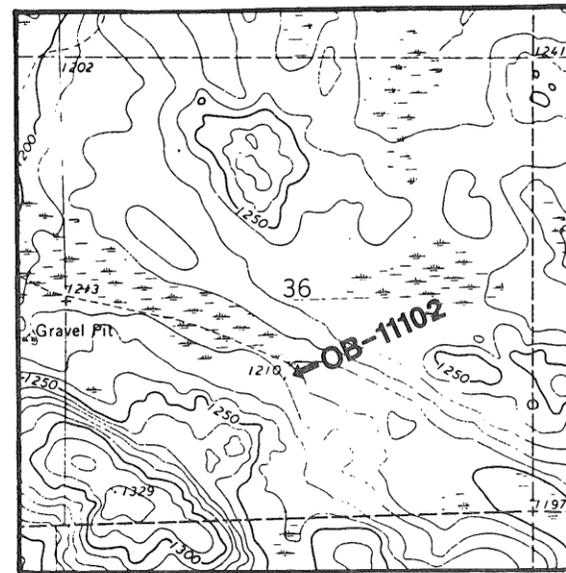
Total Depth 43 ft.

Elevation, Top of Precambrian Bedrock 1176 ft.

Drilling Method Air Rotary

Sample Diameter 6 inch

Sample Collection Method Slurry: Splitter & Buckets



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-15	Soil & Organic Seds.			
15-35	Des Moines Lobe Gl. Drift			
35-37	Rainy Lobe Gl. Drift	E, F	A, B, C	B = Cu
37-43	Bedrock	E, F	I	

A = -63 microns fraction	E = Skeletonized Grab Sample	H = Thin Section
B = Heavy Minerals, Nonmag	in Core Box	I = (Bedrock or Drift)
C = Heavy Minerals, Mag	F = Interval Cuttings in Bucket	Split of "Wholerock"
D = Sluice Box Composite	G = Core	Sample

BEDROCK

Principal Rock Type: Granite-Rich Migmatite

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. NET)		WEIGHT (GRAMS DRY)		AU	DESCRIPTION					CLASS											
	TABLE	+10 SPLIT	TABLE	M.I. CONC		CLAST		MATRIX														
	CHIPS	FEED	CONC	LIGHTS	NO.	CALC	SIZE	%	S/U	SD	ST	CY	COLOR									
				TOTAL	MAG	MAG	V.G.	PPB	V/S	GR	LS	OT	SD	CY								
18849	8.1	1.3	6.8	47.0	32.4	14.6	9.8	4.8	0	NA	P	5	95	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS				NON MAG	CALC V.G. ASSAY PPB	REMARKS
					T	P	T	P			
849	N										NO VISIBLE GOLD

MASTER FILE

Appendix 8-30C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18849	11102	35-38	3. A L NE-SW 36 68 23 K	AL. SANDY GVL. TILL	35-38	0.0	8100.0	1300.0	9.8	4.8	39.3	2203.0	2	16	B2		
18850	11102	38-43	5. A L NE-SW 36 68 23 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg WEIGHT
18849	72	-0.92	2110	530	1050	24.00	260	-83	450	-200	50	44	-31	-11	0.6	-17	-550	1.0	-290	1200	229	12	544	50	0	520.0	37.0	1 7.66

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	YGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18849	0.286	1.91	1032	114	100	238	-5	2	-0.5	264	0.6

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
18849	7	40	31	384	1.97	7	19	31	31	-5	-5	-1	-0.5	-1	-10	-5	-10	15	7	5	-10	17.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18850	-2	-0.1	-0.5	1400	-2.0	-5	78.0	1.1	180	7	-1	4	-50	1.7	37	-0.2	-1	21	95	5.40	3.9	-5	-2	2.86	-0.5	-10	-0.5	12.0	-100	4	1.0	-2	-100	-200

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
18850	16	4	45	140	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

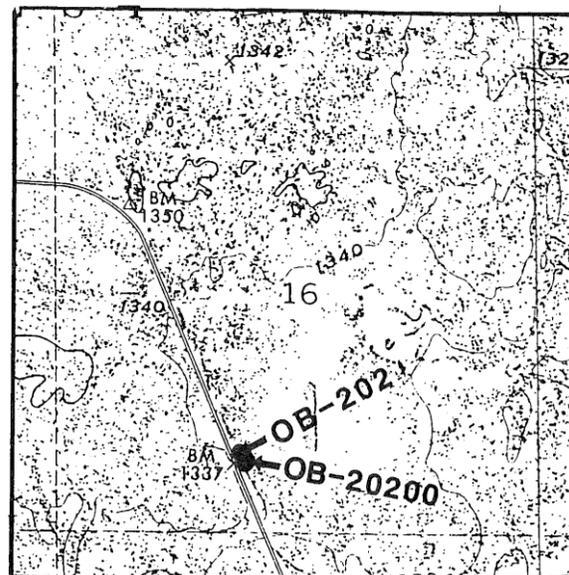
DNR Drill Hole Number OB-202
 Drilling Completion Date 12/13/85

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -16-63N-23W
 County Koochiching
 Quadrangle Deer Lake N.E. 7.5
 Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1338 ft.
 Total Depth 128 ft.
 Elevation, Top of Precambrian Bedrock 1215 ft.
 Drilling Method Rotasonic
 Sample Diameter 3.5 inch
 Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-69.5	Des Moines Lobe Gl. Drift	G	A,B,C	
69.5-123	Rainy Lobe Gl. Drift	G	A,B,C	A = Au,W B = Au,Cr
123-128	Bedrock	G,H	I	C = Ag,Zn

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Dacite Crystal Tuff

Thin Section Description: #13858 at 122 ft. boulder. Lamprophyre with biotite phenocrysts (relatively quartz-rich). Estimated mode (volume %): Biotite, 17; Chlorite, 13; Calcite, 20; Epidote, 1; Quartz, 10 or less; Feldspar, 39 or more; Opaques (martite), Tr; Pyrite, Tr. Rock consists of subhedral green biotite phenocrysts up to 5 mm long in a fine-grained matrix of quartz and feldspar (plagioclase + ?), calcite, biotite, chlorite, and epidote. The feldspar is heavily altered to the calcite-biotite-chlorite-epidote assemblage but shows remnant albite twinning and possible zonation. Some of the feldspar may be potassic but cannot ascertain. Very thin, needly inclusions of actinolite (?) are common within the feldspar. The hydrous nature of the constituent minerals and the high degree of deuteric alteration/saussuritization indicate that this rock has crystallized from a volatile-rich magma.

#13860 at 126 ft. Dacite crystal tuff. Estimated mode (volume %): Sericite, 9; Biotite (green), 1; Quartz phenocrysts, 3; Plagioclase phenocrysts, less than 1; Quartzofeldspathic matrix, 87. Rock consists of 0.5 to 2 mm embayed unit-quartz crystals and less abundant 1 mm blocky plagioclase crystals in a fine-grained quartzofeldspathic matrix, which also contains foliated sericite and biotite. The matrix ranges from very fine-grained and cherty in appearance to 0.1 mm weakly granoblastic recrystallized grains. The unit-quartz phenocrysts are weakly strained and undulose, and the plagioclase crystals are moderately saussuritized. The sericite has a pale green pleochroism and possibly is Cr or V bearing. (By T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)
 OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. NET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION	CLASS
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC						
				TABLE CONC	M. I. LIGHTS	CONC. TOTAL	NON MAG			
16801	7.9	0.4	7.5	49.5	45.9	3.6	2.5	1.1	0	NA P/C 55 10 30 5 S F Y Y B B SAND
-804CP	12.3	0.6	11.7	90.5	86.5	4.0	2.9	1.1	0	NA P 60 10 20 10 S F Y Y B B SAND
-816CP	11.9	1.6	10.3	166.9	132.4	34.5	27.3	7.2	1	587 P 75 10 10 5 U Y Y Y B B TILL
-818CP	26.0	5.4	20.6	201.0	184.3	16.7	11.2	5.5	6	628 C/P 50 50 NA TR U Y Y Y B B TILL
-820CP	19.2	4.3	14.9	119.9	75.5	44.4	34.3	10.1	0	NA P/C 60 40 NA NA U Y Y Y B B TILL
-822CP	29.7	5.1	24.6	208.1	157.0	51.1	39.1	12.0	2	207 P/C 60 40 NA NA U Y Y Y B B TILL
-824CP	29.3	3.7	25.6	218.6	149.3	69.3	51.3	18.0	1	56 P/C 60 40 NA NA U Y Y Y B B TILL
-825	7.9	1.5	6.4	90.4	66.9	23.5	19.3	4.2	0	NA P/C 60 40 NA NA U Y Y Y B B TILL
-826	12.8	1.7	11.1	185.4	157.2	28.2	22.5	5.7	1	219 P/C 65 35 NA NA U Y Y Y B B TILL

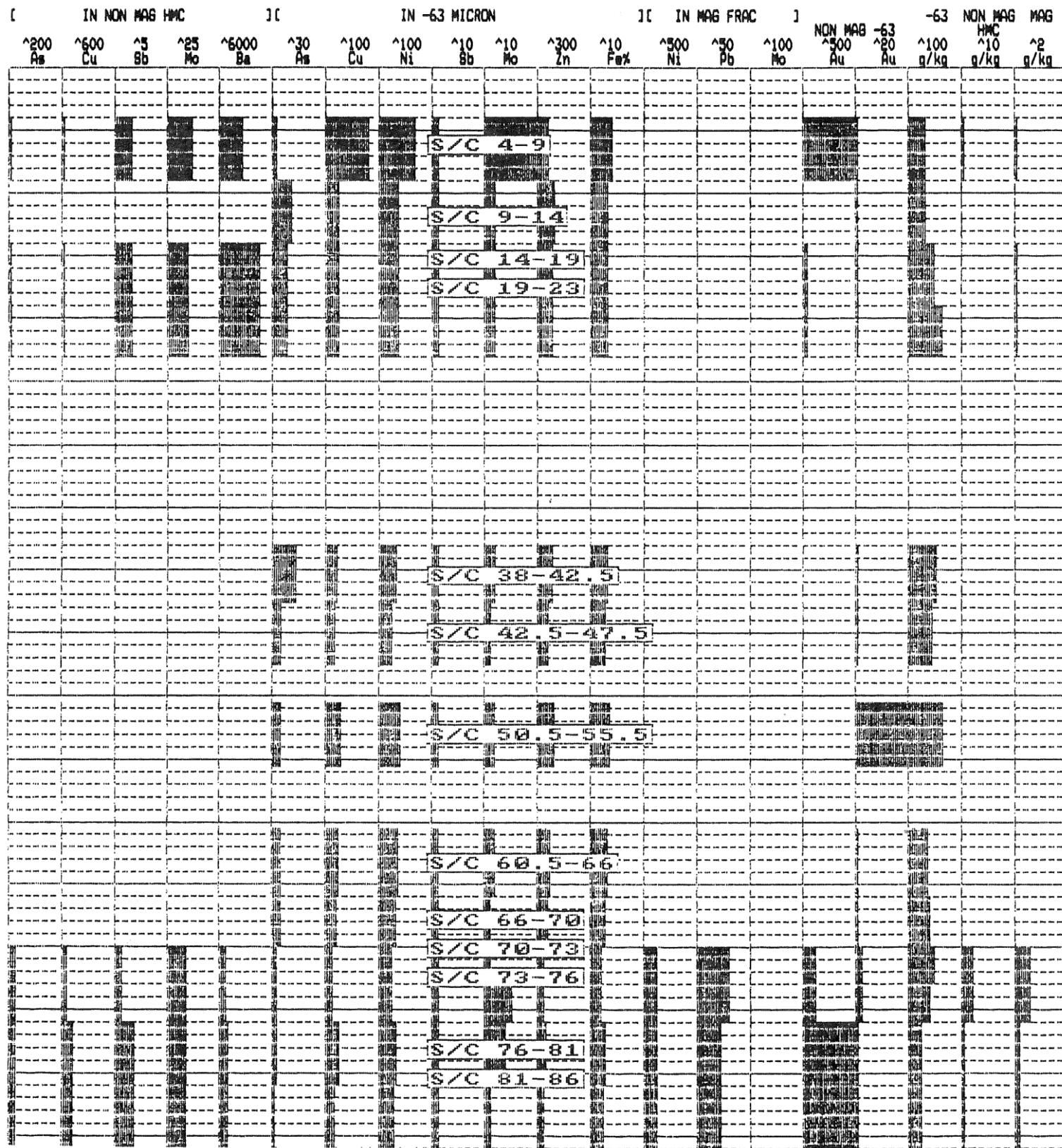
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

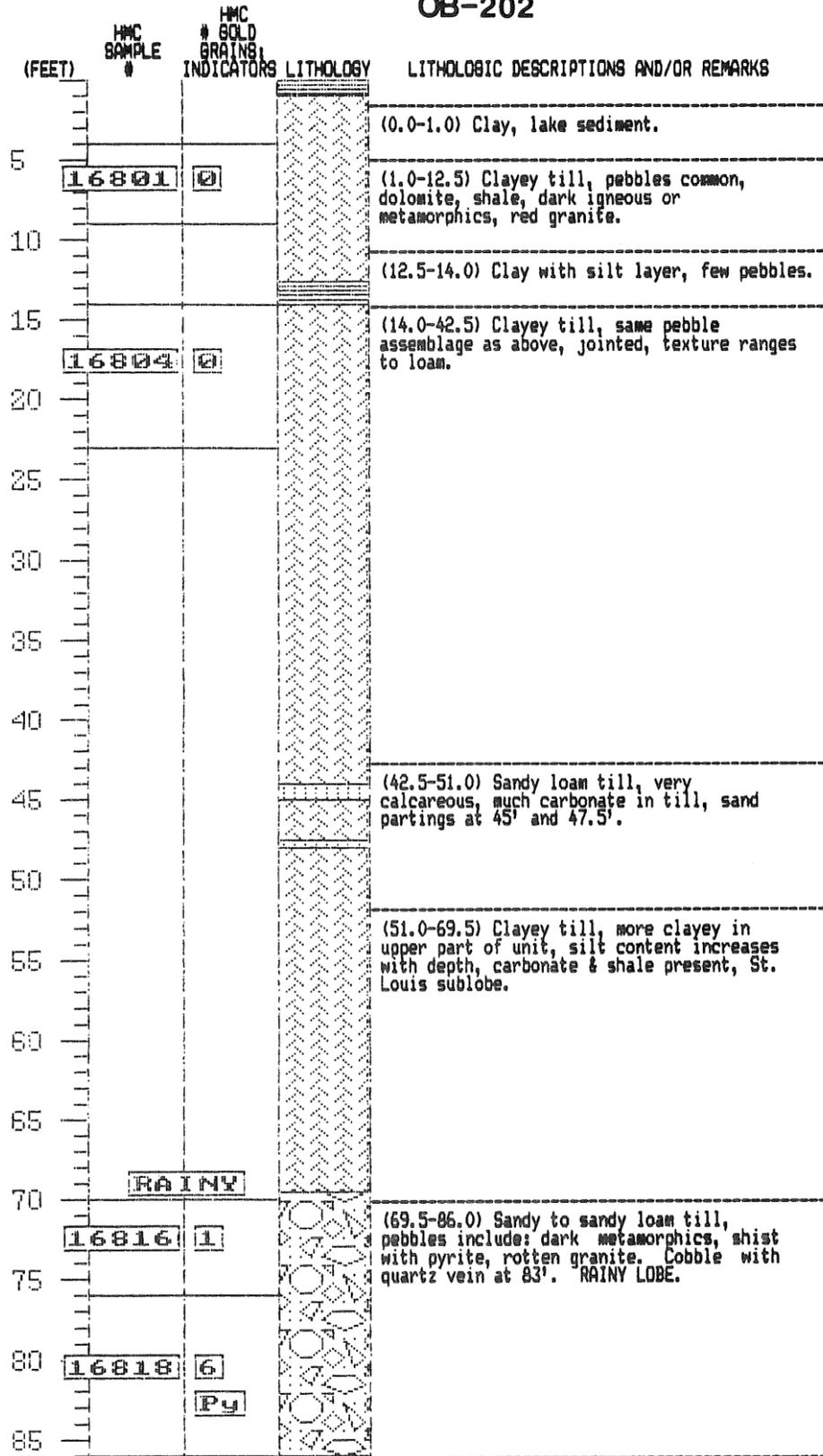
SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				ABRADED		IRREGULAR		DELICATE		TOTAL		TOTAL GMS					
				T	P	T	P	T	P	T	P						
16801	N																
-804	N																
-816	N	150 X 300	42 C	1										1			
														TOTAL	1	27.3	587
-818	Y	50 X 75	13 C	1										1			EST: 2% PYRITE
		75 X 100	18 C	2	1									3			
		75 X 150	22 C	1										1			
		100 X 100	20 C	1										1			
														TOTAL	6	11.2	628
-820	N																
-822	N	50 X 75	13 C	1										i			
		150 X 200	34 C	1										1			
														TOTAL	2	39.1	207
-824	N	100 X 150	25 C	1										1			
														TOTAL	1	51.3	56
-825	N																
-826	N	100 X 200	29 C	1										1			
														TOTAL	1	22.5	219

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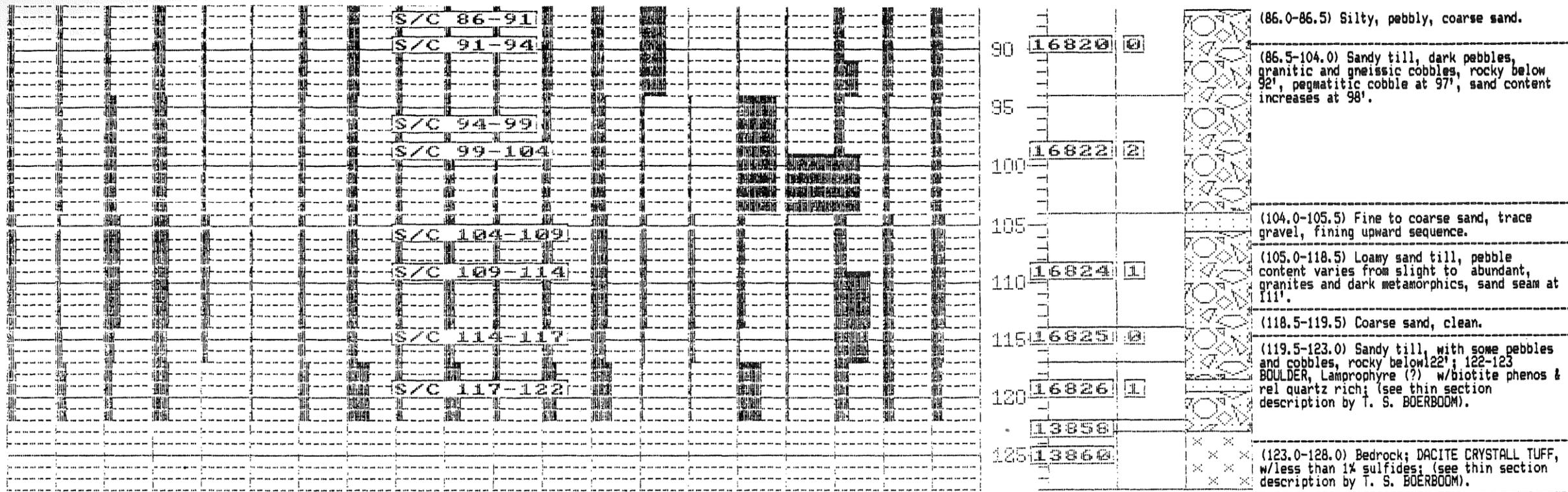
SUMMARY OF G. MEYER LOG OB-202, ROTASONIC CORE



OB-202



Append



MASTER FILE

Appendix 8-31C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D S	FDRTY	LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
16801	202	4-9	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL	4-9	0.0	7900.0	400.0	2.5	1.1	22.6	724.0	3	5	92	
16802	202	9-14	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.0	731.0	3	-1	-1	
16803	202	14-19	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.1	456.0	5	-1	-1	
16804	202	19-23	4.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL	14-23	0.0	12300.0	600.0	2.9	1.1	22.0	343.0	6	5	89	
16805	202	23-28	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16806	202	28-33	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16807	202	33-38	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16808	202	38-42.5	4.5	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.2	449.0	5	-1	-1	
16809	202	42.5-47.5	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.8	537.0	4	-1	-1	
16810	202	47.5-50.5	3.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16811	202	50.5-55.5	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	27.3	418.0	7	-1	-1	
16812	202	55.5-60.5	5.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16813	202	60.5-66	5.5	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	33.0	918.0	4	-1	-1	
13840R	202	60.5-66	5.5	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.5	868.0	3	-1	-1	
16814	202	66-70	4.	S	O	SE-SW	16 63 23 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	34.7	683.0	4	-1	-1	
16815	202	70-73	3.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.5	500.0	5	-1	-1	
16816	202	73-76	3.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	70-76	1.0	11900.0	1600.0	27.3	7.2	25.3	662.0	4	13	83	
16817	202	76-81	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	27.4	1119.0	2	-1	-1	
16817R	202	76-81	5.0	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		0	0	0	0	0	0	0	0	0	0	
16818	202	81-86	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	76-86	6.0	25000.0	5400.0	11.2	5.5	42.0	1330.0	2	21	77	
16819	202	86-91	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.3	1116.0	2	-1	-1	
16820	202	91-94	3.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	86-94	0.0	19200.0	4300.0	34.3	10.1	23.1	488.0	5	22	73	
16821	202	94-99	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	28.3	1256.0	2	-1	-1	
16822	202	99-104	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	94-104	2.0	29700.0	5100.0	39.1	12.0	47.4	906.0	5	17	78	
16822R	202	99-104	5.0	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		0	0	0	0	0	0	0	0	0	0	
16823	202	104-109	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	29.2	1272.0	2	-1	-1	
16824	202	109-114	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	104-114	1.0	29300.0	3700.0	51.3	16.0	79.2	1073.0	7	13	80	
13841R	202	109-114	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	22.8	994.0	2	-1	-1	
16825	202	114-117	3.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	114-117	0.0	7900.0	1500.0	19.3	4.2	36.3	543.0	7	19	74	
16826	202	117-122	5.	S	O	SE-SW	16 63 23 K	RL. SANDY GVL. TILL	117-122	1.0	12800.0	1700.0	22.5	5.7	23.5	286.0	3	13	84	
13858	202	122	-2.0	S	O	SE-SW	16 63 23 K	PEBBLES/BOULDERS		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	SAMP. BOULDER AT 122
13859	202	123-125	2.0	S	O	SE-SW	16 63 23 K	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
13860	202	125-128	3.0	S	O	SE-SW	16 63 23 K	BEDROCK	123-128	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AL	NA	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
	PPB	%																										g/kg	WEIGHT
16801	640	0.06	993	1000	7600	25.10	31	63	24	160	0	10	-26	12	-0.5	0	40	1.5	2600	608	350	9	10	88	-2	260.0	27.8	0	2.58
16804	40	0.06	884	990	7400	27.20	28	52	22	160	0	-6	-10	10	-0.5	0	10	1.7	4600	526	300	9	-10	49	-2	240.0	24.7	0	3.07
16816	120	0.22	1070	670	12000	29.80	92	130	56	150	0	26	-24	9	-0.5	0	-10	-0.6	600	629	120	19	30	25	-2	260.0	28.6	2	19.90
16818	700	0.18	1030	370	16000	25.00	170	170	110	120	0	24	-50	9	-0.5	0	-10	1.8	-1000	497	51	11	30	88	-2	300.0	17.0	0	8.61
16820	-25	0.21	985	510	14000	26.10	95	150	75	150	0	27	-12	6	-0.5	0	-10	-0.6	-500	608	83	17	20	51	-2	250.0	22.7	2	26.40
16822	410	0.20	1160	710	13000	29.70	99	140	64	150	0	26	-10	7	-0.5	0	-10	1.2	500	760	93	15	-10	37	-2	320.0	25.7	1	30.30
16824	78	0.14	1000	590	13000	27.50	88	130	49	140	0	35	-24	8	-0.5	0	-10	1.5	900	684	90	16	20	37	-2	290.0	27.6	2	39.60
16825	-30	0.16	675	440	12000	17.40	100	130	63	150	0	21	-19	7	-0.5	0	-10	1.0	600	325	59	8	10	62	-2	180.0	16.5	2	15.40
16826	250	0.21	717	4400	12000	19.00	150	190	130	180	0	35	-10	8	-0.5	0	-10	0.9	-100	266	68	10	-10	40	-2	150.0	11.9	2	17.30

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MO	TI02	CR	NI	CU	ZN	SE	MO	AG	PB	WT
	%	%									g/kg
16816	1.000	5.30	1200	120	23	450	-1	-1	1.0	30	0.6
16818	0.930	5.20	910	130	81	410	-1	-1	0.5	22	0.2

16820	1.100	5.30	1100	120	26	420	-1	-1	0.5	26	0.5
16822	0.710	1.70	830	140	35	570	-1	3	-0.5	4	0.4
16824	0.780	1.70	1600	160	32	430	-1	13	-0.5	6	0.6
16825	0.630	1.70	1000	140	20	420	-1	13	-0.5	4	0.5
16826	0.680	1.70	950	200	68	350	-1	3	-0.5	-1	0.4

-63um ANALYSIS (PPM)

SAMPLE NUMBER	ALU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
	PPB				%																	g/kg
13840R	8	97	92	520	3.4	18	38	25	77	5	-1	3	-0.5	-1	5	-1	-1	-1	12	-1	2	28.2
13841R	-1	52	63	340	2.0	13	21	13	37	2	-1	1	-0.5	-1	9	-1	-1	3	9	-1	-1	22.9
16801	-1	110	210	330	4.2	26	68	79	55	2	-1	10	-0.5	1	1	-1	-1	7	13	-1	-1	31.2
16802	-1	160	87	560	3.3	17	37	24	92	11	2	2	-0.5	-1	4	-1	-1	-1	24	-1	3	30.1
16803	-1	140	81	430	3.2	15	34	23	85	9	1	2	-0.5	-1	4	-1	-1	1	17	-1	3	48.5
16804	-1	140	87	490	3.1	16	36	24	88	9	-1	2	-0.5	-1	3	-1	-1	-1	16	-1	3	63.8
16808	-1	120	77	480	3.0	15	32	20	80	13	-1	2	-0.5	1	5	-1	-1	-1	15	-1	3	53.9
16809	-1	91	64	450	2.7	13	25	15	58	5	-1	1	-0.5	-1	3	-1	-1	-1	13	-1	2	42.5
16811	51	140	98	560	3.5	19	41	28	91	5	-1	2	-0.5	-1	5	-1	-1	1	18	-1	3	65.3
16813	1	68	86	500	3.3	17	36	24	72	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	2	35.9
16814	-1	80	84	460	2.9	15	32	21	59	5	1	1	-0.5	-1	2	-1	-1	-1	15	-1	2	39.2
16815	2	53	72	360	2.0	13	24	13	36	2	-1	-1	-0.5	-1	2	-1	-1	1	11	-1	-1	49.0
16816	2	64	98	360	2.0	13	24	13	36	3	-1	5	-0.5	-1	2	-1	-1	3	17	-1	2	38.0
16817	-1	60	120	410	2.8	15	33	25	52	2	-1	4	-0.5	-1	1	-1	-1	11	12	-1	-1	24.5
16817R	0	0	98	0	0.0	0	0	0	52	2	1	5	-0.5	-1	1	-1	0	10	0	0	0	0.0
16818	-1	51	80	370	2.3	14	26	17	35	1	-1	1	-0.5	-1	1	-1	-1	7	12	-1	-1	23.0
16819	-1	52	73	350	2.2	13	24	16	37	1	-1	-1	-0.5	-1	1	-1	-1	5	10	-1	-1	21.8
16820	1	53	69	330	2.1	13	24	14	40	1	-1	1	-0.5	-1	1	-1	-1	2	14	-1	-1	47.3
16821	-1	43	62	250	1.8	12	19	11	33	1	2	-1	-0.5	-1	1	-1	-1	5	16	-1	-1	21.8
16822	28	46	58	300	1.8	11	19	10	30	1	-1	2	-0.5	-1	-1	-1	-1	3	18	-1	-1	52.3
16822R	0	0	48	0	0.0	0	0	0	31	1	1	2	-0.5	-1	-1	-1	0	3	0	0	0	0.0
16823	-1	54	62	400	2.2	13	20	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	14	-1	-1	22.8
16824	1	49	58	320	1.8	11	19	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	13	-1	-1	73.8
16825	1	52	63	370	2.2	13	19	12	35	1	-1	2	-0.5	1	-1	-1	-1	2	15	-1	-1	66.9
16825	1	64	150	410	2.7	17	43	19	42	1	-1	3	-0.5	-1	-1	-1	-1	2	12	-1	-1	26.5

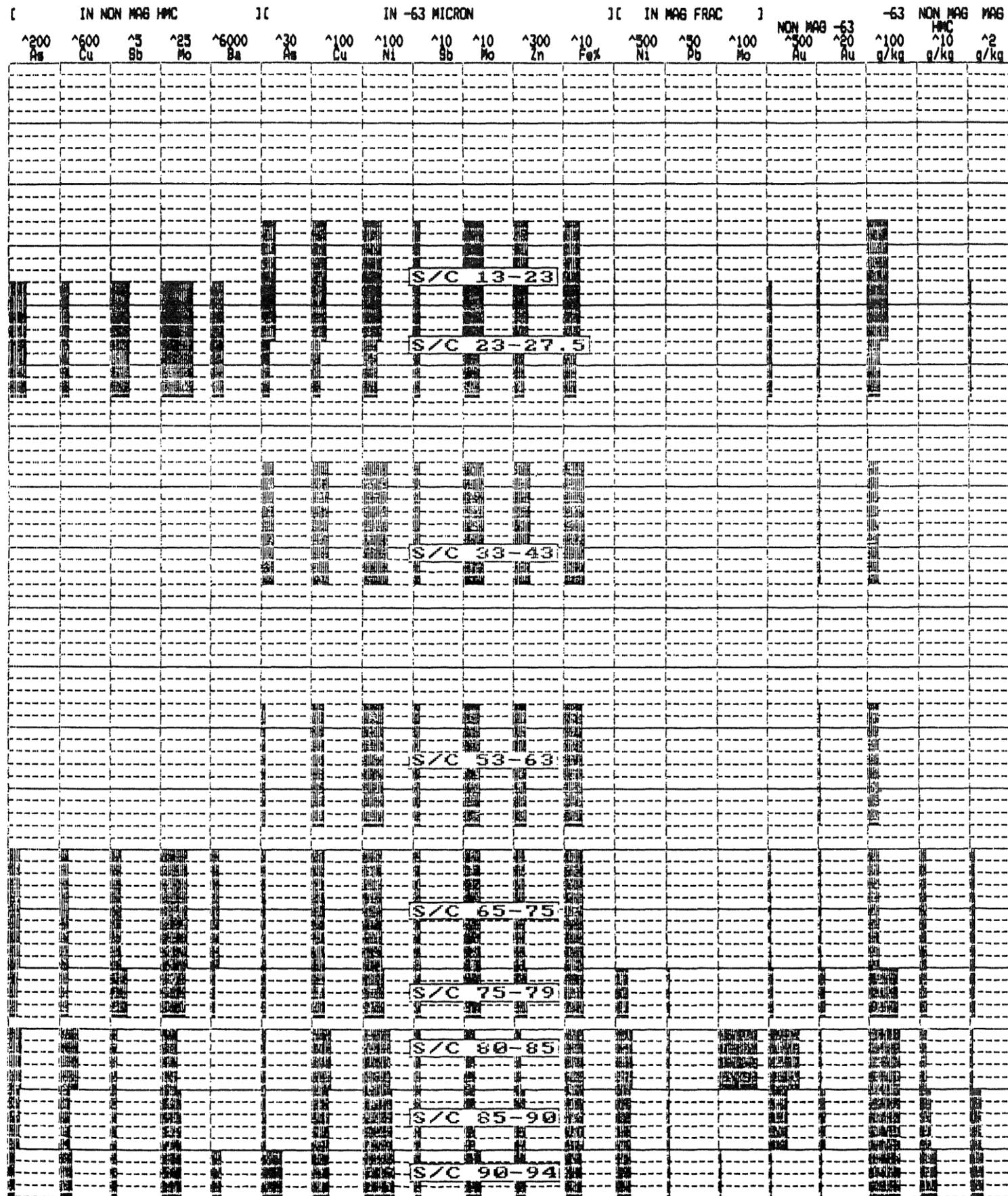
BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AL	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SD	SE	AGR	AA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
	PPB													%										%										
13858	-9	-0.2	1.4	0	0.0	0	35.0	0.0	290	32	0	2	-50	6.1	15	0.0	0	0	0	0.00	0.0	-5	-2	2.60	0.0	0	0.0	1.7	0	-3	-1.0	0	100	0
13860	-8	-0.2	-1.0	300	0.0	-1	63.0	0.0	220	8	0	10	-50	1.5	33	0.0	-1	10	55	0.00	0.0	-5	-2	2.20	-8.0	-10	0.0	2.5	-10	4	1.8	0	-100	0

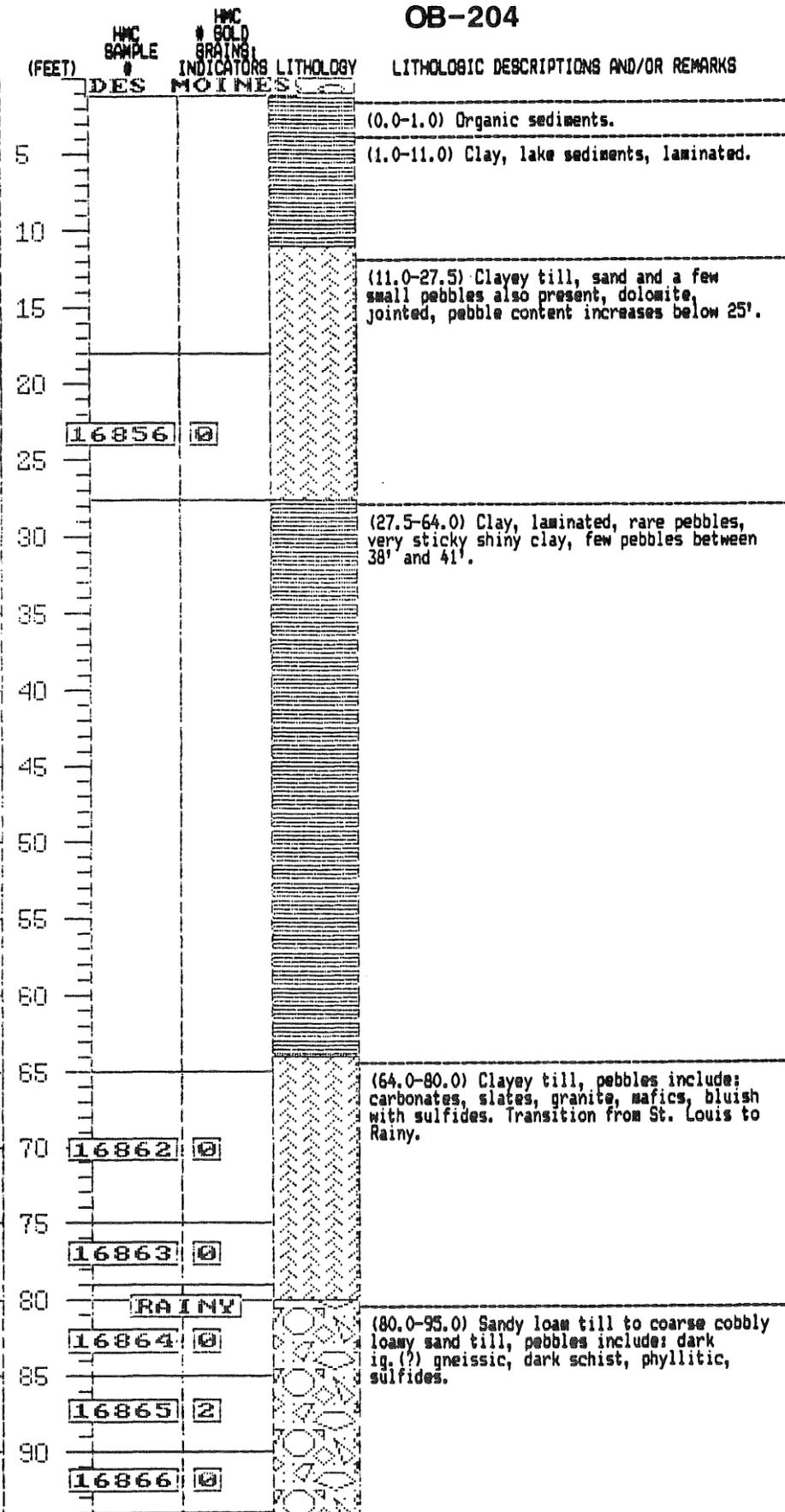
BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SiO2	S	CL	K	CA	FeO	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
									%			%	%					%								%	
13858	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-340	0	0	-3	730	-2.2	0	0.00	0
13860	12	7	30	350	0.5	0	10	2	0.71	24000	3800	1.19	75.7	0.00	-50	15000	12000	1.1	-300	72	17	-3	400	-2.3	-2	1.85	13000

BLANK PAGE



OB-204



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
16854	204	13-18	5. S D SE-SE 17 63 22 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
16855	204	18-23	5. S D SE-SE 17 63 22 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	23.5	595.0	4	-1	-1	SIC-630=13-23	
16856	204	23-27.5	4.5 S D SE-SE 17 63 22 K	DML. CLAYEY TILL	18-27.5	0.0	12100.0	600.0	2.7	1.1	20.5	859.0	2	5	93		
16857	204	33-38	5. S D SE-SE 17 63 22 K	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16858	204	38-43	5. S D SE-SE 17 63 22 K	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	23.3	1242.0	2	-1	-1	SIC-630=33-43	
16859	204	53-58	5. S D SE-SE 17 63 22 K	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16860	204	58-63	5. S D SE-SE 17 63 22 K	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	31.9	1626.0	2	-1	-1	SIC-630=53-63	
16861	204	65-70	5. S D SE-SE 17 63 22 K	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16862	204	70-75	5. S D SE-SE 17 63 22 K	DML. CLAYEY TILL	65-75	0.0	19900.0	700.0	10.9	4.5	39.8	2141.0	2	4	94	SIC-630=65-75	
16863	204	75-79	4. S D SE-SE 17 63 22 K	DML. CLAYEY TILL	75-79	0.0	8600.0	700.0	6.2	1.9	44.3	810.0	5	8	87		
16864	204	80-85	5. S D SE-SE 17 63 22 K	RL. SANDY SVL. TILL	80-85	0.0	8800.0	1600.0	6.3	1.2	46.1	781.0	6	18	76		
16865	204	85-90	5. S D SE-SE 17 63 22 K	RL. SANDY SVL. TILL	85-90	2.0	9500.0	2200.0	17.8	3.9	53.1	857.0	6	23	71		
13842R	204	85-90	5. S D SE-SE 17 63 22 K	RL. SANDY SVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	41.0	726.0	5	-1	-1		
16866	204	90-94	4. S D SE-SE 17 63 22 K	RL. SANDY SVL. TILL	90-94	0.0	7000.0	2500.0	18.4	3.2	34.7	357.0	6	36	58		
13866	204	95-102	9.0 S D SE-SE 17 63 22 K	BEDROCK	95-102	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZNR	AS	SE	MO	AG	AG2	SN	SB	BA	LA	-F	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16856	-40	0.09	794	800	6100	28.60	75	100	100	200	0	61	-12	16	-0.5	0	10	1.8	1500	491	250	8	30	29	-2	250.0	23.8	0	2.77
16862	-28	0.22	917	720	8400	28.70	96	120	92	150	0	42	-10	13	-0.5	0	-10	1.1	900	484	230	9	20	55	-2	230.0	25.6	1	7.91
16863	-35	0.12	865	530	8600	25.00	98	140	97	150	0	35	-19	12	-0.5	0	-10	1.6	500	454	160	12	-10	48	-2	190.0	35.1	1	4.70
16864	300	0.31	580	880	15000	29.10	150	180	210	150	0	49	-10	8	-0.5	0	-10	-0.7	100	306	58	5	20	27	-2	130.0	12.9	1	4.68
16865	150	0.22	709	1000	15000	23.30	150	180	130	150	0	41	-10	10	-0.5	0	-10	-0.7	-100	329	71	11	-10	27	-2	160.0	16.8	2	13.10
16866	-30	0.12	594	930	14000	20.50	190	250	150	150	0	21	-16	10	-0.5	0	-10	-0.7	1100	268	63	7	30	27	-2	110.0	17.3	3	13.70

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13842R	-1	92	180	530	3.3	23	58	32	52	2	-1	1	-0.5	-1	11	-1	-1	1	9	-1	-1	56.5
16855	1	120	92	590	3.4	18	36	26	84	9	1	4	-0.5	-1	1	-1	-1	-1	15	-1	3	39.5
16856	-1	97	71	480	2.3	14	27	17	58	5	-1	3	-0.5	-1	-1	-1	-1	1	12	-1	-2	23.9
16858	-1	140	110	560	4.0	23	46	32	96	7	-1	4	-0.5	-1	1	-1	-1	-1	14	-1	3	18.8
16860	1	89	37	550	3.5	20	39	24	68	3	2	3	-0.5	-1	-1	-1	-1	-1	14	-1	2	19.6
16862	-1	81	100	560	3.5	20	36	24	65	3	-1	3	-0.5	-1	-1	-1	-1	-1	14	-1	2	18.6
16863	2	73	100	580	3.7	21	38	25	68	3	1	3	-0.5	-1	-1	-1	-1	-1	15	-1	2	54.7
16864	-1	56	140	560	3.7	25	52	36	38	2	-1	2	-0.5	-1	-1	-1	-1	-1	14	-1	-1	59.0
16865	2	62	170	600	3.7	24	57	33	62	2	-1	2	-0.5	-1	-1	-1	-1	-1	14	-1	1	61.2
16866	1	96	190	530	3.4	25	58	32	65	12	2	3	-0.5	-1	2	-1	-1	3	12	-1	-1	59.1

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16863	0.630	1.70	1300	130	21	250	-1	-1	-0.5	-1	0.2
16864	0.750	1.70	1300	170	95	320	-1	74	-0.5	-1	0.1
16865	0.660	1.70	1000	140	29	360	-1	-1	-0.5	-1	0.4
16866	0.610	1.70	1200	140	28	370	-1	3	-0.5	-1	0.5

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13866	-8	-0.2	-1.1	580	0.0	1	61.0	0.0	230	25	0	3	-50	4.4	32	0.0	1	84	76	0.00	0.0	-5	-5	2.60	-8.0	-10	0.0	7.5	-10	-3	1.6	0	-100	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SIO2 %	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13866	60	16	96	790	5.0	0	26	2	0.07	29000	22000	4.87	63.2	0.10	-50	16000	22000	5.0	-310	270	6	-4	630	-2.0	-2	1.31	46000

Appendix 8-33A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-206

Drilling Completion Date 12/8/85

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -22-63N-21W

County St. Louis

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1301 ft.

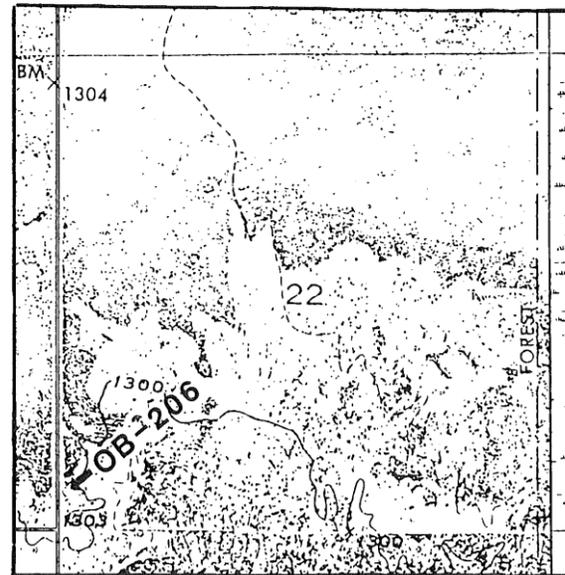
Total Depth 112.5 ft.

Elevation, Top of Precambrian Bedrock 1193 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU		DESCRIPTION							CLASS					
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC				NO. V.G.	CALC PPB	CLAST			MATRIX									
				TABLE CONC	M. I. LIGHTS	CONC. TOTAL	NON MAG			NO. MAG	SIZE	%	S/U	SD	ST	CY		COLOR				
16919	14.0	0.7	13.3	259.5	253.7	5.8	4.2	1.6	0	NA	P	5	25	70	NA	U	Y	Y	Y	B	B	TILL
-923CP	14.5	1.5	13.0	267.6	245.3	22.3	17.8	4.5	0	NA	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL
-926CP	14.1	0.2	13.9	64.9	63.9	1.0	0.7	0.3	0	NA	P	30	70	NA	NA	S	N	Y	Y	NA	B	SILT&CLAY
-928CP	13.2	0.7	12.5	227.4	198.9	28.5	24.2	4.3	0	NA	P	60	40	NA	NA	U	Y	Y	Y	GB	GB	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-94.5	Des Moines Lobe Gl. Drift	G	A,B,C	
94.5-108	Rainy Lobe Gl. Drift	G	A,B,C	
108-112.5	Bedrock	G,H	I	I = Au

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Amphibolite

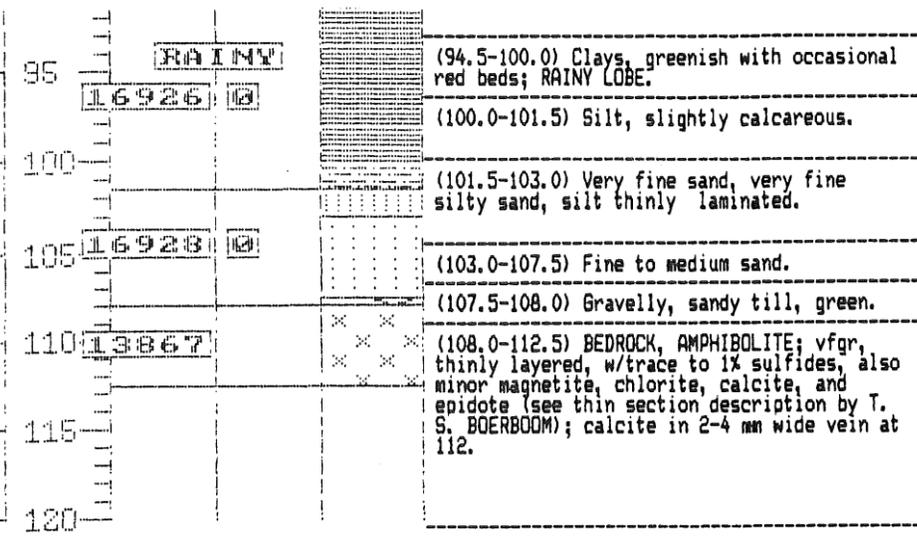
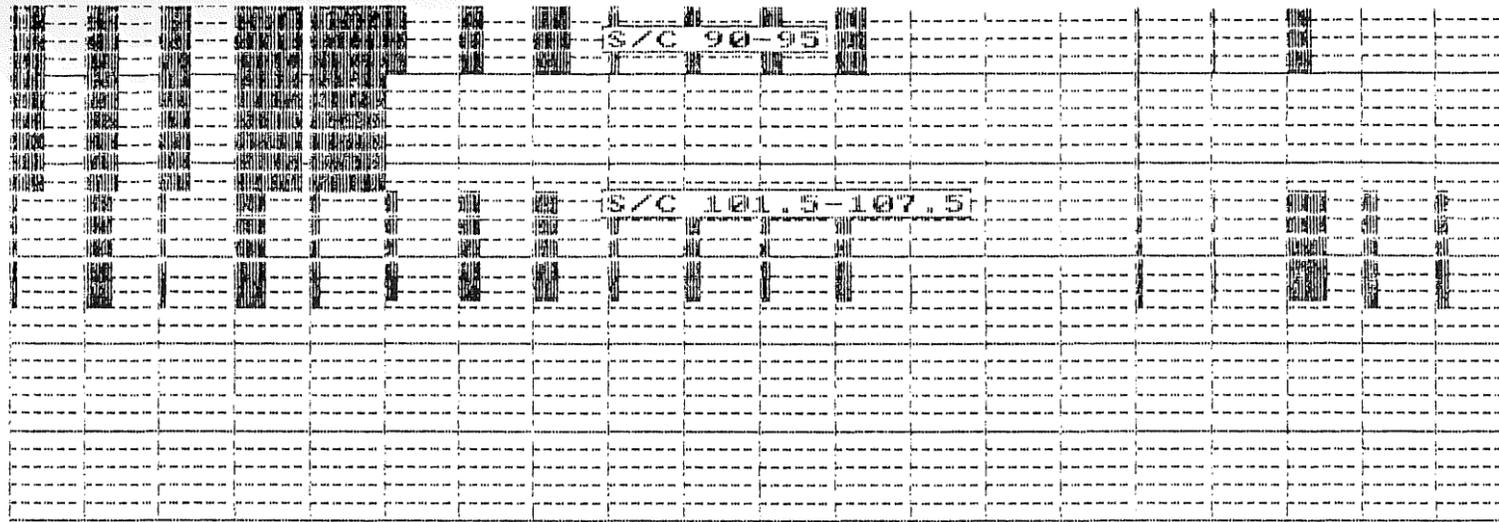
Thin Section Description: #13867 at 111.5 ft. Thinly layered fine-grained amphibolite. Estimated mode (volume %): Hornblende, 60; Cummingtonite, 15; Plagioclase (oligoclase-andesine), 23 (may include some quartz); Quartz, Tr?; Chlorite, Tr; Epidote, Tr; Calcite, Tr; Pyrite, 1 or less; Magnetite, 1 or more. Hornblende-cummingtonite amphibolite containing minor disseminated pyrite and magnetite. The pale green layers visible on a macroscopic scale are, on a microscopic scale, as rich in amphibole as the dark green layers but consist dominantly of cummingtonite (optically (+), fine polysynthetic twinning) instead of hornblende. Microveinlets of plagioclase randomly crosscut the well-defined foliation. One larger foliation-parallel vein consists (core to rim) of quartz, cummingtonite (?), and the alteration minerals chlorite, calcite, and epidote. (By T. Boerboom, MGS)

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P			
16919	N											NO VISIBLE GOLD
-923	N											NO VISIBLE GOLD
-926	N											NO VISIBLE GOLD
-928	N											NO VISIBLE GOLD



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
16917	206	20-25	5. S 0 SW-SW 22 63 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
16918	206	25-30	5. S 0 SW-SW 22 63 21 SL	DML. SILT		-1.0	-1.0	-1.0	-1.0	-1.0	23.8	1041.0		2	-1	-1	
16919	206	32.5-37	4.5 S 0 SW-SW 22 63 21 SL	DML. CLAYEY TILL	32.5-37	0.0	14000.0	700.0	4.2	1.6	32.1	1159.0		3	5	92	
16920	206	55-60	5. S 0 SW-SW 22 63 21 SL	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16921	206	60-65	5. S 0 SW-SW 22 63 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	38.2	779.0		5	-1	-1	
16922	206	75-80	5. S 0 SW-SW 22 63 21 SL	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
13843R	206	75-80	5. S 0 SW-SW 22 63 21 SL	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	28.4	791.0		4	-1	-1	
16923	206	80-82.5	2.5 S 0 SW-SW 22 63 21 SL	DML. CLAYEY TILL	75-82.5	0.0	14500.0	1500.0	17.8	4.5	40.6	1503.0		3	10	87	SIL-63=75-82.5
16924	206	85-90	5. S 0 SW-SW 22 63 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	17.4	754.0		2	-1	-1	
16925	206	90-95	5. S 0 SW-SW 22 63 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	18.4	580.0		3	-1	-1	
16926	206	95-101.5	6.5 S 0 SW-SW 22 63 21 SL	RL. CLAY: GLACIAL LK	90-101.5	0.0	14100.0	200.0	0.7	0.3	-1.0	-1.0	-1	1	-1		
16927	206	101.5-107.5	6. S 0 SW-SW 22 63 21 SL	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	50.9	951.0		5	-1	-1	
16928	206	107.5-108	0.5 S 0 SW-SW 22 63 21 SL	RL. SANDY BVL. TILL	101.5-108	0.0	13200.0	700.0	24.2	4.3	-1.0	-1.0	-1	5	-1		
13867	206	108-112.5	4.5 S 0 SW-SW 22 63 21 SL	BEDROCK	108-112.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
16919	1400	0.19	776	530	9200	25.90	73	120	500	180	0	60	-10	10	0.5	0	-10	1.9	5000	433	180	10	-10	16	-2	220.0	28.7	0	4.59
16923	47	0.14	525	350	12000	20.90	76	150	170	360	0	27	-10	10	-0.5	0	-10	1.2	1600	327	75	8	20	24	-2	120.0	11.8	1	13.10
16926	-30	0.34	653	420	6900	27.60	240	120	260	180	0	91	-29	22	0.5	0	20	2.0	88000	412	71	8	1700	-5	-2	120.0	13.7	0	0.70
16928	33	0.18	608	250	11000	19.90	170	270	220	160	0	16	-10	10	1.0	0	-10	-0.4	600	419	61	6	20	20	2	150.0	15.6	2	18.30

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT
16923	1.700	1.70	1100	170	37	290	-1	2	-0.5	4	0.3

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT
13843R	1	100	110	470	3.2	19	41	25	76	4	-1	2	-0.5	-1	11	-1	-1	-1	13	-1	2	35.9
16918	-1	99	110	650	3.9	25	46	28	77	5	-1	2	-0.5	-1	1	-1	-1	4	21	-1	2	22.9
16919	-1	97	100	600	3.7	22	42	27	74	5	-1	2	-0.5	-1	-1	-1	-1	18	-1	2	27.7	
16921	-1	98	110	580	3.7	22	42	25	71	5	-1	2	-0.5	-1	1	-1	-1	18	-1	2	49.0	
16923	2	95	110	570	3.6	22	46	28	72	3	-1	2	-0.5	1	-1	-1	-1	21	-1	2	27.0	
16924	2	150	130	660	4.2	25	52	33	100	9	-1	2	-0.5	1	1	-1	-1	22	-1	3	23.1	
16925	1	150	140	600	4.0	24	49	33	89	9	-1	2	-0.5	-1	1	-1	-1	21	-1	2	31.7	
16927	-1	58	95	290	2.2	17	31	26	33	5	-1	2	-0.5	-1	-1	-1	-1	10	-1	-1	53.5	

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13867	18	0.4	-1.0	340	-5.0	-10	22.0	-1.0	-50	48	-2	-2	-100	10.0	6	-0.5	-2	-50	59	4.40	34.0	-10	-5	1.00	-1.0	-20	2.0	-0.5	-200	-2	-0.5	-5	-200	-500

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SiO2	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
13867	157	21	123	1823	1.1	-10	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0	0	0

IDENTIFICATION

DNR Drill Hole Number OB-207

Drilling Completion Date 12/10/85

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NE $\frac{1}{4}$ -16-62N-21W

County St. Louis

Quadrangle Bear River 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1283 ft.

Total Depth 116 ft.

Elevation, Top of

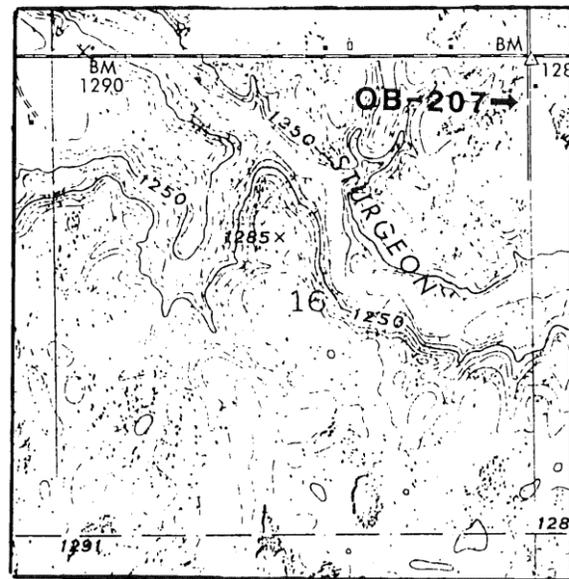
Precambrian Bedrock 1175 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection

Method Core: Sleeved & Boxed



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					CLAST			MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG		NO. MAG	CALC V.G. PPB	SIZE	%	S/U	SD	ST	CY	COLOR					
17028CP	23.4	0.8	22.6	140.4	75.9	64.5	56.6	7.9	0	NA	P	40	60	NA	NA	U	Y	Y	Y	GB	GB	TILL
-029	4.2	1.0	3.2	120.4	68.5	51.9	46.3	5.6	0	NA	P	40	60	NA	NA	U	Y	Y	Y	BN	BN	TILL
-030	7.7	0.8	6.9	222.5	51.4	171.1	146.9	24.2	0	NA	P	40	60	NA	NA	U	Y	Y	Y	BN	BN	TILL
-031	9.3	2.6	6.7	249.2	34.9	214.3	168.7	45.6	0	NA	P	30	70	NA	NA	U	Y	Y	Y	BN	BN	TILL
-032	6.7	2.8	3.9	196.0	34.0	162.0	113.6	48.4	0	NA	C	10	90	NA	NA	U	Y	Y	Y	BN	BN	TILL
17033	3.1	1.7	1.4	161.2	62.9	98.3	81.9	16.4	0	NA	C	10	90	TR	NA	U	Y	Y	Y	BN	BN	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-70.5	Des Moines Lobe Gl. Drift			
70.5-108	Rainy Lobe Gl. Drift	G	A,B,C	
108-116	Bedrock	G,H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Pyroxene Syenite/Syenitic Gneiss

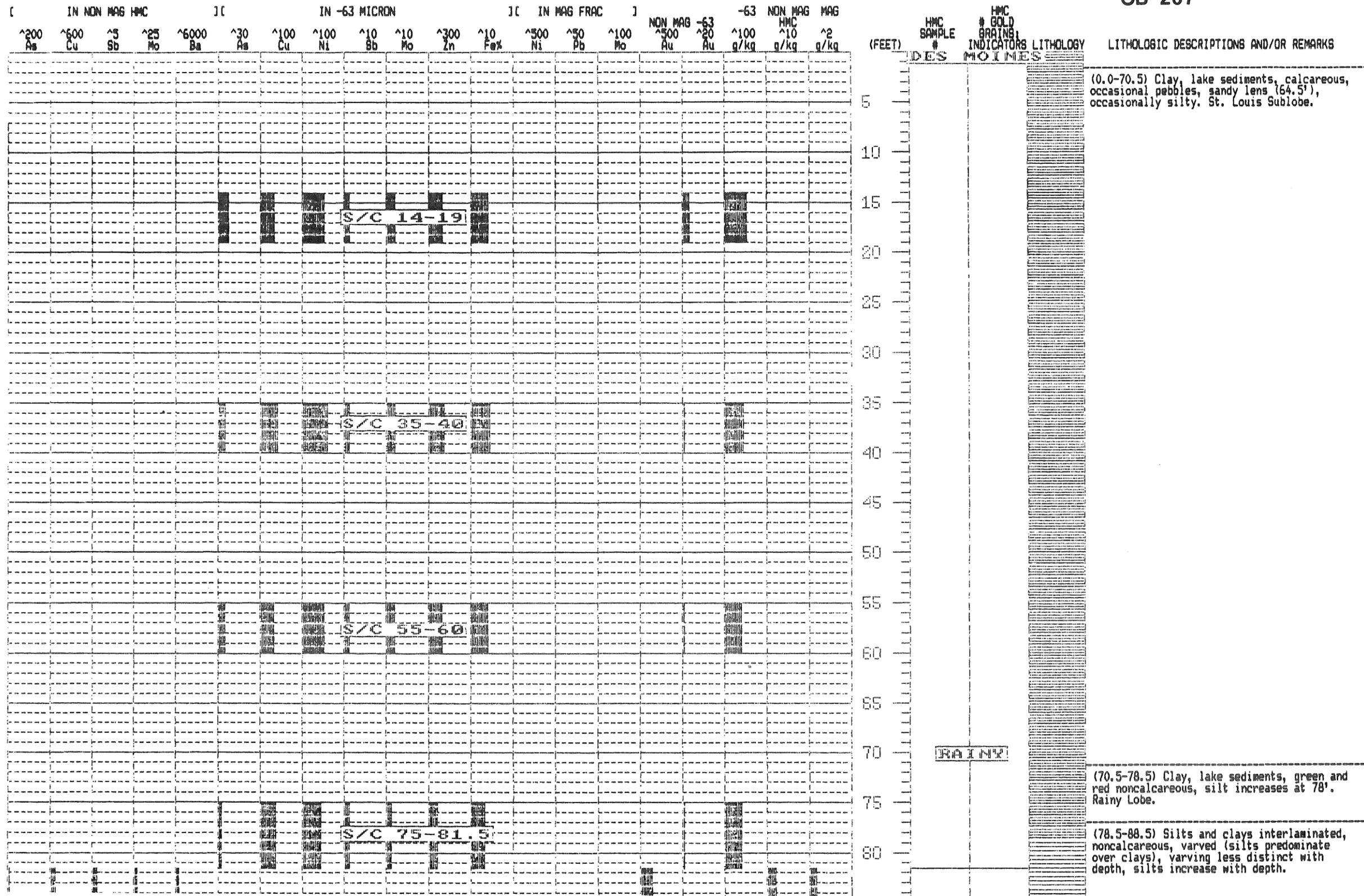
Thin Section Description: #13856 at 112.5 ft. Pyroxene syenite/syenitic gneiss. Estimated mode (volume %): Diopside, 20; Perthite, 74; Sphene, less than 1; Quartz, less than 1; Apatite, less than 1; Biotite, 3; Oxides, 1. Grass-green euhedral to subhedral foliated prismatic diopside shows weak pleochroism in cross sections. Perthite grains are subhedral to anhedral, tabular and foliated, up to 7 mm in length. Irregular masses and books of biotite are green to brown green in pleochroic color. Feldspar contains abundant fine needles of rutile. See Linden Pluton chapter in Centennial Volume for further discussion of rock type. (By T. Boerboom, MGS)

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED				IRREGULAR				DELICATE				NON MAG	CALC V.G. ASSAY PPB	REMARKS	
					T	P	T	P	T	P	T	P	T	P	TOTAL GMS					
17028	N																			
-029	N																			
-030	N																			
-031	N																			
-032	N																			
17033	N																			

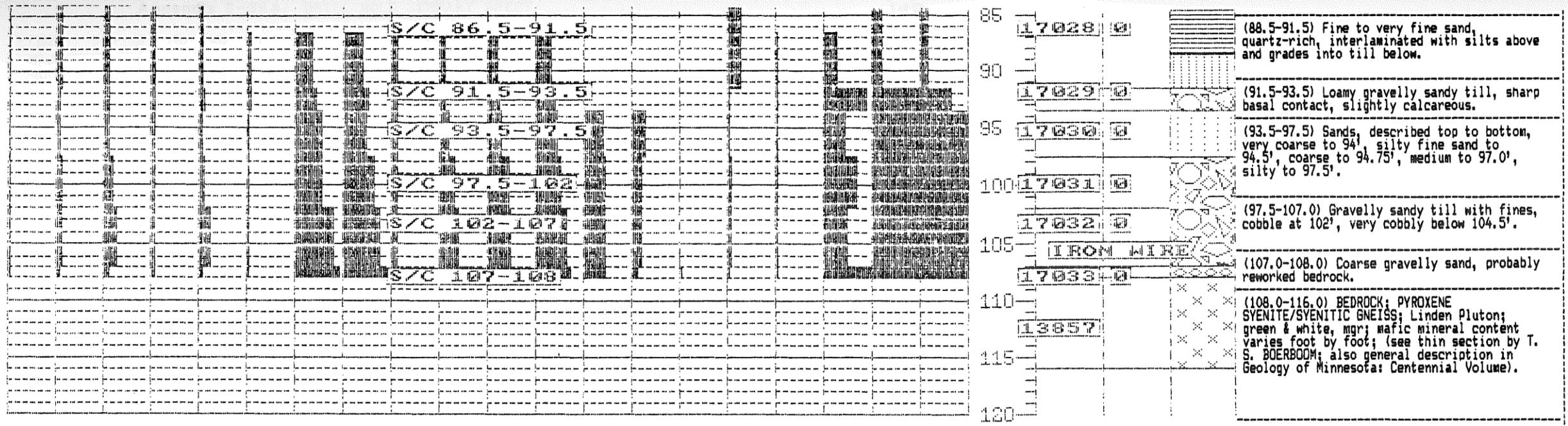


(0.0-70.5) Clay, lake sediments, calcareous, occasional pebbles, sandy lens (64.5'), occasionally silty. St. Louis Sublobe.

RAINY

(70.5-78.5) Clay, lake sediments, green and red noncalcareous, silt increases at 78'. Rainy Lobe.

(78.5-88.5) Silts and clays interlaminated, noncalcareous, varved (silts predominate over clays), varving less distinct with depth, silts increase with depth.



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FT6	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT % -63um	WT % +10	WT % SAND	REMARKS
17020	207	9-14	5. S D NE-NE 16 62 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
17021	207	14-19	5. S D NE-NE 16 62 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	19.6	380.0	5	-1	-1		
17022	207	30-35	5. S D NE-NE 16 62 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
17023	207	35-40	5. S D NE-NE 16 62 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	23.1	544.0	4	-1	-1		
17024	207	50-55	5. S D NE-NE 16 62 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
17025	207	55-60	5. S D NE-NE 16 62 21 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	23.0	599.0	4	-1	-1		
17026	207	75-81.5	6.5 S D NE-NE 16 62 21 SL	RL. CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	33.3	836.0	4	-1	-1		
17027	207	81.5-86.5	5. S D NE-NE 16 62 21 SL	RL. CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
17028	207	86.5-91.5	5. S D NE-NE 16 62 21 SL	RL. SILTY SAND	81.5-91.5	0.0	23400.0	800.0	56.6	7.9	35.2	1271.0	3	3	94		
17029	207	91.5-93.5	2. S D NE-NE 16 62 21 SL	RL. SANDY GVL. TILL	91.5-93.5	0.0	4200.0	1000.0	46.3	5.6	29.0	336.0	9	24	67		
17030	207	93.5-97.5	4. S D NE-NE 16 62 21 SL	RL. SILTY SAND	93.5-97.5	0.0	7700.0	800.0	146.9	24.2	23.3	555.0	4	10	86		
17031	207	97.5-102	4.5 S D NE-NE 16 62 21 SL	RL. SANDY GVL. TILL	97.5-102	0.0	9300.0	2600.0	168.7	45.6	34.5	497.0	7	28	65		
13844R	207	97.5-102	4.5 S D NE-NE 16 62 21 SL	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	26.9	451.0	6	-1	-1		
17032	207	102-107	5. S D NE-NE 16 62 21 SL	RL. SANDY GVL. TILL	102-107	0.0	6700.0	2800.0	113.6	48.4	27.3	580.0	5	42	53		
17033	207	107-108	2. S D NE-NE 16 62 21 SL	RL. GVL. SAND	107-109	0.0	3100.0	1700.0	81.9	16.4	21.7	229.0	9	55	36		
13856	207	108-113	5.0 S D NE-NE 16 62 21 SL	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
13857	207	113-116	3.0 S D NE-NE 16 62 21 SL	BEDROCK	108-116	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	

Appendix 8-34C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
17028	150	0.68	647	180	3800	9.80	51	110	74	170	0	9	-10	2	-0.5	0	-10	0.5	500	328	28	4	-10	23	-2	36.0	6.1	2	41.80
17029	-18	0.77	674	170	4000	10.50	46	100	50	170	0	-4	-10	2	-0.5	0	-10	0.5	600	320	25	5	-10	18	-2	30.0	2.9	11	33.80
17030	-20	0.72	756	190	3800	11.40	57	100	57	150	0	-4	-10	2	-0.5	0	-10	0.6	400	395	30	5	-10	19	-2	43.0	5.9	19	105.00
17031	-31	0.82	1000	280	3000	11.90	61	100	67	150	0	-7	-14	2	-0.5	0	-10	1.0	600	522	31	4	-10	15	-2	33.0	5.0	18	121.00
17032	-39	0.80	1510	250	2500	12.30	63	110	63	160	0	-8	36	2	-0.5	0	-10	1.4	1400	729	37	4	-10	15	-2	30.0	-4.0	17	82.80
17033	-30	0.86	881	220	2700	10.40	46	96	51	170	0	-6	-10	2	-0.5	0	-10	-0.6	500	449	18	4	-10	10	-2	19.0	0.9	26	60.80

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13844R	1	130	180	790	5.6	37	70	63	160	2	-1	4	-0.5	1	12	-1	-1	5	18	-1	1	59.6
17021	3	170	130	620	4.2	26	53	33	100	7	-1	2	-0.5	-1	2	-1	-1	1	24	-1	3	51.6
17023	1	190	140	730	4.6	30	59	38	110	5	-1	2	-0.5	-1	1	-1	-1	1	21	-1	3	42.5
17025	-1	180	130	590	4.2	24	50	33	100	5	-1	2	-0.5	-1	1	-1	-1	1	19	-1	3	38.4
17026	-1	100	130	400	3.1	20	43	35	64	2	-1	1	-0.5	1	1	-1	-1	1	16	-1	1	39.8
17028	-1	97	110	460	3.1	21	40	34	61	2	-1	1	-0.5	-1	1	-1	-1	1	15	-1	1	27.7
17029	-1	110	110	600	4.1	27	51	45	76	3	-1	1	-0.5	-1	2	-1	-1	1	16	-1	1	86.3
17030	1	120	130	690	4.5	30	49	56	82	1	-1	2	-0.5	-1	2	-1	-1	1	17	-1	1	42.0
17031	1	150	120	760	5.4	36	64	54	130	1	-1	3	-0.5	-1	2	-1	-1	6	18	-1	2	69.4
17032	1	170	140	890	6.6	43	75	79	150	1	-1	4	-0.5	1	2	-1	-1	2	20	1	2	47.1
17033	-1	160	180	1000	7.0	47	86	90	160	1	3	6	-0.5	1	2	-1	-1	2	21	-1	2	94.8

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

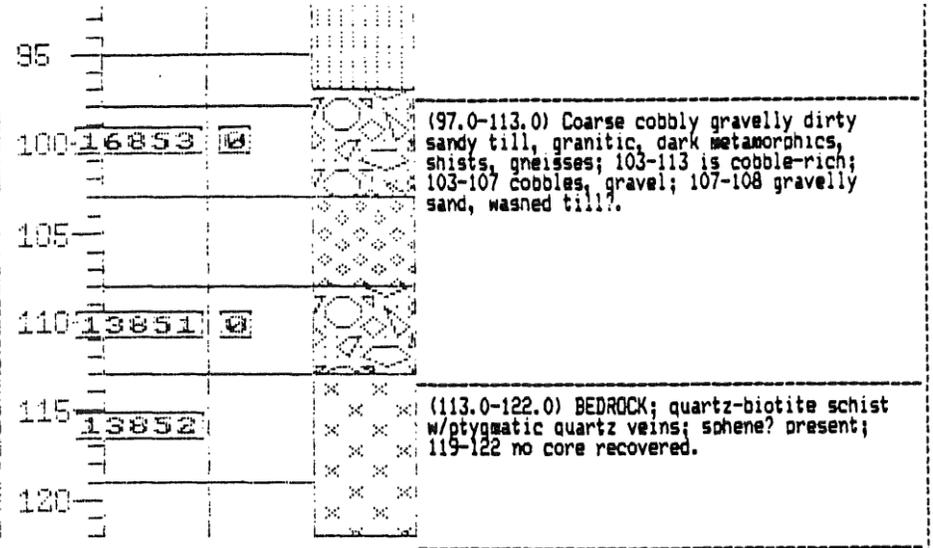
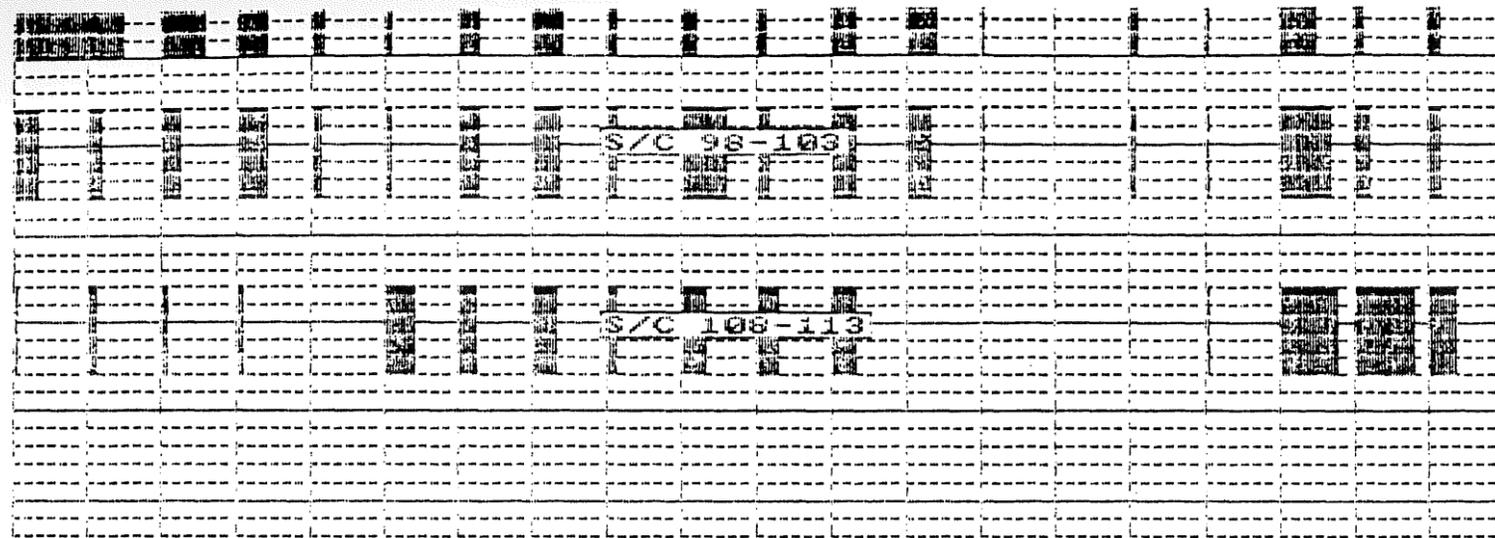
SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
17030	1.700	1.30	1400	200	37	150	-1	-1	-0.5	14	3.1
17031	1.700	1.10	1700	220	39	120	-1	-1	-0.5	10	4.9
17032	1.700	1.10	1700	230	47	110	-1	-1	-0.5	10	7.2
17033	1.700	0.92	1500	230	83	110	-1	2	-0.5	6	5.3

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13857	-10	-0.2	-1.3	4000	0.0	2	245.0	0.0	180	23	0	2	-50	5.2	133	0.0	1	94	140	0.00	0.0	-6	-3	2.30	-8.0	-10	0.0	3.2	-10	-2	-1.2	0	100	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13857	100	21	150	1000	3.0	0	14	3	0.72	28000	27000	5.04	53.7	0.00	150	59000	52000	3.1	-350	2600	7	-4	4000	-2.8	-2	1.70	55000



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63µM	WT (g) -63FEED	WT % -63µM	WT % +10	WT % SAND	REMARKS
16839	208	15-20	5. S O SE-SW 27 62 20 SL	RL. MED. TO C. SAND			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16840	208	20-25	5. S O SE-SW 27 62 20 SL	RL. MED. TO C. SAND	15-25		0.0	7800.0	1800.0	21.0	5.7	50.5	631.0	8	23	69	SI(-63)=15-25	
16840R	208	20-25	5.0 S O SE-SW 27 62 20 SL	RL. MED. TO C. SAND			0	0	0	0	0	0	0	0	0	0	0	
16841	208	25-30	5. S O SE-SW 27 62 20 SL	RL. GVL. SAND			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16842	208	30-35	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND	25-35		0.0	14800.0	0.0	39.6	15.9	21.6	1050.0	2	0	98	SI(-63)=25-35	
16842R	208	30-35	5.0 S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND			0	0	0	0	0	0	0	0	0	0	0	
16843	208	40-45	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16844	208	45-50	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND	40-50		0.0	17900.0	0.0	77.9	25.7	22.5	1246.0	2	0	98	SI(-63)=40-50	
16845	208	50-55	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16846	208	55-60	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND	50-60		0.0	20700.0	0.0	66.0	22.0	22.5	1369.0	2	0	98	SI(-63)=50-60	
16847	208	65-70	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16848	208	70-75	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND	65-75		0.0	22000.0	0.0	32.3	11.1	67.1	1577.0	4	0	96	SI(-63)=65-75	
16849	208	75-80	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16850	208	80-85	5. S O SE-SW 27 62 20 SL	RL. SILTY SAND	75-85		0.0	13100.0	0.0	22.5	6.5	51.0	1086.0	5	0	95	SI(-63)=75-85	
16851	208	85-90	5. S O SE-SW 27 62 20 SL	RL. SILT			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
16852	208	90-95	5. S O SE-SW 27 62 20 SL	RL. F. TO V.F. SAND	85-95		0.0	16600.0	0.0	15.9	5.0	57.7	1187.0	5	0	95	SI(-63)=85-95	
16853	208	98-103	5. S O SE-SW 27 62 20 SL	RL. SANDY GVL. TILL	98-103		0.0	3800.0	1900.0	6.2	1.3	19.8	293.0	7	50	43		
13845R	208	98-103	5. S O SE-SW 27 62 20 SL	RL. SANDY GVL. TILL			-1.0	-1.0	-1.0	-1.0	-1.0	23.6	320.0	7	-1	-1		
13851	208	108-113	5. S O SE-SW 27 62 20 SL	PRE-WISCONSIN TILL			-1.0	-1.0	-1.0	-1.0	-1.0	24.7	329.0	8	-1	-1		
17573	208	108-113	5.0 S O SE-SW 27 62 20 SL	PRE-WISCONSIN TILL	108-113		0.0	5200.0	1300.0	43.0	3.5	-1.0	-1.0	-1	25	-1		
13852	208	113-119	5.0 S O SE-SW 27 62 20 SL	BEDROCK			-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-35C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16840	19	0.32	594	570	10000	19.10	98	97	63	130	0	23	-11	8	-0.5	0	-10	1.5	900	253	39	6	-10	41	-2	120.0	6.7	3	16.70
16842	200	0.30	1450	860	12000	29.50	79	100	64	140	0	32	-38	11	-0.5	0	-10	1.4	-300	922	140	22	-10	61	-2	330.0	24.2	3	30.50
16844	120	0.22	991	500	11000	23.80	210	270	170	160	0	78	-10	10	-0.5	0	-10	1.4	500	646	110	13	-10	40	-2	240.0	20.9	4	59.60
16846	69	0.78	1020	480	8600	24.00	210	220	140	150	0	87	-14	11	-0.5	0	-10	0.5	500	663	100	13	-10	27	-2	250.0	23.7	3	50.60
16848	37	0.40	1000	490	8700	23.10	220	220	170	160	0	110	-19	11	-0.5	0	-10	0.8	900	607	130	9	-10	32	-2	270.0	20.9	1	17.20
16850	-5	0.29	1030	750	9000	27.00	220	230	170	160	0	76	22	10	-0.5	0	-10	1.0	700	556	110	9	10	30	-2	250.0	21.4	2	12.00
16852	52	0.23	1000	1100	8200	26.00	240	260	280	160	0	190	20	10	-0.5	0	-10	2.9	1000	610	140	-5	-10	44	2	270.0	17.8	1	12.40
16853	40	0.38	660	440	8500	23.50	190	180	120	150	0	61	-14	10	-0.5	0	-10	1.3	700	327	50	10	-10	25	-2	160.0	14.4	2	5.18
17573	-5	0.48	300	350	289	13.00	100	120	66	400	15	8	-10	-2	-0.1	-5	-200	0.4	-100	140	18	4	-12	7	0	55.0	6.2	8	32.21

-63µM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13845R	-1	92	130	400	3.1	18	38	31	55	2	-1	6	-0.5	-1	9	-1	-1	4	12	-1	-1	73.8
13851	-1	170	87	400	3.2	15	32	23	84	12	-1	3	-0.5	-1	6	-1	-1	-1	15	-1	2	75.1
16840	15	110	170	650	4.6	35	78	90	70	11	-1	6	-0.5	-1	1	-1	-1	2	14	-1	-1	80.0
16840R	0	0	160	0	0.0	0	0	0	80	8	-1	5	-0.5	1	1	-1	0	2	0	0	0	0.0
16842	-1	110	140	520	5.1	35	66	80	61	25	-1	4	-0.5	-1	1	-1	-1	1	21	-1	1	20.6
16842R	0	0	130	0	0.0	0	0	0	67	14	1	3	-0.5	-1	1	-1	0	1	0	0	0	0.0
16844	13	82	130	540	3.6	24	46	33	46	5	-1	2	-0.5	1	-1	-1	-1	-1	12	-1	-1	18.1
16846	8	89	140	630	4.1	28	51	37	53	5	-1	2	-0.5	-1	-1	-1	-1	-1	14	-1	1	16.4
16848	-1	63	91	450	2.7	18	34	23	36	9	-1	2	-0.5	-1	-1	-1	-1	-1	9	-1	-1	42.5
16850	1	60	90	400	2.5	17	31	21	37	3	-1	2	-0.5	1	-1	-1	-1	-1	11	-1	-1	47.0
16852	-1	73	100	440	3.0	20	41	28	42	3	-1	2	-0.5	-1	-1	-1	-1	-1	10	-1	-1	48.6
16853	1	76	120	450	3.1	19	36	29	51	3	-1	6	-0.5	-1	1	-1	-1	2	12	-1	-1	67.6

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16840	1.400	3.30	2100	140	31	310	-1	-1	0.5	24	0.7
16842	1.000	4.00	1900	130	25	360	-1	-1	0.5	30	1.1
16852	0.710	1.70	2400	210	36	370	-1	-1	-0.5	-1	0.3
16853	0.810	1.70	1200	160	100	290	1	-1	-0.5	-1	0.3

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13852	-8	-0.2	1.3	0	0.0	0	59.0	0.0	310	28	0	3	-50	4.8	33	0.0	0	0	0	0.00	0.0	-5	-2	1.90	0.0	0	0.0	7.4	0	-3	2.6	0	100	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CG2	NA	MG	AL	SIO2	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
13852	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-270	0	0	-3	540	-1.4	0	0.00	0

LEGEND

ST = Sample interval length (feet)
D = Drilling method for this hole:
S = Rotasonic
M = Mud Rotary
A = Air Rotary
G = Area name: L = Little Fork
O = Orr
FORTY = Forty acre location, i.e. SE 1/4-NW1/4
LEGAL DESC = Section-Township(N)-Range(W)
COUNTY: K = Koochiching
SL = St. Louis
DRIFT TYPE: DML = Des Moines Lobe
RL = Rainy Lobe
ASSAY FTG = Assayed Footage Composite,
for HMC or bedrock
GOLD GRAINS = # of gold grains counted by ODM in
Heavy Mineral Concentrate
WT (g) HMC FEED = Feed weight (grams) for heavy
mineral concentrate sample
WT (g) +10 FEED = Weight (grams) of +10 mesh in feed
weight
WT (g) NONMAG = Weight (grams) of nonmagnetic
heavy mineral conc from feed
WT (g) MAG = Weight (grams) of magnetic heavy
mineral conc from feed
WT (g) -63uM = Weight (grams) of -63 micron screen
fraction
WT (g) -63 FEED = Weight (grams) of feed for -63
micron screening
WT % -63uM = Wt% -63 micron fraction, dry screen
from feed
WT % +10 = Wt% +10 mesh fraction from HMC flowsheet
WT % SAND = Wt% by difference of -63um and +10 mesh

REMARKS = SI Sample Interval of -63um

WT g/kg = Weight of this fraction divided wt of
feed in kg x 1000

-1 (in Master File only) = Analysis not performed on
this sample

-2 (in Master File only) = Not applicable for this
sample

Sample Number Suffix (example 18908R)

R = Replicate split of same sample number

S = An analytical standard sample: Lab result

V = An analytical standard sample: certified
values

C = Recleaned the +10M fraction that was found
to contain silty-clay lumps

A or B = Two separate samples if extremely large
sample wt, i.e. mudpit

Appendix 8-36A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-209

Drilling Completion Date 12/11/85

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -SE $\frac{1}{4}$ -16-63N-20W

County St. Louis

Quadrangle Gheen N.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1346 ft.

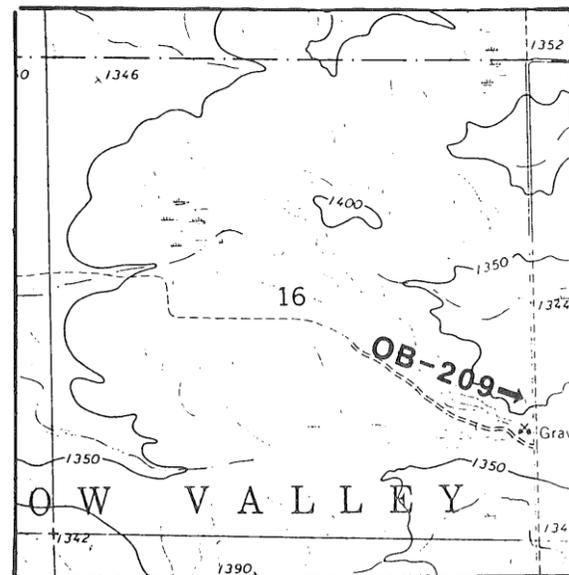
Total Depth 113 ft.

Elevation, Top of Precambrian Bedrock 1241 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-1	Organic Sediments			
1-39.5	Des Moines Lobe Gl. Drift			
39.5-105	Rainy Lobe Gl. Drift	G	A, B, C	B = Au, Co, Se
105-113	Bedrock	G, H	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Layered Hornblende-Biotite Schist/Gneiss at 107-111.5 ft., Biotite Schist (Metagraywacke) at 111.5-113 ft, with veins of Meta-granite or Quartz Syenite (Monzonite?)

Thin Section Description: (By T. Boerboom, MGS) #13861 at 107 ft. Layered hornblende-biotite schist/gneiss. Estimated mode overall rock (volume %): Hornblende, 5; Biotite (green-brown), 16; Plagioclase, 23; Orthoclase, 30; Quartz, 23; Apatite, 1; Sphene, 1; Epidote, 1; Opaques, Tr; Chlorite, Tr. Rock consists of two mineralogically and texturally distinct layer types. One layer is more hornblende-poor, biotite-rich, finer grained and equigranular than the other. The coarser grained portion contains grains (up to 2 mm) of perthitic or tartan-twinned orthoclase which are apparently remnants of a primary igneous rock, such as granodiorite or quartz monzonite. The fine-grained layer

apparently lacks orthoclase (would need stain), contains abundant biotite, and has an even grain size suggesting a protolith of pelitic sediment. Foliation is parallel to the mineralogical layering. Hornblende-rich portion is possibly similar to #13862.

#13862 at 109.5 ft. Meta-granite or quartz syenite (monzonite?). Estimated mode (volume %): Orthoclase, 50; Plagioclase, 14; Quartz, 10; Biotite (green), 17; Hornblende 2; Epidote, 5; Sphene, 1 or more; Apatite, 1 or less; Zircon, Tr. Relatively low in quartz, rich in K-feldspar. Heavily recrystallized rock contains abundant 1 to 3 mm K-feldspar crystals and feldspar-quartz porphyroclasts in a finer-grained, granoblastic, biotite-rich matrix. Individual tabular feldspar crystals are compositionally zoned. The volume of plagioclase is questionable, but seems low; staining would be necessary to determine. K-feldspar is grid-twinned and perthitic.

#13863 at 112.5 ft. Biotite schist (metagraywacke). Estimated mode (volume %): Biotite (green), 13; Chlorite, 12; Feldspar, 45; Quartz, 30; Epidote, Tr; Opaques, Tr; Zeolite, Tr. On a macroscopic scale the rock consists of alternating light and dark layers, 1 cm or less in thickness. On a microscopic scale, each of the light-colored layers has a zeolite veinlet at the center, and along each side of the veinlet the feldspar is heavily sericitized and the biotite converted to chlorite. Feldspar composition is questionable, but the refractive index (n less than quartz) and lack of twinning indicate that it is albite.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)
 OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

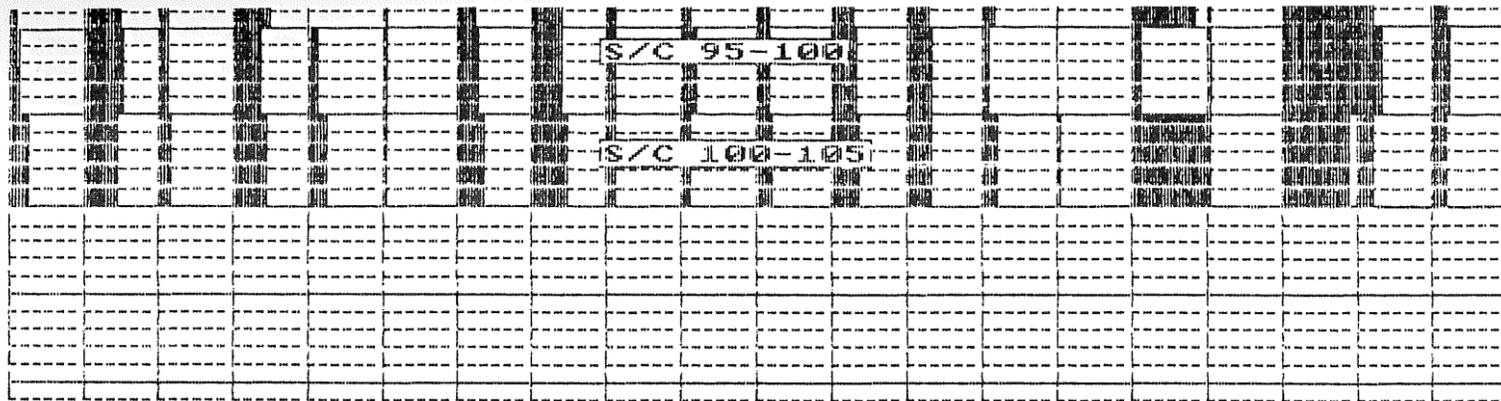
SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)		AU	DESCRIPTION								CLASS								
	TABLE SPLIT	+10 CHIPS	TABLE FEED	H. I. CONC				CLAST				MATRIX										
				CONC		NON	NO.	CALC	SIZE	%	S/U	SD	ST		CY	COLOR						
16878CP	14.3	0.6	13.7	177.8	153.9	23.9	18.1	5.8	0	NA	P	40	60	NA	NA	U	Y	Y	Y	B	B	TILL
-880CP	13.4	0.4	13.0	261.7	245.9	15.8	12.7	3.1	0	NA	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL
-882CP	12.6	4.3	8.3	148.9	125.9	23.0	19.2	3.8	1	151	P	60	40	NA	NA	U	Y	Y	Y	B	B	TILL
-883	5.4	2.4	3.0	79.4	67.8	11.6	9.6	2.0	0	NA	P	70	30	NA	NA	U	Y	Y	Y	B	B	TILL
-885CP	8.2	3.5	4.7	97.0	75.8	21.2	17.7	3.5	3	269	P	80	20	NA	NA	U	Y	Y	Y	B	B	TILL
-886	9.3	1.5	7.8	132.9	103.6	29.3	24.6	4.7	0	NA	P	80	20	NA	NA	U	Y	Y	Y	B	B	TILL
-887	6.5	3.4	3.1	101.3	87.4	13.9	11.2	2.7	0	NA	P	80	20	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS												NON MAG	CALC V.G. ASSAY PPB	REMARKS
				ABRADED		IRREGULAR		DELICATE		TOTAL		TOTAL		GMS				
				T	P	T	P	T	P	T	P	T	P					
16878	N	NO VISIBLE GOLD																
-880	N	NO VISIBLE GOLD																
-882	N	100 X 150	25 C	1														
TOTAL													1	19.2	151			
-885	Y	50 X 75	13 C	1														
		100 X 100	20 C	1														
		100 X 150	25 C	1														
TOTAL													3	17.7	269		EST. 10% PYRITE 200 FINE (50 MICRONS) MARCASITE (GLOBULAR)	
-886	N	NO VISIBLE GOLD																
-887	N	NO VISIBLE GOLD																

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95	16886	⊙	(95.0-97.0) Medium sand grading up to fine sand by 96'.
100	16887	⊙	(97.0-99.5) Gravelly fine sand. (99.5-102.0) Dirty sandy cobbles and gravel.
105			(102.0-105.0) Gravelly sandy loam till, apparently unwashed till.
110	13863		(105.0-113.0) BEDROCK; 107-111.5 layered Hornblende-Biotite schist/Gneiss; 111.5-113 biotite schist (meta graywacke); at least 3 veins of Metagranite or quartz syenite (monzonite?) such as at 109.5 (see 3 thin section descriptions by T. S. BOERBOOM).
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MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
16875	209	30-35	5. S 0 NE-SE 16 63 20 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	45.7	696.0	7	-1	-1		
16876	209	35-39.5	4.5 S 0 NE-SE 16 63 20 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	22.8	765.0	3	-1	-1		
16877	209	45-50	5. S 0 NE-SE 16 63 20 SL	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	61.1	533.0	11	-1	-1		
16878	209	50-55	5. S 0 NE-SE 16 63 20 SL	RL. MED. TO C. SAND	45-55	0.0	14300.0	600.0	18.1	5.8	-1.0	-1.0	-1	4	-1		
16879	209	55-60	5. S 0 NE-SE 16 63 20 SL	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	34.5	628.0	5	-1	-1		
16880	209	60-65	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND	55-65	0.0	13400.0	400.0	12.7	3.1	23.6	576.0	4	3	93		
16881	209	70-75	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	29.1	782.0	4	-1	-1		
16882	209	75-78	3. S 0 NE-SE 16 63 20 SL	RL. MED. TO C. SAND	70-78	1.0	12600.0	4300.0	19.2	3.8	-1.0	-1.0	-1	34	-1		
16883	209	80-85	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND	80-85	0.0	5400.0	2400.0	9.6	2.0	23.9	446.0	5	44	51		
16884	209	85-90	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	54.6	415.0	13	-1	-1		
13846R	209	85-90	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	28.7	422.0	7	-1	-1		
16885	209	90-95	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND	85-95	3.0	8200.0	3500.0	17.7	3.5	54.9	349.0	16	43	41		
16886	209	95-100	5. S 0 NE-SE 16 63 20 SL	RL. GVL. SAND	95-100	0.0	9300.0	1500.0	24.6	4.7	59.3	570.0	10	16	74		
16887	209	100-105	5. S 0 NE-SE 16 63 20 SL	RL. SANDY GVL. TILL	100-105	0.0	6500.0	3400.0	11.2	2.7	40.2	465.0	9	52	39		
16887R	209	100-105	5.0 S 0 NE-SE 16 63 20 X	RL. SANDY GVL. TILL		0	0	0	0	0	0	0	0	0	0		
13361	209	106-107	1.0 S 0 NE-SE 16 63 20 SL	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
13362	209	107-111.5	4.5 S 0 NE-SE 16 63 20 SL	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
13363	209	111.5-113	1.5 S 0 NE-SE 16 63 20 SL	BEDROCK	106-113	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-36C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZNE	AS	SE	MO	AG	AG2	SN	SB	BA	LA	AF	TA	W	PB	BI	TI	U	WT g/kg	ASSAY WEIGHT
16875	57	0.14	1310	400	10000	23.20	310	290	250	160	0	20	25	13	-0.5	0	-10	-0.8	3600	623	110	11	-10	65	2	300.0	27.0	1	13.50
16880	-40	0.13	1030	340	11000	22.50	320	290	260	160	0	15	-15	13	-0.5	0	-10	-0.9	2500	433	68	6	-10	52	-2	210.0	21.1	1	9.61
16882	200	0.09	907	380	10000	23.70	420	330	280	150	0	15	-14	11	-0.5	0	-10	-0.7	1400	406	64	8	10	75	2	220.0	18.0	2	14.20
16883	170	0.13	816	330	10000	25.40	460	330	300	130	0	27	-10	10	-0.5	0	-10	-0.6	900	340	48	9	60	73	2	190.0	16.6	2	7.56
16885	420	0.11	767	330	9700	25.80	500	320	290	140	0	16	-14	12	-0.5	0	-10	0.7	100	347	60	9	10	74	2	190.0	15.0	2	13.40
16886	69	0.15	756	330	11000	23.50	490	350	300	150	0	22	39	9	-0.5	0	-10	-0.6	500	364	68	8	30	76	2	180.0	15.4	3	18.20
16887	120000	0.13	1050	350	9700	24.20	460	300	260	130	0	44	-11	11	-0.5	0	-10	-0.9	-1400	430	57	12	10	73	2	210.0	28.6	2	8.19

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16885	0.580	1.70	1600	150	41	320	-1	-1	-0.5	8	0.4
16886	0.550	1.70	1900	170	34	350	-1	-1	-0.5	4	0.5
16887	0.650	1.70	1300	150	44	300	-1	2	-0.5	10	0.4

-63uM ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13846R	-1	77	110	430	2.7	17	36	29	43	1	-1	1	-0.5	-1	9	-1	-1	-1	14	-1	-1	68.0
16875	-1	99	100	540	3.2	20	38	24	70	3	-1	3	-0.5	-1	1	-1	-1	-1	17	-1	2	65.7
16876	3	120	120	580	3.9	24	50	32	96	4	1	4	-0.5	1	1	-1	-1	-1	22	-1	2	29.8
16877	-1	58	97	360	2.3	17	31	21	45	2	1	2	-0.5	1	-1	-1	-1	-1	20	-1	1	114.6
16879	-1	61	110	390	2.7	19	39	28	50	2	-1	1	-0.5	1	1	-1	-1	-1	15	-1	1	54.9
16880	1	67	110	400	2.8	19	38	29	52	2	-1	1	-0.5	1	1	-1	-1	-1	19	-1	1	41.0
16881	-1	59	110	420	2.7	19	39	26	48	2	-1	1	-0.5	1	1	-1	-1	-1	20	-1	2	37.2
16883	1	71	120	420	3.0	23	43	30	55	-1	-1	1	-0.5	1	-1	-1	-1	1	18	-1	-1	53.6
16884	-1	71	120	510	3.0	21	39	26	46	1	-1	-1	-0.5	-1	1	-1	-1	-1	18	-1	1	131.6
16885	-1	67	120	480	2.9	22	39	25	48	1	-1	1	-0.5	-1	1	-1	-1	-1	16	-1	-1	157.3
16886	-1	74	120	530	3.1	24	39	26	44	1	-1	2	-0.5	1	1	-1	-1	3	18	-1	1	104.0
16887	-1	82	130	550	3.5	26	46	37	62	1	-1	1	-0.5	1	-1	-1	-1	9	20	-1	1	86.5
16887R	0	0	100	0	0.0	0	0	0	60	2	-1	2	-0.5	-1	1	-1	0	9	0	0	0	0.0

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU	SB	AS	BA	BR	CD	CE	CS	CR	CO	CU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13863	-8	-0.2	-1.2	1300	0.0	1	82.0	0.0	210	17	0	3	-50	4.1	47	0.0	2	52	100	0.00	0.0	-5	-2	2.90	-8.0	-10	0.0	7.4	-10	-2	2.0	0	100	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2	NA	MG	AL	SI02	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI	FE
13863	46	24	94	640	2.0	0	46	3	0.02	33000	16000	5.21	62.8	0.00	-50	21000	23000	3.5	-300	670	7	-3	1200	-2.6	-2	1.08	38000

Appendix 8-37A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-210

Drilling Completion Date 12/8/85

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SE $\frac{1}{4}$ -25-64N-21W

County St. Louis

Quadrangle Gheen N.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1367 ft.

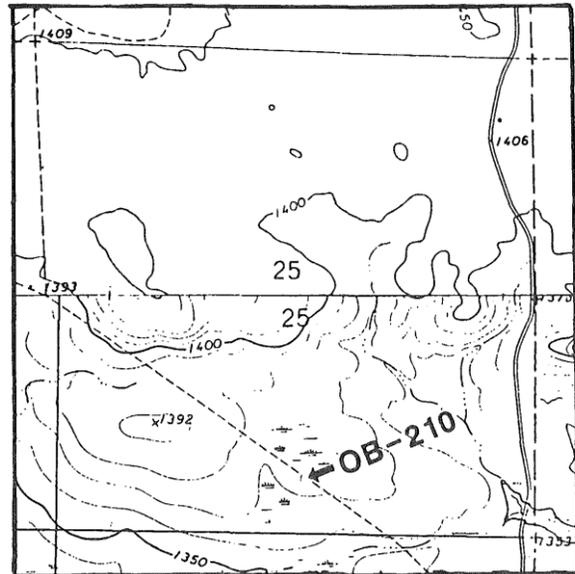
Total Depth 54 ft.

Elevation, Top of Precambrian Bedrock 1318 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-21.5	Des Moines Lobe Gl. Drift	G	A,B,C	
21.5-49	Rainy Lobe Gl. Drift	G	A,B,C	C = Cu,Ni
49-54	Bedrock	G,H	I	

A = -63 microns fraction
B = Heavy Minerals, Nonmag
C = Heavy Minerals, Mag
D = Sluice Box Composite
E = Skeletonized Grab Sample in Core Box
F = Interval Cuttings in Bucket
G = Core
H = Thin Section
I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: (Quartz) Monzonite or Monzodiorite (Streckeisen classification)

Thin Section Description: #13854 at 53 ft. (Quartz) monzonite or monzodiorite (Streckeisen classification). Estimated mode (volume %): Quartz, 6; Chlorite, 20; Plagioclase, 65; Orthoclase, 9; Pyrite, Tr; Apatite, Tr. Quartz-poor rock having plagioclase to alkali feldspar ratio of about 85:15. Primary mafic minerals are completely altered to chlorite, which is well aligned and wraps around primary feldspar grains. Plagioclase is moderately to heavily sericitized; microcline typically shows tartan twinning and is fresh. Veins of quartz and microcline cut rock parallel to foliation.

#13855 at 48 ft. pebble. Carbonaceous garnet-biotite schist (metapelite). Estimated mode (volume %): Quartz, 30; Feldspar (oligoclase), 50; Biotite, 18; Garnet (almandine), 1; Graphitic material, less than 1; Apatite, Tr. Very clean and fresh rock consisting of 0.1 to 0.5 mm polygonal quartz and feldspar (stain would be necessary to distinguish); stubby, well aligned biotite laths 0.5 mm long; garnets less than 1 mm across with sieve-textured cores and solid rims, pale yellow-orange in color. Carbonaceous material lines fractures, parallel to and at about 40° to foliation. (By T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION						CLASS								
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC		NO.		CLAST		MATRIX												
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG	NO. MAG	CALC V.G.	PPB	SIZE	%	S/U	SD	ST	CY	COLOR					
												V/S	GR	LS	OT							
17013CP	20.3	0.1	20.2	64.3	60.6	3.7	2.8	0.9	0	NA	P	30	70	TR	3	S	F	Y	Y	B	B	SAND
-017CP	24.0	5.8	18.2	226.0	137.5	88.5	82.7	5.8	2	27	P	80	20	NA	NA	U	Y	Y	Y	GB	GB	TILL
-018	8.1	1.6	6.5	104.6	62.4	42.2	39.2	3.0	0	NA	P	80	20	NA	NA	U	Y	Y	Y	GB	GB	TILL
-019	6.4	2.4	4.0	87.5	58.1	29.4	27.6	1.8	0	NA	P	80	20	NA	NA	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABGRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY	REMARKS		
					T	P	T	P	T	P				TOTAL GMS	PPB
17013	N														
-017	Y		25 X 50	8 C							1		EST. 20% PYRITE		
			100 X 125	22 C							1				
											TOTAL	2	82.7	27	
-018	Y												EST. 25% PYRITE		
-019	Y												EST. 25% PYRITE		

MASTER FILE

Appendix 8-37C.

SAMPLE NUMBER	DR NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT % -63um	WT % +10	WT % SAND	REMARKS
17011	210	5-10	5. S 0 SW-SE 25 64 21	SL	DML. CLAYEY TILL		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
17012	210	14-18	4. S 0 SW-SE 25 64 21	SL	DML CLAY; GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
17013	210	18-23	5. S 0 SW-SE 25 64 21	SL	DML. F. TO V.F. SAND 14-23		0.0	20300.0	100.0	2.8	0.9	45.8	559.0		7	0	93	
17014	210	23-25	2. S 0 SW-SE 25 64 21	SL	RL. CLAY; GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	26.2	377.0		7	-1	-1	
17015	210	25-30	5. S 0 SW-SE 25 64 21	SL	RL. SILTY SAND		-1.0	-1.0	-1.0	-1.0	-1.0	23.5	908.0		3	-1	-1	
17016	210	30-35	5. S 0 SW-SE 25 64 21	SL	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	63.5	945.0		7	-1	-1	
13847R	210	30-35	5. S 0 SW-SE 25 64 21	SL	RL. GVL. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	50.2	1200.0		4	-1	-1	
17017	210	35-40	5. S 0 SW-SE 25 64 21	SL	RL. F. TO V.F. SAND 30-40		2.0	24000.0	5800.0	82.7	5.8	28.9	542.0		5	24	71	
17018	210	40-45	3. S 0 SW-SE 25 64 21	SL	RL. GVL. SAND 40-45		0.0	8100.0	1600.0	39.2	3.0	29.4	529.0		6	20	74	
17019	210	45-48	3. S 0 SW-SE 25 64 21	SL	RL. GVL. SAND 45-48		0.0	6400.0	2400.0	27.6	1.8	34.7	413.0		8	38	54	
13855	210	48	-2.0 S 0 SW-SE 25 64 21	SL	PEBBLES/BOULDERS		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1	-1	-1	SAMP. BOULDER AT 48
13853	210	49-52	3.0 S 0 SW-SE 25 64 21	SL	BEDROCK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1	-1	-1	
13854	210	52-54	2.0 S 0 SW-SE 25 64 21	SL	BEDROCK 49-54		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0		-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AGE	SN	SB	BA	LA	RF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
17013	23	0.32	1250	370	9100	15.30	38	79	50	150	0	11	80	9	-0.5	0	-10	2.4	700	777	200	11	20	440	-2	230.0	33.7	0	3.38
17017	-33	0.29	431	270	15000	27.50	260	320	260	110	0	-8	-10	5	1.0	0	-10	-0.7	400	285	29	4	-10	35	-2	100.0	15.4	3	60.80
17018	51	0.20	582	290	14000	31.50	330	370	260	130	0	17	14	5	-0.5	0	-10	-0.7	-300	359	39	6	-10	25	-2	140.0	15.7	5	29.10
17019	-21	0.11	420	240	17000	24.60	240	340	260	150	0	19	-10	4	0.5	0	-10	-0.5	500	252	31	3	-10	33	-2	55.0	12.1	4	20.40

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13847R	-1	62	110	320	2.1	15	38	24	39	2	-1	2	-0.5	1	-1	-1	-1	1	13	-1	-1	41.8
17013	1	73	87	550	2.8	18	31	19	50	2	-1	3	-0.5	-1	2	-1	-1	17	-1	2	69.5	
17014	-1	72	98	410	2.7	18	35	22	54	3	-1	2	-0.5	-1	2	-1	-1	21	-1	2	69.5	
17015	-1	58	110	390	2.4	18	40	27	42	2	-1	2	-0.5	-1	1	-1	-1	18	-1	-1	25.9	
17016	-1	52	120	400	2.3	20	43	28	42	3	-1	2	-0.5	-1	1	-1	-1	20	-1	-1	67.2	
17017	-1	44	110	430	2.4	22	42	29	43	2	-1	2	-0.5	-1	-1	-1	-1	17	-1	-1	45.0	
17018	-1	45	110	400	2.2	20	40	27	38	1	-1	1	-0.5	-1	-1	-1	-1	23	-1	1	55.6	
17019	-1	56	120	400	2.3	21	44	29	32	1	-1	1	-0.5	-1	-1	-1	-1	16	-1	-1	84.0	

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGB %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
17017	1.100	1.70	1500	370	240	200	-1	-1	-0.5	2	0.2
17019	1.500	1.70	1600	450	300	150	1	-1	-0.5	2	0.3

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LJ	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13854	-9	-0.2	1.6	0	0.0	0	214.0	0.0	210	25	0	14	-50	4.5	102	0.0	0	0	0	0.00	0.0	-5	-2	1.70	0.0	0	0.0	5.8	0	-2	1.7	0	100	0
13855	-6	-0.1	-0.9	0	0.0	0	46.0	0.0	260	18	0	2	-50	3.5	29	0.0	0	0	0	0.00	0.0	-5	-2	2.00	0.0	0	0.0	4.0	0	-3	2.0	0	200	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SIO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13854	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-330	0	0	-5	2300	-2.5	0	0.00	0
13855	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-260	0	0	-3	380	-1.9	0	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-211

Drilling Completion Date 12/7/85

LOCATION (see map at right)

S-T-R NW¼-SE¼-22-64N-20W

County St. Louis

Quadrangle Orr S.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1316 ft.

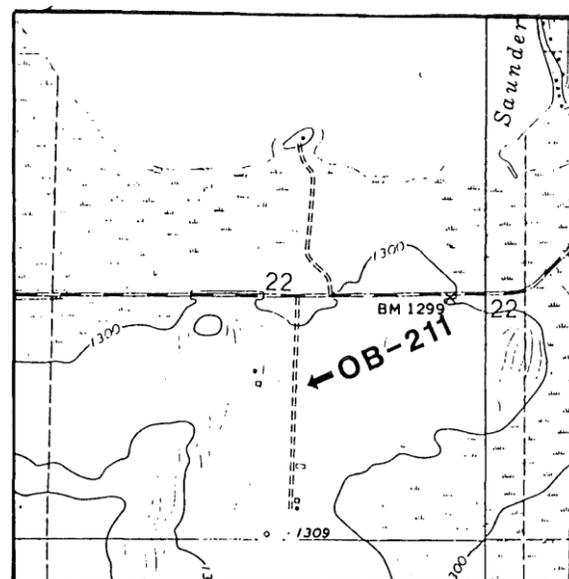
Total Depth 65 ft.

Elevation, Top of Precambrian Bedrock 1260 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-1	Organic Sediments			
1-25	Des Moines Lobe Gl. Drift	G	A,B,C	
25-56	Rainy Lobe Gl. Drift	G	A,B,C	A = Zn,Mo B = Co,Ni,Cu,Bi
56-65	Bedrock	G,H	I	C = Mo

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Amphibole Garnet Biotite Schist at 61.5 ft. and Garnet Sillimanite Biotite Schist

Thin Section Description: #13868 at 61.5 ft. Amphibole-garnet-biotite schist. Estimated mode (volume %): Garnet, 3; Hornblende and actinolite, 1; Biotite, 4; Chlorite, 1; Feldspar (dominantly sericite), 44; Quartz, 44; Opaques (pyrite + Fe-oxides), 1; Epidote (pseudomorphs), 1; Sillimanite, 1; Apatite, Tr; Tourmaline, Tr; Sphene (altered to leucoxene), Tr; Zircon, Tr. Assemblage has undergone late retrograde (very low temperature) metamorphism. Feldspar (presumably plagioclase) is altered to sericite (+ kaolinite?), and biotite is altered to chlorite. Very fine, fibrous sillimanite is present within altered feldspar. Amphiboles consist of hornblende and actinolite. Garnets are pale orange to pink, irregular in shape, and contain abundant quartz inclusions (sieve-textured). Epidote(?) is altered to clay minerals plus chlorite.

#13869 at 65 ft. Garnet-sillimanite-biotite schist. Estimated mode (volume %): Plagioclase (albite-oligoclase), 40; Quartz, 27; Biotite, 22; Garnet, 1; Sillimanite, 8; Chlorite, 1; Apatite, Tr; Zircon, Tr; Tourmaline (schorl), Tr; Opaques (pyrite), 1. Garnets are very pale pinkish-yellow, subhedral, sieve-textured. Fibrous masses of sillimanite are associated with red-brown biotite which is locally retrograded to chlorite. The plagioclase is fresh and twinned, in contrast to the heavily sericitized plagioclase in the sample from 61.5' depth. The biotite foliation wraps gently around the garnets, but no well-developed pressure shadows or snowballs garnets are present. (By T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					CLAST			MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC TOTAL	NON MAG		NO. MAG	NO. V.G.	CALC PPB	SIZE	%	S/U	SD	ST	CY	COLOR		SD	CY	
16868	12.4	0.0	12.4	110.2	110.0	0.2	0.1	0.1	0	NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND&CLAY
-871	6.1	1.9	4.2	149.1	132.4	16.7	12.6	4.1	0	NA	C	30	70	NA	NA	U	Y	Y	Y	B	BY	TILL
-872	12.8	5.5	7.3	204.1	180.0	24.1	14.3	9.8	1	345	P,C	20	80	NA	NA	U	Y	Y	Y	B	B	TILL
-873	7.9	4.0	3.9	181.9	156.3	25.6	15.3	10.3	0	NA	P	30	70	NA	NA	U	Y	Y	Y	B	B	TILL
-874	17.1	4.6	12.5	175.9	154.6	21.3	15.8	5.5	0	NA	P,C	75	25	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY	REMARKS	
					T	P	T	P	T	P				TOTAL GMS
16868	N													
-871	N													
-872	N		150 X 150	29 C	1						1			
TOTAL											1	14.3	345	
-873	N													
-874	N													

(FEET)	HMC SAMPLE #	HMC # GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS	[IN MAG FRAC]																					
					IN NON MAG HMC					IN -63 MICRON					IN MAG FRAC											
					^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 FeX	^500 Ni	^50 Pb	^100 Mo	NON MAG ^500 Au	-63 ^20 Au	-63 ^100 g/kg	NON MAG HMC ^10 g/kg	MAG ^2 g/kg		
0-5				(0.0-1.0) Organic sediments.																						
5-12				(1.0-12.0) Clay, lake sediments, gritty, few sand grains and carbonate pebbles.																						
12-13.5				(12.0-13.5) Loamy clay till (?).																						
13.5-18.5				(13.5-18.5) Clay, thin bedded, with a few thin silt laminae, silt content increases with depth.																						
18.5-25.0	16868	10		(18.5-25.0) SILT; UNOXIDIZED; to clayey silt; clay increases from 20.5' to 22', silt increases 23' to 25'. Base of St. Louis Sublobe.																						
25-30.0				(25.0-30.0) Very fine sand. Top of Rainy Lobe.																						
30-32.5				(30.0-32.5) SILTY CLAY; UNOXIDIZED; loamy; some clay, lower 6 inches is silt loam.																						
32.5-34.5				(32.5-34.5) Very fine sand, quick, laminated with l																						
34.5-36.0	16871	10		(34.5-36.0) SANDY SILT; UNOXIDIZED; bedded, loamy and clay.																						
36.0-56.0	16872	1		(36.0-56.0) GRAVELLY, SANDY TILL; UNOXIDIZED; 36-46 loamy, some cobs, noncalc; 40-41 dirty & lighter color; 46-52 more cobbly; 52-54 more fines, hard compact; 54-54.5 silt and till, noncalc; 54.5-56 cobbly & loamy.																						
56.0-65.0	13868			(56.0-65.0) BEDROCK; amphibole-garnet-biotite schist at 61.5; garnet-sillimanite-biotite schist at 65; w/tr-1% dissem sulfides; mineralogy varies on few cm scale (see 2 thin section descriptions by T. S. BOERBOOM).																						

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) FMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
16867	211	15-20	5. S D NW-SE 22 64 20 SL	DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
16868	211	20-25	5. S D NW-SE 22 64 20 SL	DML SILT	20-25	0.0	12400.0	0.0	0.1	0.1	57.4	813.0	7	0	93		
16869	211	25-30	5. S D NW-SE 22 64 20 SL	RL. F. TO V.F. SAND		-1.0	-1.0	-1.0	-1.0	-1.0	52.4	336.0	16	-1	-1		
16870	211	30-35	5. S D NW-SE 22 64 20 SL	RL. CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
16871	211	36-40	4. S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL	36-40	0.0	6160.0	1900.0	12.5	4.1	33.5	404.0	8	31	61		
16872	211	40-45	5. S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL	40-45	1.0	12800.0	5500.0	14.3	9.8	44.3	759.0	6	43	51		
16873	211	45-50	5. S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL	45-50	0.0	7900.0	4000.0	15.3	10.3	11.1	421.0	3	51	46		
16873R	211	45-50	5.0 S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL		0	0	0	0	0	0	0	0	0	0	0	
16874	211	50-55	5. S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL	50-55	0.0	17100.0	4600.0	15.8	5.5	30.7	1151.0	3	27	70		
16874R	211	50-55	5.0 S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL		0	0	0	0	0	0	0	0	0	0	0	
13848R	211	50-55	5. S D NW-SE 22 64 20 SL	RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	27.6	890.0	3	-1	-1		
13868	211	56-65	9.0 S D NW-SE 22 64 20 SL	BEDROCK	56-65	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-38C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16868	-11	0.07	602	120	0	7.30	81	0	0	0	0	12	-10	0	0.0	0	0	-0.3	400	372	41	-3	0	0	0	120.0	14.3	0	0.17
16871	-40	0.15	1130	280	6600	30.30	530	340	320	130	0	15	-19	14	-0.5	0	-10	-0.8	1700	420	80	10	-10	56	6	130.0	21.5	2	9.22
16872	400	0.12	1260	230	8900	25.70	620	410	400	140	0	23	-11	25	-0.5	0	-10	0.9	3400	542	85	12	160	48	6	190.0	28.1	1	10.50
16873	10	0.16	1070	200	8600	29.60	600	360	360	140	0	29	-18	12	-0.5	0	-10	0.9	5200	461	69	8	280	86	6	180.0	21.1	2	11.30
16874	18	0.12	1010	240	7700	27.10	610	340	380	130	0	25	-15	29	-0.5	0	-10	0.8	2000	440	68	8	240	49	4	140.0	17.2	1	11.80

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16872	0.450	1.10	530	130	88	300	-1	13	-0.5	16	0.8
16873	0.360	1.00	520	120	66	220	-1	7	-0.5	16	1.3
16874	0.480	1.70	560	100	65	220	-1	13	-0.5	12	0.3

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13848R	-1	120	210	530	4.4	29	74	80	400	5	-1	14	-0.5	1	2	-1	-1	5	10	-1	-1	31.0
16868	-1	66	93	350	2.3	15	30	19	48	2	2	3	-0.5	-1	1	-1	-1	-1	15	-1	-1	70.6
16869	1	67	100	380	2.5	16	32	21	46	1	-1	2	-0.5	-1	1	-1	-1	-1	14	-1	-1	156.0
16871	2	76	98	410	2.7	20	36	25	69	-1	-1	3	-0.5	-1	1	-1	-1	1	18	-1	-1	82.9
16872	1	68	99	430	2.9	21	38	32	100	1	-1	3	-0.5	-1	1	-1	-1	3	20	-1	1	58.4
16873	-2	92	150	490	3.8	28	61	79	580	4	-1	10	-0.5	-1	2	-1	-1	8	21	-1	1	26.4
16873R	0	0	120	0	0.0	0	0	0	540	4	-1	9	-0.5	-1	2	-1	0	8	0	0	0	0.0
16874	1	110	190	500	4.1	28	67	64	320	4	1	12	-0.5	1	2	-1	-1	7	14	-1	-1	26.7
16874R	0	0	150	0	0.0	0	0	0	320	4	1	10	-0.5	-1	2	-1	0	5	0	0	0	0.0

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13868	-7	-0.2	-1.0	0	0.0	0	66.0	0.0	230	18	0	2	-50	3.5	30	0.0	0	0	0	0.00	0.0	-5	-9	2.30	0.0	0	0.0	4.3	0	-3	1.8	0	-100	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13868	0	0	0	0	0.0	0	0	0	0.00	0	0	0.00	0.0	0.00	0	0	0	0.0	-270	0	0	5	790	-2.0	0	0.00	0

Appendix 8-39A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-212

Drilling Completion Date 12/9/85

LOCATION (see map at right)

S-T-R SE $\frac{1}{2}$ -SE $\frac{1}{2}$ -36-63N-21W

County St. Louis

Quadrangle Gheen N.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1291 ft.

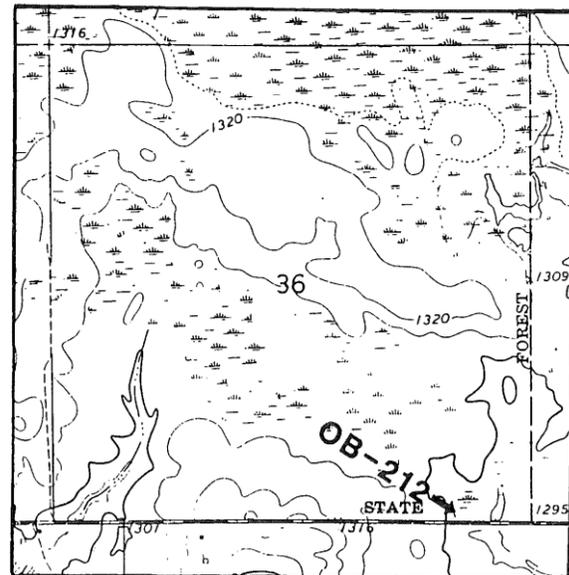
Total Depth 116 ft.

Elevation, Top of Precambrian Bedrock 1184 ft.

Drilling Method Rotasonic

Sample Diameter 3.5 inch

Sample Collection Method Core: Sleeved & Boxed



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-1	Organic Sediments			
1-73.5	Des Moines Lobe Gl. Drift			
73.5-107	Rainy Lobe Gl. Drift	G	A,B,C	A = Au, Mo B = Cu, Se
107-116	Bedrock	G,H	I	C = Mo

A = -63 microns fraction
B = Heavy Minerals, Nonmag
C = Heavy Minerals, Mag
D = Sluice Box Composite
E = Skeletonized Grab Sample in Core Box
F = Interval Cuttings in Bucket
G = Core
H = Thin Section
I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Syenite

Thin Section Description: #13864 at 109.5 ft. Syenite. Estimated mode (volume %): Microcline, 76; Plagioclase, 20; Phyllosilicate alteration assemblage after hornblende, 3; Leucoxene pseudomorphs after sphene, 1; Quartz, Tr(?). Dominantly red-stained (hematite dust) anhedral gridiron-twinned microcline up to 2.5 cm across. Granular, clear and colorless plagioclase is present between microcline grains. Plagioclase tentatively identified as andesine, possibly some albite. No quartz positively identified. Many grains look like quartz, but upon very close inspection are seen to be plagioclase feldspar. Sphene is pseudomorphed by leucoxene. Radial groups of fine-grained phyllosilicate (stilpnomelane or biotite) plus chlorite and montmorillonite occur as pseudomorphs of primary hornblende.

#13865 at 111 ft. Syenite. For mineral descriptions, see #13864. Mode also similar to #13864, except that plagioclase content in this sample may be slightly higher. The plagioclase is more definable as albite than in #13864. A (primary?) foliation is present in this sample which is defined by the preferred orientations of tabular microcline crystals. (By T. Boerboom, MGS)

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					CLAST		MATRIX											
				TABLE CONC	M.I. LIGHTS	CONC	NON MAG		NO. MAG	CALC V.G.	NO. PPB	SIZE	%	S/U	SD	ST	CY	COLOR				
16833	11.7	4.5	7.2	139.6	100.3	39.3	32.0	7.3	0	NA	P/C	25	75	NA	NA	U	Y	Y	Y	B	B	TILL
-834	5.2	2.3	2.9	63.5	37.9	25.6	22.7	2.9	0	NA	P/C	10	90	NA	NA	U	Y	Y	Y	OC	OC	TILL
-835	4.4	2.3	2.1	82.9	65.3	17.6	15.6	2.0	0	NA	P/C	10	90	NA	NA	U	Y	Y	Y	OC	OC	TILL
-836	4.9	1.0	3.9	80.0	50.4	29.6	25.3	4.3	0	NA	P	15	85	NA	NA	U	Y	Y	Y	OC	OC	TILL
-837	9.0	3.4	5.6	91.8	66.0	25.8	22.5	3.3	0	NA	P	10	90	NA	NA	U	Y	Y	Y	OC	OC	TILL
-838	12.3	3.8	8.5	159.3	149.5	9.8	7.7	2.1	0	NA	B/P	0	100	NA	NA	U	Y	Y	Y	OC	OC	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS		
				ABRADED		IRREGULAR		DELICATE		TOTAL		GMS						
				T	P	T	P	T	P	T	P	T	P	T	P	T	P	
16833	N																	
-834	N																	
-835	N																	
-836	N																	
-837	N																	
-838	N																	

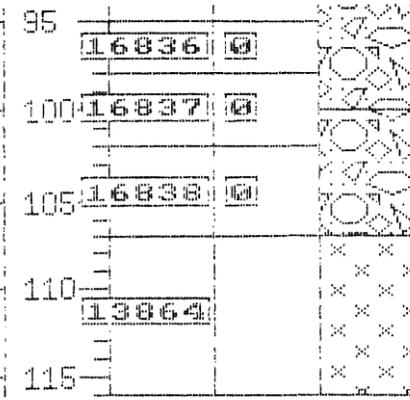
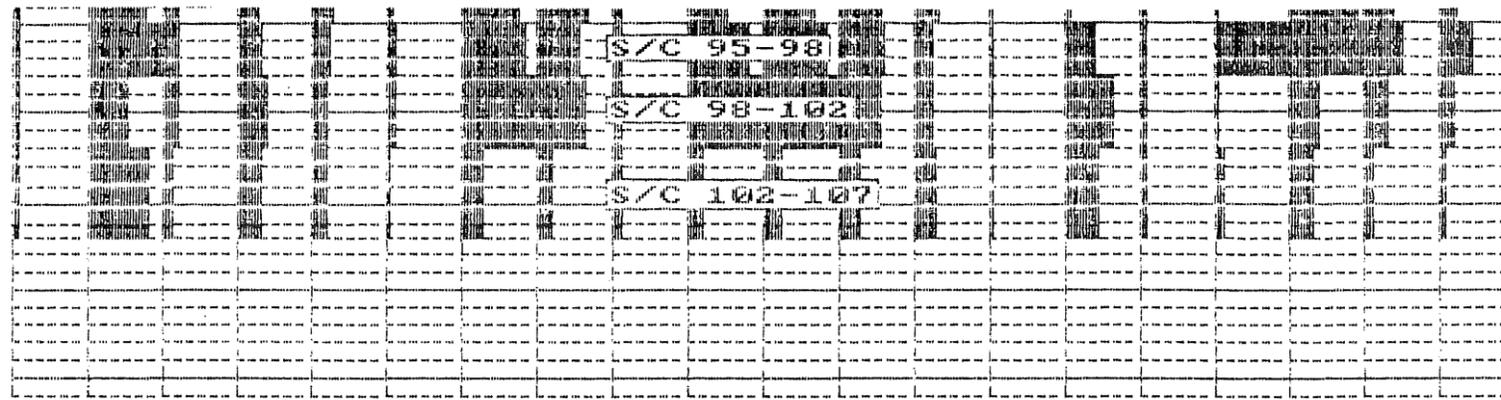
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SUMMARY OF G. MEYER LOG OB-212, ROTASONIC CORE

OB-212

Appendix 3-39B.

FEET	IN NON MAG HMC					IN -63 MICRON					IN MAG FRAC					NON MAG -63		NON MAG MAG		HMC SAMPLE #	HMC # GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
	^200 Ag	^500 Cu	^5 Bb	^25 Mo	^5000 Ba	^30 Ag	^100 Cu	^100 Ni	^10 Bb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg				
0-5																							(0.0-1.0) Organic sediments.
5-73.5																							(1.0-73.5) Clay, gray lake sediments with occasional pebbles, moderately to slightly calcareous, two silty lenses (64.5' and 72.5'), one sandy lens (40.5') oxidized tan (15'). St. Louis Sublobe.
25-30																							S/C 25-30
55-60																							S/C 55-60
75-80																							S/C 75-80
80-85																							S/C 80-85
85-90																							S/C 85-90
90-95																							S/C 90-95
73.5-80.0																							RAINNY
73.5-80.0																							(73.5-80.0) Clay, interbedded red, noncalcareous clays with gray slightly to moderately calcareous clays. Inter-fingering of Rainy and St. Louis lake sediments.
80.0-100.0																					16833	⊗	(80.0-100.0) Sandy, gravelly till, few cobbles, clast size increases with depth. Transition zone with underlying unit (97'-100'). Rainy Lobe.
85-90																					16834	⊗	
90-95																					16835	⊗	



(100.0-107.0) Sandy, gravelly till, oxidized, abundant granite fragments, possibly reworked granitic bedrock or regolith, also reddish to greenish clayey regolith. Possible pre-Rainy sediments.

(107.0-116.0) BEDROCK; syenite, weathered?; hematite? in microveinlets 110.5-114; (see 2 thin section descriptions by T. S. BOERBOOM).

MASTER FILE																				REMARKS
SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND			
16827	212	25-30	5. S 0 SE-SE 36 63 21 SL		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	23.5	735.0	3	-1	-1				
16828	212	30-35	5. S 0 SE-SE 36 63 21 SL		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1				
16829	212	55-60	5. S 0 SE-SE 36 63 21 SL		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	23.0	567.0	4	-1	-1				
16830	212	60-65	5. S 0 SE-SE 36 63 21 SL		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1				
16831	212	70-75	5. S 0 SE-SE 36 63 21 SL		DML CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1				RAINY CLAY AT 73.5
16832	212	75-80	5. S 0 SE-SE 36 63 21 SL		RL. CLAY: GLACIAL LK		-1.0	-1.0	-1.0	-1.0	-1.0	27.1	551.0	5	-1	-1				
16833	212	80-85	5. S 0 SE-SE 36 63 21 SL		RL. SANDY GVL. TILL 80-85		0.0	11700.0	4500.0	32.0	7.3	28.8	969.0	3	38	59				
16834	212	85-90	5. S 0 SE-SE 36 63 21 SL		RL. SANDY GVL. TILL 85-90		0.0	5200.0	2300.0	22.7	2.9	35.4	387.0	9	44	47				
16835	212	90-95	5. S 0 SE-SE 36 63 21 SL		RL. SANDY GVL. TILL 90-95		0.0	4400.0	2300.0	15.6	2.0	24.2	262.0	9	52	39				
13849R	212	90-95	5. S 0 SE-SE 36 63 21 SL		RL. SANDY GVL. TILL		-1.0	-1.0	-1.0	-1.0	-1.0	24.6	281.0	9	-1	-1				
16836	212	95-98	3. S 0 SE-SE 36 63 21 SL		RL. SANDY GVL. TILL 95-98		0.0	4900.0	1000.0	25.3	4.3	43.4	396.0	11	20	69				
16837	212	98-102	4. S 0 SE-SE 36 63 21 SL		PRE-WISCONSIN TILL 98-102		0.0	9000.0	3400.0	22.5	3.3	24.4	591.0	4	38	58				
16838	212	102-107	5. S 0 SE-SE 36 63 21 SL		PRE-WISCONSIN TILL 102-107		0.0	12300.0	3800.0	7.7	2.1	27.2	803.0	3	31	66				
13864	212	107-116	9.0 S 0 SE-SE 36 63 21 SL		BEDROCK 107-116		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1				

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
16833	-32	0.48	1470	270	5700	26.40	110	140	380	180	0	11	-24	9	-0.5	0	10	-0.6	900	886	180	10	-10	31	-2	140.0	39.1	3	24.60
16834	-40	0.51	2030	230	4300	23.20	57	79	200	140	0	8	-26	6	-0.5	0	10	1.4	1800	1110	170	10	-10	22	-2	95.0	25.1	4	17.30
16835	-40	0.28	1420	250	4900	19.70	110	100	450	130	0	14	43	7	-0.5	0	10	1.0	1600	575	160	10	-10	20	-2	79.0	13.6	4	12.20
16836	-32	0.45	1400	360	5400	31.50	150	130	710	150	0	16	-14	8	-0.5	0	10	1.1	1400	791	130	9	-10	20	-2	99.0	19.0	5	19.50
16837	-35	0.52	1740	260	5200	28.60	89	110	310	160	0	17	-24	10	-0.5	0	10	1.0	1200	988	140	-5	-10	22	-2	110.0	23.9	3	17.70
16838	-33	0.27	1550	260	4700	27.50	110	120	490	150	0	12	-12	8	-0.5	0	10	-0.7	1200	549	95	9	20	31	-2	67.0	12.3	1	6.21

-63um ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	V	CR	MN	FE %	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	WT g/kg
13849R	-1	180	210	770	6.2	41	82	91	240	3	-1	4	-0.5	1	2	-1	-1	2	11	-1	2	87.5
16827	-1	140	110	610	4.0	22	46	30	87	5	1	2	-0.5	-1	1	-1	-1	19	-1	2	32.0	
16829	-1	160	120	610	4.3	24	50	34	110	7	2	3	-0.5	1	1	-1	-1	17	-1	2	40.6	
16832	12	100	150	500	3.9	25	53	44	85	3	-1	2	-0.5	-1	1	-1	-1	15	-1	1	49.2	
16833	-1	110	150	770	5.1	34	59	53	120	2	-1	2	-0.5	1	1	-1	-1	13	-1	1	29.7	
16834	7	160	190	840	6.9	47	78	73	250	4	-1	5	-0.5	1	3	-1	-1	2	17	-1	4	91.5
16835	-1	150	200	700	5.5	36	69	75	200	2	-1	5	-0.5	1	2	-1	-1	2	15	-1	2	92.4
16836	31	150	230	920	6.0	35	57	85	250	4	1	8	-0.5	-1	2	-1	-1	1	12	-1	1	109.6
16837	1	76	85	620	5.6	34	65	98	340	4	-1	13	-0.5	1	2	-1	-1	2	8	-1	-1	41.3
16838	2	39	43	130	2.9	14	18	26	69	1	-1	2	-0.5	-1	-1	-1	-1	1	4	-1	-1	33.9

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
16835	0.610	1.40	780	160	60	180	-1	9	-0.5	-1	0.5
16836	0.610	1.40	1200	130	110	260	-1	38	-0.5	2	0.9
16837	0.630	1.20	1200	130	140	220	-1	64	-0.5	-1	0.4
16838	0.400	0.87	690	150	85	150	-1	45	-0.5	-1	0.2

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
13864	-8	-0.2	-1.0	1700	0.0	-1	110.0	0.0	100	7	0	3	-50	2.5	58	0.0	-1	16	280	0.00	0.0	-5	-5	2.10	-8.0	-10	0.0	2.9	-10	4	-0.9	0	-100	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FeO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
13864	19	5	40	80	0.5	0	2	2	-0.01	23000	800	3.52	63.0	0.00	50	87000	1100	0.3	-230	400	5	-3	1900	-2.4	-2	1.08	21000

IDENTIFICATION

DNR Drill Hole Number OB-20100

Drilling Completion Date 1/26/87

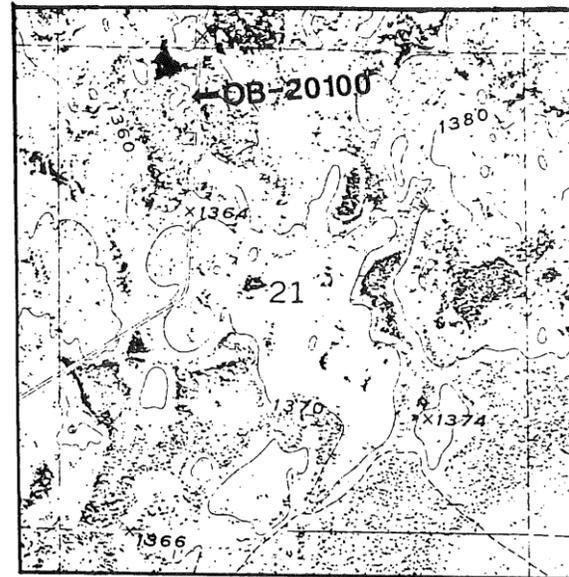
LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NW $\frac{1}{4}$ -21-63N-24W

County Koochiching

Quadrangle Deer Lake N.W. 7.5

Regional Survey Area Orr



HOLE PARAMETERS

Surface Elevation 1360 ft.

Total Depth 236 ft.

Elevation, Top of Precambrian Bedrock 1129 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-175	Des Moines Lobe Gl. Drift			
175-231	Rainy Lobe Gl. Drift	F	B,C	B = Pb C = Ni,Mo
231-236	Bedrock	F	I	

A = -63 microns fraction
B = Heavy Minerals, Nonmag
C = Heavy Minerals, Mag
D = Sluice Box Composite
E = Skeletonized Grab Sample in Core Box
F = Interval Cuttings in Bucket
G = Core
H = Thin Section
I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Granodiorite. Pink massive granodiorite. Grain size 1.0-5.0 equigranular, interlocking. Comprised of 60% pink, hem. stained feldspar, 10% white feld., 10% qtz., 10% chloritized bt. and hornblende, and 10% epidote. Trace calcite assoc. w/epidote. 0.1% dissem. sphene. (By ODM, see report in Appendix.)

Thin Section Number: #18694.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

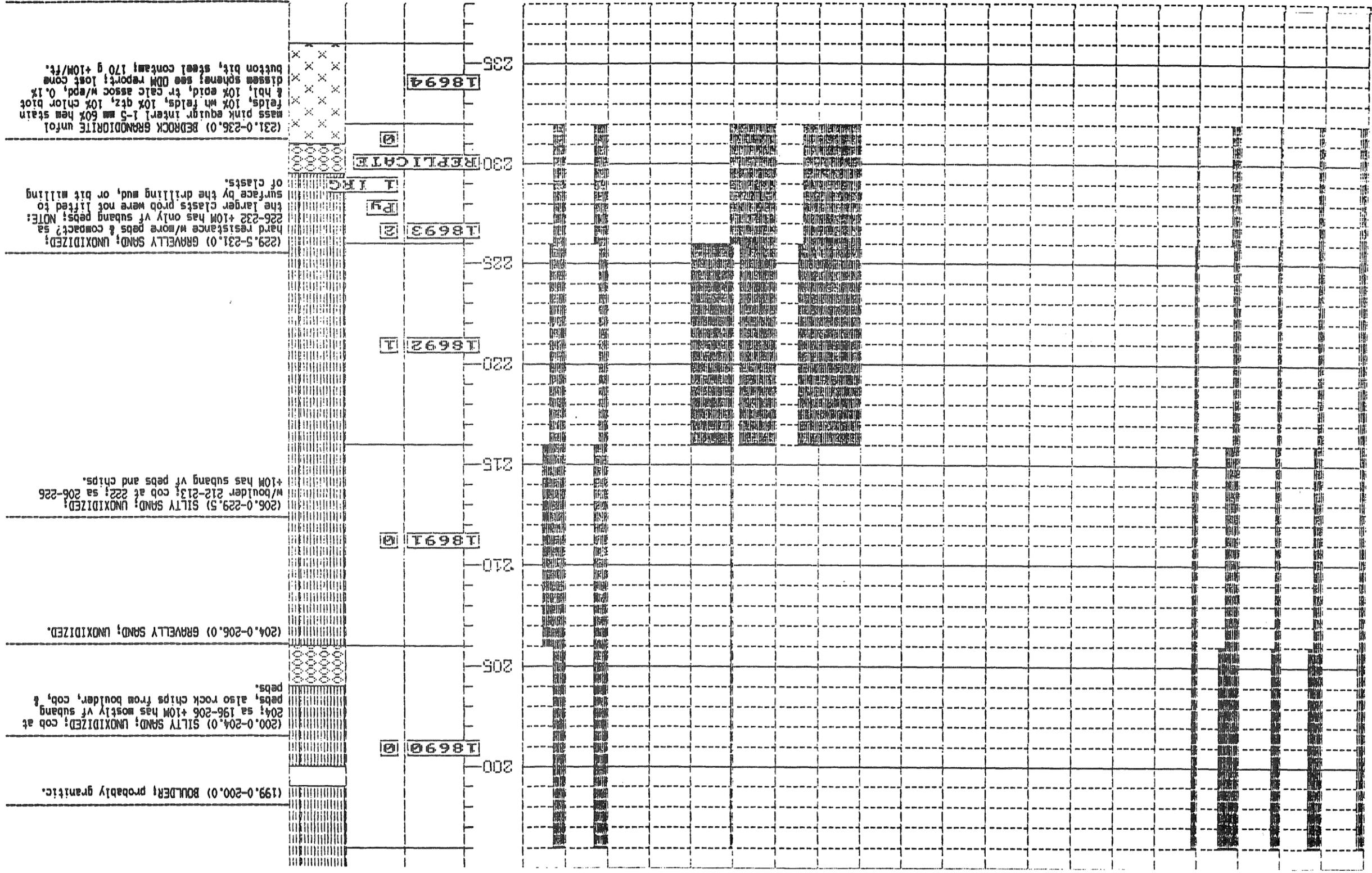
SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	TABLE CONC	M.I. CONC LIGHTS	NON MAG	NO. MAG	CALC V.G.	PPB	CLAST				MATRIX									
				M.I. CONC						SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY				
18688	11.0	0.0	11.0	156.3	134.8	21.5	17.2	4.3	1	790	TR	NA	NA	NA	A	U	Y	Y	Y	B	B	TILL
-689	7.9	0.2	7.7	88.3	68.2	20.1	16.6	3.3	0	NA	P.G	30	70	NA	NA	U	Y	Y	Y	B	GB	TILL
-690	8.8	0.4	8.4	143.4	114.5	28.9	23.6	5.3	0	NA	P.G	80	20	NA	NA	U	Y	Y	Y	B	GB	TILL
-691	8.2	0.0	8.2	163.2	127.5	35.7	27.7	8.0	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-692	12.4	0.0	12.4	130.9	94.2	36.7	27.9	8.8	1	223	TR	NA	NA	NA	A	U	Y	Y	Y	B	B	TILL
-693	10.3	0.0	10.3	156.2	119.8	36.4	29.8	6.6	2	1164	TR	NA	NA	NA	NA	U	Y	Y	Y	GY	GY	TILL
18693R	7.8	0.0	7.8	188.9	150.7	38.2	32.1	6.1	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-695	5.1	0.0	5.1	162.2	138.8	23.4	19.7	3.7	0	NA												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY	REMARKS	
					T	P	T	P	T	P				TOTAL GMS
18688	N		200 X 225	40 C			1				1			
											1	17.2	790	
-689	N		NO VISIBLE GOLD											
-690	N		NO VISIBLE GOLD											
-691	N		NO VISIBLE GOLD											
-692	N		150 X 175	31 C	1						1			
											1	27.9	223	
-693	Y		150 X 175 250 X 300	31 C 50 C		1			1		1			EST. 5% PYRITE
18693R	N		NO VISIBLE GOLD								2	29.8	1164	
-695	Y		NO VISIBLE GOLD											EST. 1% PYRITE

SLIUCE BOX 176-236



PJ

18695

MASTER FILE

Appendix 8-40C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18688	20100	176-186	10. M D NE-NW 21 63 24 K		RL. SILTY SAND	176-186	1.0	11000.0	-2.0	17.2	4.3	-1.0	-1.0	-1	-1	-1		
18689	20100	186-196	10. M D NE-NW 21 63 24 K		RL. SILTY SAND	186-196	0.0	7900.0	-2.0	16.8	3.3	-1.0	-1.0	-1	-1	-1		
18690	20100	196-206	10. M D NE-NW 21 63 24 K		RL. SILTY SAND	196-206	0.0	8800.0	-2.0	23.6	5.3	-1.0	-1.0	-1	-1	-1		
18691	20100	206-216	10. M D NE-NW 21 63 24 K		RL. SILTY SAND	206-216	0.0	8200.0	-2.0	27.7	8.0	-1.0	-1.0	-1	-1	-1		
18692	20100	216-226	10. M D NE-NW 21 63 24 K		RL. SILTY SAND	216-226	1.0	12400.0	-2.0	27.9	8.8	-1.0	-1.0	-1	-1	-1		
18693	20100	226-232	6. M D NE-NW 21 63 24 K		RL. GVL. SAND	226-232	2.0	10300.0	-2.0	29.8	6.6	-1.0	-1.0	-1	-1	-1		
18693R	20100	226-232	6.0 M D NE-NW 21 63 24 K		RL. GVL. SAND	226-232	0.0	7800.0	-2.0	32.1	6.1	-1.0	-1.0	-1	-1	-1		
18694	20100	232-236	4. M D NE-NW 21 63 24 K		BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18695	20100	176-236	60. M D NE-NW 21 63 24 K		SLUICE BOX	176-236	0.0	5100.0	-2.0	19.7	3.7	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18688	27	-0.05	0	50	9500	4.30	10	120	110	150	0	4	-10	3	1.5	0	-10	-0.2	100	72	18	1	2	147	-2	19.0	1.5	2	2.27
18689	25	0.15	0	330	11000	32.70	70	130	120	110	0	24	-10	4	-0.5	0	-10	0.8	800	368	91	8	-7	94	-2	120.0	13.4	2	12.00
18690	20	0.13	0	1900	7800	31.50	80	150	190	110	0	28	-10	12	-0.5	0	-10	1.1	700	419	94	-3	14	88	-2	140.0	12.8	3	17.20
18691	-18	0.12	0	510	12000	26.40	80	160	110	110	0	23	-20	8	0.5	0	-10	0.7	600	499	75	10	9	63	-2	180.0	14.1	3	20.00
18692	1800	0.11	0	490	9200	23.40	70	140	81	140	0	35	-20	4	-0.5	0	-10	-0.4	400	381	73	10	10	75	-2	160.0	14.6	2	10.00
18693	43	0.12	0	460	10000	25.00	70	130	74	100	0	29	-10	5	-0.5	0	-10	-0.3	-200	425	91	11	17	59	-2	160.0	12.5	3	21.60
18695	-24	0.20	764	1000	8100	25.60	80	200	140	150	0	23	-170	6	-0.5	0	-10	0.6	-400	503	120	15	160	77	-2	170.0	20.1	4	14.80

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18688	1.100	4.70	1100	190	47	270	-1	16	-0.5	39	0.4
18692	1.100	5.80	1200	840	79	320	-1	84	-0.5	24	0.7
18693	0.930	6.00	1200	630	79	340	-1	105	-0.5	18	0.6

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18694	-7	-0.2	-1.0	400	0.0	-1	35.0	0.0	-50	10	0	3	-100	3.3	19	0.0	3	21	0	0.00	0.0	-10	0	4.10	-1.0	-10	0.0	2.7	-10	9	0.9	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FeO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE
18694	8	12	62	0	1.0	0	0	0	0.00	4	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0	0.0	0

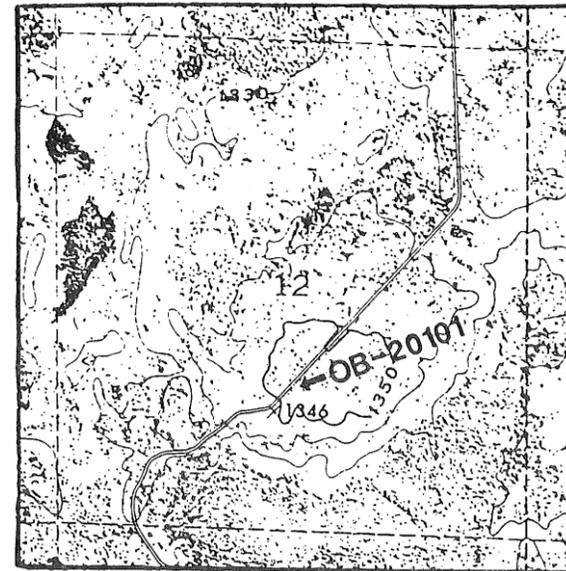
Appendix 8-41A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20101
 Drilling Completion Date 1/29/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -SE $\frac{1}{4}$ -12-63N-24W
 County Koochiching
 Quadrangle Deer Lake N.E. 7.5
 Regional Survey Area Orr



HOLE PARAMETERS

Surface Elevation 1350 ft.
 Total Depth 172 ft.
 Elevation, Top of Precambrian Bedrock 1184 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-34	Des Moines Lobe Gl. Drift			
34-166	Rainy Lobe Gl. Drift	F	B,C	C = Mo
166-172	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain

Thin Section Description: #18707

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

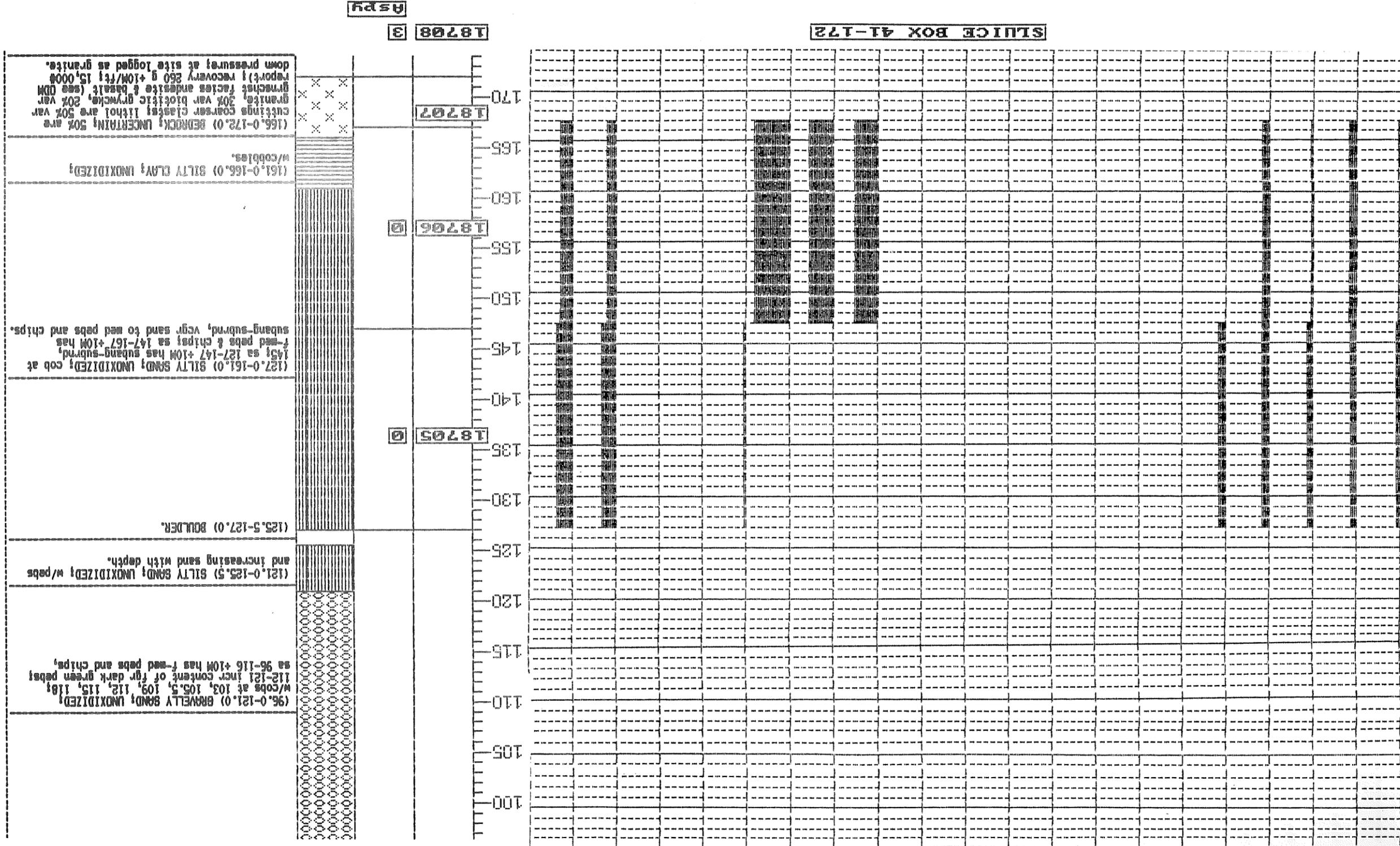
OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS							
	TABLE	+10 SPLIT	TABLE	M.I. CONC	CONC	NON MAG	NO. V.G.	CALC PPB	CLAST			MATRIX										
		CHIPS	FEED	LIGHTS	TOTAL	MAG	MAG	V.G.	PPB	SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY				
										V/S	GR	LS	OT									
18705	11.8	0.0	11.8	119.8	81.7	38.1	29.5	8.6	0	NA	TR	NA	NA	NA	NA	S	M	Y	N	B	NA	SAND
-706	8.5	0.0	8.5	147.7	126.0	21.7	16.3	5.4	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
18708	8.3	0.0	8.3	293.4	237.7	55.7	42.6	13.1	3	100												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS		
					T	P	T	P	T	P				TOTAL	GMS
18705	N		NO VISIBLE GOLD												
-706	N		NO VISIBLE GOLD												
18708	Y		50 X	75	13 C		1					1		EST. 3% PYRITE	
			50 X	125	18 C		1					1		150 GRAINS	
			100 X	150	25 C		1					1		ARSENOPYRITE	
											3	42.6	100		



MASTER FILE

Appendix 8-41C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	BOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18700	20101	41-61	20. M D NW-SE 12 63 24 K	RL. SILTY SAND		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18701	20101	61-76	15. M D NW-SE 12 63 24 K	RL. SILTY SAND		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18702	20101	76-96	20. M D NW-SE 12 63 24 K	RL. SILTY SAND		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18703	20101	96-116	20.0 M D NW-SE 12 63 24 K	RL. GVL. SAND		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18704	20101	116-127	11.0 M D NW-SE 12 63 24 K	RL. GVL. SAND		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18705	20101	127-147	20. M D NW-SE 12 63 24 K	RL. SILTY SAND	127-147	0.0	11800.0	-2.0	29.5	8.6	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18706	20101	147-167	20. M D NW-SE 12 63 24 K	RL. SILTY SAND	147-167	0.0	8500.0	-2.0	16.3	5.4	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18707	20101	167-172	5. M D NW-SE 12 63 24 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18708	20101	41-172	-3.0 M D NW-SE 12 63 24 K	SLUICE BOX	41-172	3.0	8300.0	-2.0	42.6	13.1	-1.0	-1.0	-1.0	-1	-1	-1	ST(-3)=131

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18705	22	0.12	0	460	14000	22.30	60	130	62	140	0	19	-10	4	-0.5	0	-10	0.5	-900	337	45	9	13	59	-2	150.0	16.5	3	11.30
18706	-5	-0.05	0	70	13000	5.30	10	140	94	150	0	6	-10	4	-0.5	0	-10	-0.2	-100	83	12	1	3	66	-2	30.0	1.9	2	2.54
18708	86	0.13	618	420	10000	21.40	60	110	64	130	0	16	-10	5	-0.5	0	-10	1.1	-300	406	55	9	23	34	-2	160.0	12.2	5	32.90

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18706	1.000	5.80	1000	270	59	380	-1	79	-0.5	28	0.6

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18707	-7	-0.2	-1.0	500	0.0	1	31.0	0.0	50	10	0	2	-100	3.4	17	0.0	3	31	0	0.00	0.0	-10	0	3.70	-1.0	-10	0.0	4.4	-10	3	1.0	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

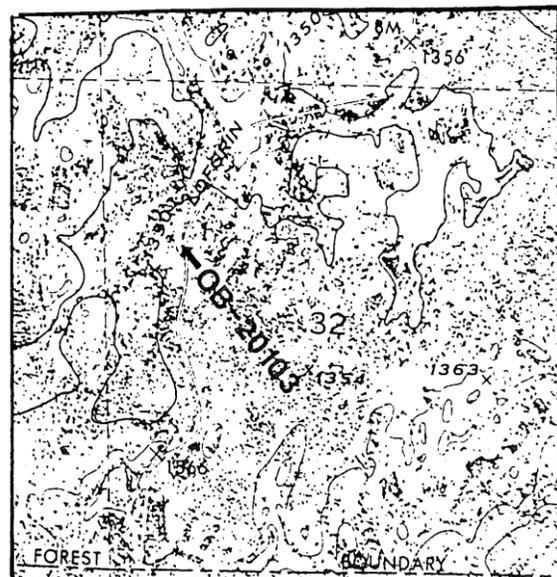
SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE		
18707	19	14	56	0	1.0	0	0	0	0.00	4	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20103
 Drilling Completion Date 1/22/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -NW $\frac{1}{4}$ -32-63N-24W
 County Koochiching
 Quadrangle Deer Lake N.W. 7.5
 Regional Survey Area Orr



HOLE PARAMETERS

Surface Elevation 1350 ft.
 Total Depth 223 ft.
 Elevation, Top of Precambrian Bedrock 1135 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-215	Des Moines Lobe Gl. Drift			
215-223	Bedrock	F	I	

- A = -63 microns fraction
- B = Heavy Minerals, Nonmag
- C = Heavy Minerals, Mag
- D = Sluice Box Composite
- E = Skeletonized Grab Sample in Core Box
- F = Interval Cuttings in Bucket
- G = Core
- H = Thin Section
- I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Meta-andesite. Medium green, moderately foliated meta-andesite. Grain size ground-mass 0.1-0.15 plag. phenos to 1.5. Equigranular, interlocking overprinted by foliation. Comprised of 75% plag. including 0.5% as phenos, 25% chlorite and 2-5% visible qtz. (By ODM, see report in Appendix)

Thin Section Number: #18686.

HEAVY MINERAL CONCENTRATE REPORT

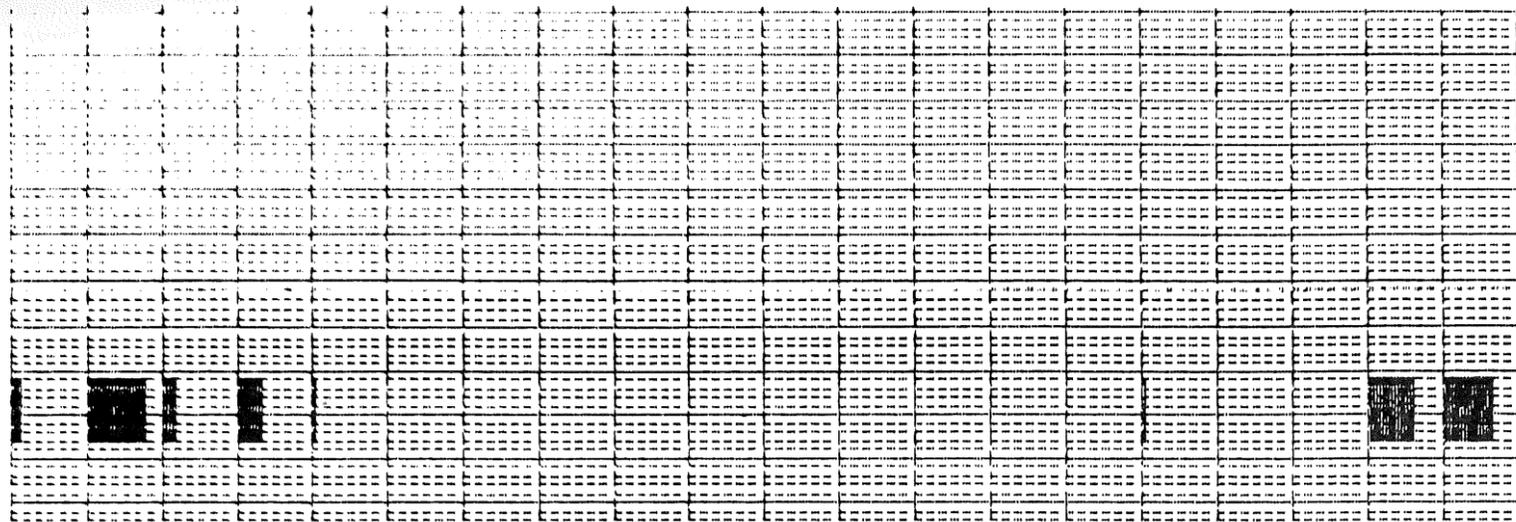
(SEE LEGEND IN APPENDIX)
 OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION						CLASS			
	TABLE	+10 SPLIT	TABLE CHIPS	TABLE FEED	M. I. CONC			CLAST			MATRIX						
			CONC	LIGHTS	NON MAG	CONC	NO. MAG	CALC V.G.	PPB	SIZE	%	S/U	SD	ST	CY	COLOR	
										V/S	GR	LS	OT			SD	CY
18687	4.8	0.0	4.8	170.7	136.0	34.7	28.4	6.3	0	NA							

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY	REMARKS					
					ABRADED	IRREGULAR	DELICATE	T	P	T				P	T	P	TOTAL	GMS
18687	Y																	EST. 7% PYRITE



SLUICE BOX 216-223

175
180
185
190
195
200
205
210
215
220
225
230

18686

18687

Q
Py



(164.0-207.0) CLAYEY TILL; UNOXIDIZED; gray; 156-176 w/ls, ign, & meta pebs; 176-196 v silty w/mostly ls pebs; 196-200 possibly sandy clay till w/cob at 200; 200-207 increasing silt content.

(207.0-209.0) GRAVELLY SAND; UNOXIDIZED; w/approx 30% ls peb content.

(209.0-215.0) GRAVELLY SAND; UNOXIDIZED; uncertain if Rainy Lobe; high peb & cob content w/ls pebs common; no sample taken.

(215.0-223.0) BEDROCK; META-ANDESITE; med green, mod foliated, equigran interlocking texture; 75% plag including 0.5% as phenos, 25% chlorite, 2-5% visible quartz; note 40% overburden contam in sample, see QDM report; drill rec 70 gms +10M/foot.

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FT6	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS	
18686	20103	216-223	7. M D SW-NW 32 63 24 K		BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18687	20103	216-223	7. M D SW-NW 32 63 24 K		SLUICE BOX	216-223	0.0	4800.0	-2.0	28.4	6.3	-1.0	-1.0	-1	-1	-1			

Appendix 8-42C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
																												g/kg	WEIGHT
18687	-14	0.07	350	360	7700	14.80	50	190	460	300	0	26	-10	8	-0.5	0	-10	0.8	200	213	73	5	84	91	-2	76.0	7.9	6	21.10

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MD	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18686	-6	-0.2	-1.0	400	0.0	-1	21.0	0.0	60	10	0	2	-100	3.6	11	0.0	2	53	0	0.00	0.0	-10	0	2.50	-1.0	-10	0.0	2.1	-10	-2	1.4	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18686	24	14	41	0	1.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-43A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20104

Drilling Completion Date 1/28/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -NE $\frac{1}{4}$ -18-63N-24W

County Koochiching

Quadrangle Deer Lake N.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1340 ft.

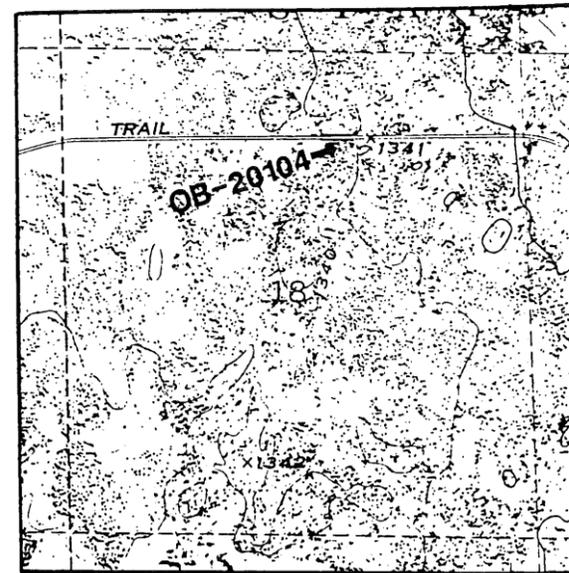
Total Depth 146 ft.

Elevation, Top of Precambrian Bedrock _____

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-133	Des Moines Lobe Gl. Drift	F		
133-146	Rainy Lobe Gl. Drift	F	B,C	B = As,Pb C = Ni,Mo

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type:

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

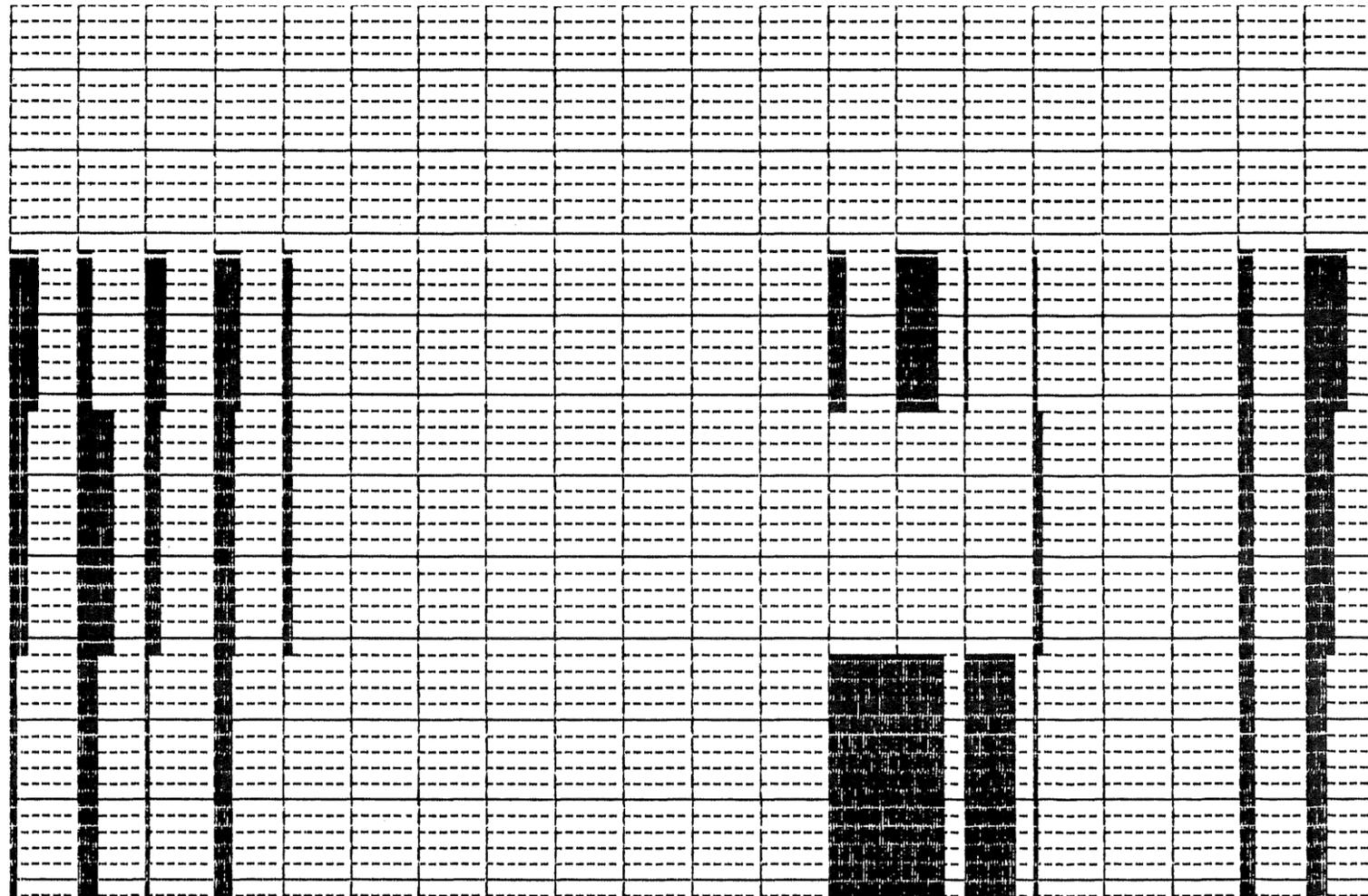
OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	FEED	TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG		NO. MAG	CALC V.G.	PPB	CLAST			MATRIX							
										SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY				
18696	10.8	0.6	10.2	90.5	52.2	38.3	25.4	12.9	1	981	P	30	20	30	A	U	Y	Y	Y	B	B	TILL
-697	10.5	0.3	10.2	139.6	107.8	31.8	23.0	8.8	0	NA	P	45	45	10	A	U	Y	Y	Y	GB	GB	TILL
-698	13.6	0.2	13.4	164.0	135.2	28.8	21.0	7.8	0	NA	P	45	55	NA	A	U	Y	Y	Y	B	B	TILL
-699	5.6	0.0	5.6	134.0	101.4	32.6	26.2	6.4	1	827												

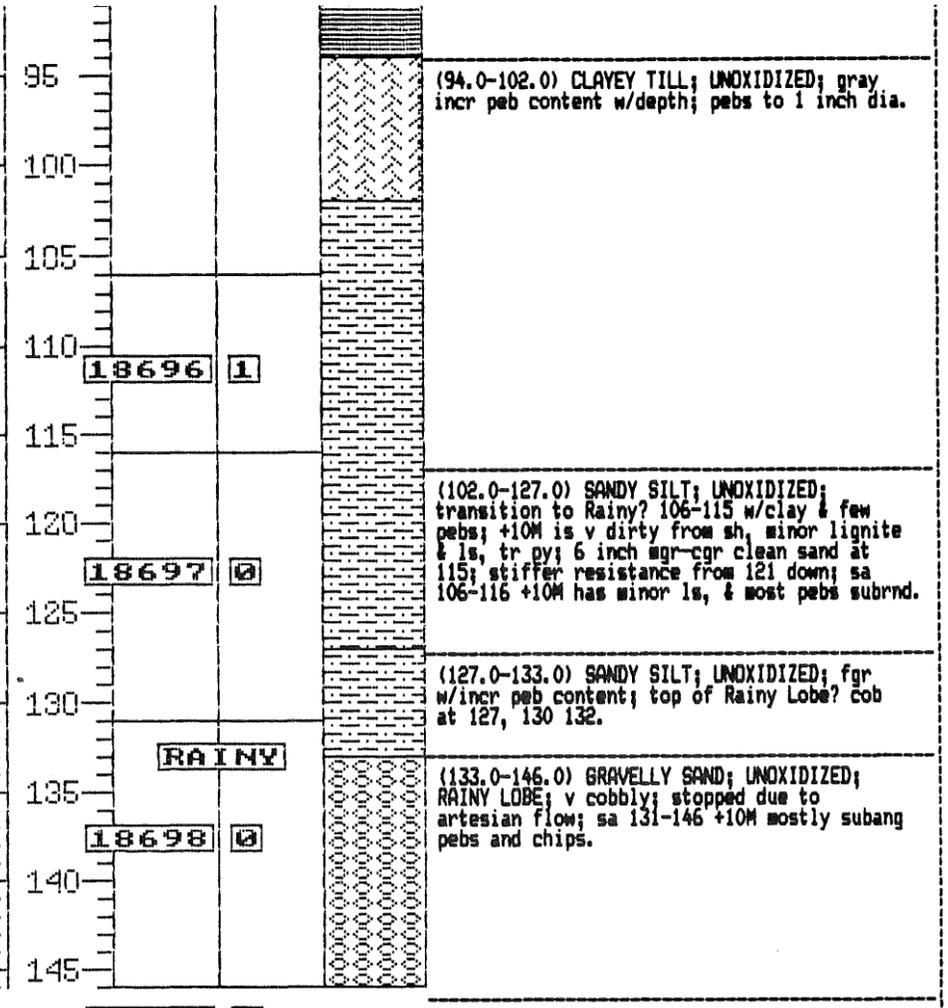
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS				NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				ABRADED T	IRREGULAR P	DELICATE T	P				
18696	N	225 X 300	48 C	1				1	25.4	981	
-697	N	NO VISIBLE GOLD									
-698	N	NO VISIBLE GOLD									
-699	Y	200 X 300	46 C	1				1	26.2	827	EST. 10% PYRITE 100 GRAINS ARSENOPYRITE



SLUICE BOX 106-146



18699 1
Py, Aspy

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT % -63uM	WT % +10	WT % SAND	REMARKS
18696	20104	106-116	10. M D NW-NE 18 63 24	K RL. SILTY SAND	106-116	1.0	10800.0	-2.0	25.4	12.9	-1.0	-1.0	-1	-1	-1		
18697	20104	116-131	15. M D NW-NE 18 63 24	K RL. SILTY SAND	116-131	0.0	10500.0	-2.0	23.0	8.8	-1.0	-1.0	-1	-1	-1		
18698	20104	131-146	15. M D NW-NE 18 63 24	K RL. GVL. SAND	131-146	0.0	13600.0	-2.0	21.0	7.8	-1.0	-1.0	-1	-1	-1		
18699	20104	106-146	40. M D NW-NE 18 63 24	K SLUICE BOX	106-146	1.0	5600.0	-2.0	26.2	6.4	-1.0	-1.0	-1	-1	-1		

Appendix 8-43C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg	WEIGHT
18696	-20	0.12	0	620	11000	24.40	90	150	110	200	0	79	-20	9	0.5	0	-10	1.4	800	473	160	12	12	67	-2	200.0	24.7	2	10.90
18697	61	0.27	0	320	11000	19.30	90	230	300	160	0	51	10	7	-0.5	0	-10	1.1	700	589	150	9	25	105	-2	200.0	25.8	2	10.20
18698	22	-0.05	0	50	13000	5.10	10	160	160	130	0	15	-10	6	-0.5	0	-10	0.2	100	96	15	1	11	78	-2	33.0	3.4	2	2.42
18699	660	0.27	901	670	8400	26.60	90	190	170	160	0	53	-10	8	-0.5	0	-10	1.4	800	567	150	11	110	83	-2	200.0	22.8	5	19.50

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18696	1.100	4.20	1100	120	35	220	-1	5	-0.5	29	1.2
18698	0.990	5.20	940	710	100	230	-1	71	-0.5	33	0.6

Appendix 8-44A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20200

Drilling Completion Date 2/6/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -16-63N-23W

County Koochiching

Quadrangle Deer Lake N.E. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1340 ft.

Total Depth 117 ft.

Elevation, Top of

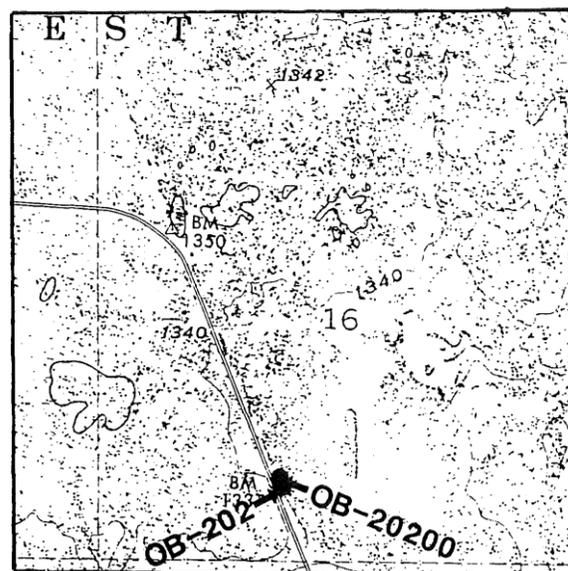
Precambrian Bedrock 1232.5 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection

Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-70	Des Moines Lobe Gl. Drift			Note: Compare to hole 202 at same site. B = Au,Cu C = Ni,Mo
70-107.5	Rainy Lobe Gl. Drift	F	B,C	
107.5-117	Bedrock	F	I	

A = -63 microns fraction
B = Heavy Minerals, Nonmag
C = Heavy Minerals, Mag
D = Sluice Box Composite
E = Skeletonized Grab Sample in Core Box
F = Interval Cuttings in Bucket
G = Core
H = Thin Section
I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Amphibolite; see also hole 202 at same site. Dark gray to green. Variably massive to well foliated. Grain size 0.2 (esp. plag.) to 0.5 (esp. amphibole). Interlocking, equigranular to inequigranular (amph. coarser than px.) to sub-diabasic. Comprised of 50% hornblende (variable to actinolite), 40% plag. and 10% chloritized biotite. 3% dissem. calcite. Trace py. (By ODM, see report in Appendix)

Thin Section Number: #18725.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

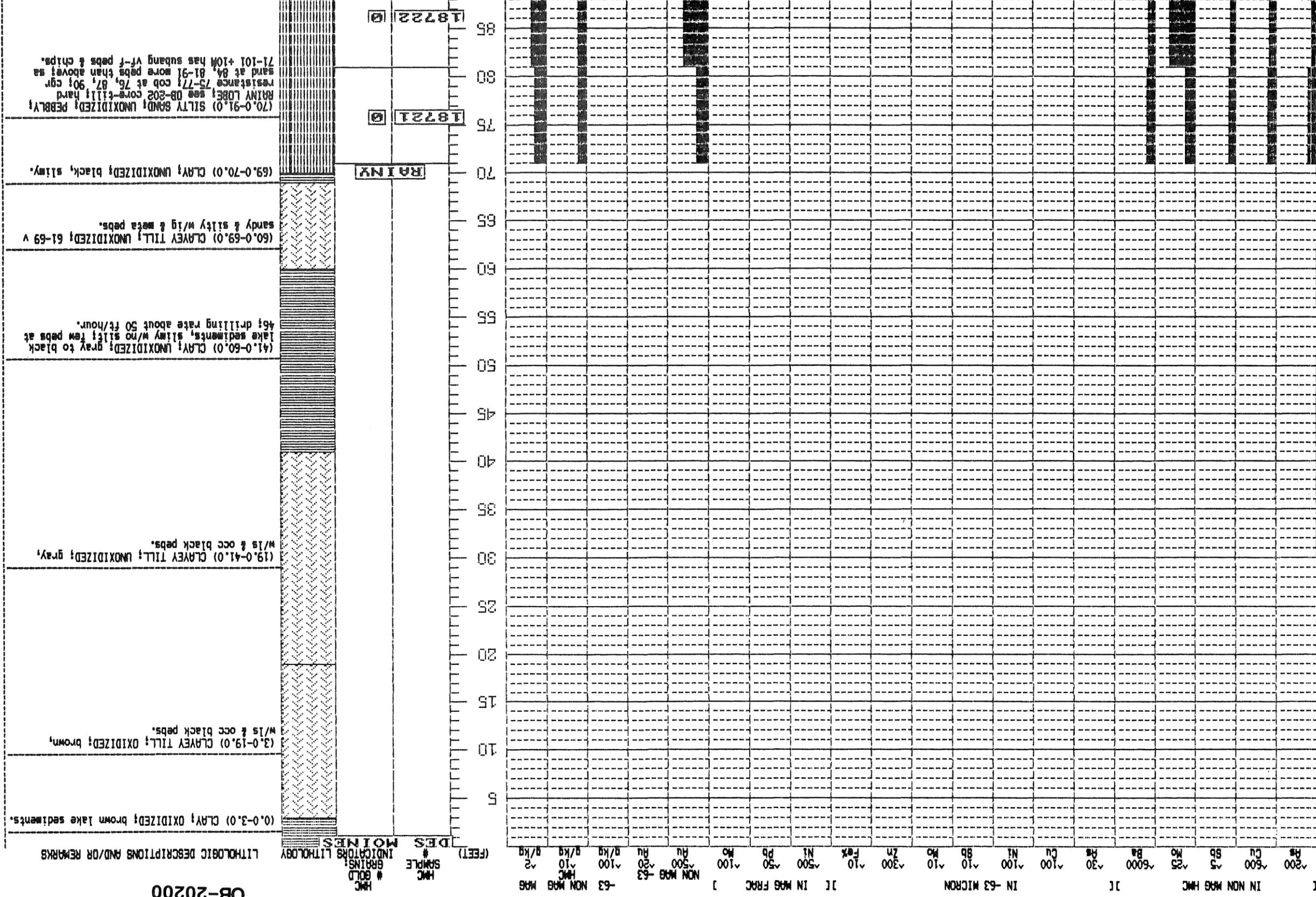
SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS						
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC				NO. V.G.	CALC PPB	CLAST			MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG			SIZE	%	S/U	SD	ST	CY		COLOR					
18721	7.5	0.3	7.2	105.6	89.2	16.4	12.2	4.2	0	NA	P	69	30	1	NA	U	Y	Y	Y	GB	GB	TILL
-722	9.1	0.0	9.1	229.4	205.4	24.0	18.0	6.0	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-723	10.6	1.2	9.4	177.5	145.8	31.7	23.9	7.8	0	NA	P	60	40	NA	NA	U	Y	Y	Y	GB	GB	TILL
18724	6.4	0.0	6.4	116.5	92.9	23.6	16.5	7.1	1	23	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-726	5.3	0.0	5.3	113.8	86.7	27.1	20.8	6.3	3	386												
-727A	11.0	0.4	10.6	132.8	93.0	39.8	29.4	10.4	0	NA	P/G	25	50	25	A	U	Y	Y	Y	GB	B	TILL
-727B	10.8	0.3	10.5	136.2	92.9	43.3	32.2	11.1	0	NA	P	30	50	20	A	U	Y	Y	Y	B	B	TILL

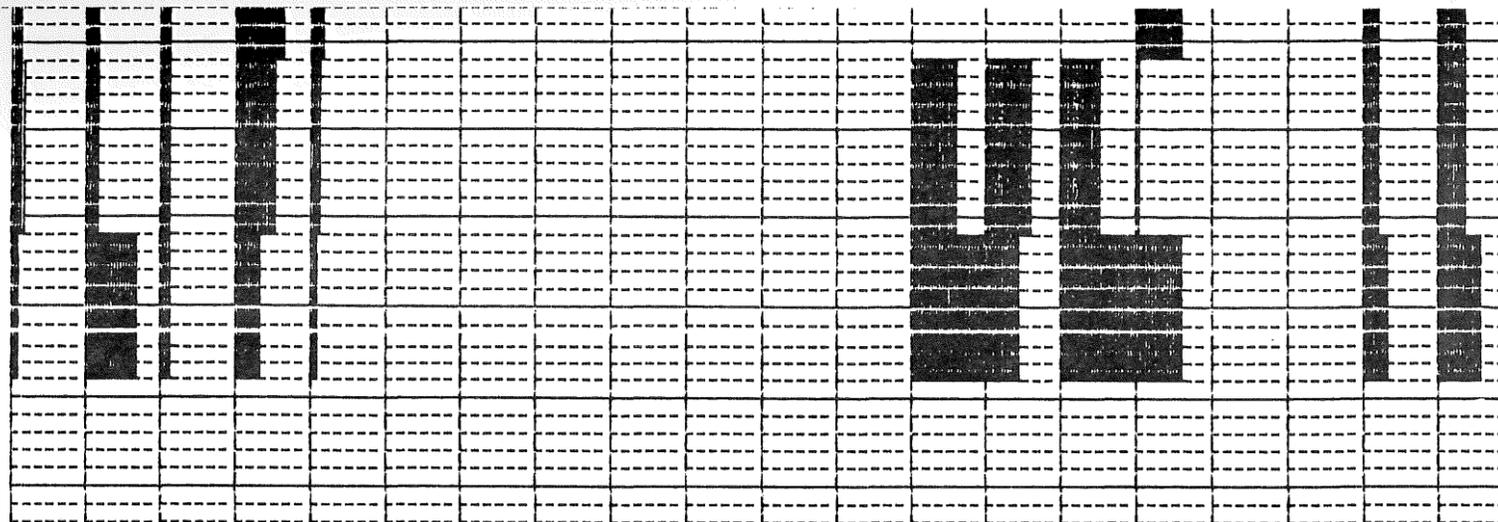
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										REMARKS		
					ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY					
					T	P	T	P	T	P			TOTAL GMS	PPB			
18721	N		NO VISIBLE GOLD														
-722	N		NO VISIBLE GOLD														
-723	N		NO VISIBLE GOLD														
18724	Y		50 X 75	13 C			1					1					EST. 5% PYRITE
-726	Y		25 X 250	27 C			1					1					EST. 15% PYRITE
			50 X 75	13 C			1					1					20 GRAINS
			100 X 175	27 C			1					1					ARSENOPYRITE
												3	20.8	386			
-727A	N		NO VISIBLE GOLD														
-727B	N		NO VISIBLE GOLD														

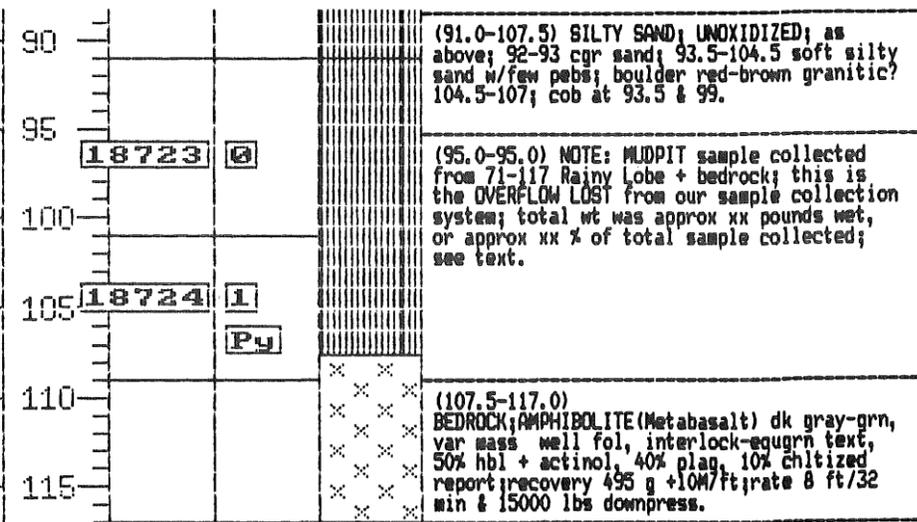
OB-20200





SLUICE BOX 71-117

MUD PIT SAMP 71-117



18726 3

Py, Aspy

18727A 0

18727B 0

(91.0-107.5) SILTY SAND; UNOXIDIZED; as above; 92-93 cgr sand; 93.5-104.5 soft silty sand w/few pebs; boulder red-brown granitic? 104.5-107; cob at 93.5 & 99.

(95.0-95.0) NOTE: MUDPIT sample collected from 71-117 Rainy Lobe + bedrock; this is the OVERFLOW LOST from our sample collection system; total wt was approx xx pounds wet, or approx xx % of total sample collected; see text.

(107.5-117.0) BEDROCK; AMPHIBOLITE (Metabasalt) dk gray-grn, var mass well fol, interlock-equigrn text, 50% hbl + actinol, 40% plag, 10% chlitzed report; recovery 495 g +10M/ft; rate 8 ft/32 min @ 15000 lbs downpress.

MASTER FILE

Appendix 8-44C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18721	20200	71-81	10. M O SE-SW 16 63 23 K	RL. SILTY SAND	71-81	0.0	7500.0	-2.0	12.2	4.2	-1.0	-1.0	-1	-1	-1		
18722	20200	81-91	10. M O SE-SW 16 63 23 K	RL. BVL. SAND	81-91	0.0	9100.0	-2.0	18.0	6.0	-1.0	-1.0	-1	-1	-1		
18723	20200	91-101	10. M O SE-SW 16 63 23 K	RL. SILTY SAND	91-101	0.0	10600.0	-2.0	23.9	7.8	-1.0	-1.0	-1	-1	-1		
18724	20200	101-109	8. M O SE-SW 16 63 23 K	RL. SILTY SAND	101-109	1.0	6400.0	-2.0	16.5	7.1	-1.0	-1.0	-1	-1	-1		
18725	20200	109-117	8. M O SE-SW 16 63 23 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18726	20200	71-117	46. M O SE-SW 16 63 23 K	SLUICE BOX	71-117	3.0	5300.0	-2.0	20.8	6.3	-1.0	-1.0	-1	-1	-1		
18727A	20200	71-117	46. M O SE-SW 16 63 23 K	MUD PIT	71-117	0.0	11000.0	-2.0	29.4	10.4	-1.0	-1.0	-1	-1	-1		MUD PIT SAMP.
18727B	20200	71-117	46.0 M O SE-SW 16 63 23 K	MUD PIT	71-117	0.0	10800.0	-2.0	32.2	11.1	-1.0	-1.0	-1	-1	-1		MUD PIT SAMP.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18721	150	0.29	0	440	12000	31.10	100	180	130	120	0	39	-20	6	-0.5	0	-10	-0.8	1200	537	120	13	-11	63	-2	210.0	20.5	2	9.07
18722	300	0.23	0	410	12000	22.50	80	160	96	120	0	20	-20	16	-0.5	0	-10	-0.5	900	539	76	10	14	62	-2	220.0	18.0	2	17.20
18723	27	0.27	0	370	13000	30.30	90	160	100	110	0	30	-10	13	-0.5	0	-10	-0.7	800	552	79	10	12	63	-2	210.0	18.9	2	13.20
18724	300	0.20	0	1600	9000	34.90	470	200	410	98	0	19	-10	8	-0.5	0	-10	0.7	-500	379	80	6	13	51	-2	140.0	15.4	3	12.40
18726	350	0.24	790	1500	12000	23.40	240	170	170	210	0	24	-20	9	-0.5	0	-10	-0.6	900	491	71	12	38	56	-2	200.0	23.0	4	16.00
18727A	51	0.16	0	2100	11000	21.80	230	170	200	200	0	23	30	8	-0.5	0	-10	0.8	900	436	94	7	11	34	-2	200.0	22.2	3	12.00
18727B	36	0.18	0	2100	11000	21.60	230	180	200	200	0	24	-10	6	-0.5	0	-10	-0.4	700	461	92	11	15	46	-2	200.0	22.1	3	11.60

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18723	1.200	4.30	830	300	73	320	-1	53	-0.5	29	0.7
18724	0.910	2.80	620	2800	87	200	-1	231	-0.5	22	1.1

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18725	-7	-0.2	-1.0	400	0.0	-1	29.0	0.0	490	30	0	2	-100	6.1	12	0.0	5	230	0	0.00	0.0	-10	0	3.00	-1.0	-10	0.0	1.7	-10	3	-0.5	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18725	70	11	83	0	1.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-45A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20201

Drilling Completion Date 2/5/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SE $\frac{1}{4}$ -10-63N-23W

County Koochiching

Quadrangle Deer Lake N.E. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1300 ft.

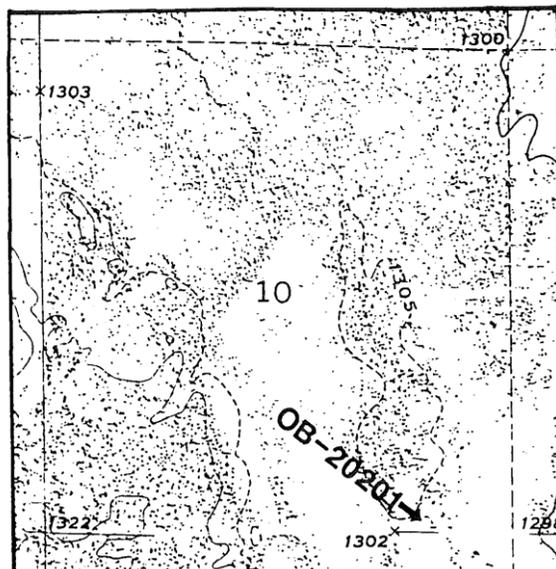
Total Depth 77 ft.

Elevation, Top of Precambrian Bedrock 1228 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-62	Des Moines Lobe Gl. Drift			
62-72	Rainy Lobe Gl. Drift	F	B,C	B = Cu,Ni,Cr, Ag,Se,Sb
72-77	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Amphibolite (basalt). Dark green, moderately foliated amphibolite (basalt). Grain size 0.2 (plag.) to 0.5 (actinolite) with inequigranular, interlocking texture. Comprised of 50% actinolite, 40% plag., and 10% chloritized biotite. 5% of chips contain 10% calcite. (By ODM, see report in Appendix.)

Thin Section Number: #18719.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS						
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC				CLAST				MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL		NON MAG	NO. MAG	NO. V.G.	CALC PPB	SIZE	%	S/U	SD		ST	CY	COLOR			
18717	8.3	0.2	8.1	135.3	105.8	29.5	23.1	6.4	0	NA	P.G	90	10	NA	NA	U	Y	Y	Y	GG	GG	TILL
-718	7.0	0.0	7.0	230.9	219.4	11.5	9.9	1.6	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL&BDK
-720	2.5	0.0	2.5	70.3	64.3	6.0	5.2	0.8	0	NA												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS								CALC V.G. ASSAY PPB	REMARKS	
				ABGRADED		IRREGULAR		DELICATE		NON MAG	TOTAL GMS			
				T	P	T	P	T	P					
18717	N	NO VISIBLE GOLD												
-718	Y	NO VISIBLE GOLD												EST. 5% PYRITE
-720	Y	NO VISIBLE GOLD												EST. 5% PYRITE 20 GRAINS ARSENOPYRITE

MASTER FILE

Appendix 8-45C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18717	20201	59-66	7. M D SE-SE 10 63 23 K	RL. BVL. SAND	59-66	0.0	8300.0	-2.0	23.1	6.4	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18718	20201	66-73	7. M D SE-SE 10 63 23 K	RL. SILTY SAND	66-73	0.0	7000.0	-2.0	9.9	1.6	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18719	20201	73-77	4. M D SE-SE 10 63 23 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18720	20201	59-77	18. M D SE-SE 10 63 23 K	SLUICE BOX	59-77	0.0	2500.0	-2.0	5.2	0.8	-1.0	-1.0	-1.0	-1.0	-1	-1	-1

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18717	-5	0.21	0	2500	11000	34.10	180	290	590	130	0	39	20	7	-0.5	0	-10	1.2	900	386	110	7	19	72	-2	130.0	17.0	3	16.90
18718	-29	0.24	0	23000	6800	36.70	330	640	1200	220	0	64	50	9	2.5	0	-10	3.0	-800	550	110	12	28	109	-2	110.0	16.5	1	7.34
18720	-33	0.32	855	5600	10000	33.00	220	380	740	190	0	28	-10	6	-0.5	0	-10	1.4	-600	470	120	9	94	59	-2	170.0	19.9	2	3.71

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18717	1.200	4.20	1500	250	86	300	-1	34	-0.5	32	0.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18719	-9	-0.2	2.0	1000	0.0	2	188.0	0.0	380	30	0	4	-100	6.8	105	0.0	2	270	0	0.00	0.0	-10	0	3.30	-1.0	-10	0.0	8.3	-10	4	1.5	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18719	30	23	130	0	2.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-46A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20204

Drilling Completion Date 2/4/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NE $\frac{1}{4}$ -18-63N-23W

County Koochiching

Quadrangle Deer Lake N.E. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1330 ft.

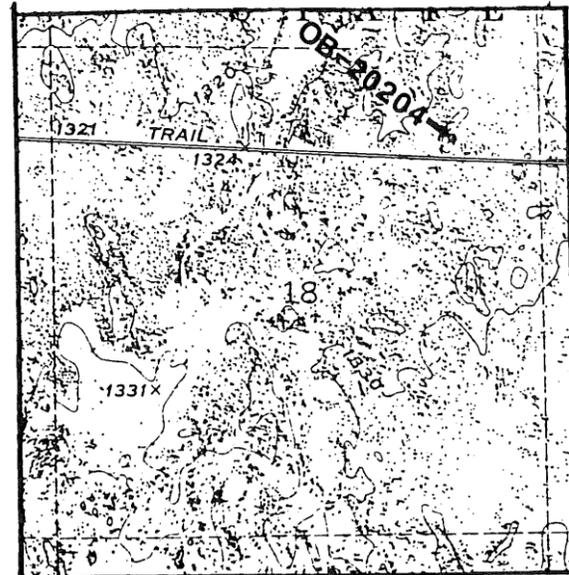
Total Depth 177 ft.

Elevation, Top of Precambrian Bedrock 1159 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS				
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC		NON MAG		NO. V.G.	CLAST			MATRIX										
				CONC	LIGHTS	TOTAL	MAG	PPB	SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY					
18712	7.5	0.0	7.5	100.4	74.7	25.7	18.1	7.6	0	NA	TR	NA	NA	NA	NA	U	Y	Y	N	B	NA	TILL
-713	11.5	0.2	11.3	238.7	198.5	40.2	31.8	8.4	0	NA	P.G	60	40	NA	NA	U	Y	Y	N	B	NA	TILL
-714	12.5	0.8	11.7	222.6	170.8	51.8	42.3	9.5	0	NA	P	60	40	NA	NA	U	Y	Y	Y	B	B	TILL
-716	5.9	0.0	5.9	210.1	171.0	39.1	31.6	7.5	3	151												

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-161	Des Moines Lobe Gl. Drift	No	No	
161-171	Rainy Lobe Gl. Drift	F	B,C	
171-177	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain

Thin Section Description: #18715

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				T	P	T	P	T	P				TOTAL GMS
18712	N												
-713	N												
-714	N												
-716	Y	50 X 75	13 C						1			EST. 15% PYRITE	
		75 X 125	20 C	1					1			20 GRAINS	
		75 X 175	25 C	1					1			ARSENOPYRITE	
										3	31.6	151	

050 150

1981

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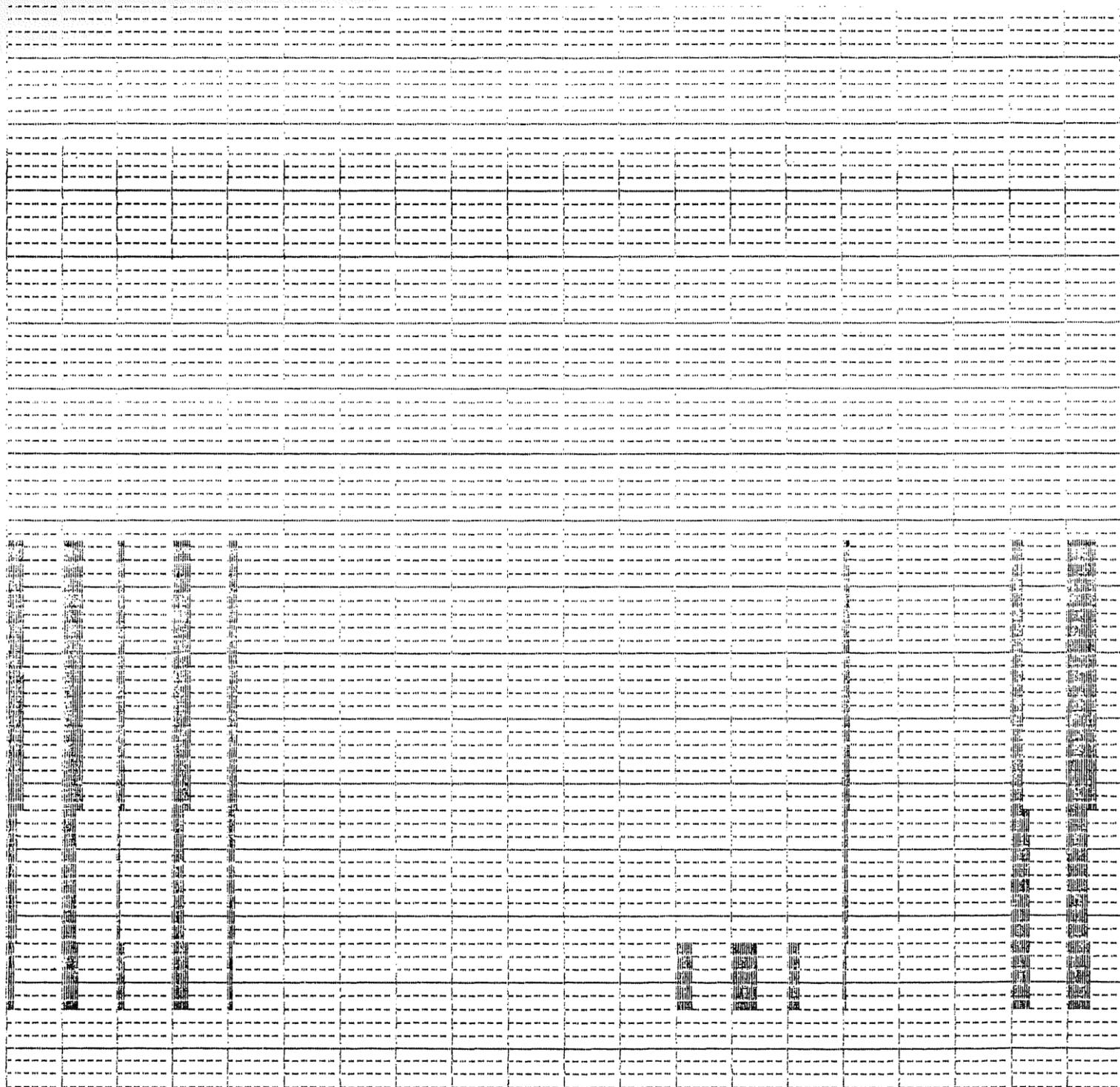
IN NON MAG HMC				IN -63 MICRON							IN MAG FRAC				NON MAG			-63			NON MAG			HMC SAMPLE #	HMC # GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
^200 As	^600 Cu	^5 Sb	^25 Mo	^5000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	(FEET)	DES	MOINES					
																					5						
																						10					
																						15					
																						20					
																						25					
																						30					
																						35					
																						40					
																						45					
																						50					
																						55					
																						60					
																						65					
																						70					
																						75					
																						80					
																						85					
																						90					
																						95					

(0.0-14.0) COARSE SAND; OXIDIZED; some clay, ls pebs dominant; O.K. for road fill material?

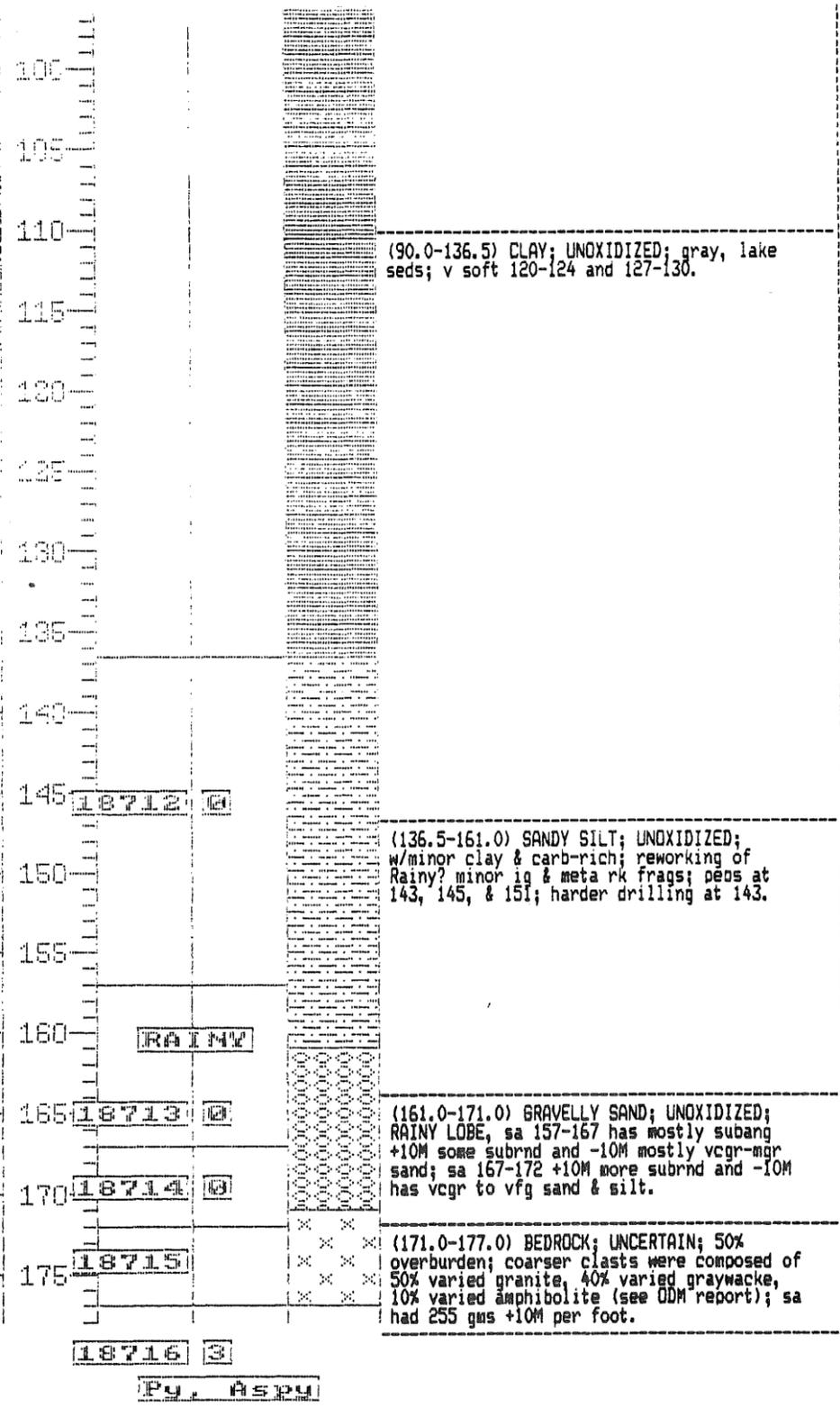
(14.0-17.0) CLAYEY TILL; UNOXIDIZED; more sand than usual, w/ls & ig/meta pebs.

(17.0-87.0) CLAY; UNOXIDIZED; lake sed, gray; possible clayey till 37-47 w/ls clasts; silt content may increase w/depth.

(87.0-90.0) CLAYEY TILL; UNOXIDIZED; w/pebs of ls & meta/igs.



SLICE BOX 136.5-177



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18712	20204	136.5-157	20.5 M O NE-NE 18 63 23 K		RL. CLAY: GLACIAL LK	136.5-157	0.0	7500.0	-2.0	18.1	7.6	-1.0	-1.0	-1	-1	-1		
18713	20204	157-167	10. M O NE-NE 18 63 23 K		RL. GVL. SAND	157-167	0.0	11500.0	-2.0	31.8	8.4	-1.0	-1.0	-1	-1	-1		
18714	20204	167-172	5. M O NE-NE 18 63 23 K		RL. GVL. SAND	167-172	0.0	12500.0	-2.0	42.3	9.5	-1.0	-1.0	-1	-1	-1		
18715	20204	172-177	5. M O NE-NE 18 63 23 K		BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18716	20204	136.5-177	40.5 M O NE-NE 18 63 23 K		SLUICE BOX	136.5-177	3.0	5900.0	-2.0	31.6	7.5	-1.0	-1.0	-1	-1	-1		

Appendix 8-46C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CD	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18712	65	0.16	0	400	11000	27.90	70	140	220	160	0	56	-10	8	-0.5	0	-10	-0.6	900	415	140	11	11	79	-2	150.0	17.4	2	13.20
18713	47	0.25	0	450	12000	25.20	110	160	150	110	0	30	-30	5	-0.5	0	-10	-0.2	600	445	65	13	-10	57	-2	160.0	12.3	3	22.80
18714	-23	0.24	0	490	11000	24.40	100	140	170	130	0	24	-20	7	-0.5	0	-10	-0.5	-500	403	54	9	-8	44	-2	140.0	13.7	3	30.70
18716	130	0.22	603	430	12000	21.10	70	130	140	150	0	18	-10	4	-0.5	0	-10	-0.5	-700	353	50	5	-14	33	-2	130.0	11.3	5	23.90

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18714	1.200	5.00	800	150	77	290	-1	18	-0.5	22	0.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18715	-6	-0.2	-1.0	600	0.0	1	28.0	0.0	-50	10	0	2	-100	2.8	15	0.0	2	26	0	0.00	0.0	-10	0	3.00	-1.0	-10	0.0	3.1	-10	-2	0.7	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

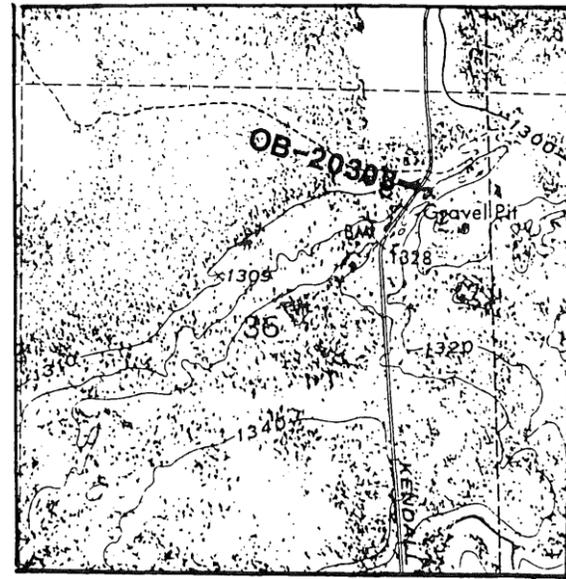
SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LDI %	FE
18715	20	13	39	0	1.5	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20303
 Drilling Completion Date 2/3/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NE $\frac{1}{4}$ -36-64N-24W
 County Koochiching
 Quadrangle Deer Lake N.E. 7.5
 Regional Survey Area Orr



HOLE PARAMETERS

Surface Elevation 1310 ft.
 Total Depth 64 ft.
 Elevation, Top of Precambrian Bedrock 1256 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-49	Des Moines Lobe Gl. Drift			
49-54	Rainy Lobe Gl. Drift	F	B,C	C = Ni
54-64	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Amphibolite. Black, well foliated to gneissic with 5% quartz stringers amphibolite. Grain size 0.1-0.5 to locally pegmatitic. Locally equigranular but hornblende generally coarser than plag.; interlocking. Comprised of 70% hornblende (brown px. in 10% gneissic bands), 30% plag. and 0.2% garnet. 2-3% fracture calcite. 0.5% stringer and fracture pyrite. 5% magnetite in 10% of chips only. (By ODM, see report in Appendix)

Thin Section Number: #18710.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU	DESCRIPTION										CLASS				
	TABLE	+10	SPLIT	M. I.	CONC.	NON		NO.	CALC	SIZE	%	S/U	SD	ST	CY	COLOR						
											CLAST		MATRIX									
											V/S	GR	LS	OT	SD	CY						
18709	7.3	0.0	7.3	166.6	116.0	50.6	44.9	5.7	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
-711	2.9	0.0	2.9	150.3	51.5	98.8	88.5	10.3	1	33												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS				NON MAG	CALC V.G. ASSAY	REMARKS
					T	P	T	P			
18709	N										
-711	Y		100 X 150	25 C		1			1	EST. 50% PYRITE 50 GRAINS ARSENOPYRITE	
									1	88.5 33	

MASTER FILE

Appendix 8-47C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT % -63um	WT % +10	WT % SAND	REMARKS
18709	20303	51-55	4. M O NE-NE 36 64 24 K	RL. SILT	51-55	0.0	7300.0	-2.0	44.9	5.7	-1.0	-1.0	-1.0	-1	-1	-1	
18710	20303	55-64	9. M O NE-NE 36 64 24 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18742R	20303	55-64	9.0 M O NE-NE 36 64 24 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18711	20303	51-64	13. M O NE-NE 36 64 24 K	SLUICE BOX	51-64	1.0	2900.0	-2.0	88.5	10.3	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18709	44	0.24	0	240	10000	22.70	100	140	140	110	0	14	-10	6	-0.5	0	-10	0.5	200	134	33	2	16	50	-2	44.0	5.6	6	32.60
18711	63	0.21	39	60	10000	21.70	80	140	180	150	0	-2	-10	2	-0.5	0	-10	0.2	-100	20	4	1	16	19	-2	5.2	-1.1	31	67.70

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18709	2.000	5.30	2000	740	120	220	-1	62	-0.5	21	0.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18710	-7	-0.2	-1.0	300	0.0	1	18.0	0.0	50	40	0	3	-100	23.3	6	0.0	2	88	0	0.00	0.0	-10	0	0.96	-1.0	-10	0.0	-0.5	-10	-3	-0.5	0	0	0
18742R	-7	-0.2	-1.0	-400	0.0	-1	18.0	0.0	50	40	0	2	-100	24.0	7	0.0	3	88	0	0.00	0.0	-10	0	0.97	-1.0	-10	0.0	1.0	-10	-3	-0.5	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18710	88	12	170	0	2.5	0	0	0	0.00	1	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0
18742R	95	6	180	0	2.5	0	0	0	0.00	1	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-48A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20401

Drilling Completion Date 1/7/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -13-63N-22W

County Koochiching

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1290 ft.

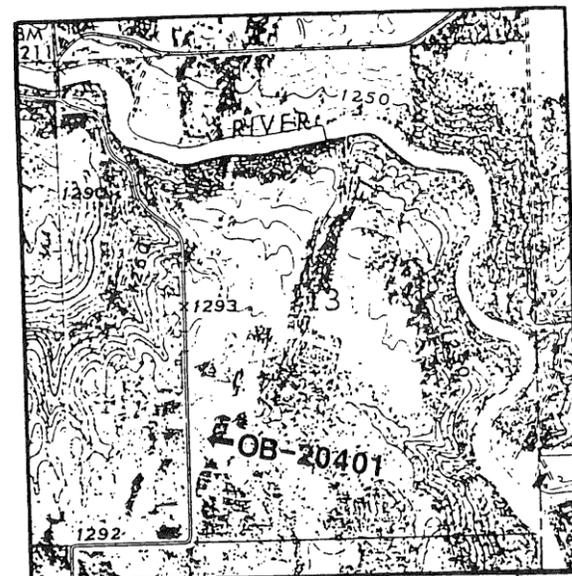
Total Depth 113.5 ft.

Elevation, Top of Precambrian Bedrock 1178 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS				
	TABLE	+10 SPLIT	CHIPS	TABLE	M.I. CONC.	NON MAG	CONC.		NON MAG	NO. V.G.	CALC PPB	CLAST		MATRIX									
		FEED	CONC	CONC	LIGHTS	TOTAL	MAG	MAG	V.G.	PPB	SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY				
												V/S	GR	LS	OT								
18650	5.3	0.4	4.9	161.2	145.6	15.6	13.6	2.0	0	0	NA	P	20	80	NA	NA	U	Y	Y	Y	GB	GB	TILL
-651	10.1	0.4	9.7	172.8	144.9	27.9	23.6	4.3	0	0	NA	P	70	30	NA	NA	U	Y	Y	Y	GB	GB	TILL
-654	2.4	0.0	2.4	89.1	78.8	10.3	9.1	1.2	2	483													
18754C	2.6	0.1	2.5	90.7	78.6	12.1	9.8	2.3	0	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-93	Des Moines Lobe Gl. Drift			
93-112	Rainy Lobe Gl. Drift	F	B, C	B = W, Cu, Pb C = Ni, Cu, Mo
112-113.5	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain, Probably Quartz Diorite. Medium gray, well foliated quartz diorite. Grain size variable 0.2-1.0 between chips. Interlocking, equigranular at chip scale. Comprised of 60% plag., 20% qtz., 10-20% hornblende and 10% biotite. 2% dissem. calcite and 0.5% dissem. pyrite. (By ODM, see report in Appendix.)

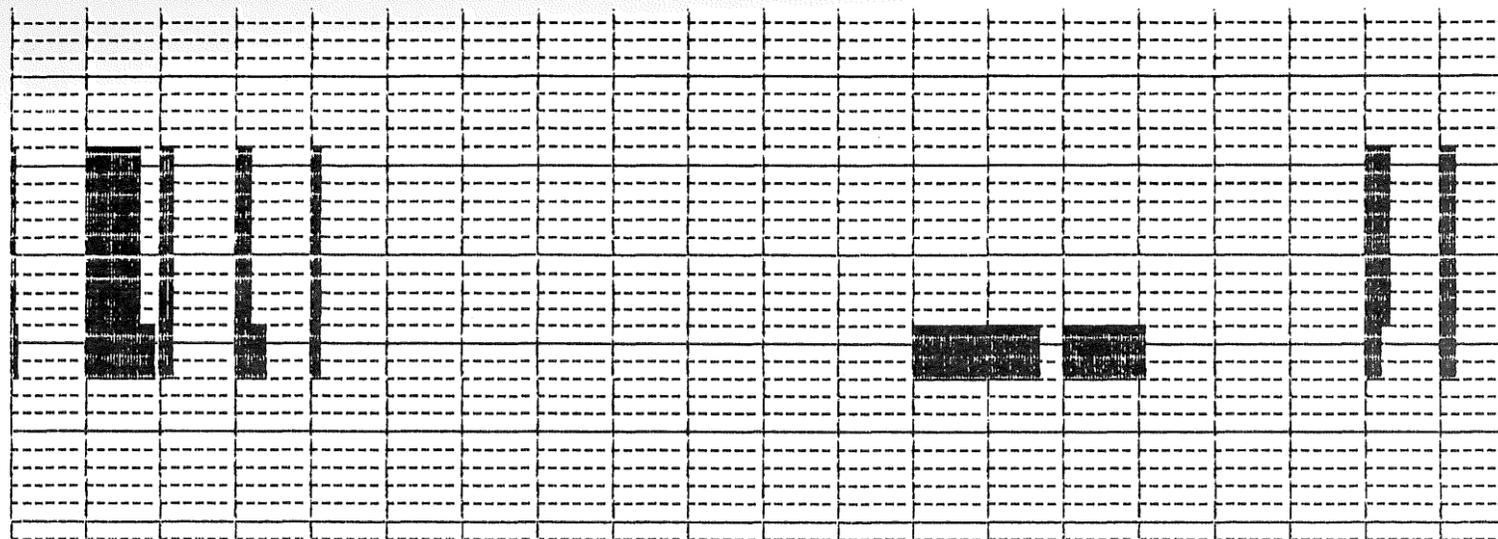
Thin Section Number: #18652 and #18653.

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

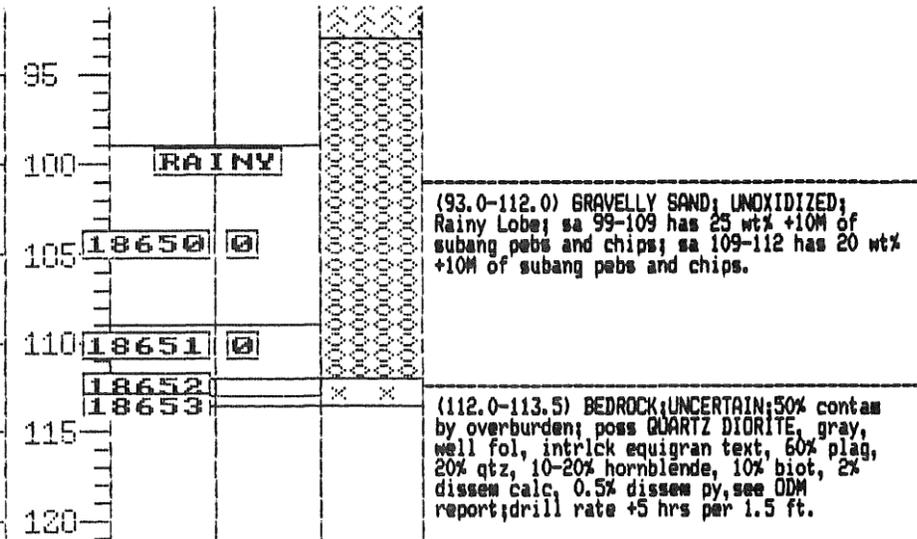
SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				T	P	T	P	T	P				TOTAL GMS
18650	N												
-651	N												
-654	Y	75 X 125	20 C			1				1			EST. 3% PYRITE
		100 X 150	25 C			1				1			3% ARSENOPYRITE (FINE)
										2	9.1	483	
18754C	Y												EST. 5% PYRITE 0.5% ARSENOPYRITE

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RECLEAVED 99-112

SLUICE BOX 99-113.5



18754C ①

Py, Aspy

18654 ②

Py, Aspy

MASTER FILE

Appendix 8-48C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18650	20401	99-109	10. M D SE-SW 13 63 22 K	RL. GVL. SAND	99-109	0.0	5300.0	-2.0	13.6	2.0	-1.0	-1.0	-1	-1	-1		
18754C	20401	99-112	13. M D SE-SW 13 63 22 K	SPECIAL SAMPLE	99-112	0.0	2600.0	-2.0	9.8	2.3	-1.0	-1.0	-1	-1	-1		RECLEANED +10M MAT'L
18651	20401	109-112	3. M D SE-SW 13 63 22 K	RL. GVL. SAND	109-112	0.0	10100.0	-2.0	23.6	4.3	-1.0	-1.0	-1	-1	-1		
18652	20401	112-113	1. M D SE-SW 13 63 22 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18653	20401	113-113.5	0.5 M D SE-SW 13 63 22 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18654	20401	99-113.5	14.5 M D SE-SW 13 63 22 K	SLUICE BOX	99-113.5	2.0	2400.0	-2.0	9.1	1.2	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18650	-5	0.14	0	240	12000	26.20	100	170	420	140	0	11	-20	5	-0.5	0	-10	-0.9	-700	225	26	11	800	111	-2	83.0	12.5	3	9.92
18651	-35	0.13	0	250	9700	23.90	100	200	540	120	0	19	-10	10	-0.5	0	27	-0.8	-700	205	47	4	4500	86	-2	73.0	9.7	2	17.40
18754C	24	-0.05	369	240	10000	24.20	120	140	690	130	0	14	-10	8	-0.5	0	-10	0.7	-300	249	41	-1	1900	48	-2	31.0	6.2	4	6.55
18654	410	0.16	505	400	11000	26.20	190	170	310	160	0	32	-10	8	-0.5	0	-10	-1.3	-1600	362	70	12	4200	111	-2	130.0	10.7	4	6.91

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18651	1.200	4.80	1300	760	350	320	-1	119	-0.5	34	0.4

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18652	-6	-0.2	3.0	500	0.0	1	43.0	0.0	60	10	0	-2	-100	3.8	23	0.0	3	58	0	0.00	0.0	-10	0	2.20	-1.0	-10	0.0	4.9	-10	20	1.4	0	0	0
18653	-6	0.3	5.0	500	0.0	-1	52.0	0.0	70	20	0	3	-100	4.7	33	0.0	2	68	0	0.00	0.0	-10	0	1.60	-1.0	-10	0.0	8.0	-10	9	1.7	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18652	39	19	77	0	1.0	0	0	0	0.00	2	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0
18653	45	20	110	0	1.5	0	0	0	0.00	2	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-49A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20402

Drilling Completion Date 12/31/86

LOCATION (see map at right)

S-T-R NW¼-SW¼-36-63N-22W

County Koochiching

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1330 ft.

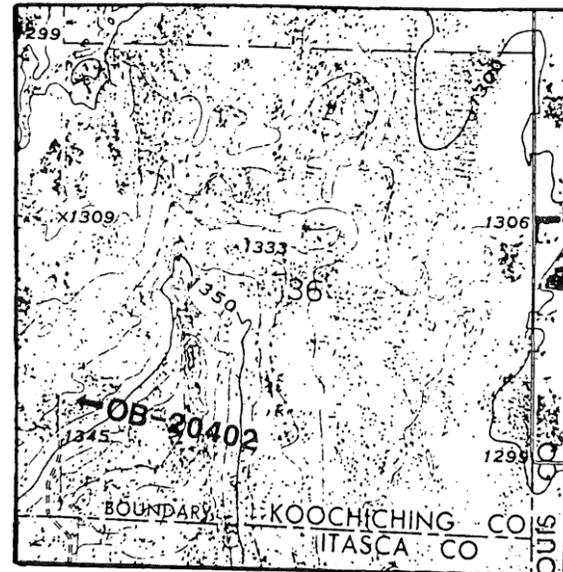
Total Depth 59.5 ft.

Elevation, Top of Precambrian Bedrock 1272 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU	DESCRIPTION										CLASS				
	TABLE SPLIT	+10 CHIPS	FEED	TABLE CONC	M.I. LIGHTS	CONC. TOTAL		NON MAG	NO. MAG	CALC V.G.	PPB	CLAST					MATRIX					
										SIZE	%	S/U SD			ST CY		COLOR					
										V/S	GR	LS	OT	SD		CY						
18646	10.5	0.6	9.9	283.8	246.9	36.9	30.0	6.9	0	NA	F	15	85	NA	NA	U	Y	Y	Y	B	B	TILL
-647	7.3	0.0	7.3	176.4	145.4	31.0	24.0	7.0	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-649	3.2	0.0	3.2	99.1	81.5	17.6	14.8	2.8	3	117												
18753C	4.4	0.0	4.4	14.9	0.0	14.9	11.9	3.0	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-48	Des Moines Lobe Gl. Drift	No	No	
48-58	Rainy Lobe Gl. Drift	F	B,C	B = Cu, Se, W, Pb C = Ni, Cu, Mo
58-59.5	Bedrock	F	I	I = W, Pb

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain

Thin Section Description: #18648

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY	REMARKS	
					ABRADED		IRREGULAR		DELICATE					TOTAL GMS
					T	P	T	P	T	P		PPB		
18646	N		NO VISIBLE GOLD											
-647	N		NO VISIBLE GOLD											
-649	Y		25 X 50	8 C	1				1				EST. 3% PYRITE	
			25 X 125	15 C			1		1				5% ARSENOPYRITE	
			75 X 100	18 C	1				1				(FINE)	
											3	14.8	117	
18753C	N		NO VISIBLE GOLD											

MASTER FILE

Appendix 8-49C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTB	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18646	20402	48-58	10. M D NW-SW 36 63 22 K	RL. MED. TO C. SAND	48-58	0.0	10500.0	-2.0	30.0	6.9	-1.0	-1.0	-1.0	-1.0	-1	-1	
18647	20402	58-58.5	0.5 M D NW-SW 36 63 22 K	BEDROCK	58-58.5	0.0	7300.0	-2.0	24.0	7.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
18648	20402	58.5-59.5	1. M D NW-SW 36 63 22 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
18753C	20402	48-58.5	10.5 M D NW-SW 36 63 22 K	SPECIAL SAMPLE	48-58.5	0.0	4400.0	-2.0	11.9	3.0	-1.0	-1.0	-1.0	-1.0	-1	-1	RECLEANED +10M MAT'L
18649	20402	48-59.5	11.5 M D NW-SW 36 63 22 K	SLUICE BOX	48-59.5	3.0	3200.0	-2.0	14.8	2.8	-1.0	-1.0	-1.0	-1.0	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18646	96	0.20	0	420	12000	23.70	140	160	560	130	0	23	-10	5	2.0	0	-10	0.7	400	355	66	12	19	55	-2	130.0	13.3	3	21.70
18647	70	0.21	0	360	12000	27.50	130	160	540	120	0	23	-10	5	0.5	0	-10	0.5	-300	233	50	7	51	45	-2	81.0	10.6	3	17.50
18753C	56	0.22	449	350	13000	21.70	140	130	440	150	0	20	-20	6	-0.5	0	-10	1.0	1000	307	82	8	38	57	-2	110.0	12.5	3	8.72
18649	120	0.27	686	580	12000	25.20	170	230	290	170	0	26	50	10	-0.5	0	-10	-0.8	-1400	496	120	11	2800	196	-2	180.0	19.3	5	10.70

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18646	1.300	4.30	1300	1700	200	270	-1	179	-0.5	28	0.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18648	-7	0.4	4.0	300	0.0	-1	31.0	0.0	50	20	0	3	-100	5.6	17	0.0	4	60	0	0.00	0.0	-10	0	2.40	-1.0	-10	0.0	4.4	-10	270	1.3	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18648	61	183	72	0	1.0	0	0	0	0.00	2	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-50A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

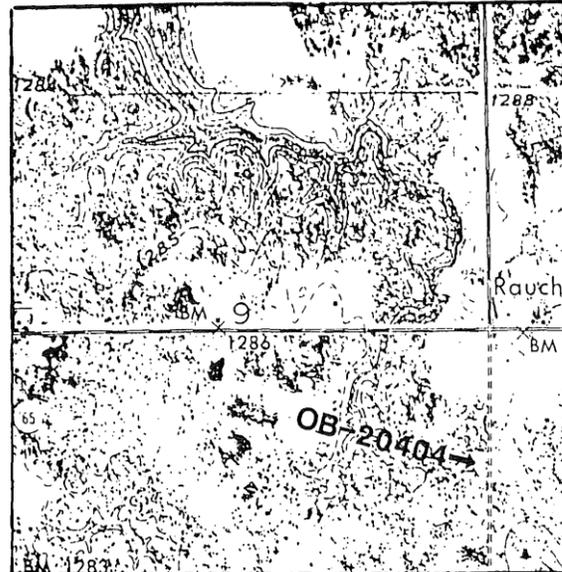
DNR Drill Hole Number OB-20404
 Drilling Completion Date 1/21/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SE $\frac{1}{4}$ -9-63N-22W
 County Koochiching
 Quadrangle Rauch 7.5
 Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1285 ft.
 Total Depth 126 ft.
 Elevation, Top of Precambrian Bedrock 1164 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-121	Des Moines Lobe Gl. Drift			
121-126	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Graywacke. Dark gray, well foliated graywacke. Grain size: sugar 0.05-0.15 and garnet metacryst 0.3-0.5 with sugary texture, no relict sand grains. Comprised of 75% qtz.-plag. sugar, 25% biotite and trace garnet metacrysts. 0.2% dissem. pyrite. (By ODM, see report in Appendix)

Thin Section Number: #18684.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

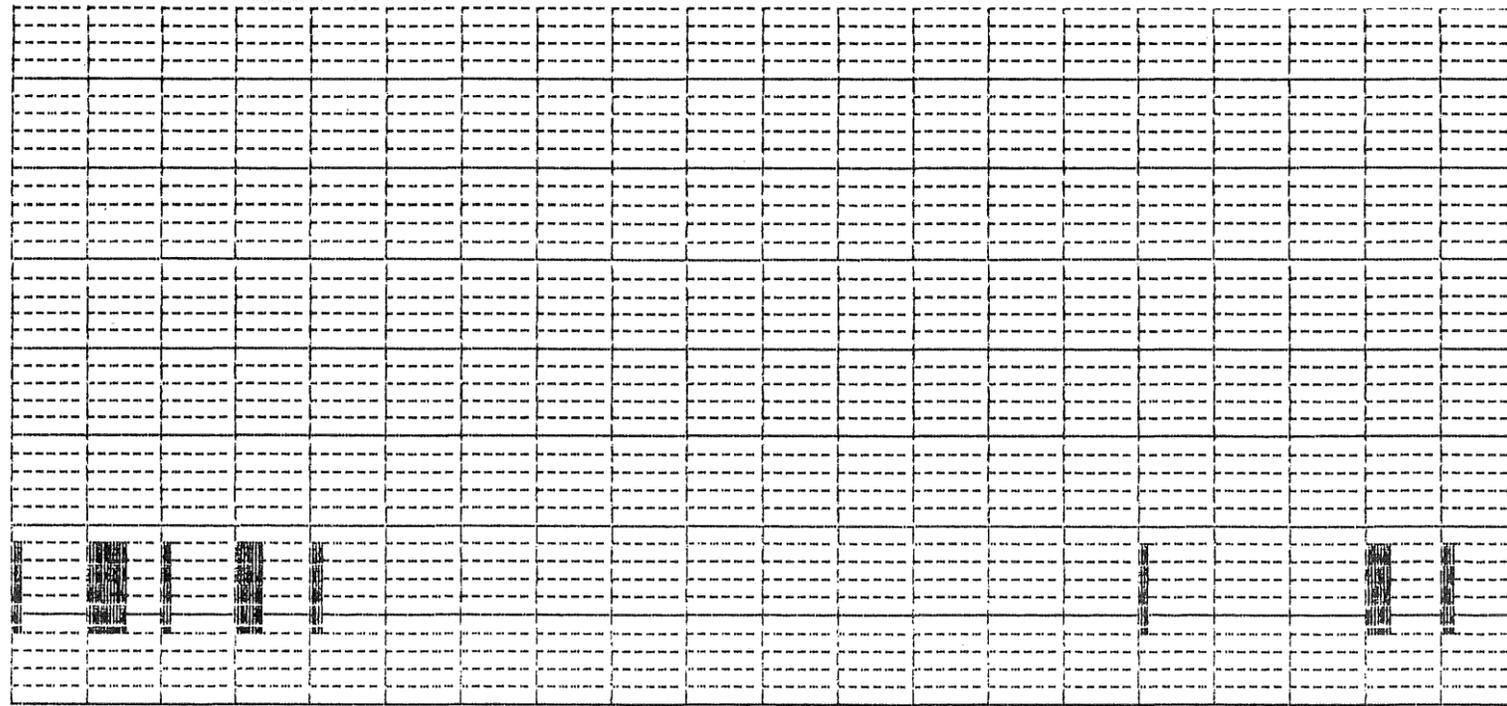
SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU	DESCRIPTION					CLASS					
	TABLE +10 SPLIT	TABLE CHIPS	TABLE FEED	M. I. CONC				CLAST		MATRIX								
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL		NON MAG	NO. MAG	CALC V.G.	PPB	SIZE		%	S/U SD	ST CY	COLOR	
18685	1.8	0.0	1.8	102.5	97.1	5.4	4.9	0.5	0	NA								

GOLD CLASSIFICATION

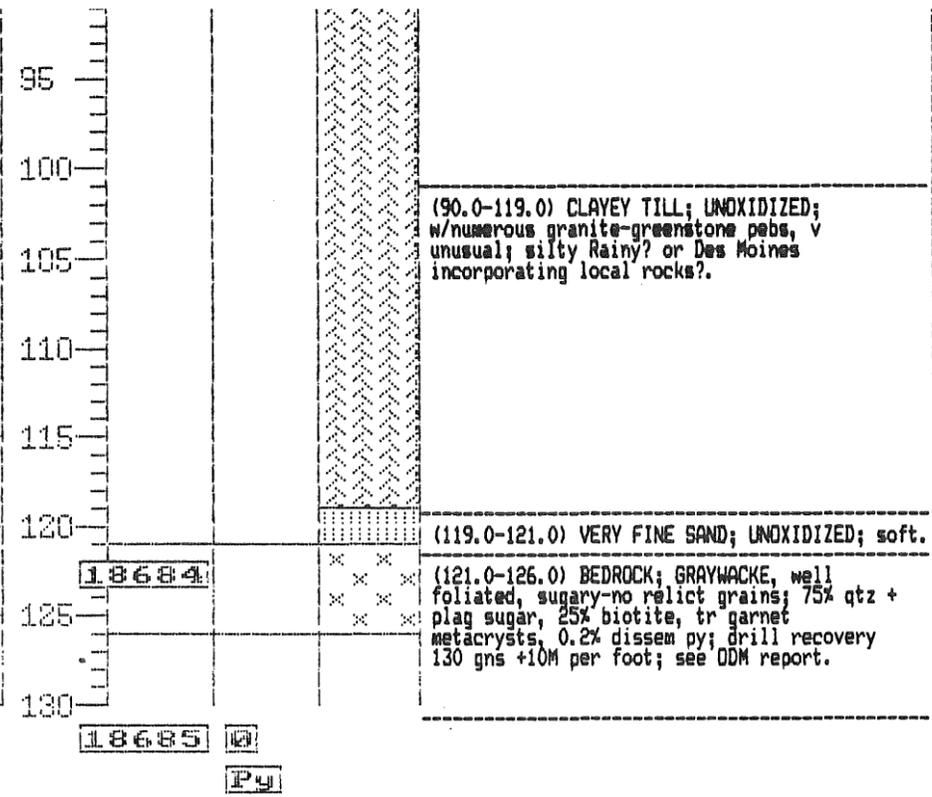
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY	REMARKS
					ABRADED	IRREGULAR	DELICATE	TOTAL	GMS	PPB			
18685	Y												EST. 10% PYRITE

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SLUICE BOX 121-126



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS	
18684	20404	121-126	5. M O SE-SE 9 63 22 K		BEDROCK			-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18685	20404	121-126	5. M O SE-SE 9 63 22 K		SLUICE BOX	121-126		0.0	1800.0	-2.0	4.9	0.5	-1.0	-1.0	-1	-1	-1		

Appendix 8-50C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18685	65	0.28	546	310	12000	31.30	220	400	300	130	0	21	-20	9	0.5	0	-10	-0.7	1000	293	52	7	31	35	2	96.0	15.8	3	4.07

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18684	-6	-0.2	2.0	700	0.0	-1	47.0	0.0	100	20	0	4	-100	4.9	30	0.0	4	69	0	0.00	0.0	-10	0	2.60	-1.0	-10	0.0	6.5	-10	2	1.6	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18684	59	15	82	0	1.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-51A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20405

Drilling Completion Date 1/13/87

LOCATION (see map at right)

S-T-R NW¼-SE¼-19-63N-22W

County Koochiching

Quadrangle Rauch 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1280 ft.

Total Depth 107 ft.

Elevation, Top of Precambrian Bedrock 1174.3 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU		DESCRIPTION						CLASS							
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC	NON MAG	CONC. LIGHTS	NON MAG	NO. V.G.	CALC PPB	CLAST			MATRIX									
										SIZE	%	S/U	SD	ST	CY	COLOR						
										V/S	GR	LS	OT	SD			CY					
18663	8.0	1.1	6.9	334.6	301.3	33.3	28.8	4.5	0	NA	P	70	30	NA	NA	U	Y	Y	Y	B	GB	TILL
-665	3.2	0.0	3.2	136.1	118.7	17.4	15.0	2.4	1	2												

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-41	No Observations			
41-99	Des Moines Lobe Gl. Drift	No	No	
99-105.7	Rainy Lobe Gl. Drift	F	B,C	
105.7-107	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain

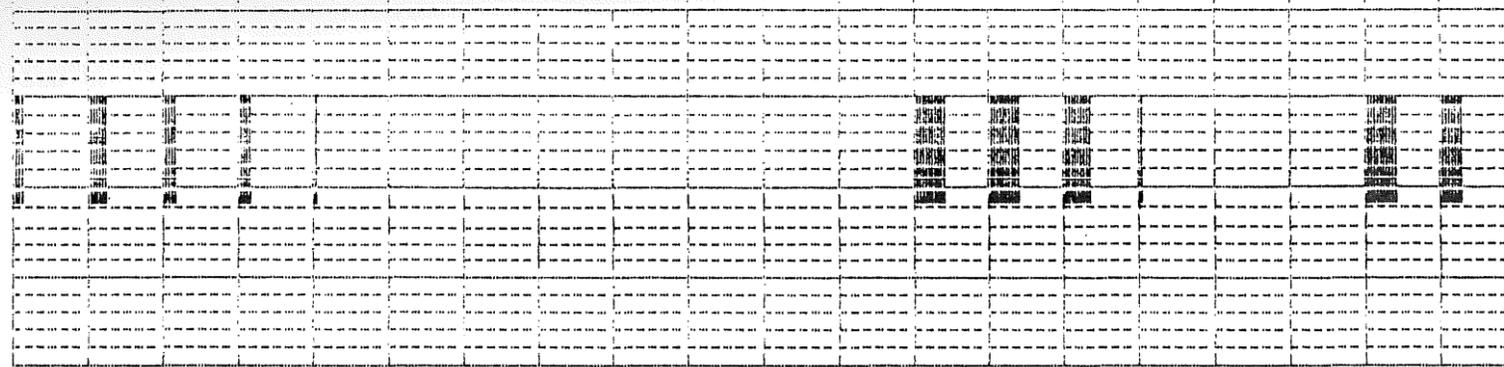
Thin Section Description: #18664

GOLD CLASSIFICATION

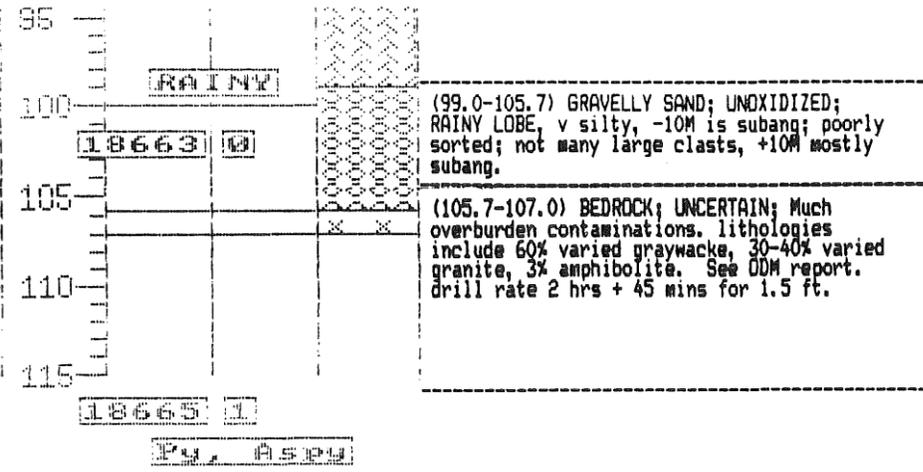
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				ABRADED		IRREGULAR		DELICATE					
				T	P	T	P	T	P	TOTAL GMS			
18663	N	NO VISIBLE GOLD											
-665	Y	25 X	25	5	0	1						1	
											EST. 7% PYRITE		
											50 GRAINS ARSENOPYRITE		

IN NON MAG HMC					IN -63 MICRON							IN MAG FRAC				NON MAG -63			NON MAG HMC		HMC SAMPLE #	# GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS	
^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	(FEET)					
																					5				
																						10			
																						15			
																						20			(0.0-41.0) NO OBSERVATIONS; UNDETERMINED whether Des Moines, clayey till or lake clay.
																						25			
																						30			
																						35			
																						40	DES MOINES		
																						45			
																						50			
																						55			(41.0-71.0) CLAY; UNOXIDIZED; lake sed; observations 41-45, 50-55, and 62-71.
																						60			
																						65			
																						70			
																						75			(71.0-83.0) NO OBSERVATIONS; UNDETERMINED whether Des Moines, clayey till or lake clay.
																						80			
																						85			
																						90			(83.0-99.0) CLAYEY TILL; UNOXIDIZED; w/ ls pebs and sh pebs; prob trans to Rainy 95.5-99.



SLICE BOX 100-107



MASTER FILE

Appendix 8-51C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NDMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18663	20405	100-105.75	5.8 M O NW-SE 19 63 22 K		RL. GVL. SAND	100-105.75	0.0	8000.0	-2.0	28.8	4.5	-1.0	-1.0	-1	-1	-1		
18664	20405	105.75-107	1.3 M O NW-SE 19 63 22 K		BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18665	20405	100-107	7. M O NW-SE 19 63 22 K		SLUICE BOX	100-107	1.0	3200.0	-2.0	15.0	2.4	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18663	-14	0.16	0	440	13000	27.60	110	200	140	120	0	24	-10	4	-0.5	0	-10	0.9	-300	194	30	4	28	50	-2	71.0	6.8	4	20.50
18665	80	0.17	515	710	13000	30.90	130	180	150	170	0	23	-10	5	-0.5	0	-10	0.8	-600	292	56	7	110	55	-2	120.0	14.2	5	11.30

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18663	1.400	6.20	1000	200	51	360	-1	34	-0.5	19	0.6

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18664	-6	-0.2	3.0	600	0.0	2	37.0	0.0	60	10	0	3	-100	3.2	21	0.0	2	45	0	0.00	0.0	-10	0	2.80	-1.0	-10	0.0	5.6	-10	4	1.3	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FeO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18664	25	16	63	0	1.5	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20502

Drilling Completion Date 1/14/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -SE $\frac{1}{4}$ -36-64N-22W

County Koochiching

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1300 ft.

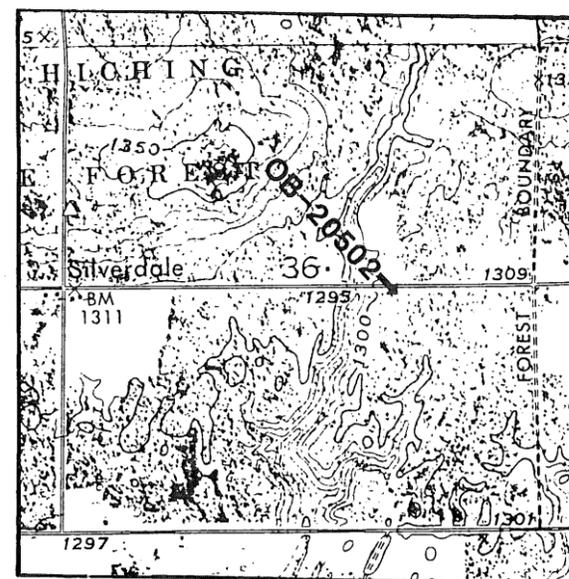
Total Depth 208 ft.

Elevation, Top of Precambrian Bedrock 1098 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-127	Des Moines Lobe Gl. Drift			
127-202	Rainy Lobe Gl. Drift	F	B,C	B = Au,As,Se, Mo,Pb C = Mo,Ni
202-208	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Graywacke. Light gray, well foliated graywacke. Grain size from 0.1-0.3 mm with a sugary texture and no relict sand. Comprised of 60-70% plag., 15-20% qtz., and 20% biotite with trace dissem. calcite and 0.2% dissem. pyrite. (By ODM, see report in Appendix.)

Thin Section Number: #18673.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU			DESCRIPTION						CLASS						
	TABLE SPLIT	+10 CHIPS	FEED	TABLE CONC	M. I. CONC		NO. V.G.	CALC PPB	CLAST			MATRIX										
					LIGHTS	TOTAL			SIZE	%	S/U	SD	ST	CY	COLOR							
18666	7.5	0.7	6.8	82.6	71.7	10.9	8.4	2.5	0	NA	G	75	25	NA	NA	U	Y	Y	Y	GB	B	TILL
-667	6.7	4.6	4.1	277.9	261.0	16.9	12.7	4.2	0	NA	P	40	60	NA	NA	U	Y	Y	Y	B	GB	TILL
-668A	9.7	1.2	8.5	78.4	60.9	17.5	11.3	6.2	0	NA	C	70	30	NA	NA	U	Y	Y	Y	GB	B	TILL
-668B	10.5	2.0	8.5	104.7	87.1	17.6	11.2	6.4	0	NA	P	55	45	NA	NA	U	Y	Y	Y	GB	B	TILL
-669	8.7	4.4	4.3	44.4	39.2	5.2	3.6	1.6	0	NA	C	65	35	NA	NA	U	Y	Y	Y	GB	B	TILL
-670	6.0	0.4	5.6	109.4	94.2	15.2	11.0	4.2	0	NA	P	50	50	NA	NA	U	Y	Y	Y	B	GB	TILL
-671	12.0	0.0	12.0	104.5	76.5	28.0	18.3	9.7	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-672	6.5	0.0	6.5	237.3	210.9	26.4	18.7	7.7	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-674	6.2	0.0	6.2	149.9	135.9	14.0	6.3	7.7	3	916												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS	
					ABRADED		IRREGULAR		DELICATE					TOTAL GMS
					T	P	T	P	T	P				
18666	N		NO VISIBLE GOLD											
-667	N		NO VISIBLE GOLD											
-668A	N		NO VISIBLE GOLD											
-668B	N		NO VISIBLE GOLD											
-669	N		NO VISIBLE GOLD											
-670	N		NO VISIBLE GOLD											
-671	N		NO VISIBLE GOLD											
-672	N		NO VISIBLE GOLD											
-674	Y		50 X 50	10 C						1				
			50 X 100	15 C						1				
			125 X 175	29 C						1				
											3	6.3	916	

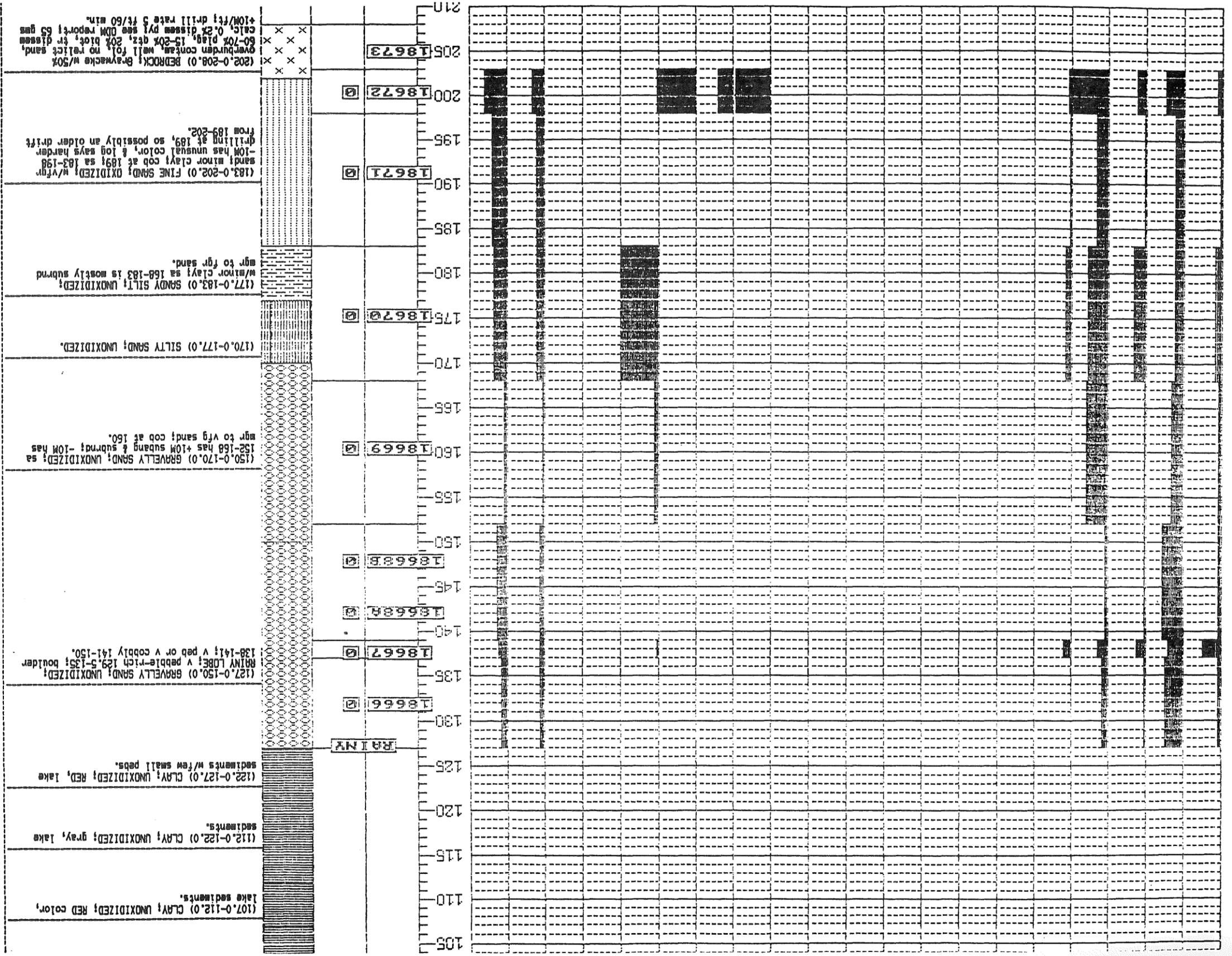
IN NON MAG HMC						IN -63 MICRON						IN MAG FRAC						NON MAG -63		-63 NON MAG HMC		MAG																				
^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg			

HMC SAMPLE #	HMC GOLD GRAINS INDICATORS	LITHOLOGY
		DES MOINES

(FEET)	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
5	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	(14.0-107.0) CLAY; UNOXIDIZED; w/silty clay, gray, lake sediments, few observations.
60	
65	
70	
75	
80	
85	
90	
95	
100	

(0.0-14.0) CLAY; OXIDIZED; dark brown at 14 but grayer above, unusual.

(14.0-107.0) CLAY; UNOXIDIZED; w/silty clay, gray, lake sediments, few observations.



MASTER FILE

Appendix 8-52C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FT6	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18666	20502	127-137	10. M 0 NW-SE 36 64 22 K	RL. GVL. SAND	127-137	0.0	7500.0	-2.0	8.4	2.5	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18667	20502	137-139	2. M 0 NW-SE 36 64 22 K	PEBBLES/BOULDERS	137-139	0.0	8700.0	-2.0	12.7	4.2	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18668A	20502	139-152	13. M 0 NW-SE 36 64 22 K	RL. GVL. SAND	139-152	0.0	9700.0	-2.0	11.3	6.2	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18668B	20502	139-152	13.0 M 0 NW-SE 36 64 22 K	RL. GVL. SAND	139-152	0.0	10500.0	2000.0	11.2	6.4	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18669	20502	152-168	16. M 0 NW-SE 36 64 22 K	RL. GVL. SAND	152-168	0.0	8700.0	-2.0	3.6	1.6	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18670	20502	168-183	15. M 0 NW-SE 36 64 22 K	RL. F. TO V.F. SAND	168-183	0.0	6000.0	-2.0	11.0	4.2	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18671	20502	183-198	15. M 0 NW-SE 36 64 22 K	RL. F. TO V.F. SAND	183-198	0.0	12000.0	-2.0	18.3	9.7	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18672	20502	198-203	5. M 0 NW-SE 36 64 22 K	RL. F. TO V.F. SAND	198-203	0.0	6500.0	-2.0	18.7	7.7	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18673	20502	203-208	5. M 0 NW-SE 36 64 22 K	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1
18674	20502	127-208	81. M 0 NW-SE 36 64 22 K	SLUICE BOX	127-208	3.0	6200.0	-2.0	6.3	7.7	-1.0	-1.0	-1.0	-1.0	-1	-1	-1

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18666	-5	-0.05	0	50	14000	5.60	30	230	290	190	0	15	-10	4	0.5	0	-10	0.3	-100	99	12	3	5	72	-2	38.0	3.1	1	2.49
18667	-19	0.24	0	280	11000	30.30	110	170	230	190	0	93	40	7	-0.5	0	-10	1.2	-1200	337	48	17	64	77	-2	120.0	23.2	1	9.78
18668A	-5	0.05	0	-50	13000	4.80	20	190	340	180	0	18	-10	2	1.0	0	-10	0.2	-100	85	11	1	21	96	-2	30.0	3.1	1	2.40
18668B	830	0.05	0	-50	13000	4.70	30	190	300	170	0	12	-10	10	0.5	0	-10	-0.2	-100	97	12	2	23	133	-2	37.0	3.7	-1	2.64
18669	55	-0.05	0	-50	13000	4.70	20	200	200	170	0	13	-10	15	-0.5	0	-10	0.2	-100	73	11	1	10	56	-2	25.0	2.6	0	2.19
18670	790	0.20	0	370	11000	26.70	90	160	150	120	0	29	-20	14	-0.5	0	-10	1.7	1000	546	110	9	43	68	-2	180.0	22.2	2	8.03
18671	-5	0.06	0	60	12000	4.60	10	140	150	150	0	4	20	8	-0.5	0	-10	0.3	200	110	17	2	6	67	-2	41.0	2.8	2	1.99
18672	-16	0.34	0	270	8200	27.10	150	180	280	110	0	20	-10	39	-0.5	0	-10	1.2	-400	306	54	8	14	53	-2	120.0	16.1	3	13.60
18674	350	0.25	1060	460	11000	26.70	180	230	240	170	0	50	-20	11	-0.5	0	-10	-0.6	500	656	98	13	85	67	-2	270.0	24.4	1	19.50

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18672	1.100	3.20	2900	460	240	180	-1	730	-0.5	19	1.2

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18673	-6	-0.2	-1.0	600	0.0	2	33.0	0.0	50	10	0	3	-100	2.7	19	0.0	3	40	0	0.00	0.0	-10	0	3.30	-1.0	-10	0.0	4.5	-10	-2	1.3	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FEG	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18673	20	15	52	0	1.5	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20601

Drilling Completion Date 1/8/87

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -NW $\frac{1}{4}$ -14-63N-21W

County St. Louis

Quadrangle Gheen N.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1300 ft.

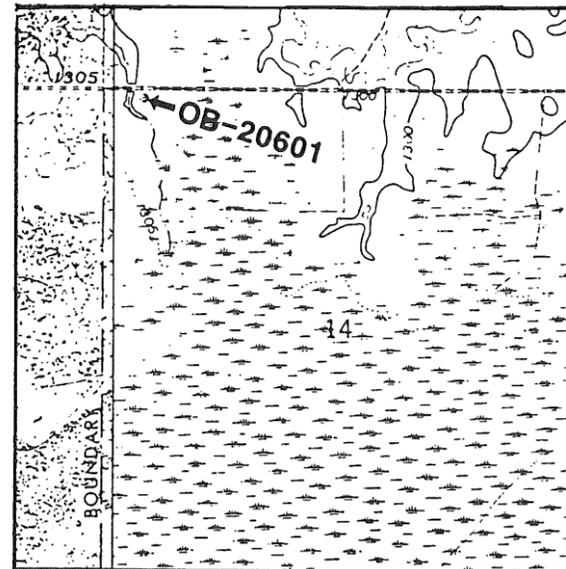
Total Depth 141 ft.

Elevation, Top of Precambrian Bedrock 1162 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-128	Des Moines Lobe Gl. Drift			
128-138	Rainy Lobe Gl. Drift	F	B,C	
138-141	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Granodiorite. White to pink, massive granodiorite. Grain size 0.5-1.5 equigranular, interlocking. Comprised of 60-70% white to pink (hem.-stained) feldspar, 30% quartz and 3% chlorite or biotite. (By ODM, see report in Appendix)

Thin Section Number: #18657.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

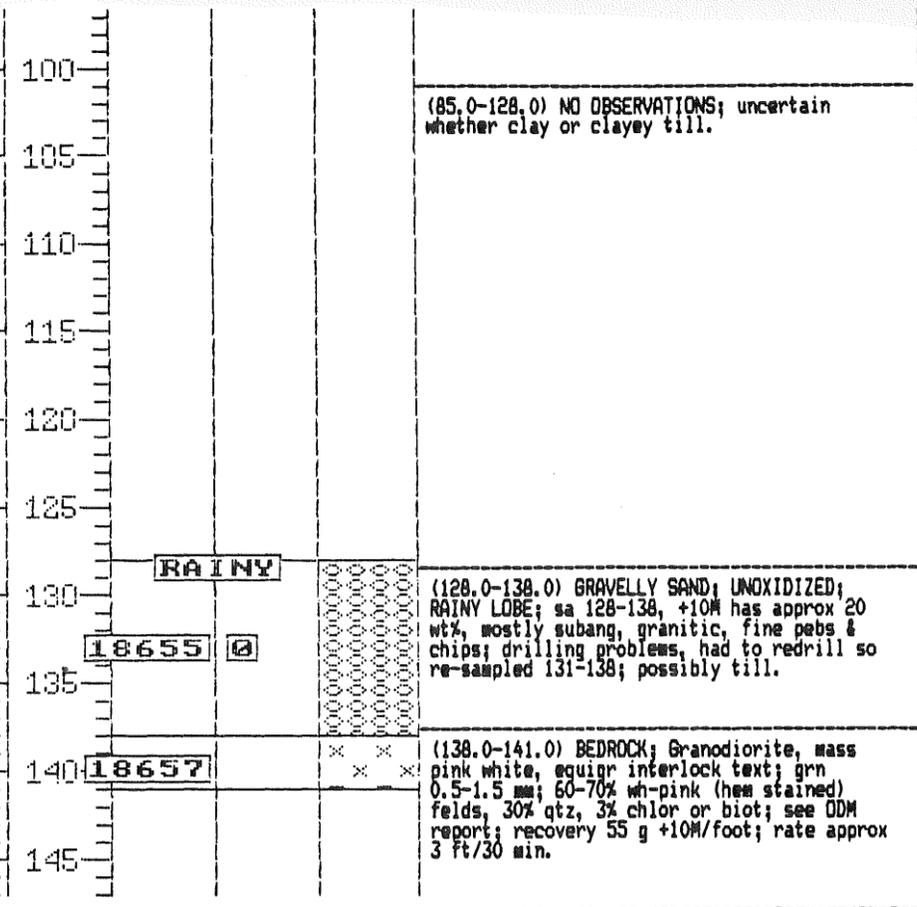
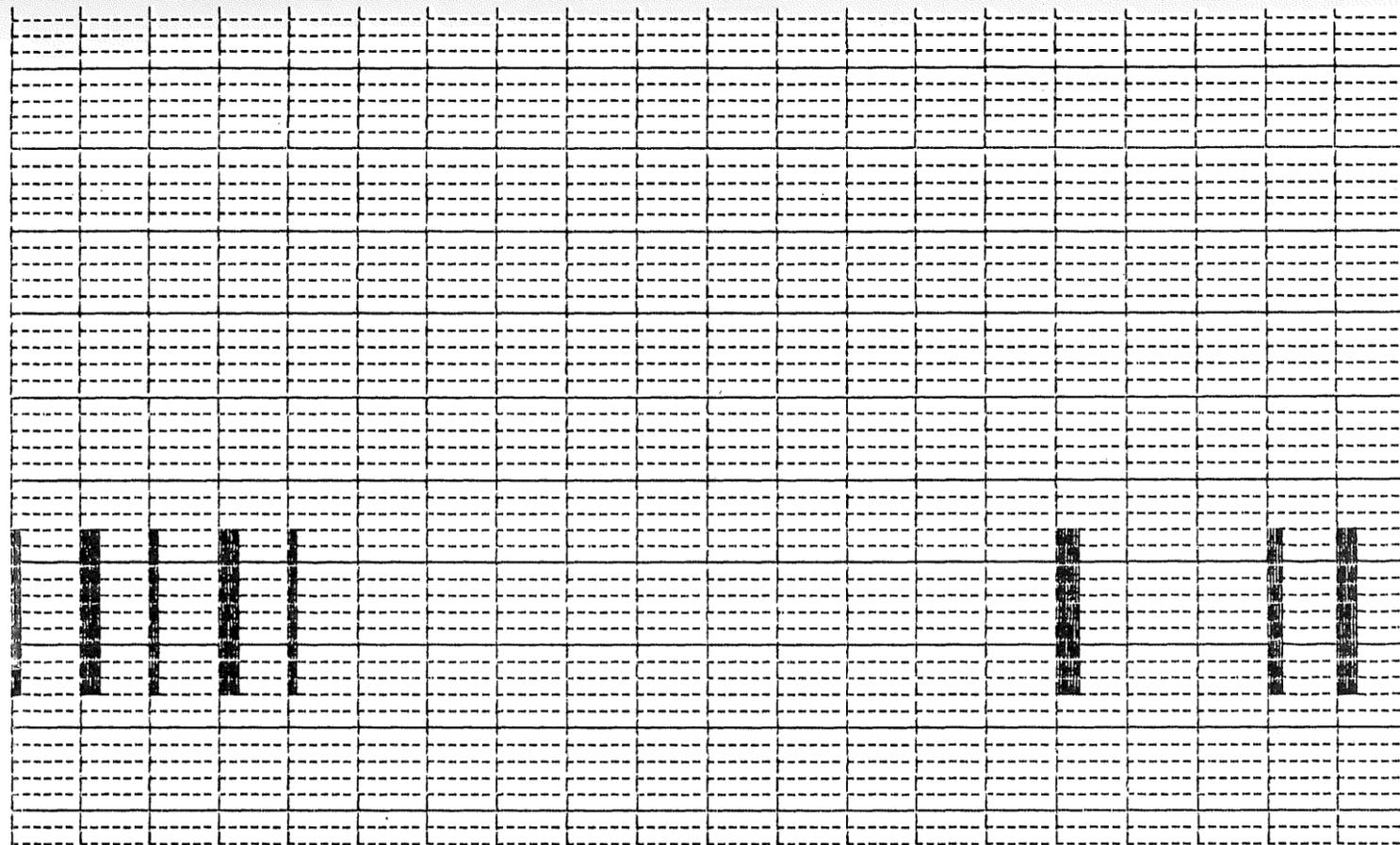
OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU		DESCRIPTION						CLASS							
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC			NO. V.G.	CALC PPB	CLAST			MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL			NON MAG	MAG	SIZE	%	S/U	SD		ST	CY	COLOR				
18655	8.4	0.4	8.0	126.6	102.1	24.5	19.6	4.9	0	NA	G/P	40	60	NA	NA	U	Y	Y	Y	B	B	TILL
-656	6.7	0.4	6.3	78.6	61.3	17.3	13.5	3.8	0	NA	G/P	15	85	NA	NA	U	Y	Y	Y	B	B	TILL
-658	5.2	0.0	5.2	126.4	98.7	27.7	24.6	3.1	1	61												
18756C	7.3	0.0	7.3	175.9	152.1	23.8	21.3	2.5	1	18	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				T	P	T	P	T	P				TOTAL
18655	N												
-656	N												
-658	Y	75 X 125	20 C	1						1			EST. 20% PYRITE 1% ARSENOPYRITE (FINE)
18756C	Y	50 X 75	13 C	1						1			EST. 10% PYRITE
										1	21.3	18	



REDRILLED 131-138

RECLEANED 128-138

SLUICE BOX 128-141

18656 @

18756C 1

Py

18658 1

Py, Aspy

MASTER FILE

Appendix 8-53C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS	
18655	20601	128-138	10. M O NW-NW 14 63 21	SL	AL. GVL. SAND	128-138	0.0	8400.0	-2.0	19.6	4.9	-1.0	-1.0	-1	-1	-1			
18656	20601	131-138	7. M O NW-NW 14 63 21	SL	REDRILLED	131-138	0.0	6700.0	-2.0	13.5	3.8	-1.0	-1.0	-1	-1	-1			REDRILLED
18756C	20601	128-138	10. M O NW-NW 14 63 21	SL	SPECIAL SAMPLE	128-138	1.0	7300.0	-2.0	21.3	2.5	-1.0	-1.0	-1	-1	-1			RECLEANED +10M MAT'L
18657	20601	138-141	3. M O NW-NW 14 63 21	SL	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1			
18658	20601	128-141	13. M O NW-NW 14 63 21	SL	SLUICE BOX	128-141	1.0	5200.0	-2.0	24.6	3.1	-1.0	-1.0	-1	-1	-1			

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18655	160	0.10	0	210	11000	23.90	210	220	170	120	0	23	-10	7	1.0	0	-10	0.4	700	278	36	8	20	47	3	110.0	12.4	2	12.50
18656	-5	-0.05	0	-50	11000	5.50	50	300	250	160	0	5	-10	7	1.0	0	-10	0.2	200	81	12	-1	5	75	3	25.0	2.6	2	2.79
18756C	58	0.13	266	190	9300	25.10	160	160	140	120	0	24	-10	4	-0.5	0	-10	-0.6	800	178	21	-1	30	42	-2	58.0	9.1	3	15.50
18658	78	0.21	476	310	11000	27.80	250	250	190	150	0	19	-10	6	-0.5	0	-10	0.6	400	373	61	6	190	69	3	120.0	13.3	5	18.70

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18656	0.900	3.80	1100	180	76	230	-1	13	-0.5	63	0.6

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18657	-6	0.2	1.0	800	0.0	2	20.0	0.0	-50	-10	0	-2	-100	1.5	15	0.0	1	25	0	0.00	0.0	-10	0	4.00	-1.0	-10	0.0	2.7	-10	3	3.1	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S %	CL	K	CA	FED %	NIR	SR	NB	MDR	BAR	TAR	BI	LOI %	FE	
18657	12	17	45	0	1.5	0	0	0	0.00	4	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20603

Drilling Completion Date 12/30/86

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -32-63N-21W

County St. Louis

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1290 ft.

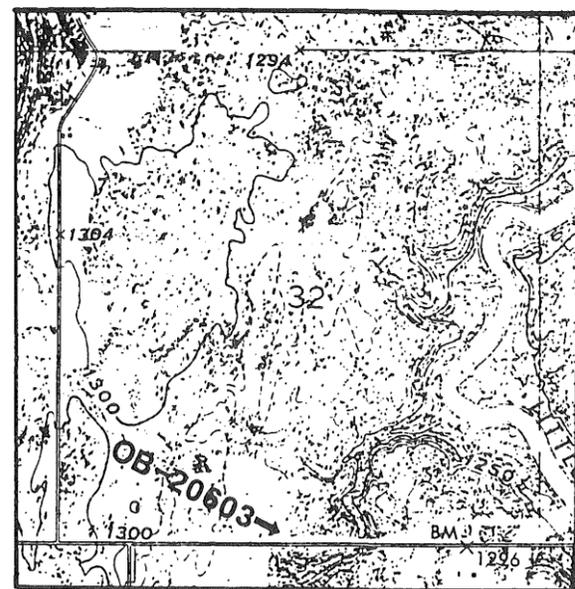
Total Depth 193 ft.

Elevation, Top of Precambrian Bedrock 1101 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE	+10	SPLIT	TABLE	M.I. CONC.	NON	NO.		CALC	CLAST					MATRIX							
	CHIPS	FEED	CONC	LIGHTS	TOTAL	MAG	MAG	V.G.	PPB	SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY				
										V/S	GR	LS	OT									
18642	11.3	0.0	11.3	317.6	139.0	178.6	153.7	24.9	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	B	TILL
18643	9.8	0.0	9.8	259.3	66.4	192.9	165.1	27.8	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	BB	B	TILL
-644	9.6	0.2	9.4	277.4	117.7	159.7	115.5	44.2	0	NA	P	70	30	NA	NA	U	Y	Y	Y	GB	B	TILL
-645	4.7	0.0	4.7	200.0	70.0	130.0	101.8	28.2	3	66												
18752C	15.4	0.0	15.4	305.9	113.9	192.0	166.1	25.9	1	96	TR	NA	NA	NA	NA	U	Y	Y	Y	GYB	GYB	TILL
18755C	10.2	0.0	10.2	577.7	341.1	236.6	208.9	27.7	1	219	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-165	Des Moines Lobe Gl. Drift			
165-189	Rainy Lobe Gl. Drift	F	B,C	C = Ni
189-193	Bedrock			

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain

Thin Section Description: #18644

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS									
					ABRADED		IRREGULAR		DELICATE		TOTAL		GMS													
					T	P	T	P	T	P	T	P	T	P	T	P	T	P								
18642	N																									
18643	N																									
-644	N																									
-645	Y		25 X	50	8	1					1														EST. 25% PYRITE 1000 GRAINS ARSENOFYRITE (FINE)	
			50 X	75	13						1															
			125 X	200	31			1																		
											3				101.8										66	
18752C	Y		175 X	275	42	1									1										EST. 7% PYRITE	
															1										166.1	
																									96	
18755C	N		250 X	400	58			1							1											
																										1
																										208.9
																										219

IN NON MAG HMC						IN -63 MICRON						IN MAG FRAC						-63 NON MAG MAG			HMC SAMPLE #	HMC # GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 As	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	NON MAG ^500 Au	^63 Au	^100 g/kg	HMC ^10 g/kg	^2 g/kg					
																					DES MOINES			
																					5			
																					10			
																					15	(0.0-18.0) CLAY; OXIDIZED; lake sediment, brown.		
																					20			
																					25			
																					30			
																					35			
																					40			
																					45			
																					50	(18.0-130.0) CLAY; UNOXIDIZED; lake sediment, gray; ls pebs noted at 30, 44, 77; v soft at 120.		
																					55			
																					60			
																					65			
																					70			
																					75			
																					80			
																					85			
																					90			
																					95			
																					100			
																					105			
																					110			
																					115			
																					120			
																					125			
																					130			

1 IN NON MGS HMC 11

As 200 ~600
Cu ~500
Sb ~5
Mo ~25
Ba ~6000
As ~30
Cu ~100
Ni ~100
Sb ~10
Mo ~10
Zn ~300
Fe% ~10
Ni ~500
Pb ~50
Mo ~100
NON MGS ~50
Au ~500
Au ~20
g/kg ~100
g/kg ~10
HMC ~2

IN -63 MICRON 11

1 IN MGS FRAC 1

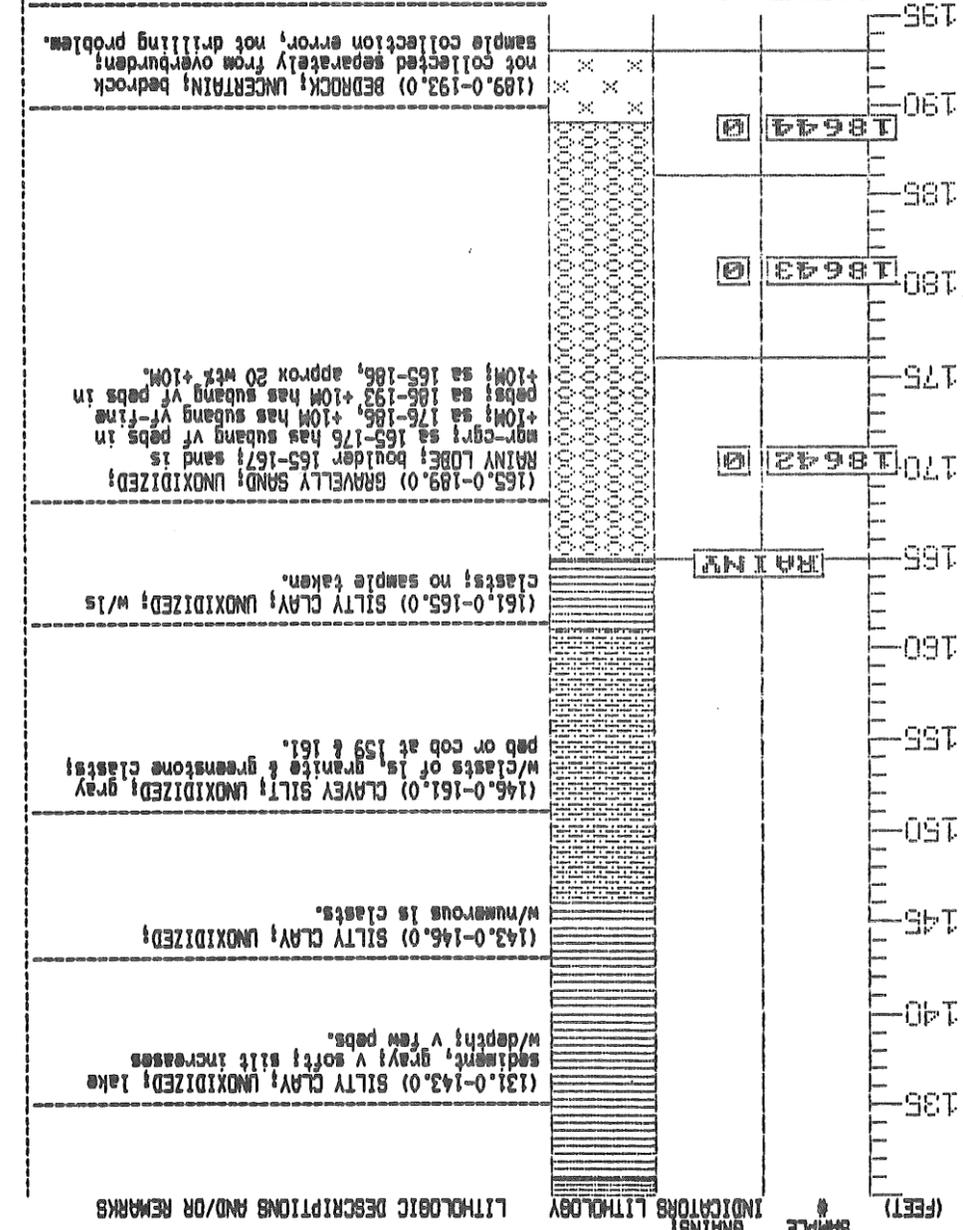
NON MGS ~53
Au ~500
Au ~20
g/kg ~100
g/kg ~10
HMC ~2

(FEET)

HMC SAMPLE

GOLD GRAINS INDICATORS LITHOLOGY

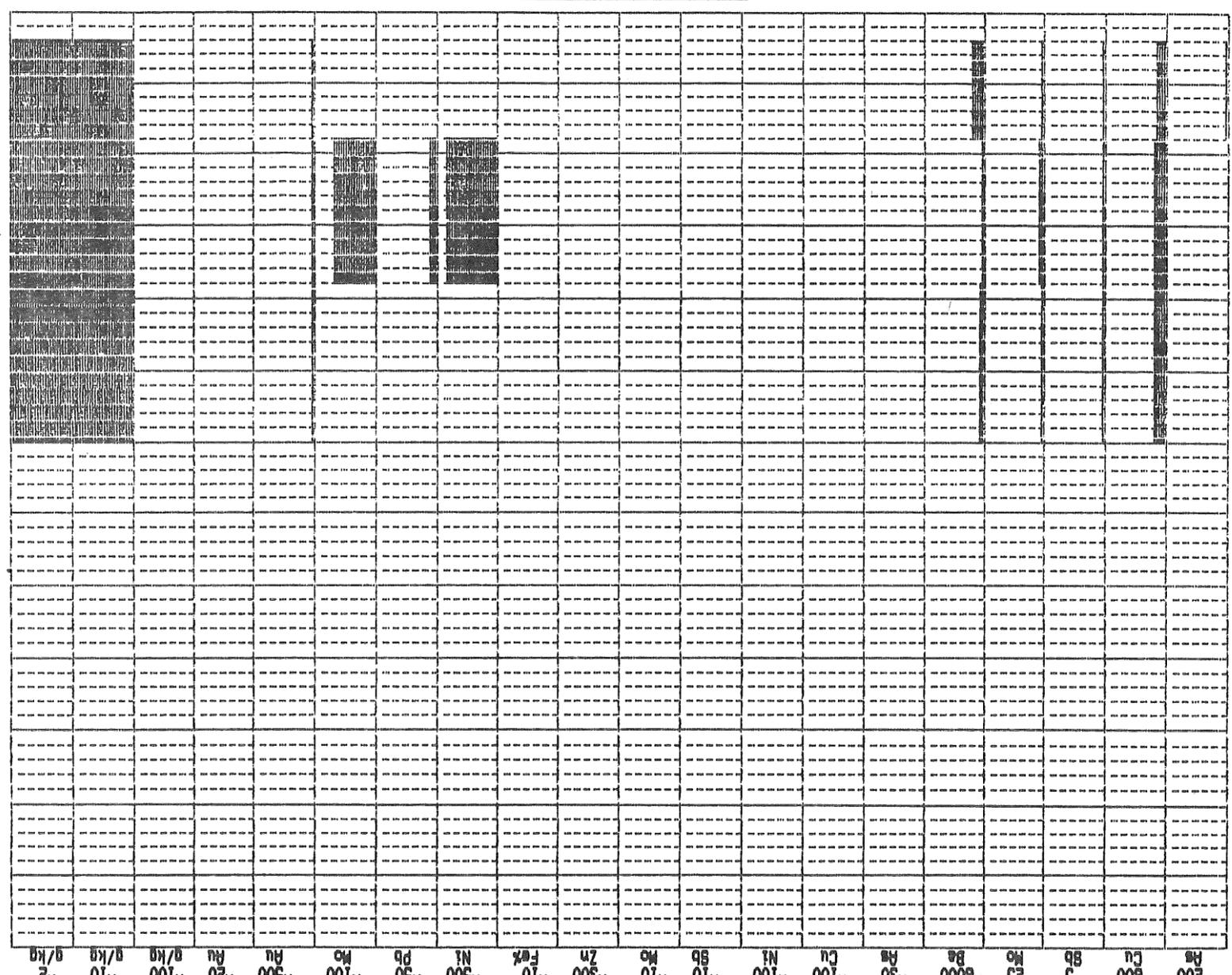
LITHOLOGIC DESCRIPTIONS AND/OR REMARKS



RECIEANED 176-186

RECIEANED 165-176, 186-193

SLUCE BOX 165-193



MASTER FILE

SAMPLE NUMBER	DN NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTB	BOLD	WT (g)	WT (g)	WT (g)	WT (g)	WT (g)	WT (g)	WT %	WT %	WT %	REMARKS
						BRAINS	HMC	FEED	+10FEED	NONMAG	MAG	-63um	-63FEED	-63um	+10	SAND
18642	20603	165-176	11. M O SE-SW 32 63 21	SL RL. GVL. SAND	165-176	0.0	11300.0	-2.0	153.7	24.9	-1.0	-1.0	-1	-1	-1	
18643	20603	176-186	10. M O SE-SW 32 63 21	SL RL. GVL. SAND	176-186	0.0	9800.0	-2.0	165.1	27.8	-1.0	-1.0	-1	-1	-1	
18752C	20603	176-186	10. M O SE-SW 32 63 21	SL SPECIAL SAMPLE	176-186	1.0	15400.0	-2.0	166.1	25.9	-1.0	-1.0	-1	-1	-1	RECLEANED +10M MAT'L
18644	20603	186-193	7. M O SE-SW 32 63 21	SL RL. GVL. SAND	186-193	0.0	9600.0	-2.0	115.5	44.2	-1.0	-1.0	-1	-1	-1	
18753C	20603	165-193	-2.0 M O SE-SW 32 63 21	SL SPECIAL SAMPLE	165-193	1.0	10200.0	-2.0	208.9	27.7	-1.0	-1.0	-1	-1	-1	SI=165-176 & 186-193
18645	20603	165-193	28. M O SE-SW 32 63 21	SL SLUICE BOX	165-193	3.0	4700.0	-2.0	101.8	28.2	-1.0	-1.0	-1	-1	-1	

Appendix 8-54C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU	NA	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
	PPB	%																										g/kg	WEIGHT
18642	-12	0.65	384	160	3000	8.20	50	110	120	150	0	3	-10	1	-0.5	0	-10	-0.2	400	193	21	3	5	20	-2	17.0	4.2	14	112.00
18643	-14	0.63	432	130	4100	9.70	60	110	110	150	0	3	-10	2	-0.5	0	-10	-0.2	300	222	21	2	7	23	-2	18.0	4.4	17	121.00
18752C	-20	0.70	504	180	4400	11.60	60	110	130	180	0	4	-10	2	-0.5	0	-10	-0.5	200	254	28	4	-14	18	-2	18.0	-2.9	11	117.00
18644	-16	0.60	0	170	3500	10.50	70	110	93	170	0	4	-10	1	-0.5	0	-10	-0.3	1100	276	24	4	8	20	-2	27.0	4.3	12	13.20
18753C	47	0.78	523	180	3400	12.70	60	94	72	160	0	7	-10	2	-0.5	0	-10	0.8	600	268	30	2	-10	17	-2	21.0	4.5	20	150.00
18645	-33	0.78	873	270	3500	14.20	90	150	150	140	0	10	-20	7	-0.5	0	-10	0.7	500	430	51	-3	55	25	-2	43.0	10.6	22	75.50

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MO	TIO2	CR	NI	CU	ZN	SE	MO	AG	PB	WT
	%	%									g/kg
18643	2.000	1.30	1200	420	110	160	-1	68	-0.5	6	2.8

Appendix 8-55A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20604

Drilling Completion Date 1/8/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -NW $\frac{1}{4}$ -17-63N-21W

County St. Louis

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1295 ft.

Total Depth 127 ft.

Elevation, Top of
Precambrian Bedrock _____

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection
Method Slurry: Trough with Dam



No samples obtained for heavy mineral concentration.

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

<u>Interval Feet</u>	<u>Interpre- tation</u>	<u>Library Samples Available</u>	<u>Subsamples Tested</u>	<u>Significant Geochem Samples</u>
0-126	Des Moines Lobe Gl. Drift			
126-127	Rainy Lobe Gl. Drift			

A = -63 microns fraction	E = Skeletonized Grab Sample	H = Thin Section
B = Heavy Minerals, Nonmag	in Core Box	I = (Bedrock or Drift)
C = Heavy Minerals, Mag	F = Interval Cuttings in Bucket	Split of "Wholerock"
D = Sluice Box Composite	G = Core	Sample

BEDROCK

Principal Rock Type:

Thin Section Description:

Appendix 8-56A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20702

Drilling Completion Date 12/18/86

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -26-62N-21W

County St. Louis

Quadrangle Meadowbrook 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1290 ft.

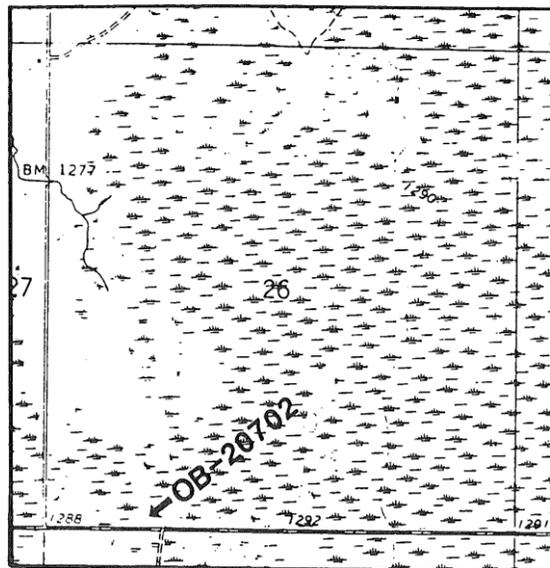
Total Depth 133 ft.

Elevation, Top of Precambrian Bedrock 1162.5 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-96	Des Moines Lobe Gl. Drift			
96-127.5	Rainy Lobe Gl. Drift	F	B,C	C = Ag, Ni, Cu
127.5-133	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite

E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core

H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain

Thin Section Description: #18630

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	FEED	TABLE CONC	M.I. LIGHTS	CONC.	NON MAG		MAG	NO. V.G.	CALC PPB	CLAST		MATRIX								
										SIZE	%	S/U	SD	ST	CY	COLOR	SD	CY				
										V/S	GR	LS	OT					SD	CY			
18626	5.8	0.3	5.5	246.1	220.5	25.6	22.6	3.0	0	NA	P	60	40	NA	NA	U	Y	Y	Y	B	B	TILL
18626R	4.4	0.3	4.1	174.6	145.0	29.6	25.8	3.8	0	NA	P	75	25	NA	NA	U	Y	Y	Y	BNB	BNB	TILL
-27	15.0	0.4	14.6	290.7	224.3	66.4	53.6	12.8	0	NA	C	20	80	NA	NA	U	Y	Y	Y	B	GB	TILL
-28	13.3	0.2	13.1	266.0	197.3	68.7	52.9	15.8	3	188	F	60	40	NA	NA	U	Y	Y	Y	B	GB	TILL
18628R	10.7	0.0	10.7	214.9	139.4	75.5	58.7	16.8	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-29	10.3	0.0	10.3	242.9	181.0	61.9	46.3	15.6	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	GB	TILL
-631	3.0	0.0	3.0	96.3	63.2	33.1	25.9	7.2	2	2												
18748C	19.1	0.0	19.1	376.5	340.1	36.4	11.5	24.9	0	NA	TR	NA	NA	NA	NA	S	C	Y	N	GB	NA	SAND

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED				IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
					T	P	T	P	T	P	TOTAL	GMS			
18626	N														
18626R	N														
-27	N														
-28	Y		100 X	125	22	C		1				1		EST. 1% PYRITE	
			100 X	150	25	C		1				1		250 GRAINS	
			100 X	200	29	C		1				1		ARSENOPYRITE	
												3	52.9	.188	PHOTO REFERENCE #129
18628R	N														
-29	N														
-631	Y		25 X	25	5	C		2				2		EST. 5% PYRITE	
												2	25.9	2	0.5% ARSENOPYRITE (FINE)
18748C	N														

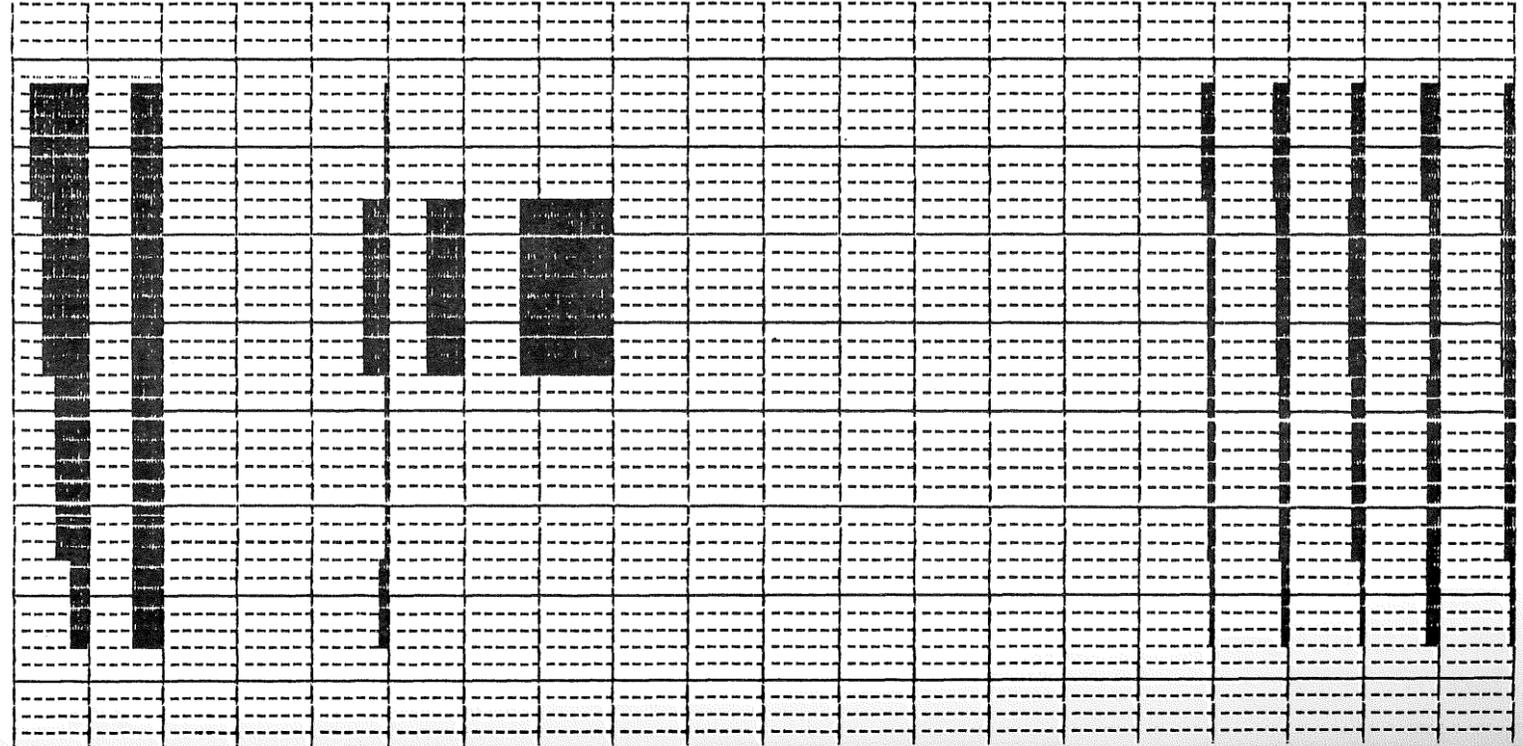
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OB-20702

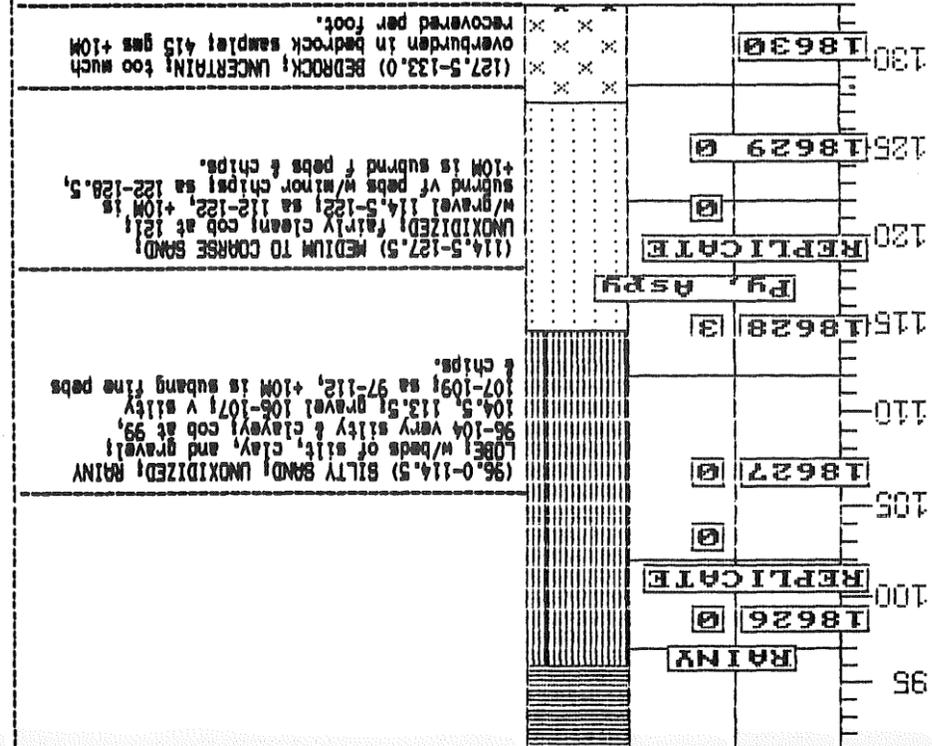
Appendix 8-56B.

IN NON MAG HMC					IN -63 MICRON					IN MAG FRAC					NON MAG -63			NON MAG MAG			HMC SAMPLE #	HMC GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
^800 Ag	^600 Cu	^5 Bb	^25 Mo	^6000 Ba	^30 Am	^100 Cu	^100 Ni	^10 Bb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	(FEET)				
																					5			
																						10		
																						15		(0.0-24.0) CLAY; OXIDIZED; not completely oxidized, gray zones; softer clay 17-24.
																						20		
																						25		
																						30		
																						35		
																						40		
																						45		
																						50		(24.0-96.0) CLAY; UNOXIDIZED; lake sediments, gray, w/silty clay; drilling rate 25 feet per hour.
																						55		
																						60		
																						65		
																						70		
																						75		
																						80		
																						85		
																						90		

RECEIVED 97-128.5
SLICE BOX 97-133



18748C 0
18631 2
Py, Aspy



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D & FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FT6	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18626	20702	97-102	5. M O SW-SW 26 62 21	SL	RL. SILTY SAND	97-102	0.0	5800.0	-2.0	22.6	3.0	-1.0	-1.0	-1	-1	-1		
18626R	20702	97-102	5.0 M O SW-SW 26 62 21	SL	RL. SILTY SAND	97-102	0.0	4400.0	-2.0	25.8	3.8	-1.0	-1.0	-1	-1	-1		
18627	20702	102-112	10. M O SW-SW 26 62 21	SL	RL. SILTY SAND	102-112	0.0	15000.0	-2.0	53.6	12.8	-1.0	-1.0	-1	-1	-1		
18628	20702	112-122	10. M O SW-SW 26 62 21	SL	RL. MED. TO C. SAND	112-122	3.0	13300.0	-2.0	52.9	15.8	-1.0	-1.0	-1	-1	-1		
18628R	20702	112-122	10.0 M O SW-SW 26 62 21	SL	RL. MED. TO C. SAND	112-122	0.0	10700.0	-2.0	58.7	16.8	-1.0	-1.0	-1	-1	-1		
18629	20702	122-128.5	6.5 M O SW-SW 26 62 21	SL	RL. MED. TO C. SAND	122-128.5	0.0	10300.0	-2.0	46.3	15.6	-1.0	-1.0	-1	-1	-1		
18630	20702	128.5-133	4.5 M O SW-SW 26 62 21	SL	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18748C	20702	97-128.5	31.5 M O SW-SW 26 62 21	SL	SPECIAL SAMPLE	97-128.5	0.0	19100.0	-2.0	11.5	24.9	-1.0	-1.0	-1	-1	-1		RECLEANED +10M MAT'L
18631	20702	97-133	36. M O SW-SW 26 62 21	SL	SLUICE BOX	97-133	2.0	3000.0	-2.0	25.9	7.2	-1.0	-1.0	-1	-1	-1		

Appendix 8-56C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18626	66	0.32	221	120	8400	8.80	30	120	97	150	0	9	-10	2	3.5	0	-10	0.2	200	111	11	-1	44	42	-2	22.0	2.1	4	20.00
18626R	-16	0.74	360	250	7800	16.00	60	110	130	160	0	22	10	2	-0.5	0	-10	1.0	500	194	21	3	37	73	-2	35.0	6.3	6	6.94
18627	-18	0.42	564	430	8700	19.60	60	120	96	130	0	22	-10	3	0.5	0	-10	0.8	-400	335	43	10	28	46	-2	90.0	10.4	4	39.20
18628	160	0.31	629	570	9800	22.00	60	120	80	120	0	28	30	4	-0.5	0	-10	1.0	-400	388	49	14	25	54	-2	130.0	10.1	4	38.80
18629	-19	0.38	614	490	8700	21.00	100	170	150	130	0	23	-10	5	-0.5	0	-10	0.9	1000	337	50	7	23	51	-2	99.0	10.3	4	33.90
18748C	-19	0.38	563	530	8100	23.40	70	110	70	140	0	17	-10	3	-0.5	0	-10	0.8	400	337	44	7	20	54	-2	110.0	6.3	1	81.20
18631	90	0.36	874	780	7000	23.00	80	140	110	180	0	19	-10	4	-0.5	0	-10	0.8	600	514	79	13	120	66	-2	160.0	12.6	9	19.50

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18628	1.000	6.70	1500	520	65	480	-1	48	6.5	12	1.2

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18630	-7	-0.2	2.0	800	0.0	1	32.0	0.0	120	10	0	2	-100	3.9	20	0.0	1	58	0	0.00	0.0	-10	0	3.40	-1.0	-10	0.0	3.8	-10	-2	0.8	0	0	0

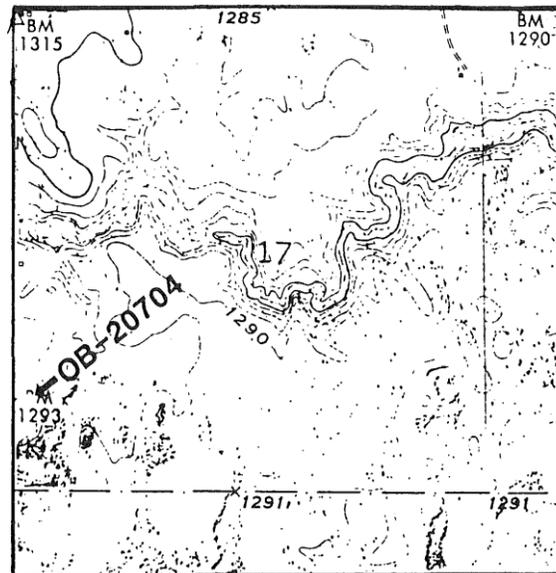
BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FeO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18630	32	20	67	0	1.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-57A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20704
 Drilling Completion Date 12/17/86
 LOCATION (see map at right)
 S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -17-62N-21W
 County St. Louis
 Quadrangle Bear River 7.5
 Regional Survey Area Orr
 HOLE PARAMETERS
 Surface Elevation 1290 ft.
 Total Depth 102 ft.
 Elevation, Top of Precambrian Bedrock 1192 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-80	Des Moines Lobe Gl. Drift			
80-98	Rainy Lobe Gl. Drift	F	B,C	C = Ag
98-102	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Graywacke. Dark gray, moderately to weakly foliated graywacke. Grain size 0.05-0.1 sugar, 0.2-1.0 relict sand. Sugary texture with 20% relict sand. Comprised of 20% biotite, 60% qtz.-plag. sugar and 20% relict sand including 5-10% blue to colorless qtz., 5% plag., and 5% cherty lithics. 0.5% dissem. py. 0.1% dissem. magnetite. (By ODM, see report in Appendix)

Thin Section Number: #18624.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS						
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC	NON MAG	NO. MAG		CLAST	MATRIX													
				CONC	CONC	CONC	NO. V.G.	SIZE	%	S/U	SD	ST	CY	COLOR								
							PPB	V/S	GR	LS	OT			SD	CY							
18622R	8.7	0.0	8.7	294.0	168.3	125.7	108.5	17.2	1	35	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-23	6.7	0.2	6.5	241.0	161.3	79.7	68.8	10.9	0	NA	P	60	40	NA	NA	U	Y	Y	Y	B	BGN	TILL
-22	10.1	0.4	9.7	348.8	233.3	115.5	98.5	17.0	1	220	C	50	50	NA	NA	U	Y	Y	Y	B	BGN	TILL
-625	3.8	0.0	3.8	131.1	89.9	41.2	32.4	8.8	1	1												
18747C	7.8	0.1	7.7	214.8	145.8	69.0	59.2	9.8	0	NA	G	70	30	NA	NA	U	Y	Y	N	B	NA	TILL

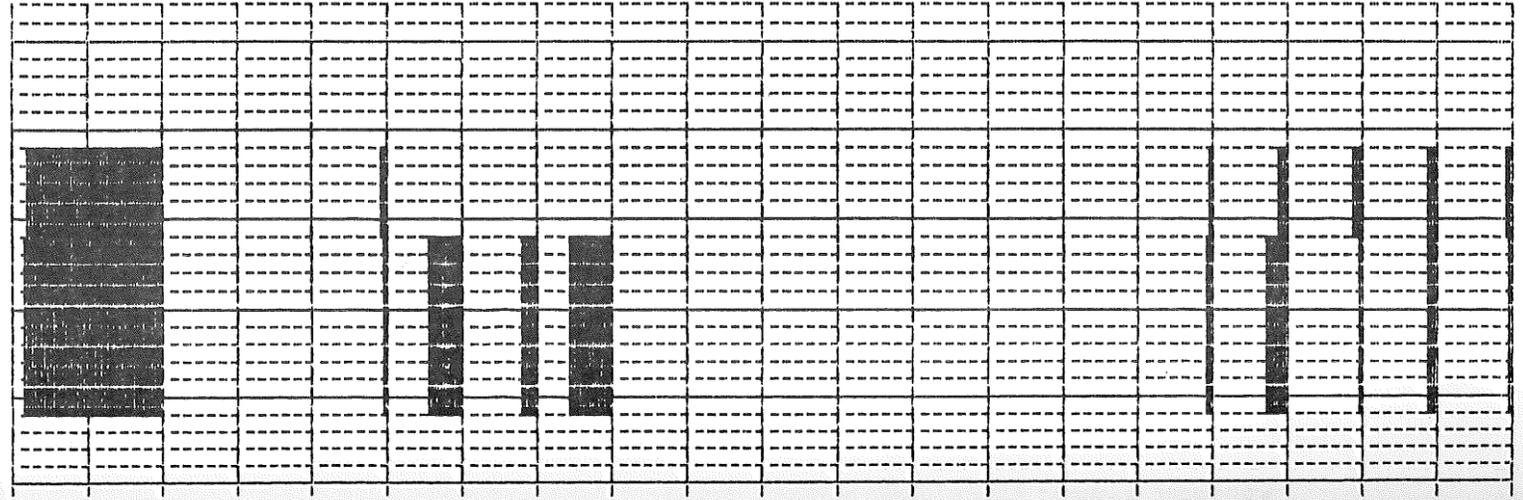
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS								NON MAG	CALC V.G. ASSAY PPB	REMARKS
					ABRADED		IRREGULAR		DELICATE		TOTAL	GMS			
					T	P	T	P	T	P					
-22	Y		150 X	350	46	C	1					1		EST. 3% PYRITE 700 GRAINS	
												1	98.5	220	ARSENOPYRITE PHOTO REFERENCE #129
18622R	N		125 X	150	27	C	1					1	108.5	35	
-23	N		NO VISIBLE GOLD												
625	Y		25 X	25	5	C						1		EST. 15% PYRITE 4% ARSENOPYRITE	
												1	32.4	1	PHOTOMICROGRAPH FILM REFERENCE #137
18747C	N		NO VISIBLE GOLD												

SLICE BOX 84-102

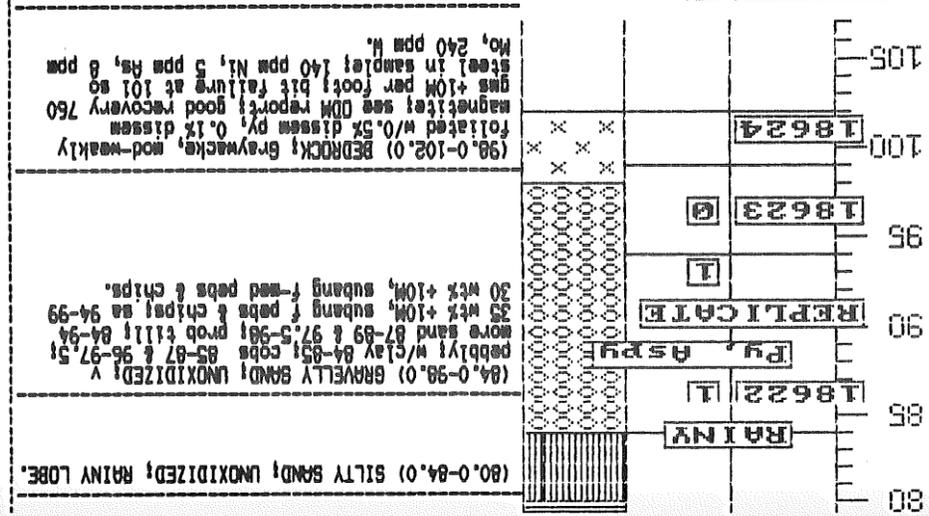
RECLAIMED 84-99



Py, ASPY

18625 I

18747C @



(80-0-84.0) SILTY SAND; UNOXIDIZED; RAINY LOBE.

(84-0-98.0) GRAVELLY SAND; UNOXIDIZED; V

pebbly; w/c lay 84-85; cobb 85-87 & 96-97, 98; more sand 87-89 & 97.5-98; prob till; 84-94 35 wt% +10M, subang f pebs & chips; 94-99 30 wt% +10M, subang f- med pebs & chips.

(98.0-102.0) BEDROCK; graywacke, mod-waxky foliated w/0.5% disse; 0.1% disse magnetite; see DM report; good recovery 760 gms +10M per foot; bit falling at 101 so steel in sampler 140 ppm Ni, 5 ppm As, 8 ppm Mo, 240 ppm H.

MASTER FILE

Appendix 8-57C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D & FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18622	20704	84-94	10. M O SW-SW 17 62 21	SL RL. GVL. SAND	84-94	1.0	10100.0	-2.0	98.5	17.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
18622R	20704	84-94	10.0 M O SW-SW 17 62 21	SL RL. GVL. SAND	84-94	1.0	8700.0	-2.0	108.5	17.2	-1.0	-1.0	-1.0	-1.0	-1	-1	
18747C	20704	84-99	15. M O SW-SW 17 62 21	SL SPECIAL SAMPLE	84-99	0.0	7800.0	-2.0	59.2	9.8	-1.0	-1.0	-1.0	-1.0	-1	-1	RECLEANED +10M MAT'L
18623	20704	94-99	5. M O SW-SW 17 62 21	SL RL. GVL. SAND	94-99	0.0	6700.0	-2.0	68.8	10.9	-1.0	-1.0	-1.0	-1.0	-1	-1	
18624	20704	99-102	3. M O SW-SW 17 62 21	SL BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
18625	20704	84-102	18. M O SW-SW 17 62 21	SL SLUICE BOX	84-102	1.0	3800.0	-2.0	32.4	8.8	-1.0	-1.0	-1.0	-1.0	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18622	21	0.58	555	180	4700	10.90	40	120	66	170	0	5	-10	7	-0.5	0	-10	-0.3	500	262	25	6	110	26	-2	33.0	4.5	10	72.20
18747C	-15	0.60	486	230	4300	14.90	70	160	57	190	0	13	-10	3	-0.5	0	-10	0.8	400	225	27	5	180	22	-2	27.0	3.3	8	43.30
18623	49	0.52	421	270	4100	14.60	70	210	67	150	0	15	-10	3	-0.5	0	-10	0.7	-300	210	23	5	240	25	-2	29.0	4.3	10	50.30
18625	-26	0.55	756	310	4000	15.70	80	180	77	170	0	13	-90	7	-0.5	0	-10	-0.5	-400	409	48	6	630	26	-2	48.0	4.0	9	48.70

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18622	1.300	2.50	1200	290	74	230	-1	43	1.5	10	1.7

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18624	-7	0.3	5.0	800	0.0	2	52.0	0.0	70	30	0	-2	-100	4.6	29	0.0	8	140	0	0.00	0.0	-10	0	3.00	-1.0	-10	0.0	4.8	-10	240	1.3	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18624	45	17	79	0	1.5	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-58A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20705

Drilling Completion Date 2/7/87

LOCATION (see map at right)

S-T-R NE $\frac{1}{4}$ -SE $\frac{1}{4}$ -30-62N-21W

County St. Louis

Quadrangle Bear River 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1290 ft.

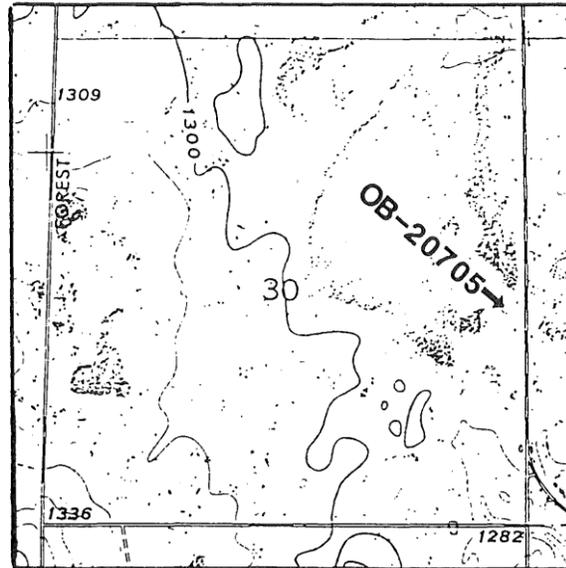
Total Depth 217 ft.

Elevation, Top of Precambrian Bedrock _____

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION						CLASS							
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					CLAST			MATRIX										
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG		NO. MAG	NO. V.G.	CALC PPB	SIZE	%	S/U		SD	ST	CY	COLOR	SD	CY	
18728	9.7	0.6	9.1	106.6	64.8	41.8	31.0	10.8	0	NA	P	50	50	NA	NA	U	Y	Y	Y	B	B	TILL
-729	11.5	0.6	10.9	175.5	144.8	30.7	23.4	7.3	0	NA	C	50	50	NA	NA	U	Y	Y	Y	B	B	TILL
-730	10.6	0.9	9.7	165.6	121.9	43.7	34.6	9.1	1	1626	C	45	55	NA	NA	U	Y	Y	Y	B	B	TILL
-731	8.1	0.4	7.7	144.7	85.0	59.7	46.1	13.6	0	NA	P	55	45	NA	NA	U	Y	Y	Y	B	B	TILL
-732	11.0	0.2	10.8	181.3	115.8	65.5	49.9	15.6	0	NA	P	20	80	NA	NA	U	Y	Y	Y	B	GB	TILL
-733	12.6	0.2	12.4	177.7	122.3	55.4	44.5	10.9	0	NA	P	35	65	NA	NA	U	Y	Y	N	B	NA	TILL
-734	9.8	0.0	9.8	239.0	136.6	102.4	88.5	13.9	0	NA	TR	NA	NA	NA	NA	S	M,C	Y	N	B	NA	SAND
-735	12.2	0.1	12.1	209.3	128.2	81.1	70.4	10.7	0	NA	P	45	55	NA	NA	S	M,C	Y	N	B	NA	SAND
18736	8.4	0.4	8.0	200.3	121.5	78.8	69.2	9.6	0	NA	P	35	65	NA	NA	U	Y	Y	N	B	NA	TILL
18737	4.9	0.0	4.9	156.2	98.6	57.6	43.9	13.7	1	15												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	ABRADED				IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY	REMARKS
					T	P	T	P	T	P	TOTAL	GMS			
18728	N														
-729	N														
-730	N		250 X	450	61	C	1					1			
												1	34.6	1626	
-731	N														
-732	N														
-733	N														
-734	N														
-735	N														
18736	N														
18737	Y		75 X	75	15	C	1					1		EST. 7% PYRITE 15 GRAINS ARSENOPYRITE	
												1	43.9	15	

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

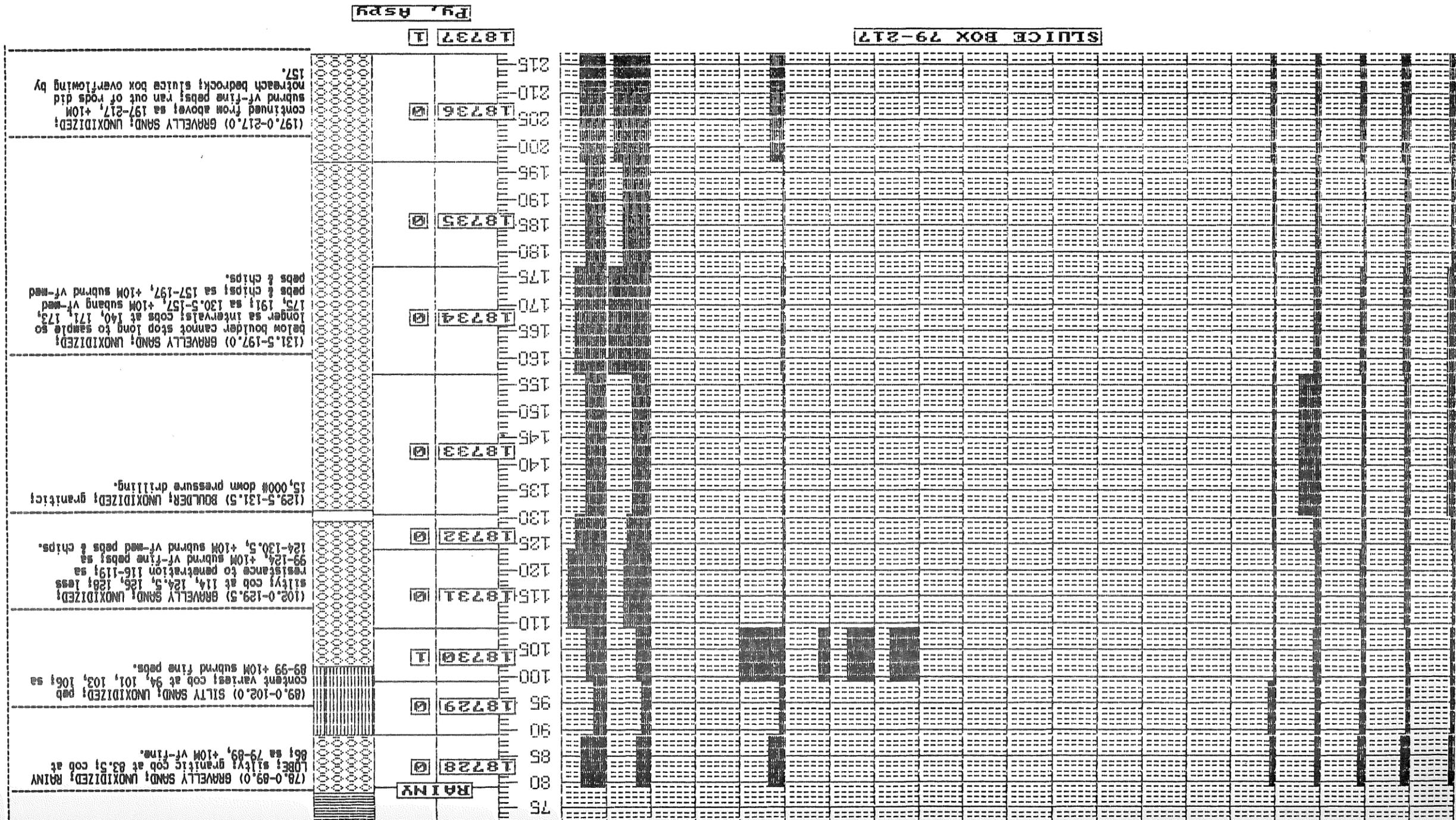
Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-78	Des Moines Lobe Gl. Drift			
78-217	Rainy Lobe Gl. Drift	F	B,C	B = Se

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type:

Thin Section Description:



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT % -63um	WT % +10	WT % SAND	REMARKS
18728	20705	79-89	10. M D NE-SE 30 62 21 SL	RL. BVL. SAND	79-89	0.0	9700.0	-2.0	31.0	10.8	-1.0	-1.0	-1	-1	-1	
18729	20705	89-99	10. M D NE-SE 30 62 21 SL	RL. SILTY SAND	89-99	0.0	11500.0	-2.0	23.4	7.3	-1.0	-1.0	-1	-1	-1	
18730	20705	99-109	10. M D NE-SE 30 62 21 SL	RL. BVL. SAND	99-109	1.0	10600.0	-2.0	34.6	9.1	-1.0	-1.0	-1	-1	-1	
18731	20705	109-124	15. M D NE-SE 30 62 21 SL	RL. SILTY SAND	109-124	0.0	8100.0	-2.0	46.1	13.6	-1.0	-1.0	-1	-1	-1	
18732	20705	124-130.5	6.5 M D NE-SE 30 62 21 SL	RL. BVL. SAND	124-130.5	0.0	11000.0	-2.0	49.9	15.6	-1.0	-1.0	-1	-1	-1	
18733	20705	130.5-157	26.5 M D NE-SE 30 62 21 SL	RL. BVL. SAND	130.5-157	0.0	12600.0	-2.0	44.5	10.9	-1.0	-1.0	-1	-1	-1	
18734	20705	157-177	20. M D NE-SE 30 62 21 SL	RL. BVL. SAND	157-177	0.0	9800.0	-2.0	88.5	13.9	-1.0	-1.0	-1	-1	-1	
18735	20705	177-197	20. M D NE-SE 30 62 21 SL	RL. GRAVEL	177-197	0.0	12200.0	-2.0	70.4	10.7	-1.0	-1.0	-1	-1	-1	
18736	20705	197-217	20. M D NE-SE 30 62 21 SL	RL. BVL. SAND	197-217	0.0	8400.0	-2.0	69.2	9.6	-1.0	-1.0	-1	-1	-1	
18737	20705	79-217	-3.0 M D NE-SE 30 62 21 SL	BLUICE BOX	79-217	1.0	4900.0	-2.0	43.9	13.7	-1.0	-1.0	-1	-1	-1	ST(-3)=138

Appendix 8-58C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18728	180	0.39	0	380	7400	17.00	70	130	130	170	0	20	50	3	-0.5	0	-10	0.8	600	398	45	7	8	28	-2	110.0	9.1	3	11.40
18729	68	0.27	0	490	11000	20.80	60	120	56	160	0	12	30	3	-0.5	0	-10	0.7	-1000	409	54	12	9	38	-2	150.0	6.0	2	10.80
18730	1300	0.40	0	360	8600	17.80	60	120	54	160	0	13	-10	4	-0.5	0	-10	0.4	300	289	38	6	-5	20	-2	84.0	7.8	3	10.90
18731	-18	0.51	0	260	6800	14.50	50	110	60	160	0	10	-10	3	-0.5	0	-10	0.5	300	264	37	5	6	21	-2	58.0	6.1	6	11.70
18732	-18	0.47	0	300	6700	16.70	60	110	66	170	0	15	-20	4	-0.5	0	-10	0.4	500	330	45	8	8	29	-2	86.0	45.0	5	11.80
18733	-18	0.27	0	320	10000	22.30	70	130	71	160	0	29	20	12	-0.5	0	-10	0.4	-400	302	34	8	6	28	-2	56.0	11.5	4	9.76
18734	49	0.15	0	190	12000	20.40	50	110	89	140	0	33	-10	4	-0.5	0	-10	0.5	300	191	21	2	5	34	-2	46.0	4.3	9	12.40
18735	-14	0.14	0	180	12000	20.40	50	110	76	140	0	17	-10	3	-0.5	0	-10	0.3	400	180	19	4	4	50	-2	50.0	4.9	6	11.90
18736	170	0.12	0	180	12000	23.30	60	110	120	140	0	26	-10	3	-0.5	0	-10	0.7	600	182	25	3	-4	48	-2	53.0	4.9	8	11.60
18737	42	0.41	737	330	7500	16.80	60	130	82	170	0	17	-10	4	-0.5	0	-10	-0.4	-300	395	55	12	21	27	-2	100.0	8.9	9	33.60

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18730	1.400	4.50	1400	320	36	330	-1	23	-0.5	29	0.9

IDENTIFICATION

DNR Drill Hole Number OB-20801

Drilling Completion Date 2/11/86

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SW $\frac{1}{4}$ -10-62N-20W

County St. Louis

Quadrangle Meadowbrook 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1300 ft.

Total Depth 137 ft.

Elevation, Top of

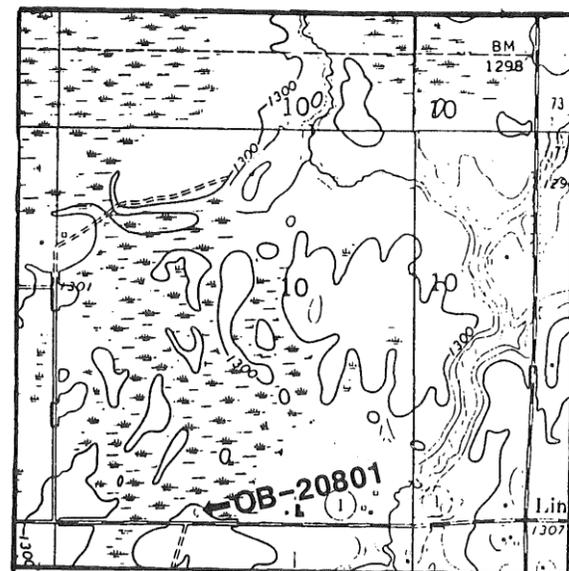
Precambrian Bedrock Not known

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection

Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-50.5	Des Moines Lobe Gl. Drift	No	No	
50.5-139	Rainy Lobe Gl. Drift	F	B,C	B = Au,As,Ag,Sb W,Pb,Bi,Se,Cr, Fe,Ni,Cu,Sn C = Ag,As,Pb,Mo, Se,Cu,Ni,Cr

Gold particle micrographs from Scanning Electron Microscope are also available.

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type:

Thin Section Description:

OB-20801

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION	CLASS
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC						
				TABLE CONC	M. I. LIGHTS	CONC. TOTAL	NON MAG			
18605	11.0	5.4	5.6	163.3	162.1	21.2	16.7	4.5	2	101 C 90 10 NA NA U Y Y Y B B TILL
-06	11.6	0.0	11.6	299.4	254.7	44.7	35.6	9.1	6	1160 TR NA NA NA NA U Y Y Y B B TILL
18606R	16.0	0.0	16.0	404.4	322.1	82.3	68.0	14.3	2	31 TR NA NA NA NA U Y Y Y GB GB TILL
-07	13.1	0.1	13.0	344.3	302.1	42.2	34.3	7.9	0	NA P 50 50 NA NA U Y Y Y GB GB TILL
-08	12.8	0.0	12.8	339.1	289.7	49.4	37.6	11.8	0	NA TR NA NA NA NA U Y Y Y B B TILL
-09	13.7	0.0	13.7	203.9	151.0	52.9	39.9	13.0	3	35 TR NA NA NA NA U Y Y Y B B TILL
18609R	10.5	0.0	10.5	154.9	116.4	38.5	29.8	8.7	3	78 TR NA NA NA NA U Y Y Y B B TILL
-10	7.9	0.0	7.9	172.9	139.9	33.0	30.1	2.9	0	NA TR NA NA NA NA U Y Y Y B EGN TILL
18611	12.8	0.2	12.6	158.8	54.6	104.2	49.2	55.0	7	48 F 70 30 NA NA U Y Y Y B B TILL
-12	7.2	0.0	7.2	198.1	148.8	49.3	46.7	2.6	2	5 TR NA NA NA NA U Y Y Y EGN EGN TILL
18612R	13.0	0.0	13.0	233.6	134.2	99.4	94.5	4.9	13	125 TR NA NA NA NA U Y Y Y GNB GNB TILL
18613	3.3	0.0	3.3	107.8	79.7	28.1	22.9	5.2	25	228
18744C	13.3	0.1	13.2	309.5	262.8	46.7	38.7	8.0	0	NA 6 75 25 NA NA U Y Y N B NA TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P			
18605	Y	50 X 50	10 C							1	EST. 30% PYRITE 2% ARSENOPYRITE PHOTO REFERENCE #130	
		75 X 125	20 C							1		
<hr/>												
										2	16.7	101
-06	Y	50 X 50	10 C							2	EST. 35% PYRITE 2% PYRITE PHOTO REFERENCE #129	
		100 X 200	29 C							1		
		125 X 125	25 C							1		
		150 X 250	38 C	1						1		
		250 X 250	46 C							1		
<hr/>												
										6	35.6	1160
18606R	Y	75 X 75	15 C							1	EST. 20% PYRITE 0.5% ARSENOPYRITE	
		75 X 125	20 C	1						1		
<hr/>												
										2	68.0	31
-07	N	NO VISIBLE GOLD										
-08	N	NO VISIBLE GOLD										
-09	Y	25 X 25	5 C							1	EST. 20% PYRITE	
		50 X 75	13 C							1		
		75 X 100	18 C							1		
<hr/>												
										3	39.9	35
18609R	Y	25 X 75	10 C							1	EST. 10% PYRITE 0.25% ARSENOPYRITE	
		75 X 75	15 C							1		
		100 X 100	20 C							1		
<hr/>												
										3	29.8	78
-10	Y	NO VISIBLE GOLD										
18611	Y	25 X 25	5 C							3	EST. 80% PYRITE, CRYSTALLINE 500 GRAINS ARSENOPYRITE (FINE) 100 GRAINS ARSENOPYRITE (COARSE) PHOTOMICROGRAPH AVAILABLE FILM REFERENCE #136	
		25 X 50	8 C							2		
		50 X 100	15 C							1		
		75 X 125	20 C							1		
<hr/>												
										7	49.2	48
-12	Y	25 X 25	5 C							1	EST. 65% PYRITE	
		50 X 50	10 C							1		
<hr/>												
										2	46.7	5

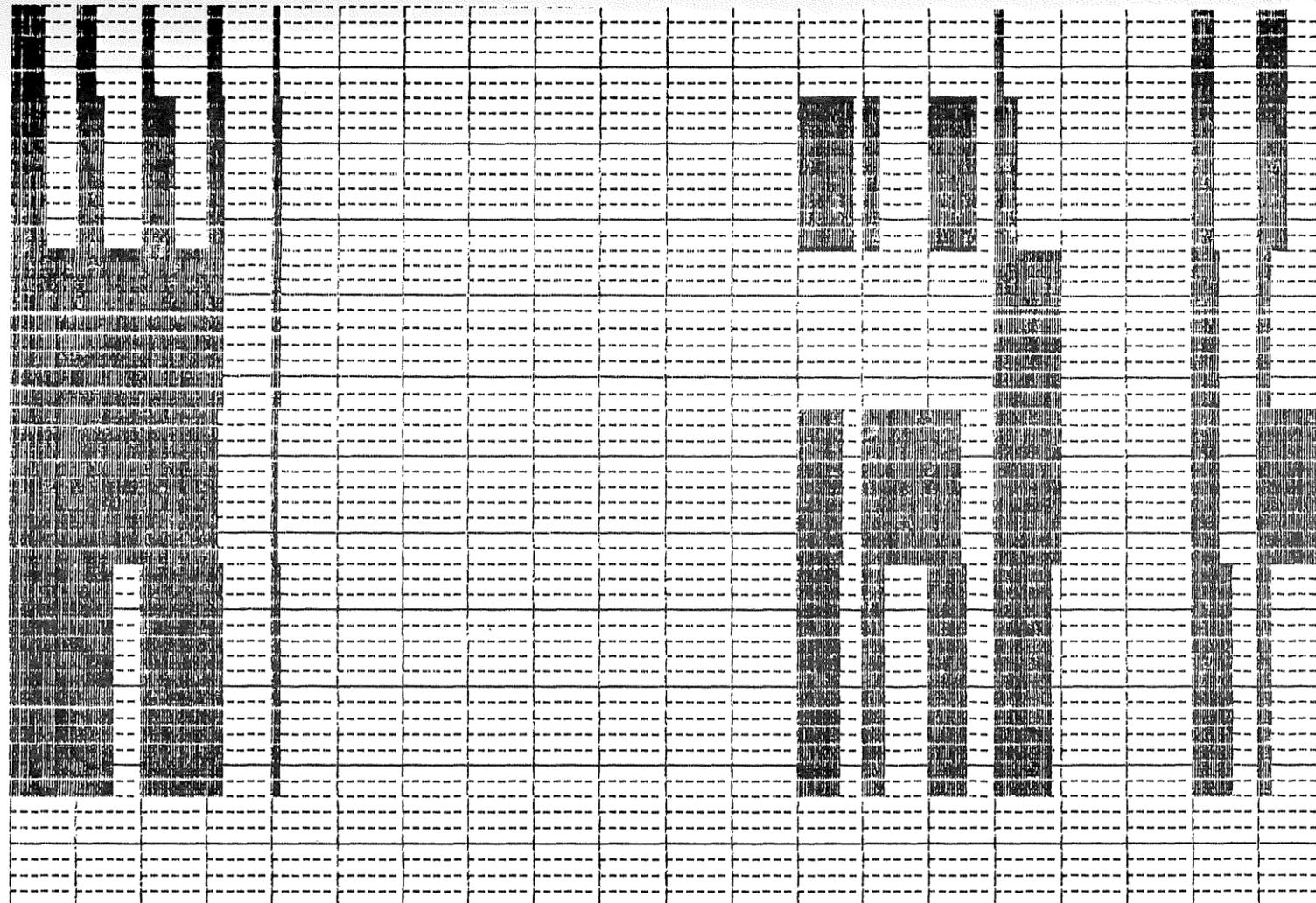
GOLD CLASSIFICATION CONT.

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

NUMBER OF GRAINS

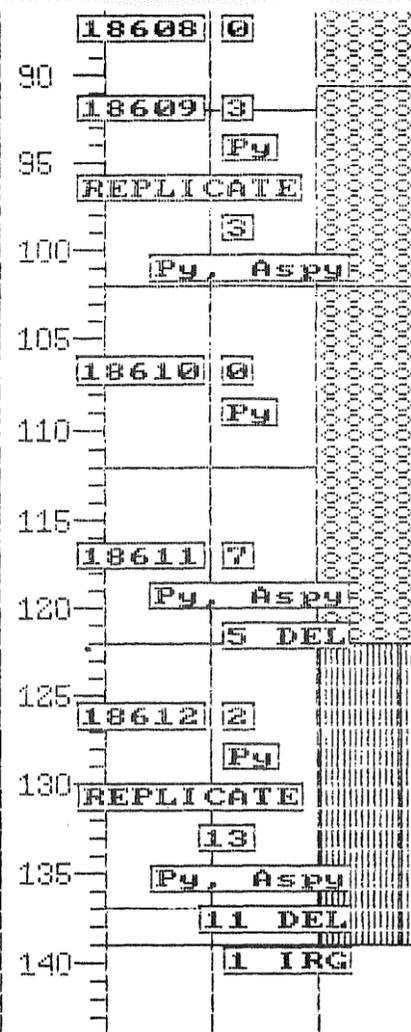
SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY PPB	REMARKS
				T	P	T	P	T	P			
18612R	Y	25 X 25	5 C							4	EST. 60% PYRITE 1000 GRAINS ARSENOPYRITE	
		25 X 50	8 C							3		
		50 X 50	10 C							1		
		50 X 75	13 C							2		
		75 X 75	15 C							1		
		100 X 125	22 C							1		
<hr/>												
										1	1	
<hr/>												
										13	94.5	125
18613	Y	25 X 25	5 C							1	EST. 40% PYRITE 1% ARSENOPYRITE PHOTOMICROGRAPH AVAILABLE FILM REFERENCE #138	
		25 X 50	8 C							1		
		25 X 75	10 C							3		
		25 X 125	15 C							1		
		50 X 50	10 C	1						4		
		50 X 75	13 C				2			2		
		75 X 75	15 C							1		
<hr/>												
										25	22.9	228
18744C	Y	NO VISIBLE GOLD										
												EST. 60% PYRITE 300 GRAINS ARSENOPYRITE

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RECLEANED 52-137

SLUICE BOX 52-137



(90.5-102.0) GRAVELLY SAND; UNOXIDIZED; w/harder resistance & cobs at 94, 98, 99; sa 92-102 +10M is 30 wt% & many subang pebs, rest subrnd pebs and chips; possibly till.

(102.0-122.0) GRAVELLY SAND; UNOXIDIZED; sa 102-112 much fgr sand; sa 102-112 +10M is 30 wt% & many subang pebs, rest subrnd pebs and chips; sa 112-122 +10M 30 wt% & subang and subrnd pebs & chips, possibly till.

(122.0-139.0) SILTY SAND; UNOXIDIZED; w/approx 5 wt% +10M mostly subang pebs & chips; fgr sand w/minor clay; stopped by time and weather, did not reach bedrock.

18744C 0
 Py, Aspy
 18613 25
 Py, Aspy
 2 IRG
 17 DEL

MASTER FILE

Appendix 8-59C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18605	20801	52-62	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	52-62	2.0	11000.0	-2.0	16.7	4.5	-1.0	-1.0	-1.0	-1.0	-1	-1	
18605R	20801	52-62	10.0 M O SE-SW 10 62 20 SL	RL. GVL. SAND		0	0	0	0	0	0	0	0	0	0	0	
18606	20801	62-72	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	62-72	6.0	11600.0	-2.0	35.6	9.1	-1.0	-1.0	-1.0	-1.0	-1	-1	
18606R	20801	62-72	10.0 M O SE-SW 10 62 20 SL	RL. GVL. SAND	62-72	2.0	1600.0	-2.0	68.0	14.3	-1.0	-1.0	-1.0	-1.0	-1	-1	
18607	20801	72-82	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	72-82	0.0	13100.0	-2.0	34.3	7.9	-1.0	-1.0	-1.0	-1.0	-1	-1	
18608	20801	82-92	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	82-92	0.0	12800.0	-2.0	37.6	11.8	-1.0	-1.0	-1.0	-1.0	-1	-1	
18608R	20801	82-92	10.0 M O SE-SW 10 62 20 SL	RL. GVL. SAND		0	0	0	0	0	0	0	0	0	0	0	
18609	20801	92-102	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	92-102	3.0	13700.0	-2.0	39.9	13.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
18609R	20801	92-102	10.0 M O SE-SW 10 62 20 SL	RL. GVL. SAND	92-102	3.0	10500.0	-2.0	29.8	8.7	-1.0	-1.0	-1.0	-1.0	-1	-1	
18610	20801	102-112	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	102-112	0.0	7900.0	-2.0	30.1	2.9	-1.0	-1.0	-1.0	-1.0	-1	-1	
18611	20801	112-122	10. M O SE-SW 10 62 20 SL	RL. GVL. SAND	112-122	7.0	12800.0	-2.0	49.2	55.0	-1.0	-1.0	-1.0	-1.0	-1	-1	
18612	20801	122-137	15. M O SE-SW 10 62 20 SL	RL. GVL. SAND	122-137	2.0	7200.0	-2.0	46.7	2.6	-1.0	-1.0	-1.0	-1.0	-1	-1	
18612R	20801	122-137	15.0 M O SE-SW 10 62 20 SL	RL. GVL. SAND	122-137	13.0	13000.0	-2.0	94.5	4.9	-1.0	-1.0	-1.0	-1.0	-1	-1	
18744C	20801	52-137	85. M O SE-SW 10 62 20 SL	SPECIAL SAMPLE	52-137	0.0	13300.0	-2.0	38.7	8.0	-1.0	-1.0	-1.0	-1.0	-1	-1	RECLEANED +10M MAT'L
18613	20801	52-137	85. M O SE-SW 10 62 20 SL	SLUICE BOX	52-137	25.0	3300.0	-2.0	22.9	5.2	-1.0	-1.0	-1.0	-1.0	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CD	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18605	25	0.08	211	350	7500	13.30	160	270	410	110	0	41	-10	7	1.0	0	-10	1.1	300	124	-2	3	550	66	4	49.0	5.4	2	15.40
18606	910	0.17	647	890	9300	30.30	310	260	320	110	0	90	-20	6	1.0	0	-10	1.9	-600	396	48	12	690	69	3	160.0	14.1	3	26.00
18607	58	0.16	577	630	9400	26.50	220	210	210	120	0	67	-10	6	-0.5	0	-10	2.4	-600	373	51	10	610	75	2	140.0	15.6	3	25.50
18608	67	0.17	878	640	11000	25.40	190	190	160	110	0	98	-30	5	-0.5	0	-10	0.9	400	564	78	8	400	81	-2	230.0	23.9	3	27.60
18609	160	0.21	824	1700	9400	27.90	250	260	240	140	0	100	40	6	-0.5	0	-10	2.4	-600	529	74	10	610	70	3	220.0	19.1	3	29.30
18610	600	0.15	339	1500	3500	39.20	730	470	660	440	0	320	-20	5	1.0	0	-10	6.3	-600	181	60	-4	230	93	7	71.0	12.0	4	22.20
18611	690	0.07	0	490	2400	34.50	560	550	660	170	0	490	30	4	2.0	0	35	4.8	400	143	39	5	210	187	7	60.0	6.0	4	12.90
18612	420	0.17	192	400	1800	34.80	690	570	330	140	0	360	-10	6	1.5	0	-10	10.0	600	124	92	-3	91	151	10	47.0	9.5	6	34.40
18744C	190	0.19	456	880	7400	35.50	410	280	350	150	0	160	-20	7	-0.5	0	71	4.5	-600	293	35	9	1100	192	4	100.0	7.7	3	28.30

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	AS	WT g/kg
18605	1.300	2.70	2200	580	130	290	1	94	2.0	4	0.0	0.4
18605R	0.950	2.50	2300	230	120	290	0.3	35	-0.5	8	5.8	0
18606	0.990	3.50	2500	440	88	370	-1	82	3.0	8	0.0	0.8
18606R	0.680	3.00	3000	170	79	440	0.2	26	-0.5	8	4.8	8.9
18607	0.730	3.50	1900	160	75	410	-0.1	21	-0.5	14	4.2	0
18608R	0.530	3.50	1700	160	70	410	-0.1	18	-0.5	12	3.4	0
18609	1.000	4.00	2100	420	74	370	1	71	3.0	10	0.0	0.9
18609R	0.510	3.30	2100	150	64	290	0.1	17	-0.5	12	6.1	0.8
18610	0.760	2.80	2500	240	130	340	0.4	66	-0.5	12	15.0	0
18611	0.960	3.00	1900	350	110	280	-1	49	-0.5	48	0.0	4.3
18612	0.900	3.20	2300	330	87	350	2	56	2.5	16	0.0	0.4
18612	0.460	2.80	2500	210	90	380	0.7	37	-0.5	22	30.0	0.4

IDENTIFICATION

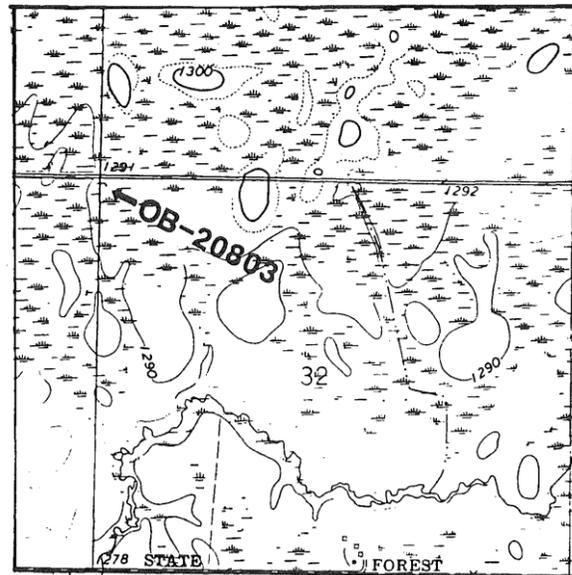
DNR Drill Hole Number OB-20803
 Drilling Completion Date 12/19/86

LOCATION (see map at right)

S-T-R NW¼-NW¼-32-62N-20W
 County St. Louis
 Quadrangle Meadowbrook 7.5
 Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1290 ft.
 Total Depth 129 ft.
 Elevation, Top of Precambrian Bedrock 1166 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-4	Organic Sediments			
4-90.5	Des Moines Lobe Gl. Drift			
90.5-124	Rainy Lobe Gl. Drift	F	B, C	B = Au, As, Sb, Pb C = Ag
124-129	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Uncertain, probably Graywacke. Light gray and well foliated. Sugar 0.1%, relict sand to 0.5%. Sugary with 5% relict sand grains. Comprised of 80% qtz.-plag. sugar, 5% relict sand grains (mostly plag.), and 15% biotite to (mostly) chlorite. 0.1% dissem. py. (By ODM, see report in Appendix)

Thin Section Number: #18636.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU		DESCRIPTION						CLASS						
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC				NO. V.G.	CALC PPB	CLAST			MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG			NO. MAG	SIZE	%	S/U	SD	ST		CY	COLOR				
																			V/S	GR	LS	OT
18732	9.9	0.0	9.9	151.4	115.3	36.1	29.1	7.0	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
-33	19.6	0.0	19.6	289.4	219.7	69.7	57.1	12.6	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-34	16.9	0.0	16.9	233.7	166.9	66.8	53.3	13.5	0	NA	TR	NA	NA	NA	A	U	Y	Y	Y	GB	GB	TILL
-35	13.3	0.0	13.3	259.7	216.4	43.3	36.1	7.2	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-637	3.6	0.0	3.6	96.1	65.4	30.7	24.7	6.0	4	50												
18749C	10.5	0.0	10.5	129.1	96.6	32.5	29.7	2.8	0	NA	TR	NA	NA	NA	NA	S	C	Y	N	B	NA	SAND
18750C	19.1	0.0	19.1	343.2	270.1	73.1	58.8	14.3	2	133	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL

GOLD CLASSIFICATION

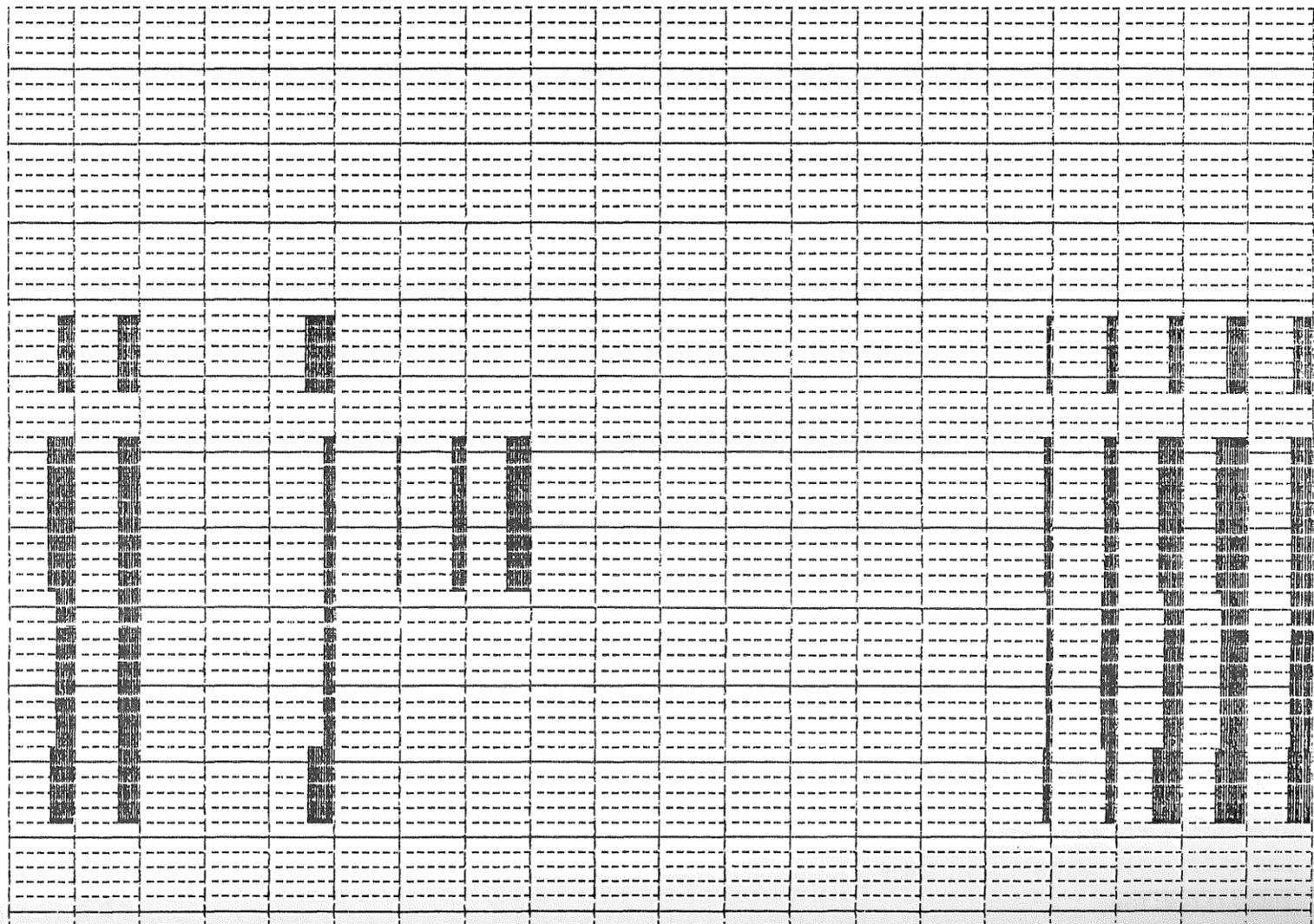
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										REMARKS										
				ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY													
				T	P	T	P	T	P			TOTAL	GMS		PPB									
18732	N	NO VISIBLE GOLD																						
-33	N	NO VISIBLE GOLD																						
-34	N	NO VISIBLE GOLD																						
-35	N	NO VISIBLE GOLD																						
-637	Y	25 X 25	5 C									1											EST. 10% PYRITE 800 GRAINS ARSENOPYRITE (FINE)	
		50 X 50	10 C									1												
		50 X 75	13 C									1												
		50 X 100	15 C									1												
													4	24.7										
18749C	Y	NO VISIBLE GOLD																						
																								EST. 7% PYRITE
18750C	Y	25 X 50	8 C									1												EST. 10% PYRITE
		125 X 225	34 C									1												
													2	58.8										133

RECLAIMED 106-116

RECLAIMED 91-124

SLUICE BOX 91-129



RAINY

18632

18633

18634

18635

18636

18750C 2

PJ

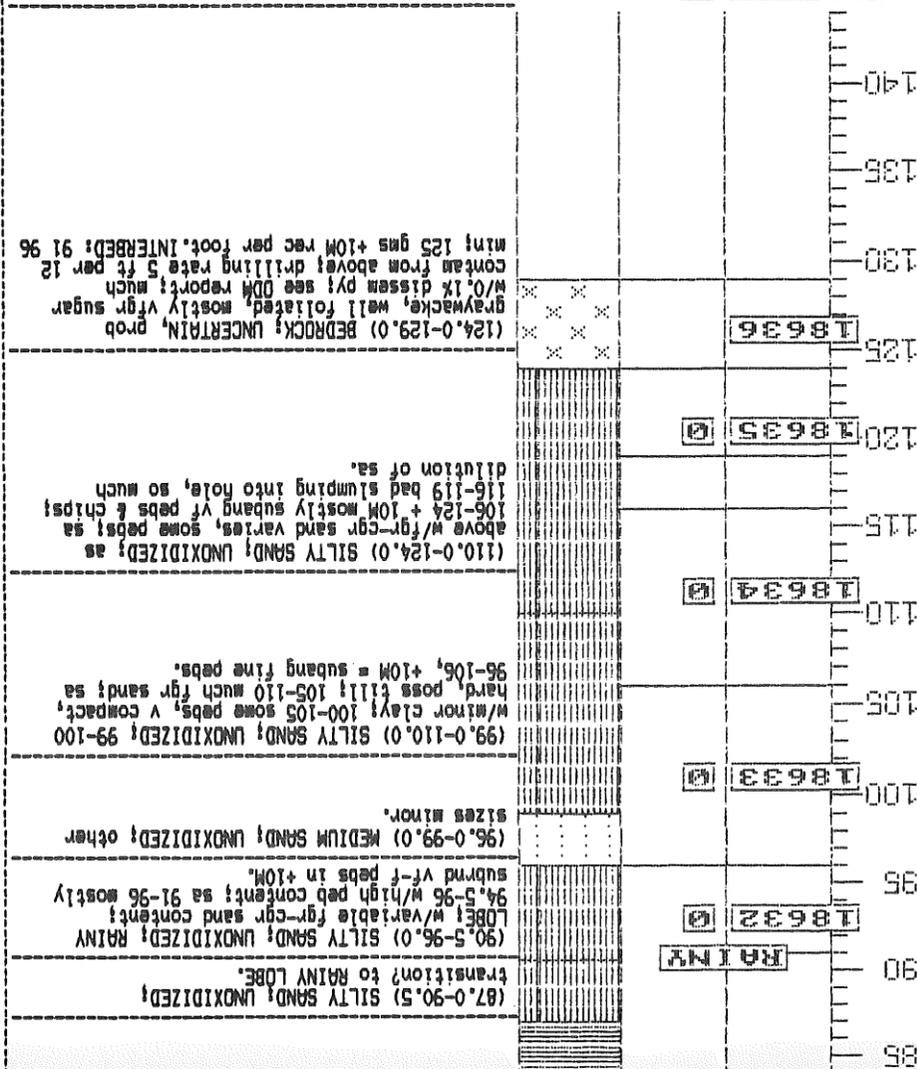
18749C 0

PJ

18637 4

PJ, ASPY

1 DEL



MASTER FILE

Appendix 8-60C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D 6 FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT % -63uM	WT % +10	WT % SAND	REMARKS
18632	20803	91-96	5. M O NW-NW 32 62 20	SL RL. SILTY SAND	91-96	0.0	9900.0	-2.0	29.1	7.0	-1.0	-1.0	-1.0	-1	-1	-1	
18633	20803	96-106	10. M O NW-NW 32 62 20	SL RL. SILTY SAND	96-106	0.0	19600.0	-2.0	57.1	12.6	-1.0	-1.0	-1.0	-1	-1	-1	
18634	20803	106-116	10. M O NW-NW 32 62 20	SL RL. SILTY SAND	106-116	0.0	16900.0	-2.0	53.3	13.5	-1.0	-1.0	-1.0	-1	-1	-1	
18750C	20803	106-116	10. M O NW-NW 32 62 20	SL SPECIAL SAMPLE	106-116	2.0	19100.0	-2.0	58.8	14.3	-1.0	-1.0	-1.0	-1	-1	-1	RECLEANED +10M MAT'L
18635	20803	119-124	5. M O NW-NW 32 62 20	SL RL. SILTY SAND	119-124	0.0	13300.0	-2.0	36.1	7.2	-1.0	-1.0	-1.0	-1	-1	-1	
18636	20803	124-129	5. M O NW-NW 32 62 20	SL BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18749C	20803	91-124	33. M O NW-NW 32 62 20	SL SPECIAL SAMPLE	91-124	0.0	10500.0	-2.0	29.7	2.8	-1.0	-1.0	-1.0	-1	-1	-1	RECLEANED +10M MAT'L
18637	20803	91-129	38. M O NW-NW 32 62 20	SL SLUICE BOX	91-129	4.0	3600.0	-2.0	24.7	6.0	-1.0	-1.0	-1.0	-1	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18632	200	0.25	822	820	9700	27.10	240	250	290	140	0	75	-10	4	0.5	0	-10	2.3	700	514	91	6	26	69	2	200.0	19.3	3	21.40
18633	88	0.17	568	750	10000	23.80	200	240	250	130	0	63	-20	6	0.5	0	-10	1.4	400	359	53	9	8	123	3	140.0	14.2	3	41.70
18634	86	0.15	635	960	10000	25.60	210	240	290	120	0	63	-10	5	-0.5	0	-10	1.9	600	409	57	11	12	46	2	160.0	15.0	3	39.10
18750C	100	0.16	656	1100	9800	29.80	240	210	250	150	0	99	-10	5	-0.5	0	-10	1.6	-600	465	72	12	20	66	3	170.0	14.8	3	43.00
18635	220	0.18	542	970	10000	25.60	200	220	200	120	0	55	70	4	-0.5	0	-10	1.1	-500	331	42	10	-6	40	2	130.0	11.4	3	26.40
18749C	35	0.19	283	600	9300	23.60	180	180	190	120	0	82	-10	3	-0.5	0	-10	2.8	600	183	18	4	-12	91	2	66.0	7.3	3	14.70
18637	76	0.19	835	930	8200	22.60	210	320	220	160	0	33	-10	6	-0.5	0	-10	-0.6	-500	461	140	6	60	69	-2	180.0	15.9	7	18.20

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18634	1.200	4.30	2500	180	42	440	-1	4	4.0	10	0.8

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18636	-7	-0.2	2.0	400	0.0	2	37.0	0.0	130	20	0	3	-100	5.4	19	0.0	1	86	0	0.00	0.0	-10	0	3.40	-1.0	-10	0.0	3.9	-10	-2	0.8	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18636	30	14	59	0	1.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20804

Drilling Completion Date 2/11/86

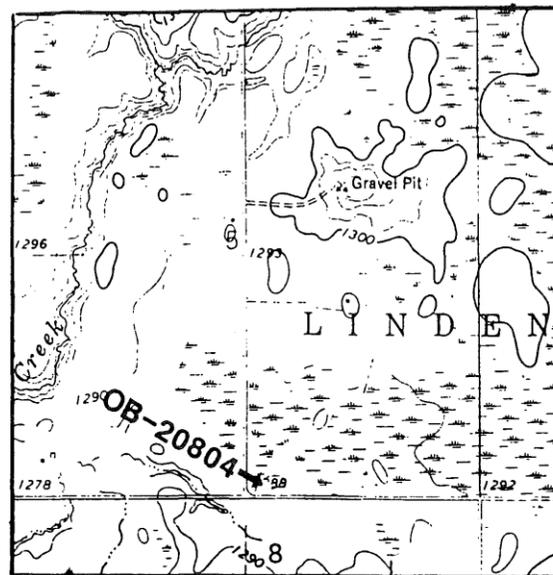
LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SE $\frac{1}{4}$ -5-62N-20W

County St. Louis

Quadrangle Gheen N.W. 7.5

Regional Survey Area Orr



HOLE PARAMETERS

Surface Elevation 1288 ft.

Total Depth 92 ft.

Elevation, Top of Precambrian Bedrock _____

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-64	Des Moines Lobe Gl. Drift			
64-92	Rainy Lobe Gl. Drift	F	B,C	C = Ag, Ni, Co

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite

E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core

H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type:

Thin Section Description:

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

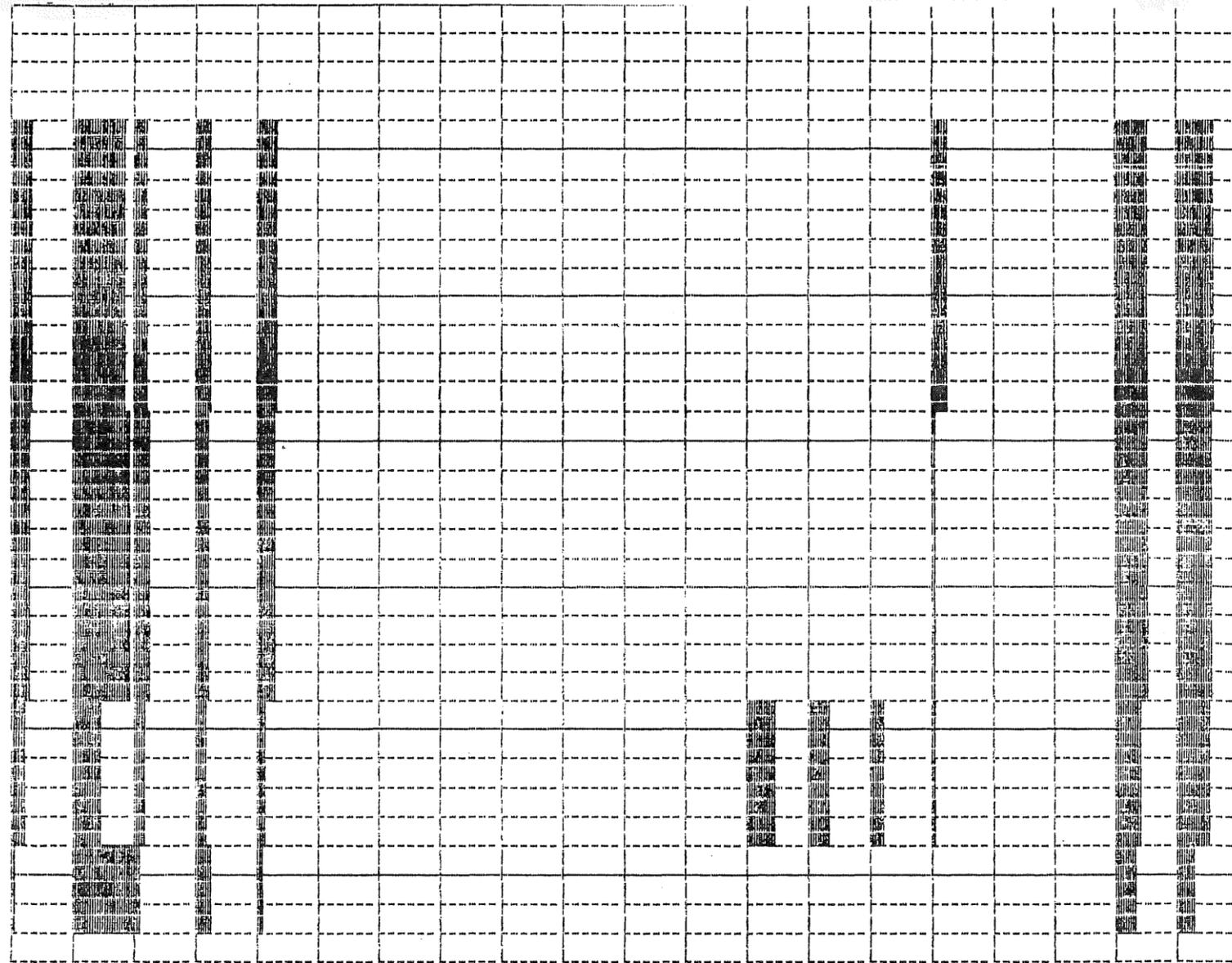
OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	H. I. CONC					CLAST					MATRIX								
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG		NO. V.G.	CALC PPB	SIZE	%	S/U	SD	ST	CY	COLOR	SD		CY		
18601	11.3	1.6	9.7	367.5	297.4	70.1	56.6	13.5	0	NA	C	85	15	NA	NA	U	Y	Y	Y	BN	BN	TILL
-02	19.4	1.8	17.6	557.8	445.0	112.8	91.6	21.2	0	NA	C	90	10	NA	NA	U	Y	Y	Y	BN	B	TILL
18602R	8.3	0.6	7.7	200.1	145.2	54.9	46.0	8.9	4	91	P	60	40	NA	NA	U	Y	Y	Y	B	B	TILL
-03	9.3	0.2	9.1	272.1	222.8	49.3	39.7	9.6	0	NA	C	65	15	NA	NA	U	Y	Y	Y	B	B	TILL
-04	3.2	0.2	3.0	82.9	71.3	11.6	9.7	1.9	0	NA	P	85	15	NA	NA	U	Y	Y	Y	B	BN	TILL
18604R	6.4	0.0	6.4	164.8	133.5	31.3	25.0	6.3	2	48	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-621	2.9	0.0	2.9	126.1	96.4	29.7	22.7	7.0	1	28												
18743C	23.7	0.0	23.7	407.5	279.7	127.8	100.1	27.7	3	162	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

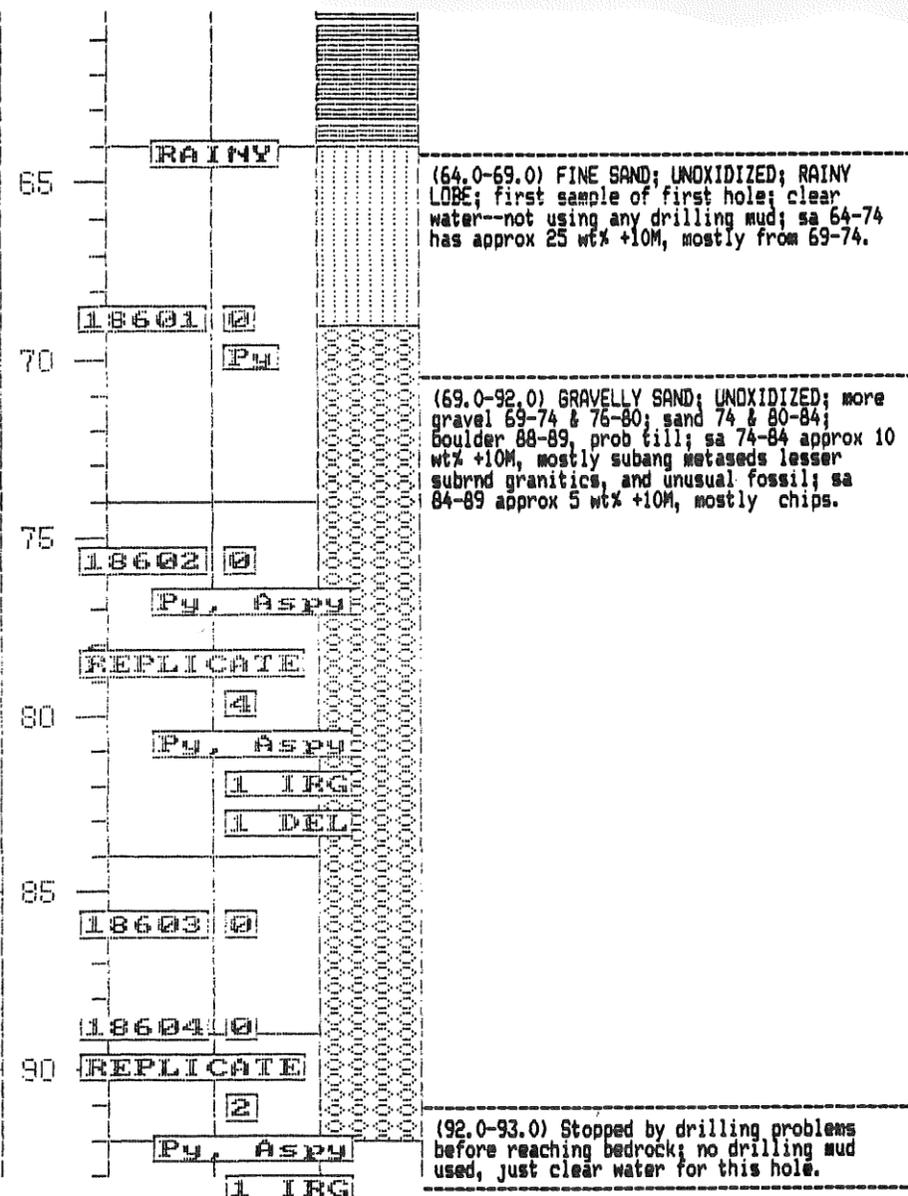
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS
				ABRADED		IRREGULAR		DELICATE				
				T	P	T	P	T	P			
18601	Y	NO VISIBLE GOLD										EST. 35% PYRITE
-02	Y	NO VISIBLE GOLD										EST. 30% PYRITE 1% ARSENOPYRITE
18602R	Y	25 X 50	8 C					1		1		EST. 15% PYRITE 150 GRAINS ARSENOPYRITE
		50 X 50	10 C							1		
		75 X 100	18 C							1		
		75 X 175	25 C					1		1		
-03	N	NO VISIBLE GOLD								4	46.0	91
-04	N	NO VISIBLE GOLD										
18604R	Y	50 X 50	10 C							1		EST. 15% PYRITE 0.1% ARSENOPYRITE
		75 X 100	18 C							1		
										2	25.0	48
-621	Y	75 X 75	15 C							1		EST. 15% PYRITE 1000 GRAINS ARSENOPYRITE
										1	22.7	28
18743C	Y	25 X 25	5 C							1		EST. 50% PYRITE 300 GRAINS ARSENOPYRITE
		25 X 75	10 C							1		
		200 X 250	42 C							1		
										3	100.1	162



RECLEANED 74-92

SLUICE BOX 64-92



MASTER FILE

Appendix 8-61C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D B FORTY LEGAL DESC	COUNTY	DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG -63uM	WT (g) -63FEED	WT % -63uM	WT % +10	WT % SAND	REMARKS
18601	20804	64-74	10. M O SW-SE 5 62 20	SL	RL. GVL. SAND	64-74	0.0	11300.0	-2.0	56.6	13.5	-1.0	-1.0	-1	-1	
18602	20804	74-84	10. M O SW-SE 5 62 20	SL	RL. GVL. SAND	74-84	0.0	19400.0	-2.0	91.6	21.2	-1.0	-1.0	-1	-1	
18602R	20804	74-84	10.0 M O SW-SE 5 62 20	SL	RL. GVL. SAND	74-84	4.0	8300.0	-2.0	46.0	8.9	-1.0	-1.0	-1	-1	
18743C	20804	74-92	18. M O SW-SE 5 62 20	SL	SPECIAL SAMPLE	74-92	3.0	23700.0	-2.0	100.1	27.7	-1.0	-1.0	-1	-1	RECLEANED +10M MAT'L
18603	20804	84-89	5. M O SW-SE 5 62 20	SL	RL. GVL. SAND	84-89	0.0	9300.0	-2.0	39.7	9.6	-1.0	-1.0	-1	-1	
18604	20804	89-92	3. M O SW-SE 5 62 20	SL	RL. GVL. SAND	89-92	0.0	3200.0	-2.0	9.7	1.9	-1.0	-1.0	-1	-1	
18604R	20804	89-92	3.0 M O SW-SE 5 62 20	SL	RL. GVL. SAND	89-92	2.0	6400.0	-2.0	25.0	6.3	-1.0	-1.0	-1	-1	
18621	20804	64-92	28. M O SW-SE 5 62 20	SL	SLUICE BOX	64-92	1.0	2900.0	-2.0	22.7	7.0	-1.0	-1.0	-1	-1	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT ASSAY g/kg WEIGHT
18601	120	0.46	493	690	4300	30.30	280	260	510	160	0	61	-10	6	-0.5	0	-10	1.1	2000	281	42	-3	21	52	4	85.0	12.5	5 34.50
18602	22	0.35	330	470	4900	24.10	220	240	560	140	0	53	20	5	-0.5	0	-10	1.3	1600	192	26	-2	41	58	4	64.0	6.9	5 68.70
18743C	150	0.33	511	630	6500	30.40	250	230	470	140	0	52	-10	5	-0.5	0	-10	1.0	1600	340	48	4	64	46	3	120.0	14.4	4 73.70
18603	-22	0.24	647	460	7700	24.20	170	190	270	120	0	36	-60	4	1.0	0	-10	0.9	800	393	55	8	67	60	2	150.0	14.9	4 29.30
18604	-9	0.13	295	180	6600	10.10	70	210	630	140	0	11	-10	6	0.5	0	-10	0.4	400	174	29	6	75	39	2	65.0	7.8	3 10.60
18604R	32	0.24	490	470	9100	21.10	170	220	280	150	0	42	-10	6	-0.5	0	-10	1.8	600	341	59	7	320	86	2	120.0	10.3	4 18.70
18621	62	0.53	755	910	6300	27.80	220	410	390	150	0	39	-10	6	-0.5	0	-10	1.7	1500	561	120	10	120	101	3	190.0	19.2	8 16.90

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGD %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18603	0.810	3.80	1300	230	73	340	-1	19	3.0	16	1.0

Appendix 8-62A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20901

Drilling Completion Date 12/19/86

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -NE $\frac{1}{4}$ -14-63N-20W

County St. Louis

Quadrangle Gheen 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1335 ft.

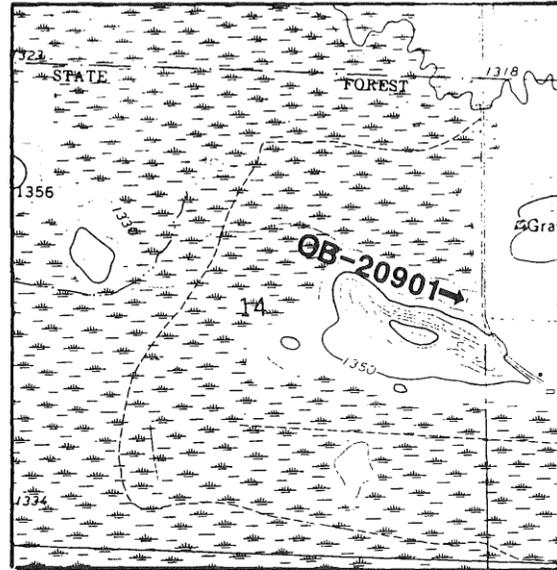
Total Depth 65 ft.

Elevation, Top of Precambrian Bedrock 1275 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-47.5	Des Moines Lobe Gl. Drift			
47.5-60	Rainy Lobe Gl. Drift	F	B,C	B = Cu,Ba,Bi C = Ag,Ni,Mo
60-65	Bedrock	F	I	

A = -63 microns fraction E = Skeletonized Grab Sample H = Thin Section
 B = Heavy Minerals, Nonmag in Core Box I = (Bedrock or Drift)
 C = Heavy Minerals, Mag F = Interval Cuttings in Bucket Split of "Wholerock"
 D = Sluice Box Composite G = Core Sample

BEDROCK

Principal Rock Type: Graywacke. Sample is minimum 70% overburden clast contamination. Mainly whole pebbles of gray (biotitic) to green (chloritic) wacke and pink to white granitoids (no volc.); balance is drill cuttings, possibly bedrock, of sugary biotitic graywacke containing 1% relict sand and 5-10% dissem. pyrite. (i.e.: Graywacke is all one variety, either bedrock or large boulder.) (By ODM, see report in Appendix)

Thin Section Number: #18640.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

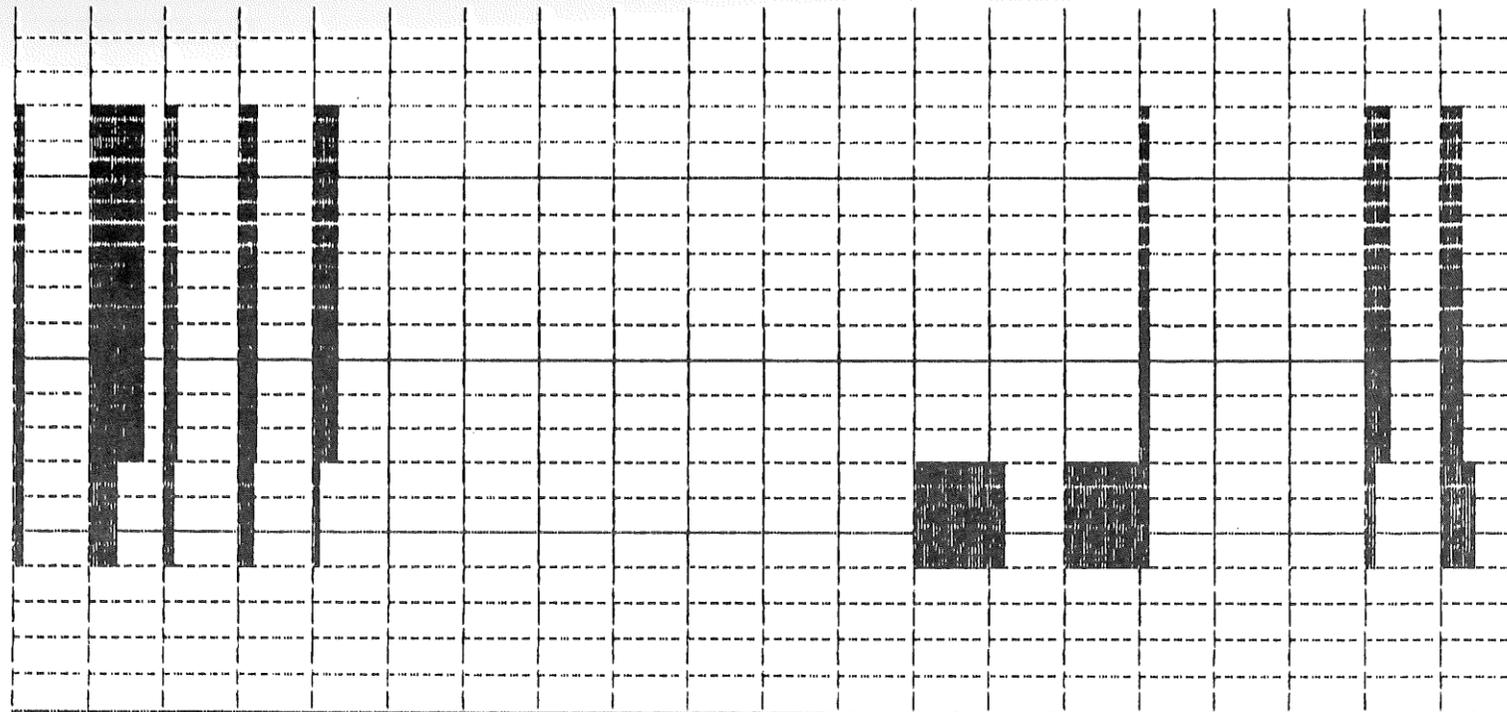
OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS						
	TABLE	+10 SPLIT	TABLE CHIPS	TABLE FEED	M. I. CONC				CLAST		MATRIX											
					CONC	LIGHTS		TOTAL	NON MAG	NO. MAG	CALC V.G.	PPB	SIZE	%	S/U SD		ST CY	COLOR				
18638	11.9	0.0	11.9	167.2	129.0	38.2	30.5	7.7	0	NA	TR	NA	NA	NA	A	U	Y	Y	Y	BB	GB	TILL
18638R	9.7	0.0	9.7	155.0	121.6	33.4	25.6	7.8	1	1424	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
-39	6.1	0.0	6.1	76.3	62.4	13.9	8.7	5.2	1	172	TR	NA	NA	NA	NA	U	Y	Y	Y	BB	GB	TILL
18639R	5.4	0.0	5.4	125.5	102.1	23.4	18.4	5.0	1	157	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
-641	5.0	0.0	5.0	120.8	100.7	20.1	15.7	4.4	2	24												
18751C	0.4	0.0	0.4	53.2	52.0	1.2	0.9	0.3	0	NA	TR	NA	NA	NA	NA	S	M	Y	N	B	NA	SAND

GOLD CLASSIFICATION

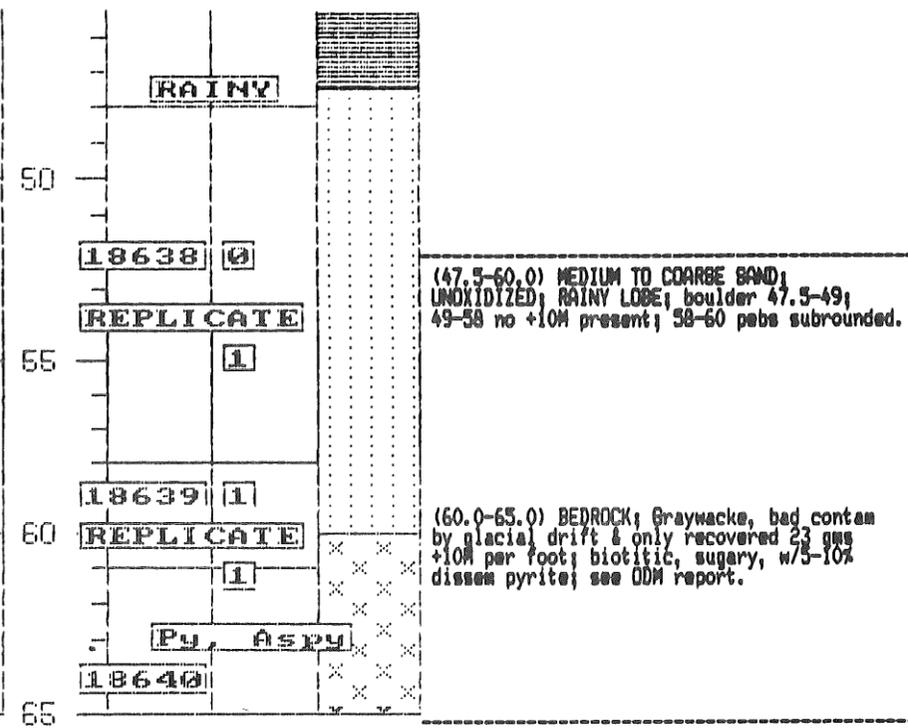
VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										REMARKS
					ABRADED		IRREGULAR		DELICATE		NON MAG	CALC V.G. ASSAY			
					T	P	T	P	T	P			TOTAL	GMS	
18638	N		NO VISIBLE GOLD												
18638R	N		200 X	400	54	C	1					1			
												1	25.6	1424	
-39	N		75 X	125	20	C	1					1			PHOTO REFERENCE #130
												1	8.7	172	
18639R	Y		100 X	150	25	C	1					1			EST. 5% PYRITE 150 GRAINS
												1	18.4	157	ARSENOPYRITE
-641	Y		50 X	50	10	C	1	1	1			2			EST. 20% PYRITE 1% ARSENOPYRITE (FINE)
												2	15.7	24	
18751C	N		NO VISIBLE GOLD												



RECLEAVED 58-61

SLUICE BOX 48-65



18751C 0

18641 2

Py, Aspy

1 IRG

MASTER FILE

Appendix 8-62C.

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18638	20901	48-58	10. M D SE-NE 14 63 20	SL	RL. MED. TO C. SAND 48-58	0.0	11900.0	-2.0	30.5	7.7	-1.0	-1.0	-1	-1	-1		
18638R	20901	48-58	10.0 M D SE-NE 14 63 20	SL	RL. MED. TO C. SAND 48-58	1.0	9700.0	-2.0	25.6	7.8	-1.0	-1.0	-1	-1	-1		
18639	20901	58-61	3. M D SE-NE 14 63 20	SL	RL. MED. TO C. SAND 58-61	1.0	6100.0	-2.0	8.7	5.2	-1.0	-1.0	-1	-1	-1		
18639R	20901	58-61	3.0 M D SE-NE 14 63 20	SL	RL. MED. TO C. SAND 58-61	1.0	5400.0	-2.0	18.4	5.0	-1.0	-1.0	-1	-1	-1		
18751C	20901	58-61	3. M D SE-NE 14 63 20	SL	SPECIAL SAMPLE 58-61	0.0	400.0	-2.0	0.9	0.3	-1.0	-1.0	-1	-1	-1		RECLEANED +10M MAT'L
18640	20901	61-65	4. M D SE-NE 14 63 20	SL	BEDROCK	-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18641	20901	48-65	17. M D SE-NE 14 63 20	SL	SLUICE BOX 48-65	2.0	5000.0	-2.0	15.7	4.4	-1.0	-1.0	-1	-1	-1		

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18638	54	0.19	817	320	8600	30.40	280	280	430	180	0	23	-10	6	-0.5	0	-10	0.8	2000	545	76	9	38	52	3	190.0	21.9	3	22.10
18639	69	0.10	396	180	9700	13.80	110	280	220	110	0	22	-10	5	-0.5	0	-10	0.5	400	255	43	8	31	61	2	87.0	10.4	1	16.80
18639R	-23	0.30	499	270	8700	22.20	200	230	180	110	0	13	-10	5	-0.5	0	23	0.7	700	360	64	7	65	99	4	120.0	12.7	3	13.60
18751C	17	0.22	268	290	11000	29.00	190	190	180	130	0	24	-10	4	-0.5	0	-10	1.6	700	193	28	6	71	72	3	71.0	8.7	2	0.85
18641	-31	0.36	949	370	8200	28.70	350	500	380	140	0	28	-30	8	-0.5	0	-10	-0.8	800	714	140	10	100	109	3	240.0	30.6	3	11.30

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	AS	WT g/kg
18638	0.380	2.70	2200	220	66	350	0.1	12	-0.5	8	2.5	0.8
18639	0.880	3.20	1500	560	92	310	-1	98	3.0	10	0.0	0.9
18639R	0.530	3.20	1400	190	61	290	-0.1	23	-0.5	14	2.1	0.9

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18640	-7	-0.2	2.0	800	0.0	2	40.0	0.0	100	20	0	3	-100	4.0	25	0.0	2	71	0	0.00	0.0	-10	0	3.70	-1.0	-10	0.0	5.4	-10	-2	1.3	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

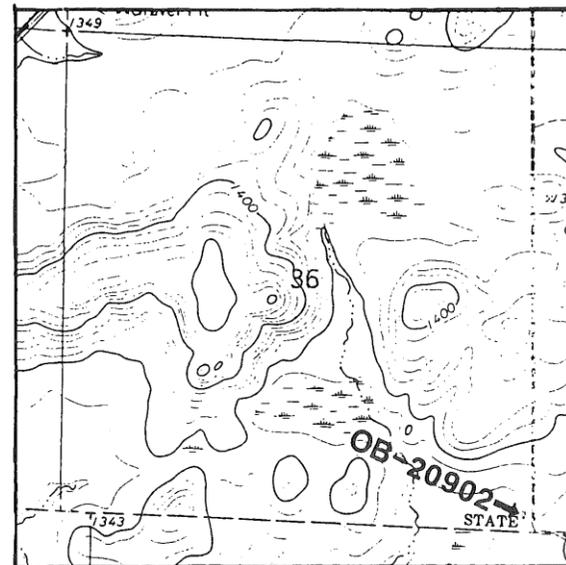
SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S %	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18640	37	17	75	0	1.5	0	0	0	0.00	4	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

IDENTIFICATION

DNR Drill Hole Number OB-20902
 Drilling Completion Date 12/15/86

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SE $\frac{1}{4}$ -36-63N-20W
 County St. Louis
 Quadrangle Gheen 7.5
 Regional Survey Area Orr



HOLE PARAMETERS

Surface Elevation 1340 ft.
 Total Depth 29.5 ft.
 Elevation, Top of Precambrian Bedrock 1316.5 ft.
 Drilling Method Mud Rotary
 Sample Diameter 4.5 inch
 Sample Collection Method Slurry: Trough with Dam

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-10	Des Moines Lobe Gl. Drift			
10-23.5	Rainy Lobe Gl. Drift	F	B,C	B = Au,W C = Ag,Mo,Ni
23.5-29.5	Bedrock			

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Graywacke. Dark gray, well foliated to schistose graywacke. Relict sand 0.2-0.3, secondary sugar 0.05-0.1 and garnet 0.5. Sugary texture with relict sand. Comprised of 25% biotite, 75% qtz.-plag. sugar, less than 1% relict qtz. sand grains and 0-1% garnet metacrysts. 0.2% dissem. pyrite. (By ODM, see report in Appendix)

Thin Section Number: #18616.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)
 OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION								CLASS					
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC		NON MAG			NO. V.G.	CALC		CLAST		MATRIX								
										SIZE	%	S/U SD		ST CY		COLOR		SD CY				
										V/S	GR	LS	OT									
18614	3.6	0.1	3.5	150.9	143.0	7.9	6.4	1.5	0	NA	P	80	20	NA	NA	U	Y	Y	Y	B	B	TILL
18614R	2.1	0.1	2.0	58.1	51.7	6.4	5.1	1.3	0	NA	P	85	15	NA	NA	U	Y	Y	Y	GB	GB	TILL
-15	8.0	0.1	7.9	310.7	287.5	23.2	19.1	4.1	0	NA	P	85	15	NA	NA	U	Y	Y	Y	B	B	TILL
-617	3.8	0.0	3.8	142.8	122.1	20.7	17.8	2.9	0	NA												
18745C	4.1	0.0	4.1	95.0	87.6	7.4	6.5	0.9	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GYB	GYB	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	DIAMETER	THICKNESS	NUMBER OF GRAINS								NON MAG	CALC V.G. ASSAY	REMARKS		
				ABRADED		IRREGULAR		DELICATE		TOTAL						
				T	P	T	P	T	P	T	P	TOTAL	GMS	PPB		
18614	N	NO VISIBLE GOLD														
18614R	N	NO VISIBLE GOLD														
-15	N	NO VISIBLE GOLD														
18617	Y	NO VISIBLE GOLD														EST. 30% PYRITE 2% ARSENOPIRYTE
18745C	Y	NO VISIBLE GOLD														EST. 10% PYRITE

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D 6 FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FT6	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18614	20902	10-15	5. M O SE-SE 36 63 20 SL	RL. GVL. SAND	10-15	0.0	3600.0	-2.0	6.4	1.5	-1.0	-1.0	-1.0	-1	-1	-1	
18614R	20902	10-15	5.0 M O SE-SE 36 63 20 SL	RL. GVL. SAND	10-15	0.0	2100.0	-2.0	5.1	1.3	-1.0	-1.0	-1.0	-1	-1	-1	
18745C	20902	10-20	10. M O SE-SE 36 63 20 SL	SPECIAL SAMPLE	10-20	0.0	4100.0	-2.0	6.5	0.9	-1.0	-1.0	-1.0	-1	-1	-1	RECLEANED +10M MAT'L
18615	20902	15-20	5. M O SE-SE 36 63 20 SL	RL. GVL. SAND	15-20	0.0	8000.0	-2.0	19.1	4.1	-1.0	-1.0	-1.0	-1	-1	-1	
18616	20902	25-29.5	4.5 M O SE-SE 36 63 20 SL	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18617	20902	10-29.5	19.5 M O SE-SE 36 63 20 SL	SLUICE BOX	10-29.5	0.0	3800.0	-2.0	17.8	2.9	-1.0	-1.0	-1.0	-1	-1	-1	

Appendix 8-63C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT	ASSAY
																												g/kg	WEIGHT
18614	240	0.12	204	170	11000	9.40	40	130	110	98	0	12	-10	6	-0.5	0	-10	0.7	400	112	19	4	550	56	-2	44.0	4.7	2	7.95
18614R	66	0.31	518	370	10000	21.20	110	130	92	110	0	24	-30	8	-0.5	0	-10	1.4	-700	310	68	-1	1400	56	-2	110.0	12.4	2	3.63
18745C	-38	0.19	296	290	24000	25.10	300	230	260	140	0	44	-20	7	-0.5	0	-10	1.1	-600	181	36	6	750	51	3	71.0	12.0	2	4.46
18615	-15	0.09	-5	190	21000	13.70	120	250	270	97	0	16	30	8	-0.5	0	-10	0.8	-300	143	-2	4	1000	48	2	53.0	5.4	2	17.20
18617	80	0.24	461	390	13000	26.40	280	290	320	120	0	29	-20	18	-0.5	0	-10	1.3	-1200	334	80	6	5400	56	2	120.0	15.8	5	12.90

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18615	1.100	2.70	2100	900	120	290	-1	190	2.0	6	0.5

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18616	-7	-0.2	2.0	600	0.0	1	41.0	0.0	160	30	0	3	-100	7.6	22	0.0	3	120	0	0.00	0.0	-10	0	2.80	-1.0	-10	0.0	5.1	-10	54	5.6	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18616	92	15	110	0	1.5	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-64A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-20904

Drilling Completion Date 1/9/87

LOCATION (see map at right)

S-T-R SE $\frac{1}{4}$ -SE $\frac{1}{4}$ -6-63N-20W

County St. Louis

Quadrangle Gheen N.W. 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1325 ft.

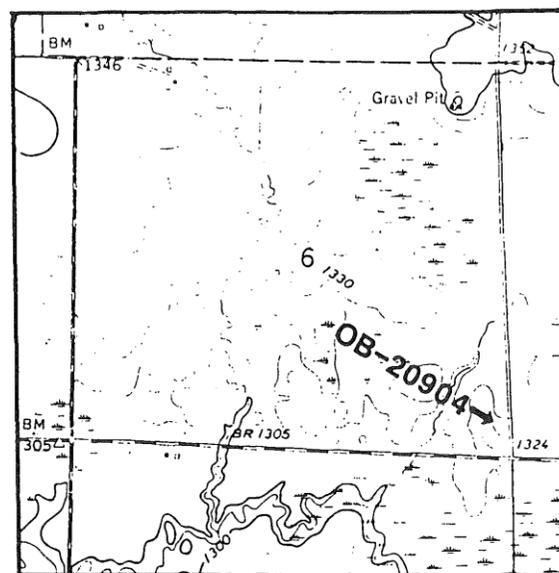
Total Depth 125 ft.

Elevation, Top of Precambrian Bedrock _____

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)			AU	DESCRIPTION										CLASS				
	TABLE	+10 SPLIT	TABLE CHIPS	TABLE CONC	M. I. CONC			CLAST		MATRIX												
					CONC	LIGHTS		TOTAL	NON MAG	MAG	NO. V.G.	CALC PPB	SIZE	%	S/U	SD	ST		CY	COLOR		
18659	7.0	0.9	6.1	311.2	289.5	21.7	19.6	2.1	0	NA	P	50	50	NA	NA	U	Y	Y	Y	B	B	TILL
-550	6.0	0.0	6.0	212.3	191.8	20.5	17.8	2.7	1	11	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
18660R	10.0	0.0	10.0	196.9	157.7	39.2	34.8	4.4	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	GB	GB	TILL
-661	4.5	0.0	4.5	12.6	9.1	3.5	3.0	0.5	0	NA	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL
-662	1.9	0.0	1.9	76.4	70.5	5.9	5.5	0.4	0	NA												
18757C	9.5	0.0	9.5	253.2	220.6	32.6	29.7	2.9	1	13	TR	NA	NA	NA	NA	U	Y	Y	Y	B	B	TILL

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-100	Des Moines Lobe Gl. Drift			
100-125	Rainy Lobe Gl. Drift	F	B,C	B = Pb,Bi,Sn

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type:

Thin Section Description:

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

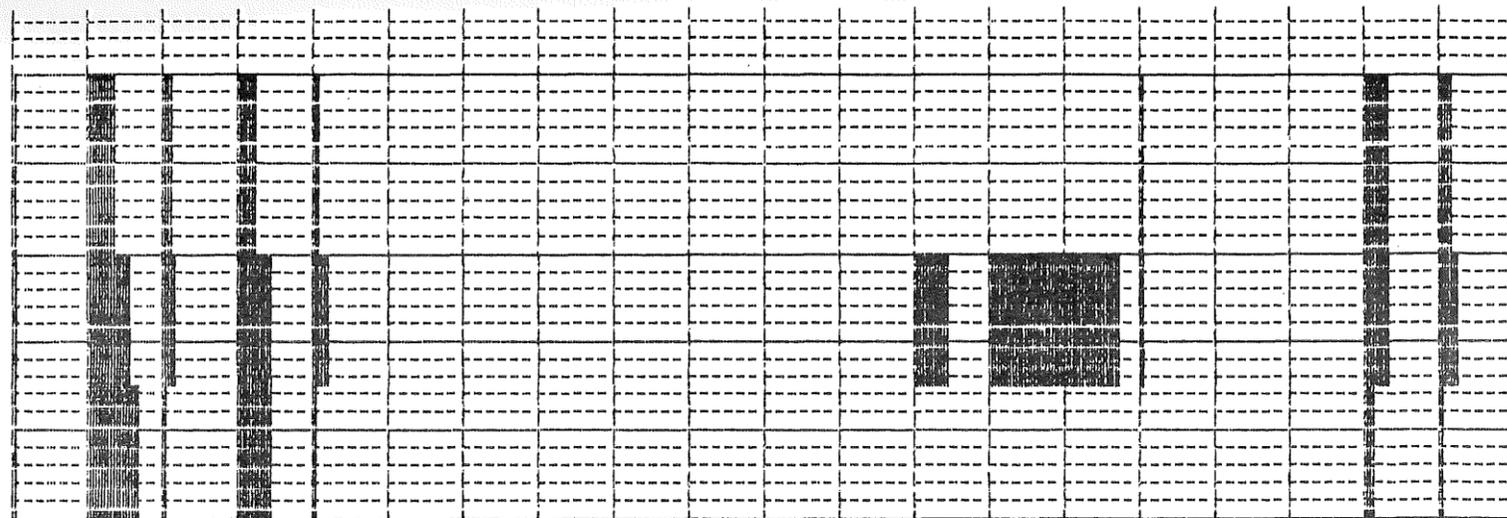
SAMPLE #	PANNED Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS
				ABGRADED T	IRREGULAR P	DELICATE T	DELICATE P	TOTAL	GMS			
18659	N											
-660	Y	50 X 50	10 C						1			EST. 5% PYRITE
									1	17.8	11	
18660R	Y											EST. 10% PYRITE
-661	N											
-662	Y											EST. 5% PYRITE, 200 GRAINS ARSENOPYRITE, 2 GRAINS BORNITE
18757C	Y	50 X 75	13 C						1			EST. 7% PYRITE
									1	29.7	13	

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IN NON MAG HMC					IN -63 MICRON					IN MAG FRAC					NON MAG -63		-63 NON MAG		MAG		HMC SAMPLE #	HMC # GOLD GRAINS INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
^200 As	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 Ag	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au	^20 Au	^100 g/kg	^10 g/kg	^2 g/kg	(FEET)				
																					5			
																						10		
																						15		
																						20		
																						25		
																						30		
																						35		
																						40		
																						45		
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																						55		
																						60		
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																						80		
																						85		
																						90		
																						95		

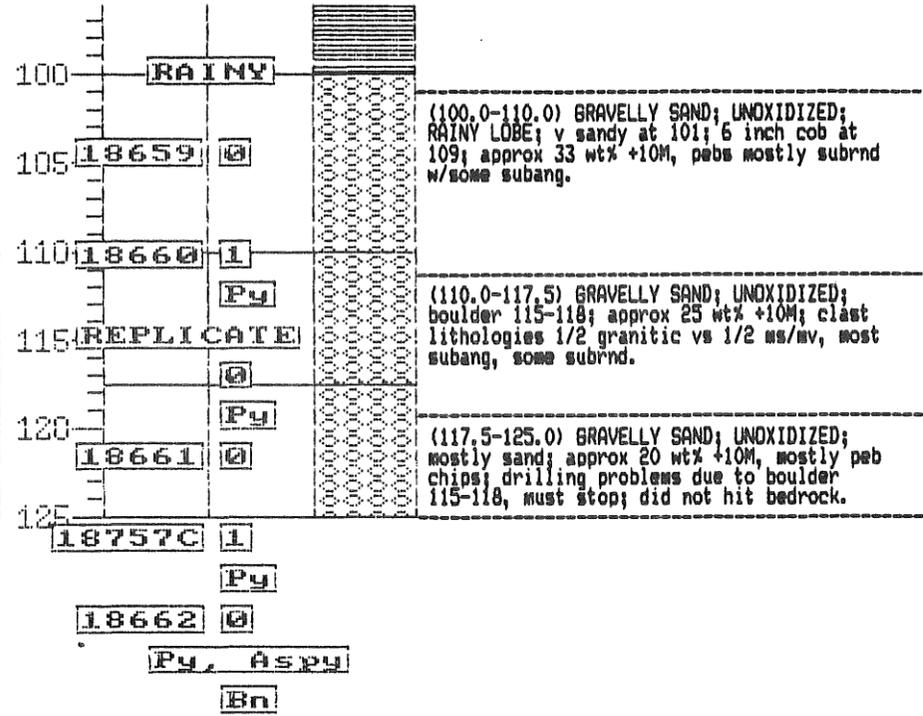
(0.0-15.0) CLAY; OXIDIZED; depth of oxidation uncertain.

(15.0-100.0) CLAY; OXIDIZED; with silty clay, gray.



RECLEANED 100-125

SLUICE BOX 105-125



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18659	20904	100-110	10. M D SE-SE 6 63 20	SL RL. GVL. SAND	100-110	0.0	7000.0	-2.0	19.6	2.1	-1.0	-1.0	-1	-1	-1		
18660	20904	110-117.5	7.5 M D SE-SE 6 63 20	SL RL. GVL. SAND	110-117.5	1.0	6000.0	-2.0	17.8	2.7	-1.0	-1.0	-1	-1	-1		
18660R	20904	110-117.5	7.5 M D SE-SE 6 63 20	SL RL. GVL. SAND	110-117.5	0.0	10000.0	-2.0	34.8	4.4	-1.0	-1.0	-1	-1	-1		
18661	20904	117.5-125	7.5 M D SE-SE 6 63 20	SL RL. GVL. SAND	117.5-125	0.0	4500.0	-2.0	3.0	0.5	-1.0	-1.0	-1	-1	-1		
18757C	20904	100-125	25. M D SE-SE 6 63 20	SL SPECIAL SAMPLE	100-125	1.0	9500.0	-2.0	29.7	2.9	-1.0	-1.0	-1	-1	-1	RECLEANED +10M MAT'L	
18662	20904	100-125	25. M D SE-SE 6 63 20	SL SLUICE BOX	100-125	0.0	1900.0	-2.0	5.5	0.4	-1.0	-1.0	-1	-1	-1		

Appendix 8-64C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	DE	DR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18659	21	0.17	0	170	11000	28.00	100	140	210	120	0	11	-10	6	-0.5	0	-10	0.6	400	148	15	-2	270	55	-2	45.0	7.7	3	14.40
18660	-19	0.21	0	130	12000	28.80	160	190	340	110	0	10	20	11	-0.5	0	83	0.8	1100	314	27	7	130	129	-2	66.0	10.5	3	12.60
18661	-5	-0.05	0	-50	7900	4.70	50	300	410	230	0	6	10	11	1.5	0	-10	-0.2	200	77	9	-1	11	65	4	16.0	3.0	1	2.37
18757C	97	0.25	459	260	9100	31.10	190	130	190	110	0	21	-30	9	-0.5	0	-10	-1.0	900	266	21	-4	-30	48	2	65.0	6.4	3	22.00
18662	-38	0.28	1210	380	9400	37.40	370	320	450	220	0	22	-30	18	1.0	0	-10	-0.2	1100	716	82	-4	190	66	2	190.0	33.5	3	3.91

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	DR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18660	1.100	2.30	1100	220	160	170	-1	73	-0.5	49	0.5

IDENTIFICATION

DNR Drill Hole Number OB-20906

Drilling Completion Date 12/16/86

LOCATION (see map at right)

S-T-R NW $\frac{1}{4}$ -SW $\frac{1}{4}$ -35-63N-20W

County St. Louis

Quadrangle Gheen 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1330 ft.

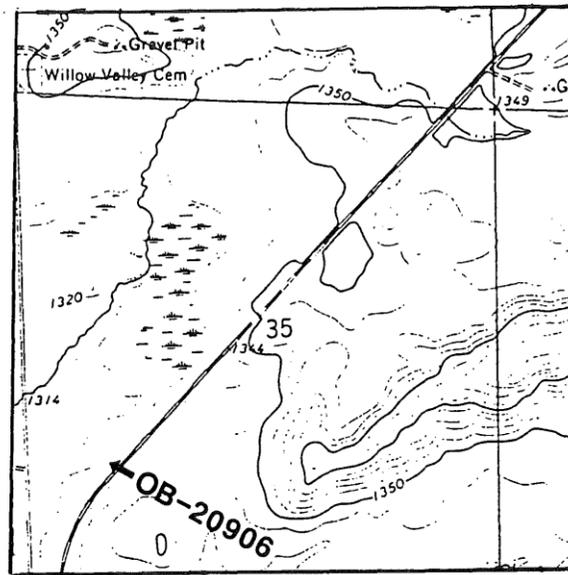
Total Depth 33 ft.

Elevation, Top of Precambrian Bedrock 1302.5 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)		WEIGHT (GRAMS DRY)				AU	DESCRIPTION						CLASS									
	TABLE	+10 SPLIT	TABLE	M. I. CONC		NO.		CALC	CLAST			MATRIX											
				CONC	LIGHTS				NON MAG	MAG	V.G.	PPB	SIZE		Z	S/U	SD	ST	CY	COLOR			
18618	30.8	0.0	30.8	295.6	207.1	88.5	71.2	17.3	6	114	TR	NA	NA	NA	NA	U	Y	Y	Y	BGN	BGN	TILL	
18618R	9.7	0.0	9.7	136.5	102.1	34.4	28.4	6.0	2	4	TR	NA	NA	NA	NA	U	Y	Y	Y	GNB	GNB	TILL	
-620	4.7	0.0	4.7	156.6	130.1	26.5	22.3	4.2	4	144													
18746C	0.5	0.0	0.5	12.5	12.4	0.1	0.1	0.0	0		NA	TR	NA	NA	NA	NA	S	F	Y	Y	B	B	SAND&CLAY

SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-23	Des Moines Lobe Gl. Drift			
23-27.5	Rainy Lobe Gl. Drift	F	B,C	B = Au, Ni, Cu, Pb, Bi C = Ag
27.5-33	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Siltstone. Dark gray, schistose siltstone. Sugar 0.05. Sugary texture; no relict sand. Comprised of 20-50% (av. 30%) biotite and 70% qtz.-plag. sugar. 1% dissem. py. (By ODM, see report in Appendix)

Thin Section Number: #18619.

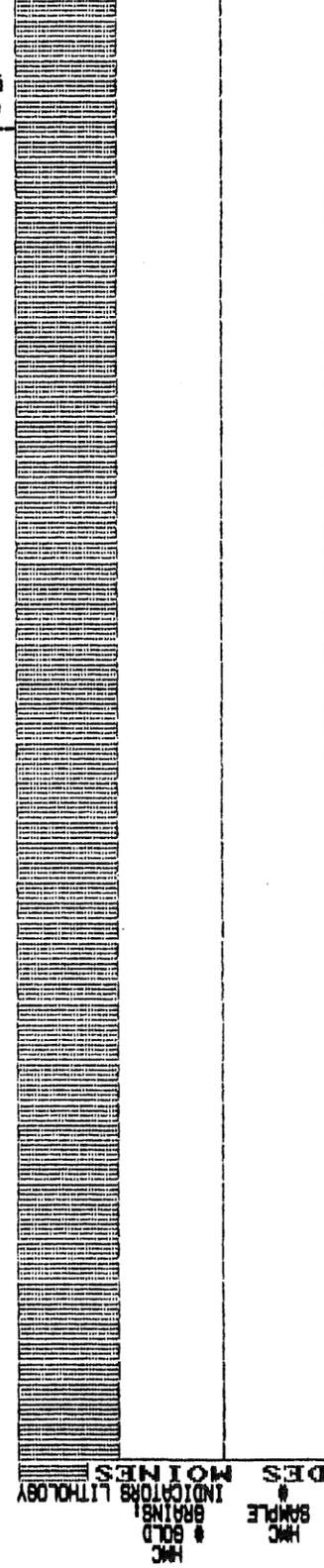
GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS		
				ABGRADED		IRREGULAR		DELICATE						
				T	P	T	P	T	P	TOTAL	GMS			
18618	Y	25 X 25	5 C					1		1				
		25 X 50	8 C		1		1			2				
		50 X 50	10 C		1					1				
		100 X 100	20 C	1						1				
		100 X 225	31 C	1						1				
										6	71.2	114		
18618R	Y	25 X 25	5 C					1		1				
		25 X 50	8 C					1		1				
										2	28.4	4		
18620	Y	25 X 25	5 C				1			1				
		50 X 50	10 C				1			1				
		100 X 100	20 C	1	1					2				
										4	22.3	144		
18746C	Y	NO VISIBLE GOLD												EST. 70% PYRITE

IN NON MGB HMC		IN -63 MICRON										IN MGB FRAC												
Hg	Cu	Pb	Mo	Ba	Ra	Cu	Ni	Sb	Mo	Zn	Pb	Ni	Fe	Zn	Mo	Pb	Ni	Fe	Zn	Mo	Pb	Ni	Fe	
~200	~500	~5	~25	~6000	~30	~100	~10	~10	~300	~10	~500	~100	~10	~300	~100	~50	~500	~10	~300	~100	~50	~500	~10	
g/kg																								

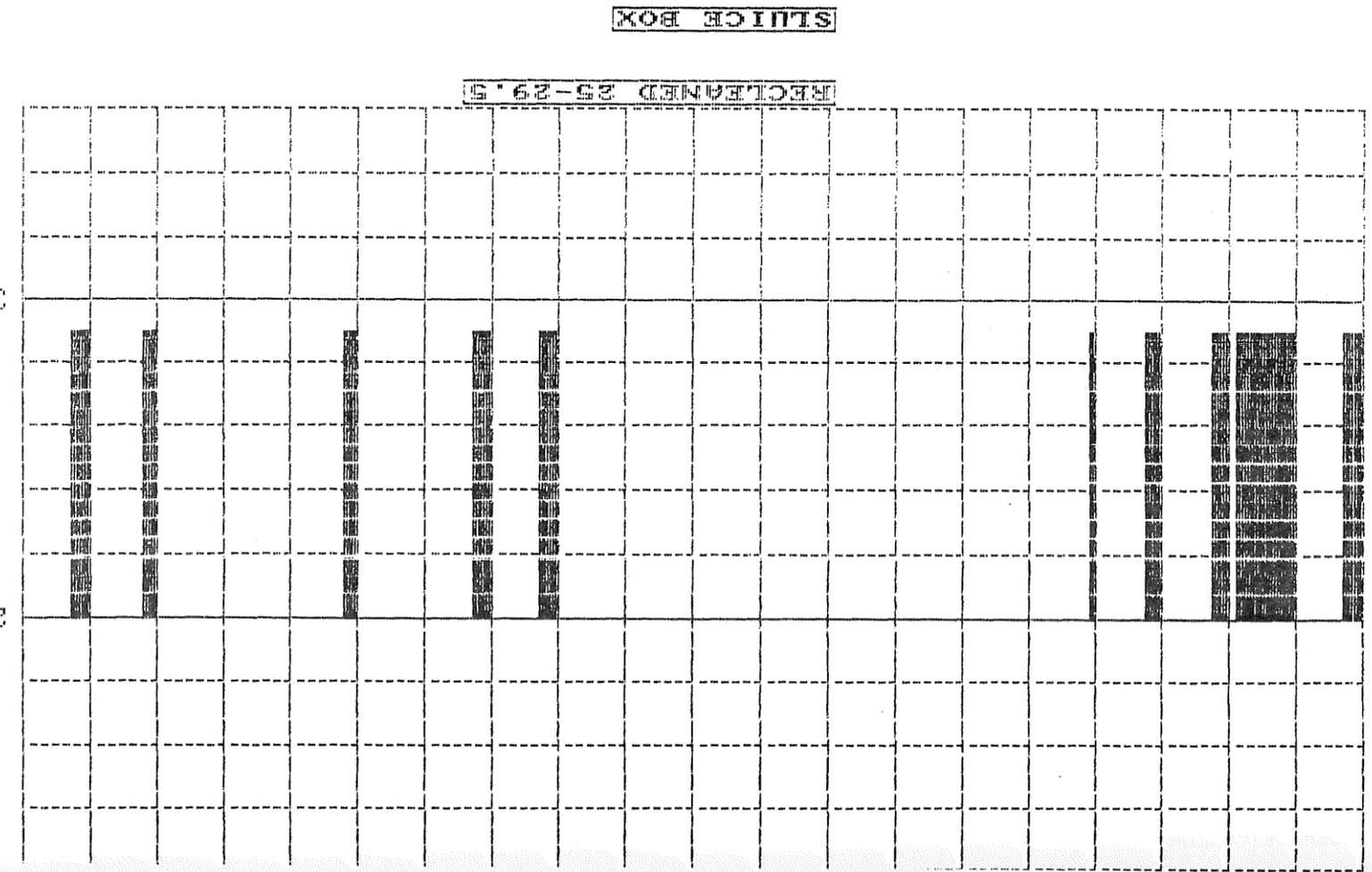
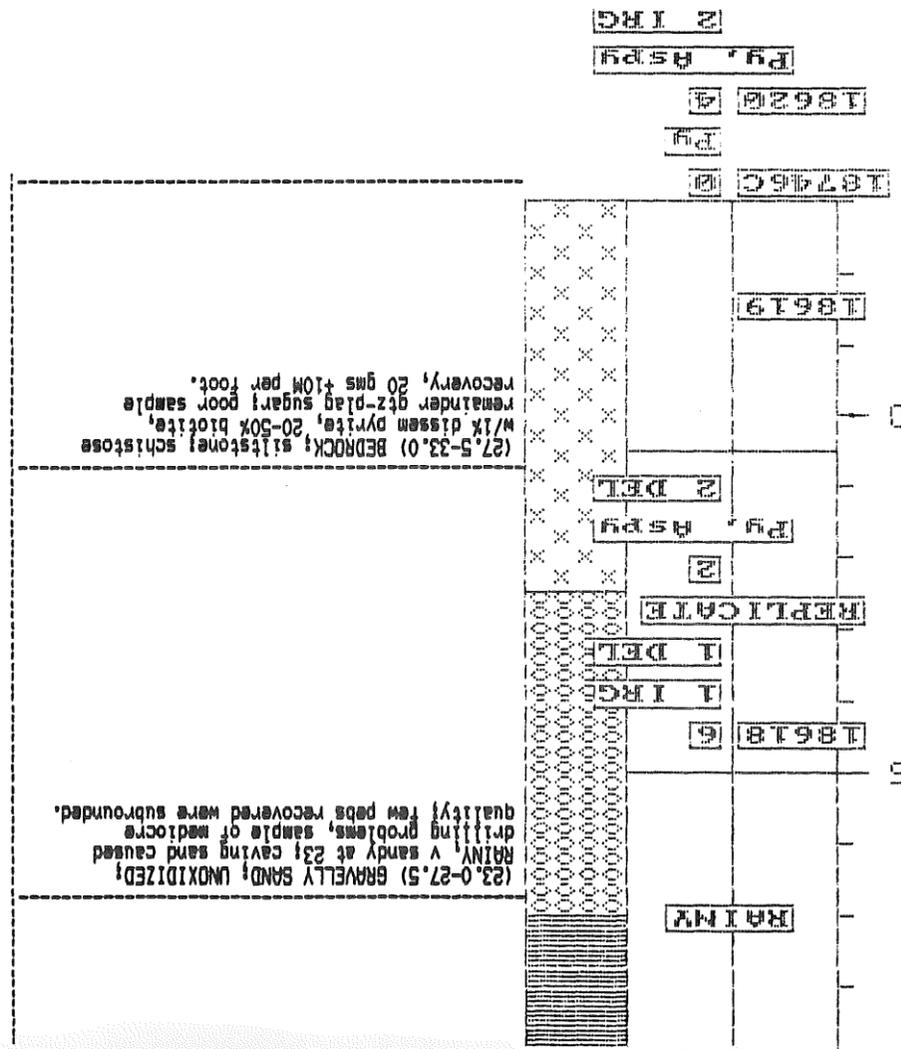
DES MOINES LITHOLOGY (FEET)



LITHOLOGIC DESCRIPTIONS AND/OR REMARKS

(18.0-23.0) CLAY; UNOXIDIZED; w/misty clay, gray.

OB-20906



MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
18618	20906	25-29.5	4.5 M D NW-SW 35 63 20 SL	SL	RL. GVL. SAND	25-29.5	6.0	30800.0	-2.0	71.2	17.3	-1.0	-1.0	-1	-1	-1	
18618R	20906	25-29.5	4.5 M D NW-SW 35 63 20 SL	SL	RL. GVL. SAND	25-29.5	2.0	9700.0	-2.0	28.4	6.0	-1.0	-1.0	-1	-1	-1	
18746C	20906	25-29.5	4.5 M D NW-SW 35 63 20 SL	SL	SPECIAL SAMPLE	25-29.5	0.0	500.0	-2.0	0.1	0.0	-1.0	-1.0	-1	-1	-1	RECLEANED +10M MAT'L
18619	20906	29.5-33	3.5 M D NW-SW 35 63 20 SL	SL	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1	
18620	20906	25-33	8. M D NW-SW 35 63 20 SL	SL	SLUICE BOX	25-33	4.0	4700.0	-2.0	22.3	4.2	-1.0	-1.0	-1	-1	-1	

Appendix 8-65C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18618	110	0.11	530	390	8300	26.10	400	480	520	130	0	59	-20	6	0.5	0	-10	1.2	500	363	64	9	110	138	7	140.0	14.8	2	51.90
18746C	36	0.12	759	730	0	40.60	350	0	0	0	0	82	-20	0	0.0	0	0	2.3	-600	355	79	8	870	0	0	160.0	14.8	0	0.08
18620	120	0.26	580	450	7600	28.70	400	390	410	160	0	63	-20	0	3.5	0	0	1.4	800	435	110	7	210	0	0	160.0	16.9	5	16.60

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18618	0.780	3.00	1900	150	63	350	1	-1	2.0	14	0.6

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18619	-6	-0.2	-1.0	600	0.0	2	44.0	0.0	90	10	0	3	-100	3.4	22	0.0	-1	58	0	0.00	0.0	-10	0	3.30	-1.0	-10	0.0	4.7	-10	4	1.3	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL	SiO2 %	S %	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18619	40	17	61	0	1.5	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-66A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-21002

Drilling Completion Date 1/15/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -NW $\frac{1}{4}$ -34-64N-21W

County St. Louis

Quadrangle Silverdale 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1310 ft.

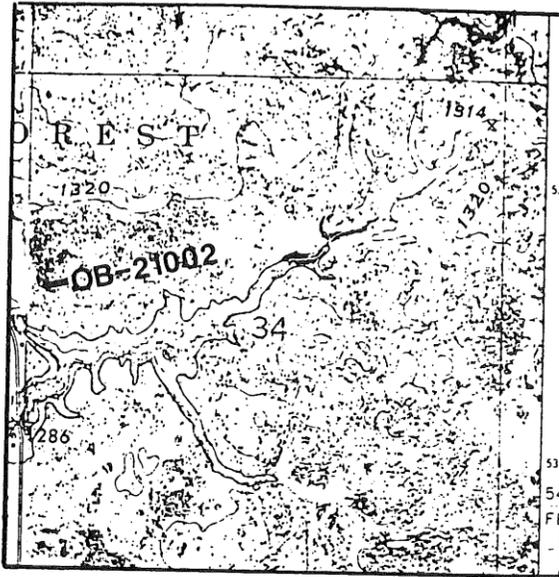
Total Depth 122 ft.

Elevation, Top of Precambrian Bedrock 1193 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-95.5	Des Moines Lobe Gl. Drift			
95.5-117	Rainy Lobe Gl. Drift	F	B,C	B = Ba,Pb,Cu,Ni C = Mo,Ni
117-122	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Metagraywacke. 90% whole pebbles up to 2cm diameter, 10% cuttings of coarser clasts; lithologies are 70% varied graywacke, 30% varied granite, no amphibolite. (By ODM, see report in Appendix)

Thin Section Number: #18678.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

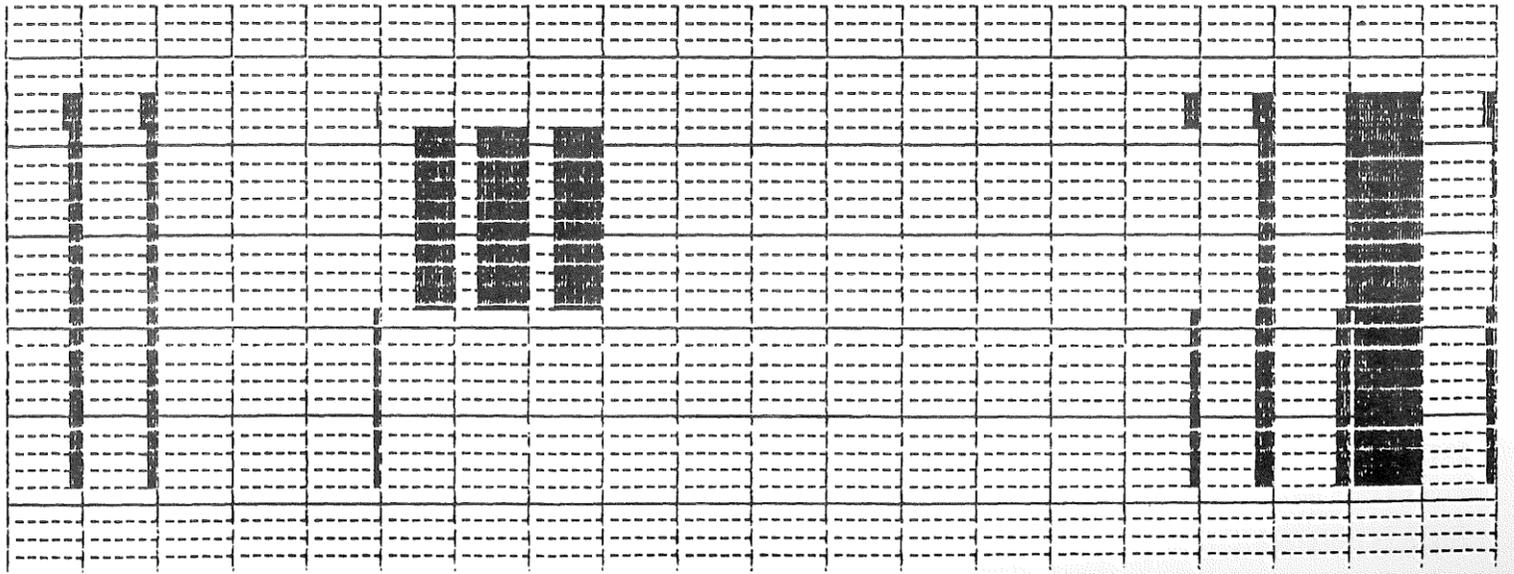
SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	M. I. CONC					NO. CALC	CLAST			MATRIX									
				TABLE CONC	M.I. LIGHTS	CONC. TOTAL	NON MAG			NO. MAG	V.G. PPB	SIZE	%	S/U	SD	ST	CY	COLOR				
18675	8.8	2.3	6.5	124.6	110.5	14.1	11.9	2.2	0	NA	P	85	15	TR	NA	U	Y	Y	Y	GB	GB	TILL
-676	8.5	2.0	6.5	82.5	70.3	12.2	9.3	2.9	0	NA	C	80	20	NA	NA	U	Y	Y	Y	GB	GB	TILL
-677	8.6	0.2	8.4	69.9	47.4	22.5	17.9	4.6	0	NA	P	80	20	NA	NA	U	Y	Y	Y	GB	GB	TILL
-679	4.0	0.0	4.0	126.9	104.9	22.0	19.0	3.0	4	573												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

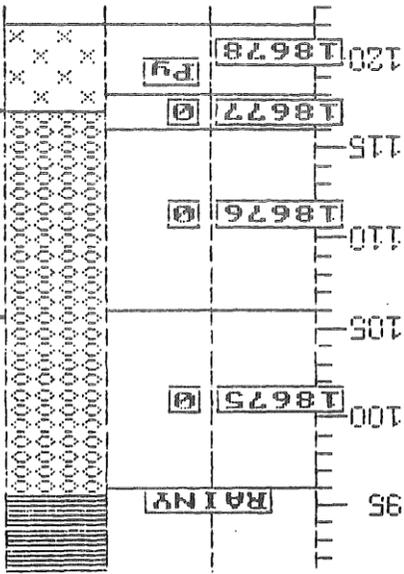
SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS
					T	P	T	P	T	P	TOTAL	GMS					
18675	N		NO VISIBLE GOLD														
-676	N		NO VISIBLE GOLD														
-677	Y		NO VISIBLE GOLD														EST. 20% PYRITE
-679	Y		50 X 50	10 C	1							1					EST. 25% PYRITE
			75 X 75	15 C	1							1					125 GRAINS
			100 X 175	27 C	1							1					ARSENOPYRITE
			125 X 200	31 C				1				1					
													4	19.0	573		

SLUICE BOX 96-122



18679 4

PY, ASPY
1 IRG



(95.5-117.0) GRAVELLY SAND; UNOXIDIZED; v
pebbly but no boulders; cob at 97.5'
drilling mud is v viscous; pebb
subang-subdrnd & mostly metaseds (see +10M
vial); 96-116 has 25 wt% +10M; 116-118 has
10 wt% +10M; possibly fill.

(117.0-122.0) BEDROCK; possibly
metagraywacke; much drift contamination;
some mudpit fines; note into bedrock sample
118-122; recovered 330 gm/foot of +10M; see
DM report.

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NDNMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS
18675	21002	96-106	10. M D SW-NW 34 64 21 SL	RL. GVL. SAND	96-106	0.0	8800.0	-2.0	11.9	2.2	-1.0	-1.0	-1	-1	-1		
18676	21002	106-116	10. M D SW-NW 34 64 21 SL	RL. GVL. SAND	106-116	0.0	8500.0	-2.0	9.3	2.9	-1.0	-1.0	-1	-1	-1		
18677	21002	116-118	2.0 M D SW-NW 34 64 21 SL	RL. GVL. SAND	116-118	0.0	8600.0	-2.0	17.9	4.6	-1.0	-1.0	-1	-1	-1		
18678	21002	118-122	4. M D SW-NW 34 64 21 SL	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1		
18679	21002	96-122	26. M D SW-NW 34 64 21 SL	SLUICE BOX	96-122	4.0	4000.0	-2.0	19.0	3.0	-1.0	-1.0	-1	-1	-1		

Appendix 8-66C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18675	39	0.18	0	530	13000	34.10	260	350	550	190	0	25	20	6	-0.5	0	-10	0.8	-600	359	52	6	21	66	2	120.0	17.5	1	8.81
18676	-5	-0.05	0	-50	10000	6.50	70	480	910	130	0	11	-10	5	0.5	0	-10	-0.2	-100	77	10	1	8	141	4	27.0	2.6	1	2.80
18677	-20	0.16	0	370	9500	37.60	380	450	750	130	0	35	20	7	-0.5	0	-10	-0.2	1100	472	80	7	24	123	3	180.0	24.5	2	12.90

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18676	0.910	2.20	1400	330	91	190	-1	52	-0.5	34	0.3

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CO	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18678	-6	-0.2	-1.0	400	0.0	1	31.0	0.0	60	10	0	3	-100	2.2	19	0.0	4	55	0	0.00	0.0	-10	0	3.50	-1.0	-10	0.0	4.4	-10	-2	0.9	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SiO2 %	S	CL	K	CA	FEO %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE	
18678	30	21	41	0	4.0	0	0	0	0.00	4	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-67A. DRILL HOLE SUMMARY SHEET

IDENTIFICATION

DNR Drill Hole Number OB-21005

Drilling Completion Date 1/16/87

LOCATION (see map at right)

S-T-R SW $\frac{1}{4}$ -SW $\frac{1}{4}$ -22-64N-21W

County St. Louis

Quadrangle Nett Lake 7.5

Regional Survey Area Orr

HOLE PARAMETERS

Surface Elevation 1352 ft.

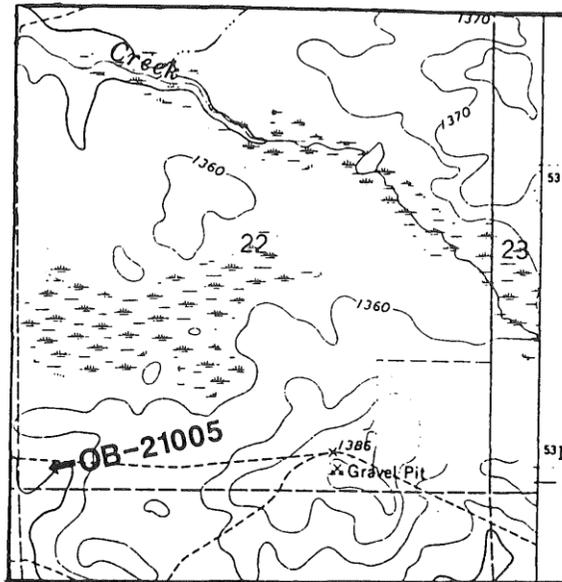
Total Depth 76 ft.

Elevation, Top of Precambrian Bedrock 1281 ft.

Drilling Method Mud Rotary

Sample Diameter 4.5 inch

Sample Collection Method Slurry: Trough with Dam



SEE FOLLOWING PAGES

Sample Types, Intervals, Chemical Data, Gold Grain Counts, Graphic Summary Log

INFORMATION SUMMARY

Interval Feet	Interpretation	Library Samples Available	Subsamples Tested	Significant Geochem Samples
0-44	Des Moines Lobe Gl. Drift			
44-71	Rainy Lobe Gl. Drift	F	B,C	B = Cu,Ni,Sb,Bi As,Ba,Pb C = Ni,Mo
71-76	Bedrock	F	I	

A = -63 microns fraction
 B = Heavy Minerals, Nonmag
 C = Heavy Minerals, Mag
 D = Sluice Box Composite
 E = Skeletonized Grab Sample in Core Box
 F = Interval Cuttings in Bucket
 G = Core
 H = Thin Section
 I = (Bedrock or Drift) Split of "Wholerock" Sample

BEDROCK

Principal Rock Type: Metagraywacke. Medium gray, weakly foliated metagraywacke. Grain size from 0.2-0.4 where discernible (boundaries of lithic sand grains indistinct). Sandy, not sugary texture. Comprised of 10% qtz. sand grains, 70% lithic sand grains (int. volc. where discernible) and 15-20% chlorite. 1% vein calcite. 0.1% disemm. py. and 0.2% vein pyrite. (By ODM, see report in Appendix)

Thin Section Number: #18682.

HEAVY MINERAL CONCENTRATE REPORT

(SEE LEGEND IN APPENDIX)

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG.WET)			WEIGHT (GRAMS DRY)			AU		DESCRIPTION					CLASS								
	TABLE SPLIT	+10 CHIPS	FEED	M. I. CONC	NON MAG	CONC. TOTAL	NO. V.G.	CALC PPB	CLAST		MATRIX											
		SIZE	%	S/U	SD	ST	CY	COLOR			SD	CY										
		V/S	GR	LS	OT																	
18680	7.5	0.5	7.0	154.1	139.6	14.5	11.8	2.7	0	NA	P,G	90	10	NA	NA	U	Y	Y	Y	GB	GB	TILL
-681	8.8	0.8	8.0	144.3	141.3	3.0	2.6	0.4	0	NA	P,G	95	5	NA	NA	U	Y	Y	Y	GN	GN	TILL&BOK
-683	4.7	0.0	4.7	148.2	141.5	6.7	5.7	1.0	0	NA												

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE # PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS						NON MAG	CALC V.G. ASSAY PPB	REMARKS	
				T	P	T	P	T	P				TOTAL GMS
18680	N	NO VISIBLE GOLD											
-681	N	NO VISIBLE GOLD											
-683	Y	NO VISIBLE GOLD											EST. 5% PYRITE 1 GRAIN GALENA

(FEET)	IN NON MAG HMC				IN -63 MICRON				IN MAG FRAC				NON MAG -63		NON MAG MAG		HMC SAMPLE	# GOLD GRAINS/INDICATORS	LITHOLOGY	LITHOLOGIC DESCRIPTIONS AND/OR REMARKS
	^200 Au	^600 Cu	^5 Sb	^25 Mo	^6000 Ba	^30 Ag	^100 Cu	^100 Ni	^10 Sb	^10 Mo	^300 Zn	^10 Fe%	^500 Ni	^50 Pb	^100 Mo	^500 Au				
0-5																				(0.0-11.0) CLAY; OXIDIZED; lake sediments, brown.
5-11																				(11.0-21.0) CLAY; UNOXIDIZED; lake sediments, gray, w/silty clay.
11-21																				(21.0-36.0) CLAYEY TILL; UNOXIDIZED; w/lvs & sh pebs; a cob at 29; more resistant to drill penetration than lake clay; black granules of ?, organics at 35.
36-44																				(36.0-44.0) CLAY; UNOXIDIZED; w/silty clay; softer to drill.
44-46																				RAINY (44.0-46.0) SILTY SAND; UNOXIDIZED; RAINY LOBE, vfgr-fgr sand.
46-52																				(46.0-52.0) MEDIUM TO COARSE SAND; UNOXIDIZED; coarsening downward 46-50.
52-54																				18680 (52.0-54.0) GRAVELLY SAND; UNOXIDIZED; sample 50-60 had 20 wt% +10 mesh material.
54-71																				18681 (54.0-71.0) SILTY SAND; UNOXIDIZED; w/vfgr-fgr sand; beds of pebs of 58 and at 62 1/2; pebs in sample 60-72.5 are 1/8-1/4 inch, ang to subrndd & 10 wt% +10M.
71-76																				18682 (71.0-76.0) BEDROCK; METAGRAYWACKE, weakly fol, 1% vein calc, tr dissem & vein py; good recov 590 g +10M/ft; less metamor than other grynkes, shows orig text, 70% lithics mostly intermed volc, 10% quartz, 20% matrix chlor; .2-.4 mm; see ODM report.
76-80																				18683 Py, Aspy

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D G	FORTY LEGAL DESC	COUNTY	DRIPT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63um	WT (g) -63FEED	WT (g) -63um	WT % +10	WT % SAND	REMARKS	
18680	21005	50-60	10.	M O SW-SW 22 64 21	SL	RL. SILTY SAND	50-60	0.0	7500.0	-2.0	11.8	2.7	-1.0	-1.0	-1	-1	-1			
18681	21005	60-72.5	12.5	M O SW-SW 22 64 21	SL	RL. SILTY SAND	60-72.5	0.0	8800.0	-2.0	2.6	0.4	-1.0	-1.0	-1	-1	-1			
18682	21005	72.5-76	3.5	M O SW-SW 22 64 21	SL	BEDROCK		-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1	-1	-1			
18683	21005	50-76	26.	M O SW-SW 22 64 21	SL	SLUICE BOX	50-76	0.0	4700.0	-2.0	5.7	1.0	-1.0	-1.0	-1	-1	-1			

Appendix 8-67C.

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
18680	-23	0.22	0	330	12000	34.10	180	270	350	240	0	38	-10	7	-0.5	0	-10	1.9	1000	512	97	12	24	123	2	180.0	22.4	2	8.85
18681	-16	0.30	0	240	9000	34.50	270	400	1700	150	0	140	40	9	1.0	0	-10	12.0	-400	558	85	-4	18	226	5	160.0	21.6	0	2.27
18683	-32	0.27	1380	510	10000	39.30	300	320	520	220	0	75	-30	7	-0.5	0	-10	3.0	800	814	150	10	53	119	3	310.0	39.9	1	4.36

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
18680	0.830	2.50	1300	570	140	200	-1	83	-0.5	30	0.4

BEDROCK ANALYSIS (PPM)

SAMPLE NUMBER	AU PPB	SB	AS	BA	BR	CD	CE	CS	CR	CD	EU	HF	IR	FE %	LA	LU	MO	NI	RB	SM	SC	SE	AGR	NA %	TA	TE	TB	TH	SN	W	U	YB	ZNR	ZR
18682	-7	0.3	-1.0	500	0.0	1	45.0	0.0	120	20	0	4	-100	4.9	26	0.0	2	81	0	0.00	0.0	-10	0	3.40	1.0	-10	0.0	4.6	-10	5	1.4	0	0	0

BEDROCK ANALYSIS (PPM) CONTINUED

SAMPLE NUMBER	CU	PB	ZN	MN	AG	SNR	LI	BE	CO2 %	NA	MG	AL %	SI02 %	S	CL	K	CA	FED %	NIR	SR	NB	MOR	BAR	TAR	BI	LOI %	FE		
18682	53	11	86	0	2.0	0	0	0	0.00	3	0	0.00	0.0	0.00	0	0	0	0.0	0	0	0	0	0	0	0	0.0	-2	0.00	0

Appendix 8-68A

Samples 17557-17564 of the Rainy lobe were taken from surface exposures in gravel pits or cuts along the Littlefork River during an early reconnaissance of the area. These are not drill samples. The site maps for these are available along with site maps for each drill hole.

HEAVY MINERAL CONCENTRATE REPORT

OVERBURDEN DRILLING MANAGEMENT LIMITED LABORATORY SAMPLE LOG

SAMPLE NO.	WEIGHT (KG. WET)			WEIGHT (GRAMS DRY)				AU	DESCRIPTION										CLASS			
	TABLE SPLIT	+10 CHIPS	TABLE FEED	TABLE CONC	M. I. CONC				CLAST			MATRIX										
					M.I.	CONC.	NON		NO.	CALC	SIZE	%	S/U	SD	ST	CY	COLOR					
					LIGHTS	TOTAL	MAG		MAG	V.G.	PPB	V/S	GR	LS	OT	SD	CY					
17557	8.5	1.2	7.3	255.9	220.7	35.2	28.2	7.0	6	345	GP	40	60	NA	NA	U	Y	Y	Y	B	B	TILL
17558	6.5	1.2	5.3	118.8	98.4	20.4	19.3	1.1	1	591	G	30	70	NA	NA	U	Y	Y	Y	B	B	TILL
17559	7.9	0.4	7.5	158.0	103.8	54.2	45.8	8.4	0	NA	G	85	15	NA	NA	U	Y	Y	Y	GB	GB	TILL
17560	6.6	0.2	6.4	182.5	111.5	71.0	52.5	18.5	0	NA	G	30	70	NA	NA	S	F	Y	Y	B	B	SAND
17561	4.4	1.0	3.4	169.3	148.4	20.9	16.9	4.0	0	NA	G	35	65	NA	NA	U	Y	Y	Y	B	B	TILL
17562	5.7	1.4	4.3	70.4	51.0	19.4	14.8	4.6	0	NA	G	40	60	NA	NA	S	H	Y	Y	B	B	SAND
17563	5.7	1.4	4.3	251.4	236.7	14.7	11.5	3.2	0	NA	G	35	65	NA	NA	U	Y	Y	N	BN	BN	TILL
17564	7.1	0.6	6.5	143.8	107.4	36.4	29.3	7.1	0	NA	G	30	70	NA	NA	U	Y	Y	Y	B	B	TILL

GOLD CLASSIFICATION

VISIBLE GOLD FROM SHAKING TABLE AND PANNING

SAMPLE #	PANNED	Y/N	DIAMETER	THICKNESS	NUMBER OF GRAINS										NON MAG	CALC V.G. ASSAY PPB	REMARKS
					ABRADED		IRREGULAR		DELICATE		TOTAL	GMS					
					T	P	T	P	T	P							
17557	N		25 X 25	5 C			1					1	345				
			25 X 50	8 C			1				1						
			25 X 75	10 C			1				1						
			50 X 50	10 C						1	1						
			100 X 100	20 C	1						1						
			150 X 200	34 C	1						1						
											6	28.2	345				
17558	N		150 X 250	38 C	1						1						
											1	19.3	591				
17559	N		NO VISIBLE GOLD														
17560	N		NO VISIBLE GOLD														
17561	N		NO VISIBLE GOLD														
17562	N		NO VISIBLE GOLD														
17563	N		NO VISIBLE GOLD														
17564	N		NO VISIBLE GOLD														

MASTER FILE

SAMPLE NUMBER	DH NUMBER	SAMPLE INTERVAL	ST D 6 FORTY LEGAL DESC	COUNTY DRIFT TYPE	ASSAY FTG	GOLD GRAINS	WT (g) HMC	WT (g) FEED	WT (g) +10FEED	WT (g) NONMAG	WT (g) MAG	WT (g) -63uM	WT (g) -63FEED	WT (g) -63uM	WT % +10	WT % SAND	REMARKS
17557	SS	0-1.5	1.5 SE-NE 31 68 24 K	RL. SANDY GVL. TILL	0-1.5	6.0	8500.0	1200.0	28.2	7.0	-1.0	-1.0	-1	14	-1	SURF SAMP	
17558	SS	0-1.5	1.5 SE-SW 25 68 25 K	RL. SANDY GVL. TILL	0-1.5	1.0	6500.0	1200.0	19.3	1.1	-1.0	-1.0	-1	18	-1	SURF SAMP	
17559	SS	0-1.0	1.0 SW-NE 25 68 25 K	RL. SANDY GVL. TILL	0-1.0	0.0	7900.0	400.0	45.8	8.4	-1.0	-1.0	-1	5	-1	SURF SAMP	
17560	SS	0-1.5	1.5 SE-SW 10 68 25 K	RL. MED. TO C. SAND	0-1.5	0.0	6600.0	200.0	52.5	18.5	-1.0	-1.0	-1	3	-1	SURF SAMP	
17561	SS	0-1.5	1.5 SE-SW 10 68 25 K	RL. GVL. SAND	0-1.5	0.0	4400.0	100.0	16.9	4.0	-1.0	-1.0	-1	2	-1	SURF SAMP	
17562	SS	5-7	2.0 NW-SW 19 68 25 K	RL. GVL. SAND	5-7	0.0	5700.0	1400.0	14.8	4.6	-1.0	-1.0	-1	25	-1	SURF SAMP	
17563	SS	8-13	5.0 NW-SW 19 68 25 K	RL. GVL. SAND	8-13	0.0	5700.0	1400.0	11.5	3.2	-1.0	-1.0	-1	25	-1	SURF SAMP	
17564	SS	5-10	5.0 NW-SW 19 68 25 K	RL. MED. TO C. SAND	5-10	0.0	7100.0	600.0	29.3	7.1	-1.0	-1.0	-1	8	-1	SURF SAMP	

NONMAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	AU PPB	NA %	CE	CR	MN	FE	CO	NI	CU	ZN	ZN2	AS	SE	MO	AG	AG2	SN	SB	BA	LA	HF	TA	W	PB	BI	TH	U	WT g/kg	ASSAY WEIGHT
17557	568	-1.20	3280	560	702	27.00	88	130	30	-200	16	-14	-36	-12	0.4	-19	-690	22.9	-340	2520	140	12	-39	26	0	934.0	44.0	3	17.93
17558	390	-1.70	4640	650	590	33.00	35	-120	26	-430	52	-20	-44	-18	0.1	-26	-970	1.2	-470	3720	160	9	-56	23	0	0.0	46.0	3	13.76
17559	32	-0.34	490	270	768	28.00	280	200	130	-200	36	28	-10	-6	2.4	-11	-200	-0.2	-100	260	80	8	-21	12	0	85.7	13.0	6	34.68
17560	63	0.29	270	500	644	24.00	69	77	16	-200	22	9	-10	-4	0.2	-5	-200	0.6	-100	130	62	9	-19	8	0	45.0	9.1	8	39.90
17561	-21	-0.38	460	440	702	23.00	67	89	14	210	18	-9	-10	-6	-0.1	-14	-200	0.7	-100	190	60	9	-28	5	0	57.0	11.0	4	12.56
17562	220	-0.42	450	500	570	24.00	71	-65	16	290	14	-9	-10	-6	-0.2	-14	-200	-0.2	-100	240	60	8	-29	8	0	102.0	14.0	3	10.61
17563	-23	-0.50	620	390	552	21.00	65	-68	33	-200	41	-10	-10	-7	-0.1	-15	-200	-0.2	-220	310	38	6	-30	10	0	132.0	14.0	2	8.21
17564	180	-0.41	620	470	552	24.00	79	92	22	-200	14	-8	-10	-5	-0.2	-12	-200	0.4	-100	320	59	7	-25	6	0	120.0	16.0	4	22.26

MAGNETIC HEAVY MINERAL CONCENTRATE (PPM)

SAMPLE NUMBER	MGO %	TIO2 %	CR	NI	CU	ZN	SE	MO	AG	PB	WT g/kg
17557	0.633	4.76	1900	119	40	310	-5	1	-0.5	253	0.8
17558	1.060	9.43	3200	201	38	783	-5	1	-0.5	250	0.2

The above samples of the Rainy lobe were taken from surface exposures in gravel pits or cuts along the Littlefork River during an early reconnaissance of the area. These are not drill samples. The site maps for these are available along with site maps for each drill hole.

APPENDIX 8-2. LOGS OF ROTASONIC DRILL CORE
BY GARY MEYER, MGS

OB-101
SW 1/4 SE 1/4 sec. 16, T. 157 N., R. 25 W.
Surface elev. 1141 ± 5 ft.

Logged 1/21/86

Depth (feet) From To	Geological Description	Texture	Munsell color
0 2.5	Peat--fibrous, woody		2.5Y2/1
	St. Louis Sublobe		
2.5 3.5	Clay, probably till leached of carb.; noncalc., slightly calc. by 3', gley color	clay	7.5Y3/1 to 5G4/1 by 3'
3.5 107.5	Clayey till; abundant carb. pebbles; calc., mottled; much carb.; seems more pebbles, <u>more sand than typical</u> ; crystalline pebbles fairly common; some med. pebbles noted from 15' inc. some shale pebbles; <u>much more shale</u> than in other St. Louis tills seen up to now, common as carb. Lens of lake clay 29' to 31', apparently very few pebbles, sticky; sand parting at 55'; till is relatively "dry", stiff; till could approach loam below sand; mod. calc.; little lignite at 62.5', several large pebbles from 63' to 66' inc. shale, very large shale pebble at 68'; several large carb. pebbles from 74' to 75' but not great amount of med. to large pebbles; shale not quite as obvious from 75' but still common; large granite pebble at 91'; sand seems to increase w/depth; dk cobble at 93', other large pebbles, large dk cobble at 105'; apparently getting larger rocks--shale still common as is carb.; several large carb. pebbles toward bottom; somewhat more clayey at bottom, but break fairly sharp	clay to clay loam clay loam by 25' clay loam to loam by 55' loam by 75' or so	2.5Y6/2 overall 2.5Y5/3 by 9' 2.5Y4/1 by 13' 5Y4/1 by 25'
107.5 117.5	Lake clay, mod. calc., lot of carb. pebbles, may be very clayey till; much more clay, much less sand than till above; granite pebble at 110.5'; but very few grains from 109'; shiny, massive clay; till parting at 111', also little silt, till is as above; calc., some lighter gray silt laminae, not regularly spaced however; clay beds are dominant; silt beds increase w/depth in thickness & percentage of total; interbeds of sand toward bottom 6" or so	silty clay clay by 109'	5Y4/1 silt beds 5Y5/1
117.5 123	Very fine to fine dirty sand; micaceous lake sand; some med. sand by 119', clean micaceous med. sand in last foot or so; could be till layer at 120'--loamy, mod. calc.	sand	5Y6-5/1
123 125	Loamy to clayey till w/lake clay interbeds or lenses, also pebbly zones; calc.	clay loam	5Y4/1

OB-101 (continued)

		Rainy Lobe		
125	126	Sandy till--dk cobbles, slightly calc.--could be Rainy till (no more than a foot) or till mixed w/local rock	sandy loam to sandy clay loam	5Y5/1
126		Bedrock		

APPENDIX 8-2.

OB-102

Logged 1/21/86

SW1/4 SW1/4 sec. 12, T. 156 N., R. 25 W.
Surface elev. 1164 ± 5 ft.

Depth (feet) From To	Geological Description	Texture	Munsell color
0 0.5	Organics, black		
St. Louis Sublobe			
0.5 1.5	Clay, probably B horizon in leached till; noncalc.	clay	5Y3/1
1.5 31	Mottled clay till w/carb. pebbles, mod. calc., streaks of lt gray, Fe stains; large crystalline pebble at 4', noted shale grain at 10', not too many; calc. by 7', shale pebble at 13.5'; fair amount of crystalline pebbles, several large pebbles 15.5' to 17', large granite pebble at 22.5', but mostly small pebbles; some shale	clay loam	5Y5/3 2.5Y4/2 by 7' 5Y4/1 by 15' or so
31 32	Clay lens or interbed; few grains, pebbles	clay	5Y4/2-1
32 131.5	Clayey till, as above, calc., more shale pebbles than till above; lignite pebble at 43'; still about same texture; large shale pebble at 47.5'; more large shale pebbles below; granite cobble at 58.5'; till seems more loamy; large carb. pebbles 63' to 64', also lignite pebble; horizontal jointing developed by 60'; still some shale, but not as common as in OB-101; some grit but still clay loam by 68'; lignite pebbles noted occ.; 79' to 83' noted number of large pebbles inc. several shale; calc; crystalline cobble at 89'; shale pebble at 108'; from 110' shale fairly common, occ. lignite; 113.5' to 114', two cobbles, carb. and crystalline; massive till but seems to have zones more pebbly than others, seems to get little more gritty w/depth; dirty sand parting at 125'; at 131' seems more sandy, could be inclusions of fine silty sand in till	clay loam clay loam to loam by 85' loam by 119'? grada- tional	5Y4/2-1 5Y4/1 by 45' or so
131.5 157	Till seems more clayey than above, w/somewhat fewer pebbles; calc.; still fair amount of med. to large pebbles; some shale, carb. common; last 1.5' or so contained several lake clay interbeds or inclusions	clay loam	"
157 159	Lake clay; thin till layer at about 157.5'; very loamy fine to med. sand lamina in last 6" or so; mod. calc. to base	clay	--
Rainy Lobe			
159 162.5	Very sandy till; cobbly in top 6", apparently wave-washed; some cobbles below; slightly calc.; <u>noted med. carb. pebble</u> + smaller carb. grains	sand	5Y5/1

OB-102 (continued)

162.5 166	Mostly med. to coarse sand, some very coarse and small pebbles; occ. cobbles	sand	5Y6/1
166 168.5	As above, fairly clean sand w/fair amount of large pebbles; fines probably <10%; could be till but very sandy	"	"
168.5 169.5	Clean med. to coarse sand; only small pebbles; could be "barrel wash"	"	"
169.5 174.5	Med. to coarse sand; very little fines, several carb. pebbles; from 170' to 171' several silt to silty sand laminae, apparently indicating fluvial origin for sand; cobbles at 172', 172.5', 174.5'; some are quite smooth	"	"
174.5 176	Seems slightly more fines; cobbly 175' to 175.5', but cobbles could have fallen in ahead of casing; couple inches of silty very fine sand at 176'; carb. pebble noted	"	"
176 177	Fining-upward sequence, coarse sand to silty very fine sand; few small carb. pebbles	sand to loamy sand	--
177 177.5	Fining up, med. to coarse sand to silty fine sand	sand to loamy sand	--
177.5 178.3	Fining up, very coarse sand to med. sand, last few inches finely laminated silt + clayey silt; some pebbly (carb.) layers could be "flow" material, slightly calc.; basically fluvial w/minor lacustrine; "rugose" coral noted in coarse sand, much sand is quartz	sand to silt	5Y5/1
178.3 181	Inch or so of very fine sand then med. sand below, homogeneous; noted only couple pebbles toward top	sand	--
181 182.5	Thin clay layer at 181'; large pebble few inches below, then med. to coarse sand, some small pebbles; silty zones apparently related to weathered schist pebbles in sand, which give greenish cast to sand in places	sand	--
182.5 183.5	Loamy sandy till, slightly calc., apparently Rainy lobe, no more than a foot; compact, definitely more fines than above, slightly "greener" than sand	loamy sand	5Y5/1
183.5	Bedrock		

APPENDIX 8-2.

OB-103
SE¹/₄SW¹/₄ sec. 19, T. 69 N., R. 26 W.
Surface elev. 1111 ± 5 ft.

Logged 1/16/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
		No core to 65'		
		St. Louis Sublobe		
65	78	Clayey till, common carb. pebbles, calc.; most pebbles small, nothing large; appears uniform	clay	5Y4/1
78	89	As above, a few large pebbles noted; occ. shale, many carb. pebbles; calc.	clay	2.5Y4/1
89	91	Transitional, very clayey till; some carb. pebbles	clay	"
91	95	Lake clay, slightly calc., vague bedding	clay	5Y4/1
95	98	Pebbly clay--at top of core run so probably not in place	--	--
98	103	Lake clay; slightly calc., vague bedding	clay	2.5Y4/1
103	111	As above; mod. calc. "pure" clay; noted pebble at 106'; very shiny, sticky clay	"	2.5Y4/1-2 by 105'
111	118	As above, small carb. pebble at 113', a few other grains; mod. to slightly calc.; somewhat more silt from about 115'	"	2.5Y4/1
118	119.5	Loamy sediment; slightly calc., grades up to clay	loam	2.5Y4/1
		Rainy Lobe		
119.5	122	Cobbly gravelly sandy loam till, slightly calc.; mostly dk pebbles	sandy loam, loamy sand by 120'	5Y5/2
122		Bedrock		

OB-104
SW¹/₄SW¹/₄ sec. 16, T. 68 N., R. 26 W.
Surface elev. 1148 ± 5 ft.

Logged 1/22/86

epth (feet)		Geological Description	Texture	Munsell color
From	To			
		Thin organics on top		
		St. Louis Sublobe		
0	25.5	Clayey till; leached to about 1' where slightly calc. with visible dolograins; more pebbles and more crystalline pebbles than clayey tills farther east; shale pebble 5'; mottled w/lt-gray bands from 3', calc. by 3'; shale fairly common; mostly small pebbles, occ. med.; pebbles fairly common; large carb. pebble at 13'; few other good sized pebbles below; shale uncommon but present; gneissic cobble at 22', then seems little coarser below to 23', then clayey; lake clay at about 24.5'-24.8' then clayey till to 25.5'	clay to clay loam clay loam 22'-23' then clay	5Y4/3 2.5Y5/2 by 1' 5/2-4/2 by 6' 2.5Y4/1 by 14.5'
25.5	30	Lake clay, shiny "pure" clay; calc.; few silt laminae but mostly shiny sticky clay, no grains; may be little more silt by 29'	clay	5Y4/1 2.5Y4/1 by 29'
30	30.5	Clayey till--apparently as till above, calc.; abrupt upper and lower contacts	clay	"
30.5	34	Clayey silt, then few inches of pebbly clay which could be till, then silt at 31 feet; little very fine silty sand below pebbly clay; coarsens downward to very fine sandy silt	silt loam	2.5Y5/1 5Y5/1 by 31.5'
34	55	Very clayey till, fairly abrupt upper contact, maybe an inch or so; calc.; seems more clayey, less pebbly than till above; little sand inclusion at 39.5'; noted couple shale pebbles; pebble content seems to pick up a little from 45.5'; at 47.5'-48.5' several beds or lenses of sand & pebble-rich till; could be flow till; couple shale pebbles noted at base	clay	2.5Y4/1 (close to 5Y)
55	56	Med. sand, abrupt upper contact; silty w/shale pebbles; gray	loamy sand	--
56	60	Very clayey till--some pebbles, not a lot of sand; blocky; mod. calc. to calc.	clay	5Y4/1
60	60.8	Very dk gray med. to coarse shale-rich sand, some layers are mostly shale; some small shale pebbles; interbedded w/clay in last few inches; coarse sand is mainly shale	sand	5Y3/1

APPENDIX 8-2.

OB-104 (continued)

60.8	67	Very clayey till, calc., apparently as above; med. sand lens at 62', pebbly zone at 63.7' w/carb.; sand parting at 64.3', couple large pebbles below; sand parting at 64.7'; shale seems fairly common	clay	5Y4/1
67	69	Coarse sandy pebbly clayey till; much carb., some shale pebbles, possibly from sand unit below	loam to sandy clay loam	5Y4/1
69	69.5	Fine to med. sand--dirty	sand	gray
69.5	71.5	Clayey till as above 67' some shale, calc.	clay	5Y4/1
71.5	73.5	Gravelly till as 67' to 69'; much carb. + shale pebbles; few inches of gravel-free clay at 73'	sandy clay loam to clay loam	"
73.5	75	Loamy coarse sand + fine gravel, pebble lithology as above; little clayey "till" at 74.2'	loamy sand	--
75	77.5	Coarse gravelly sandy loamy till, pebble lithology as above; could be layered toward top	sandy loam	5Y4/1-3/1
77.5	81	Lake clay, calc., a few grains; lighter colored than above till; large pebble at 79.5', another at 80', but very few other grains; silty in last foot or so	silty clay to silt loam	5Y4/1
Rainy Lobe				
81	89	Gray silty fine to med. sand; contained large pebble at 81.5'; probably Rainy till, slightly calc.; cobble at 82'; pebbles fairly common, but no cobbles to about 88'; cobbly + pebbly in last foot or so, mainly granitics & dark metamorphics	loamy sand	--
89		Bedrock		

OB-105
SE1/4SW1/4 sec. 28, T. 68 N., R. 25 W.
Surface elev. 1188 ± 5 ft.

Logged 1/15/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
0	1	Sandy loam, some gravel; apparently disturbed material as drilled in road	sandy loam (fill)	10YR3/3
St. Louis Sublobe				
1	4	Clayey till; apparently carb. pebbles leached out, not too many other pebbles; slightly calc.?	clay loam	10YR4/4
4	9	Clayey till; carb. pebbles common, also granite, others; "good" till; shale not obvious--noted one pebble at 8'; large granite pebble at 5.5', secondary carb. near base; mod. calc.	clay loam	10YR5/3-4
9	10	Same till mixed w/underlying sand	sandy clay loam	10YR5/3-4
10	14.5	Sand, coarse; a few dolomite pebbles	sand	2.5Y5/3
14.5	16	Mottled clayey till, transition to unoxidized	clay loam	10YR4/4 + 2.5Y4/2
16	18	Clayey till, calc.; dolomite pebbles common; transitional to underlying sand	"	2.5Y4/1
Rainy Lobe				
18	19.5	Med. to coarse sand, slightly calc.	sand	2.5Y5/3
19.5	23	Med. sand, some coarse	"	"
23	24	Fine sand, noncalc.	"	2.5Y5/2
24	25.5	Med. sand	"	5/3
25.5	26	Beds of med. & fine sand; mica flakes	"	5/2
26	27	Fine sand w/very fine silty sand bed toward bottom	"	--
27	29	Med. to coarse sand, very slightly calc.	"	5/3
29	38.5	Coarse to very coarse sand, some granules, slightly calc.	"	"
38.5	41	Coarse to very coarse sand, fair amount of med. sand	"	"
41	43.5	Med. to coarse sand	"	"

APPENDIX 8-2.

OB-105 (continued)

43.5	45	Coarse to very coarse sand--some Fe staining	sand	2.5Y5/3
45	46.5	Med. to coarse sand	"	"
46.5	47.5	Coarse gray sand	"	2.5Y5/2
47.5	49	Coarse to very coarse gravelly sand, fining up; sharp contact at base	"	"
49	50	Fine sand to very fine sand, slightly calc.	"	2.5Y5/1
50	51	Med. sand w/beds of very fine sand	"	"
51	52	Coarse sand w/few granules, small pebbles, very slightly calc.	"	"
52	56	Alternating layers of med. and coarse to very coarse sand	"	"
56		Bedrock	"	"

OB-106
SW1/4 NW1/4 sec. 19, T. 69 N., R. 25 W.
Surface elev. 1106 ± 5 ft.

Logged 1/15/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
St. Louis Sublobe				
0	4	Clay, some silt: more silty in last foot or so; noncalc.	silty clay	2.5Y5/3
4	6.5	Fine silty sand, very fine toward top; color banded, noncalc.	loamy sand to sand	2.5Y5/4
6.5	7.2	Clay, calc.; about 8" to 9" of sand in base of clay	clay	2.5Y5/4
7.2	8.0	Pebbly coarse sand; much carb.; pebbles are small	sand	7.5Y5/1-2
8.0	9.0	Silty clay; mottles, Fe stain; few sand beds toward base	silty clay	10Y5/1 + 5Y5/2
9.0	11.0	Medium to very coarse sand; little fine gravel, much carb.; few clay beds toward top	sand	--
11.0	13.0	Clay, silty; mod. calc.; trace organics?	silty clay	5Y4/1
13.0	13.5	Med. to very coarse sand; carb. rich, fine pebbles, calc.	sand	2.5Y5/2
13.5	15	Med to coarse sand	"	"
15	18	Med. to very coarse sand, carb. rich, fine gravel; pebble line at base?	"	"
18	19.5	Med. to coarse sand; seems to have organic blobs, including small bits of wood	"	--
19.5	23	Clay loam till, seems more silty toward top; couple large granite pebbles, one shale pebble, calc.	clay loam to clay	2.5Y4/1
23	24	Clay, mod. calc., little to no bedding--contains some grains; may be less than 1' thick	clay	5Y4/1
24	58	Very clayey till; carb. pebbles most common; calc.; several med. pebbles noted, but most are small; mod. calc. by 40'	clay	2.5Y4/1 5Y4/1 by 31'
58	82	As above; large carb. pebble at 62'; carb. cobble at 63'; small crystalline cobble at 74'; noted some small sandy brownish blobs toward bottom, could be incorporated till?	clay	2.5Y4/1
82	86	Lake clay--clear contact--lt & dk beds w/varying clay content; slightly calc.	clay	5Y4/1+3/1

APPENDIX 8-2.

OB-106 (continued)

86	91	More massive & clayey--still bedded but more clay	clay	5Y4/1-4/2
91	98.5	As above, mod. calc.; silt laminae 93-94'; otherwise massive sticky clay; only very few grains noted; noted carb. grain toward bottom; some silt, very fine sand laminae toward base	clay	"
Rainy Lobe				
98.5	108	Loamy sandy till; pebbly at upper contact, small loamy gradational zone in top few inches; slightly calc.; till contains much fine to med. sand; large black cobble w/sulfides at 100'; fewer pebbles + cobbles from about 102'; still loamy sand; fair amount of fine to med. pebbles, but not too many larger; many of larger pebbles appear similar to bedrock; very sandy till, or possibly poorly sorted gravelly sand	loamy sand	2.5GY5/1
108		Bedrock		

OB-107
NE¹/₄ SE¹/₄ sec. 29, T. 68 N., R. 24 W.
Surface elev. 1152 ± 5 ft.

Logged 1/16/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
St. Louis Sublobe				
0	2	Clay, organics	clay	10YR3/1
2	3	Clay; very few grains; lake sediment; noncalc.	clay	2.5Y5/3
3	5	Clayey till; apparently bedded w/thin clay beds (2.5Y5/1); pebbles fairly common, mostly carb.; could be flow till & lake sediments; mod. calc.	clay	2.5Y5/3
5	9.5	Mostly clayey till; carb. pebbles, large one toward bottom; mottled; fairly large shale pebble at base	clay	"
9.5	12	Clay & silt loam beds, mottled	clay + silt loam	5Y5/1 + 2.5Y5/3
12	13.5	Silt loam, mottled, mod. calc.	silt loam	2.5Y5/4 + 5Y6/2
13.5	21	Clayey till; fair amount of pebbles, mostly carb.; calc., mottled	clay loam to clay	2.5Y5/3 to 2.5Y4/3-2
21	35	Clayey till as above, seems to be somewhat more clayey from 20'; carb. most obvious, but some crystalline; noted shale grain; calc.	clay	2.5Y4/1 by 16'
35	48.5	As above, very clayey; mostly carb. pebbles, none very large; noted one small lignite grain; pebbly zone at base	"	2.5Y4/1
48.5	49.5	Bedded clay + silt; some till?; transition zone; "till" probably pebble dropstones	clay	5Y4/1
49.5	59	Lake clay, mod. to slightly calc., thinly bedded; bed of silty clay, highly calc., 5Y5/1 at 50', but mostly very clayey, no sand grains noticeable, shiny; thinly bedded w/lighter + darker beds; till "pod" at about 55.5' is full of carb. grains and sandy; probably fell from ice	clay	"
59	62	Lake clay, mod. calc.; somewhat lighter than above, more silty?	clay	5Y5/1
62	63.5	Mostly clay, but thin beds of silt, mod. calc; fine sand beds interbedded w/clay in last few inches	"	"

APPENDIX 8-2.

OB-107 (continued)

		Rainy Lobe		
63.5	65	Fine to med. sand, very slightly calc.	sand	2.5Y5/1
65	80	Med. sand	"	--
80	83	Med. to coarse sand	"	--
83	89	Coarse sand; coarse to very coarse by 86'; very slightly calc.	"	--
89	97	Med. sand, very slightly calc.; some coarse sand; gray	"	--
97	102	Coarse sand, gray	"	--
102	115	Med. sand, noncalc.; very uniform; not much coarse; gray	"	--
115	117	Coarse sand, gray	"	--
117	121	Med. to coarse sand, gray	"	--
121	132	Fine to med. sand, gray	"	--
132	138	Med. sand, gray	"	--
138	142	Fine to med. sand, gray	"	--
142		Bedrock		

OB-108
 NW¹/₄NE¹/₄ sec. 16, T. 69 N., R. 24 W.
 Surface elev. 1118 ± 5 ft.

Logged 1/22/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
0	1	Fill: organics & sandy loam full of carb. pebbles		
St. Louis Sublobe				
1	4	Several inches of med. sand then silt, clayey, non-calc., to silt; has some very fine sand	silt loam	2.5Y5/2 5/3 by 2'
4	6.5	Fe stained, silty clay; very slightly calc.	silty clay	5Y5/2
6.5	7.8	Inch or so of med. sand on top, then silt loam below, as in sequence above; by 7' silty clay again, only very slightly calc. at most	sand to silty clay	2.5Y5/3 silt 2.5Y5/2 clay
7.8	10	Basically clay but seems to have little sand; no pebbles, mod. calc.	silty clay to clay	2.5Y5/3
10	12	Clay; obscure bedding, number of large secondary carb. nodules; mottled, calc.	clay	2.5Y5/2
12	76	Very clayey till; med. carb. pebble at top; some carb. pebbles but very clayey, mottled, banded to about 15', then unoxidized; occ. med. to large carb. pebbles, few crystalline, but generally small; seems to be silt bed few inches thick above unoxidized till; calc., have not noted any shale; good horizontal jointing by 40' or so	clay	2.5Y4/1 by 15'
76	79	Silty med. to coarse sand to 77' then layers of clay and sand; some small pebbles, carb.-rich sand	sand - & clay -	2.5Y5/2-1 5Y4/1
79	83	Silty med. to coarse sand as above	sand	
83	84	Sand as above & clay layers (till layers?)		
84	90.5	Till as from 12' to 76'; very clayey; pebbles mostly carb.; calc.	clay	2.5Y4/1
90.5	93	Lake clay, slightly darker than above, shiny; mod. calc; 92' to 92.5' some grains; rest is lake clay	clay	5Y4/1-3/1
Rainy Lobe				
93	96	Laminated clay, slightly calc.; silt in last 6" or so is 5Y5/1 and slightly calc.	"	"
96	99	Med. sand; silt bed in first few inches; coarse sand in last 6"	sand	--

APPENDIX 8-2.

OB-108 (continued)

99	100.5	Silty very fine to fine sand; possibly some silt beds; coarse pebbly sand in basal 1" to 2"; slightly calc.	loamy sand	5Y4/1
100.5	103	Loamy pebbly sandy till for 6" or so, then seems cleaner; slightly calc.; sand or somewhat washed till to about 103'; contains some pebbles, cobbles; very slightly to noncalc.	loamy sand to sand	5Y5/1
103	116	Loamy sandy till; several cobbles (dk metamorphics); sandy loam at top; slightly to very slightly calc.; by 110', cobbly pebbly sandy till, cobbles mostly are dark to gneissic; large cobble at 114.5'	loamy sand	5Y5/1
116	117	Primarily med. sand, dirty; start of new day so may not be good sample	sand	"
117	118	Dirty sand & gravel; a lot of darks; not sure if till	gravelly sand	"
118	123	Cobbly gravelly till	loamy sand	"
123	124	Cobble zone; dk metamorphics to gneissic		
124	126	Typical Rainy till; gravelly, slightly calc.	loamy sand	"
126	131.5	Coarse sand & gravel, large pebbles, lot of darks & granites. Cobbly sandy gravel from 128', including some <u>large</u> cobbles	gravelly sand to gravel	--
131.5		Bedrock--gneissic		

OB-109
SE 1/4 SE 1/4 sec. 16, T. 69 N., R. 23 W.
Surface elev. 1155 ± 5 ft.

Logged 1/22/86

Depth (Feet)		Geological Description	Texture	Munsell color
From	To			
		Thin organics on top		
		St. Louis Sublobe		
0	38	Extremely clayey till; slightly calc. near top. Dolomite grains by 1.5'; few pebbles above that; pebbles + grains (mostly carb.) are rare, but enough to be till; calc. to mod. calc. by 2', hard, stiff; much mottling from 12.5', yellower w/gray streaks: Mn stains? Fe stains; gypsum crystals associated w/gray mottles; carb. cobble at 17'; calc. by 17', almost all grains are carb.; last sign of staining gone by 24'; shale pebble at 21', only one noted in hole; oxidation zone 2" to 3" wide (2.5Y5/3) at 26'; small granitic cobble at 27'--seemed few more crystalline pebbles below, but still very clayey; quite calc. by 26'; pebble content seems even less from about 27.5'--very few until about 33.5', mostly only sand + small pebbles	clay	10YR5/3 2.5Y5/3 by 1.5' 2.5Y5/2 by 2.5' 4/2 by 5' 2.5Y5/3 + mottles of 10YR5/3 + N5/0 2.5Y4/1 by 21'
38	39.5	Sandy zone of same (?) till; lots of carb. grains; crumbly, apparently no bedding; calc.	loam	2.5Y5/1
39.5	44	Till as above; very clayey w/mostly carb. pebbles	clay	2.5Y4/1
44	45	Till as above; calc. sandy loam beds, probably inclusions, but basically same till to bedrock; few more pebbles at base	clay minor sandy loam	"
45		Bedrock		

APPENDIX 8-2.

OB-110
NW¹/₄SE¹/₄ sec. 12, T. 68 N., R. 24 W.
Surface elev. 1155 ± 5 ft.

Logged 1/16/86

Depth (feet) From To	Geological Description	Texture	Munsell color
0 1	Organic clay loam	clay loam	10YR3/1
	St. Louis Sublobe		
1 2	Clayey lake sediment--apparently few grains; carb. could be leached; noncalc.	" "	2.5Y5/2
2 3	Clay--apparently lake sediments, slightly calc., no grains noted	clay	2.5Y5/3
3 5	Clay till w/thin clay beds (2.5Y5/1)--flow till?; mod. calc.; pebbles mostly carb.; fair amount of sand in clay, noted little shale	clay	"
5 12	Clay till as above, but apparently no more clay beds; pebbles as above; calc. from 10'; quite clayey but is till	clay	2.5Y5/2 by 7'
12 25	As above, but fair amount of granitic pebbles; carb. still dominant	"	2.5Y4/1 by 16'
25 33	Possibly slightly more clayey till, calc.; several med. pebbles at 29'; large granite pebble at about 33'	"	"
33 37.5	Apparently lake clay; shiny, more clayey than above but still fair amount of grains, some pebbles; grains appear to be in groups; clay breaks differently than till above; mod. calc.	"	5Y4/1
	Rainy Lobe		
37.5 42	Lake sediment, good bedding, only very few grains; slightly calc.; few silt laminae below 41'; fine sand partings in last few inches, few pebbles	"	"
42 45	Cobbly gravelly loamy sandy till, slightly calc.	loamy sand	5Y5/1
45 50	Sandy loam--only small pebbles--could all be sluff	sandy loam	5Y5/1
50 52	Cobbly gravelly sandy loam till, slightly calc.; noted a few carb. grains	sandy loam	5Y5/1
52 54	Bedrock or regolith--possibly reworked or powdered		
54	Bedrock		

OB-202
SE¹/₄SW¹/₄ sec. 16, T. 63 N., R. 23 W.
Surface elev. 1338 ± 5 ft.

Logged 1/13/86

Depth (feet) From To	Geological Description	Texture	Munsell color
	St. Louis Sublobe		
0 0.5	Lake sediment; noncalc., no pebbles, no bedding	clay	5Y5/2
0.5 4	Till; small pebbles common: dolomite, few darks, few red granites: highly calc.; no large pebbles	"	mottled 5Y5/3 2.5Y5/3 by 2'
4 8	As above; a few larger pebbles, mottled gray, Fe staining, highly calc.; noted one shale pebble	"	"
8 12.5	As above, but color change and calc. by about 10'	"	2.5Y4/2 + 4/1 by 10'
12.5 14	Stiff clay; a few large carb. pebbles; most pebbles are carb.; thin oxidized silt layer, a few Fe stains, highly calc.; couple shale pebbles	"	2.5Y4/1
14 16	Core disturbed, softer than above	"	mottled 2.5Y4/2
16 21	Till as above clay; granite pebble and carb. pebbles; 2.5Y4/2 from 20'	"	mottled 2.5Y4/2 + 4/3
21 26	As above, but stiffer from 21'-22'; lignite, shale pebbles	"	2.5Y4/2
26 29	As above; several large carb. pebbles; horizontal joints closely spaced; dark pebbles, gneissic pebbles. Texture could range to clay loam for this till	"	2.5Y4/1 from 26.5'
29 33	As above; shale and carb. pebbles	"	"
33 38	As above; large chert pebble, granite cobble; not as stiff as above; calc.	clay loam	"
38 42.5	As above; shale grains	"	"
42.5 51	Sandy loam till - very calc.; dirty sand parting at 45', large pebble also; below parting have loam till and sandy loam till, and loamy sand parting at 47.5'; loam till below black cobble at 48'; much carb. in till, generally more pebbly than intervals above	sandy loam + loam little loamy sand	2.5Y4/2 2.5Y4/1 from 47.5'

APPENDIX 8-2.

B-202 (continued)

51	58.5	Clayey till; gradational contact, still some pebbles, not stiff; calc., more clayey than any of above intervals	clay	"
58.5	65.5	As above, soft; shale grain, carb. grains; till could range to silty clay as appears to have fair amount of silt; lignite grain	"	"
65.5	68	Soft, more grit in till, possibly to silty clay loam; dolomite cobble about 67'; loam by 67.5'	clay loam	"
68	69.5	Mush - very soft loamy texture, not many pebbles, very wet	loam	"
Rainy Lobe				
69.5	73.5	Very sandy till; lighter color, slightly calc.; dk metamorphic cobble at 72.5'; dk pebbles; noted one small carb. grain; ranges from sandy loam to loamy sand	very sandy loam	2.5Y5/1
73.5	78.5	Moist till, slightly less sandy than above; concretion at 74' is 2.5Y5/1, slightly calc., not very hard; little more sandy from 75.5'; also seems dryer from 75.5'; more pebbles from 76.5'. Some Fe staining, could be post-coring; dk pebbles common	sandy loam	2.5Y4/1 ranges to 4/2 2.5Y4/1 - 5/1 by 75.5'
78.5	80	Noncalc. sandy till; cobbles of schist with pyrite common	sandy loam to loamy sand	2.5Y4/1 - 4/2
80	83	Sample has dried out, otherwise as above; another dk cobble; fines are prob. mostly silt "rock flour"	"	"
83	86	Sandy loam till, may range to loamy sand; quartz vein and schist cobble at 83', lot of dk pebbles; rotten granite at 85.5', dk cobble at 85'	sandy loam	2.5Y4-5/1
86	86.5	Silty, pebbly, coarse sand lens 6"-10" thick	loamy sand	2.5Y5/2
86.5	87.5	Sandy loam till; granite cobble, large slate pebble	very sandy loam	"
87.5	90	Sandy till, noncalc.; fair amount of granitic pebbles, some dk pebbles; couple small granitic to gneissic cobbles	"	2.5Y5/1
90	93	As above, rocky from 92'; dk cobbles, also granitic	"	"
93	98	Seems coarser from about 92', more gravel and cobbles; gneissic cobble at 97.5', pegmatitic cobble at 97'	"	"

B-202 (continued)

98	104	Seems a little more sandy; noncalc.; fairly rocky; large gneissic cobble at 100'	loamy sand	"
104	105.5	Fine to coarse sand; post-sampling oxidation; noncalc.; trace fine gravel; fining-upward sequence	sand	gray
105.5	107.5	Loamy sand till; some pebbles, noncalc.	loamy sand	2.5Y5/1-6/1
107.5	110	As above, but not as many pebbles, not as rocky; rich in sand; dk metamorphic cobble at top	"	"
110	111	As above, but more pebbles	"	"
111	118.5	Sand seam at top, then as above, noncalc.; many coarse granite and dk metamorphic pebbles, red granite pebble at 114', small chert or carb. pebble at 111.5', granitic cobble at 116'	"	2.5Y5/1
118.5	119.5	Less than 1' of fine to coarse sand; fairly clean lens 8"-10" thick	sand	2.5Y6/2
119.5	122	Sandy till; some pebbles, cobbles	sandy loam	2.5Y4/1
122	122.5	Rocky sandy till	gravelly sandy loam	"
122.5		Bedrock		

APPENDIX 8-2.

OB-204
SE1/4SE1/4 sec. 17, T. 63 N., R. 22 W.
Surface elev. 1289 ± 5 ft.

Logged 1/14/86

Depth (feet) From To	Geological Description	Texture	Munsell color
0 1	Leaf litter, organics, little peat at base		
	St. Louis Sublobe		
1 4	Lake clay; calc., wet; couple dolomite grains at 2.5'	clay	2.5Y5/3
4 7	Lake clay; calc., few small wood fragments; peat parting at 5.5', could be out of place; little secondary carb. at 6'	"	2.5Y6/2
7 11	Laminated, slightly mottled clay with laminae of lighter colored fines	"	5Y4/1 by 6' mottled 2.5Y4/2- 4/3
11 16	Clayey till; sand floating in fine matrix; calc., no laminations; still only small pebbles, mostly dolomite	"	"
16 23	As above, very clayey; few pebbles present are small; calc.; horizontal breaks in core	"	2.5Y4/2-1 from 21'
23 27.5	As above; picking up more pebbles by 25'; still very clayey; one large dolomite pebble noted, most pebbles are carb.; rip up clasts, band of sandy silt at base	"	2.5Y4/1
27.5 30.5	Lake clay; laminated; very few grains toward top, then none; calc.	"	"
30.5 33	Start noticing a few grains and small pebbles; seems too clayey for till	"	"
33 36	Slightly darker gray clay; some laminations, very few grains; seems more clayey, thus the darker color in top few inches - 2.5Y3/1; very thin carb. laminae along bedding planes	"	"
36 38	Very sticky, shiny clay, very fine, mod. calc.; no grains noted	"	"
38 41	As above, but start noticing some grains, chiefly dolomite; still sticky, much clay, little silt	"	"
41 44	As above, but no grains noted until about 42.5' where thin area of concentrated grains; otherwise massive clay with obscure laminations	"	"

B-204 (continued)

44 50	A very few grains toward top then very massive clay; has bedding but texture doesn't appear to vary; no grains noted; one carb. granule toward bottom	clay	2.5Y4/1
50 54	Massive lake clay; only a very few sand grains noted; calc.	"	"
54 60.5	Lake clay; massive, no grains noted; calc.	"	2.5Y4/1 5Y5/1 by 56'
60.5 64	Pebble line then a more gritty clay for a few inches, then massive shiny clay to about 61.5' where gets somewhat gritty, matrix is more silty; probably closer to source; fair amount of sand grains; noted couple dolomite pebbles; could possibly be "flow till"	"	5Y5/1
64 65	Silty lake deposit; clay is more silty than above	"	5Y5/1
65 69	Clayey till; some grains; carb. and dk "slate" pebbles; large granite pebble at 66.5', large carb. pebble at 68'; some zones are more silty; ranges to clay loam or silty clay loam; 7.5YR6/3 noncalc. clay bleb about 67.5'	clay - clay loam	5Y4/1
69 73	As above, clayey till; seems less carb. than first clayey till; more granitic and dk mafic pebbles; mod. calc., slightly calc. by 71'	clay	5Y5/1
73 79	Clayey till as above; small cobble at 74.5' is bluish with much sulfide; other pebbles nearby; large carb. and granite pebbles from 76'-78'; mod. to slightly calc.; last 6" more pebbly, gradational	"	"
79 80	Transition zone; mostly noncalc.; greenish sandy loam with inclusions of slightly calc. clayey till with carb. grains; could be some loamy sand at base (non-till)	sandy loam	2.5GY4/1- 5/1
	Rainy Lobe		
80 82	Sandy loam till; several large pebbles, cobbles; noncalc.	"	"
82 83	Coarse cobbly loamy sand till; mostly dk but some gneissic pebbles; little sand at base is 7.5Y5/2; till color from ground-up rocks	loamy sand	5GY4/1
83 85	Poor sample; mostly clayey till from above; stuck in barrel?	"	"
85 87	Coarse loamy sand till with some cobbles; mostly dk schist pebbles; noncalc.; lighter colored sand inclusions	"	"

87	95	As above; many phyllitic to schistose dk cobbles with much sulfide; some zones coarser than others	loamy sand	7.5Y5/2 + 1
95		Bedrock, schist, fine		

OB-206
 SW¹/₄SW¹/₄ sec. 22, T. 63 N., R. 21 W.
 Surface elev. 1301 ± 5 ft.

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
0	0.5	Organic--peat, black		
St. Louis Sublobe				
0.5	2.5	Silty clay--seems to have some grit; noncalc.	silty clay	10YR5/2 to 1' then 5Y5/2
2.5	3.0	Silty very fine to fine sand	loamy sand	--
3.0	20	Clay; mottled and some obscure laminae from 4'; calc. by 4'; well-developed thin laminations recognizable by 5'; seems to be mostly clay w/lesser or greater amounts of silt, could range to silty clay; noted first dropstone carb. pebble at 12.5' w/several carb. grains nearby; granite pebble at 14.5'; laminations not as obvious from 12', but still present	clay	5Y5/3 2.5Y4/1 by 9'
20	29	Varved clay and silt, about 1:1 ratio to start, then silt becomes dominant w/depth; large carb. pebble at 26', 1" to 2" of sandy loam till? just below pebble; few other pebbles at about 27' in varved clay + silt; occ. carb. grains below	clay + silt	5Y4/1-clay 5/1-silt
29	30.5	Laminations not as regular; silty clay, clay, clayey silt + silt; carb. dropstones at 30.5'	clay to silt	5Y5/1 + 4/1
30.5	32.5	Mostly silty clay; several pebbles; small gneissic cobble at about 32'; some dk-gray clay beds below	silty clay	5Y5/1 to 5Y4/1
32.5	37	Silty clay till (?); sand peppered in clay; seems more silty than other St. Louis tills; calc.; a few large pebbles; more clayey w/depth	silty clay to silty clay loam	5Y5/2-1
37	63	By 37' or so seems more clayey, less grit; still occ. large pebbles; other grains; difficult to pick exact contact, if any; still could be very clayey till as no obvious bedding; calc.; couple large pebbles at 42'; if is till is exceptionally clayey; if is lake clay is massive w/many dropstones; breaks in horizontal joints; granitic cobble at 48'; few other small carb. pebbles; shale pebble at 53', other pebbles in vicinity; seems a little more silty from 54' to 55.5', looks little more like till; more silty again from 56.5'; sandy zone 60' to 60.5' (clay loam) has small dk cobble at base	clay	5Y5/1-4/1

APPENDIX 3-2.

63	65	More silty than above; silt; contact fairly abrupt; large granite pebble at 65', others present; calc.	silt loam	5Y5/1
65	75	Sample not retrieved; only little sticky clay; probably silt to fine sand	--	--
75	82.5	Top few inches mainly silt, then grades to silty till; appears same as 32.5'-37', but more sand + pebbles; more sandy w/depth; mod. calc. to calc.; quite gravelly at 79.5' to 81.5' including small cobble and some large carb. pebbles, large dk pebble at 81.5'	silty clay loam to sandy clay loam by 79.5'	5Y5/1-4/1
82.5	94	Lake clay; granite pebble, other grains at 85', otherwise smooth clay; could have some obscure bedding; some definite bedding by 87'; very rare grains; calc.; small dk cobble at 92'; large pebble below	clay	"
94	94.5	Dk-gray laminated clay, more "pure" than above	clay	5Y4/1
Rainy Lobe				
94.5	100	Clay, greenish slightly calc., w/reddish bed (non-calc.) near top--5YR5/3-2 or 7.5YR5/3-2	clay	5Y5/1
100	101.5	Silt mainly; slightly calc.	silt	--
101.5	103	Very fine sand + very fine silty sand + silt (?); thinly laminated	loamy sand + sand	--
103	107.5	Fine to medium sand	sand	--
107.5	108	Last 6" at most a greenish gravelly sandy till?; slightly calc., compact	loamy sand	10Y5/2
108		Bedrock		

OB-207
NE¹/₄NE¹/₄ sec. 16, T. 62 N., R. 21 W.
Surface elev. 1283 ± 5 ft.

Logged 1/22/86

epth (feet)		Geological Description	Texture	Munsell color
From	To			
		Few inches of black loam on top		
		St. Louis Sublobe		
0	68.5	Lake clay, calc., from below loam; some obscure bedding or banding evident by 5'; "dry", no grains noted; extremely hard to split; generally massive, few laminae noted from 30' to 31'; very few grains noted below 28', granite pebble at 34', carb. pebble at 40', few other grains but clearly lake sediment. Two carb. pebbles at 47.5', 51.5'; sand grain every foot or so, exceptionally rare; darker clay bed 1/2" thick at 57.5' and others about 1' above & below, but no regular alternation apparent; pebble at 64.5', also inch or so band of gritty clay containing fair amount of fine sand	clay	2.5Y5/3 2.5Y6/3 by 4' 2.5Y5/2 by 8' may range to 6/2 in places 2.5Y4/2 by 24' 2.5Y4/1 by 25' 5Y4/1 by 56'--probably sooner
68.5	70.5	Dk-gray clay, less silty than above; few dropstones, appears laminated; mod. calc.	clay	5Y4-3/1
		Rainy Lobe		
70.5	71.3	Lt-greenish clay; vague bedding, slightly calc.	clay	5Y5/1-2
71.3	71.6	Reddish + greenish clay, only a few recognizable (non-calc.) red beds which seem to fade w/depth, less distinguishable; texture seems about same between red & green beds	"	5YR5/3 to 7.5YR5/3
71.6	78.5	Greenish clay; possibly little more silty than above; noncalc.; laminated, but not obviously; silt by 78' if not sooner	silty clay to silt	5Y5/2 7.5Y5/2 by 73'
78.5	84	Laminated silt + clay--probably are true varves; silt about twice as thick as clay but ranges from 1:1 to 3:1; noncalc.; noted one dropstone	silt to clay	7.5Y5/2
84	88.5	Varves less distinct; still some clay laminae, but mostly silt; can feel clay better than see it; noncalc.; seems to be coarsening downward to very fine sandy silt	silt, minor clay to silt loam	"

APPENDIX 8-2.

OB-207 (continued)

88.5	91.5	Fine to very fine sand, quartz-rich; appears laminated with silty sand beds; large granite pebble at 89.5'; med. sand bed at 91' coarsens in last few inches, grades to underlying unit	sand to loamy sand	5Y5/2-1
91.5	93.5	Loamy gravelly sandy till, sharp basal contact; slightly calc., compact; fairly certain is till	loamy sand	7.5Y5/2-1
93.5	97.5	Very coarse sand to 94'; then silty fine sand few inches thick, underlain by coarse sand; med. sand by 95'; silty in last few inches	sand	--
97.5	104.5	Gravelly sandy till; fair amount of fines; compact; slightly calc.; drilled through large cobble at 102'; not many big rocks, however	loamy sand	5GY4/1 to 7.5Y5/2 by 100 ft.
104.5	107	Very cobbly till?--probably mostly reworked bedrock; slightly to mod. calc.	"	"
107	108	Coarse gravelly sand--prob. mostly reworked bedrock	gravelly sand	--
108		Bedrock		

OB-208
SE 1/4 SW 1/4 sec. 27, T. 62 N., R. 20 W.
Surface elev. 1298 ± 5 ft.

Logged 1/14/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
0	0.5	Few inches of organic debris over granite cobble; may be fill		
Rainy Lobe				
0.5	1.5	Silt, noncalc.; (loess?)	silt loam	2.5Y6/3
1.5	2.5	Silt, noncalc.; (loess?); close to 7.5YR4/6; sharp basal contact	"	10YR4/6
2.5	10	Sand, fine to very fine; silty zones; noncalc.	sand	10YR5/3 2.5Y6/2 by 8'
10	10.5	Very fine sand; abrupt contacts above and below	"	10YR5/3
10.5	12.5	Fine sand, noncalc.; very abrupt contact at base	"	2.5Y6/2
12.5	14	Poorly sorted gravelly sand; large pebbles to small cobbles (mostly dk metamorphics) and fine to coarse sand; few small pebbles; noncalc.	gravelly sand	2.5Y6/3
14	16	Wet fine sand	sand	2.5Y6/4
16	17	Wet coarse sand with fine pebbles; abrupt contact with above	"	2.5Y6/3
17	20.5	Silty fine to coarse sand, pebbly with several large pebbles; poorly sorted	"	--
20.5	24	Clean pebbly, med. to coarse sand; abrupt contact; many schist pebbles; all grains are Rainy lobe; no dolomite	"	--
24	25	Silty pebbly fine to coarse sand; abrupt contacts	"	--
25	25.5	Fine sand	"	2.5Y5/3
25.5	28	Clean, coarse, gravelly sand with silty zones; coarser pebbles 27'-28'	"	--
28	30	Mostly fine sand, some pebbles	"	--
30	32	Fine sand	"	--
32	36	Fine to med. sand	"	2.5Y6/3
36	38.5	Fine sand	"	2.5Y6/1

APPENDIX 8-2.

DB-208 (continued)

38.5	47	Fine to med. sand	sand	2.5Y6/1
47	50	Mostly fine sand	"	"
50	50.1	Laminated silt and clay (2.5Y3/1); noncalc.	silt & clay	2.5Y3/1 + 2.5Y5/2
50.1	52	Fine sand, noncalc.	sand	2.5Y6/1
52	62.5	Fine sand, some med. sand; abrupt basal contact; small clay clasts at 54', 58'	"	"
62.5	64	Very fine sandy silt	silt loam	2.5Y5/1
64	64.5	Very fine sand	sand	"
64.5	67.2	Fine sand, noncalc.	"	"
67.2	67.3	Laminated silt and clay	silt & clay	--
67.3	67.9	Fine sand	sand	--
67.9	68.5	Laminated silt and clay and fine sand	silt, clay, sand	5Y4/1 for clay
68.5	71	Fine sand; no med. or coarser sand		
71	73	Laminated sandy silt, minor clay, and very fine silty sand; pebble at 72.5'	loam, loamy sand, clay	5Y4/1 for clay
73	75	Clean, very fine sand	sand	2.5Y8/1 dry
75	75.5	Mostly clay; laminated	clay	5Y4/1
75.5	76	Very wet fine sand	sand	--
76	79	Silt loam, very wet, clay to very fine sand; noncalc.; sample is mushy, so hard to tell if laminated	silt loam	5Y5/1
79	82	Fine silty sand	sand	"
82	82.5	Silty clay	clay	5Y4/1
82.5	84	Silty fine sand	sand	--
84	84.5	Very fine sand with clay laminae	"	--

DB-208 (continued)

84.5	85.5	Clean very fine sand	sand	--
85.5	88	Obscurely bedded silt and clay; clay layers are minor	silt, clay	5Y5/2, 5Y4/1
88	92.5	Very fine sand, quick; clay beds at 89.5', 90.5' about 1" thick; clay parting at 92.5'	sand	--
92.5	93	Fine sand	"	--
93	97	Very fine sand	"	--
97	103	Coarse cobbly gravelly dirty sand till; granitic and dk metamorphic clasts	gravelly sand	5Y5/1
103	108	Cobbles, gravel: gneiss, dk metamorphics, metavolcanics, schists; 1' gravelly sand toward bottom - washed till?	gravel	--
108	113	Not much preserved; loamy till; noncalc.; could be Rainy till which incorporated underlying clay, soil	loam	2.5Y4/1
113		Bedrock		

APPENDIX 8-2.

OB-209
NE 1/4 SE 1/4 sec. 16, T. 63 N., R. 20 W.
Surface elev. 1346 ± 5 ft.

Logged 1/15/86

Depth (feet) From To	Geological Description	Texture	Munsell color
	Few inches of roots and organic clay		
	St. Louis Sublobe		
0 4	Only 1' core recovered; organic-rich clay	clay	2.5Y4/1
4 7.5	Clay, calc.; thin silt beds lighter and more calc.; clay band from 5'-5.5' is 2.5Y4/1; laminated by 5' (noticeable); bedding not as obvious 6'-7'; some gley colors; by 7' pure clay beds are thin, more silty beds dominant	clay & silty clay loam	2.5Y6/2 to 2.5Y5/2 - 5/3
7.5 14	Varved clay as above; clayey silt about twice as thick as clay beds; noted weathered schist pebble at 13'. About 2-3 varve couplets/inch; gley colors gone by 10.5'	"	5Y5/2 silt 5Y4/2 clay
14 17	Wet sticky core; mod. calc.; still appears to be laminated clays; carb. pebble 15', grain at 14'	"	2.5Y5/2
17 18.5	Very fine sandy silt, mod. calc.; clay bed(s) in middle, and toward bottom; obscure bedding, interbedded with clay toward base	silt loam	5Y5/2
18.5 20	Dk-gray clay, slightly calc.; obscure bedding	clay	5Y4/1
20 22	Very thinly laminated slightly calc. clay and lighter colored clayey silt (more calc.); granite pebble at 20.5'	"	"
22 25	Lake clay; appears more massive than above, but bedding is present	"	5Y4/1-2
25 28.5	As above; very rare sand grains; bedding more distinct by 27'; increasing silt from 28', 5 to 6 pebbles noted at 28.5'	"	5Y4/1
28.5 34.5	Silty clay with beds of clay; slightly calc. to mod. calc.; a few silt laminae from 33' to 34.5'	silty clay & clay from 28'	5Y4/1
34.5 39.5	Clay, some bedding; pebble at 36.5'; somewhat more silt by 36', more distinct bedding from about 38'; mod. calc.	clay	"

B-209 (continued)

		Rainy Lobe		
39.5	52	Fine sand, noncalc.; much biotite mica in sand; some medium sand, which seems to increase downward	sand	5Y5/2-1
52	54	Med. to coarse sand; gravel toward bottom, also silt layer toward bottom; noncalc.	"	--
54	55	Interbedded med. to coarse sand and very fine silty sand (sandy silt)	sand & loamy sand	--
55	60	Dirty fine and med. sand	sand	--
60	67	Coarse sand, noncalc. Layer of large pebbles at 64' includes one small cobble; coarse to very coarse sand below pebbles	"	5Y5/1
67	73	Coarse sand and gravel; very fine sand layer at 68', then coarse cobbly sand and gravel to about 71.5', where not quite as cobbly, but still quite gravelly	gravelly sand	--
73	74	Fine sand	sand	--
74	75	Cobbly fine to med. sand; poorly sorted	gravelly sand	--
75	76	Very fine to fine sand	sand	--
76	78	Coarse sand fining upward to med. sand	"	--
78	82	Very coarse gravelly sand; gravel is dominated by dk metamorphics	gravelly sand	5Y5/2
82	95	Very cobbly gravelly sand, similar to 74'-75'; dirty, could be "washed" till as so poorly sorted; cobbles mostly dk metamorphics; much fine sand; 93'-94' better sorted, gravelly sand	"	"
95	97	Med. sand grading up to fine sand by 96' (fine to 96', then med., some coarse); sluff?	sand	--
97	99.5	Gravelly fine sand; sluff?	"	--
99.5	102	Dirty sandy cobbles and gravel	gravel	--
102	105	Gravelly sandy loam till; apparently unwashed till, otherwise as above; boulder at base	sandy loam	5Y5/1
105		Bedrock, not sure if any regolith, possibly broken on top		

APPENDIX 8-2.

OB-210
 SW¹/₄SE¹/₄ sec. 25, T. 64 N., R. 21 W.
 Surface elev. 1367 ± 5 ft.

Logged 1/15/86

Depth (feet)		Geological Description	Texture	Munsell color
From	To			
		Started in shallow ditch		
		St. Louis Sublobe		
0	10	Clayey till; very few pebbles & grains, but too many for lake sediment; one large pebble at 2.5'. Carb. grains common but not dominant; secondary carb. by 2', calc. by 1.5'; gets more silty w/depth	clay to silty clay	2.5Y5/3 2.5Y5/4 by 1' 2.5Y5/3 by 4'
10	12.5	Silt to very fine sandy silt; abrupt contact; fewer grains than above	silt loam	2.5Y5/3
12.5	14	Very fine sand	sand	"
14	16	Silty clay; wet; a few grains; mod. calc.	silty clay	"
16	18.5	Very fine silty sand, few inches of transition at top; mod. calc.	sand	"
18.5	21.5	Unoxidized very fine silty sand; 5Y3/1 clay beds from about 20' are 1/2" or so thick	"	5Y5/1
		Rainy Lobe		
21.5	23	Clay, slightly calc.; silty clay by 22.5'; thinly bedded	clay	5Y4/1
23	25.5	Silty clay & thin silt beds--not true varves?; "classic" varves by 24.5'; clay is pure, silt is pure	clay + silt	5Y2/1-clay + 5Y6/1-silt
25.5	28	Clayey silt to very fine sand by 26'; a few sand grains noted in silt; very slightly calc.	silt loam to sand	5Y5/1
28	28.5	Fine sand	sand	5Y6/1
28.5	29	Very fine sand	sand	--
29	30	Fine sand; a few pebbles	sand	--
30	36	Fine sand w/granules & pebbles, some are large; apparently poorly graded w/very fine to medium sand & gravel, but few intermediate clasts; no cobbles; could be till w/much fine sand; abundant dk metamorphic pebbles; compact	gravelly sand	5Y5/1
36	40	Dense fine sand w/med. to coarse sand; few granules	sand	5Y5/1

OB-210 (continued)

40	43	Pebbly fine to coarse sand; fewer pebbles from 41.5'; compact	sand	5Y5/1
43	47	Fine sand, some coarse; coarsens w/depth; gravelly sand by 45' with med. gravel; compact	"	"
47	48	Cobbly dirty sandy gravel--angular cobbles--could be till;	sandy gravel	"
48	49	Greenish rocky silt--could be broken rock or regolith or reworked regolith		5GY5/1
49		Bedrock		

APPENDIX 8-2.

OB-211
 NW¹/₄SE¹/₄ sec. 22, T. 64 N., R. 20 W.
 Surface elev. 1316 ± 5 ft.

Logged 1/14/86

Depth (feet) From	To	Geological Description	Texture	Munsell color
0	0.5	Woody organic clay		
St. Louis Sublobe				
0.5	3.5	Gritty lake clay; root fragments; noted one carb. pebble at 3.0'; highly calc.	clay	5Y5/3
3.5	10	As above, gray color; large roots at 8', occ. sand grains	clay	5Y5/1, some mottles to 5Y5/2 5/0 around roots at 8-9'
10	12	As above, mottled, iron stains; a few dolomite pebbles toward bottom; calc.	"	--
12	13.5	Loamy layer with carb. pebbles (till?) for about 1" then 4" laminated slightly calc. clay, then clayey noncalc. silt	clay to silty clay loam	2.5Y5/2 loamy layer 5Y4/1 clay 2.5Y5/2 silt
13.5	16	Clay, calc.; obscure thin beds, shiny surfaces; few thin silt laminae (2.5Y6-7/1); only slightly calc. from about 15'; no grains noted; occ. tiny wood fragments	clay	2.5Y4/1
16	18.5	Clay; interbedded pure clay (slightly calc.) and more silty clay (calc.); no grains noted	"	5Y4/1 & 5Y5/1
18.5	22	Clayey silt with some clay beds which increase in number below 20.5'; slightly calc.; no sand noted	silty clay loam	5Y5/1
22	25	As above, clayey silt to silt, some clay beds; mod. calc.; all silt from 23' except minor clay layer and granite pebble at 24'	silt	"
Rainy Lobe				
25	30	Very fine sand	sand	--
30	32.5	Silty clay loam and clay beds; last 6" or so was more a silt loam which contained one granule	silty clay loam	5Y4/1 & 5/1
32.5	34.5	Very fine sand, quick; laminated with 1" thick clay beds at 33.5'; med. sand parting below clay then more very fine sand	sand	--

OB-211 (continued)

34.5	36	Bedded silt loam and clay; slightly calc.	silt loam & clay	--
36	40	Gravelly loamy sand till; some cobbles noncalc.	loamy sand	2.5Y5/1-2
40	41	Dirty gravelly sand till; lighter colored	sand to loamy sand	--
41	46	Gravelly loamy sand till; some cobbles; noncalc.	loamy sand	2.5Y5/2-1
46	52	More cobbly from 46'	"	"
52	54	Seems to have a little more fines; still gravelly loamy sand till; hard, compact till when dried out	"	"
54	54.5	Silt and till, noncalc.	"	5Y5/2
54.5	56	Cobbly gravelly loamy sand till	"	5Y4/2
56		Bedrock		

APPENDIX 8-2.

OB-212
SE¹/₄SE¹/₄ sec. 36, T. 63 N., R. 21 W.
Surface elev. 1291 ± 5 ft.

Logged 1/14/86

Depth (feet) From To	Geological Description	Texture	Munsell color
	Top few inches woody black organic clay		
	St. Louis Sublobe		
0 1	Clay; no grains noted; noncalc.	clay	7.5Y5/1
1 4	Clay; calc.; carb. grains common; apparently lake sediment	"	2.5Y5/4-5/3 mottled gray 2.5Y 5/2 by 1.5 w/5/4 - 5/3 mottles
4 15	Clay; calc.; secondary carb.; traces of disturbed bedding; lacks sand grains; mottles end by 13'; noted few grains, one pebble about 11', very few grains below	"	2.5Y4/1 top 6" then 5Y5/2 with 2.5Y5/4 mottles
15 25	Stiff clay, difficult to split, "pure"; noted small granule at 19'; mod. calc. by 20'; granite pebble at 20', few carb. grains below	"	5Y4/1
25 31	As above, clay with very rare sand grains; small dolomite pebble at 30'; mod. calc.	"	"
31 35	As above, massive clay; dk pebble at 32', other grains very rare, few small dolomite pebbles; mod. calc.	"	"
35 41	Massive clay as above; large granite pebble at about 36.5'; more grains with depth? Thin 1/2" fine sandy silt parting at 40.5'; less calc. with depth?	"	"
41 45	As above, slightly calc. by 43'; granite pebble and some carb. at 42.3'; other occ. grains; several pebbles at base	"	"
45 57	Missing 9' of core; what is present is mostly soft clay, harder in last foot or so	"	"
57 59	Lake clay, fairly soft; large granite pebble, small carb. pebble and grains toward top with few below	"	"
59 65	Massive stiff clay, mod. calc.; several grains toward top; slightly more gritty parting at 64.5'	"	"
65 71	Massive clay, not quite as stiff as above, slightly calc.; no grains noted	"	"

OB-212 (continued)

71	73.5	As above, massive clay; lt-gray, calc., clayey silt parting at 72.5'	clay	5Y4/1
Rainy Lobe				
73.5	74	Varved red noncalc. clay with gray clay	"	5YR4/2 & 2.5Y4/1
74	77	Clay, lighter than above; slightly calc.; more silty than above; a few thin "red" beds from 76'	"	2.5Y4/1
77	80	Very slightly calc. clay, more silty than above; fairly soft	"	5Y5/1
80	82	Till, top 6" or so fairly clayey; sand loam till, gravelly, but no large pebbles or cobbles	sand loam	5Y5/2
82	84	Sandy loam till as above, noncalc.; somewhat gravelly, few small cobbles	"	5Y4/2
84	87	Somewhat more gravelly than above	"	"
87	97	As above; becomes more rocky with depth, seems somewhat "greener"	"	5Y4/3
97	100	More loamy than above, dense; still gravelly; could be transitional zone between two tills; noncalc.; many granite pebbles	sandy loam to loam	2.5Y4/3
100	104	Loamy gravelly till; oxidized color, noncalc.; rock types appear same as above; dense; many granite pebbles, cobbles; also (as compared to holes already seen) granite is abundant in sand fraction. More rocky from 101', probably cored boulder or several cobbles; basically reworked bedrock and regolith	loam	2.5Y4/4
104	107	Crushed rock with zones of reddish to dark-green clayey regolith; upper part could be reworked by glacier (transition zone)		
107	116	Bedrock, weathered		

APPENDIX 8-3. HP-41C PROGRAM FOR REFLECTION SEISMIC ALGORITHM

```

01*LBL "SEIS 12"  52 "X"      103 /      153 GTO 01
02 "LABEL"       53 PROMPT  104 SQRT   154 GTO 04
03 PROMPT       54 X+2    105 "DS="  155 END
04 "VU"         55 STO 07  106 ARCL X
05 PROMPT       56 RCL 05  107 AVIEW
06 STO 00       57 RCL 06  108 RCL 03
07 "VS"         58 *      109 X<=Y?
08 PROMPT       59 RCL 07  110 GTO 01
09 STO 01       60 -      111 GTO 03
10 +            61 4
11 RCL 01       62 /
12 RCL 00       63 SQRT
13 -            64 "DS="
14 X<Y          65 ARCL X
15 /            66 AVIEW
16 SQRT        67 STO 00
17 "XC"        68 RCL 03
18 PROMPT      69 X>Y?
19 2            70 GTO 03
20 /            71 "X<Y?"
21 *            72 GTO 04
22 STO 02      73 X=Y?
23 "DU="       74 GTO 01
24 ARCL X
25 AVIEW

26*LBL 01      75*LBL 03
27 "DS"       76 RCL 03
28 PROMPT     77 5
29 STO 03     78 -
30 RCL 01     79 STO 03
31 /          80 GTO 05
32 RCL 02     81*LBL 05
33 RCL 00     82 RCL 01
34 /          83 /
35 +          84 RCL 02
36 STO 04     85 RCL 00
37 RCL 03     86 /
38 RCL 01     87 +
39 *          88 STO 04
40 RCL 02     89 RCL 03
41 RCL 00     90 RCL 01
42 *          91 *
43 +          92 RCL 02
44 RCL 04     93 RCL 00
45 /          94 *
46 STO 05     95 +
47*LBL 02     96 RCL 04
48 "T"        97 /
49 PROMPT     98 RCL 06
50 X+2        99 *
51 STO 06     100 RCL 07
              101 -
              102 4
              103 /
              104 SQRT
              105 "DS="
              106 ARCL X
              107 AVIEW
              108 RCL 03
              109 X<=Y?
              110 GTO 01
              111 GTO 03
              XEQ "SEIS 12"
              LABEL
              SAMPLE
              RUN DS
              VU 1,415.0000 RUN T 780.0000 RUN
              VS 6,000.0000 RUN X .2605 RUN
              XC 328.0000 RUN DS=739.3230
              DU=12.6995 DS=739.1710
              DS DS=739.0172
              T 650.0000 RUN DS=738.8614
              X .2605 RUN DS=738.7037
              DS=738.5440
              DS=738.3823
              DS=738.2185
              DS=734.6557
              DS=734.8675
              DS=735.0762
              DS=735.2821
              DS=735.4850
              DS=735.6851
              DS=735.8824
              DS=736.0770
              DS=736.2689
              DS=736.4582
              DS=736.6449
              DS=736.8291
              DS=737.0109
              DS=737.1903
              DS=737.3673
              DS=737.5420
              DS=737.7144
              DS=737.8846
              DS=738.0526
              DS = DEPTH SATURATED LAYER
              DU = DEPTH UNSATURATED LAYER
              T = ARRIVAL TIME IN SECONDS
              VS = VELOCITY SATURATED LAYER
              VU = VELOCITY UNSATURATED LAYER
              X = SHOT TO GEOPHONE DISTANCE
              XC = CRITICAL DISTANCE
    
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APPENDIX B: HP-41C PROGRAM FOR REFRACTION SEISMIC ALGORITHM

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01*LBL "SEIS 11"  53 STO 05  103 "TD V3 UD?"  152 CF 14
02 "LABEL"       54 SF 14   104 PROMPT      153 "STA "
03 PROMPT       55*LBL 16  105 +          154 RCL 00
04 "STA "       56 FS? 15  106 RCL 11     155 ARCL X
05 PROMPT       57 GTO 17  107 -          156 AVIEW
06 STO 00       58 "TD V2 DD?"  108 2          157 FS? 19
              59 PROMPT  109 /          158 GTO 15
              60 "TD V2 UD?"  110 "DTD12="  159 RCL 00
              61 PROMPT  111 ARCL X     160 RCL 12
              62 +      112 AVIEW     161 X=Y?
              63 STO 07  113*LBL 21     162 GTO 15
              64 RCL 06  114 RCL 08     163 FS? 16
              65 -      115 -          164 GTO 16
              66 2      116 1000
              67 /      117 /
              68 "DTD1="  118 RCL 05
              69 ARCL X  119 *
              70 AVIEW  120 RCL 05
              71 STO 00  121 RCL 10
              72*LBL 18  122 /
              73 1000   123 ASIN
              74 /      124 COS
              75 RCL 01  125 /
              76 *      126 "DEPTH Z2="
              77 RCL 01  127 ARCL X
              78 RCL 05  128 AVIEW
              79 /      129 RCL 09
              80 ASIN   130 +
              81 COS    131 "Z1+Z2="
              82 /      132 ARCL X
              83 "DEPTH Z1="  133 AVIEW
              84 ARCL X  134 FS? 19
              85 AVIEW  135 GTO 22
              86 STO 09  136 GTO 23
              87 FS? 16  137*LBL 17
              88 GTO 22  138 "DTD1"
              89 FS? 18  139 PROMPT
              90 GTO 20  140 STO 08
              91 FS? 17  141 GTO 18
              92 GTO 19
              93 "V3?"
              94 PROMPT
              95 STO 10
              96 "TT V3?"
              97 PROMPT
              98 STO 11
              99 SF 17
              100*LBL 19
              101 "TD V3 DD?"
              102 PROMPT

              SF 16
              XEQ "SEIS 11"
              LABEL
              SAMPLE
              RUN
              STA 1.00 RUN
              N STA 7.00 RUN
              TT V2? 48.00 RUN
              V1? 2,921.00 RUN
              V2 DD? 4,762.00 RUN
              V2 UD? 6,097.00 RUN
              DIP L2=4.60
              TRUE V2=5,330.18
              TD V2 DD? 7.00 RUN
              TD V2 UD? 2,921.00 RUN
              V2 DD? 4,762.00 RUN
              V2 UD? 6,097.00 RUN
              DIP L2=4.60
              TRUE V2=5,330.18
              TD V2 DD? 7.00 RUN
              TD V2 UD? 46.00 RUN
              DTB1=2.50
              DEPTH Z1=0.73
              TD V2 DD? 46.00 RUN
              TD V2 UD? 114.00 RUN
              DTB1=2.50
              DEPTH Z1=0.73
              STA 2.00
              TD V2 DD? 40.00 RUN
              TD V2 UD? 15.00 RUN
              DTB1=3.50
              DEPTH Z1=12.22
              STA 3.00
              TD V2 DD? 40.00 RUN
              TD V2 UD? 15.00 RUN
              DTB1=3.50
              DEPTH Z1=12.22
              STA 2.00
              TD V2 DD? 60.00 RUN
              TD V2 UD? 100.00 RUN
              SF 19
              XEQ "SEIS 11"
              LABEL
              SAMPLE
              RUN
              STA 1.00 RUN
              N STA 7.00 RUN
              DTB12=27.00
              DEPTH Z2=133.92
              Z1+Z2=146.14
              STA 3.00
              TD V2 DD?
              DD = DOWN DIP
              DTD1 = DELAY TIME LAYER ONE
              DTD12 = DELAY TIME LAYERS ONE AND TWO
              STA = STATION
              TT = TOTAL TIME
              UD = UP DIP
              V1 = VELOCITY LAYER ONE
              V2 = VELOCITY LAYER TWO
              V3 = VELOCITY LAYER THREE
    
```

Appendix 9-1. A brief compilation of the regional geology of the Vermilion district.

The Vermilion district, as exposed 30 to 60 miles along strike to the east of the Orr area, consists of a thick succession of subaqueous volcanic rocks and derivative sedimentary rocks formed during the interval 2750-2700 Ma ago (Sims, 1976). It is bordered on the south by the Giants Range batholith, on the north by the Vermilion Granitic Complex, and on the east by the Saganaga batholith. This greenstone belt is composed of a volcanic-sedimentary pile formed by the coalescence of distinct volcanic centers (see Schulz, 1980, for the volcanic evolution of this belt). The central portion contains two mafic volcanic units (Ely Greenstone and Newton Lake formation) with minor volcanogenic sedimentary rocks, whereas the eastern and western parts contain major portions of dacitic volcanic rocks and derivative graywackes (Lake Vermilion and Knife Lake formations). The literature has discussions on different geographic parts of the district (east, central, and west), so it is useful to note the spatial relations of the formations in each part. There are a number of intrusive and extrusive rocks (felsic to ultramafic) spatially associated with the Knife Lake Group which have not yet been assigned to that group or to any formation in the district (Green, 1982). Morey (1980) lists five distinct episodes of intrusive activity in the Vermilion district and adjacent areas: (1) synvolcanic rocks, including metadiabase and hypabyssal porphyries having a wide range in composition; (2) syntectonic granitic rocks of the Saganaga and Giants Range batholiths; (3) late- or post-tectonic syenitic rocks and related lamprophyres; (4) post-tectonic quartz monzonitic rocks of the Giants Range batholith and alkalic plutons such as the Linden pluton to the west of Tower; and (5) diabasic dikes of Middle Precambrian age and basalt dikes of Late Precambrian age. Several periods of folding accompanied the emplacement of the oldest plutonic rocks (Sims, 1976; Green and Schulz, 1982; Sims and Southwick, 1980). In the western part of the district, two generations of folds have been identified (Sims, 1972, pp. 56-58; Ojakangas, Sims and Hooper, 1978). The supracrustal rocks were metamorphosed to greenschist and locally to upper amphibolite facies during the periods of folding and granite intrusion. Extensive faulting occurred during and following the late emplacement of monzonite and syenite into the supracrustal rocks (Sims, 1976). The metamorphic grade within the greenschist facies generally increases toward bounding granite masses or major faults (Morey, 1978). However, mineralogic zoning is not well developed in the supracrustal rocks, mainly because of differences in their bulk chemistry. Retrograde metamorphism is also widespread in the supracrustal rocks (op. cit.). The quartzofeldspathic rocks contain chlorite, muscovite, albite, quartz, and epidote, whereas the mafic rocks contain chlorite, calcite, tremolite or actinolite, epidote, and quartz. Relict augite and labradorite are common in the mafic rocks, as are zoned plagioclase and relict hornblende in the felsic volcanic and clastic rocks (op. cit.).

Appendix 9-2. Outline of analytical methods.

A. HMC - Nonmagnetic Fraction

X-Ray Assay Laboratories, Ltd.

A. HMC - Nonmagnetic Fraction

Bondar-Clegg & Co., Ltd.

Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers	Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers
Au	5 ppb	3/4 split	Unknown	NA	S.N. between	Au	.5 ppb	3/4 split	NA	INAA	Sample Numbers Between 18763-18837
Na	.05 %	.5	Unknown	NA	16801-18757	Na	.05 %	.5	NA	INAA	
Ce	3-5 ppm	.5	Unknown	NA	(18604A-18757, 18601-18643, 18617-18737)	Sc	.5 ppm	.5	NA	INAA	
Cr	50 ppm	.5	Unknown	NA		Ce	10 ppm	.5	NA	INAA	
Mn	1 ppm	.5	Unknown	DCP		Cr	50 ppm	.5	NA	INAA	
Fe	.5 %	.5	Unknown	NA		Mn	1 ppm	.5	HCl-HNO ₃ (1:3)	AA	
Co	10 ppm	.5	Unknown	NA		Fe	.5 %	.5	NA	AA	
Ni	1 ppm	.5	Unknown	DCP		Co	10 ppm	.5	NA	AA	
Cu	1 ppm	.5	Unknown	DCP		Ni	50 ppm	.5	NA	AA	
Zn	1 ppm	.5	Unknown	DCP		Cu	1 ppm	.5	HCl-HNO ₃ (1:3)	AA	
As	1 ppm	.5	Unknown	NA		Zn	200 ppm	.5	NA	INAA	
Se	10 ppm	.5	Unknown	NA		As	1 ppm	.5	NA	INAA	
Mo	1 ppm	.5	Unknown	DCP	(18611-18736, 18646-18724)	Se	10 ppm	.5	NA	INAA	
Mo	1 ppm	.5	Unknown	ICPMS or PMS	(18601-18643, 18604A-18757, 18617-18737)	Br	1 ppm	.5	NA	INAA	
Ag	.5 ppm	.5	Unknown	DCP		Rb	10 ppm	.5	NA	INAA	
Sn	10 ppm	.5	Unknown	ICPMS or PMS		Zr	500 ppm	.5	NA	INAA	
Sb	.2 ppm	.5	Unknown	NA	(18611-18736)	Mo	2 ppm	.5	NA	INAA	
Cs	2 ppm	.5	Unknown	NA	(18646-18724)	Ag	5 ppm	.5	NA	INAA	
Ba	100 ppm	.5	Unknown	NA		Cd	10 ppm	.5	NA	INAA	
La	5 ppm	.5	Unknown	NA	Summary:	Sn	200 ppm	.5	NA	INAA	
Ir	100 ppb	.5	Unknown	NA	All Rotasonic	Sb	.2 ppm	.5	NA	INAA	
Hf	2 ppm	.5	Unknown	NA	Samples, Orr	Te	20 ppm	.5	NA	INAA	
Ta	1 ppm	.5	Unknown	NA	& Littlefork	Cs	1 ppm	.5	NA	INAA	
W	2 ppm	.5	Unknown	NA	and all Mud	Ba	100 ppm	.5	NA	INAA	
Pb	5 ppm	.5	Unknown	ICPMS	Rotary Samples,	La	5 ppm	.5	NA	INAA	
Bi	2 ppm	.5	Unknown	ICPMS	Orr Area	Sm	.1 ppm	.5	NA	INAA	
Th	.5 ppm	.5	Unknown	NA		Eu	2 ppm	.5	NA	INAA	
U	.5 ppm	.5	Unknown	NA		Tb	1 ppm	.5	NA	INAA	
W	10 ppm	.5	Unknown	PMS	(16801-17073)	Yb	5 ppm	.5	NA	INAA	
						Lu	.5 ppm	.5	NA	INAA	
						Ir	100 ppb	.5	NA	INAA	
						Hf	2 ppm	.5	NA	INAA	
						Ta	1 ppm	.5	NA	INAA	
						W	2 ppm	.5	NA	INAA	
						Pb	2 ppm	.5	HCl-HNO ₃ (1:3)	AA	
						Th	.5 ppm	.5	NA	INAA	
						U	.5 ppm	.5	NA	INAA	
						Zn2	1 ppm	.5	HCl-HNO ₃ (1:3)	AA	
						Ag2	.1 ppm	.5	HCl-HNO ₃ (1:3)	AA	

Note: Cs and Ce not assayed for all sample numbers (sample numbers in parentheses).
Mo assayed by two different methods (sample numbers in parentheses).

Appendix 9-2.

B. HMC - Magnetic Fraction

X-Ray Assay Laboratories, Ltd.

Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers
Mg	100 ppm	.5	Unknown	DCP	All Sample Numbers
Mg	.01 % MgO	.5	Unknown	XRF	Between 16906-18724
Ti	100 or 10 ppm	.5	Unknown	DCP	
TiO ₂	.01 %	.5	Unknown	XRF	
Cr	1 ppm	.5	Unknown	DCP	
Cr	10 ppm	.5	Unknown	XRF	Summary: All Rotasonic Orr & Littlefork; All Mud Rotary Orr Area
Ni	1 ppm	.5	Unknown	DCP	
Cu	1 or .5 ppm	.5	Unknown	DCP	
Zn	1 or .5 ppm	.5	Unknown	DCP	
Se	1 ppm	.5	Unknown	GFAA	
Mo	1 ppm	.5	Unknown	DCP	
Ag	.5 ppm	.5	Unknown	DCP	
Pb	1 ppm	.5	Unknown	DCP	

Note: One batch of 21 samples (#18611-18724) were assayed by XRF for Mg, Ti, and Cr in replicate to compare to DCP analysis.

Bondar-Clegg & Co., Ltd.

Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers
Mg	.001 %	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	All Sample Numbers
Ti	.01 %	.5	NA	XRF	Between 18760-18882
Cr	2 ppm	.5	NA	XRF	
Ni	1 ppm	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	
Cu	1 ppm	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	
Zn	1 ppm	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	
Se	1 ppm	.5	NA	XRF	Summary: Littlefork, Air Rotary
Mo	1 ppm	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	
Ag	.5 ppm	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	
Pb	5 ppm	.5	HF-HClO ₄ -HNC ₃ -HCl	DCP	

C. -63 um Fraction

X-Ray Assay Laboratories, Ltd.

Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers
Au	1 ppb	20	Fire Assay	FA/NA	Sample Numbers Between 13830-17074
V	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Cr	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Mn	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Fe	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Co	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Ni	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Cu	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Zn	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
As	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Se	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Se	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	GFAA	
Mo	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Ag	.5 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Ag	.5 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Cd	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	
Sn	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	Summary: All Rotasonic Samples, Orr & Littlefork
Sb	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Te	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
W	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Pb	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Bi	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
U	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	ICPMS	
Sn	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	EMS	(14470R-14475R)
Sb	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	(14470R-14475R)
Mo	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	(14470R-14475R)
Se	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	(14470R-14475R)
Bi	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	(14470R-14475R)
Pb	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	(14470R-14475R)
Te	1 ppm	.5	HF-HClO ₄ -HNO ₃ -HCl	DCP	(14470R-14475R)

Note: Ag, Sn, Sb, Mo, Bi, Pb, and Te assayed by two methods. Se assayed by three methods.

Appendix 9-2.

C. -63 um Fraction

Bondar-Clegg & Co., Ltd.

Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers
Au	1 ppb	20	Fire Assay	INAA	Samples No's. Between 18760-18882 Summary: Littlefork, Air Rotary
V	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Cr	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Mn	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Fe	.05 %	.5	Mult Acid Tot Dig	ICP or DCP	
Co	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Ni	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Cu	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Zn	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
As	5 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Se	5 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Mo	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Ag	.5 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Cd	1 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Sn	10 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Sb	5 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Te	10 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
W	10 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Pb	5 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
Bi	2 ppm	.5	Mult Acid Tot Dig	ICP or DCP	
U	10 ppm	.5	Mult Acid Tot Dig	ICP or DCP	

D. Bedrock

X-Ray Assay Laboratories, Ltd.

Element Symbol	Lower Detection Limit	Subsample Weight Assayed(g)	Extraction	Assay Method	Applicable Sample Numbers
Au	2-5 ppb	30	Unknown	NA	(13852-13872)
Sb	.1-.2 ppm	.5	Unknown	NA	
As	.5-1 ppm	.5	Unknown	NA	
BaR	1 ppm	.5	Unknown	DCP	
Ba	50-100 ppm	.5	Unknown	NA	
Cd	1 ppm	.5	Unknown	DCP	
Ce	3-5 ppm	.5	Unknown	NA	
Cr	20-50 ppm	.5	Unknown	NA	
Co	.2-5 ppm	.5	Unknown	NA	
Hf	1-2 ppm	.5	Unknown	NA	
Ir	50-100 ppm	.5	Unknown	NA	
Fe	100 ppm	.5	Unknown	DCP	
Fe	.2-.5 %	.5	Unknown	NA	
La	2-5 ppm	.5	Unknown	NA	
MoR	1 ppm	.5	Unknown	ICPMS	
Mo	1 ppm	.5	Unknown	NA	
NiR	1 ppm	.5	Unknown	DCP	
Ni	20 ppm	.5	Unknown	NA	
Rb	8 ppm	.5	Unknown	ICPMS	
Se	5-10 ppm	.5	Unknown	NA	
AgR	.5 ppm	.5	Unknown	DCP	
Ag	2 ppm	.5	Unknown	NA	
Na	100 ppm	.5	Unknown	DCP	
Na	.02-.05 %	.5	Unknown	NA	
Ta	8 ppm	.5	Unknown	ICPMS	
TaR	.5-1 ppm	.5	Unknown	NA	
Te	10 ppm	.5	Unknown	ICPMS	
Th	.2-.5 ppm	.5	Unknown	NA	
Sn	10 ppm	.5	Unknown	ICPMS	
W	1-2 ppm	.5	Unknown	NA	
U	.2-.5 ppm	.5	Unknown	NA	
ZnR	1 ppm	.5	Unknown	DCP	
Zn	100 ppm	.5	Unknown	NA	
Cu	1 ppm	.5	Unknown	DCP	
Pb	5 ppm	.5	Unknown	ICPMS	
Mn	2 ppm	.5	Unknown	DCP	
Li	1 ppm	.5	Unknown	AA	
Be	1 ppm	.5	Unknown	DCP	
CO ₂	.01 %	.5	Unknown	WET	
Mg ²	100 ppm	.5	Unknown	DCP	
Al	.01 %	.5	Unknown	DCP	
SiO ₂	.01 %	.5	Unknown	XRF	
S	.01 %	.5	Unknown	XRF	
Cl	50 ppm	.5	Unknown	XRF	
K	100 ppm	.5	Unknown	DCP	
Ca	100 ppm	.5	Unknown	DCP	
FeO	.1 %	.5	Unknown	WET	
Sr	1 ppm	.5	Unknown	DCP	
Nb	1 ppm	.5	Unknown	ICPMS	
Bi	2 ppm	.5	Unknown	ICPMS	
LOI	.01 %	.5	Unknown	XRF	

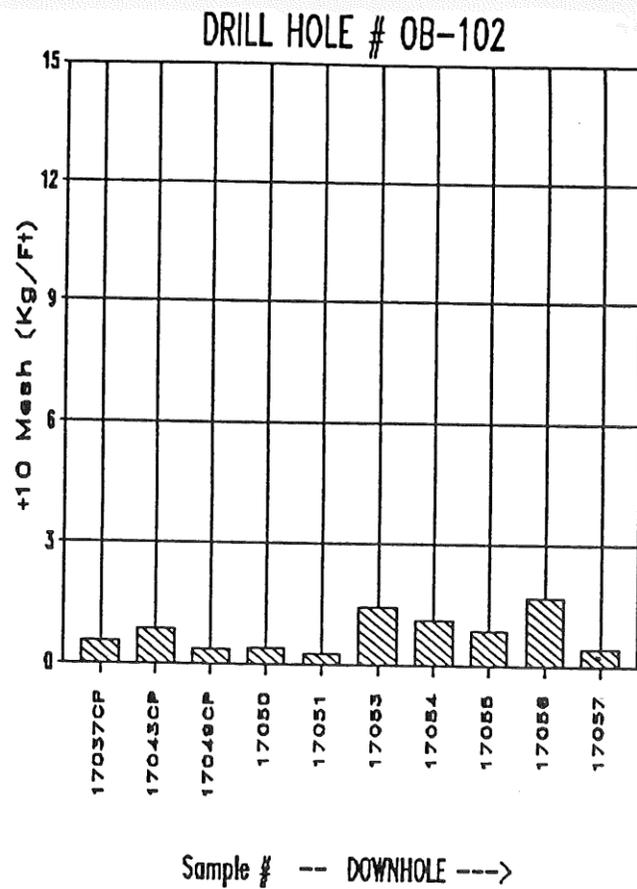
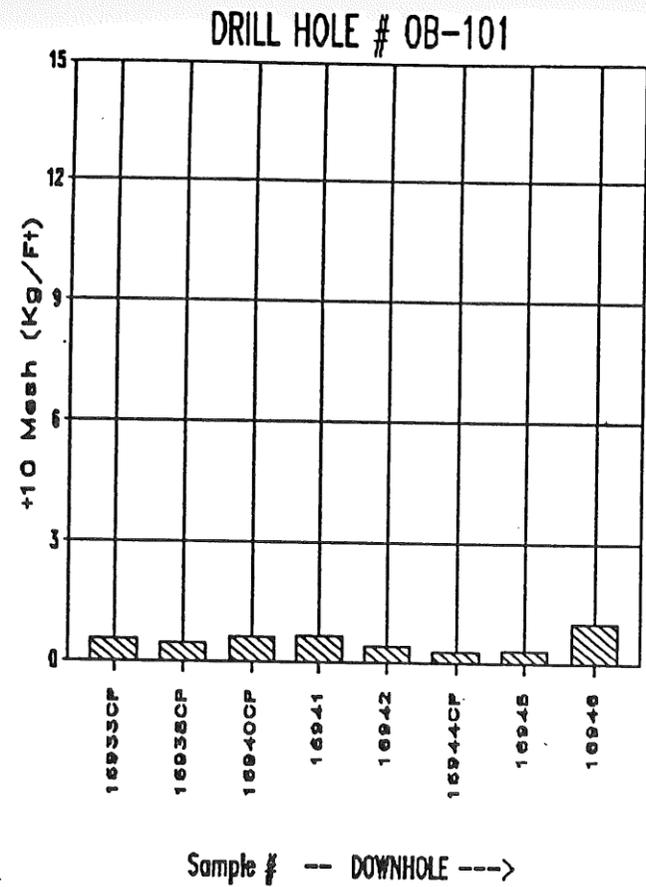
Note: Some elements were only assayed in one batch (#13852-13872)

Appendix 9-2.

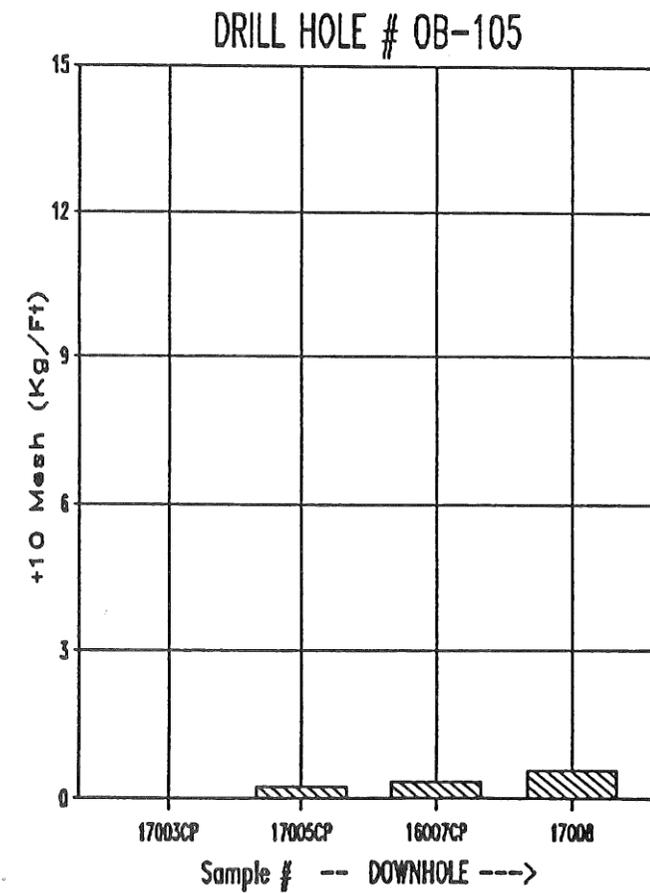
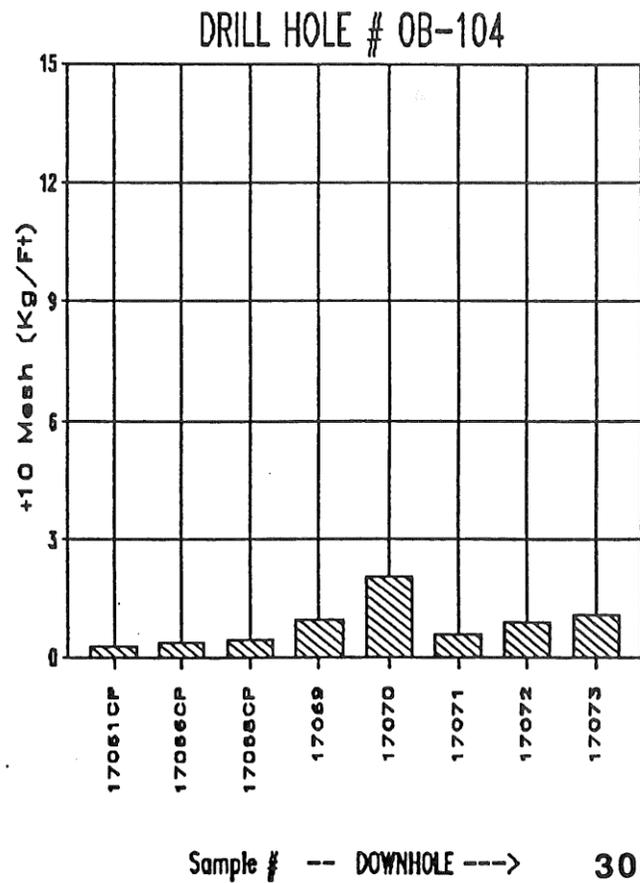
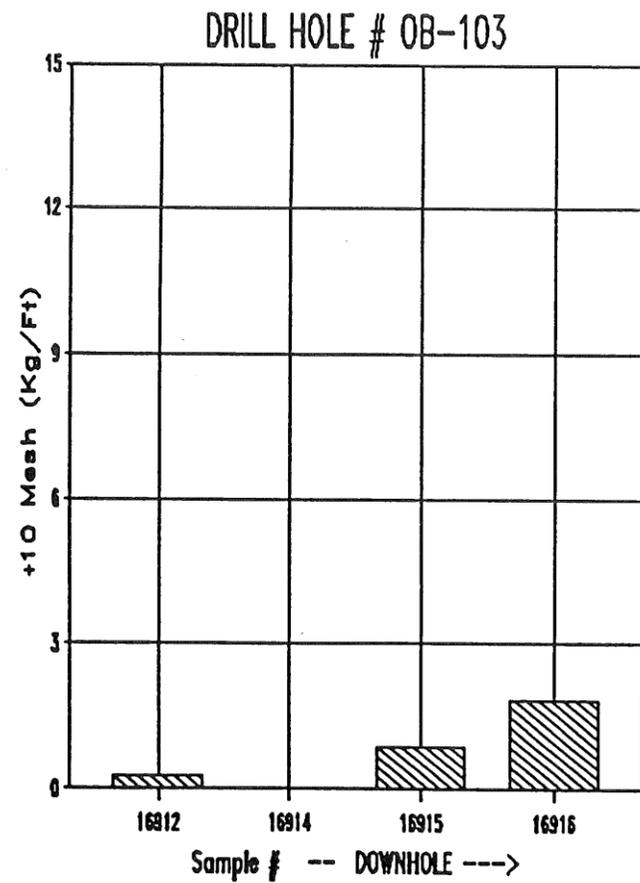
D. Bedrock

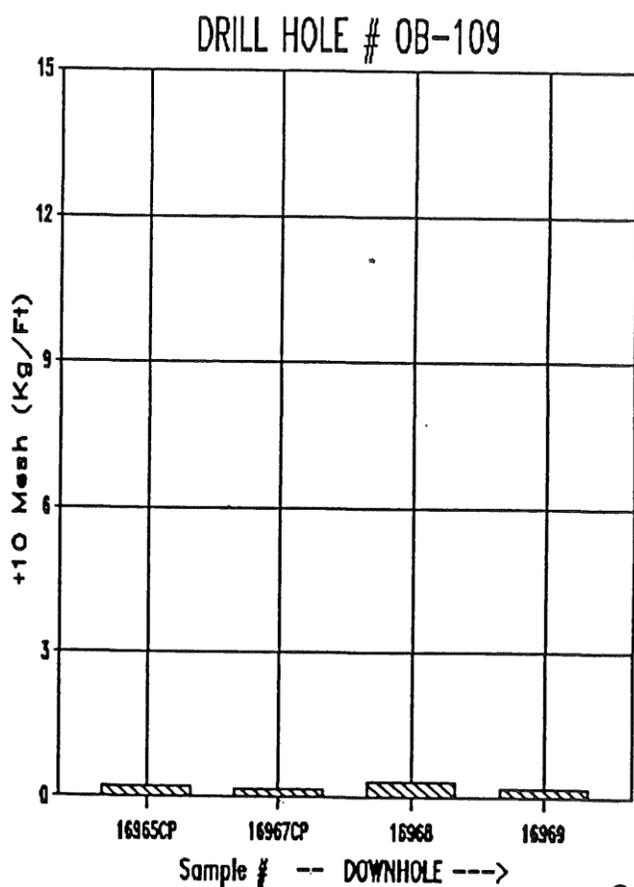
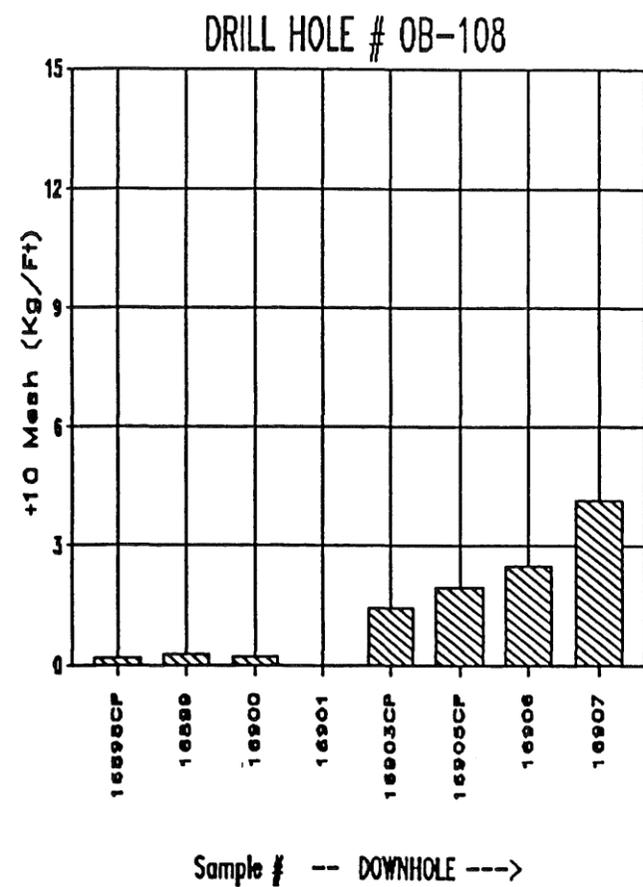
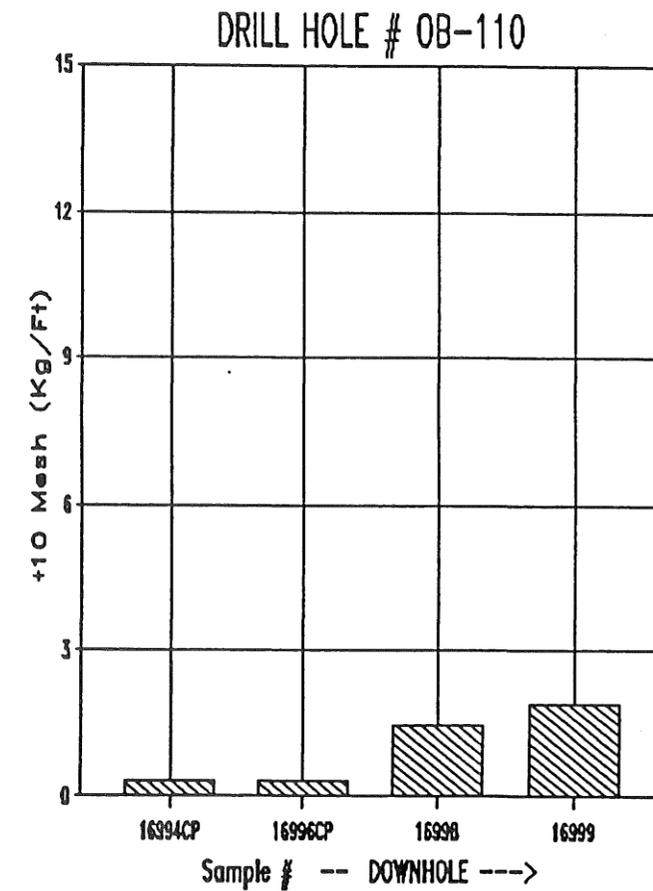
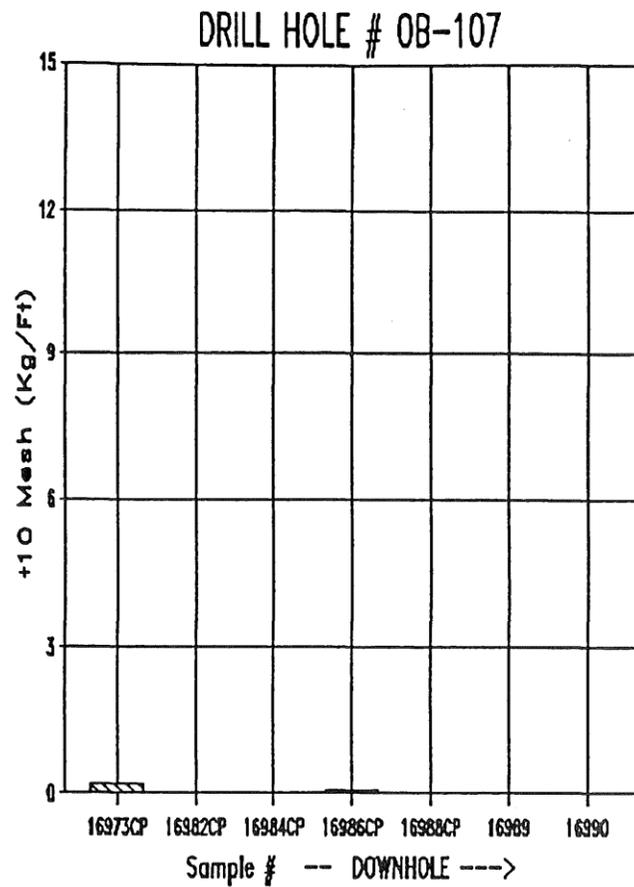
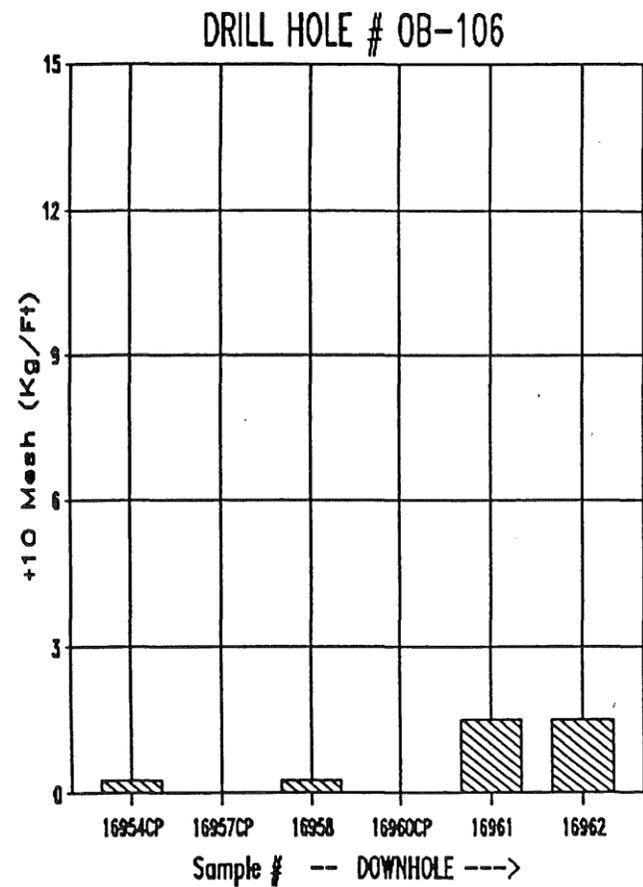
Bondar-Clegg & Company, Ltd.

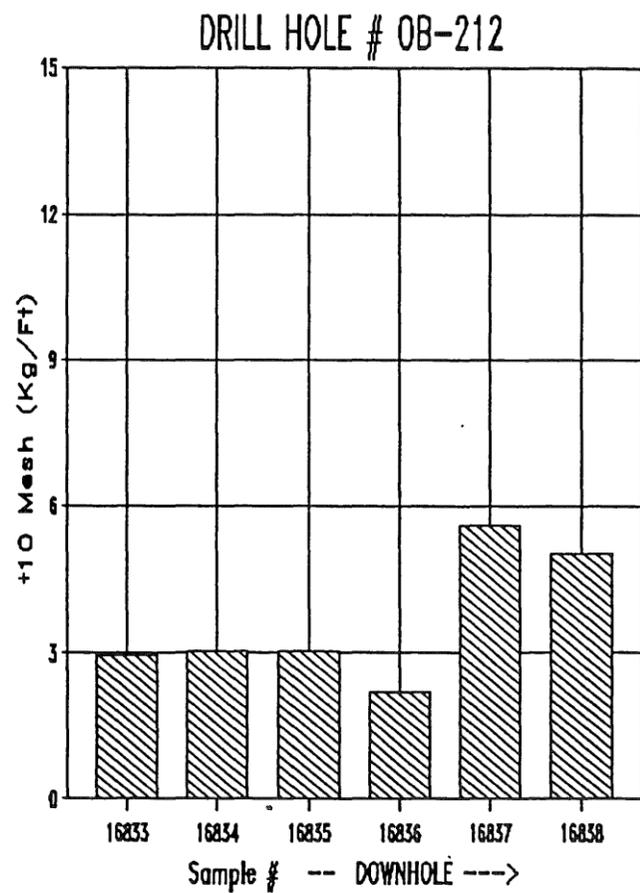
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Au	5 ppb	30	NA	INAA	
Sb	.2 ppm	30	NA	INAA	19700-19710,
As	1 ppm	30	NA	INAA	13867
Ba	100 ppm	30	NA	INAA	
Br	1 ppm	30	NA	INAA	
Cd	10 ppm	30	NA	INAA	
Ce	10 ppm	30	NA	INAA	Summary:
Cs	1 ppm	30	NA	INAA	Bedrock
Cr	50 ppm	30	NA	INAA	Rotasonic
Co	10 ppm	30	NA	INAA	
Eu	2 ppm	30	NA	INAA	
Hf	2 ppm	30	NA	INAA	
Ir	100 ppb	30	NA	INAA	
Fe	.5 %	30	NA	INAA	
La	5 ppm	30	NA	INAA	
Lu	.5 ppm	30	NA	INAA	
Mo	2 ppm	30	NA	INAA	
Ni	50 ppm	30	NA	INAA	
Rb	10 ppm	30	NA	INAA	
Sm	.1 ppm	30	NA	INAA	
Sc	.5 ppm	30	NA	INAA	
Se	10 ppm	30	NA	INAA	
Ag	5 ppm	.5	NA	INAA	
AgR	.5 ppm	30	Mult Acid Tot Dig	DCP	
Na	.05 %	30	NA	INAA	
Ta	1 ppm	30	NA	INAA	
Te	20 ppm	30	NA	INAA	
Tb	1 ppm	30	NA	INAA	
Th	.5 ppm	30	NA	INAA	
Sn	200 ppm	30	NA	INAA	
SnR	10 ppm	.5	Mult Acid Tot Dig	DCP	
W	2 ppm	30	NA	INAA	
U	.5 ppm	30	NA	INAA	
Yb	5 ppm	30	NA	INAA	
Zn	200 ppm	30	NA	INAA	
ZnR	1 ppm	.5	Mult Acid Tot Dig	DCP	
Zr	500 ppm	30	NA	INAA	
Cu	1 ppm	.5	Mult Acid Tot Dig	DCP	
Pb	5 ppm	.5	Mult Acid Tot Dig	DCP	
Mn	1 ppm	.5	Mult Acid Tot Dig	DCP	



Appendix 9-3. Graphs of +10 Mesh Content of Samples for Rotasonic and Mud Rotary Drilling.

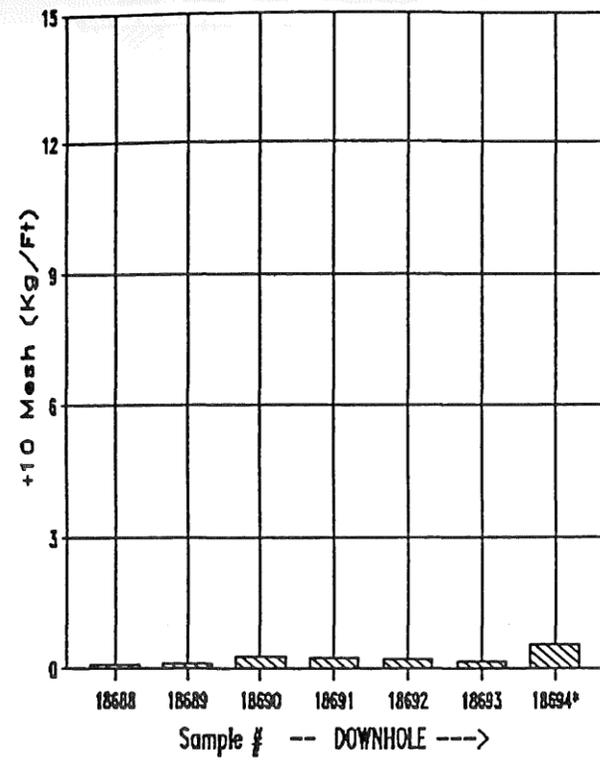






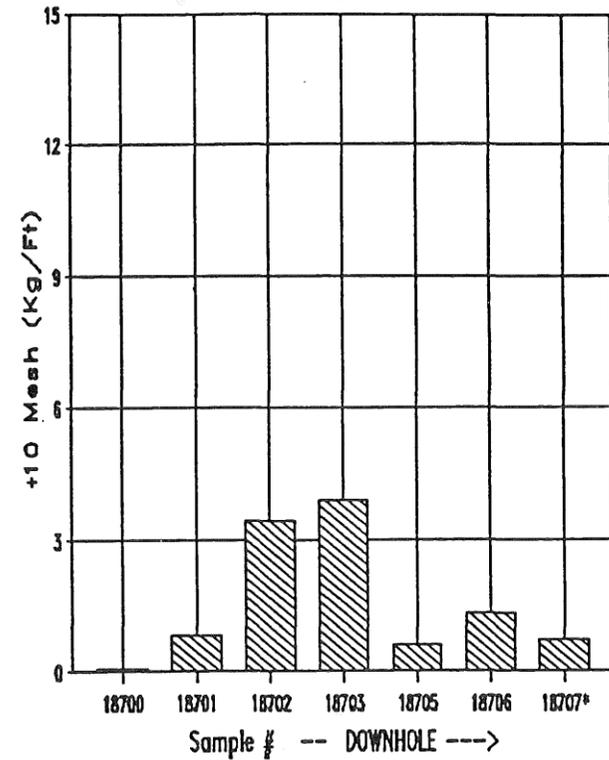
DRILL HOLE # OB-20100

* = Bedrock



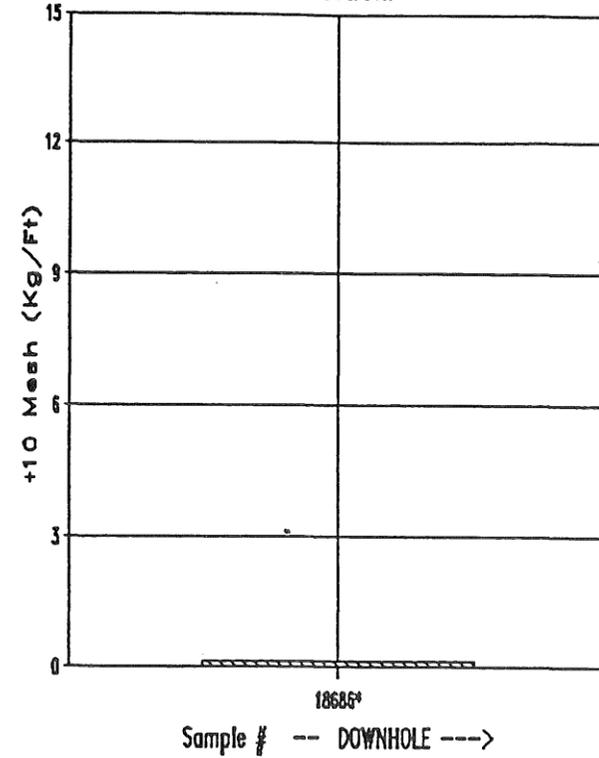
DRILL HOLE # OB-20101

* = Bedrock



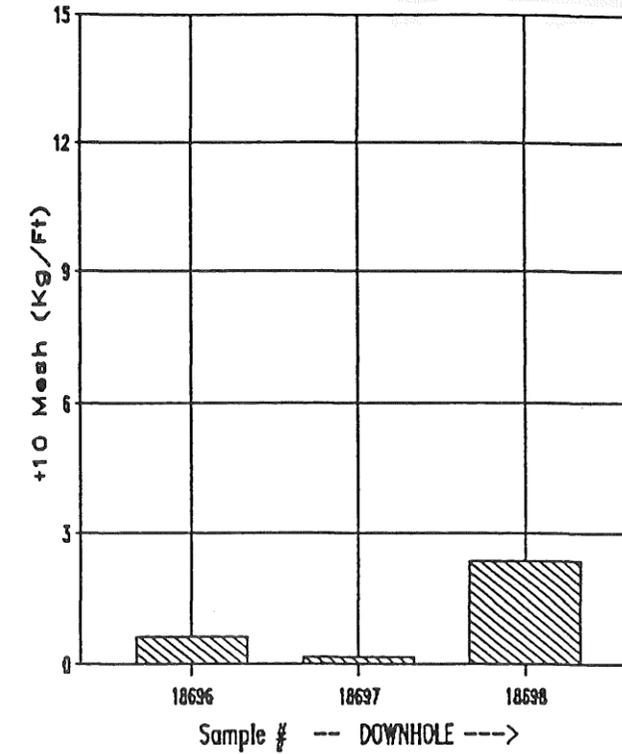
DRILL HOLE # OB-20103

* = Bedrock



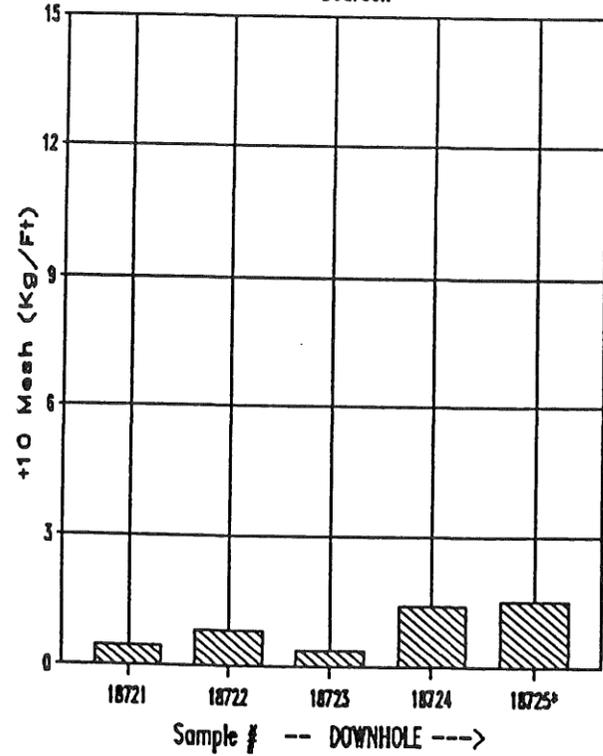
DRILL HOLE # OB-20104

* = Bedrock



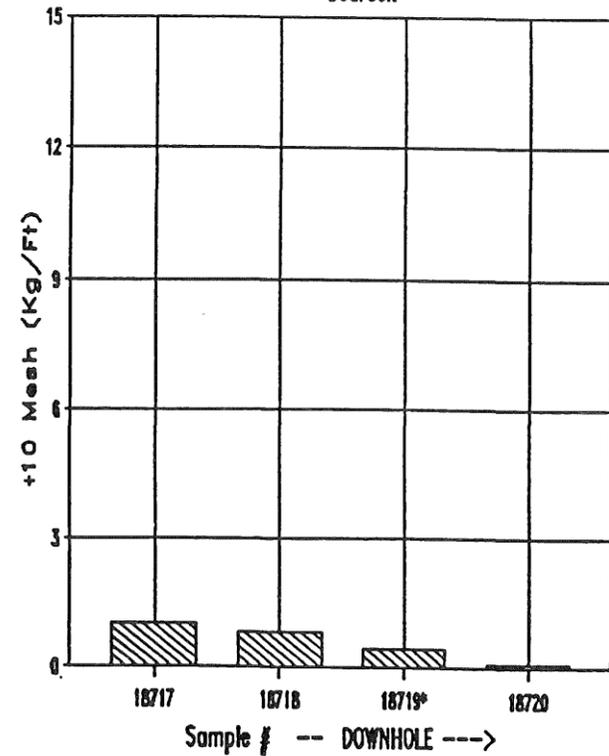
DRILL HOLE # OB-20200

* = Bedrock



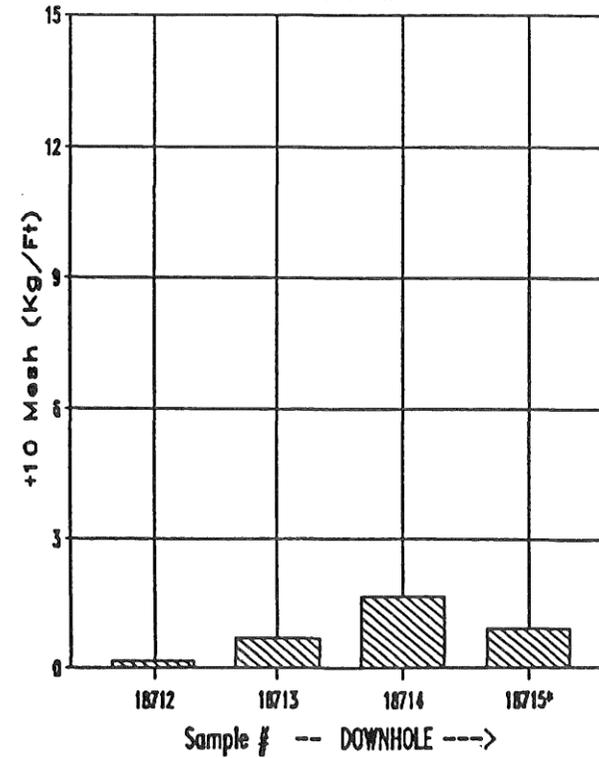
DRILL HOLE # OB-20201

* = Bedrock



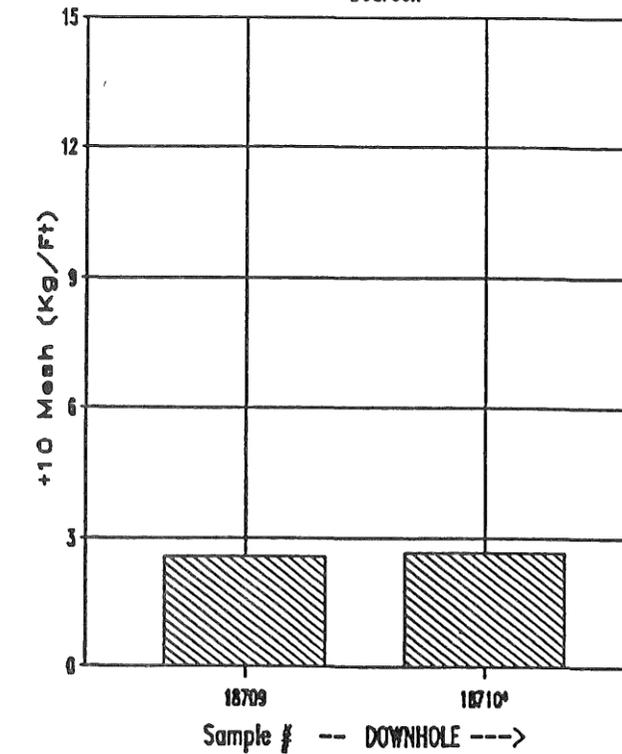
DRILL HOLE # OB-20204

* = Bedrock



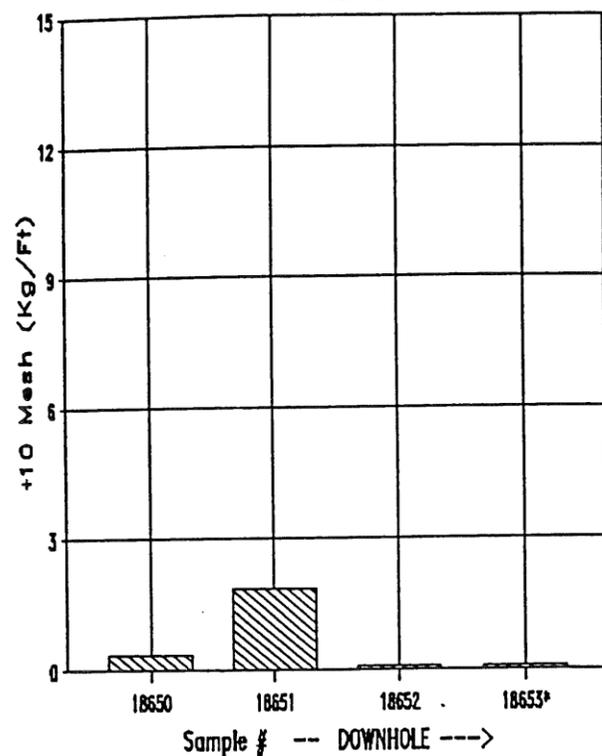
DRILL HOLE # OB-20303

* = Bedrock



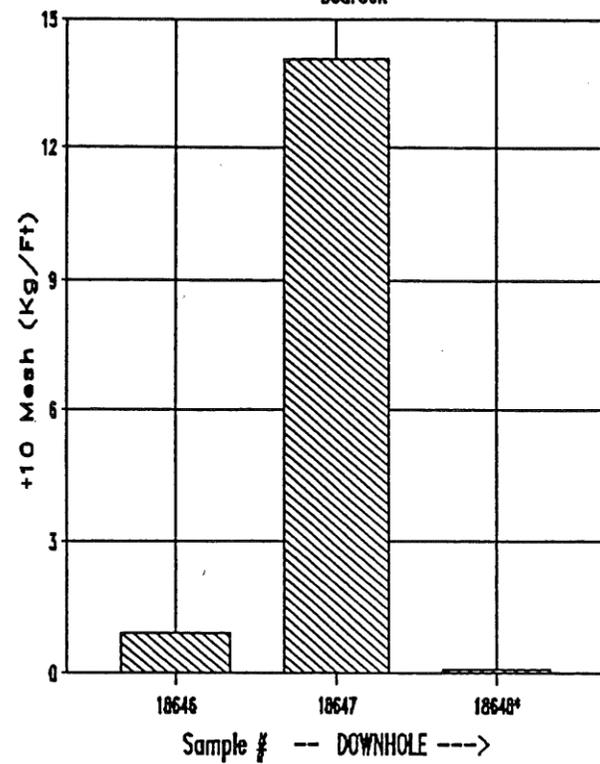
DRILL HOLE # OB-20401

* = Bedrock



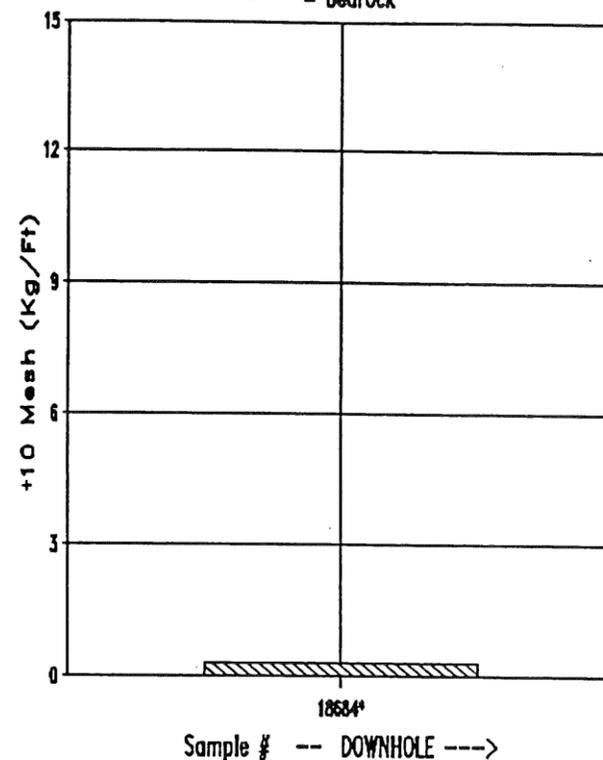
DRILL HOLE # OB-20402

* = Bedrock



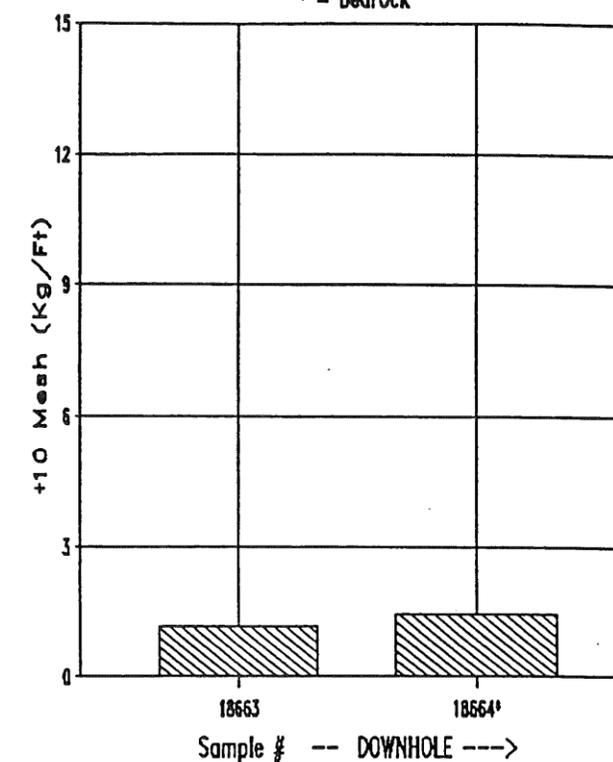
DRILL HOLE # OB-20404

* = Bedrock



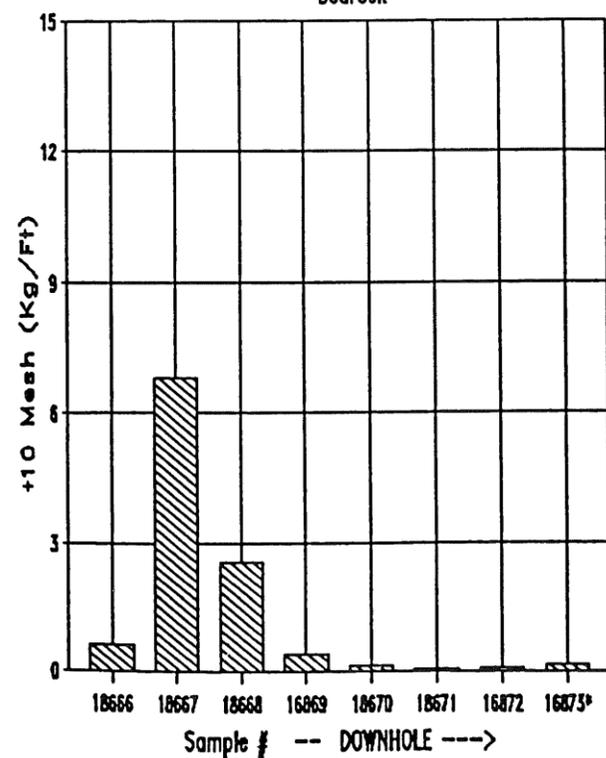
DRILL HOLE # OB-20405

* = Bedrock



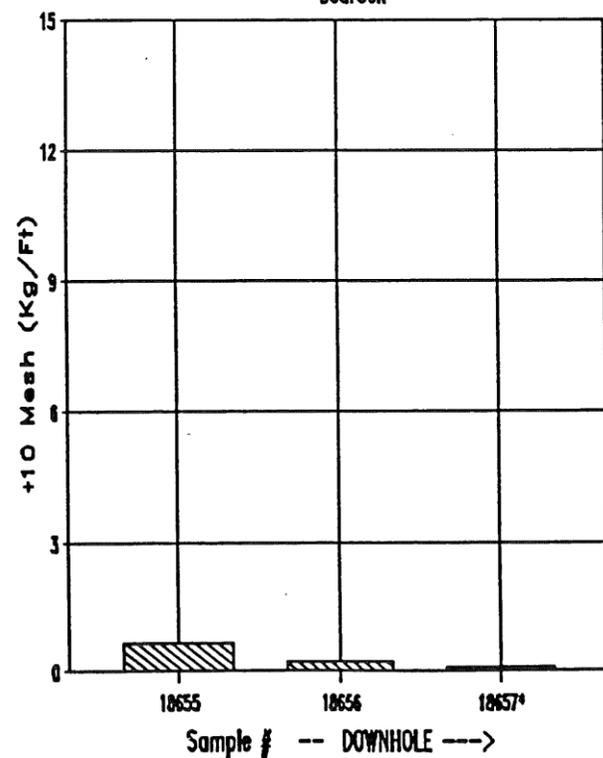
DRILL HOLE # OB-20502

* = Bedrock



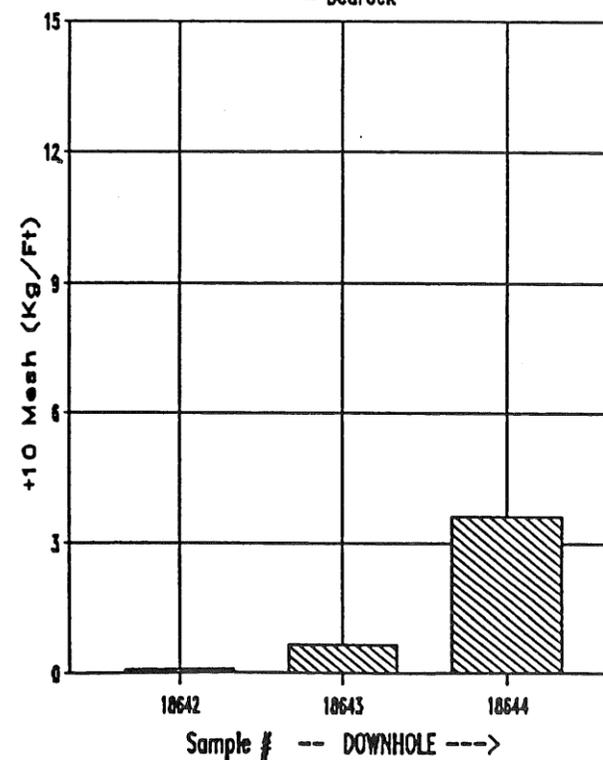
DRILL HOLE # OB-20601

* = Bedrock



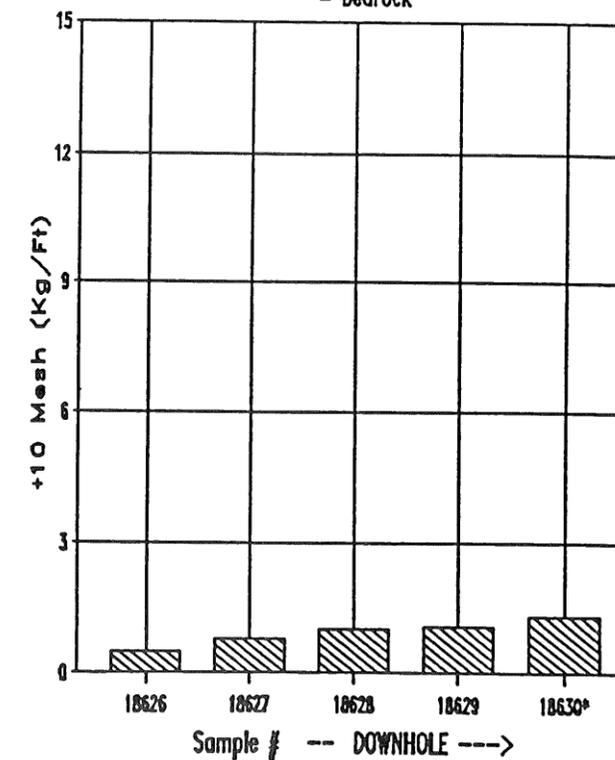
DRILL HOLE # OB-20603

* = Bedrock



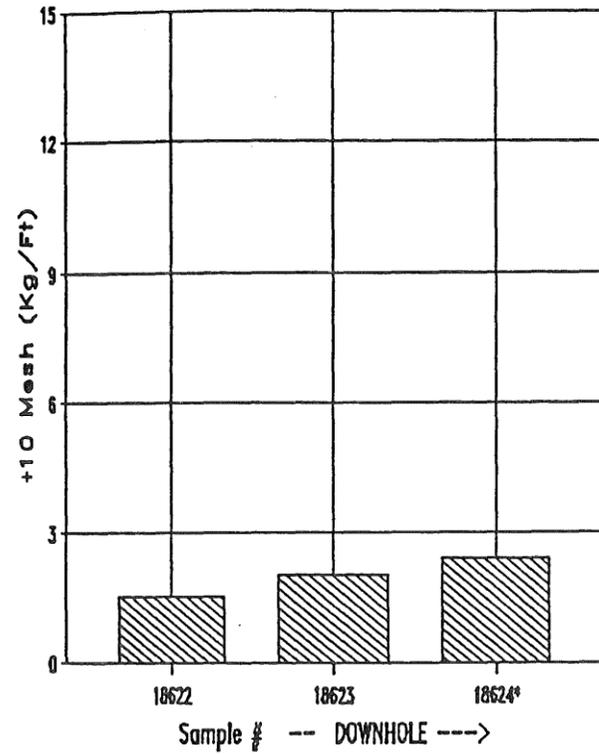
DRILL HOLE # OB-20702

* = Bedrock



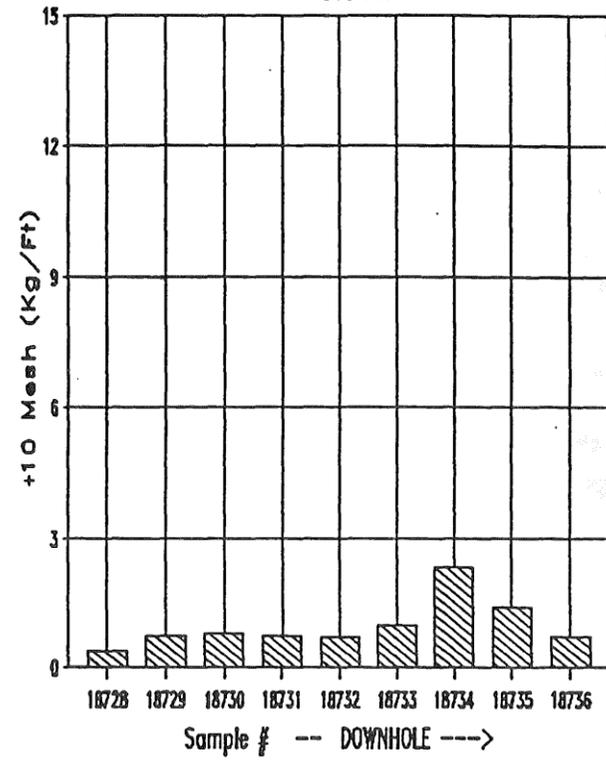
DRILL HOLE # OB-20704

* = Bedrock

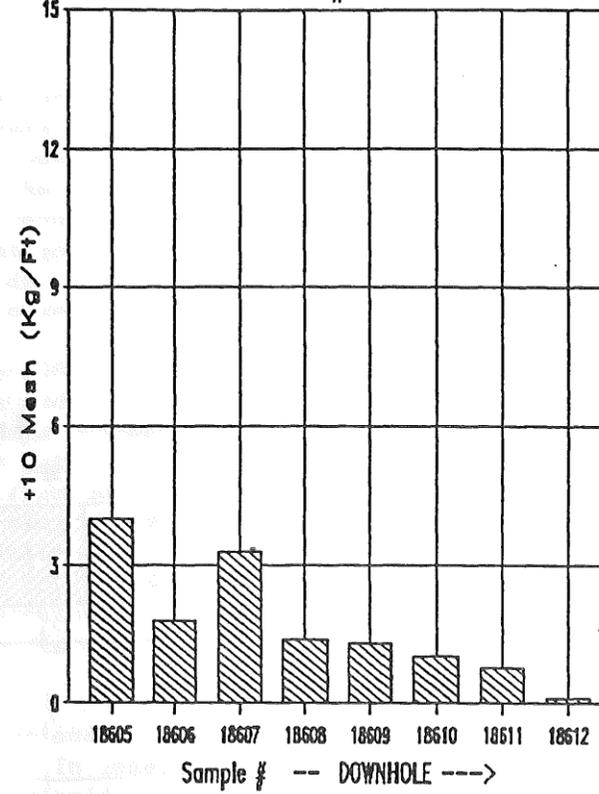


DRILL HOLE # OB-20705

* = Bedrock

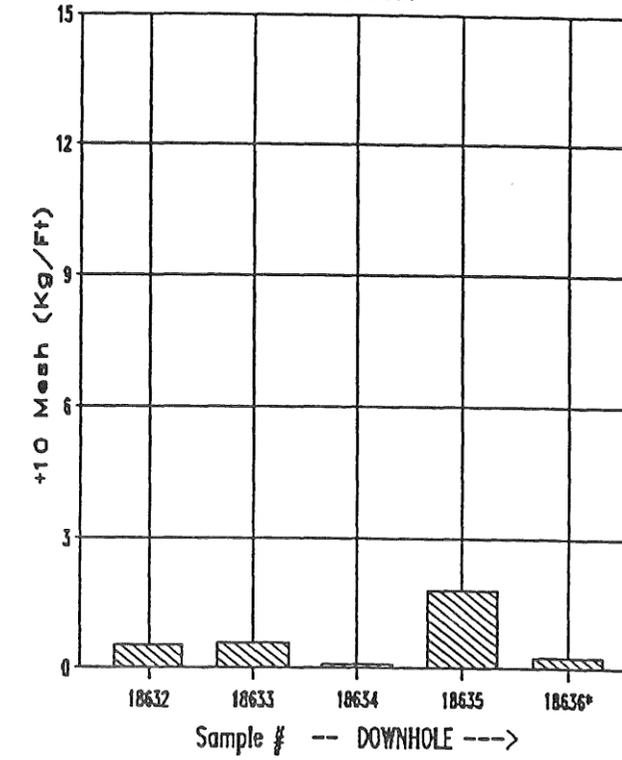


DRILL HOLE # OB-20801

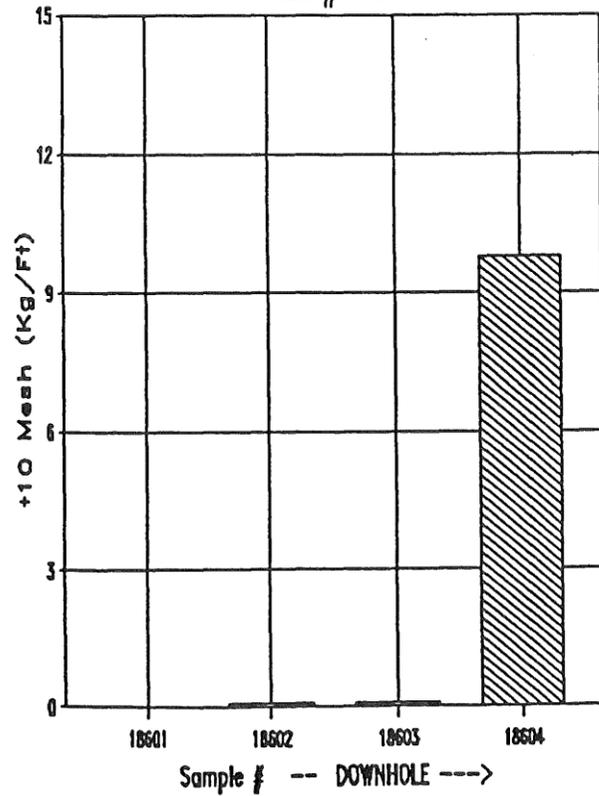


DRILL HOLE # OB-20803

* = Bedrock

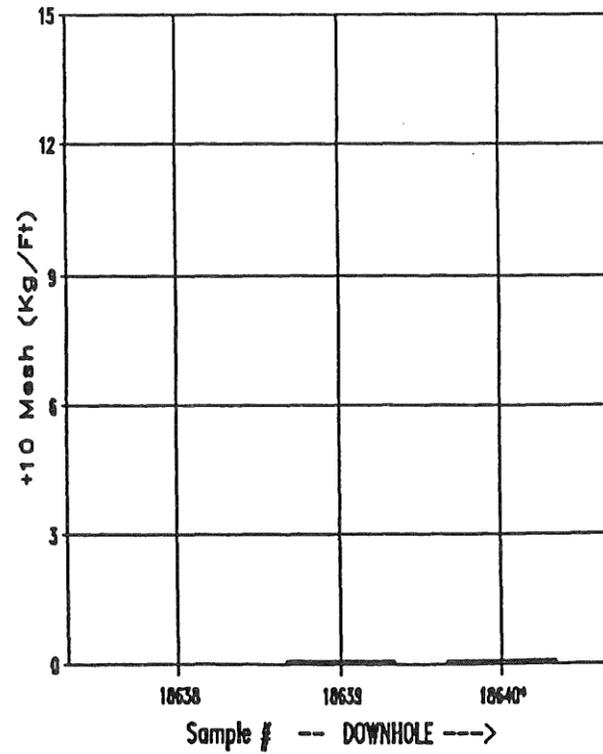


DRILL HOLE # OB-20804



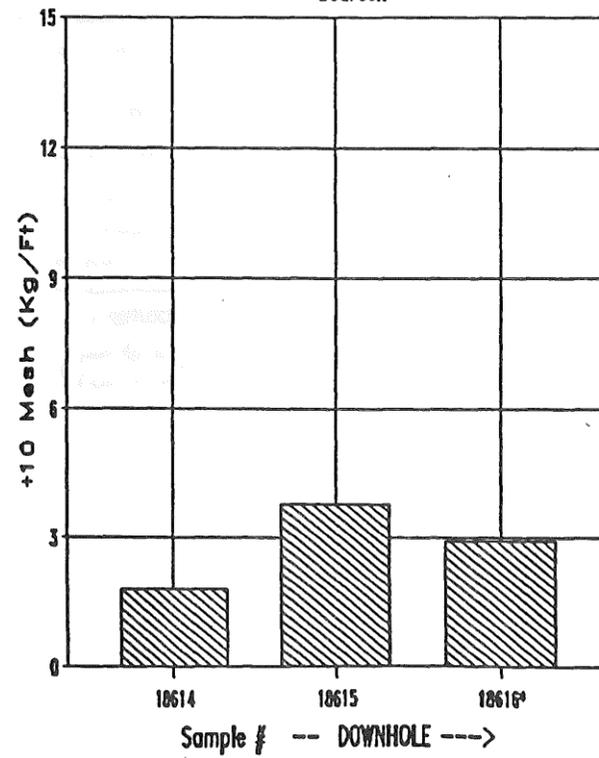
DRILL HOLE # OB-20901

* = Bedrock



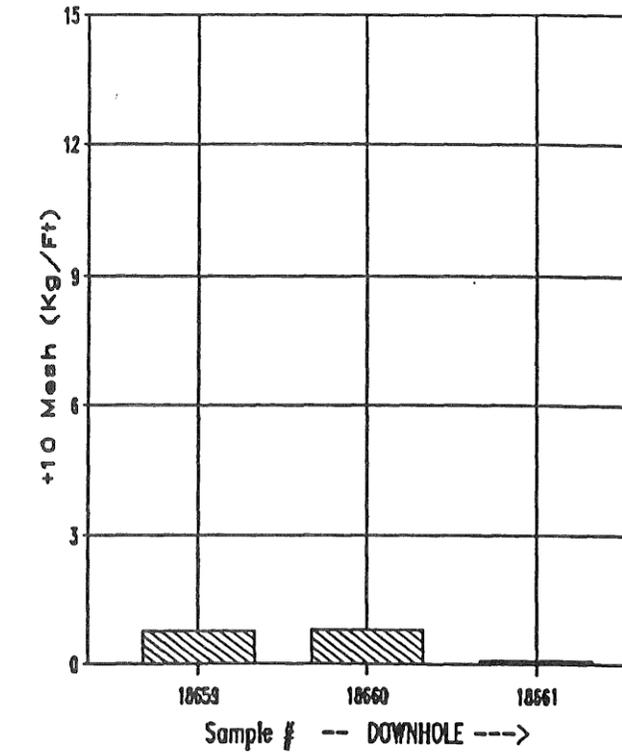
DRILL HOLE # OB-20902

* = Bedrock



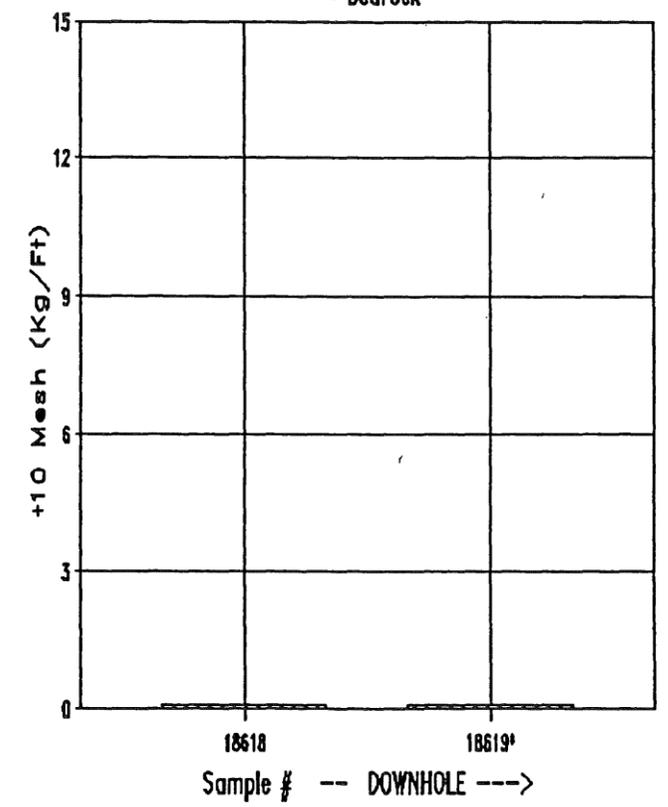
DRILL HOLE # OB-20904

* = Bedrock



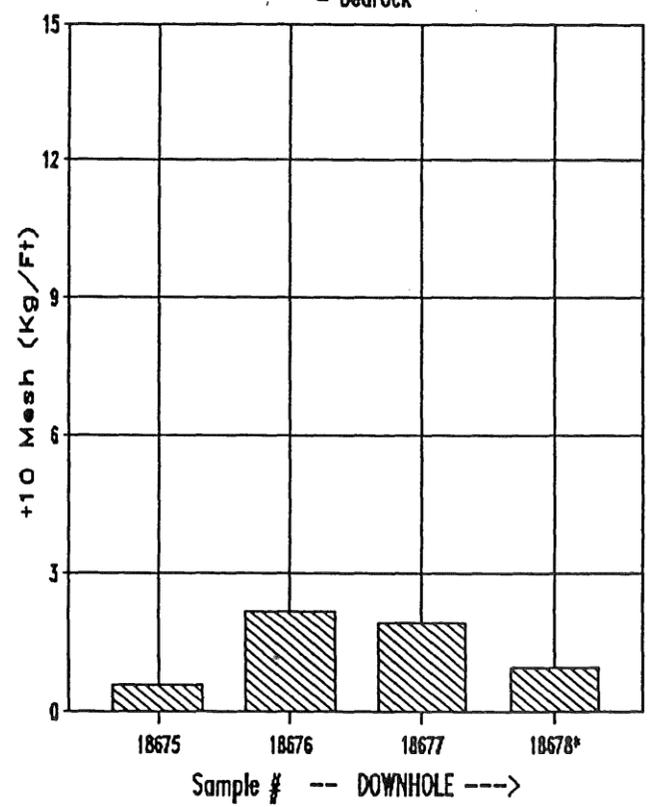
DRILL HOLE # OB-20906

* = Bedrock



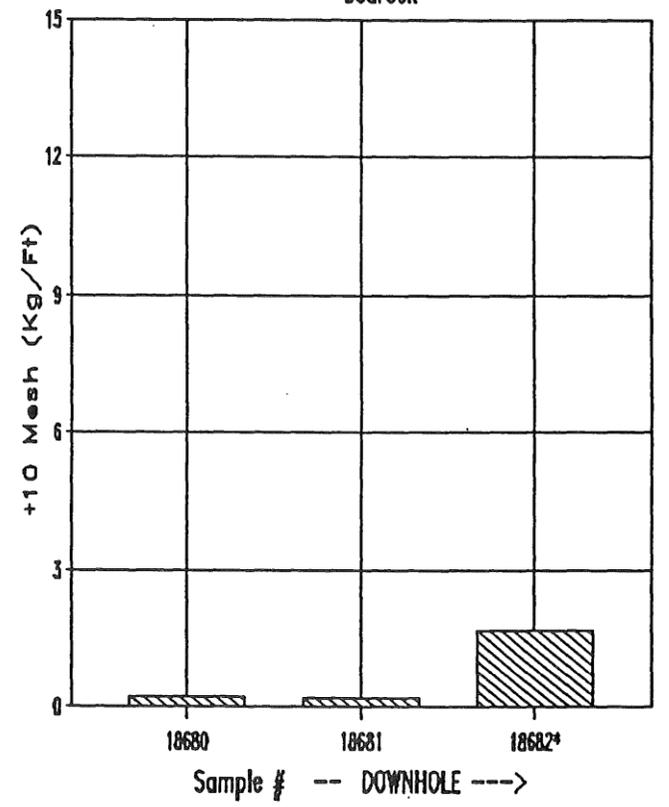
DRILL HOLE # OB-21002

* = Bedrock



DRILL HOLE # OB-21005

* = Bedrock



Appendix 9-4. Gold Losses in Mud Rotary Samples

We have assembled four types of information to try to interpret the gold grain losses from the mud rotary sampling system. These include: (1) evaluation of the high gold grain counts from hole 20801 to relate losses into the sluice box there; (2) evaluation of gold grain counts in the samples and sluice box of all the other drill holes; (3) collection of the entire mudpit, as well as the regular samples and sluice box, at hole 20200 roughly 50 feet from (previous) gold-bearing Rotasonic hole 202; and (4) magnetite grain size and mass distribution from the 20200 mudpit to estimate the equivalent gold losses.

In the mud rotary drill hole 20801, 38 gold particles were counted from 1/5 to 7/10 split samples and replicate samples. Another 43 gold particles are estimated to remain (uncounted) in the complementary splits of hole 20801 in storage. The total, estimated plus actual, number of gold grains in the regular samples from hole 20801 is 81. An additional 25 gold particles were counted in the sluice box. Therefore, it is estimated that for every 3 or 4 gold grains collected in the regular sample, one additional gold grain was lost to the sluice box. Furthermore, the mass of each gold particle has been calculated and graphed in Figure 4-8. Figure 4-8C shows that the gold grain distribution of the sluice samples is skewed to the smaller sizes.

The gold grains in the samples and sluice box in the other mud rotary drill holes were also compared. In general, the holes around hole 20801 show a similar sample/sluice box gold particle ratio. Hole 20804, however, has 18 gold particles in the samples and only 1 in the sluice box. Other drill holes further away from 20801 have a different ratio (2:1, 1:1, and worst case 0:3). Such varying factors as mud mix, drilling rate, silt content of the sample, and gold grain sizes are interpreted to have caused the above variation in recovery ratios.

The previous discussion quantifies gold recovered in the sluice box, but some gold grains may have overflowed the sluice box into the mudpit. To test this, for hole 20200, the total mudpit sample, 101 pounds, was collected. No gold grains were found in the 44 pounds of mudpit sample processed with the regular HMC flowsheet. A 16½ pound sample of the mudpit was sieved (Table 40-8) and the magnetite was separated from it. The magnetite size vs. frequency distribution is graphed in Figure 4-8I. Most of the liberated magnetite lost to the mudpit is in the mass range from 1-10 ug. The estimated size gold flakes with equivalent settling velocity to these magnetite particles, as determined from Tourtelot, 1968, ranges from .47 ug to 5.52 ug or 55 microns x 11 microns (flake diameter x thickness) up to 125 microns x 25 microns. That size range of gold grains is, unfortunately, the most common found in our samples (see Figure 4-8G). In conclusion, equivalency calculations from the magnetite data from the mudpit sample indicates that some common-size gold particles could be lost to the mudpit. However, none were found in the sample tested.

Appendix 9-5. Quality and Lithology of "Bedrock"
Samples from Rotary Drill Holes

By
S. A. Averill

1. INTRODUCTION

In December of 1986 and January of 1987, the Minnesota Department of Natural Resources conducted a regional program of rotary drilling in the northern part of the state for the purpose of heavy mineral geochemical sampling. Twenty-four chip samples that were deemed to represent bedrock intersections were submitted to Overburden Drilling Management Limited of Nepean, Ontario, Canada for logging (Appendix A). This report summarizes ODM's findings, particularly in the area of sample quality.

2. EQUIPMENT AND PROCEDURES

The samples were logged under a Nikon Model SMZ-10 zoom-type binocular microscope at 10 to 40X magnification using Cool White fluorescent illumination. A two-stage logging procedure was used:

1. Approximately 200 dry chips were scanned to determine the general character of the sample (degree of homogeneity, presence of veins, etc.)
2. Approximately 50 chips were immersed in water and examined in detail; colour, structure, texture, grain size and mineralogy were determined and the samples were classified using genetic rather than metamorphic names.

The lithologies present, and the number of samples of each are listed below:

<u>Lithology</u>	<u>Number of Samples</u>
1. Graywacke	8
2. Basalt	3
3. Andesite	1
4. Quartz diorite	1
5. Granodiorite	2

These lithologies comprise only 15 of the 24 samples; the remaining nine samples appear to consist entirely of whole pebbles and drill cuttings of coarser overburden clasts (cobbles or small boulders). The principal clast lithologies present are graywacke and granodiorite, similar to bedrock units #1 and #5 respectively. Within each lithology, several varieties are present and no one variety represents more than 10 percent of the sample; thus the bedrock portion of the sample, if any, is very minor and unrecognizable. In four other samples (18636, 18640, 18652 and 18673), the proportion of lithologically unique cuttings is about 50 percent; these cuttings probably represent bedrock but could be from large boulders. In the remaining eleven samples, the proportion of unique cuttings ranges from 70 to 100 percent; all of these samples are assumed to represent bedrock.

4. LITHOLOGIC DESCRIPTIONS

In general, all of the rock units except granodiorite appear to have undergone amphibolite facies metamorphism; less metamorphosed samples that occur sporadically are herein assumed to be from pressure shadow areas but could be from a different volcano-sedimentary belt (ODM has not been advised of the locations of the drill holes). Most of the graywacke samples contain 0.1 to 1.0 percent pyrite; otherwise sulphide minerals are uncommon. A brief summary of each rock unit is provided below.

4.1 Graywacke

Most of the graywacke samples are gray, sugary schists containing about 25 percent biotite. The sugar has a grain size of 0.05 to 0.1 mm (i.e. silt-like) and consists of plagioclase and quartz. The plagioclase is generally colourless; where it is cloudy enough to be differentiated from quartz, the plagioclase:quartz ratio is about 4:1. Garnet metacrysts are present in some samples. Sample 18682 is less metamorphosed than the other graywacke samples and shows the original texture (0.2 to 0.4 mm grains) and composition (70 percent lithic grains, mainly of intermediate volcanics; 10 percent quartz grains; 20 percent matrix chlorite) of the sandstone. Some other samples that consist mainly of sugar still contain relict quartz sand but not the volcanic lithics; thus the sugar appears to be formed by the breakdown of the lithics.

4.2 Basalt

Only three samples are of basalt. They are all black to green amphibolites composed of 50 to 70 percent hornblende, (Sample 18710) or actinolite + hornblende (Samples 18719 and 18725), and 30 to 50 percent plagioclase. Sample 18710 is a garnet-bearing amphibolitic gneiss with 10 percent pyroxene-bearing bands.

4.3 Andesite

The only andesite sample, No. 18686, is a greenschist facies variety. It is medium green and slightly porphyritic (0.5 percent plagioclase phenocrysts to 1.5 mm). The groundmass consists of 0.1 - 0.15 mm interlocking grains of plagioclase (75 percent), chlorite (20-25 percent), and quartz (2-3 percent).

4.4

Quartz Diorite

The only quartz diorite sample is No. 18652. The quartz diorite resembles the amphibolitized basalt but is coarser grained (up to 1.0 mm) and has a much less mafic composition (60 percent plagioclase, 20 percent quartz, 10-20 percent hornblende, 10 percent biotite). It contains 0.5 percent disseminated pyrite.

4.5

Granodiorite

Granodiorite occurs in Samples 18657 and 18694. It is the only unfoliated rock unit present and is therefore assumed to have been emplaced after peak deformation. It is a pink rock having a grain size ranging between 0.5 and 5.0 mm. Feldspar constitutes 60-70 percent of the rock. It is mostly pink rather than white; hence the name "granodiorite" is used loosely, although it may be justified as much of the pink colouration appears to be due to hematite staining. The quartz content varies from 10 to 30 percent. Sample 18657 contains 3 percent chloritized biotite while Sample 18694 contains 10 percent chloritized hornblende and biotite.

CONCLUSIONS

The samples are of extremely variable quality. In those cases where a clean sample of bedrock chips was obtained, it is possible to glean much useful information from the chips and to classify the samples by their pre-metamorphic names. Unfortunately, many of the samples appear to consist entirely of overburden clasts rather than bedrock cuttings, and others are so severely contaminated by clasts that the presence of any bedrock cuttings is questionable. Obviously, it must have been very difficult in the field to determine the type of material that was being drilled and to decide what to sample and how to sample it. If bedrock could not be differentiated from overburden, how could one recognize stratigraphic contacts within the overburden section! Clearly future programs require either a different drilling system, or major improvements to the present one.



S.A. Averill
President

SAMPLE NUMBER	COLOUR	STRUCTURE	GRAIN SIZE (mm)	TEXTURE	MINERALOGY				NAME
					Silicates	Carbonates	Sulphides	Other	
18616 D.H. # 20902	Dark gray	Well-foliated to schistose	Relict sand: 0.2-0.5 Secondary sand: 0.05-0.1 Garnet: 0.05	Sugary with relict sand	25% biotite 75% Qtz-plag. 5% garnet 1% relict Qtz. sand grains 0.1% garnet matrix	Nil	0.2% disseminated pyrite	Nil	GRAYWACKÉ (20% overburden clast content.)
18619 D.H. # 20906	Dark gray	Schistose	Sugar 0.05	Sugary no relict sand	20-50% (var. 30%) biotite 70% Qtz-plag. sugar	Nil	1% disseminated pyrite	Nil	SILTSTONE (90% overburden clast content.)
18624 D.H. # 20704	Dark gray	Moderately to weakly-foliated	Sugar 0.05-0.1 Relict sand 0.2-1.0	Sugary with 20% relict sand	20% biotite 60% Qtz-plag. 20% relict sand includes 5-10% blue to white relict Qtz. plag. 5% garnet	Nil	0.5% disseminated pyrite	0.1% disseminated magnetite	GRAYWACKÉ (10% overburden content.)
18636 ↑↓ D.H. # 20803	Light gray	Well-foliated	Sugar 0.1 Relict sand to 0.5	Sugary with 5% relict sand grains	80% Qtz-plag. 5% garnet 5% relict sand grains (mostly plagioclase) 15% biotite to (mostly) chlorite	Nil	0.1% disseminated pyrite	Nil	GRAYWACKÉ BEDROCK OR BOULDER (70% overburden clast content.)
18630 D.H. # 20702	Sample granitoidly interbedded	in 70-100% overburden diorite and sugary graywacke, so can't discern		clast contamination where in roughly equal proportions of above lithologies represents bedrock	(cuttings of coarse pink to white, leucocratic -- ie several boulders)				OVER-BURDEN

Appendix 9-5

SAMPLE NUMBER	COLOUR	STRUCTURE	GRAIN SIZE (mm)	TEXTURE	MINERALOGY				NAME
					Silicates	Carbonates	Sulphides	Other	
18640 D.H.# 20901	Sample is minimum gray (biotitic) to green (chloritic) is drill cuttings - sand and 5-10% dissemin.	70% overburden clast contamination	70% overburden clast contamination	pink to white granitic graywacke (ie graywacke is all one variety);	-- mainly whole pebbles of white granitic beds (no vol.); balance containing 1% relict bedrock or large boulder.				GRAYWACKE BEDROCK OR BLDG. (70% overburden contamination)
18644 D.H.# 20603	50% whole pebbles and 40% graywacke, 5% mafic volcanics (amphibolite)		50% drill cuttings of coarser clasts; lithologies are					50-60% varied granite,	OVER-BURDEN
18648 D.H.# 20402	30% platy buff bentonite mud, varied graywacke, 30-40% varied granite, 10% amphibolite		70% pebbles and cobble cuttings -- lithologies are					60%	OVER-BURDEN
18652 D.H.# 20401	Medium gray	Well foliated	Variable 0.2-1.0 between chips	Interlocking equigranular at chip scale	60% plag., 20% qtz., 10-20 hornblende 10% biotite	2% dissemin. calcite	0.5% dissemin. pyrite	Nil	QTZ. DIORITE BEDROCK or BOULDER (50% obvious overburden clast contam.)
18653 D.H.# 20401	70% whole pebbles, 30% granite 50% varied not drill cuttings		50% drill cuttings of coarser clasts; graywacke, 50% amphibolite. Fines are mostly bentonite drill mud,					lithologies are 50% varied	OVER-BURDEN

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SAMPLE NUMBER	COLOUR	STRUCTURE	GRAIN SIZE (mm)	TEXTURE	MINERALOGY				NAME
					Silicates	Carbonates	Sulphides	Other	
18657 D.H.# 20601	White to pink	Massive	0.5-1.5	Equigranular, interlocking	60-70% white to pink (hem. stained) feldspar, 30% quartz, 3% chlorite or biotite	Nil	Nil	Nil	GRANODIORITE (40% overburden clast contamination all granitoid)
18664 D.H.# 20405	70% whole pebbles and varied graywacke, 30-40% varied granite, 3% amphibolite.		30% drill cuttings of coarser clasts. Lithologies are					60%	OVER-BURDEN
18672 D.H.# 20502	30% whole pebbles, 40% varied granite.		70% drill cuttings of coarser clasts. Lithologies are					60% varied graywacke,	OVER-BURDEN
18673 D.H.# 20502	Light gray	Well foliated	0.1-0.3	Sugary, no relict sand	60-70% plag 15-20% qtz (coarser sugary alluvial differentiation of plag. from qtz.) 20% biotite	Trace dissemin. calcite	0.2% dissemin. pyrite	Nil	GRAYWACKE BEDROCK or (50% obvious overburden clast contamination)
18678 D.H.# 21002	90% whole pebbles up to 2cm diameter, 70% varied graywacke,		30% cuttings of coarser clasts; varied granite, no amphibolite.					lithologies are	OVER-BURDEN

Appendix 9-6. List of the 30 highest assays for Au, As, Ni, Cu, and Zn from the total HMC nonmag samples. Column titles are SN = sample number; DH = drill hole; AF = sample interval; CDT = drift type (see individual drill hole data for drift type). For the arsenic values, the accompanying gold assay is listed. Similarly, accompanying Cu or Zn assays are listed.

GOLD

S.N.	DH	AF	CDT	AU
18674	20502	127-208	39	350
18726	20200	71-117	39	350
18784	10401	177-181	11	350
17558		0-1.5	11	390
16872	211	40-45	11	400
16822	202	94-104	11	410
18654	20401	99-113.5	39	410
16885	209	85-95	13	420
18612	20801	122-137	13	420
17557		0-1.5	11	568
18610	20801	102-112	13	600
16801	202	4-9	21	640
18699	20104	106-146	39	660
18611	20801	112-122	13	690
16818	202	76-86	11	700
16916	103	119.5-122	11	730
18861	10202	112-122	13	772
18670	20502	168-183	15	790
18668B	20502	139-152	13	830
18606	20801	62-72	13	910
17072	104	81-84	10	1100
18854	10403	94-99	11	1260
18730	20705	99-109	13	1300
18837	10503	70-72	12	1360
16919	206	32.5-37	21	1400
18692	20100	216-226	10	1800
18845	10901	133-135	13	1800
18808	10602	62-68	11	2840
17069	104	69.5-73	21	3400
16887	209	100-105	11	120000

ARSENIC

S.N.	DH	AF	CDT	AS	AU
16945	101	117.5-123	25	100	-5
17051	102	150-155	21	100	37
17068	104	60-69	21	100	60
18609	20801	92-102	13	100	160
18851	11006	39-44	11	105	99
16900	108	84-89	21	110	-38
16898	108	66-76	21	110	-32
16996	110	27.5-37.5	21	110	-29
17050	102	145-150	21	110	22
16969	109	40-45	21	110	29
16848	208	65-75	15	110	37
18857	10202	102-112	13	111	72
16968	109	35-40	21	120	21
18816	10603	95-100	11	120	27
16957	106	70-77	21	130	73
17070	104	73-77.5	21	140	-16
18681	21005	60-72.5	10	140	-16
18744C	20801	52-137	13	160	190
18819	10601	35-45	11	177	23
16958	106	77-82	21	180	30
16915	103	118-119.5	26	180	79
18861	10202	112-122	13	181	772
16852	208	85-95	15	190	52
16916	103	119.5-122	11	210	730
16914	103	100-110	27	230	100
16999	110	47-52	11	240	100
18814	10304	133-137	11	245	100
18610	20801	102-112	13	320	600
18612	20801	122-137	13	360	420
18611	20801	112-122	13	490	690

COPPER

S.N.	DH	AF	CDT	CU	ZN
18753C	20402	48-58.5	14	440	150
18849	11102	35-38	11	450	-200
16835	212	90-95	11	450	130
18662	20904	100-125	39	450	220
18687	20103	216-223	39	460	300
18783	10401	167-177	11	462	-200
18743C	20804	74-92	13	470	140
16838	212	102-107	32	490	150
16919	206	32.5-37	21	500	180
18601	20804	64-74	13	510	160
18618	20906	25-29.5	13	520	130
18683	21005	50-76	39	520	220
18816	10603	95-100	11	534	-200
18647	20402	58-58.5	34	540	120
18651	20401	109-112	13	540	120
18675	21002	96-106	13	550	190
18646	20402	48-58	14	560	130
18602	20804	74-84	13	560	140
18717	20201	59-66	13	590	130
18604	20804	89-92	13	630	140
18611	20801	112-122	13	660	170
18610	20801	102-112	13	660	440
18754C	20401	99-112	13	690	130
16836	212	95-98	11	710	150
18720	20201	59-77	39	740	190
18677	21002	116-118	13	750	130
18676	21002	106-116	13	910	130
18812	10303	115-118	11	1039	-200
18718	20201	66-73	10	1200	220
18681	21005	60-72.5	10	1700	150

NICKEL

S.N.	DH	AF	CDT	NI
18683	21005	50-76	39	320
16882	209	70-78	13	330
16883	209	80-85	13	330
16871	211	36-40	11	340
16874	211	50-55	11	340
16961	106	98.5-102	11	340
16962	106	102-107	11	340
17019	210	45-48	13	340
18852	11006	44-46	11	340
16886	209	95-100	13	350
18675	21002	96-106	13	350
16873	211	45-50	11	360
18879	10105	172-177	13	360
17018	210	40-45	13	370
18720	20201	59-77	39	380
18620	20906	25-33	39	390
18685	20404	121-126	39	400
18681	21005	60-72.5	10	400
16872	211	40-45	11	410
18621	20804	64-92	39	410
18873	10102	133-137.5	13	420
18677	21002	116-118	13	450
18610	20801	102-112	13	470
18618	20906	25-29.5	13	480
18676	21002	106-116	13	480
18641	20901	48-65	39	500
18611	20801	112-122	13	550
18612	20801	122-137	13	570
18718	20201	66-73	10	640
18812	10303	115-118	11	650

ZINC

S.N.	DH	AF	CDT	ZN	CU
18680	21005	50-60	10	240	350
16899	108	76-81	24	250	110
16941	101	97.5-102.5	21	270	78
16940	101	90-97.5	21	270	80
16933	101	55-65	21	270	84
17050	102	145-150	21	270	120
16944	101	107.5-117.5	27	270	150
16960	106	85-95	27	270	230
18854	10403	94-99	11	270	295
17068	104	60-69	21	280	110
17061	104	20-30	21	280	120
17562		5-7	13	290	16
16942	101	102.5-107.5	21	290	96
16938	101	80-90	21	290	97
16900	108	84-89	21	300	130
18847	10902	56-57.5	11	300	155
16914	103	100-110	27	300	270
18687	20103	216-223	39	300	460
17066	104	50-60	21	310	94
17049	102	135-145	21	310	100
16968	109	35-40	21	340	110
17051	102	150-155	21	360	100
16954	106	55-65	21	360	130
16967	109	25-35	21	360	140
16923	206	75-82.5	21	360	170
17573	208	100-113	11	400	66
17069	104	69.5-73	21	400	150
18814	10304	133-137	11	400	204
18610	20801	102-112	13	440	660
16969	109	40-45	21	510	120

APPENDIX 9-8A.

List of All -63 um Sample Assays by Drill Hole. S.N. = sample number; DH = drill hole; SI = sample interval (see Appendix 8-1 for detailed sample information).

S.N.	DH	SI	DM	GL	DT	AU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	MVA	RM	
16929	101	15-20	S	L	21	-2	120	89	560	3.5	20	39	25	77	7	-1	3	-0.5	-1	1	-1	-1	-1	20	-1	3	36.5		
16931	101	40-45	S	L	21	1	120	83	580	3.2	19	34	22	86	9	-1	3	-0.5	-1	1	-1	-1	-1	17	-1	3	88.5		
16935	101	70-75	S	L	21	1	110	76	590	3.2	18	33	21	77	9	2	3	-0.5	-1	1	-1	-1	-1	16	-1	3	25.4	SI[-63]=65-75	
16940	101	95-97.5	S	L	21	-1	130	82	650	3.4	20	37	24	87	9	1	4	-0.5	-1	1	-1	-1	-1	17	-1	4	42.6		
16941	101	97.5-102.5	S	L	21	1	130	80	660	3.5	20	37	24	88	9	-1	4	-0.5	-1	1	-1	-1	-1	16	-1	3	31.4		
13830R	101	97.5-102.5	S	L	21	-1	130	79	550	3.0	17	33	22	79	9	2	3	-0.5	1	8	-1	-1	1	13	-1	3	39.9		
16942	101	102.5-107.5	S	L	21	-1	130	83	650	3.5	21	35	23	88	9	2	4	-0.5	-1	1	-1	-1	1	19	-1	3	38.7		
16944	101	112.5-117.5	S	L	27	-1	120	120	590	3.6	23	42	25	79	5	-1	2	-0.5	-1	1	-1	-1	-1	19	-1	2	24.2	SI[-63]=107.5-117.5	
16945	101	117.5-123	S	L	25	-1	92	110	500	3.3	23	37	25	54	5	-1	2	-0.5	-1	-1	-1	-1	-1	15	-1	-1	26.5		
16946	101	123-126	S	L	21	-1	120	150	640	4.4	28	57	38	83	4	-1	3	-0.5	-1	1	-1	-1	-1	2	19	-1	2	75.4	AF OVERLAPS RAINY
13850	101	125-126	S	L	11	-1	150	170	560	4.3	25	58	38	91	5	-1	2	-0.5	-1	5	-1	-1	-1	2	13	-1	2	72.6	
17035	102	25-30	S	L	21	0	0	51	0	0.0	0	0	0	69	6	1	2	-0.5	1	1	-1	0	-1	0	0	0	14.9	SI[-63]=20-30	
17035R	102	25-30	S	L	21	-1	120	74	500	3.2	17	32	20	74	5	-1	3	-0.5	-1	2	-1	-1	-1	13	-1	2	0.0		
17037	102	45-50	S	L	21	-1	120	81	560	3.3	19	35	21	83	7	-1	3	-0.5	-1	1	-1	-1	-1	15	-1	3	23.1	SI[-63]=40-50	
17041	102	85-90	S	L	21	-1	120	79	590	3.3	19	35	22	82	7	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	18.5	SI[-63]=80-90	
17043	102	110-115	S	L	21	-1	120	82	560	3.1	18	33	20	79	6	-1	3	-0.5	-1	1	-1	-1	-1	15	-1	3	14.0	SI[-63]=105-115	
17048	102	135-140	S	L	21	-1	130	87	630	3.5	20	37	23	79	7	1	3	-0.5	-1	2	-1	-1	-1	19	-1	3	40.9		
17049	102	140-145	S	L	21	-1	140	84	640	3.7	20	38	24	87	8	-1	3	-0.5	-1	1	-1	-1	-1	16	-1	3	36.1		
17050	102	145-150	S	L	21	2	130	82	660	3.6	21	39	25	87	6	-1	3	-0.5	-1	2	-1	-1	-1	19	-1	3	64.0		
17051	102	150-155	S	L	21	1	140	89	660	3.7	21	40	25	92	6	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	59.4		
13831R	102	150-155	S	L	21	-1	140	91	570	3.2	18	38	26	90	9	-1	3	-0.5	-1	1	-1	-1	1	14	-1	3	41.8		
17052	102	155-157	S	L	21	-1	140	90	640	3.7	21	41	26	89	6	-1	3	-0.5	-1	2	-1	-1	1	25	-1	3	55.4		
17053	102	160-165	S	L	11	15	71	89	520	3.4	21	33	18	51	3	-1	2	-0.5	-1	1	-1	-1	8	15	-1	1	44.9		
17054	102	165-170	S	L	14	12	65	69	440	2.6	16	23	9	34	2	-1	1	-0.5	-1	1	-1	-1	2	14	-1	1	33.8		
17055	102	170-175	S	L	14	6	65	67	390	2.4	15	22	12	30	2	-1	1	-0.5	-1	-1	-1	-1	2	11	-1	-1	51.6		
13832R	102	170-175	S	L	14	-1	71	77	410	2.5	15	24	17	37	7	-1	1	-0.5	-1	2	-1	-1	-1	2	7	-1	-1	23.4	
17056	102	175-178.5	S	L	10	6	67	61	400	2.6	16	25	11	33	2	-1	1	-0.5	-1	-1	-1	-1	2	12	-1	-1	58.3		
17057	102	178.5-183	S	L	14	-1	72	79	410	2.7	17	25	12	38	2	-1	1	-0.5	-1	1	-1	-1	2	11	-1	1	53.8		
16910	103	75-80	S	L	21	-1	130	91	610	3.7	21	39	24	80	25	-1	3	-0.5	16	1	-1	-1	-1	18	-1	3	45.3	SI[-63]=70-80	
16910R	103	75-80	S	L	21	0	0	58	0	0.0	0	0	0	74	6	-1	3	-0.5	1	2	2	0	-1	0	0	0	0.0		
16911	103	80-85	S	L	21	-1	140	92	550	3.6	20	39	23	82	5	-1	4	-0.5	1	2	1	-1	1	18	-1	3	37.5		
13833R	103	80-85	S	L	21	2	140	90	480	3.2	17	36	23	81	5	-1	3	-0.5	-1	1	-1	-1	-1	12	-1	3	74.3		
16912	103	85-91	S	L	21	-1	150	94	570	3.8	21	41	26	90	11	-1	4	-0.5	1	2	-1	-1	1	19	-1	4	44.4		
16913	103	100-105	S	L	27	-1	190	120	640	1.6	26	52	33	120	12	1	4	-0.5	1	2	-1	-1	1	22	-1	4	60.2		
16914	103	105-110	S	L	27	1	160	120	700	4.5	26	52	33	110	8	-1	3	-0.5	1	2	-1	-1	1	22	-1	4	52.1		
16915	103	118-119.5	S	L	26	1	77	120	530	3.3	21	38	22	56	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	-1	91.2		
16916	103	119.5-122	S	L	11	-1	74	100	530	3.3	23	34	20	49	5	-1	2	-0.5	-1	-1	-1	-1	6	17	-1	2	77.2		
17059	104	15-20	S	L	21	1	150	78	580	3.4	20	38	23	83	5	-1	4	-0.5	-1	2	1	-1	1	16	-1	3	34.8		
17060	104	20-25	S	L	21	1	120	76	540	3.3	18	35	20	73	5	-1	4	-0.5	-1	2	1	-1	1	14	-1	3	22.5		
17062	104	30.5-34	S	L	27	1	130	110	620	3.6	22	44	26	91	4	-1	5	-0.5	1	3	5	-1	1	18	-1	3	20.9	SI[-63]=25.5-34	
17062R	104	30.5-34	S	L	27	0	0	83	0	0.0	0	0	0	85	5	-1	2	-0.5	1	1	-1	0	-1	0	0	0	0.0		
17064	104	45-50	S	L	21	-1	160	90	650	3.8	21	42	27	90	7	-1	5	-0.5	-1	3	1	-1	1	19	-1	4	23.7	SI[-63]=40-50	
17066	104	55-60	S	L	21	-1	170	96	610	3.8	22	47	27	100	7	-1	5	-0.5	-1	3	1	-1	2	18	-1	3	25.5		
17067	104	60-65	S	L	21	1	170	89	630	3.9	22	45	28	100	7	1	5	-0.5	1	3	-1	-1	-1	3	-1	-1	28.8		
13834R	104	60-65	S	L	21	-1	150	100	580	3.6	20	42	28	100	7	-1	3	-0.5	-1	2	-1	-1	1	16	-1	3	21.8		
17068	104	65-69	S	L	21	2	150	88	660	4.0	23	45	28	98	7	-1	5	-0.5	1	3	2	-1	1	19	-1	3	32.4		
17069	104	69.5-73	S	L	21	-1	140	69	640	3.8	21	43	27	95	5	-1	6	-0.5	1	3	2	-1	1	17	-1	3	50.3		
17069R	104	69.5-73	S	L	21	0	0	73	0	0.0	0	0	0	92	7	1	3	-0.5	1	1	-1	0	1	0	0	0	0.0		
17070	104	73-77.5	S	L	21	2	140	88	630	3.8	21	44	27	110	6	-1	6	-0.5	1	3	3	-1	2	16	-1	3	35.4		
17071	104	77.5-81	S	L	27	1	120	100	590	3.7	21	46	26	88	4	-1	6	-0.5	-1	3	1	-1	1	18	-1	3	53.9		
17072	104	81-84	S	L	10	1	98	92	530	3.4	20	39	21	69	3	-1	5	-0.5	1	2	1	-1	2	17	-1	3	69.8		
17073	104	84-89	S	L	15	2	87	97	470	3.2	20	36	20	60	3	-1	5	-0.5	1	2	1	-1	5	18	-1	3	27.4		
13835R	104	84-89	S	L	15	-1	99	110	530	3.4	22	41	28	65	3	-1	2	-0.5	-1	1	-1	-1	5	14	-1	2	36.2		
17000	105	10.5-15	S	L	24	6	90	98	540	3.5	21	39	29	71	4	-1	4	-0.5	-1	2	1	-1	5	21	-1	2	45.2		
17001	105	15-18	S	L	21	-1	130	88	550	3.3	19	40	27	120	5	-1	4	-0.5	1	2	1	-1	3	22	-1	3	48.4		
17003	105	25-30	S	L	14	-1	75	95	300	3.1	21	30	20	65	2	-1	3	-0.5	-1	2	-1	-1	2	18	-1	1	24.0	SI[-63]=20-30	
17005	105	35-41	S	L	14	-1	90	120	370	4.0	25	45	43	170	4	-1	6	-0.5	1	2	1	-1	3	26	-1	1	13.4	SI[-63]=30-41	
17006	105	41-46	S	L	14	-1	100	130	520	4.8	37	65	76	550	5	-1	9	-0.5	-1	2	-1	-1	3	26	-1	2	31.5		
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16989	107	132-137	S L 14	150	100	120	650	4.4	29	41	32	96	4	-1	4	-0.5	-1	2	-1	-1	2	16	-1	-1	64.0	
16990	107	137-142	S L 15	-2	100	120	690	4.3	29	45	28	66	3	-1	3	-0.5	-1	1	-1	-1	2	16	-1	-1	17.1	
16895	108	56-61	S L 21	-1	150	98	630	4.1	25	49	30	99	9	-1	4	-0.5	1	2	-1	-1	1	21	-1	4	18.2	SIC-63]=51-61
16897	108	66-71	S L 21	1	160	98	640	0.0	23	44	28	92	9	1	4	-0.5	16	2	-1	-1	1	16	-1	3	14.2	SIC-63]=61-71
16897R	108	66-71	S L 21	0	0	68	0	0.0	0	0	0	88	7	1	3	-0.5	1	2	-1	0	1	0	0	0	0.0	
16898	108	71-76	S L 21	-1	170	98	630	4.2	23	46	29	98	10	2	4	-0.5	1	2	-1	-1	1	18	-1	3	20.5	
16899	108	76-81	S L 24	1	160	98	620	3.9	23	45	28	96	10	2	4	-0.5	1	2	-1	-1	1	20	-1	3	24.9	
16900	108	84-89	S L 21	-1	180	100	670	4.3	25	48	31	110	11	3	4	-0.5	1	2	-1	-1	1	17	-1	3	37.8	
13838R	108	84-89	S L 21	-1	190	110	590	3.9	21	47	30	100	9	1	5	-0.5	-1	2	-1	-1	1	15	-1	3	43.5	
16901	108	96-100.5	S L 14	-1	91	120	570	3.9	27	52	35	60	3	-1	2	-0.5	-1	-1	-1	-1	1	11	-1	-1	32.1	
16902	108	100.5-106	S L 11	-1	86	120	620	3.7	25	47	28	55	2	-1	2	-0.5	-1	1	-1	-1	-1	17	-1	-1	27.4	
16903	108	106-111	S L 11	-1	92	120	610	3.8	25	48	31	54	2	-1	2	-0.5	-1	1	-1	-1	-1	13	-1	1	34.5	
16904	108	111-116	S L 11	-1	83	120	620	3.6	25	45	29	47	2	-1	2	-0.5	-1	1	-1	-1	2	15	-1	1	32.3	
16905	108	116-121	S L 11	-1	84	130	710	4.4	26	46	31	63	2	-1	3	-0.5	1	-1	-1	-1	3	24	-1	4	58.8	
16906	108	121-126	S L 11	-1	87	120	640	3.7	26	47	31	57	3	-1	2	-0.5	1	-1	-1	-1	3	14	-1	-1	48.4	
16907	108	126-131.5	S L 13	-1	110	170	740	0.5	34	75	63	85	3	-1	4	-0.5	1	1	-1	-1	6	17	-1	1	28.1	
16965	109	20-24	S L 21	-1	160	92	610	3.9	22	46	29	98	10	-1	5	-0.5	1	2	1	-1	1	16	-1	3	29.1	
16966	109	25-30	S L 21	-1	150	93	560	3.5	21	42	27	97	7	-1	5	-0.5	1	2	1	-1	1	16	-1	3	23.9	
16967	109	30-35	S L 21	-1	160	93	570	3.8	22	43	26	96	10	-1	4	-0.5	1	2	1	-1	1	15	-1	3	25.1	
16968	109	35-40	S L 21	-1	110	75	510	2.9	18	39	20	74	5	1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	45.7	
16969	109	40-45	S L 21	-1	180	92	580	3.8	22	45	28	99	9	1	4	-0.5	1	2	1	-1	1	15	-1	3	30.9	
16992	110	15-20	S L 21	-1	160	100	520	3.7	21	43	26	93	9	1	4	-0.5	1	2	1	-1	1	22	-1	4	51.0	
16994	110	25-27.5	S L 21	-1	150	97	520	3.5	21	41	26	92	9	-1	4	-0.5	1	2	1	-1	2	23	-1	4	29.5	SIC-63]=20-27.5
16995	110	27.5-32.5	S L 21	-1	140	86	640	4.1	24	45	28	93	9	-1	4	-0.5	-1	2	1	-1	1	21	-1	4	21.1	
16996	110	32.5-37.5	S L 27	-1	100	82	590	3.5	21	39	24	80	5	-1	4	-0.5	-1	2	1	-1	1	20	-1	4	25.3	
16997	110	37.5-42	S L 17	-1	110	110	550	4.1	25	50	36	87	4	-1	3	-0.5	-1	2	1	-1	1	24	-1	3	36.5	
16998	110	42-47	S L 11	4	95	80	480	3.5	22	37	27	75	4	-1	3	-0.5	1	2	1	-1	2	22	-1	2	70.4	
16999	110	47-52	S L 11	7	110	110	600	4.3	26	47	47	140	3	2	4	-0.5	-1	2	1	-1	3	22	-1	4	52.0	
13839R	110	47-52	S L 11	-1	120	130	280	4.3	23	47	52	170	5	-1	7	-0.5	-1	2	-1	-1	2	14	-1	3	39.7	
18871	10102	123-128	A L 15	23	69	69	823	3.44	23	61	29	45	-5	-5	1	2.7	-1	-10	13	-10	-10	45	9	-10	26.2	
18872	10102	128-133	A L 13	2	75	63	694	3.10	25	67	43	41	-5	-5	1	2.7	-1	-10	9	-10	-10	43	5	-10	16.2	
18873	10102	133-137.5	A L 13	6	71	63	720	3.04	21	67	35	47	-5	-5	1	1.7	-1	-10	9	-10	-10	41	-2	-10	31.1	
18875	10105	145-155	A L 15	1	44	49	616	2.84	15	55	29	57	-5	14	3	0.9	-1	-10	11	13	-10	47	-2	-10	18.9	
18876	10105	155-162	A L 13	1	83	67	855	3.99	23	81	39	77	-5	-5	5	2.3	-1	-10	15	-10	-10	57	3	-10	8.1	
18877	10105	162-167	A L 13	40	55	55	748	3.08	19	61	35	57	-5	-5	5	1.7	-1	-10	7	-10	21	47	-2	-10	19.6	
18878	10105	167-172	A L 15	6	89	75	1002	3.92	29	75	39	51	-5	5	3	3.7	-1	-10	7	-10	13	49	7	19	20.5	
18879	10105	172-177	A L 13	7	95	80	1000	4.00	27	80	41	55	-5	-5	2	1.0	-1	-10	5	-10	10	45	5	-10	6.9	
18881	10105	177-190	A L 13	1	69	77	841	3.62	23	73	39	47	-5	-5	5	2.3	-1	-10	17	-10	51	47	5	-10	9.9	
18856	10202	102-107	A L 13	3	82	33	549	2.24	11	53	21	71	-5	-5	1	-0.5	-1	-10	-5	-10	-10	35	-2	-10	20.9	
18857	10202	107-112	A L 13	3	100	47	549	2.46	15	63	27	77	-5	-5	1	-0.5	-1	-10	-5	-10	-10	37	-2	-10	22.8	
18858	10202	112	A L 18	28	58	-1	569	2.62	13	57	21	51	-5	45	1	-0.5	-1	-10	-5	-10	-10	105	-2	-10	17.1	SLUFF MAT'L
18859	10202	112-117	A L 13	4	52	43	455	2.12	9	47	17	41	-5	-5	1	-0.5	-1	-10	-5	-10	-10	27	-2	-10	15.7	
18861	10202	117-122	A L 10	8	62	43	539	2.56	13	63	27	61	-5	-5	1	-0.5	-1	-10	-5	-10	-10	37	-2	-10	30.5	
18862	10202	122-127	A L 13	2	59	43	445	2.04	13	43	13	35	-5	8	1	0.5	-1	-10	-5	-10	-10	29	-2	-10	27.4	
18863	10202	127-132	A L 13	6	66	49	483	2.28	13	45	15	41	-5	-5	1	0.5	-1	-10	-5	-10	-10	29	5	-10	29.5	
18864	10202	132-137	A L 10	5	64	45	529	2.48	15	45	23	47	-5	-5	1	0.9	-1	-10	5	-10	-10	41	-2	-10	18.9	
18865	10202	137-142	A L 15	2	63	61	539	2.58	15	47	21	47	-5	-5	1	0.9	-1	-10	15	-10	-10	49	-2	-10	27.5	
18866	10202	142-147	A L 15	2	61	61	571	2.62	17	47	21	49	-5	-5	1	2.7	-1	-10	11	-10	-10	47	-2	-10	29.4	
18867	10202	147-152	A L 14	3	59	49	471	2.16	15	39	17	39	-5	-5	1	1.5	-1	-10	7	-10	-10	41	5	-10	32.6	
18868	10202	152-157	A L 13	6	51	51	499	2.36	13	39	15	37	-5	-5	1	1.5	-1	-10	13	-10	-10	37	-2	-10	20.1	
18869	10202	157-162	A L 11	2	61	59	612	3.00	17	55	33	57	-5	-5	1	1.5	-1	-10	9	-10	-10	43	7	-10	12.0	
18882	10202	162-167	A L 13	75	103	77	1496	9.09	23	87	51	59	-5	-5	9	1.7	-1	-10	19	-10	352	53	-2	-10	5.2	
18812	10303	115-118	A L 11	89	50	45	485	2.72	15	47	105	55	5	-5	5	0.9	-1	-10	-5	-10	11	51	5	-10	6.7	
18814	10304	133-137	A L 11	154	76	57	642	3.02	17	35	31	59	7	-5	3	-0.5	-1	-10	-5	-10	-10	27	9	-10	3.5	
18773	10401	117-122	A L 10	2	105	51	545	2.39	15	29	29	29	31	-5	5	-0.5	-1	15	13	-10	-10	30	5	-10	32.5	
18774	10401	122-146	A L 14	-1	88	59	633	3.11	15	31	29	35	21	-5	7	-0.5	-1	-10	11	-10	-10	43	-2	-10	40.1	
18775	10401	146-151	A L 15	-1	105	51	619	3.27	15	33	29	39	25	-5	7	-0.5	-1	-10	11	-10	-10	39	3	-10	18.9	
18776	10401	151-157	A L 15	-1	95	53	511	2.39	13	25	15	25	13	-5	5	-0.5	-1	-10	7	-10	-10	30	5	-10	56.3	
18777	10401	157-162	A L 13	-1	101	59	523	2.51	13	27	19	31	21	-5	7	-0.5	-1	-10	19	-10	-10	30	9	-10	44.7	
18778	10401	162-167	A L 13	1	99	55	523	2.49	13	27	21	31	29	-5	7	-0.5	-1	-10	11	-10	-10	72	-2	-10	40.2	
18779	10401	167-172	A L 13	11	119	67	593	3.15	19	47	201	65	45	-5	7	-0.5	-1	-10	11	14	-10	57	3	-10	19.7	
18783	10401	172-177	A L 11	2	192	75	861	3.79	25	73	457	63	43	-5	9	-0.5	9	-10	15	-10	-10	72	-2	-10	15.7	
18784	10401	177-181	A L 11	4																						

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18788	10700	62-67	A L 14	2	142	65	785	4.37	19	47	63	69	29	-5	7	-0.5	3	-10	9	-10	-10	61	9	-10	1.1
18789	10700	67-72	A L 14	-10	118	63	973	6.29	17	45	65	99	25	-5	13	-0.5	16	-10	7	10	41	59	-2	-10	1.2
18790	10700	72-77	A L 14	-10	92	55	853	5.13	17	41	61	73	19	-5	9	-0.5	7	-10	-5	-10	97	41	-2	-10	1.0
18791	10700	77-87	A L 14	-1	101	69	1213	10.00	15	47	97	123	23	19	47	-0.5	53	-10	5	-10	-10	70	-2	-10	3.0
18792	10700	87-92	A L 14	-1	104	63	1077	7.83	17	51	81	93	19	-5	23	-0.5	39	-10	7	-10	23	59	-2	-10	10.3
18793	10700	92-97	A L 14	-1	106	65	853	5.37	17	47	51	75	15	-5	11	-0.5	17	-10	5	-10	53	32	-2	-10	3.5
18794	10700	97-103	A L 14	-1	124	61	761	4.33	17	41	37	53	13	-5	9	-0.5	83	29	-5	-10	27	24	3	-10	4.8
18795	10700	103-108	A L 14	2	154	63	761	4.27	15	43	45	61	11	-5	9	-0.5	13	-10	-5	-10	33	21	-2	-10	4.4
18796	10700	108-113	A L 15	39	138	59	655	3.39	13	35	27	47	5	15	5	-0.5	-1	31	-5	-10	-10	15	-2	-10	11.9
18797	10700	113-118	A L 15	-1	178	89	875	4.57	21	45	41	69	13	-5	5	-0.5	-1	-10	-5	-10	-10	24	-2	-10	5.8
18798	10700	118-123	A L 15	7	184	75	755	4.03	19	35	29	47	21	-5	5	-0.5	-1	-10	-5	-10	-10	30	-2	-10	18.7
18799	10700	123-128	A L 15	105	193	91	905	4.99	23	43	37	53	25	-5	7	0.5	3	-10	-5	-10	-10	26	-2	-10	7.3
18802	10700	128-133	A L 10	42	169	73	747	3.67	17	37	35	49	19	-5	3	-0.5	-1	-10	-5	12	-10	21	-2	-10	12.4
18803	10700	133-138	A L 10	26	146	67	731	3.67	17	33	37	51	23	-5	5	-0.5	2	-10	-5	-10	-10	32	-2	-10	8.8
18804	10700	138-143	A L 13	23	72	59	509	2.98	15	53	53	49	15	-5	5	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	42.4
18767	10704	92-97	A L 15	7	87	39	423	1.91	9	17	19	29	9	-5	3	-0.5	-1	199	-5	-10	-10	15	3	-10	183.0
18767R	10704	92-97	A L 15	6	70	34	464	1.92	14	32	20	40	10	-5	2	-0.5	-1	-10	-5	-10	-10	18	3	-10	0
18767R	10704	92-97	A L 15	2	74	34	458	1.87	12	26	18	44	14	-5	2	-0.5	-1	-10	-5	-10	-10	14	3	-10	0
18767R	10704	92-97	A L 15	2	70	32	452	1.86	12	26	18	40	-5	-5	2	-0.5	-1	-10	-5	-10	-10	20	3	-10	0
18767R	10704	92-97	A L 15	2	68	38	454	2.16	12	40	18	38	12	-5	4	0.6	-1	-10	-5	-10	-10	18	3	-10	0
18767R	10704	92-97	A L 15	-1	70	38	454	1.87	12	26	18	42	22	-5	2	-0.5	-1	-10	-5	-10	-10	18	5	-10	0
18767R	10704	92-97	A L 15	-1	70	34	456	1.87	12	24	18	38	20	-5	2	-0.5	-1	-10	-5	-10	-10	12	5	-10	0
18767R	10704	92-97	A L 15	2	74	38	454	1.92	12	26	18	40	20	-5	2	-0.5	-1	-10	-5	-10	-10	10	3	-10	0
18767R	10704	92-97	A L 15	1	70	34	450	1.87	12	30	18	36	14	-5	2	-0.5	-1	-10	-5	-10	-10	8	5	-10	0
18767R	10704	92-97	A L 15	-1	74	34	454	1.87	12	26	18	40	14	-5	2	-0.5	-1	-10	-5	-10	-10	10	3	-10	0
18768	10704	97-102	A L 13	1	95	37	477	2.07	9	17	17	25	13	-5	3	-0.5	-1	-10	5	-10	-10	17	5	-10	133.7
18769	10704	102-105	A L 15	4	98	41	545	2.37	11	23	21	31	11	-5	3	-0.5	-1	-10	5	-10	-10	17	-2	-10	21.1
18771	10704	105-106	A L 11	-1	125	51	629	3.03	17	31	33	39	13	-5	3	-0.5	-1	-10	-5	-10	47	17	5	-10	37.1
18839	10901	113-118	A L 15	3	56	55	600	2.72	13	33	45	47	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	11	5	-10	98.6
18842	10901	118-123	A L 15	10	51	47	557	2.54	11	31	43	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	-5	3	-10	74.3
18843	10901	123-128	A L 15	17	64	59	620	3.00	13	35	47	47	-5	-5	1	-0.5	-1	-10	-5	-10	-10	5	-2	-10	21.9
18844	10901	128-133	A L 13	15	52	51	551	2.72	13	35	41	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	5	-2	-10	27.7
18845	10901	133-135	A L 13	9	71	57	606	3.06	15	37	47	55	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	-2	-10	23.1
18846	10901	135-140	A L 34	-1	54	51	447	2.96	33	69	103	63	-5	-5	1	-0.5	-1	-10	-5	-10	45	21	3	-10	59.2
18851	11006	39-44	A L 11	1	99	73	690	3.76	15	59	45	67	-5	10	1	-0.5	-1	-10	-5	-10	13	11	5	-10	8.0
18852	11006	44-46	A L 11	-1	67	57	696	2.88	15	45	41	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	31.7
18853	11006	46-51	A L 34	-1	64	69	1257	3.78	31	111	123	63	5	-5	3	-0.5	-1	-10	-5	-10	-10	15	3	-10	42.7
18849	11102	35-38	A L 11	7	40	31	384	1.97	7	19	31	31	-5	-5	-1	-0.5	-1	-10	-5	-10	15	7	5	-10	17.8
16801	202	4-9	S O 21	-1	110	210	330	4.2	26	68	79	55	2	-1	10	-0.5	1	1	-1	-1	7	13	-1	-1	31.2
16802	202	9-14	S O 21	-1	160	87	560	3.3	17	37	24	92	11	2	2	-0.5	-1	4	-1	-1	-1	24	-1	3	30.1
16803	202	14-19	S O 21	-1	140	81	430	3.2	15	34	23	85	9	1	2	-0.5	-1	4	-1	-1	1	17	-1	3	48.5
16804	202	19-23	S O 21	-1	140	87	490	3.1	16	36	24	88	9	-1	2	-0.5	-1	3	-1	-1	-1	16	-1	3	63.8
16808	202	38-42.5	S O 21	-1	120	77	480	3.0	15	32	20	80	13	-1	2	-0.5	1	5	-1	-1	-1	15	-1	3	53.9
16809	202	42.5-47.5	S O 21	-1	91	64	450	2.7	13	25	15	58	5	-1	1	-0.5	-1	3	-1	-1	-1	13	-1	2	42.5
16811	202	50.5-55.5	S O 21	51	140	98	560	3.5	19	41	28	91	5	-1	2	-0.5	-1	5	-1	-1	1	18	-1	3	65.3
16813	202	60.5-66	S O 21	1	88	86	500	3.3	17	36	24	72	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	2	35.9
13840R	202	60.5-66	S O 21	8	97	92	520	3.4	18	38	25	77	5	-1	3	-0.5	-1	5	-1	-1	-1	12	-1	2	28.2
16814	202	66-70	S O 21	-1	80	84	460	2.9	16	32	21	59	5	1	1	-0.5	-1	2	-1	-1	-1	15	-1	2	39.2
16815	202	70-73	S O 11	2	53	72	360	2.0	13	24	13	36	2	-1	-1	-0.5	-1	2	-1	-1	1	11	-1	-1	49.0
16816	202	73-76	S O 11	2	64	98	360	2.0	13	24	13	36	3	-1	5	-0.5	-1	2	-1	-1	3	17	-1	2	38.0
16817	202	76-81	S O 11	-1	60	120	410	2.8	16	33	25	52	2	-1	4	-0.5	-1	1	-1	-1	11	12	-1	-1	24.5
16817R	202	76-81	S O 11	0	0	98	0	0.0	0	0	0	52	2	1	5	-0.5	-1	1	-1	0	10	0	0	0	0.0
16818	202	81-86	S O 11	-1	51	80	370	2.3	14	26	17	35	1	-1	1	-0.5	-1	1	-1	-1	7	12	-1	-1	23.0
16819	202	86-91	S O 11	-1	52	73	350	2.2	13	24	16	37	1	-1	-1	-0.5	-1	1	-1	-1	5	10	-1	-1	21.8
16820	202	91-94	S O 11	1	53	69	330	2.1	13	24	14	40	1	-1	1	-0.5	-1	1	-1	-1	2	14	-1	-1	47.3
16821	202	94-99	S O 11	-1	43	62	290	1.8	12	19	11	33	1	2	-1	-0.5	-1	1	-1	-1	5	16	-1	-1	21.8
16822	202	99-104	S O 11	28	46	58	300	1.8	11	19	10	30	1	-1	2	-0.5	-1	-1	-1	-1	3	18	-1	-1	52.3
16822R	202	99-104	S O 11	0	0	48	0	0.0	0	0	0	31	1	1	2	-0.5	-1	-1	-1	0	3	0	0	0	0.0
16823	202	104-109	S O 11	-1	54	62	400	2.2	13	20	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	14	-1	-1	22.8
16824	202	109-114	S O 11	1	49	58	320	1.8	11	19	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	13	-1	-1	73.8
13841R	202	109-114	S O 11	-1	52	63	340	2.0	13	21	13	37	2	-1	1	-0.5	-1	9	-1	-1	3	9	-1	-1	22.9
16825	202	114-117	S O 11	1	52	63	370	2.2	13	19	12	35	1	-1	2	-0.5	1	-1	-1	-1	2	15	-1	-1	66.9
16826	202	117-122	S O 11	1	64	150	410	2.7	17	43	19	42	1	-1	3										

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308	16924	206	85-90	S	0	27	2	150	130	660	4.2	25	52	33	100	9	-1	2	-0.5	1	1	-1	-1	-1	22	-1	3	23.1
309	16925	206	90-95	S	0	27	1	150	140	600	4.0	24	49	33	89	9	-1	2	-0.5	-1	1	-1	-1	-1	21	-1	2	31.7
310	16927	206	101.5-107.5	S	0	15	-1	58	95	290	2.2	17	31	26	33	5	-1	2	-0.5	-1	-1	-1	-1	-1	10	-1	-1	53.5
311	17021	207	14-19	S	0	27	3	170	130	620	4.2	26	53	33	100	7	-1	2	-0.5	-1	2	-1	-1	1	24	-1	3	51.6
312	17023	207	35-40	S	0	27	1	190	140	730	4.6	30	59	38	110	5	-1	2	-0.5	-1	1	-1	-1	-1	21	-1	3	42.5
313	17025	207	55-60	S	0	27	-1	180	130	590	4.2	24	50	33	100	5	-1	2	-0.5	-1	1	-1	-1	1	19	-1	3	38.4
318	17026	207	75-81.5	S	0	17	-1	100	130	400	3.1	20	43	35	64	2	-1	1	-0.5	1	1	-1	-1	-1	16	-1	1	39.8
319	17028	207	86.5-91.5	S	0	10	-1	97	110	460	3.1	21	40	34	61	2	-1	1	-0.5	-1	1	-1	-1	-1	15	-1	1	27.7
320	17029	207	91.5-93.5	S	0	11	-1	110	110	600	4.1	27	51	45	76	3	-1	1	-0.5	-1	2	-1	-1	-1	16	-1	1	86.3
321	17030	207	93.5-97.5	S	0	10	1	120	130	690	4.5	30	49	56	82	1	-1	2	-0.5	-1	2	-1	-1	1	17	-1	1	42.0
322	17031	207	97.5-102	S	0	11	1	150	120	760	5.4	36	64	54	130	1	-1	3	-0.5	-1	2	-1	-1	6	18	-1	2	69.4
323	13844R	207	97.5-102	S	0	11	1	130	180	790	5.6	37	70	63	160	2	-1	4	-0.5	1	12	-1	-1	5	18	-1	1	59.6
324	17032	207	102-107	S	0	11	1	170	140	890	6.6	43	75	79	150	1	-1	4	-0.5	1	2	-1	-1	2	20	1	2	47.1
325	17033	207	107-108	S	0	13	-1	160	180	1000	7.0	47	86	90	160	1	3	6	-0.5	1	2	-1	-1	2	21	-1	2	94.8
326	16840	208	20-25	S	0	14	15	110	170	650	4.6	35	78	90	70	11	-1	6	-0.5	-1	1	-1	-1	2	14	-1	-1	80.0
327	16840R	208	20-25	S	0	14	0	0	0	0	0.0	0	0	0	80	8	-1	5	-0.5	1	1	-1	0	2	0	0	0	0.0
328	16842	208	30-35	S	0	15	-1	110	140	520	5.1	35	66	80	61	25	-1	4	-0.5	-1	1	-1	-1	1	21	-1	1	20.6 SII(-63)=25-35
333	16842R	208	30-35	S	0	15	0	0	130	0	0.0	0	0	0	67	14	1	3	-0.5	-1	1	-1	0	1	0	0	0	0.0
334	16844	208	45-50	S	0	15	13	82	130	540	3.6	24	46	33	46	5	-1	2	-0.5	1	-1	-1	-1	-1	12	-1	-1	18.1 SII(-63)=40-50
335	16846	208	55-60	S	0	15	8	89	140	630	4.1	28	51	37	53	5	-1	2	-0.5	-1	-1	-1	-1	-1	14	-1	1	16.4 SII(-63)=50-60
336	16848	208	70-75	S	0	15	-1	63	91	450	2.7	18	34	23	36	9	-1	2	-0.5	-1	-1	-1	-1	-1	9	-1	-1	42.5 SII(-63)=65-75
337	16850	208	80-85	S	0	10	1	60	90	400	2.5	17	31	21	37	3	-1	2	-0.5	1	-1	-1	-1	-1	11	-1	-1	47.0 SII(-63)=75-85
338	16852	208	90-95	S	0	15	-1	73	100	440	3.0	20	41	28	42	3	-1	2	-0.5	-1	-1	-1	-1	-1	10	-1	-1	48.6 SII(-63)=85-95
339	16853	208	98-103	S	0	11	1	76	120	450	3.1	19	36	29	51	3	-1	6	-0.5	-1	1	-1	-1	2	12	-1	-1	67.6
340	13845R	208	98-103	S	0	11	-1	92	130	400	3.1	18	38	31	55	2	-1	6	-0.5	-1	9	-1	-1	4	12	-1	-1	73.8
341	13851	208	108-113	S	0	32	-1	170	87	400	3.2	15	32	23	84	12	-1	3	-0.5	-1	6	-1	-1	-1	15	-1	2	75.1
342	16875	209	30-35	S	0	27	-1	99	100	540	3.2	20	38	24	70	3	-1	3	-0.5	-1	1	-1	-1	-1	17	-1	2	65.7
343	16876	209	35-39.5	S	0	27	3	120	120	580	3.9	24	50	32	96	4	1	4	-0.5	1	1	-1	-1	-1	22	-1	2	29.8
344	16877	209	45-50	S	0	15	-1	58	97	360	2.3	17	31	21	45	2	1	2	-0.5	1	-1	-1	-1	-1	20	-1	1	114.6
345	16879	209	55-60	S	0	15	-1	61	110	390	2.7	19	39	28	50	2	-1	1	-0.5	1	1	-1	-1	-1	15	-1	1	54.9
346	16880	209	60-65	S	0	13	1	67	110	400	2.8	19	38	29	52	2	-1	1	-0.5	1	1	-1	-1	-1	19	-1	1	41.0
347	16881	209	70-75	S	0	13	-1	59	110	420	2.7	19	39	26	48	2	-1	1	-0.5	1	1	-1	-1	-1	20	-1	2	37.2
348	16883	209	80-85	S	0	13	1	71	120	420	3.0	23	43	30	55	-1	-1	1	-0.5	1	-1	-1	-1	1	18	-1	-1	53.6
353	16884	209	85-90	S	0	13	-1	71	120	510	3.0	21	39	26	46	1	-1	-1	-0.5	-1	1	-1	-1	-1	18	-1	1	131.6
354	13846R	209	85-90	S	0	13	-1	77	110	430	2.7	17	36	29	43	1	-1	1	-0.5	-1	9	-1	-1	-1	14	-1	-1	68.0
355	16885	209	90-95	S	0	13	-1	67	120	480	2.9	22	39	25	48	1	-1	1	-0.5	-1	1	-1	-1	-1	16	-1	-1	157.3
356	16886	209	95-100	S	0	13	-1	74	120	530	3.1	24	39	25	44	1	-1	2	-0.5	1	1	-1	-1	3	18	-1	1	104.0
357	16887	209	100-105	S	0	11	-1	82	130	550	3.5	26	46	37	62	1	-1	1	-0.5	1	-1	-1	-1	9	20	-1	1	86.5
358	16887R	209	100-105	S	0	11	0	0	100	0	0.0	0	0	0	60	2	-1	2	-0.5	-1	1	-1	0	9	0	0	0	0.0
359	17013	210	18-23	S	0	25	1	73	87	550	2.8	18	31	19	50	2	-1	3	-0.5	-1	2	-1	-1	-1	17	-1	2	69.5
360	17014	210	23-25	S	0	17	-1	72	98	410	2.7	18	35	22	54	3	-1	2	-0.5	-1	2	-1	-1	-1	21	-1	2	69.5
361	17015	210	25-30	S	0	10	-1	58	110	390	2.4	18	40	27	42	2	-1	2	-0.5	-1	1	-1	-1	-1	18	-1	-1	25.9
362	17016	210	30-35	S	0	13	-1	52	120	400	2.3	20	43	28	42	3	-1	2	-0.5	-1	1	-1	-1	-1	20	-1	-1	67.2
363	13847R	210	30-35	S	0	13	-1	62	110	320	2.1	16	38	24	39	2	-1	2	-0.5	1	-1	-1	-1	1	13	-1	-1	41.8
364	17017	210	35-40	S	0	15	-1	44	110	430	2.4	22	42	29	43	2	-1	2	-0.5	-1	-1	-1	-1	1	17	-1	-1	45.0
365	17018	210	40-45	S	0	13	-1	45	110	400	2.2	20	40	27	38	1	-1	1	-0.5	-1	-1	-1	-1	-1	23	-1	1	55.6
366	17019	210	45-48	S	0	13	-1	56	120	400	2.3	21	44	29	32	1	-1	1	-0.5	-1	-1	-1	-1	-1	16	-1	-1	84.0
369	16868	211	20-25	S	0	26	-1	66	93	350	2.3	15	30	19	48	2	2	3	-0.5	-1	1	-1	-1	-1	15	-1	-1	70.6
370	16869	211	25-30	S	0	15	1	67	100	380	2.5	16	32	21	46	1	-1	2	-0.5	-1	1	-1	-1	-1	14	-1	-1	156.0
371	16871	211	36-40	S	0	11	2	76	98	410	2.7	20	36	25	69	-1	-1	3	-0.5	-1	1	-1	-1	1	18	-1	-1	82.9
372	16872	211	40-45	S	0	11	1	68	99	430	2.9	21	38	32	100	1	-1	3	-0.5	-1	1	-1	-1	3	20	-1	1	58.4
373	16873	211	45-50	S	0	11	-2	92	150	490	3.8	28	61	79	580	4	-1	10	-0.5	-1	2	-1	-1	8	21	-1	1	26.4
374	16873R	211	45-50	S	0	11	0	0	120	0	0.0	0	0	0	540	4	-1	9	-0.5	-1	2	-1	0	8	0	0	0	0.0
375	16874	211	50-55	S	0	11	1	110	190	500	4.1	28	67	64	320	4	1	12	-0.5	1	2	-1	-1	7	14	-1	-1	26.7
376	13848R	211	50-55	S	0	11	-1	120	210	530	4.4	29	74	80	400	5	-1	14	-0.5	1	2	-1	-1	5	10	-1	-1	31.0
377	16874R	211	50-55	S	0	11	0	0	150	0	0.0	0	0	0	320	4	1	10	-0.5	-1	2	-1	0	5	0	0	0	0.0
378	16827	212	25-30	S	0	27	-1	140	110	610	4.0	22	46	30	87	5	1	2	-0.5	-1	1	-1	-1	-1	19	-1	2	32.0
379	16829	212	55-60	S	0	27	-1	160	120	610	4.3	24	50	34	110	7	2	3	-0.5	1	1	-1	-1	-1	17	-1	2	40.6
380	16832	212	75-80	S	0	17	12	100	150	500	3.9	25	53	44	85													

APPENDIX 9-8B. List of All -63 um Sample Assays by Sample Number.

S.N.	DH	SI	DM	GL	DT	AU	V	CR	MN	FE	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U	MVA	RM
13830R	101	97.5-102.5	S	L	21	-1	130	79	550	3.0	17	33	22	79	9	2	3	-0.5	1	8	-1	-1	1	13	-1	3	39.9	
13831R	102	150-155	S	L	21	-1	140	91	570	3.2	18	38	26	90	9	-1	3	-0.5	-1	1	-1	-1	1	14	-1	3	41.8	
13832R	102	170-175	S	L	14	-1	71	77	410	2.5	15	24	17	37	7	-1	1	-0.5	-1	2	-1	-1	2	7	-1	-1	23.4	
13833R	103	80-85	S	L	21	2	140	90	480	3.2	17	36	23	81	5	-1	3	-0.5	-1	1	-1	-1	-1	12	-1	3	74.3	
13834R	104	60-65	S	L	21	-1	150	100	580	3.6	20	42	28	100	7	-1	3	-0.5	-1	2	-1	-1	1	16	-1	3	21.8	
13835R	104	84-89	S	L	15	-1	99	110	530	3.4	22	41	28	65	3	-1	2	-0.5	-1	1	-1	-1	5	14	-1	2	36.2	
13836R	106	70-75	S	L	21	-1	180	98	580	3.8	21	44	28	99	9	1	4	-0.5	-1	2	-1	-1	1	14	-1	3	37.1	
13837R	106	102-107	S	L	11	-1	83	120	520	3.3	22	39	23	47	3	-1	1	-0.5	-1	1	-1	-1	3	9	-1	-1	49.0	
13838R	108	84-89	S	L	21	-1	190	110	590	3.9	21	47	30	100	9	1	5	-0.5	-1	2	-1	-1	1	15	-1	3	43.5	
13839R	110	47-52	S	L	11	-1	120	130	280	4.3	23	47	52	170	5	-1	7	-0.5	-1	2	-1	-1	2	14	-1	3	39.7	
13840R	202	60.5-66	S	O	21	0	97	92	520	3.4	18	38	25	77	5	-1	3	-0.5	-1	5	-1	-1	-1	12	-1	2	28.2	
13841R	202	109-114	S	O	11	-1	52	63	340	2.0	13	21	13	37	2	-1	1	-0.5	-1	9	-1	-1	3	9	-1	-1	22.9	
13842R	204	85-90	S	O	11	-1	92	180	530	3.3	23	58	32	62	2	-1	1	-0.5	-1	11	-1	-1	1	9	-1	-1	56.5	
13843R	206	75-80	S	O	21	1	100	110	470	3.2	19	41	25	76	4	-1	2	-0.5	-1	11	-1	-1	-1	13	-1	2	35.9	
13844R	207	97.5-102	S	O	11	1	130	180	790	5.6	37	70	63	160	2	-1	4	-0.5	-1	12	-1	-1	5	18	-1	1	59.6	
13845R	208	98-103	S	O	11	-1	92	130	400	3.1	18	38	31	55	2	-1	6	-0.5	-1	9	-1	-1	4	12	-1	-1	73.8	
13846R	209	85-90	S	O	13	-1	77	110	430	2.7	17	36	29	43	1	-1	1	-0.5	-1	9	-1	-1	-1	14	-1	-1	68.0	
13847R	210	30-35	S	O	13	-1	62	110	320	2.1	16	38	24	39	2	-1	2	-0.5	1	-1	-1	-1	1	13	-1	-1	41.8	
13848R	211	50-55	S	O	11	-1	120	210	530	4.4	29	74	80	400	5	-1	14	-0.5	1	2	-1	-1	5	10	-1	-1	31.0	
13849R	212	90-95	S	O	11	-1	180	210	770	6.2	41	82	91	240	3	-1	4	-0.5	1	2	-1	-1	2	11	-1	2	87.5	
13850	101	125-126	S	L	11	-1	150	170	560	4.3	25	58	38	91	5	-1	2	-0.5	-1	5	-1	-1	2	13	-1	2	72.6	
13851	208	108-113	S	O	32	-1	170	87	400	3.2	15	32	23	84	12	-1	3	-0.5	-1	6	-1	-1	-1	15	-1	2	75.1	
16801	202	4-9	S	O	21	-1	110	210	330	4.2	26	68	79	55	2	-1	10	-0.5	1	1	-1	-1	7	13	-1	-1	31.2	
16802	202	9-14	S	O	21	-1	160	87	560	3.3	17	37	24	92	11	2	2	-0.5	-1	4	-1	-1	-1	24	-1	3	30.1	
16803	202	14-19	S	O	21	-1	140	81	430	3.2	15	34	23	85	9	1	2	-0.5	-1	4	-1	-1	1	17	-1	3	48.5	
16804	202	19-23	S	O	21	-1	140	87	490	3.1	16	36	24	88	9	-1	2	-0.5	-1	3	-1	-1	-1	16	-1	3	63.8	
16808	202	38-42.5	S	O	21	-1	120	77	480	3.0	15	32	20	80	13	-1	2	-0.5	1	5	-1	-1	-1	15	-1	3	53.9	
16809	202	42.5-47.5	S	O	21	-1	91	64	450	2.7	13	25	15	58	5	-1	1	-0.5	-1	3	-1	-1	-1	13	-1	2	42.5	
16811	202	50.5-55.5	S	O	21	51	140	98	560	3.5	19	41	28	91	5	-1	2	-0.5	-1	5	-1	-1	1	18	-1	3	65.3	
16813	202	60.5-66	S	O	21	1	88	86	500	3.3	17	36	24	72	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	2	35.9	
16814	202	66-70	S	O	21	-1	80	84	460	2.9	16	32	21	59	5	1	1	-0.5	-1	2	-1	-1	-1	15	-1	2	39.2	
16815	202	70-73	S	O	11	2	53	72	360	2.0	13	24	13	36	2	-1	-1	-0.5	-1	2	-1	-1	1	11	-1	-1	49.0	
16816	202	73-76	S	O	11	2	64	98	360	2.0	13	24	13	36	3	-1	5	-0.5	-1	2	-1	-1	3	17	-1	2	38.0	
16817	202	76-81	S	O	11	-1	60	120	410	2.8	16	33	25	52	2	-1	4	-0.5	-1	1	-1	-1	11	12	-1	-1	24.5	
16817R	202	76-81	S	O	11	0	0	98	0	0.0	0	0	0	52	2	1	5	-0.5	-1	1	-1	0	10	0	0	0	0.0	
16818	202	81-86	S	O	11	-1	51	80	370	2.3	14	26	17	35	1	-1	1	-0.5	-1	1	-1	-1	7	12	-1	-1	23.0	
16819	202	86-91	S	O	11	-1	52	73	350	2.2	13	24	16	37	1	-1	-1	-0.5	-1	1	-1	-1	5	10	-1	-1	21.8	
16820	202	91-94	S	O	11	1	53	69	330	2.1	13	24	14	40	1	-1	1	-0.5	-1	1	-1	-1	2	14	-1	-1	47.3	
16821	202	94-99	S	O	11	-1	43	62	290	1.8	12	19	11	33	1	2	-1	-0.5	-1	1	-1	-1	5	16	-1	-1	21.8	
16822	202	99-104	S	O	11	28	46	58	300	1.8	11	19	10	30	1	-1	2	-0.5	-1	-1	-1	-1	3	18	-1	-1	52.3	
16822R	202	99-104	S	O	11	0	0	48	0	0.0	0	0	0	31	1	1	2	-0.5	-1	-1	-1	0	3	0	0	0	0.0	
16823	202	104-109	S	O	11	-1	54	62	400	2.2	13	20	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	14	-1	-1	22.8	
16824	202	109-114	S	O	11	1	49	58	320	1.8	11	19	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	13	-1	-1	73.8	
16825	202	114-117	S	O	11	1	52	63	370	2.2	13	19	12	35	1	-1	2	-0.5	1	-1	-1	-1	2	15	-1	-1	66.9	
16826	202	117-122	S	O	11	1	64	150	410	2.7	17	43	19	42	1	-1	3	-0.5	-1	-1	-1	-1	2	12	-1	-1	26.5	
16827	212	25-30	S	O	27	-1	140	110	610	4.0	22	46	30	87	5	1	2	-0.5	-1	1	-1	-1	-1	19	-1	2	32.0	
16829	212	55-60	S	O	27	-1	160	120	610	4.3	24	50	34	110	7	2	3	-0.5	1	1	-1	-1	-1	17	-1	2	40.6	
16832	212	75-80	S	O	17	12	100	150	500	3.9	25	53	44	85	3	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	1	49.2	
16833	212	80-85	S	O	11	-1	110	150	770	5.1	34	59	53	120	2	-1	2	-0.5	1	1	-1	-1	1	13	-1	1	29.7	
16834	212	85-90	S	O	11	7	160	190	840	6.9	47	78	73	250	4	-1	5	-0.5	1	3	-1	-1	2	17	-1	4	91.5	
16835	212	90-95	S	O	11	-1	150	200	700	5.5	36	69	75	200	2	-1	5	-0.5	1	2	-1	-1	2	15	-1	2	92.4	
16836	212	95-98	S	O	11	31	150	230	920	6.0	35	57	85	250	4	1	8	-0.5	-1	2	-1	-1	1	12	-1	1	109.6	
16837	212	98-102	S	O	32	1	76	85	620	5.6	34	65	98	340	4	-1	13	-0.5	1	2	-1	-1	2	8	-1	-1	41.3	
16838	212	102-107	S	O	32	2	39	43	130	2.9	14	18	26	69	1	-1	2	-0.5	-1	-1	-1	-1	1	4	-1	-1	33.9	
16840	208	20-25	S	O	14	15	110	170	650	4.6	35	78	90	70	11	-1	6	-0.5	-1	1	-1	-1	2	14	-1	-1	80.0	
16840R	208	20-25	S	O	14	0	0	160	0	0.0	0	0	0	80	8	-1	5	-0.5	1	1	-1	0	2	0	0	0	0.0	
16842	208	30-35	S	O	15	-1	110	140	520	5.1	35	66	80	61	25	-1	4	-0.5	-1	1	-1	-1	1	21	-1	1	20.6	SI[-63]=25-35
16842R	208	30-35	S	O	15	0	0	130	0	0.0	0	0	0	67	14	1	3	-0.5	-1	1	-1	0	1	0	0	0	0.0	
16844	208	45-50	S	O	15	13	82	130	540	3.6	24	46	33	46	5	-1	2	-0.5	1	-1	-1	-1	-1	12	-1	-1	18.1	SI[-63]=40-50
16846</																												

APPENDIX 9-8B.

16887	209	100-105	S O 11	-1	82	130	550	3.5	26	46	37	62	1	-1	1	-0.5	1	-1	-1	-1	9	20	-1	1	86.5
16887R	209	100-105	S O 11	0	0	100	0	0.0	0	0	0	60	2	-1	2	-0.5	-1	1	-1	0	9	0	0	0	0.0
16895	108	56-61	S L 21	-1	150	98	630	4.1	25	49	30	99	9	-1	4	-0.5	1	2	-1	-1	1	21	-1	4	18.2 SI[-63]=51-61
16897	108	66-71	S L 21	1	160	98	640	0.0	23	44	28	92	9	1	4	-0.5	16	2	-1	-1	1	16	-1	3	14.2 SI[-63]=61-71
16897R	108	66-71	S L 21	0	0	68	0	0.0	0	0	0	88	7	1	3	-0.5	1	2	-1	0	1	0	0	0	0.0
16898	108	71-76	S L 21	-1	170	98	630	4.2	23	46	29	98	10	2	4	-0.5	1	2	-1	-1	1	18	-1	3	20.5
16899	108	76-81	S L 24	1	160	98	620	3.9	23	45	28	96	10	2	4	-0.5	1	2	-1	-1	1	20	-1	3	24.9
16900	108	84-89	S L 21	-1	180	100	670	4.3	25	48	31	110	11	3	4	-0.5	1	2	-1	-1	1	17	-1	3	37.8
16901	108	96-100.5	S L 14	-1	91	120	570	3.9	27	52	35	60	3	-1	2	-0.5	-1	-1	-1	-1	1	11	-1	-1	32.1
16902	108	100.5-106	S L 11	-1	86	120	620	3.7	25	47	28	55	2	-1	2	-0.5	-1	1	-1	-1	-1	17	-1	-1	27.4
16903	108	106-111	S L 11	-1	92	120	610	3.8	25	48	31	54	2	-1	2	-0.5	-1	1	-1	-1	-1	13	-1	1	34.5
16904	108	111-116	S L 11	-1	83	120	620	3.6	25	45	29	47	2	-1	2	-0.5	-1	1	-1	-1	2	15	-1	1	32.3
16905	108	116-121	S L 11	-1	84	130	710	4.4	26	46	31	63	2	-1	3	-0.5	1	-1	-1	-1	3	24	-1	4	58.8
16906	108	121-126	S L 11	-1	87	120	640	3.7	26	47	31	57	3	-1	2	-0.5	1	-1	-1	-1	3	14	-1	-1	48.4
16907	108	126-131.5	S L 13	-1	110	170	740	0.5	34	75	63	85	3	-1	4	-0.5	1	1	-1	-1	6	17	-1	1	28.1
16910	103	75-80	S L 21	-1	130	91	610	3.7	21	39	24	80	25	-1	3	-0.5	16	1	-1	-1	-1	18	-1	3	45.3 SI[-63]=70-80
16910R	103	75-80	S L 21	0	0	58	0	0.0	0	0	0	74	6	-1	3	-0.5	1	2	2	0	-1	0	0	0	0.0
16911	103	80-85	S L 21	-1	140	92	550	3.6	20	39	23	82	5	-1	4	-0.5	1	2	1	-1	1	18	-1	3	37.5
16912	103	85-91	S L 21	-1	150	94	570	3.8	21	41	26	90	11	-1	4	-0.5	1	2	-1	-1	1	19	-1	4	44.4
16913	103	100-105	S L 27	-1	190	120	640	1.6	26	52	33	120	12	1	4	-0.5	1	2	-1	-1	1	22	-1	4	60.2
16914	103	105-110	S L 27	1	160	120	700	4.5	26	52	33	110	8	-1	3	-0.5	1	2	-1	-1	1	22	-1	4	52.1
16915	103	118-119.5	S L 26	1	77	120	530	3.3	21	38	22	56	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	-1	91.2
16916	103	119.5-122	S L 11	-1	74	100	530	3.3	23	34	20	49	5	-1	2	-0.5	-1	-1	-1	-1	6	17	-1	2	77.2
16918	206	25-30	S O 26	-1	99	110	650	3.9	25	46	28	77	5	-1	2	-0.5	-1	1	-1	-1	4	21	-1	2	22.9
16919	206	32.5-37	S O 21	-1	97	100	600	3.7	22	42	27	74	5	-1	2	-0.5	-1	-1	-1	-1	-1	18	-1	2	27.7
16921	206	60-65	S O 27	-1	98	110	580	3.7	22	42	25	71	5	-1	2	-0.5	-1	1	-1	-1	-1	18	-1	2	49.0
16923	206	80-82.5	S O 21	2	95	110	570	3.6	22	46	28	72	3	-1	2	-0.5	1	-1	-1	-1	-1	21	-1	2	27.0 SI[-63]=75-82.5
16924	206	85-90	S O 27	2	150	130	660	4.2	25	52	33	100	9	-1	2	-0.5	1	1	-1	-1	-1	22	-1	3	23.1
16925	206	90-95	S O 27	1	150	140	600	4.0	24	49	33	89	9	-1	2	-0.5	-1	1	-1	-1	-1	21	-1	2	31.7
16927	206	101.5-107.5	S O 15	-1	58	95	290	2.2	17	31	26	33	5	-1	2	-0.5	-1	-1	-1	-1	-1	10	-1	-1	53.5
16929	101	15-20	S L 21	-2	120	89	560	3.5	20	39	25	77	7	-1	3	-0.5	-1	1	-1	-1	-1	20	-1	3	36.5
16931	101	40-45	S L 21	1	120	83	580	3.2	19	34	22	86	9	-1	3	-0.5	-1	1	-1	-1	-1	17	-1	3	88.5
16935	101	70-75	S L 21	1	110	76	590	3.2	18	33	21	77	9	2	3	-0.5	-1	1	-1	-1	-1	16	-1	3	25.4 SI[-63]=65-75
16940	101	95-97.5	S L 21	-1	130	82	650	3.4	20	37	24	87	9	1	4	-0.5	-1	1	-1	-1	1	17	-1	4	42.6
16941	101	97.5-102.5	S L 21	1	130	80	660	3.5	20	37	24	88	9	-1	4	-0.5	-1	1	-1	-1	-1	16	-1	3	31.4
16942	101	102.5-107.5	S L 21	-1	130	83	650	3.5	21	35	23	88	9	2	4	-0.5	-1	1	-1	-1	1	19	-1	3	38.7
16944	101	112.5-117.5	S L 27	-1	120	120	590	3.6	23	42	25	79	5	-1	2	-0.5	-1	1	-1	-1	-1	19	-1	2	24.2 SI[-63]=107.5-117.5
16945	101	117.5-123	S L 25	-1	92	110	500	3.3	23	37	25	54	5	-1	2	-0.5	-1	-1	-1	-1	-1	15	-1	-1	26.5
16946	101	123-126	S L 21	-1	120	150	640	4.4	28	57	38	83	4	-1	3	-0.5	-1	1	-1	-1	2	19	-1	2	75.4 AF OVERLAPS RAINY
16947	106	14.5-19.5	S L 24	-2	73	68	940	2.8	15	25	21	79	7	-1	3	-0.5	-1	-1	-1	-1	1	21	-1	3	24.4
16949	106	35-40	S L 21	1	150	96	640	3.9	23	42	28	93	5	-1	4	-0.5	-1	2	-1	-1	1	21	-1	4	25.1 SI[-63]=30-40
16952	106	50-55	S L 21	-1	160	97	610	3.9	23	44	28	94	10	-1	5	-0.5	-1	2	1	-1	1	21	-1	4	29.6 SI[-63]=45-55
16954	106	60-65	S L 21	-1	160	96	560	3.6	21	40	26	93	9	-1	5	-0.5	-1	2	-1	-1	1	21	-1	4	36.3 SI[-63]=55-65
16955	106	65-70	S L 21	1	170	93	580	3.6	22	43	27	88	7	-1	4	-0.5	1	2	-1	-1	1	21	-1	4	88.1
16957	106	75-77	S L 21	-1	160	91	530	3.5	21	40	25	92	9	-1	4	-0.5	1	2	-1	-1	1	22	-1	4	55.1 SI[-63]=70-77
16958	106	77-82	S L 21	2	120	77	540	3.0	18	35	21	77	5	-1	3	-0.5	-1	2	-1	-1	1	19	-1	4	26.2
16960	106	90-95	S L 27	-1	150	120	590	4.3	26	53	34	110	7	-1	3	-0.5	1	2	-1	-1	1	22	-1	3	22.0 SI[-63]=85-95
16961	106	98.5-102	S L 11	4	81	110	500	3.2	22	39	23	48	4	-1	2	-0.5	-1	1	-1	-1	1	12	-1	-1	24.4
16962	106	102-107	S L 11	1	80	120	410	2.9	21	37	21	44	3	-1	2	-0.5	-1	1	-1	-1	5	11	-1	-1	56.4
16965	109	20-24	S L 21	-1	160	92	610	3.9	22	46	29	98	10	-1	5	-0.5	1	2	1	-1	1	16	-1	3	29.1
16966	109	25-30	S L 21	-1	150	93	560	3.5	21	42	27	97	7	-1	5	-0.5	1	2	1	-1	1	16	-1	3	23.9
16967	109	30-35	S L 21	-1	160	93	570	3.8	22	43	26	96	10	-1	4	-0.5	1	2	1	-1	1	15	-1	3	25.1
16968	109	35-40	S L 21	-1	110	75	510	2.9	18	39	20	74	5	1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	45.7
16969	109	40-45	S L 21	-1	180	92	580	3.8	22	45	28	99	9	1	4	-0.5	1	2	1	-1	1	15	-1	3	30.9
16973	107	45-48.5	S L 21	-1	120	66	460	2.9	17	32	20	70	5	-1	3	-0.5	-1	1	-1	-1	-1	14	-1	2	34.3 SI[-63]=40-48.5
16975	107	65-70	S L 14	4	140	110	560	3.9	24	48	35	97	5	-1	3	-0.5	1	2	-1	-1	2	21	-1	2	15.0
16977	107	75-80	S L 14	3	170	110	600	4.1	24	48	32	100	7	-1	4	-0.5	1	2	1	-1	1	19	-1	3	22.8 SI[-63]=70-80
16979	107	84-89	S L 14	-3	120	120	570	3.8	22	47	47	280	9	1	8	-0.5	1	2	1	-1	2	23	-1	3	10.0 SI[-63]=80-89
16980	107	90-95	S L 14	-7	88	110	530	3.8	24	46	43	240	5	-1	5	-0.5	1	1	-1	-1	2	16	-1	-1	6.8
16981	107	95-100	S L 14	1100	100	140	590	4.5	30	56	41	95	4	-1	4	-0.5	1	2	-1	-1	3	18	-1	-1	25.4
16983	107	105-110	S L 14	8	100	140	670	4.5	29	53	39	110	4	-1	5	-0.5	-1	1	-1	-1	2	22	-1	-1	3.8 SI[-63]=100-110
16985	107	115-120	S L 14	-5	110	180	810	5.0	35	69	37	89	3	-1	3	-0.5	-1	2	-1	-1	1	18	-1	-1	4.7 SI[-63]=110-120
16987	107	125-127	S L 15	15	140	180	800	5.7	38	54	39	110	7	-1	5	-0.5	-1	2	-1	-1	2	19	-1	2</	

APPENDIX 9-8B.

17017	210	35-40	S O 15	-1	44	110	430	2.4	22	42	29	43	2	-1	2	-0.5	-1	-1	-1	-1	1	17	-1	-1	45.0	
17018	210	40-45	S O 13	-1	45	110	400	2.2	20	40	27	38	1	-1	1	-0.5	-1	-1	-1	-1	-1	23	-1	1	55.6	
17019	210	45-48	S O 13	-1	56	120	400	2.3	21	44	29	32	1	-1	1	-0.5	-1	-1	-1	-1	-1	16	-1	-1	84.0	
17021	207	14-19	S O 27	3	170	130	620	4.2	26	53	33	100	7	-1	2	-0.5	-1	2	-1	-1	1	24	-1	3	51.6	
17023	207	35-40	S O 27	1	190	140	730	4.6	30	59	38	110	5	-1	2	-0.5	-1	1	-1	-1	-1	21	-1	3	42.5	
17025	207	55-60	S O 27	-1	180	130	590	4.2	24	50	33	100	5	-1	2	-0.5	-1	1	-1	-1	1	19	-1	3	38.4	
17026	207	75-81.5	S O 17	-1	100	130	400	3.1	20	43	35	64	2	-1	1	-0.5	1	1	-1	-1	-1	16	-1	1	39.8	
17028	207	86.5-91.5	S O 10	-1	97	110	460	3.1	21	40	34	61	2	-1	1	-0.5	-1	1	-1	-1	-1	15	-1	1	27.7	
17029	207	91.5-93.5	S O 11	-1	110	110	600	4.1	27	51	45	76	3	-1	1	-0.5	-1	2	-1	-1	-1	16	-1	1	86.3	
17030	207	93.5-97.5	S O 10	1	120	130	690	4.5	30	49	56	82	1	-1	2	-0.5	-1	2	-1	-1	1	17	-1	1	42.0	
17031	207	97.5-102	S O 11	1	150	120	760	5.4	36	64	54	130	1	-1	3	-0.5	-1	2	-1	-1	6	18	-1	2	69.4	
17032	207	102-107	S O 11	1	170	140	890	6.6	43	75	79	150	1	-1	4	-0.5	1	2	-1	-1	2	20	1	2	47.1	
17033	207	107-108	S O 13	-1	160	180	1000	7.0	47	86	90	160	1	3	6	-0.5	1	2	-1	-1	2	21	-1	2	94.8	
17035	102	25-30	S L 21	0	0	51	0	0.0	0	0	0	69	6	1	2	-0.5	1	1	-1	0	-1	0	0	0	14.9	SI[-63]=20-30
17035R	102	25-30	S L 21	-1	120	74	500	3.2	17	32	20	74	5	-1	3	-0.5	-1	2	-1	-1	-1	13	-1	2	0.0	
17037	102	45-50	S L 21	-1	120	81	560	3.3	19	35	21	83	7	-1	3	-0.5	-1	1	-1	-1	-1	15	-1	3	23.1	SI[-63]=40-50
17041	102	85-90	S L 21	-1	120	79	590	3.3	19	35	22	82	7	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	18.5	SI[-63]=80-90
17043	102	110-115	S L 21	-1	120	82	560	3.1	18	33	20	79	6	-1	3	-0.5	-1	1	-1	-1	-1	15	-1	3	14.0	SI[-63]=105-115
17044	102	135-140	S L 21	-1	130	87	630	3.5	20	37	23	79	7	1	3	-0.5	-1	2	-1	-1	-1	19	-1	3	40.9	
17049	102	140-145	S L 21	-1	140	84	640	3.7	20	38	24	87	8	-1	3	-0.5	-1	1	-1	-1	-1	16	-1	3	36.1	
17050	102	145-150	S L 21	2	130	82	660	3.6	21	39	25	87	6	-1	3	-0.5	-1	2	-1	-1	-1	19	-1	3	64.0	
17051	102	150-155	S L 21	1	140	89	660	3.7	21	40	25	92	6	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3	59.4	
17052	102	155-157	S L 21	-1	140	90	640	3.7	21	41	26	89	6	-1	3	-0.5	-1	2	-1	-1	1	25	-1	3	55.4	
17053	102	160-165	S L 11	15	71	89	520	3.4	21	33	18	51	3	-1	2	-0.5	-1	1	-1	-1	8	15	-1	1	44.9	
17054	102	165-170	S L 14	12	65	69	440	2.6	16	23	9	34	2	-1	1	-0.5	-1	1	-1	-1	2	14	-1	1	33.8	
17055	102	170-175	S L 14	6	65	67	390	2.4	15	22	12	30	2	-1	1	-0.5	-1	-1	-1	-1	2	11	-1	-1	51.6	
17056	102	175-178.5	S L 10	6	67	61	400	2.6	16	25	11	33	2	-1	1	-0.5	-1	-1	-1	-1	2	12	-1	-1	58.3	
17057	102	178.5-183	S L 14	-1	72	79	410	2.7	17	25	12	38	2	-1	1	-0.5	-1	1	-1	-1	2	11	-1	1	53.8	
17059	104	15-20	S L 21	1	150	78	580	3.4	20	38	23	83	5	-1	4	-0.5	-1	2	1	-1	1	16	-1	3	34.8	
17060	104	20-25	S L 21	1	120	76	540	3.3	18	35	20	73	5	-1	4	-0.5	-1	2	1	-1	1	14	-1	3	22.5	
17062	104	30.5-34	S L 27	1	130	110	620	3.6	22	44	26	91	4	-1	5	-0.5	1	3	5	-1	1	18	-1	3	20.9	SI[-63]=25.5-34
17062R	104	30.5-34	S L 27	0	0	83	0	0.0	0	0	0	85	5	-1	2	-0.5	1	1	-1	0	-1	0	0	0	0.0	
17064	104	45-50	S L 21	-1	160	90	650	3.8	21	42	27	90	7	-1	5	-0.5	-1	3	1	-1	1	19	-1	4	23.7	SI[-63]=40-50
17066	104	55-60	S L 21	-1	170	96	610	3.8	22	47	27	100	7	-1	5	-0.5	-1	3	1	-1	2	18	-1	3	25.5	
17067	104	60-65	S L 21	1	170	89	630	3.9	22	45	28	100	7	1	5	-0.5	1	3	-1	-1	-1	3	-1	-1	28.8	
17068	104	65-69	S L 21	2	150	88	660	4.0	23	45	28	98	7	-1	5	-0.5	1	3	2	-1	1	19	-1	3	32.4	
17069	104	69.5-73	S L 21	-1	140	69	640	3.8	21	43	27	95	5	-1	6	-0.5	1	3	2	-1	1	17	-1	3	50.3	
17069R	104	69.5-73	S L 21	0	0	73	0	0.0	0	0	0	92	7	1	3	-0.5	1	1	-1	0	1	0	0	0	0.0	
17070	104	73-77.5	S L 21	2	140	88	630	3.8	21	44	27	110	6	-1	6	-0.5	1	3	3	-1	2	16	-1	3	35.4	
17071	104	77.5-81	S L 27	1	120	100	590	3.7	21	46	26	88	4	-1	6	-0.5	-1	3	1	-1	1	18	-1	3	53.9	
17072	104	81-84	S L 10	1	98	92	530	3.4	20	39	21	69	3	-1	5	-0.5	1	2	1	-1	2	17	-1	3	69.8	
17073	104	84-89	S L 15	2	87	97	470	3.2	20	36	20	60	3	-1	5	-0.5	1	2	1	-1	5	18	-1	3	27.4	
18762	10501	62-71	A L 13	122	126	61	675	4.03	15	41	39	93	-5	-5	3	-0.5	-1	35	-5	-10	-10	19	-2	-10	5.9	
18764	10501	71-76	A L 11	15	104	63	643	3.47	19	43	43	53	-5	-5	5	-0.5	-1	-10	7	-10	91	26	3	-10	14.5	
18765	10501	76-81	A L 11	5	113	65	621	3.07	15	31	27	33	9	-5	3	-0.5	-1	-10	-5	-10	45	10	-2	-10	36.3	
18767	10704	92-97	A L 15	7	87	39	423	1.91	9	17	19	29	9	-5	3	-0.5	-1	199	-5	-10	-10	15	3	-10	183.0	
18767R	10704	92-97	A L 15	6	70	34	464	1.92	14	32	20	40	10	-5	2	-0.5	-1	-10	-5	-10	-10	18	3	-10	0	
18767R	10704	92-97	A L 15	2	74	34	458	1.87	12	26	18	44	14	-5	2	-0.5	-1	-10	-5	-10	-10	14	3	-10	0	
18767R	10704	92-97	A L 15	2	70	32	452	1.86	12	26	18	40	-5	-5	2	-0.5	-1	-10	-5	-10	-10	20	3	-10	0	
18767R	10704	92-97	A L 15	2	68	38	454	2.16	12	40	18	38	12	-5	4	0.6	-1	-10	-5	-10	-10	18	3	-10	0	
18767R	10704	92-97	A L 15	-1	70	38	454	1.87	12	26	18	42	22	-5	2	-0.5	-1	-10	-5	-10	-10	18	5	-10	0	
18767R	10704	92-97	A L 15	-1	70	34	456	1.87	12	24	18	38	20	-5	2	-0.5	-1	-10	-5	-10	-10	12	5	-10	0	
18767R	10704	92-97	A L 15	2	74	38	454	1.92	12	26	18	40	20	-5	2	-0.5	-1	-10	-5	-10	-10	10	3	-10	0	
18767R	10704	92-97	A L 15	1	70	34	450	1.87	12	30	18	36	14	-5	2	-0.5	-1	-10	-5	-10	-10	8	5	-10	0	
18767R	10704	92-97	A L 15	-1	74	34	454	1.87	12	26	18	40	14	-5	2	-0.5	-1	-10	-5	-10	-10	10	3	-10	0	
18768	10704	97-102	A L 13	1	95	37	477	2.07	9	17	17	25	13	-5	3	-0.5	-1	-10	5	-10	-10	17	5	-10	133.7	
18769	10704	102-105	A L 15	4	98	41	545	2.37	11	23	21	31	11	-5	3	-0.5	-1	-10	5	-10	-10	17	-2	-10	21.1	
18771	10704	105-106	A L 11	-1	125	51	629	3.03	17	31	33	39	13	-5	3	-0.5	-1	-10	-5	-10	47	17	5	-10	37.1	
18773	10401	117-122	A L 10	2	105	51	545	2.39	15	29	29	29	31	-5	5	-0.5	-1	15	13	-10	-10	30	5	-10	32.5	
18774	10401	122-146	A L 14	-1	88	59	633	3.11	15	31	29	35	21	-5	7	-0.5	-1	-10	11	-10	-10	43	-2	-10	40.1	
18775	10401	146-151	A L 15	-1	105	51	619	3.27	15	33	29	39	25	-5	7	-0.5	-1	-10	11	-10	-10	39	3	-10	18.9	
18776	10401	151-157	A L 15	-1	95	53	511	2.39	13	25	15	25	13	-5	5	-0.5	-1	-10	7	-10	-10	30	5	-10	56.3	

APPENDIX 9-8B.

18824	10503	5-10	A L 14	4	61	63	606	3.36	17	43	37	65	-5	-5	1	-0.5	-1	-10	-5	-10	-10	25	9	-10	27.4
18825	10503	10-15	A L 14	-1	51	57	579	3.02	13	37	29	53	-5	-5	1	-0.5	6	-10	-5	-10	-10	15	3	-10	20.7
18826	10503	15-20	A L 15	17	51	57	531	2.80	15	39	37	59	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	7	-2	-10	20.7
18827	10503	20-25	A L 15	-1	54	63	598	3.04	15	35	31	59	-5	5	1	-0.5	-1	-10	-5	-10	-10	25	11	-10	55.8
18828	10503	25-30	A L 12	20	56	59	597	2.90	13	35	59	61	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	3	-10	19.2
18829	10503	30-35	A L 12	3	48	55	575	3.34	17	47	53	73	-5	-5	5	-0.5	-1	-10	-5	-10	43	15	5	-10	14.1
18830	10503	35-40	A L 12	-1	52	57	600	3.36	17	51	57	63	-5	-5	1	-0.5	6	-10	-5	-10	23	13	-2	-10	17.9
18831	10503	40-45	A L 14	-1	68	75	728	3.99	19	53	57	-1	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	7	11	-10	17.0
18832	10503	45-50	A L 14	-1	64	65	734	3.46	19	63	59	63	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	-2	-10	11.7
18833	10503	50-55	A L 12	-1	70	73	1144	4.01	23	59	67	71	-5	-5	1	-0.5	-1	-10	-5	-10	-10	7	3	-10	13.3
18834	10503	55-60	A L 12	-1	61	63	762	3.48	17	45	53	55	-5	-5	1	-0.5	-1	-10	-5	-10	-10	17	3	-10	8.0
18835	10503	60-65	A L 12	-1	72	69	660	3.54	17	43	41	53	-5	-5	1	-0.5	-1	-10	-5	-10	-10	17	5	-10	17.2
18836	10503	65-70	A L 12	3	78	47	447	2.36	13	45	35	15	-5	-5	1	-0.5	-1	-10	-5	-10	-10	-5	3	-10	0.9
18837	10503	70-72	A L 12	26	67	83	587	3.76	23	61	77	71	-5	-5	3	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	10.0
18839	10901	113-118	A L 15	3	56	55	600	2.72	13	33	45	47	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	11	5	-10	98.6
18842	10901	118-123	A L 15	10	51	47	557	2.54	11	31	43	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	-5	3	-10	74.3
18843	10901	123-128	A L 15	17	64	59	620	3.00	13	35	47	47	-5	-5	1	-0.5	-1	-10	-5	-10	-10	5	-2	-10	21.9
18844	10901	128-133	A L 13	15	52	51	551	2.72	13	35	41	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	5	-2	-10	27.7
18845	10901	133-135	A L 13	9	71	57	606	3.06	15	37	47	55	-5	-5	1	-0.5	-1	-10	-5	-10	-10	11	-2	-10	23.1
18846	10901	135-140	A L 34	-1	54	51	447	2.96	33	69	103	63	-5	-5	1	-0.5	-1	-10	-5	-10	45	21	3	-10	59.2
18849	11102	35-38	A L 11	7	40	31	384	1.97	7	19	31	31	-5	-5	-1	-0.5	-1	-10	-5	-10	15	7	5	-10	17.8
18851	11006	39-44	A L 11	1	99	73	690	3.76	15	59	45	67	-5	10	1	-0.5	-1	-10	-5	-10	13	11	5	-10	8.0
18852	11006	44-46	A L 11	-1	67	57	696	2.88	15	45	41	45	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	-5	-2	-10	31.7
18853	11006	46-51	A L 14	-1	64	69	1257	3.78	31	111	123	63	5	-5	3	-0.5	-1	-10	-5	-10	-10	15	3	-10	42.7
18854	10403	94-99	A L 11	3	69	45	632	2.76	17	53	31	53	-5	14	3	0.5	-1	-10	5	-10	63	39	-2	-10	41.7
18856	10202	102-107	A L 13	3	82	33	549	2.24	11	53	21	71	-5	-5	1	-0.5	-1	-10	-5	-10	-10	35	-2	-10	20.9
18857	10202	107-112	A L 13	3	100	47	549	2.46	15	63	27	77	-5	-5	1	-0.5	-1	-10	-5	-10	-10	37	-2	-10	22.8
18858	10202	112	A L 18	28	58	-1	569	2.62	13	57	21	51	-5	45	1	-0.5	-1	-10	-5	-10	-10	105	-2	-10	17.1 SLUFF MAT'L
18859	10202	112-117	A L 13	4	52	43	455	2.12	9	47	17	41	-5	-5	1	-0.5	-1	-10	-5	-10	-10	27	-2	-10	15.7
18861	10202	117-122	A L 10	8	62	43	539	2.56	13	63	27	61	-5	-5	1	-0.5	-1	-10	-5	-10	-10	37	-2	-10	30.5
18862	10202	122-127	A L 13	2	59	43	445	2.04	13	43	13	35	-5	8	1	0.5	-1	-10	-5	-10	-10	29	-2	-10	27.4
18863	10202	127-132	A L 13	6	66	49	483	2.28	13	45	15	41	-5	-5	1	0.5	-1	-10	-5	-10	-10	29	5	-10	29.5
18864	10202	132-137	A L 10	5	64	45	529	2.48	15	45	23	47	-5	-5	1	0.9	-1	-10	5	-10	-10	41	-2	-10	18.9
18865	10202	137-142	A L 15	2	63	61	539	2.58	15	47	21	47	-5	-5	1	0.9	-1	-10	15	-10	-10	49	-2	-10	27.5
18866	10202	142-147	A L 15	2	61	61	571	2.62	17	47	21	49	-5	-5	1	2.7	-1	-10	11	-10	-10	47	-2	-10	29.4
18867	10202	147-152	A L 14	3	59	49	471	2.16	15	39	17	39	-5	-5	1	1.5	-1	-10	7	-10	-10	41	5	-10	32.6
18868	10202	152-157	A L 13	6	51	51	499	2.36	13	39	15	37	-5	-5	1	1.5	-1	-10	13	-10	-10	37	-2	-10	20.1
18869	10202	157-162	A L 11	2	61	59	612	3.00	17	55	33	57	-5	-5	1	1.5	-1	-10	9	-10	-10	43	7	-10	12.0
18871	10102	123-128	A L 15	23	69	69	823	3.44	23	61	29	45	-5	-5	1	2.7	-1	-10	13	-10	-10	45	9	-10	26.2
18872	10102	128-133	A L 13	2	75	63	694	3.10	25	67	43	41	-5	-5	1	2.7	-1	-10	9	-10	-10	43	5	-10	16.2
18873	10102	133-137.5	A L 13	6	71	63	720	3.04	21	67	35	47	-5	-5	1	1.7	-1	-10	9	-10	-10	41	-2	-10	31.1
18875	10105	145-155	A L 15	1	44	49	616	2.84	15	55	29	57	-5	14	3	0.9	-1	-10	11	13	-10	47	-2	-10	18.9
18876	10105	155-162	A L 13	1	83	67	855	3.99	23	81	39	77	-5	-5	5	2.3	-1	-10	15	-10	-10	57	3	-10	8.1
18877	10105	162-167	A L 13	40	55	55	748	3.08	19	61	35	57	-5	-5	5	1.7	-1	-10	7	-10	21	47	-2	-10	19.6
18878	10105	167-172	A L 15	6	89	75	1002	3.92	29	75	39	51	-5	5	3	3.7	-1	-10	7	-10	13	49	7	19	20.5
18879	10105	172-177	A L 13	7	95	80	1000	4.00	27	80	41	55	-5	-5	2	1.0	-1	-10	5	-10	10	45	5	-10	6.9
18881	10105	177-190	A L 13	1	69	77	841	3.62	23	73	39	47	-5	-5	5	2.3	-1	-10	17	-10	51	47	5	-10	9.9
18882	10202	162-167	A L 13	75	103	77	1496	9.09	23	87	51	59	-5	-5	9	1.7	-1	-10	19	-10	352	53	-2	-10	5.2

Appendix 9-9A. List of all nonmag HMC sample assays, by drill hole.

S. N.	DH	DM	DT	AU	NA	SC	CE	CR	MN	FE	CO	NI	CU	ZN	AS	SE	BR	RB	ZR	MO	AG	CD	SN	SB	TE	CS	BA	LA	SH	EU	TE	VB	LU	IR	HF	TA	W	PB	BI	TH	U	WT	ZN2	AG2
16933	101	S	21	10	.14	0	477	610	6700	24.1	55	110	84	270	92	-10	0	0	0	19	.5	0	-10	3.9	0	0	3700	273	0	0	0	0	0	-100	140	8	-10	21	-2	100	16.4	7.23	0	0
16938	101	S	21	91	.14	0	520	660	6900	23.2	54	130	97	290	88	-10	0	0	0	17	.5	0	-10	3.7	0	0	4000	331	0	0	0	0	0	-100	160	8	-10	11	-2	120	21.4	12	0	0
16940	101	S	21	26	.11	0	457	630	6900	23	53	120	80	270	88	-12	0	0	0	18	2	0	-10	3.4	0	0	4100	293	0	0	0	0	0	-100	160	6	-10	8	-2	100	20.6	9.14	0	0
16941	101	S	21	140	.11	0	522	760	7200	22.3	51	95	78	270	94	23	0	0	0	16	.5	0	-10	3.7	0	0	4500	317	0	0	0	0	0	-100	160	8	-10	33	-2	110	22	8.41	0	0
16942	101	S	21	-22	.1	0	512	660	6500	23.3	55	130	96	290	83	10	0	0	0	15	.5	0	-10	3.6	0	0	5600	310	0	0	0	0	0	-100	160	8	-10	5	-2	110	21.6	8.07	0	0
16944	101	S	27	230	.03	0	727	640	7400	26.4	83	160	150	270	92	-10	0	0	0	15	1	0	-10	3.5	0	0	4600	406	0	0	0	0	0	-100	140	-4	-10	14	-2	140	21.8	2.57	0	0
16945	101	S	25	-5	.29	0	1410	390	10000	26.4	160	230	160	170	100	-10	0	0	0	10	.5	0	-10	1.8	0	0	700	851	0	0	0	0	0	-100	120	9	-10	43	-2	200	51.3	19.3	0	0
16946	101	S	21	-23	.12	0	540	180	15000	22.9	110	270	140	120	62	-10	0	0	0	8	.5	0	-10	-5	0	0	-300	343	0	0	0	0	0	-100	39	-2	-10	16	-2	92	20.4	11.7	0	0
17037	102	S	21	64	.12	0	647	870	7200	26.1	87	100	90	240	89	-16	0	0	0	13	.5	0	-10	3.1	0	0	4700	271	0	0	0	0	0	-100	200	7	-10	30	-2	150	20.9	13.9	0	0
17043	102	S	21	160	.13	0	554	680	7800	27	94	120	94	240	95	-14	0	0	0	13	.5	0	-10	3.3	0	0	3400	237	0	0	0	0	0	-100	160	8	-10	17	-2	130	16.3	18	0	0
17049	102	S	21	34	.14	0	560	760	7300	26.4	86	110	100	310	92	-10	0	0	0	11	.5	0	-10	3.7	0	0	6500	246	0	0	0	0	0	-100	150	11	-10	19	-2	120	21.1	9.44	0	0
17050	102	S	21	22	.14	0	548	800	8900	29.5	90	130	120	270	110	-11	0	0	0	16	.5	0	-10	4	0	0	8400	225	0	0	0	0	0	-100	140	6	-10	17	-2	120	17.7	4.25	0	0
17051	102	S	21	37	.12	0	557	810	7100	31.5	91	130	100	360	100	-15	0	0	0	15	.5	0	-10	4.9	0	0	5300	236	0	0	0	0	0	-100	150	5	-10	30	-2	120	18.9	4.38	0	0
17053	102	S	11	67	.3	0	546	420	8800	23.5	100	160	63	120	40	-10	0	0	0	4	-.5	0	-10	-5	0	0	-300	358	0	0	0	0	0	-100	69	6	210	30	-2	110	11.2	38.5	0	0
17054	102	S	14	-23	.23	0	341	530	9600	23.3	72	110	36	130	16	-10	0	0	0	3	-.5	0	-10	-5	0	0	-200	200	0	0	0	0	0	-100	85	8	-10	23	-2	60	13.7	35.9	0	0
17055	102	S	14	190	.24	0	307	470	9000	21.4	64	110	32	140	13	-10	0	0	0	3	-.5	0	-10	-5	0	0	-200	178	0	0	0	0	0	-100	74	7	-10	21	-2	52	13.2	39.8	0	0
17056	102	S	10	-24	.42	0	352	480	9500	21.5	63	100	37	140	11	-10	0	0	0	3	-.5	0	-10	-5	0	0	-200	197	0	0	0	0	0	-100	87	7	-10	21	-2	58	12.6	30.1	0	0
17057	102	S	14	46	.3	0	434	510	8300	21.3	67	110	42	140	17	-14	0	0	0	3	-.5	0	-10	-2	0	0	-100	255	0	0	0	0	0	-100	95	8	-10	26	-2	76	14.1	35.7	0	0
16912	103	S	21	110	.15	0	852	640	6300	25.4	62	100	110	230	77	-10	0	0	0	13	.5	0	-10	1.9	0	0	1600	464	0	0	0	0	0	-100	290	10	10	36	-2	190	35.1	5.06	0	0
16914	103	S	27	100	.18	0	1140	870	6800	38.2	140	150	270	300	230	-34	0	0	0	11	.5	0	200	10	0	0	17000	614	0	0	0	0	0	-100	210	-9	-10	570	-2	160	43	.21	0	0
16915	103	S	26	79	.21	0	310	280	11000	20.4	140	220	160	120	180	-10	0	0	0	6	-.5	0	-10	-4	0	0	-300	140	0	0	0	0	0	-100	60	4	-10	16	-2	32	11.1	7.28	0	0
16916	103	S	11	730	.24	0	554	300	11000	21.4	140	230	180	160	210	11	0	0	0	8	-.5	0	-10	-4	0	0	500	309	0	0	0	0	0	-100	74	3	-10	33	-2	65	16.6	8.16	0	0
17061	104	S	21	-25	.13	0	859	720	7200	29	80	130	120	280	97	-19	0	0	0	9	.5	0	-10	2.1	0	0	2400	463	0	0	0	0	0	-100	210	11	30	60	-2	200	28.7	2.83	0	0
17066	104	S	21	45	.1	0	583	880	7300	27.8	99	120	94	310	97	-10	0	0	0	9	.5	0	-10	2.9	0	0	4500	264	0	0	0	0	0	-100	110	6	-10	31	-2	130	16.6	11.6	0	0
17068	104	S	21	60	.03	0	499	650	6600	28.2	99	110	110	280	100	-18	0	0	0	12	.5	0	-10	3.2	0	0	12000	225	0	0	0	0	0	-100	120	4	-10	22	-2	110	15.6	8.49	0	0
17069	104	S	21	3400	.12	0	490	520	6500	27.4	80	120	150	400	3	-10	0	0	0	10	-.5	0	-10	4.3	0	0	4600	266	0	0	0	0	0	-100	130	15	-10	55	-2	96	16.5	2.71	0	0
17070	104	S	21	-16	.03	0	290	310	5700	34.2	88	150	140	220	140	-10	0	0	0	11	2	0	-10	4.5	0	0	5600	163	0	0	0	0	0	-100	44	2	-10	50	-2	85	9.4	7.73	0	0
17071	104	S	27	-24	.16	0	528	360	10000	25	130	200	110	140	55	18	0	0	0	6	.5	0	-10	.7	0	0	1000	275	0	0	0	0	0	-100	56	-3	-10	17	-2	94	14.3	5.58	0	0
17072	104	S	10	1100	.2	0	558	290	11000	22.9	140	220	100	120	40	-10	0	0	0	4	.5	0	-10	.8	0	0	600	310	0	0	0	0	0	-100	56	-3	-10	21	-2	97	15.2	15.1	0	0
17073	104	S	15	180	.23	0	617	310	12000	26.1	170	230	97	110	84	-10	0	0	0	4	-.5	0	-10	.6	0	0	500	343	0	0	0	0	0	-100	68	7	-10	40	-2	110	22.7	10.8	0	0
17003	105	S	14	44	.13	0	255	390	9300	18.3	41	93	24	130	-2	-10	0	0	0	5	-.5	0	-10	-3	0	0	400	148	0	0	0	0	0	-100	60	6	-10	14	-2	39	7.1	74.5	0	0
17005	105	S	14	26	.13	0	163	320	9500	17.1	43	96	25	130	-2	-10	0	0	0	5	-.5	0	-10	-3	0	0	-300	91	0	0	0	0	0	-100	28	6	-10	15	-2	23	3.8	95.6	0	0
17007	105	S	14	72	.13	0	188	370	8900	20.1	68	120	42	120	-4	-10	0	0	0	5	-.5	0	-10	-4	0	0	400	109	0	0	0	0	0	-100	34	6	-10	15	-2	28	6.1	102	0	0
17008	105	S	14	-18	.22	0	200	340	8300	19.5	90	150	63	130	9	-10	0	0	0	4	-.5	0	-10	-4	0	0	-200	115	0	0	0	0	0	-100	40	5	-10	16	-2	29	9	83.3	0	0
17010	105	S	14	18	.25	0	142	300	8700	17.6	74	140	58	130	-4	-10	0	0	0	4	-.5	0	-10	.5	0	0	-100	75	0	0	0	0	0	-100	21	4	-10	17	-2	15	3.3	105	0	0
16954	106	S	21	-33	.15	0	1070	800	5700	31.7	88	100	130	360	96	-27	0	0	0	21	.5	0	-10	3.3	0	0	3300	640	0	0	0	0	0	-100	300	6	40	17	-2	200	29.2	1.53	0	0
16957	106	S	21	73	.12	0	1010	740	6200	30.7	89	110	170	240	130	-27	0	0	0	15	.5	0	-10	3.8	0	0	4200	616	0	0	0	0	0	-100	320	15	-10	21	-2	180	38	1.01	0	0
16958	106	S	21	30																																								

Appendix 9-9A. continued

S.N.	DM	DT	AU	NA	SC	CE	CR	MN	FE	CO	NI	CU	ZN	AS	SE	BR	RB	ZR	MO	AG	CD	SN	SB	TE	CS	BA	LA	SH	EU	FB	YB	LU	IR	HF	TR	W	PB	BI	TH	U	HT	ZM2	AG2
17013	210	S	20	.23	.32	0	1290	370	9100	16.3	38	79	50	190	11	80	0	0	9	-5	0	-10	2.4	0	0	700	777	0	0	0	0	-100	200	11	20	440	-2	230	33.7	3.38	0	0	
17017	210	S	13	-.33	.29	0	431	270	15000	27.5	260	320	260	110	-8	-10	0	0	0	5	1	0	-10	-7	0	0	400	285	0	0	0	0	-100	29	4	-10	35	-2	100	15.4	60.8	0	0
17018	210	S	13	.51	.2	0	582	290	14000	31.5	330	370	260	130	17	14	0	0	0	5	-5	0	-10	-7	0	0	-300	359	0	0	0	0	-100	39	6	-10	26	-2	140	15.7	29.1	0	0
17019	210	S	13	-.21	.11	0	420	240	17000	24.6	240	340	260	150	19	-10	0	0	0	4	.5	0	-10	-5	0	0	500	252	0	0	0	0	-100	31	3	-10	33	-2	99	12.1	20.4	0	0
16868	211	S	26	-.11	.07	0	602	120	0	7.3	81	0	0	0	12	-10	0	0	0	0	0	0	-3	0	0	400	372	0	0	0	0	-100	41	-3	0	0	0	120	14.3	.17	0	0	
16871	211	S	11	-.40	.15	0	1130	280	6600	30.3	530	340	320	130	15	-19	0	0	0	14	-5	0	-10	-8	0	0	1700	420	0	0	0	0	-100	80	10	-10	56	6	130	21.5	9.22	0	0
16872	211	S	11	.400	.12	0	1260	230	8900	25.7	620	410	400	140	23	-11	0	0	0	25	-5	0	-10	.9	0	0	3400	542	0	0	0	0	-100	89	12	160	48	6	190	28.1	10.5	0	0
16873	211	S	11	.10	.16	0	1070	200	8600	29.6	600	360	360	140	29	-18	0	0	0	12	-5	0	-10	.9	0	0	5200	461	0	0	0	0	-100	69	8	280	86	6	180	21.1	11.3	0	0
16874	211	S	11	.18	.12	0	1010	240	7700	27.1	610	340	380	130	25	-15	0	0	0	29	-5	0	-10	.9	0	0	2000	440	0	0	0	0	-100	68	8	240	49	4	140	17.2	11.8	0	0
16833	212	S	11	-.32	.48	0	1470	270	5700	26.4	110	140	380	180	11	-24	0	0	0	9	-5	0	10	-6	0	0	900	886	0	0	0	0	-100	180	10	-10	31	-2	140	39.1	24.6	0	0
16834	212	S	11	-.40	.51	0	2030	230	4300	23.2	57	79	200	140	8	-26	0	0	0	6	-5	0	10	1.4	0	0	1800	1110	0	0	0	0	-100	170	10	-10	22	-2	95	25.1	17.3	0	0
16835	212	S	11	-.40	.28	0	1420	250	4900	19.7	110	100	450	130	14	49	0	0	0	7	-5	0	10	1	0	0	1600	575	0	0	0	0	-100	100	10	-10	20	-2	79	13.6	12.2	0	0
16836	212	S	11	-.32	.45	0	1400	360	5400	31.5	150	130	710	150	16	-14	0	0	0	8	-5	0	10	1.1	0	0	1400	791	0	0	0	0	-100	130	9	-10	20	-2	99	19	19.6	0	0
16837	212	S	32	-.35	.52	0	1740	260	5200	28.6	89	110	310	160	17	-24	0	0	0	10	-5	0	10	1	0	0	1200	988	0	0	0	0	-100	140	-5	-10	22	-2	110	23.9	17.7	0	0
16838	212	S	32	-.33	.27	0	1550	260	4700	27.5	110	120	490	150	12	-12	0	0	0	8	-5	0	10	-7	0	0	1200	549	0	0	0	0	-100	95	9	20	31	-2	67	12.3	6.21	0	0
18688	20100	H	10	.27	-.05	0	0	50	9500	4.3	10	120	110	150	4	-10	0	0	0	3	1.5	0	-10	-2	0	-2	100	72	0	0	0	0	-100	18	1	2	147	-2	19	1.5	2.27	0	0
18689	20100	H	10	.25	.15	0	0	330	11000	32.7	70	130	120	110	24	-10	0	0	0	4	-5	0	-10	.8	0	-4	800	368	0	0	0	0	-100	91	8	-7	94	-2	120	13.4	12	0	0
18690	20100	H	10	.20	.13	0	0	1900	7800	31.5	80	150	190	110	28	-10	0	0	0	12	-5	0	-10	1.1	0	-3	700	419	0	0	0	0	-100	94	-3	14	88	-2	140	12.8	17.2	0	0
18691	20100	H	10	-.18	.12	0	0	610	12000	26.4	80	160	110	110	23	-20	0	0	0	8	.5	0	-10	.7	0	-2	600	499	0	0	0	0	-100	75	10	3	63	-2	180	14.1	20	0	0
18692	20100	H	10	1800	.11	0	0	490	9200	23.4	70	140	81	140	35	-20	0	0	0	4	-5	0	-10	-4	0	-1	400	381	0	0	0	0	-100	73	10	10	75	-2	160	14.6	10	0	0
18693	20100	H	13	.43	.12	0	0	460	10000	25	70	130	74	100	29	-10	0	0	0	5	-5	0	-10	-3	0	-2	-200	425	0	0	0	0	-100	91	11	17	59	-2	160	12.5	21.6	0	0
18695	20100	H	39	-.24	.2	0	764	1000	8100	25.6	80	200	140	150	23	-170	0	0	0	6	-5	0	-10	.6	0	0	-400	503	0	0	0	0	-100	120	15	160	77	-2	170	20.1	14.8	0	0
18705	20101	H	10	.22	.12	0	0	460	14000	22.3	60	130	62	140	19	-10	0	0	0	4	-5	0	-10	.5	0	-2	-900	337	0	0	0	0	-100	45	9	13	59	-2	150	16.5	11.3	0	0
18706	20101	H	10	-.5	-.05	0	0	70	13000	5.3	10	140	94	150	6	-10	0	0	0	4	-5	0	-10	-2	0	-2	-100	83	0	0	0	0	-100	12	1	3	66	-2	30	1.9	2.54	0	0
18708	20101	H	39	.86	.13	0	618	420	10000	21.4	60	110	64	130	16	-10	0	0	0	5	-5	0	-10	1.1	0	0	-300	406	0	0	0	0	-100	55	9	23	34	-2	160	12.2	32.9	0	0
18687	20103	H	39	-.14	.07	0	350	360	7700	14.8	50	190	460	300	26	-10	0	0	0	8	-5	0	-10	.8	0	0	200	213	0	0	0	0	-100	73	5	84	91	-2	76	7.9	21.1	0	0
18696	20104	H	10	-.20	.12	0	0	620	11000	24.4	90	150	110	200	79	-20	0	0	0	9	.5	0	-10	1.4	0	-1	800	473	0	0	0	0	-100	160	12	12	67	-2	200	24.7	10.9	0	0
18697	20104	H	10	.61	.27	0	0	320	11000	19.3	90	230	300	160	51	10	0	0	0	7	-5	0	-10	1.1	0	-2	700	589	0	0	0	0	-100	150	9	25	105	-2	200	25.8	10.2	0	0
18698	20104	H	13	.22	-.05	0	0	50	13000	5.1	10	160	160	130	15	-10	0	0	0	6	-5	0	-10	.2	0	-2	100	96	0	0	0	0	-100	15	1	11	78	-2	33	3.4	2.42	0	0
18699	20104	H	39	.660	.27	0	901	670	8400	26.6	90	190	170	160	53	-10	0	0	0	8	-5	0	-10	1.4	0	0	800	567	0	0	0	0	-100	150	11	110	83	-2	200	22.8	19.5	0	0
18721	20200	H	10	.150	.29	0	0	440	12000	31.1	100	180	130	120	39	-20	0	0	0	6	-5	0	-10	.8	0	-5	1200	537	0	0	0	0	-100	120	13	-11	63	-2	210	20.5	9.07	0	0
18722	20200	H	13	.300	.23	0	0	410	12000	22.5	80	160	96	120	20	-20	0	0	0	16	-5	0	-10	-5	0	-2	900	539	0	0	0	0	-100	76	10	14	62	-2	220	18	17.2	0	0
18723	20200	H	10	.27	.27	0	0	370	13000	30.3	90	160	100	110	30	-10	0	0	0	13	-5	0	-10	-7	0	-5	800	552	0	0	0	0	-100	79	10	12	63	-2	210	18.9	13.2	0	0
18724	20200	H	10	.300	.2	0	0	1600	9000	34.9	470	200	410	98	19	-10	0	0	0	8	-5	0	-10	.7	0	5	-500	379	0	0	0	0	-100	80	6	13	51	-2	140	15.4	12.4	0	0
18726	20200	H	39	.350	.24	0	790	1500	12000	23.4	240	170	170	210	24	-20	0	0	0	9	-5	0	-10	-6	0	0	900	491	0	0	0	0	-100	71	12	38	56	-2	200	23	16	0	0
18727A	20200	H	40	.51	.16	0	0	2100	11000	21.8	230	170	200	200	23	30	0	0	0	8	-5	0	-10	.8	0	-2	900	436	0	0	0	0	-100	94	7	11	34	-2	200	22.2	12	0	0
18727B	20200	H	40	.36	.18	0	0	2100	11000	21.6	230	180	200	200	24	-10	0	0	0	6	-5	0	-10	-4	0	-2	700	461	0	0	0	0	-100	92	11	15	46	-2	200	22.1	11.6	0	0
18717	20201	H	13	-.5	.21	0	0	2600	11000	34.1	180	290	590	130	39	20	0	0	0	7	-5	0	-10	1.2	0	-4	900	386	0	0	0	0	-100	110	7	13	72	-2	13				

Appendix 9-9A. continued.

S. N.	DH	DM	DT	AU	NA	SC	CE	CR	MN	FE	CO	NI	CU	ZN	AS	SE	BR	RB	ZR	MO	AG	CD	SN	SB	TE	CS	BA	LA	SH	EU	TB	YB	LU	IR	HF	TA	H	PB	BI	TH	U	HT	ZN2	AG2	
18812	10303	A	11	-28	-1	112	3620	300	859	30	580	650	1039	-200	91	-24	-5	-37	7600	50	3	-40	-740	.6	-140	-2	580	2150	306	13	41	53	-11	-100	99	4	120	89	0	403	185	12.76			
18814	10304	A	11	100	.53	76.3	340	290	1318	24	180	170	204	400	245	-10	-5	-10	3700	6	1.2	-10	-300	.8	-20	-1	160	150	31	6	6	25	-4.3	-100	72	6	29	22	0	34	11	16.58	80	-5	
18774	10401	A	10	-12	-.39	100	1420	420	599	24	190	140	109	-200	50	-10	-5	-10	7500	-5	1.5	-20	-370	.4	-20	-1	-100	767	104	10	14	34	-6.1	-100	150	8	-17	15	0	201	44	15.66	20		
18776	10401	A	15	10	.72	77.6	580	360	329	19	120	130	65	-200	24	-10	-5	-10	7000	2	1.3	-10	-200	.5	-33	-1	-100	270	52.1	8	7	20	-3.9	-100	120	8	-10	8	0	68.3	1.3	35.88	18	-5	
18778	10401	A	13	-12	.65	91.1	740	500	464	25	210	190	99	210	46	-10	-5	-10	8800	3	1.4	-21	-270	.5	-40	-1	-100	370	57.3	6	9	29	-5.1	-100	170	10	-18	17	0	1.19	2.3	10.22	30	-5	
18783	10401	A	11	-5	.38	120	1090	370	631	25	150	130	462	-200	23	-10	-5	-10	5000	-4	.9	-10	-200	.4	-45	-1	-100	604	85.7	5	12	33	-6.3	-100	75	6	-14	27	0	180	47	30.81	25	-5	
18784	10401	A	11	350	-.44	189	1560	270	1175	31	78	120	288	-200	22	-10	-5	-20	3100	-5	1.2	49	-400	-.2	-54	-1	-100	873	113	5	16	57	-10	-100	48	1	-22	27	0	257	72.2	14.28	18	0	
18854	10403	A	11	1260	-.66	103	740	390	1542	26	310	310	295	270	58	-10	-5	-28	4500	6	.6	-33	410	.4	-62	2	1600	400	51.6	6	9	26	-4.6	-100	92	6	120	21	0	1.02	31	24.86	43	-12	
18763	10501	A	13	30	-.34	83.9	200	370	1270	26	230	170	91	-200	82	-10	-5	-10	1700	8	2	-10	-200	.7	-20	-1	370	100	21	2	4	19	-3.4	-100	33	8	22	27	0	35	6.7	31.57	44	-5	
18765	10501	A	11	71	.28	91.8	380	460	360	26	210	140	73	-200	64	-10	-5	-21	5200	3	1.9	-10	230	.6	-20	-1	-100	180	35	5	6	25	-4.1	-100	92	11	466	17	0	57.1	1.2	27.29	54	-5	
18824	10503	A	14	-5	.3	87.4	330	440	298	21	75	79	22	-200	4	-10	-5	17	3200	-2	.4	-10	-200	.4	-20	-1	-100	170	30	4	4	16	-3.1	-100	63	7	-11	6	0	51.9	10	35.34	16	-5	
18826	10503	A	15	-5	.41	88	420	440	228	21	70	97	11	-200	5	-10	-5	10	3400	-2	.3	-10	-200	.4	-20	-1	-100	220	36	3	5	19	-3.5	-100	66	7	-10	5	0	64.7	1.2	43.41	10	-5	
18828	10503	A	13	62	.52	85.7	710	490	345	21	62	-50	13	-200	5	-10	-5	-10	6500	-2	.5	-10	-200	.4	-31	-1	-100	390	56.9	6	8	21	-4.1	-100	120	8	-13	8	0	1.13	2.3	31.14	11	-5	
18830	10503	A	12	-12	-.35	103	590	440	284	25	130	66	81	-200	8	-10	-5	-10	3600	7	.7	-10	-200	.4	-20	-1	140	300	47	7	8	26	-4.5	-100	67	8	54	11	0	94.6	16	10.9	23	-5	
18832	10503	A	14	-11	.28	102	530	430	301	23	100	77	40	-200	6	-10	-5	-10	3900	4	.4	-10	-200	.4	-20	-1	-100	270	45	5	7	24	-4.4	-100	66	11	-17	7	0	90.8	16	15.03	10	-5	
18834	10503	A	12	31	-.33	89.6	600	400	210	21	100	130	32	-200	6	-10	-5	-10	4700	-2	.7	-10	-200	.4	-20	-1	-100	310	52.2	5	8	21	-3.8	-100	79	11	23	4	0	1.11	20	12.72	14	-5	
18836	10503	A	12	47	-.23	79.9	370	380	374	21	150	160	68	-200	38	-10	-5	-10	3900	2	.6	-10	-200	.6	-20	-1	-100	200	38	4	6	19	-3.3	-100	71	9	-14	10	0	66.9	1.4	28.16	127	-5	
18837	10503	A	12	1360	-.31	76.9	710	320	478	22	240	270	258	-200	33	-10	-5	-10	4100	5	1.7	-10	-200	.5	-20	-1	-100	380	51.2	3	3	6	21	-3.3	-100	76	6	-15	20	0	1.32	18	25.05	43	-5
18819	10601	A	11	23	.43	71.3	410	300	419	22	220	210	161	210	177	-10	-5	-10	5300	12	.8	-10	-200	.7	-20	-1	-100	190	36	5	5	24	-4.4	-100	100	9	53	23	0	45	1.3	22.79	77	-5	
18806	10602	A	14	25	.46	89.6	470	270	616	22	200	190	179	-200	23	-10	-5	12	4300	4	1.1	-10	-200	.4	-20	-1	-100	240	44	7	7	20	-3.8	-100	74	7	-11	15	0	50.9	1.5	37.07	38	-5	
18808	10602	A	11	2840	.23	81.2	340	410	365	23	210	180	99	220	27	-10	-5	12	4600	6	.6	-10	-200	.5	-20	-1	-100	170	30	5	5	19	-3.5	-100	77	8	110	15	0	46	15	25.66	18	-5	
18816	10603	A	11	27	.71	87.3	2600	260	745	24	360	310	534	-200	120	-10	-5	-24	5700	-7	1.7	-26	-500	-.2	-120	-1	-100	1440	206	11	30	68	-13	-100	98	5	51	30	0	346	103	17.66	45		
18789	10700	A	14	-5	.29	85.9	180	310	490	22	130	120	54	-200	24	-10	-5	-10	2100	4	1.2	-10	-200	.4	-20	-1	-100	89	19	3	4	18	-3.4	-100	41	6	-11	10	0	29	6.3	25.62	19	-5	
18791	10700	A	14	-5	.21	89.1	160	340	468	22	120	140	43	-200	27	-10	-5	20	1900	6	.9	15	210	.5	-20	-1	-100	70	18	3	4	19	-3	-100	26	5	-14	6	0	24	5.2	17.82	27	-5	
18793	10700	A	14	29	.24	100	200	330	405	23	120	120	43	-200	22	-10	-5	12	2100	6	1.1	-10	-200	.4	-20	-1	-100	92	21	3	4	20	-3.8	-100	34	7	-11	8	0	25	6.6	42.65	28	-5	
18795	10700	A	14	27	.28	92.5	190	320	438	21	120	110	116	-200	21	-10	-5	-10	1900	2	.6	21	-200	.4	-20	-1	-100	87	20	4	4	19	-3.6	-100	33	6	-9	8	0	24	6.1	52.43	20	-5	
18797	10700	A	15	11	.34	91.3	310	360	340	22	120	85	52	-200	25	-10	-5	-10	3900	2	.4	-10	-200	.5	-20	-1	-100	140	32	5	5	22	-4.2	-100	77	9	-9	6	0	39	1.2	63.16	17	-5	
18799	10700	A	15	73	.4	93	380	420	372	24	120	120	52	-200	21	-10	-5	-10	6100	3	.2	-10	-200	.6	-26	-1	-100	190	35	6	6	22	-4.4	-100	110	10	-11	8	0	57	1.4	34.34	20	-5	
18803	10700	A	10	-5	.41	91.4	340	390	364	22	110	100	38	-200	17	-10	-5	-10	4600	3	.8	14	-200	.4	-20	-1	-100	170	35	6	6	20	-4	-100	87	8	-10	7	0	44	1.2	45.39	24	-5	
18804	10700	A	13	56	-.34	84.5	1260	390	408	23	220	210	156	-200	21	-10	-5	-10	6300	-4	.8	-10	-200	.5	-51	-1	130	729	85.6	6	10	24	-4.5	-100	120	9	21	16	0	245	2.5	31.83	25	-5	
18768	10704	A	13	15	.35	82.2	730	340	395	20	120	130	94	210	27	-10	-5	15	7600	-2	1	-10	210	.5	-44	-1	-100	390	58.1	7	8	24	-4.7	-100	140	8	24	11	0	94.5	2.3	20.16	28	-5	
18771	10704	A	15	32	.26	93.3	740	370	408	23	160	140	102	230	31	-10	-5	-10	7600	-2	1.4	-10	210	.5	-20	-1	-100	390	59.8	6	8	28	-5.2	-100	140	9	85	11	0	105	2.2	19.37	30	-5	
18842	10901	A	15	48	-.59	93.7	900	360	874	26	280	260	315	-200	81	-22	-5	-39	9700	-9	.5	-41	-470	.9	-82	-3	-230	512	84.5	10	15	35	-5.7	-100	190	13	-31	35	0	166	40	17.9	80	-15	
18844	10901	A	15	84	-.29	103	390	220	1156	24	220	200	203	-200	61	-10	-5	-23	3900	3	.6	-28	-200	1.2	-51	-1	-100	180	41	3	8	28	4.4	-100	86	10	-24	20	0	56.3	1.8	47.6	71	-5	
18845	10901	A	13	1800	-.27	116	320	250	1634	26	240	220	233	-200	68	-10	-5	-21	2500	-6	.5	-26	-200	.7	-47	-1	-100	150	34	5	7	27	5.1	-100	66	10	-23	22	0	44	1.5	61.22	65	-5	
18847	10902	A	11	120	-.57	92.2	1080	330	818	27	170	98	155	300	79	-10	-5	-34	8300	-7	.2	-36	-410	-.2	-70	-2																			

Appendix 9-9A. continued.

S. N.	OH	DM	DT	AU	NA	SC	CE	CR	MN	FE	CO	NI	CU	ZN	AS	SE	BR	RB	ZR	MO	AG	CD	SN	SB	TE	CS	EA	LA	SH	EU	TEI	YB	LU	IR	HF	TR	W	PB	BI	TH	U	HT	ZN2	AG2
18626	20702	H	10	66	.32	0	221	120	8400	8.9	30	120	97	150	9	-10	0	0	0	2	3.5	0	-10	.2	0	0	200	111	0	0	0	0	0	-100	11	-1	44	42	-2	22	2.1	20	0	0
18626R	20702	H	10	-16	.74	0	360	250	7800	16	60	110	130	160	22	10	0	0	0	2	-5	0	-10	1	0	0	500	194	0	0	0	0	0	-100	21	3	37	73	-2	35	6.3	6.94	0	0
18627	20702	H	10	-18	.42	0	564	430	8700	19.6	60	120	96	130	22	-10	0	0	0	3	.5	0	-10	.8	0	0	-400	335	0	0	0	0	0	-100	43	10	28	46	-2	90	10.4	39.2	0	0
18628	20702	H	14	160	.31	0	623	570	9800	22	60	120	80	120	28	30	0	0	0	4	-5	0	-10	1	0	0	-400	389	0	0	0	0	0	-100	49	14	25	54	-2	130	10.1	38.8	0	0
18629	20702	H	14	-19	.38	0	614	490	8700	21	100	170	150	130	23	-10	0	0	0	5	-5	0	-10	.9	0	0	1000	337	0	0	0	0	0	-100	50	7	23	51	-2	99	10.3	33.9	0	0
18748C	20702	H	14	-19	.38	0	563	530	8100	23.4	70	110	70	140	17	-10	0	0	0	3	-5	0	-10	.8	0	0	400	337	0	0	0	0	0	-100	44	7	20	54	-2	110	6.3	81.2	0	0
18631	20702	H	39	90	.36	0	874	780	7000	23	60	140	110	180	19	-10	0	0	0	4	-5	0	-10	.8	0	0	600	514	0	0	0	0	0	-100	79	13	120	66	-2	160	12.6	19.5	0	0
18622	20704	H	13	21	.58	0	555	180	4700	10.9	40	120	66	170	5	-10	0	0	0	7	-5	0	-10	-.3	0	0	500	262	0	0	0	0	0	-100	25	6	110	26	-2	33	4.5	72.2	0	0
18747C	20704	H	13	-15	.6	0	486	230	4300	14.9	70	160	57	190	13	-10	0	0	0	3	-5	0	-10	.9	0	0	400	225	0	0	0	0	0	-100	27	5	180	22	-2	27	3.3	43.3	0	0
18623	20704	H	13	49	.52	0	421	270	4100	14.6	70	210	67	150	15	-10	0	0	0	3	-5	0	-10	.7	0	0	-300	210	0	0	0	0	0	-100	23	5	240	25	-2	29	4.3	50.3	0	0
18625	20704	H	39	-26	.55	0	756	310	4000	15.7	80	180	77	170	13	-90	0	0	0	7	-5	0	-10	-.5	0	0	-400	409	0	0	0	0	0	-100	48	6	630	26	-2	48	4	48.7	0	0
18728	20705	H	13	180	.39	0	0	380	7400	17	70	130	130	170	20	50	0	0	0	3	-5	0	-10	.8	0	-2	600	398	0	0	0	0	0	-100	45	7	8	28	-2	110	9.1	11.4	0	0
18729	20705	H	10	68	.27	0	0	490	11000	20.8	60	120	56	160	12	30	0	0	0	3	-5	0	-10	.7	0	-2	-1000	409	0	0	0	0	0	-100	54	12	9	38	-2	150	16	10.8	0	0
18730	20705	H	13	1300	.4	0	0	360	8600	17.8	60	120	54	160	13	-10	0	0	0	4	-5	0	-10	.4	0	-2	300	289	0	0	0	0	0	-100	38	6	-5	20	-2	84	7.8	10.9	0	0
18731	20705	H	10	-18	.51	0	0	260	6800	14.5	50	110	60	160	10	-10	0	0	0	3	-5	0	-10	.5	0	-2	300	264	0	0	0	0	0	-100	37	5	6	21	-2	58	6.1	11.7	0	0
18732	20705	H	13	-18	.47	0	0	300	6700	16.7	60	110	66	170	15	-20	0	0	0	4	-5	0	-10	.4	0	-2	500	330	0	0	0	0	0	-100	45	8	8	29	-2	86	45	11.8	0	0
18733	20705	H	13	-18	.27	0	0	320	10000	22.3	70	130	71	160	29	20	0	0	0	12	-5	0	-10	.4	0	-2	-400	302	0	0	0	0	0	-100	34	8	6	29	-2	96	11.5	9.76	0	0
18734	20705	H	13	49	.15	0	0	190	12000	20.4	50	110	89	140	33	-10	0	0	0	4	-5	0	-10	.5	0	-2	300	191	0	0	0	0	0	-100	21	2	5	34	-2	46	4.3	12.4	0	0
18735	20705	H	12	-14	.14	0	0	180	12000	20.4	50	110	76	140	17	-10	0	0	0	3	-5	0	-10	.3	0	-2	400	180	0	0	0	0	0	-100	19	4	4	50	-2	50	4.9	11.9	0	0
18736	20705	H	13	170	.12	0	0	180	12000	23.3	60	110	120	140	26	-10	0	0	0	3	-5	0	-10	.7	0	-2	600	182	0	0	0	0	0	-100	25	3	-4	48	-2	53	4.3	11.6	0	0
18737	20705	H	39	42	.41	0	737	330	7500	16.8	60	130	82	170	17	-10	0	0	0	4	-5	0	-10	-.4	0	0	-300	395	0	0	0	0	0	-100	55	12	21	27	-2	100	8.9	33.6	0	0
18605	20801	H	13	25	.08	0	211	350	7500	13.3	160	270	410	110	41	-10	0	0	0	7	1	0	-10	1.1	0	0	300	124	0	0	0	0	0	-100	-2	3	550	66	4	49	5.4	15.4	0	0
18606	20801	H	13	910	.17	0	647	890	9300	30.3	310	260	320	110	90	-20	0	0	0	6	1	0	-10	1.9	0	0	-600	396	0	0	0	0	0	-100	48	12	690	69	3	160	14.1	26	0	0
18607	20801	H	13	58	.16	0	577	630	9400	26.5	220	210	210	120	67	-10	0	0	0	6	-5	0	-10	2.4	0	0	-600	373	0	0	0	0	0	-100	51	10	610	75	2	140	15.6	25.5	0	0
18608	20801	H	13	67	.17	0	878	640	11000	25.4	190	190	160	110	98	-30	0	0	0	5	-5	0	-10	.9	0	0	-400	564	0	0	0	0	0	-100	78	8	400	81	-2	230	23.9	27.6	0	0
18609	20801	H	13	160	.21	0	824	1700	9400	27.9	250	260	240	140	100	40	0	0	0	6	-5	0	-10	2.4	0	0	-600	529	0	0	0	0	0	-100	74	10	610	70	3	220	19.1	29.3	0	0
18610	20801	H	13	600	.15	0	339	1500	3500	39.2	730	470	660	440	320	-20	0	0	0	5	1	0	-10	6.3	0	0	-600	181	0	0	0	0	0	-100	60	-4	230	93	7	71	12	22.2	0	0
18611	20801	H	13	690	.07	0	0	490	2400	34.5	560	550	660	170	490	30	0	0	0	4	2	0	35	4.8	0	0	400	143	0	0	0	0	0	-100	39	5	210	187	7	60	6	12.9	0	0
18612	20801	H	13	420	.17	0	192	400	1800	34.8	690	570	330	140	360	-10	0	0	0	6	1.5	0	-10	10	0	0	600	124	0	0	0	0	0	-100	92	-3	91	151	10	47	9.5	34.4	0	0
18744C	20801	H	13	190	.19	0	456	880	7400	35.5	410	280	350	150	160	-20	0	0	0	7	-5	0	71	4.5	0	0	-600	293	0	0	0	0	0	-100	35	9	1100	192	4	100	7.7	28.3	0	0
18632	20803	H	10	200	.25	0	822	820	9700	27.1	240	250	290	140	75	-10	0	0	0	4	.5	0	-10	2.3	0	0	700	514	0	0	0	0	0	-100	91	6	26	69	2	200	19.3	21.4	0	0
18633	20803	H	10	88	.17	0	568	750	10000	23.8	200	240	250	130	63	-20	0	0	0	6	.5	0	-10	1.4	0	0	400	359	0	0	0	0	0	-100	53	9	8	123	3	140	14.2	41.7	0	0
18634	20803	H	10	86	.15	0	635	960	10000	25.6	210	240	290	120	63	-10	0	0	0	5	-5	0	-10	1.9	0	0	600	409	0	0	0	0	0	-100	57	11	12	46	2	160	15	39.1	0	0
18750C	20803	H	10	100	.16	0	656	1100	9800	29.8	240	210	250	150	99	-10	0	0	0	5	-5	0	-10	1.6	0	0	-600	465	0	0	0	0	0	-100	72	12	20	66	3	170	14.8	43	0	0
18635	20803	H	10	220	.18	0	542	970	10000	25.6	200	220	200	120	55	70	0	0	0	4	-5	0	-10	1.1	0	0	-500	331	0	0	0	0	0	-100	42	10	-6	40	2	130	11.4	26.4	0	0
18749C	20803	H	10	35	.19	0	283	600	9300	23.6	180	180	190	120	82	-10	0	0	0	3	-5	0	-10	2.8	0	0	600	183	0	0	0	0	0	-100	18	4	-12	91	2	66	7.3	14.7	0	0
18637	20803	H	39	76	.19	0	835	930	8200	22.6	210	320	220	160	33	-10	0	0	0	6	-5	0	-10	-.6	0	0	-500	461	0	0	0	0	0	-100	140	6	60	69	-2	180	15.9	18.2	0	0
18601	20804	H	13	120	.46																																							

Appendix 9-9B. List of all nonmag HMC sample assays, sorted by sample number.

S. N.	DN	DN OT	AU	NR	SC	CE	CR	MN	FE	CO	MI	CU	ZN	AS	SE	BR	RB	ZR	MO	NO	CD	SN	SB	TE	CS	BA	LA	SH	EU	TB	VB	LU	IR	HF	TA	H	PB	BI	TH	U	HT	ZN2	AG2
16801	202	S 21	640	.06	0	993	1000	7600	25.1	31	63	24	160	10	-26	0	0	0	12	-3	0	40	1.5	0	0	2600	608	0	0	0	0	-100	350	9	10	88	-2	260	27.8	2.58	0	0	
16804	202	S 21	40	.06	0	884	990	7400	27.2	28	52	22	160	-6	-10	0	0	0	10	-3	0	10	1.7	0	0	4600	526	0	0	0	0	-100	300	9	-10	49	-2	240	24.7	3.07	0	0	
16816	202	S 11	120	.22	0	1070	670	12000	29.8	92	130	56	150	26	-24	0	0	0	9	-3	0	-10	-6	0	0	600	629	0	0	0	0	-100	120	19	30	25	-2	260	28.6	19.9	0	0	
16818	202	S 11	700	.18	0	1030	370	16000	25	170	170	110	120	24	-50	0	0	0	9	-3	0	-10	1.8	0	0	-1000	497	0	0	0	0	-100	51	11	30	88	-2	300	17	8.61	0	0	
16820	202	S 11	-25	.21	0	985	510	14000	26.1	95	150	75	150	27	-12	0	0	0	6	-3	0	-10	-6	0	0	-500	608	0	0	0	0	-100	83	17	20	51	-2	250	22.7	26.4	0	0	
16822	202	S 11	-110	.2	0	1160	710	13000	29.7	99	140	64	150	26	-10	0	0	0	7	-3	0	-10	1.2	0	0	500	760	0	0	0	0	-100	93	15	-10	37	-2	320	26.7	30.3	0	0	
16824	202	S 11	78	.14	0	1000	590	13000	27.3	88	130	49	140	35	-24	0	0	0	8	-3	0	-10	1.5	0	0	900	684	0	0	0	0	-100	90	16	20	37	-2	290	27.6	39.6	0	0	
16825	202	S 11	-30	.16	0	675	440	12000	17.4	100	130	63	150	21	-19	0	0	0	7	-3	0	-10	1	0	0	600	325	0	0	0	0	-100	59	8	10	62	-2	180	16.5	15.4	0	0	
16826	202	S 11	250	.21	0	717	4400	12000	19	150	190	130	180	35	-10	0	0	0	8	-3	0	-10	.9	0	0	-100	266	0	0	0	0	-100	68	10	-10	40	-2	150	11.9	17.3	0	0	
16833	212	S 11	-32	.48	0	1470	270	5700	26.4	110	140	380	180	11	-24	0	0	0	9	-3	0	10	-6	0	0	900	886	0	0	0	0	-100	180	10	-10	31	-2	140	39.1	24.6	0	0	
16834	212	S 11	-40	.51	0	2030	230	4300	23.2	57	79	200	140	8	-26	0	0	0	6	-3	0	10	1.4	0	0	1800	1110	0	0	0	0	-100	170	10	-10	22	-2	95	25.1	17.3	0	0	
16835	212	S 11	-40	.28	0	1420	250	4900	19.7	110	100	450	130	14	.49	0	0	0	7	-3	0	10	1	0	0	1600	575	0	0	0	0	-100	100	10	-10	20	-2	79	13.6	12.2	0	0	
16836	212	S 11	-32	.45	0	1400	360	5400	31.5	150	130	710	150	16	-14	0	0	0	8	-3	0	10	1.1	0	0	1400	791	0	0	0	0	-100	130	9	-10	20	-2	99	19	19.6	0	0	
16837	212	S 32	-35	.52	0	1740	260	5200	28.6	89	110	310	160	17	-24	0	0	0	10	-3	0	10	1	0	0	1200	988	0	0	0	0	-100	140	-5	-10	22	-2	110	23.9	17.7	0	0	
16838	212	S 32	-33	.27	0	1550	260	4700	27.5	110	120	490	150	12	-12	0	0	0	8	-3	0	10	-7	0	0	1200	549	0	0	0	0	-100	95	9	20	31	-2	67	12.3	6.21	0	0	
16840	208	S 14	19	.32	0	594	570	10000	19.1	98	97	63	130	23	-11	0	0	0	8	-3	0	-10	1.5	0	0	900	253	0	0	0	0	-100	39	6	-10	41	-2	120	6.7	16.7	0	0	
16842	208	S 15	200	.3	0	1450	860	12000	29.5	79	100	64	140	32	-38	0	0	0	11	-3	0	-10	1.4	0	0	-300	922	0	0	0	0	-100	140	22	-10	61	-2	330	24.2	30.5	0	0	
16844	208	S 15	120	.22	0	991	500	11000	23.8	210	270	170	160	78	-10	0	0	0	10	-3	0	-10	1.4	0	0	500	646	0	0	0	0	-100	110	13	-10	40	-2	240	20.9	59.6	0	0	
16846	208	S 15	69	.78	0	1020	480	8600	24	210	220	140	150	87	-14	0	0	0	11	-3	0	-10	.5	0	0	500	663	0	0	0	0	-100	100	13	-10	27	-2	250	23.7	50.6	0	0	
16848	208	S 15	37	.4	0	1000	490	8700	23.1	220	220	170	160	110	-19	0	0	0	11	-3	0	-10	.8	0	0	900	607	0	0	0	0	-100	130	9	-10	32	-2	270	20.9	17.2	0	0	
16850	208	S 10	-5	.29	0	1030	750	9000	27	220	230	170	160	76	22	0	0	0	10	-3	0	-10	1	0	0	700	556	0	0	0	0	-100	110	9	-10	30	-2	250	21.4	12	0	0	
16852	208	S 15	52	.23	0	1000	1100	8200	26	240	260	280	160	190	20	0	0	0	10	-3	0	-10	2.9	0	0	1000	610	0	0	0	0	-100	140	-5	-10	44	2	270	17.8	12.4	0	0	
16853	208	S 11	40	.38	0	660	440	8500	23.5	190	180	120	150	61	-14	0	0	0	10	-3	0	-10	1.3	0	0	700	327	0	0	0	0	-100	50	10	-10	25	-2	160	14.4	5.18	0	0	
16856	204	S 21	-40	.09	0	794	800	6100	28.6	75	100	100	200	61	-12	0	0	0	16	-3	0	10	1.8	0	0	1500	491	0	0	0	0	-100	290	8	30	29	-2	250	23.8	2.77	0	0	
16862	204	S 21	-28	.22	0	917	720	8400	28.7	96	120	92	150	42	-10	0	0	0	13	-3	0	-10	1.1	0	0	900	484	0	0	0	0	-100	230	9	20	55	-2	230	25.6	7.91	0	0	
16863	204	S 21	-35	.12	0	865	530	8600	25	98	140	97	150	35	-19	0	0	0	12	-3	0	-10	1.6	0	0	500	454	0	0	0	0	-100	160	12	-10	48	-2	190	35.1	4.7	0	0	
16864	204	S 11	300	.31	0	580	880	15000	29.1	150	180	210	150	49	-10	0	0	0	8	-3	0	-10	-7	0	0	100	306	0	0	0	0	-100	58	5	20	27	-2	130	12.9	4.68	0	0	
16865	204	S 11	190	.22	0	709	1000	15000	23.3	150	180	130	150	41	-10	0	0	0	10	-3	0	-10	-7	0	0	-100	329	0	0	0	0	-100	71	11	-10	27	-2	160	16.8	13.1	0	0	
16866	204	S 11	-30	.12	0	594	930	14000	20.5	190	250	150	150	21	-16	0	0	0	10	-3	0	-10	-7	0	0	1100	268	0	0	0	0	-100	63	7	30	27	-2	110	17.3	13.7	0	0	
16868	211	S 26	-11	.07	0	602	120	0	7.3	81	0	0	0	12	-10	0	0	0	0	0	0	0	-3	0	0	400	372	0	0	0	0	-100	41	-3	0	0	0	120	14.3	.17	0	0	
16871	211	S 11	-40	.15	0	1130	280	6600	30.3	530	340	320	130	15	-19	0	0	0	14	-3	0	-10	-8	0	0	1700	420	0	0	0	0	-100	80	10	-10	56	6	130	21.5	9.22	0	0	
16872	211	S 11	400	.12	0	1260	230	8900	25.7	620	410	400	140	23	-11	0	0	0	25	-3	0	-10	.9	0	0	3400	542	0	0	0	0	-100	89	12	160	48	6	190	28.1	10.5	0	0	
16873	211	S 11	10	.16	0	1070	200	8600	29.6	600	360	360	140	29	-18	0	0	0	12	-3	0	-10	.9	0	0	5200	461	0	0	0	0	-100	69	8	280	86	6	180	21.1	11.3	0	0	
16874	211	S 11	18	.12	0	1010	240	7700	27.1	610	340	380	130	25	-15	0	0	0	29	-3	0	-10	.8	0	0	2000	440	0	0	0	0	-100	68	8	240	49	4	140	17.2	11.8	0	0	
16878	209	S 15	57	.14	0	1310	400	10000	23.2	310	290	250	160	20	-26	0	0	0	13	-3	0	-10	-8	0	0	3600	623	0	0	0	0	-100	110	11	-10	65	2	300	27	13.5	0	0	
16880	209	S 14	-40	.13	0	1030	340	11000	22.5	320	290	260	160	15	-15	0	0	0	13	-3	0	-10	-9	0	0	2500	433	0	0	0	0	-100	68	6	-10	52	-2	210	21.1	9.61	0	0	
16882	209	S 13	200	.09	0	907	380	10000	23.7	420	330	280	150	15	-14	0	0	0	11	-3	0	-10	-7	0	0	1400	406	0	0	0	0	-100	64	8	10	75	2	220	18	14.2	0	0	
16883	209	S 13	170	.13	0	816	330	10000	26.4	460	330	300	130	27	-10	0	0	0	10	-3	0	-10	-6	0	0	900	340	0	0	0	0	-100	48	9	60	73	2	190	18.8	7.56	0	0	
16885	209	S 13	420	.11	0	76																																					

Appendix 9-9B continued.

S.N.	DM	DM DT	AU	NR	SC	CE	CR	MM	FE	CO	NI	CU	ZN	AS	SE	BR	RB	ZR	MO	RS	CD	SM	SO	TE	CS	EA	LA	SH	EU	TB	VB	LU	IR	HF	TR	H	PB	BI	TH	U	MT	ZN2	AG2
16986	107	S 14	84	.26	0	161	330	8800	19.1	72	130	60	140	11	-10	0	0	0	5	-3	0	-10	.7	0	0	-300	94	0	0	0	0	0	-100	40	4	-10	15	-2	25	6.1	106	0	0
16988	107	S 15	48	.34	0	183	300	8400	17.1	63	130	56	140	11	-10	0	0	0	6	-5	0	-10	-.3	0	0	-200	107	0	0	0	0	0	-100	48	6	-10	16	-2	27	5.7	110	0	0
16989	107	S 14	60	.24	0	255	320	9700	18.3	71	140	70	150	16	-10	0	0	0	6	-5	0	-10	-.4	0	0	100	135	0	0	0	0	0	-100	65	5	-10	19	-2	35	6.2	130	0	0
16990	107	S 15	39	.21	0	270	340	10000	18.9	79	130	65	130	13	-10	0	0	0	7	-5	0	-10	-.3	0	0	-200	153	0	0	0	0	0	-100	71	6	-10	11	-2	39	8.7	87	0	0
16994	110	S 21	70	.16	0	672	540	8700	24.7	88	120	150	210	58	-10	0	0	0	13	.5	0	-10	1.2	0	0	1500	382	0	0	0	0	0	-100	190	10	40	18	15	140	24.6	3.99	0	0
16996	110	S 21	-23	.11	0	851	660	7600	25.3	150	140	180	200	110	-10	0	0	0	13	.5	0	-10	1.5	0	0	2200	340	0	0	0	0	0	-100	190	7	80	18	-2	180	24.4	4.74	0	0
16998	110	S 11	140	.15	0	663	330	12000	19.3	240	210	190	120	41	-16	0	0	0	8	-5	0	-10	.6	0	0	200	280	0	0	0	0	0	-100	88	10	-10	18	-2	120	16.5	13.3	0	0
16999	110	S 11	100	.08	0	542	280	12000	22.7	230	270	240	130	240	-18	0	0	0	8	.5	0	-10	-.7	0	0	-800	258	0	0	0	0	0	-100	83	7	40	29	-2	110	17.1	19.1	0	0
17003	105	S 14	44	.18	0	255	390	9300	18.3	41	93	21	130	-2	-10	0	0	0	5	-5	0	-10	-.3	0	0	400	148	0	0	0	0	0	-100	60	6	-10	14	-2	39	7.1	74.5	0	0
17005	105	S 14	26	.18	0	163	320	9500	17.1	43	96	25	130	-2	-10	0	0	0	5	-5	0	-10	-.3	0	0	-300	91	0	0	0	0	0	-100	28	6	-10	15	-2	23	3.8	95.6	0	0
17007	105	S 14	72	.19	0	188	370	8900	20.1	68	120	42	120	-4	-10	0	0	0	5	-5	0	-10	-.4	0	0	400	109	0	0	0	0	0	-100	34	6	-10	15	-2	28	6.1	102	0	0
17008	105	S 14	-18	.22	0	200	340	8300	19.5	90	150	63	130	9	-10	0	0	0	4	-5	0	-10	-.4	0	0	-200	115	0	0	0	0	0	-100	40	5	-10	16	-2	29	9	83.3	0	0
17010	105	S 14	18	.25	0	142	300	8700	17.6	74	140	58	130	-4	-10	0	0	0	4	-5	0	-10	.5	0	0	-100	75	0	0	0	0	0	-100	21	4	-10	17	-2	16	3.3	105	0	0
17017	210	S 20	23	.32	0	1290	370	9100	16.3	38	79	50	190	11	80	0	0	0	9	-5	0	-10	2.4	0	0	700	777	0	0	0	0	0	-100	200	11	20	140	-2	230	33.7	3.38	0	0
17018	210	S 13	-33	.29	0	431	270	15000	27.5	260	320	260	110	-8	-10	0	0	0	5	1	0	-10	-.7	0	0	400	285	0	0	0	0	0	-100	29	4	-10	35	-2	100	15.4	60.8	0	0
17019	210	S 13	51	.2	0	582	290	14000	31.5	330	370	260	130	17	14	0	0	0	5	-3	0	-10	-.7	0	0	-300	359	0	0	0	0	0	-100	39	6	-10	26	-2	140	15.7	29.1	0	0
17019	210	S 13	-21	.11	0	420	240	17000	24.6	240	340	260	150	19	-10	0	0	0	4	.5	0	-10	-.5	0	0	500	252	0	0	0	0	0	-100	31	3	-10	33	-2	93	12.1	20.4	0	0
17028	207	S 16	150	.68	0	647	180	3800	9.8	51	110	74	170	9	-10	0	0	0	2	-5	0	-10	.5	0	0	500	328	0	0	0	0	0	-100	28	4	-10	23	-2	36	6.1	41.8	0	0
17029	207	S 11	-18	.77	0	674	170	4000	10.5	46	100	50	170	-4	-10	0	0	0	2	-5	0	-10	.5	0	0	600	320	0	0	0	0	0	-100	25	5	-10	18	-2	30	2.9	33.8	0	0
17030	207	S 15	-20	.72	0	756	190	3800	11.4	57	100	57	150	-4	-10	0	0	0	2	-5	0	-10	.6	0	0	400	395	0	0	0	0	0	-100	30	5	-10	19	-2	43	5.9	105	0	0
17031	207	S 11	-31	.82	0	1000	280	3000	11.9	61	100	67	150	-7	-14	0	0	0	2	-5	0	-10	1	0	0	600	522	0	0	0	0	0	-100	31	4	-10	15	-2	33	5	121	0	0
17032	207	S 11	-39	.8	0	1510	250	2500	12.3	63	110	63	160	-8	36	0	0	0	2	-5	0	-10	1.4	0	0	1400	729	0	0	0	0	0	-100	37	4	-10	15	-2	30	-4	82.8	0	0
17033	207	S 13	-30	.86	0	881	220	2700	10.4	46	96	51	170	-6	-10	0	0	0	2	-5	0	-10	-.6	0	0	500	449	0	0	0	0	0	-100	18	4	-10	10	-2	19	9	60.8	0	0
17037	102	S 21	64	.12	0	647	870	7200	26.1	87	100	90	240	89	-16	0	0	0	13	.5	0	-10	3.1	0	0	4700	271	0	0	0	0	0	-100	200	7	-10	30	-2	150	20.9	13.9	0	0
17043	102	S 21	160	.13	0	554	680	7800	27	94	120	94	240	95	-14	0	0	0	13	.5	0	-10	3.3	0	0	3400	237	0	0	0	0	0	-100	160	8	-10	17	-2	130	16.3	18	0	0
17049	102	S 21	34	.14	0	560	760	7300	26.4	86	110	100	310	92	-10	0	0	0	11	.5	0	-10	3.7	0	0	6500	246	0	0	0	0	0	-100	150	11	-10	19	-2	120	21.1	9.44	0	0
17050	102	S 21	22	.14	0	548	800	8900	29.5	90	130	120	270	110	-11	0	0	0	16	.5	0	-10	4	0	0	8400	225	0	0	0	0	0	-100	140	6	-10	17	-2	120	17.7	4.25	0	0
17051	102	S 21	37	.12	0	557	810	7100	31.5	91	130	100	360	100	-15	0	0	0	15	.5	0	-10	4.9	0	0	5300	236	0	0	0	0	0	-100	150	5	-10	30	-2	120	18.9	4.38	0	0
17053	102	S 11	67	.3	0	546	420	8800	23.5	100	160	63	120	40	-10	0	0	0	4	-5	0	-10	-.5	0	0	-300	358	0	0	0	0	0	-100	69	6	210	30	-2	110	11.2	38.5	0	0
17054	102	S 14	-23	.29	0	341	530	9600	23.3	72	110	36	130	16	-10	0	0	0	3	-5	0	-10	-.5	0	0	-200	200	0	0	0	0	0	-100	65	8	-10	23	-2	60	13.7	35.9	0	0
17055	102	S 14	190	.24	0	307	470	9000	21.4	64	110	32	140	13	-10	0	0	0	3	-5	0	-10	-.5	0	0	-200	178	0	0	0	0	0	-100	74	7	-10	21	-2	52	13.2	39.8	0	0
17056	102	S 10	-24	.42	0	352	480	9500	21.5	63	100	37	140	11	-10	0	0	0	3	-5	0	-10	-.5	0	0	-200	197	0	0	0	0	0	-100	87	7	-10	21	-2	58	12.6	30.1	0	0
17057	102	S 14	46	.3	0	434	510	8300	21.3	67	110	42	140	17	-14	0	0	0	3	-5	0	-10	-.2	0	0	-100	255	0	0	0	0	0	-100	95	8	-10	26	-2	76	14.1	35.7	0	0
17061	104	S 21	-25	.13	0	859	720	7200	29	80	130	120	280	97	-19	0	0	0	9	.5	0	-10	2.1	0	0	2400	463	0	0	0	0	0	-100	210	11	30	60	-2	200	28.7	2.83	0	0
17066	104	S 21	45	.1	0	583	880	7300	27.8	99	120	94	310	97	-10	0	0	0	9	.5	0	-10	2.9	0	0	4500	264	0	0	0	0	0	-100	110	6	-10	31	-2	130	16.6	11.6	0	0
17068	104	S 21	60	.09	0	493	650	6600	28.2	99	110	110	280	100	-18	0	0	0	12	.5	0	-10	3.2	0	0	12000	225	0	0	0	0	0	-100	120	4	-10	22	-2	110	15.6	8.49	0	0
17069	104	S 21	-16	.08	0	290	310	5700	34.2	88	150	140	220	140	-10	0	0	0	11	2	0	-10	4.5	0	0	5600	163	0	0	0	0	0	-100	44	2	-10	50	-2	85	9.4	7.73	0	0
17072	104	S 27	-24	.16	0	528	360	10000	25	130	200	110	140	55	18	0	0	0	6	.5	0	-10	.7	0	0	1000	275	0	0	0	0	0	-100	56	-3	-10	17	-2	94				

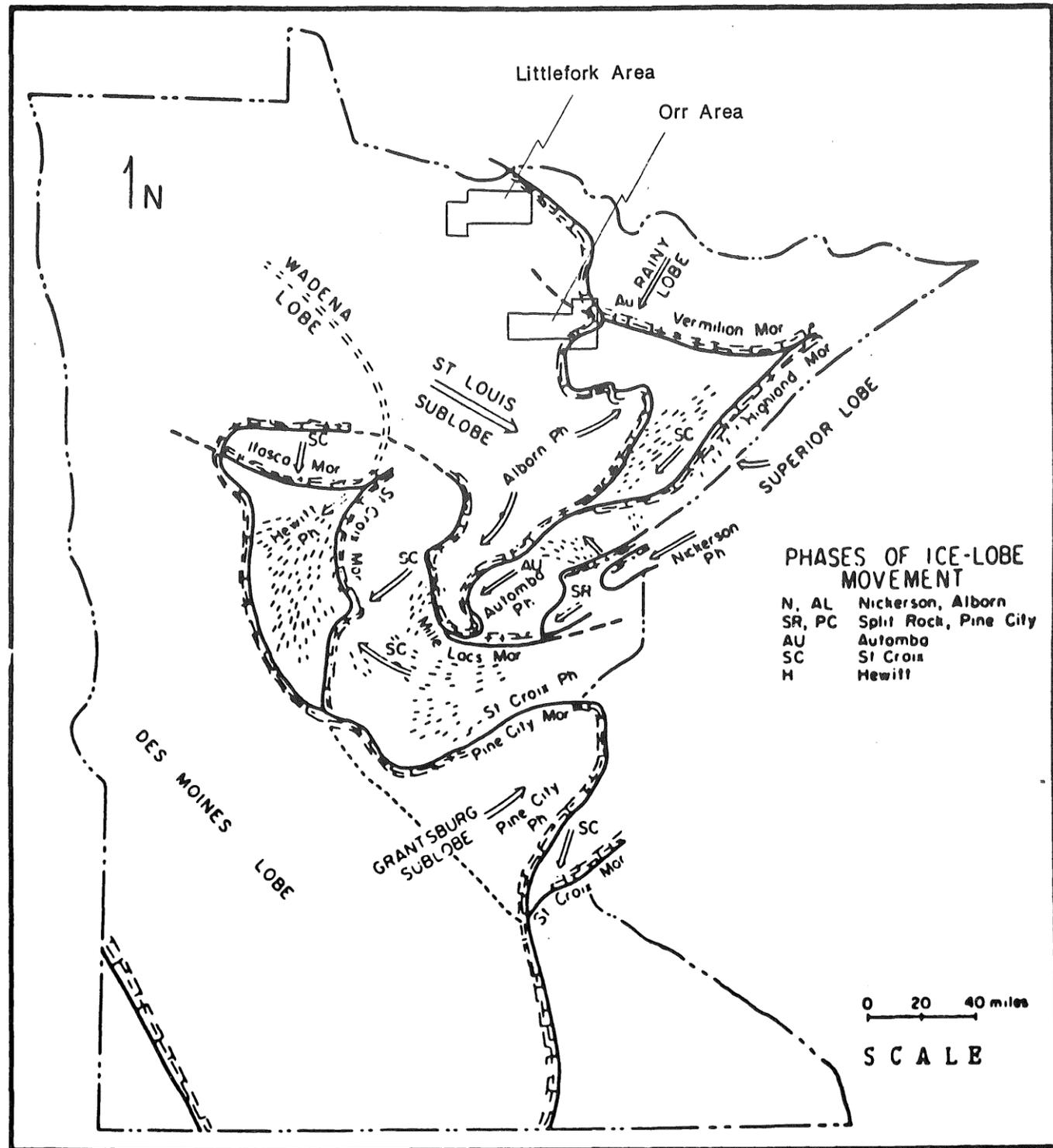
Appendix 9-9B continued.

S. N.	DM	DM DT	AU	NA	SC	CE	CR	HM	FE	CO	HI	CU	ZH	AS	SE	BR	RB	ZR	NO	RB	CO	SN	SB	TE	CS	EA	LA	SH	EU	TB	VB	LU	IR	HF	TA	H	PB	BI	TH	U	HT	ZN2	AS2
18633	20803	M 10	88	.17	0	568	750	10000	23.8	200	240	250	130	63	-20	0	0	0	6	.5	0	-10	1.4	0	0	400	359	0	0	0	0	-100	53	9	8	123	3	140	14.2	41.7	0	0	
18634	20803	M 10	86	.15	0	635	960	10000	25.6	210	240	290	120	63	-10	0	0	0	5	-5	0	-10	1.9	0	0	600	409	0	0	0	0	-100	57	11	12	46	2	160	15	39.1	0	0	
18635	20803	M 10	220	.18	0	542	970	10000	25.6	200	220	200	120	55	70	0	0	0	4	-5	0	-10	1.1	0	0	-500	331	0	0	0	0	-100	42	10	-6	40	2	130	11.4	26.1	0	0	
18637	20803	M 39	76	.19	0	835	930	8200	22.6	210	320	220	160	33	-10	0	0	0	6	-5	0	-10	-6	0	0	-500	461	0	0	0	0	-100	140	6	60	69	-2	180	15.9	18.2	0	0	
18638	20901	M 14	54	.19	0	817	320	8600	30.4	280	280	430	180	23	-10	0	0	0	6	-5	0	-10	.8	0	0	2000	545	0	0	0	0	-100	76	9	38	52	3	190	21.9	22.1	0	0	
18639	20901	M 14	69	.1	0	396	180	9700	13.8	110	280	220	110	22	-10	0	0	0	5	-5	0	-10	.5	0	0	400	255	0	0	0	0	-100	43	8	31	61	2	87	10.4	16.8	0	0	
18639R	20901	M 14	-23	.3	0	499	270	8700	22.2	200	230	180	110	13	-10	0	0	0	5	-5	0	23	.7	0	0	700	360	0	0	0	0	-100	64	7	65	99	4	120	12.7	13.6	0	0	
18641	20901	M 39	-31	.36	0	949	370	8200	28.7	350	500	380	140	28	-30	0	0	0	8	-5	0	-10	-.8	0	0	800	714	0	0	0	0	-100	140	10	100	109	3	240	30.6	11.3	0	0	
18642	20603	M 13	-12	.65	0	384	160	3000	8.2	50	110	120	150	3	-10	0	0	0	1	-5	0	-10	-.2	0	0	400	193	0	0	0	0	-100	21	3	5	20	-2	17	4.2	112	0	0	
18643	20603	M 13	-14	.63	0	432	130	4100	9.7	60	110	110	150	3	-10	0	0	0	2	-5	0	-10	-.2	0	-2	300	222	0	0	0	0	-100	21	2	7	23	-2	18	4.4	121	0	0	
18644	20603	M 13	-16	.6	0	0	170	3500	10.5	70	110	93	170	4	-10	0	0	0	1	-5	0	-10	-.3	0	-1	1100	276	0	0	0	0	-100	24	4	8	20	-2	27	4.3	13.2	0	0	
18645	20603	M 39	-33	.78	0	873	270	3500	14.2	90	150	150	140	10	-20	0	0	0	7	-5	0	-10	.7	0	-1	500	430	0	0	0	0	-100	51	-3	55	25	-2	43	10.6	75.5	0	0	
18646	20402	M 14	96	.2	0	420	12000	23.7	140	160	560	130	23	-10	0	0	0	0	5	2	0	-10	.7	0	-2	400	355	0	0	0	0	-100	66	12	19	55	-2	130	13.3	21.7	0	0	
18647	20402	M 34	70	.21	0	0	360	12000	27.5	130	160	540	120	23	-10	0	0	0	5	.5	0	-10	.5	0	-2	300	233	0	0	0	0	-100	50	7	51	45	-2	81	10.6	17.5	0	0	
18649	20402	M 39	120	.27	0	686	580	12000	25.2	170	230	290	170	26	50	0	0	0	10	-5	0	-10	-.8	0	-1	-1400	496	0	0	0	0	-100	120	11	2800	196	-2	180	19.3	10.7	0	0	
18650	20401	M 13	-5	.14	0	0	240	12000	26.2	100	170	420	140	11	-20	0	0	0	5	-5	0	-10	-.9	0	-5	-700	225	0	0	0	0	-100	26	11	800	111	-2	83	12.5	9.92	0	0	
18651	20401	M 13	-35	.13	0	0	250	9700	23.9	100	200	540	120	19	-10	0	0	0	10	-5	0	27	-.8	0	0	-700	205	0	0	0	0	-100	47	4	4500	86	-2	73	9.7	17.4	0	0	
18654	20401	M 39	410	.16	0	505	400	11000	26.2	190	170	310	160	32	-10	0	0	0	8	-5	0	-10	-1.3	0	-1	-1600	362	0	0	0	0	-100	70	12	4200	111	-2	130	10.7	6.91	0	0	
18655	20601	M 13	160	.1	0	0	210	11000	23.9	210	220	170	120	23	-10	0	0	0	7	1	0	-10	-.4	0	-2	700	278	0	0	0	0	-100	36	8	20	47	3	110	12.4	12.5	0	0	
18656	20601	M 13	-5	-.05	0	0	-50	11000	5.5	50	300	260	160	5	-10	0	0	0	7	1	0	-10	.2	0	-2	200	81	0	0	0	0	-100	12	-1	5	75	3	25	2.6	2.79	0	0	
18658	20601	M 39	78	.21	0	476	310	11000	27.8	250	250	190	150	19	-10	0	0	0	6	-5	0	-10	.6	0	-1	400	373	0	0	0	0	-100	61	6	190	69	3	120	13.3	18.7	0	0	
18659	20904	M 13	21	.17	0	0	170	11000	28	100	140	210	120	11	-10	0	0	0	6	-5	0	-10	.6	0	-3	400	148	0	0	0	0	-100	15	-2	270	55	-2	45	7.7	14.4	0	0	
18660	20904	M 13	-19	.21	0	0	130	12000	28.8	160	190	340	110	10	20	0	0	0	11	-5	0	83	.8	0	-4	1100	314	0	0	0	0	-100	27	7	130	129	-2	66	10.5	12.6	0	0	
18661	20904	M 13	-5	-.05	0	0	-50	7900	4.7	50	300	410	230	6	10	0	0	0	11	1.5	0	-10	-.2	0	-2	200	77	0	0	0	0	-100	9	-1	11	65	4	16	3	2.37	0	0	
18662	20904	M 39	-38	.28	0	1210	380	9400	37.4	370	320	450	220	22	-30	0	0	0	18	1	0	-10	-.2	0	-1	1100	716	0	0	0	0	-100	82	-4	190	66	2	190	33.5	3.91	0	0	
18663	20405	M 13	-14	.16	0	0	440	13000	27.6	110	200	140	120	24	-10	0	0	0	4	-5	0	-10	.9	0	-2	-300	194	0	0	0	0	-100	30	4	28	50	-2	71	6.8	20.5	0	0	
18665	20405	M 39	80	.17	0	515	710	13000	30.9	130	180	150	170	23	-10	0	0	0	5	-5	0	-10	.8	0	-1	-600	292	0	0	0	0	-100	56	7	110	55	-2	120	14.2	11.3	0	0	
18666	20502	M 13	-5	-.05	0	0	50	14000	5.6	30	230	290	190	15	-10	0	0	0	4	.5	0	-10	.3	0	-2	-100	99	0	0	0	0	-100	12	3	5	72	-2	38	3.1	2.49	0	0	
18667	20502	M 35	-19	.24	0	0	280	11000	30.3	110	170	230	190	93	40	0	0	0	7	-5	0	-10	1.2	0	-4	-1200	337	0	0	0	0	-100	48	17	64	77	-2	120	23.2	9.78	0	0	
18668A	20502	M 13	-5	.05	0	0	-50	13000	4.8	20	190	340	180	18	-10	0	0	0	2	1	0	-10	-.2	0	-2	-100	85	0	0	0	0	-100	11	1	21	96	-2	30	3.1	2.4	0	0	
18668B	20502	M 13	830	.05	0	0	-50	13000	4.7	30	190	300	170	12	-10	0	0	0	10	.5	0	-10	-.2	0	-2	-100	97	0	0	0	0	-100	12	2	23	133	-2	37	3.7	2.64	0	0	
18669	20502	M 13	55	-.05	0	0	-50	13000	4.7	20	200	200	170	13	-10	0	0	0	15	-5	0	-10	.2	0	-2	-100	73	0	0	0	0	-100	11	1	10	56	-2	25	2.6	2.19	0	0	
18670	20502	M 15	790	.2	0	0	370	11000	26.7	90	160	150	120	29	-20	0	0	0	14	-5	0	-10	1.7	0	-5	1000	546	0	0	0	0	-100	110	9	43	68	-2	180	22.2	8.03	0	0	
18671	20502	M 15	-5	.06	0	0	60	12000	4.6	10	140	150	150	4	20	0	0	0	8	-5	0	-10	.3	0	-2	200	110	0	0	0	0	-100	17	2	6	67	-2	41	2.8	1.99	0	0	
18672	20502	M 15	-16	.34	0	0	270	8200	27.1	150	180	280	110	20	-10	0	0	0	39	-5	0	-10	1.2	0	-4	-400	306	0	0	0	0	-100	54	8	14	53	-2	120	16.1	13.6	0	0	
18674	20502	M 39	350	.25	0	1060	460	11000	26.7	180	230	240	170	50	-20	0	0	0	11	-5	0	-10	-.6	0	-1	500	656	0	0	0	0	-100	98	13	86	67	-2	270	24.4	19.5	0	0	
18675	21002	M 13	39	.18	0	0	530	13000	34.1	260	350	550	190	25	20	0	0	0	6	-5	0	-10	.8	0	6	-600	359	0	0	0	0	-100	52	6	21	66	2	120	17.5	8.81	0	0	
18676	21002	M 13	-5	-.05	0	0	-50	10000	6.5	70	480	910	130	11	-10	0	0	0	5	.5	0	-10	-.2	0	6	-100	77	0	0	0	0	-100	10	1	8	141	4	27	2.6	2.8	0	0	
18680	21005	M 10	-20	.16	0	0	370	9500	37.6	380	450	750	1																														

Appendix 9-9B continued.

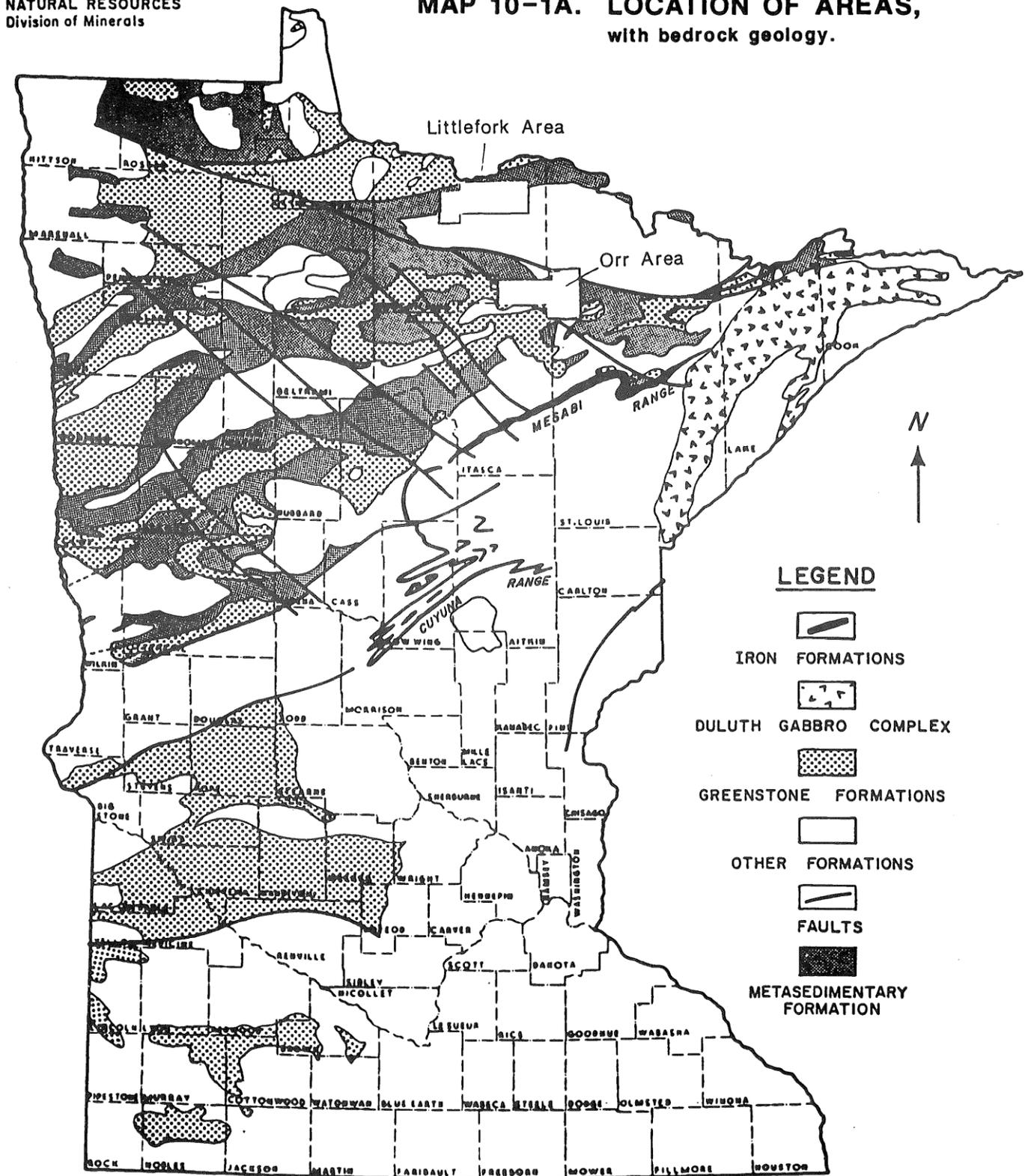
S. N.	DM	DM DT	AU	NA	SC	CE	CR	MM	FE	CO	MI	CU	ZN	AS	SE	BR	RB	ZR	NO	AG	CD	SM	SO	TE	CS	BA	LA	SH	EU	TB	VB	LU	IR	HF	TA	M	PB	BI	TH	U	HT	ZH2	AG2
18734	20705	H 13	49	.15	0	0	190	12000	20.4	50	110	89	140	33	-10	0	0	0	4	-5	0	-10	.5	0	-2	300	191	0	0	0	0	0	-100	21	2	5	34	-2	46	4.3	12.4	0	0
18735	20705	H 12	-14	.14	0	0	180	12000	20.4	50	110	76	140	17	-10	0	0	0	3	-5	0	-10	.3	0	-2	400	180	0	0	0	0	0	-100	19	4	4	50	-2	50	4.9	11.9	0	0
18736	20705	H 13	170	.12	0	0	180	12000	23.3	60	110	120	140	26	-10	0	0	0	3	-5	0	-10	.7	0	-2	600	182	0	0	0	0	0	-100	25	3	-4	48	-2	53	4.9	11.6	0	0
18737	20705	H 39	42	.41	0	737	330	7500	16.8	60	130	82	170	17	-10	0	0	0	4	-5	0	-10	-4	0	0	-300	395	0	0	0	0	0	-100	55	12	21	27	-2	100	8.9	33.6	0	0
18743C	20804	H 13	150	.33	0	511	630	6500	30.4	250	230	470	140	52	-10	0	0	0	5	-5	0	-10	1	0	0	1600	340	0	0	0	0	0	-100	48	4	64	46	3	120	14.1	73.7	0	0
18744C	20804	H 13	190	.19	0	456	880	7400	35.5	410	280	350	150	160	-20	0	0	0	7	-5	0	71	4.5	0	0	-600	293	0	0	0	0	0	-100	35	9	1100	192	4	100	7.7	28.3	0	0
18745C	20902	H 13	-38	.19	0	296	290	24000	25.1	300	230	260	140	44	-20	0	0	0	7	-5	0	-10	1.1	0	0	-600	181	0	0	0	0	0	-100	36	6	750	51	3	71	12	4.46	0	0
18746C	20906	H 13	36	.12	0	733	730	0	40.6	350	0	0	0	02	-20	0	0	0	0	0	0	0	2.3	0	0	-600	355	0	0	0	0	0	-100	79	0	870	0	0	160	14.8	.08	0	0
18747C	20704	H 13	-15	.6	0	486	230	4300	14.9	70	160	57	190	13	-10	0	0	0	3	-5	0	-10	.8	0	0	400	225	0	0	0	0	0	-100	27	5	180	22	-2	27	3.3	43.3	0	0
18748C	20702	H 14	-19	.38	0	563	530	8100	23.4	70	110	70	140	17	-10	0	0	0	3	-5	0	-10	.8	0	0	400	337	0	0	0	0	0	-100	44	7	20	54	-2	110	6.3	81.2	0	0
18749C	20803	H 10	35	.19	0	283	600	9300	23.6	180	180	190	120	82	-10	0	0	0	3	-5	0	-10	2.8	0	0	600	183	0	0	0	0	0	-100	18	4	-12	91	2	66	7.3	14.7	0	0
18750C	20803	H 10	100	.16	0	656	1100	9800	29.8	240	210	250	150	99	-10	0	0	0	5	-5	0	-10	1.6	0	0	-600	465	0	0	0	0	0	-100	72	12	20	66	3	170	14.8	.43	0	0
18751C	20901	H 14	17	.22	0	268	290	11000	23	190	190	180	130	24	-10	0	0	0	4	-5	0	-10	1.6	0	0	700	193	0	0	0	0	0	-100	28	6	71	72	3	71	8.7	.85	0	0
18752C	20603	H 13	-20	.7	0	504	180	4400	11.6	60	110	130	180	4	-10	0	0	0	2	-5	0	-10	.5	0	0	200	254	0	0	0	0	0	-100	28	4	-14	18	-2	18	-2.9	117	0	0
18753C	20402	H 14	56	.22	0	449	350	13000	21.7	140	130	440	150	20	-20	0	0	0	6	-5	0	-10	1	0	0	1000	307	0	0	0	0	0	-100	82	8	38	57	-2	110	12.5	8.72	0	0
18754C	20401	H 13	24	-.05	0	363	240	10000	24.2	120	140	690	130	14	-10	0	0	0	8	-5	0	-10	.7	0	0	-300	249	0	0	0	0	0	-100	41	-1	1900	48	-2	31	6.2	6.55	0	0
18755C	20603	H 13	47	.78	0	523	180	3400	12.7	60	94	72	160	7	-10	0	0	0	2	-5	0	-10	.8	0	0	600	268	0	0	0	0	0	-100	30	2	-10	17	-2	21	4.5	150	0	0
18756C	20601	H 13	58	.13	0	266	190	9300	25.1	160	160	140	120	24	-10	0	0	0	4	-5	0	-10	-6	0	0	800	178	0	0	0	0	0	-100	21	-1	30	42	-2	58	9.1	15.5	0	0
18757C	20904	H 13	97	.25	0	453	260	9100	31.1	190	130	190	110	21	-30	0	0	0	9	-5	0	-10	-1	0	0	900	266	0	0	0	0	0	-100	21	-4	-30	48	2	65	6.4	22	0	0
18763	10501	A 13	30	.34	83.3	200	370	1270	26	230	170	91	-200	82	-10	-5	-10	1700	8	2	-10	-200	.7	-20	-1	370	100	21	2	4	19	-3.4	-100	33	8	22	27	0	35	6.7	31.57	44	-5
18765	10501	A 11	71	.28	91.8	380	460	360	26	210	140	73	-200	64	-10	-5	-10	5200	3	1.9	-10	230	.6	-20	-1	-100	180	35	5	6	25	-4.1	-100	92	11	466	17	0	57.1	12	27.29	54	-5
18768	10704	A 13	15	.35	82.2	730	340	395	20	120	130	94	210	27	-10	-5	15	7600	-2	1.1	-10	.210	.5	-44	-1	-100	390	58.1	7	8	24	-4.7	-100	140	8	24	11	0	94.5	23	20.16	28	-5
18771	10704	A 15	32	.26	93.3	740	370	408	23	160	140	102	230	31	-10	-5	-10	7600	-2	1.4	-10	210	.5	-20	-1	-100	390	59.8	6	8	28	-5.2	-100	140	9	85	11	0	105	22	19.37	30	-5
18774	10401	A 10	-12	-.39	100	1420	420	599	24	190	140	109	-200	50	-10	-5	-10	7500	-5	1.5	-20	-370	.4	-20	-1	-100	767	104	10	14	34	-6.1	-100	150	8	-17	15	0	201	14	15.66	20	-5
18776	10401	A 15	10	.72	77.6	580	360	329	19	120	130	65	-200	24	-10	-5	-10	7000	2	1.3	-10	-200	.5	-33	-1	-100	270	52.1	8	7	20	-3.9	-100	120	8	-10	8	0	68.3	19	35.88	18	-5
18778	10401	A 13	-12	.65	94.1	740	500	464	25	210	190	99	210	46	-10	-5	-10	8800	3	1.4	-21	-270	.5	-40	-1	-100	370	57.3	6	9	29	-5.1	-100	170	10	-18	17	0	119	23	10.22	30	-5
18783	10401	A 11	-5	.38	120	1090	370	631	25	150	130	462	-200	23	-10	-5	-10	5000	-4	.9	-10	-280	.4	-45	-1	-100	604	85.7	5	12	33	-6.3	-100	75	6	-14	27	0	180	47	30.81	25	-5
18784	10401	A 11	350	-.44	189	1560	270	1175	31	78	120	288	-200	22	-10	-5	-20	3100	5	1.2	49	-400	-2	-54	-1	-100	878	113	5	16	57	-10	-100	48	1	-22	27	0	257	72.2	14.28	18	0
18789	10700	A 14	-5	.23	85.3	180	310	490	22	130	120	54	-200	24	-10	-5	-10	2100	4	1.2	-10	-200	.4	-20	-1	-100	89	19	3	4	18	-3.4	-100	41	6	-11	10	0	29	6.3	25.62	19	-5
18791	10700	A 14	-5	.21	89.1	160	340	468	22	120	140	43	-200	27	-10	-5	-10	1900	6	.9	15	210	.5	-20	-1	-100	70	18	3	4	19	-3	-100	26	5	-14	6	0	24	5.2	17.82	27	-5
18793	10700	A 14	27	.28	92.5	190	320	438	21	120	110	116	-200	21	-10	-5	-10	1900	2	.6	21	-200	.4	-20	-1	-100	87	20	4	4	19	-3.6	-100	33	6	-9	8	0	24	6.1	52.43	28	-5
18795	10700	A 14	27	.28	92.5	190	320	438	21	120	110	116	-200	21	-10	-5	-10	1900	2	.6	21	-200	.4	-20	-1	-100	87	20	4	4	19	-3.6	-100	33	6	-9	8	0	24	6.1	52.43	28	-5
18797	10700	A 15	11	.34	91.3	310	360	340	22	120	85	52	-200	25	-10	-5																											

MAP 10-1B. LOCATION OF AREAS, with glacial geology
(modified from Wright, 1972).



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MAP 10-1A. LOCATION OF AREAS, with bedrock geology.



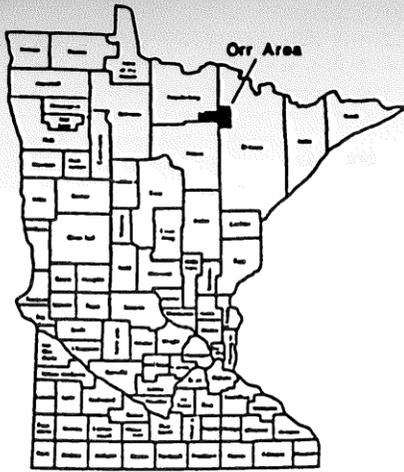
Note: Greenstone areas north of the fault passing from Bigstone County northeastward to Morrison County are adapted from G. B. Meroy et al, Map 3-13, 1982. Protolith for the areas south of this fault are probably older mafic to intermediate greenstones as adapted from P. K. Sims, Geologic Map of Minnesota, 1970.

MAP 10-2
ORR AREA

DRILL HOLE LOCATIONS

MINNESOTA DEPARTMENT OF
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PROJECT 252



MAP LOCATION

T.64N.

T.63N.

T.62N.

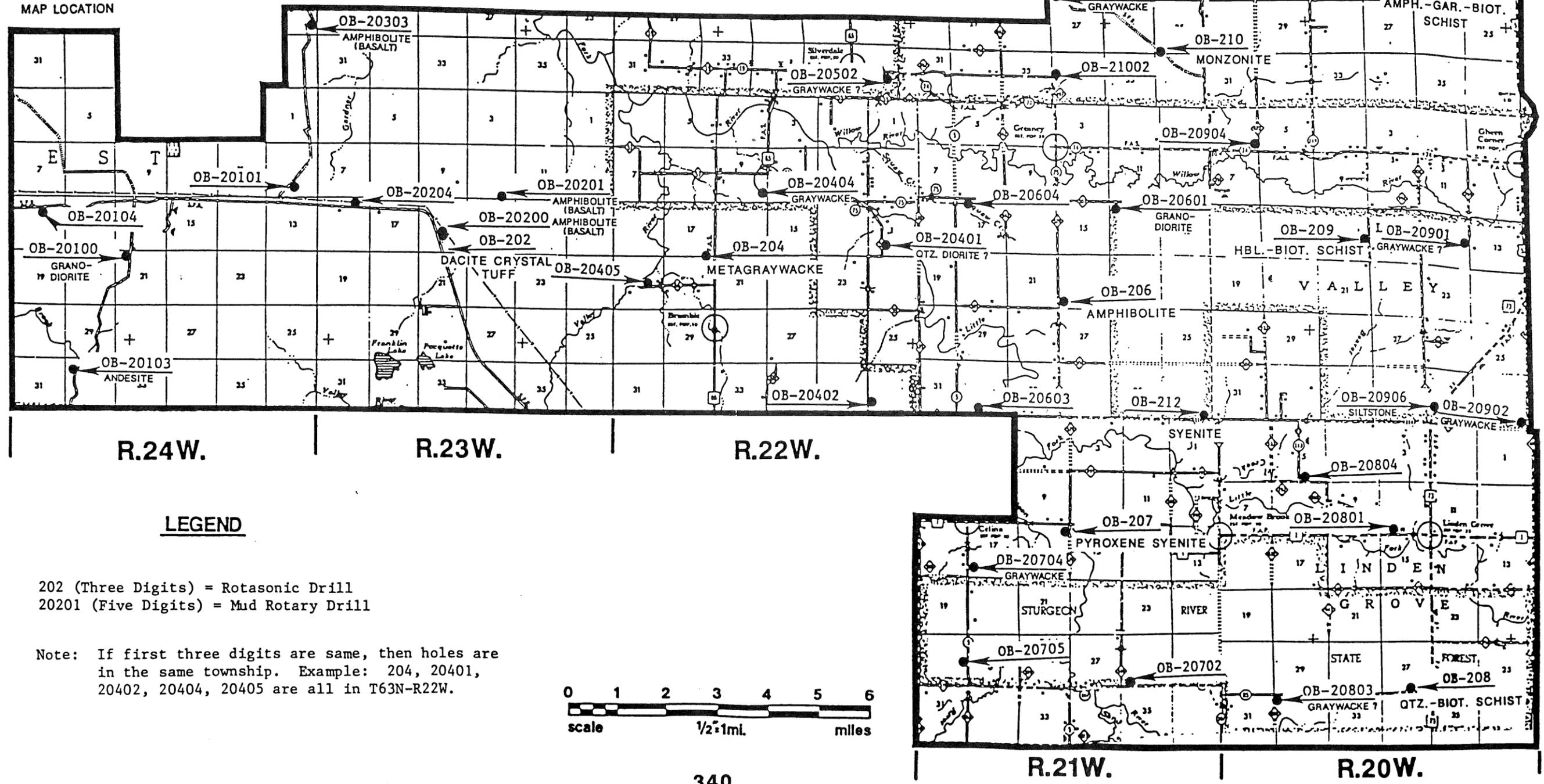
R.24W.

R.23W.

R.22W.

R.21W.

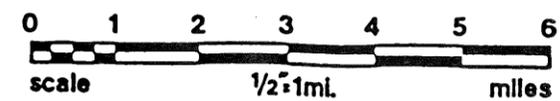
R.20W.



LEGEND

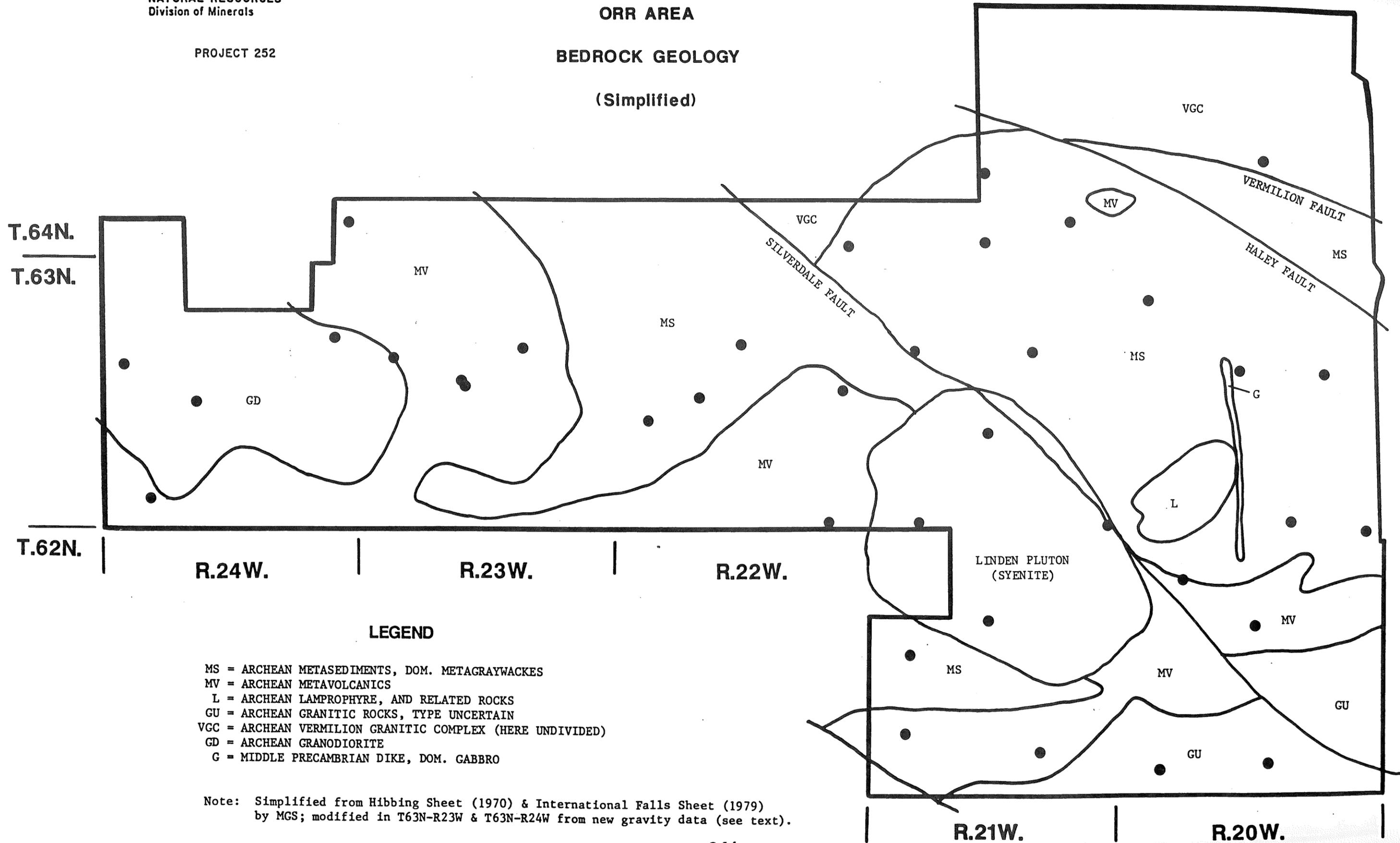
202 (Three Digits) = Rotasonic Drill
20201 (Five Digits) = Mud Rotary Drill

Note: If first three digits are same, then holes are in the same township. Example: 204, 20401, 20402, 20404, 20405 are all in T63N-R22W.



PROJECT 252

BEDROCK GEOLOGY
(Simplified)



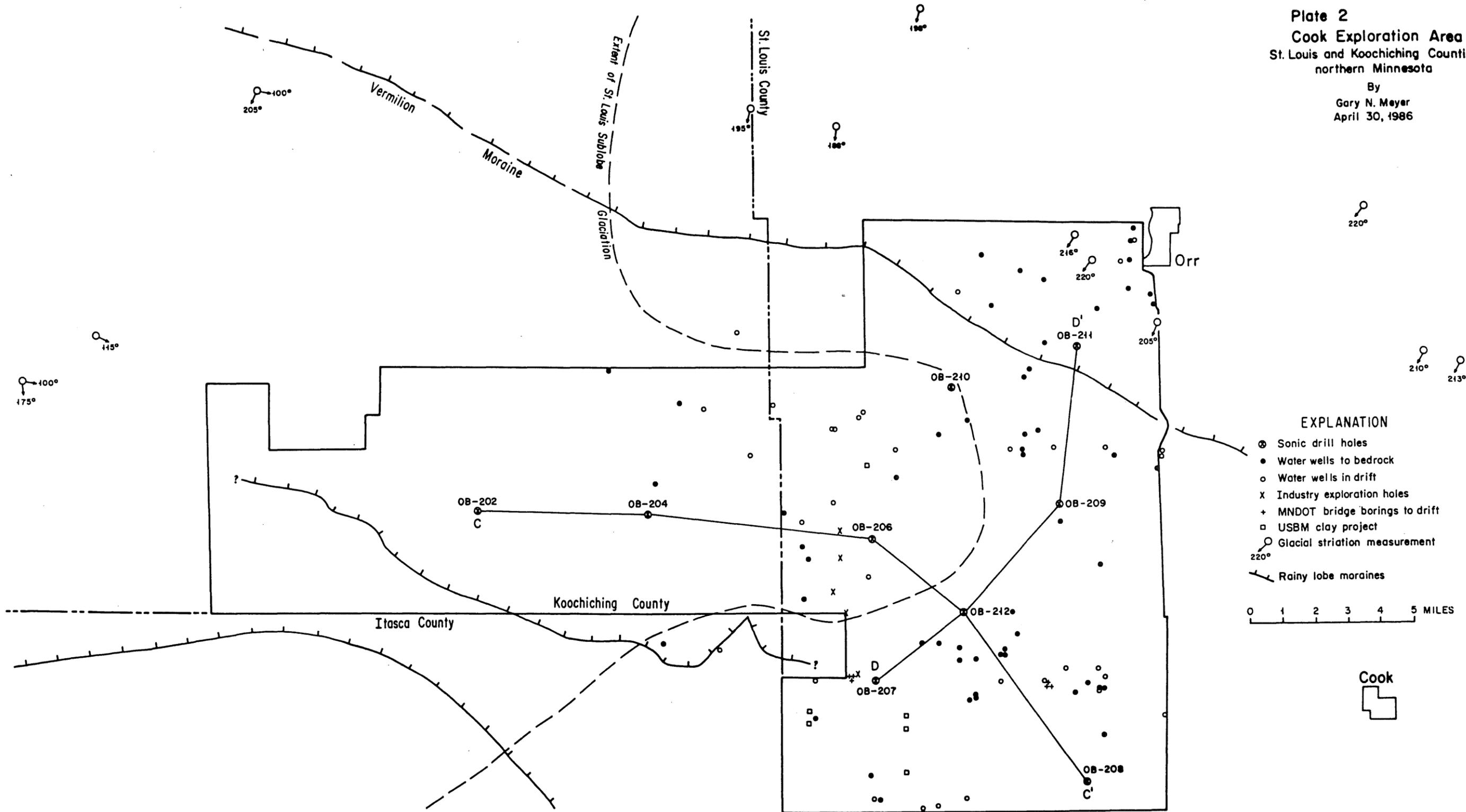
LEGEND

- MS = ARCHEAN METASEDIMENTS, DOM. METAGRAYWACKES
- MV = ARCHEAN METAVOLCANICS
- L = ARCHEAN LAMPROPHYRE, AND RELATED ROCKS
- GU = ARCHEAN GRANITIC ROCKS, TYPE UNCERTAIN
- VGC = ARCHEAN VERMILION GRANITIC COMPLEX (HERE UNDIVIDED)
- GD = ARCHEAN GRANODIORITE
- G = MIDDLE PRECAMBRIAN DIKE, DOM. GABBRO

Note: Simplified from Hibbing Sheet (1970) & International Falls Sheet (1979) by MGS; modified in T63N-R23W & T63N-R24W from new gravity data (see text).

Plate 2
Cook Exploration Area
St. Louis and Koochiching Counties
northern Minnesota

By
Gary N. Meyer
April 30, 1986



EXPLANATION

- ⊙ Sonic drill holes
- Water wells to bedrock
- Water wells in drift
- x Industry exploration holes
- + MNDOT bridge borings to drift
- USBM clay project
- Glacial striation measurement
- ↖ Rainy lobe moraines

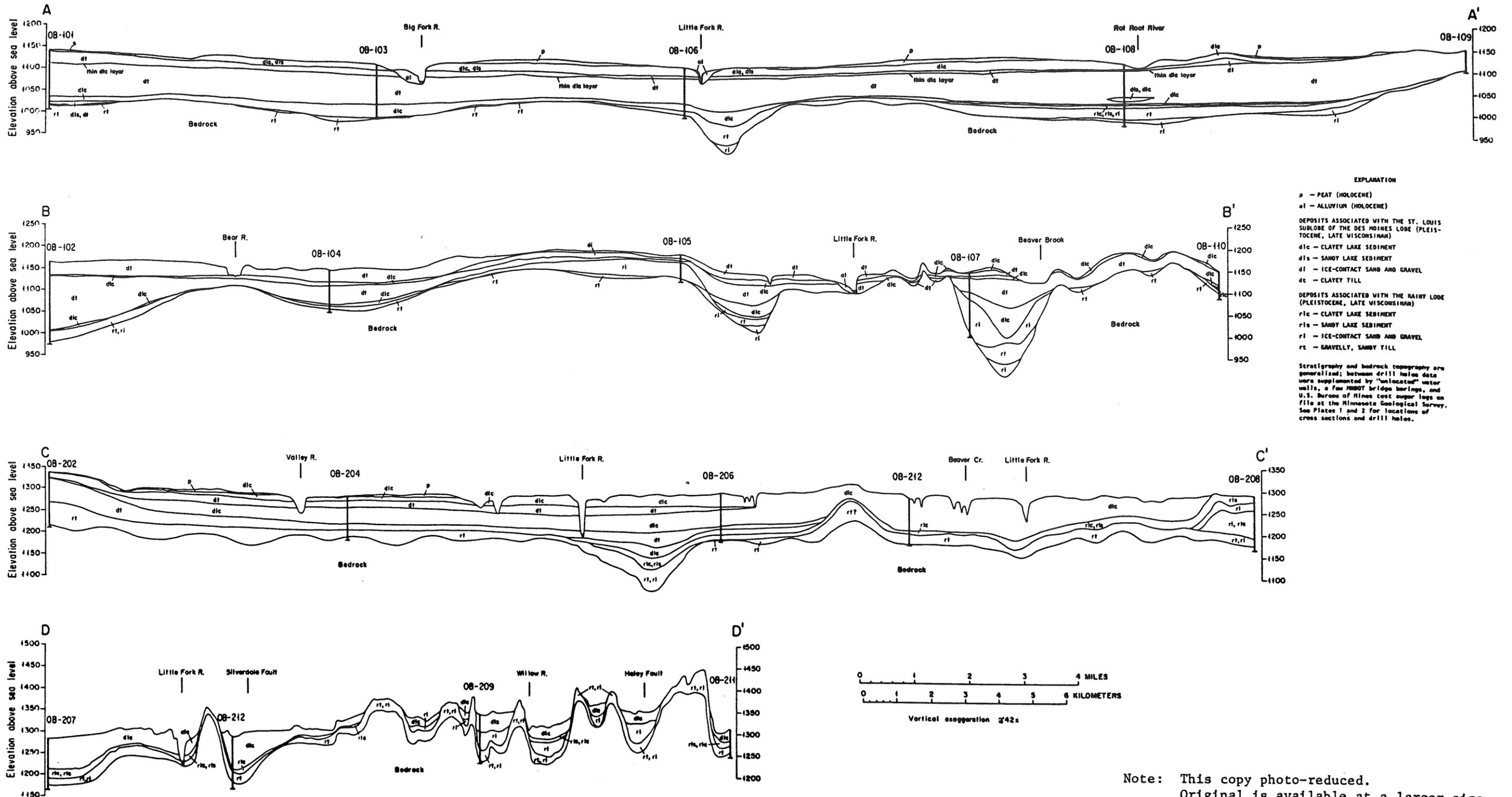
0 1 2 3 4 5 MILES

Cook

Note: This copy photo-reduced.
Original at 1/2" = mile available.

CROSS SECTIONS

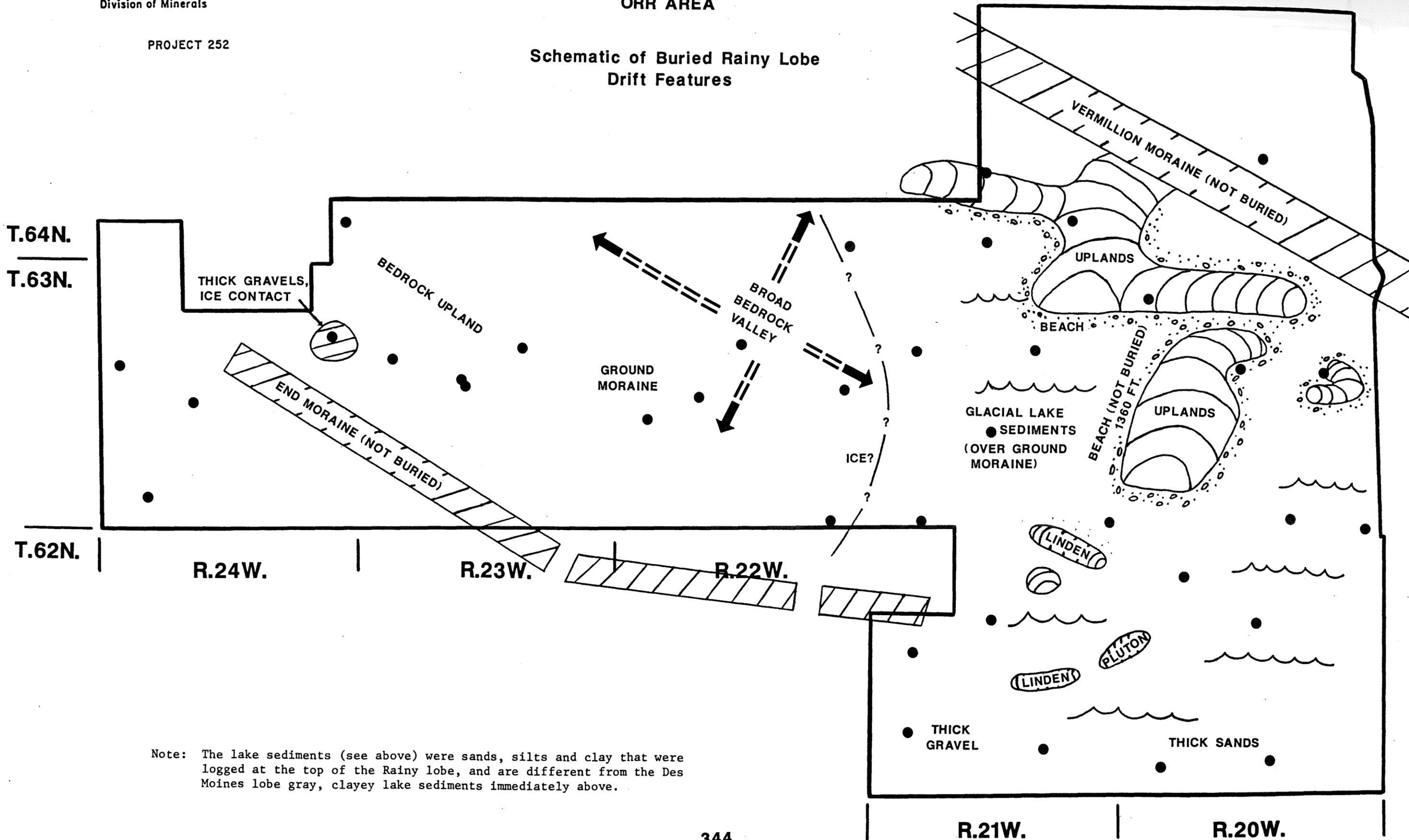
Little Fork and Cook Minnesota, Exploration Areas



Note: This copy photo-reduced.
Original is available at a larger size.

PROJECT 252

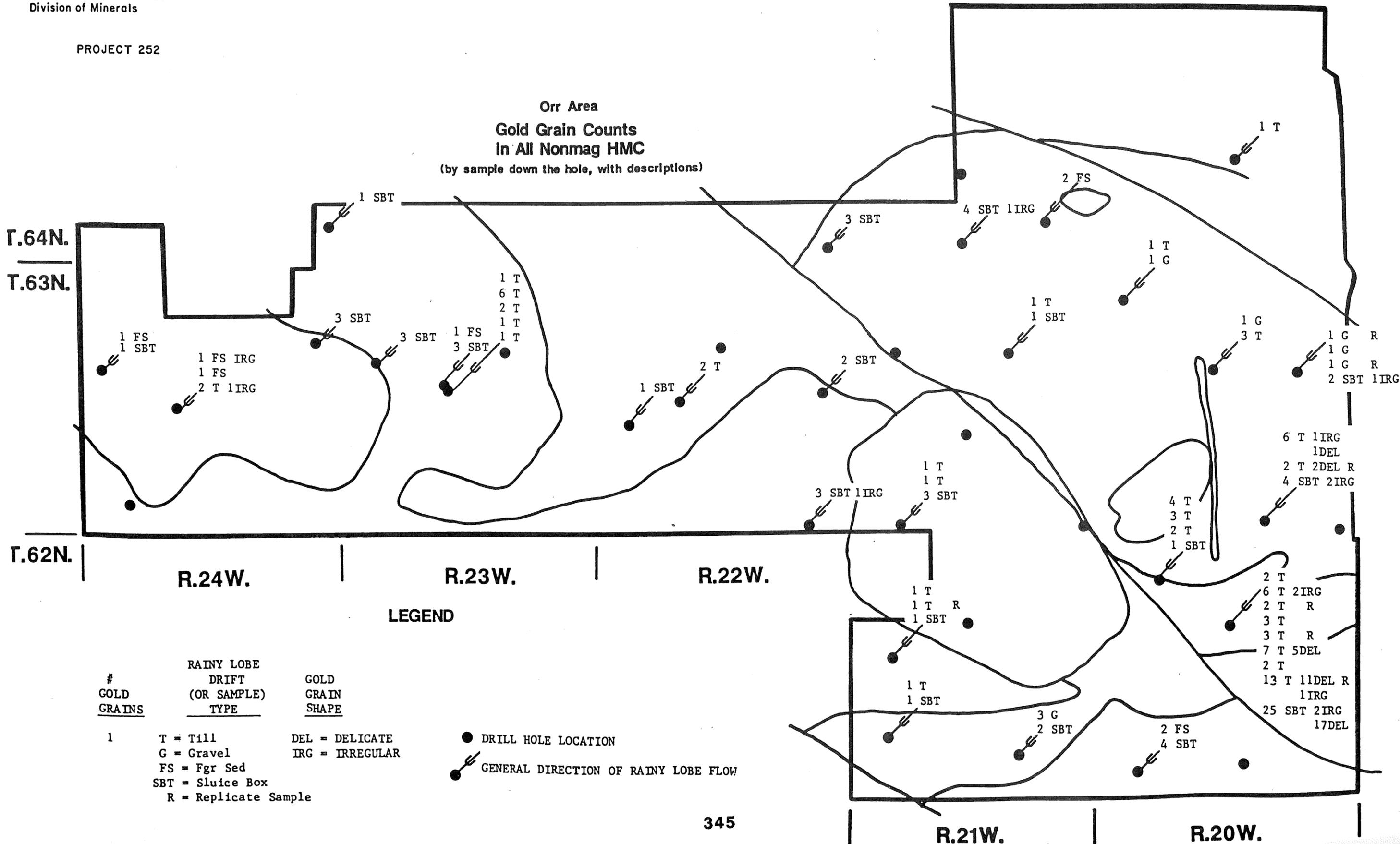
Schematic of Buried Rainy Lobe
Drift Features



Note: The lake sediments (see above) were sands, silts and clay that were logged at the top of the Rainy lobe, and are different from the Des Moines lobe gray, clayey lake sediments immediately above.

PROJECT 252

Orr Area
Gold Grain Counts
in All Nonmag HMC
(by sample down the hole, with descriptions)



# GOLD GRAINS	RAINY LOBE DRIFT (OR SAMPLE) TYPE	GOLD GRAIN SHAPE
1	T = Till	DEL = DELICATE
	G = Gravel	IRG = IRREGULAR
	FS = Fgr Sed	
	SBT = Sluice Box	
	R = Replicate Sample	

● DRILL HOLE LOCATION
 GENERAL DIRECTION OF RAINY LOBE FLOW

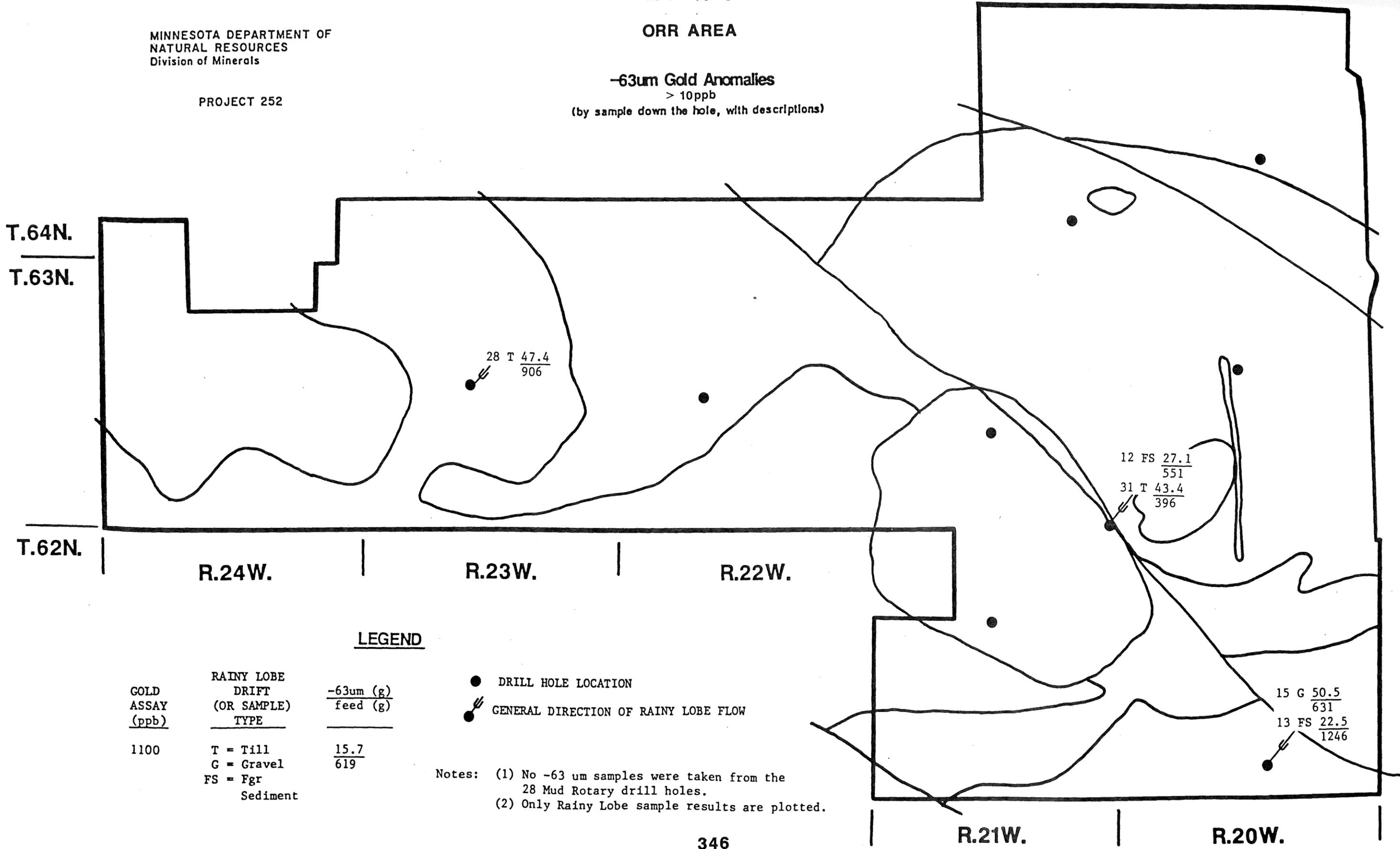
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NATURAL RESOURCES
Division of Minerals

PROJECT 252

MAP 10-8

ORR AREA

-63um Gold Anomalies
> 10ppb
(by sample down the hole, with descriptions)



LEGEND

GOLD ASSAY (ppb)	RAINY LOBE DRIFT (OR SAMPLE) TYPE	-63um (g) feed (g)
1100	T = Till	15.7
	G = Gravel	619
	FS = Fgr Sediment	

- DRILL HOLE LOCATION
- ↘ GENERAL DIRECTION OF RAINY LOBE FLOW

Notes: (1) No -63 um samples were taken from the 28 Mud Rotary drill holes.
(2) Only Rainy Lobe sample results are plotted.

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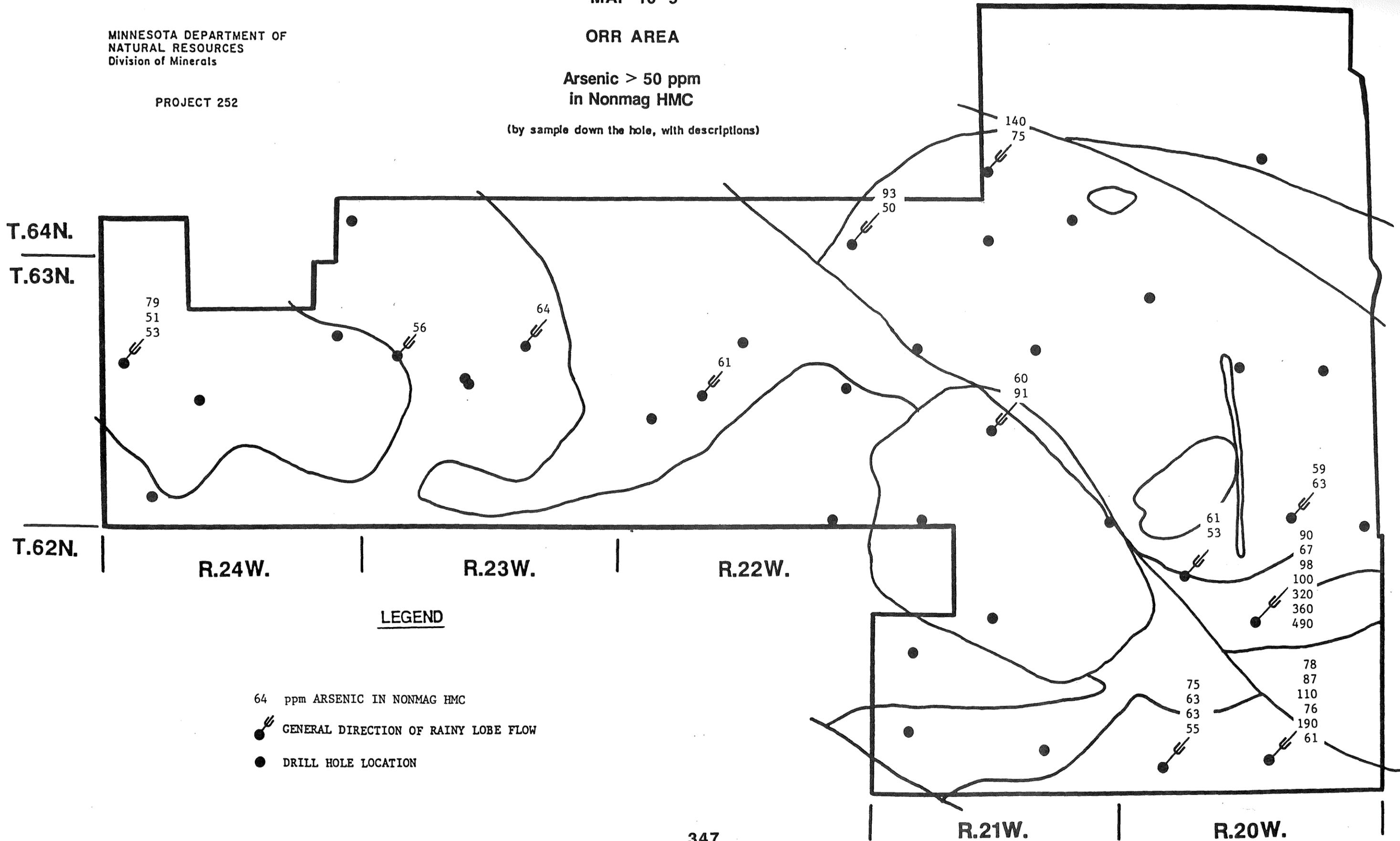
PROJECT 252

MAP 10-9

ORR AREA

Arsenic > 50 ppm
in Nonmag HMC

(by sample down the hole, with descriptions)



LEGEND

- 64 ppm ARSENIC IN NONMAG HMC
- GENERAL DIRECTION OF RAINY LOBE FLOW
- DRILL HOLE LOCATION

Fig. 4

Bouguer gravity anomaly map of the Cook exploration area. Solid dots represent gravity stations. Contour interval is 1.0 milligal.

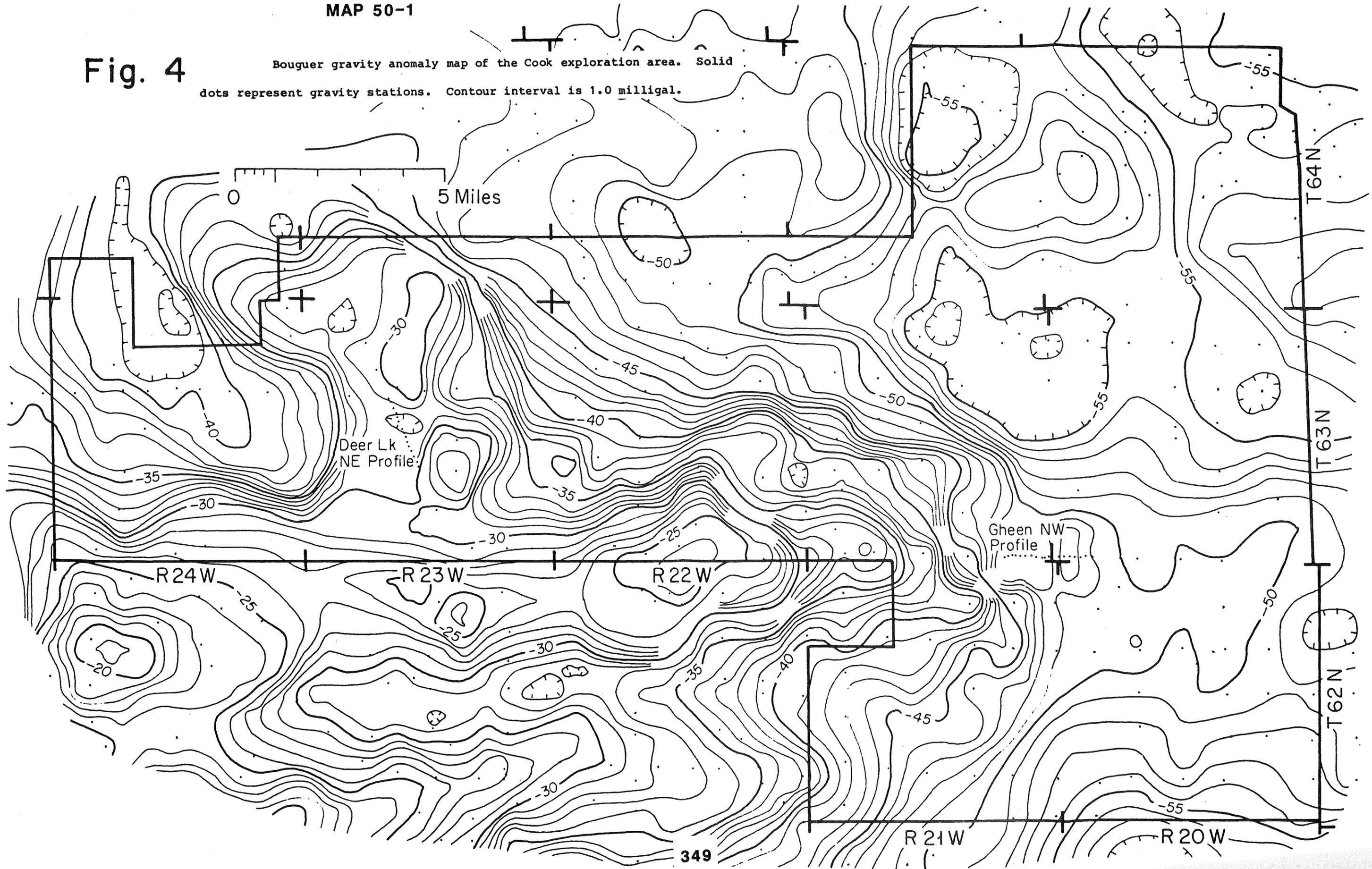


Fig. 5

The second vertical derivative (SVD) of the gravity anomaly in the Cook exploration area. Solid dots represent gravity stations. Contour interval is 0.1 milligal/km².

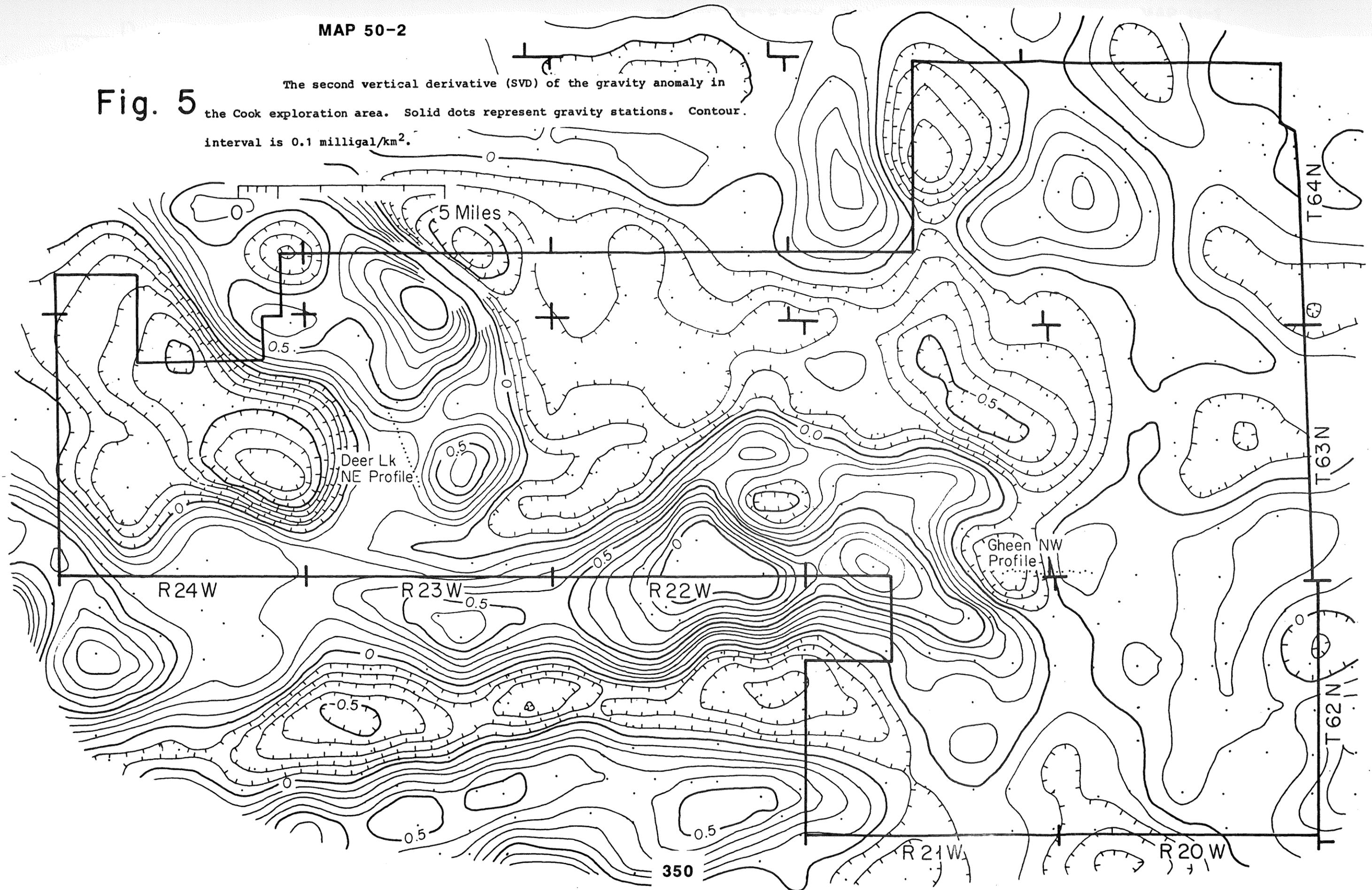
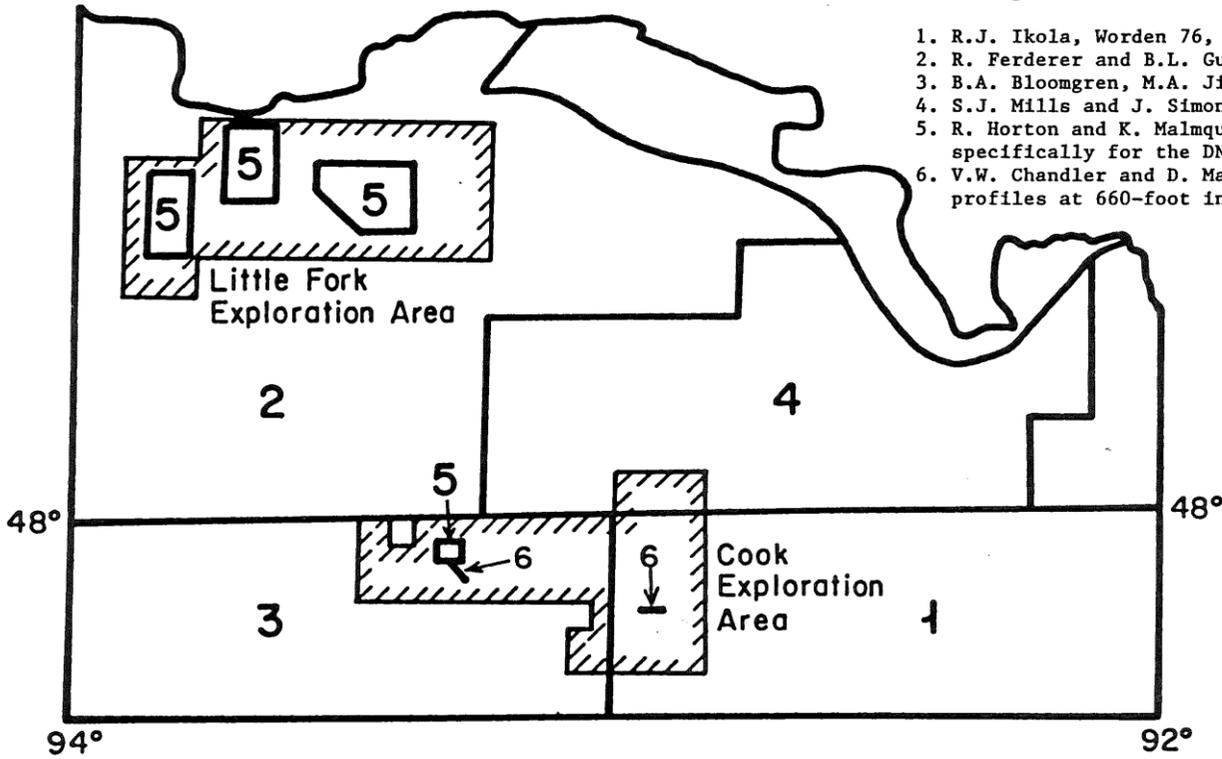
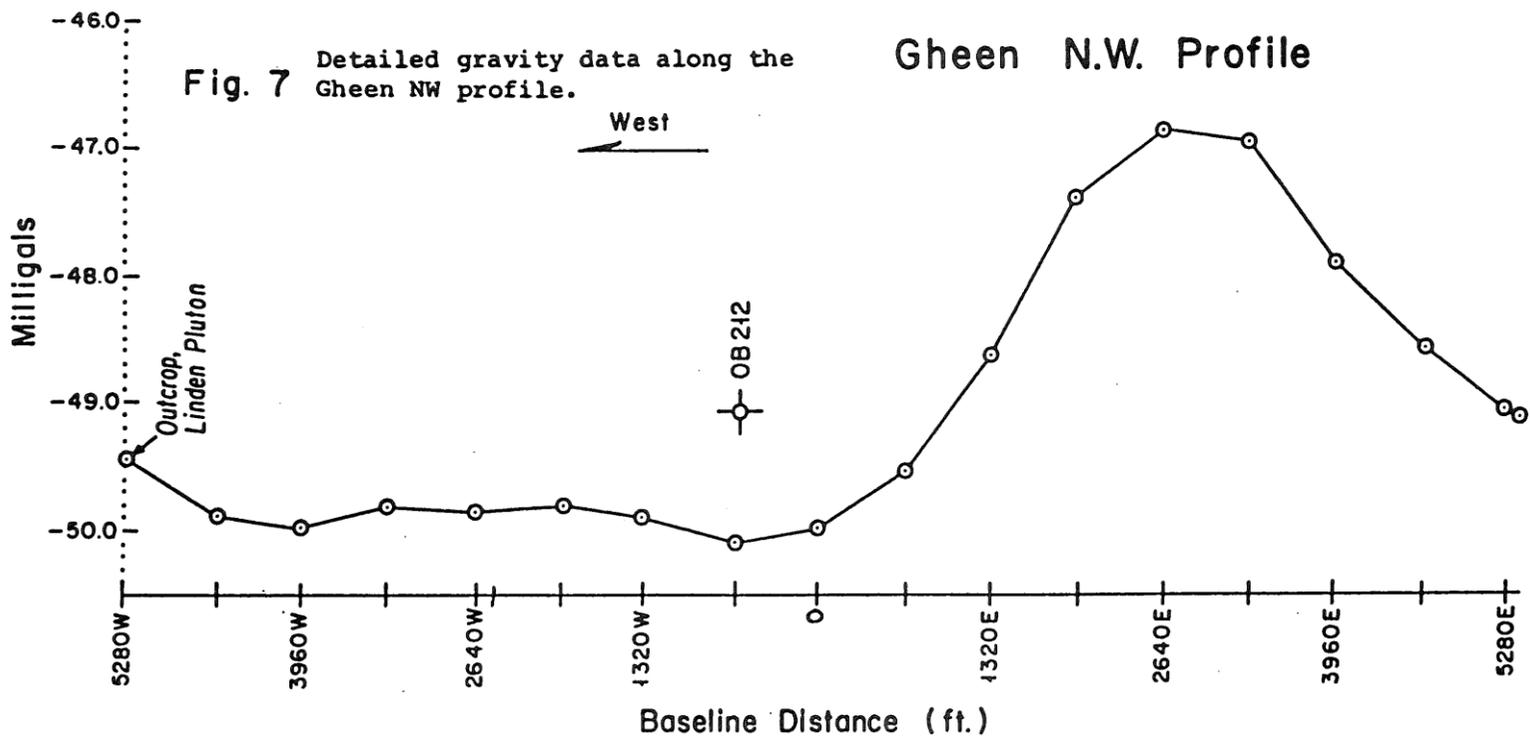
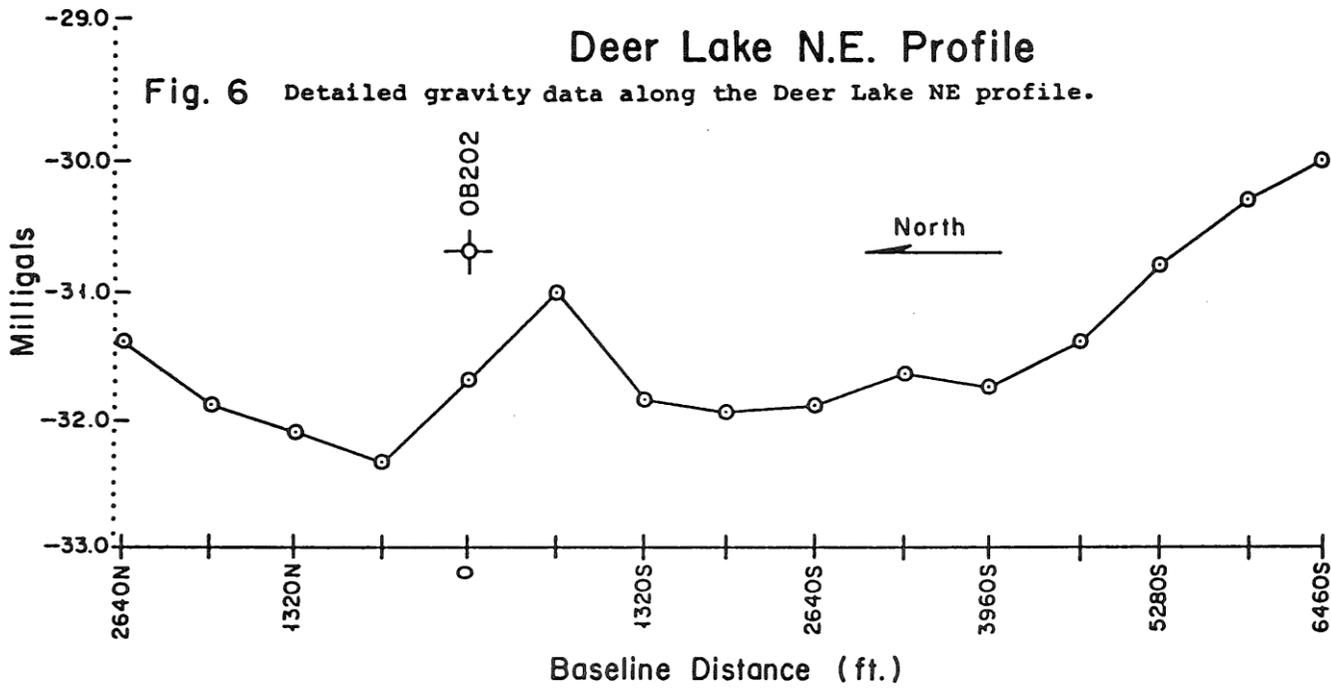


Fig. 1 Index map showing field responsibility and instrumentation for gravity data around DNR's Little Fork and Cook exploration areas.



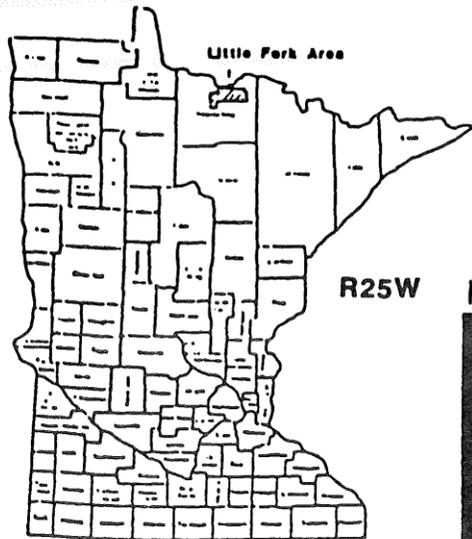
1. R.J. Ikola, Worden 76, 1966.
2. R. Ferderer and B.L. Gulbranson, La Coste-Romberg G-320, 1983.
3. B.A. Bloomgren, M.A. Jirsa, and P.L. McSwiggen, La Coste-Romberg G-226, 1984.
4. S.J. Mills and J. Simonet, La Coste-Romberg G-226 and G-320, 1985.
5. R. Horton and K. Malmquist, La Coste-Romberg G-551, 1986 (collected specifically for the DNR project).
6. V.W. Chandler and D. Martin, La Coste-Romberg 364 (collected along profiles at 660-foot intervals specifically for the DNR project).

351

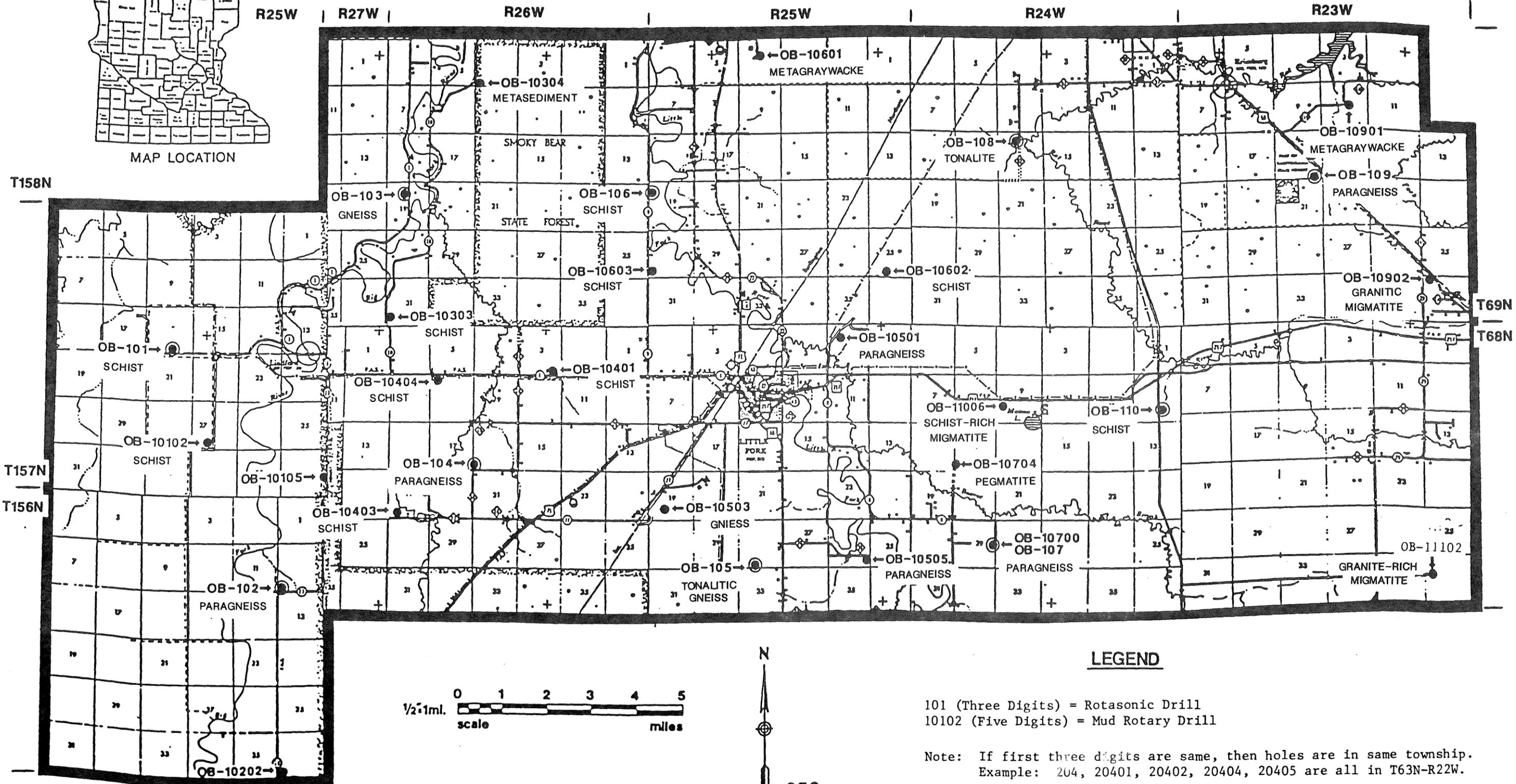


MINNESOTA DEPARTMENT OF
NATURAL RESOURCES
Division of Minerals
PROJECT 252

DRILL HOLE LOCATIONS



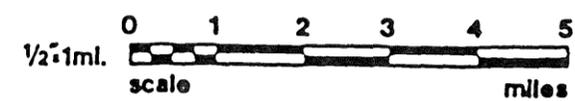
MAP LOCATION



LEGEND

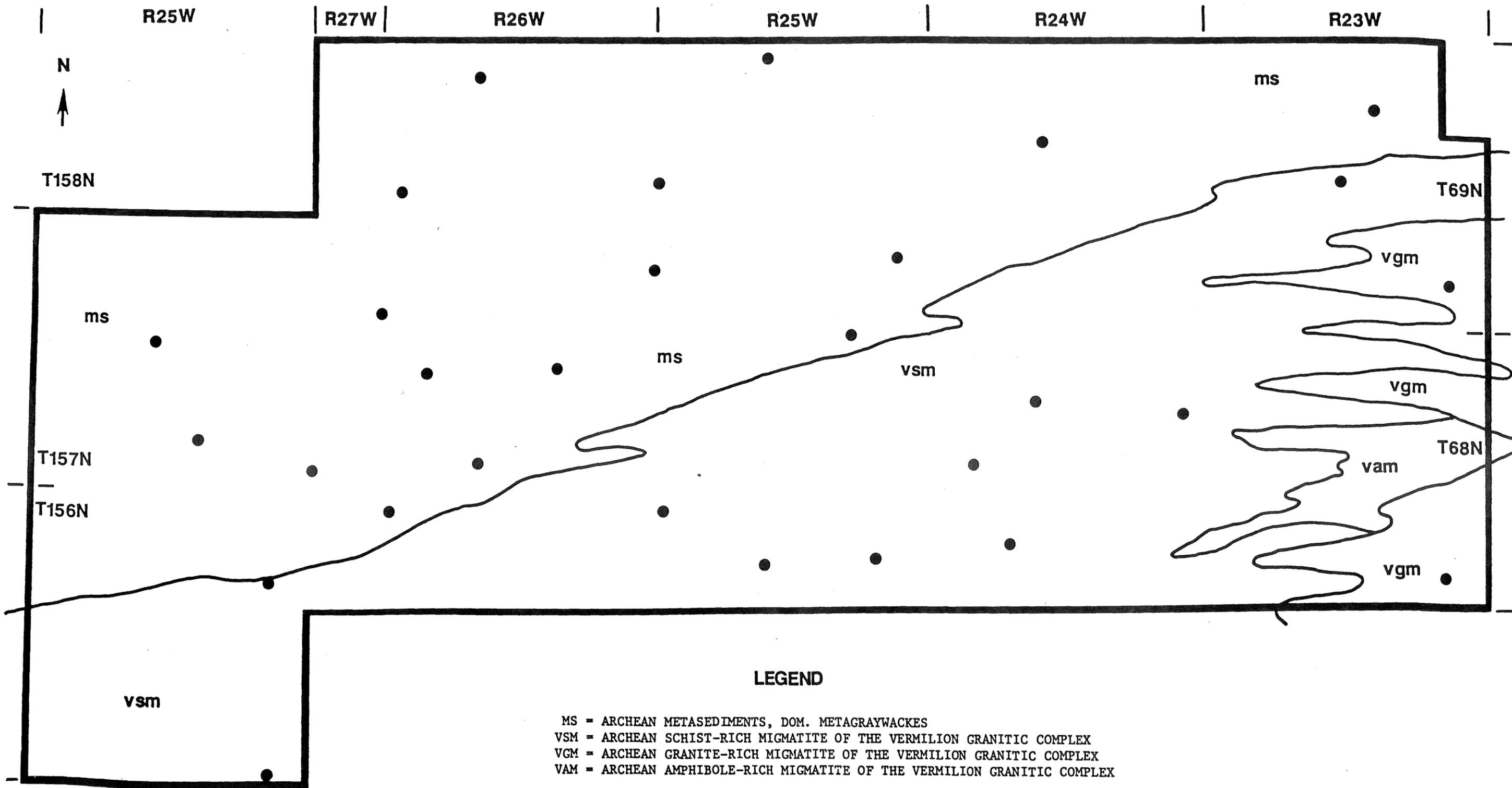
101 (Three Digits) = Rotasonic Drill
10102 (Five Digits) = Mud Rotary Drill

Note: If first three digits are same, then holes are in same township.
Example: 204, 20401, 20402, 20404, 20405 are all in T63N-R22W.



LITTLE FORK AREA
BEDROCK GEOLOGY
(Simplified)

PROJECT 252



LEGEND

- MS = ARCHEAN METASEDIMENTS, DOM. METAGRAYWACKES
- VSM = ARCHEAN SCHIST-RICH MIGMATITE OF THE VERMILION GRANITIC COMPLEX
- VGM = ARCHEAN GRANITE-RICH MIGMATITE OF THE VERMILION GRANITIC COMPLEX
- VAM = ARCHEAN AMPHIBOLE-RICH MIGMATITE OF THE VERMILION GRANITIC COMPLEX

Note: Simplified from the International Falls (1979) Sheet by the MGS.

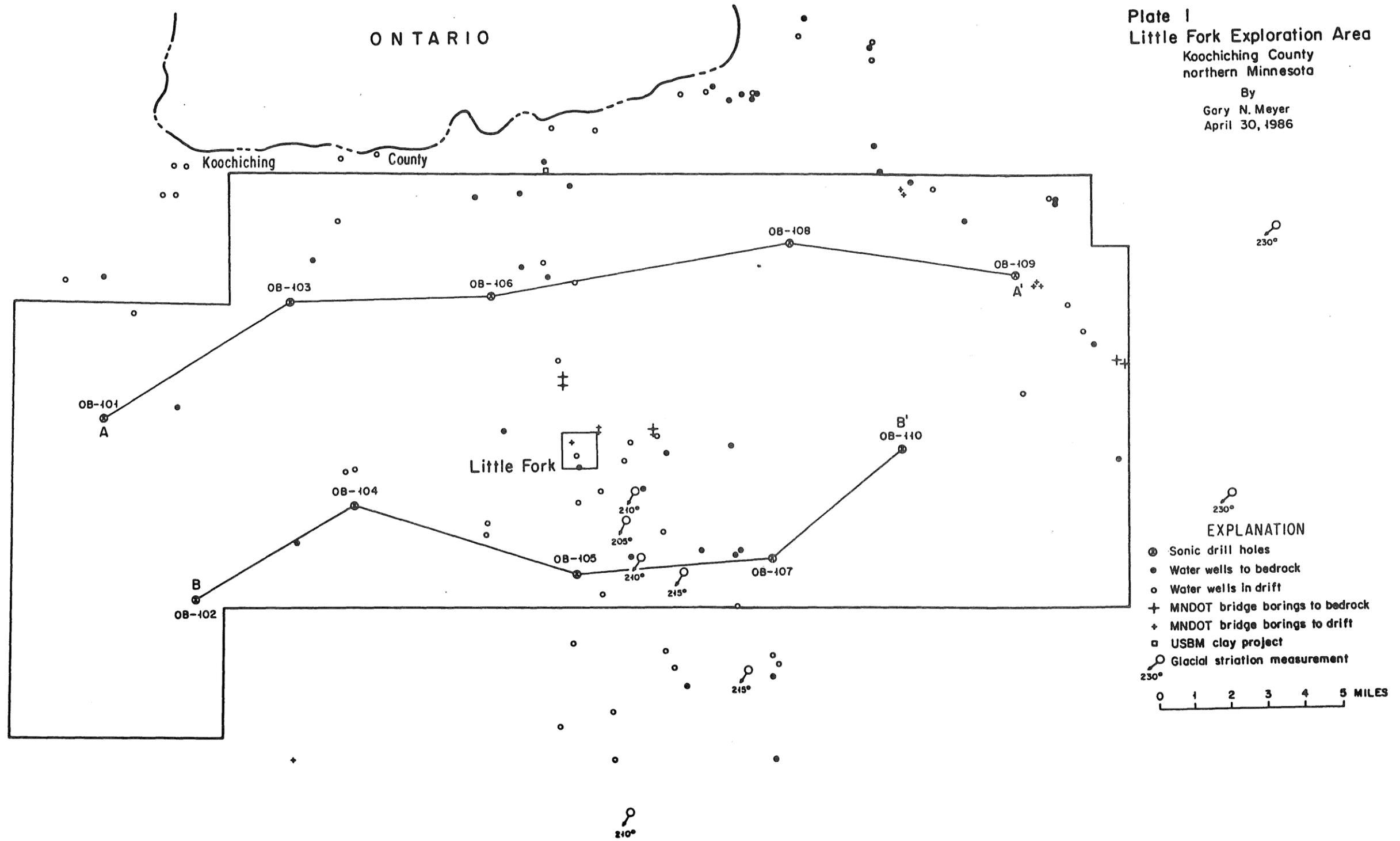
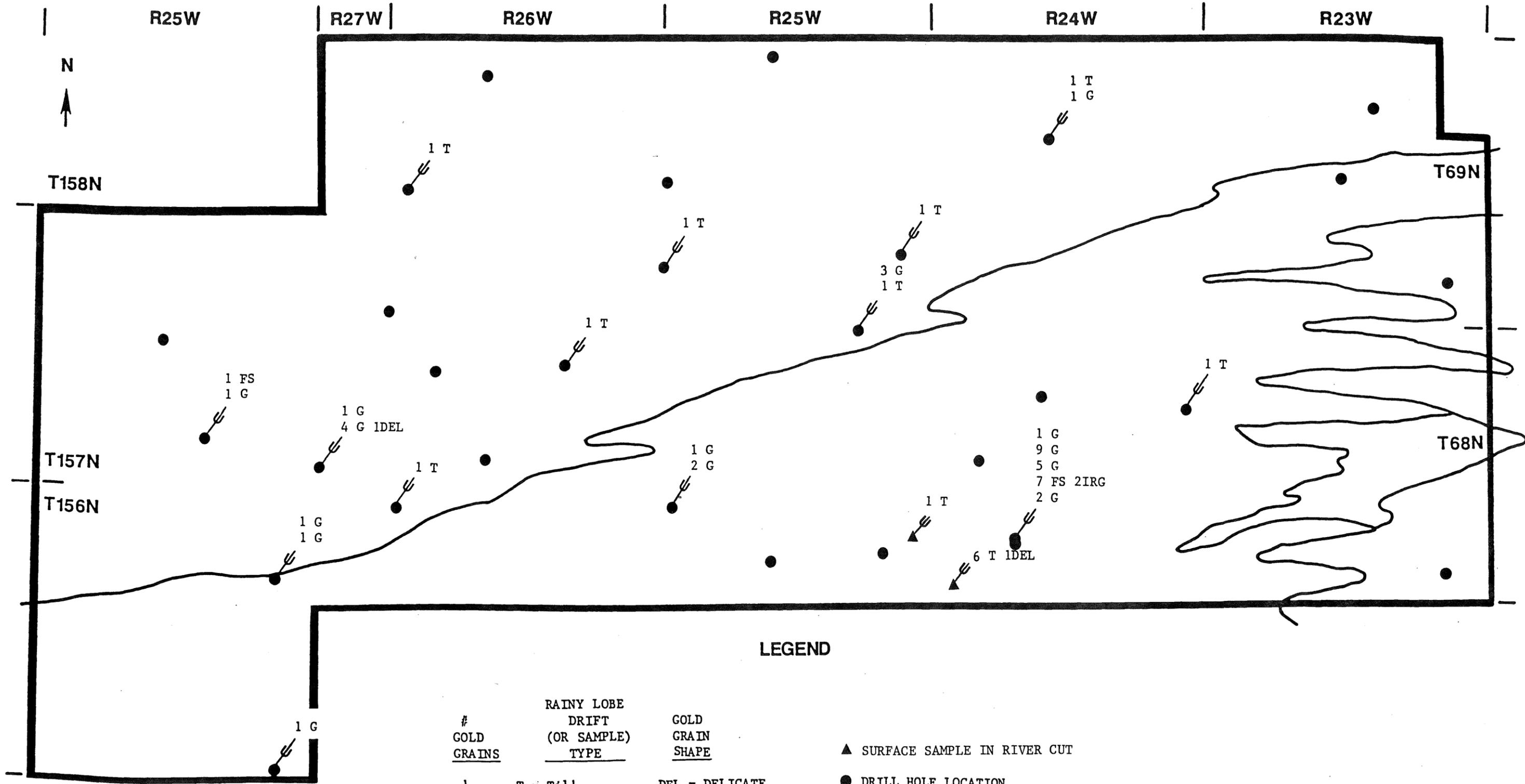


Plate I
Little Fork Exploration Area
Koochiching County
northern Minnesota
By
Gary N. Meyer
April 30, 1986

Note: This copy photo-reduced.
Original at 1/2" = mile available.

Gold Grain Counts
In All Nonmag HMC
(by sample down the hole, with descriptions)

PROJECT 252



LEGEND

# GOLD GRAINS	RAINY LOBE DRIFT (OR SAMPLE) TYPE	GOLD GRAIN SHAPE	
1	T = Till	DEL = DELICATE	▲ SURFACE SAMPLE IN RIVER CUT
	G = Gravel	IRG = IRREGULAR	● DRILL HOLE LOCATION
	FS = Fgr Sed		⚡ GENERAL DIRECTION OF RAINY LOBE FLOW

LITTLE FORK AREA

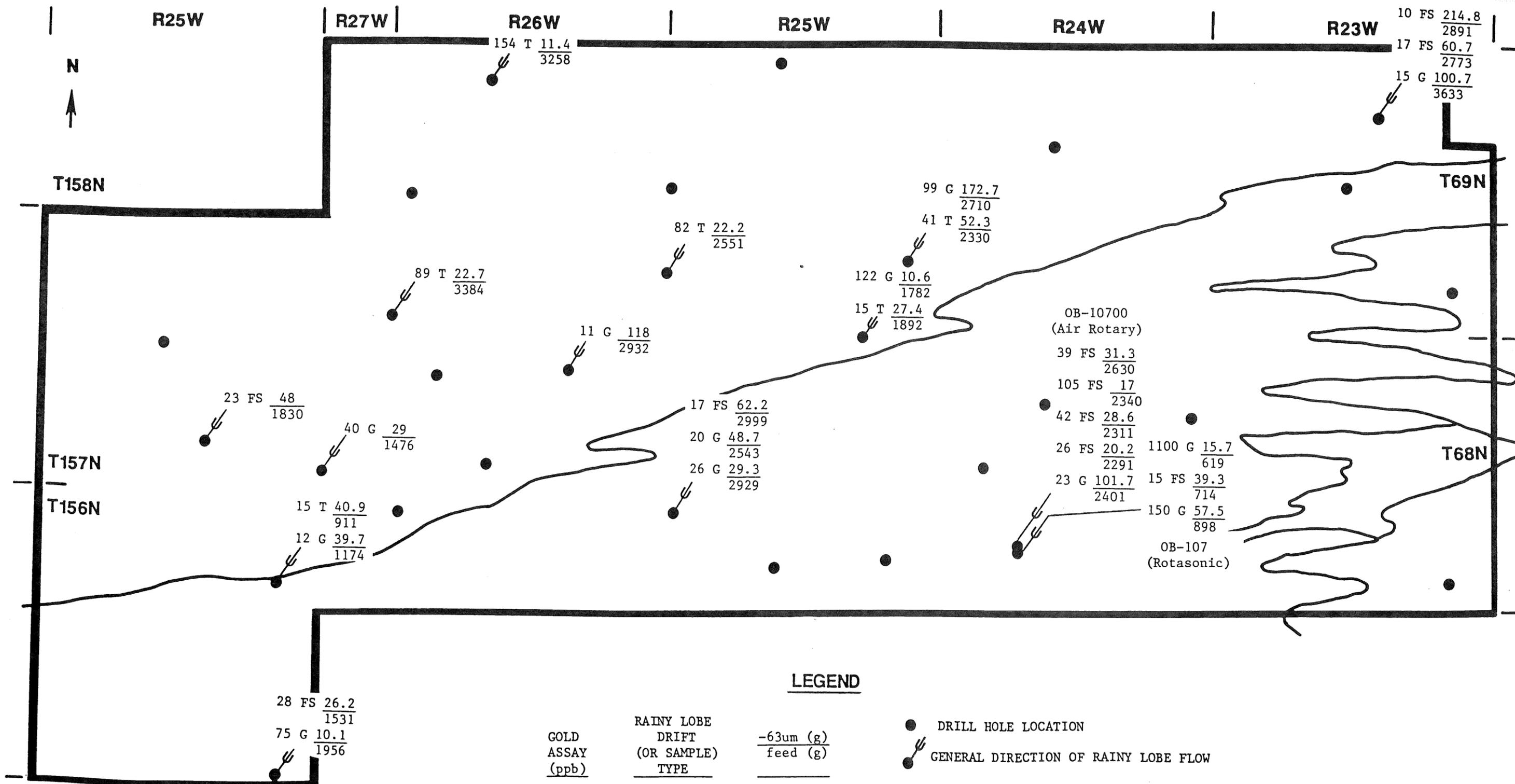
MAP 11-5

MINNESOTA DEPARTMENT OF
NATURAL RESOURCES
Division of Minerals

PROJECT 252

-63um Gold Anomalies

(by sample down the hole, with descriptions)



LEGEND

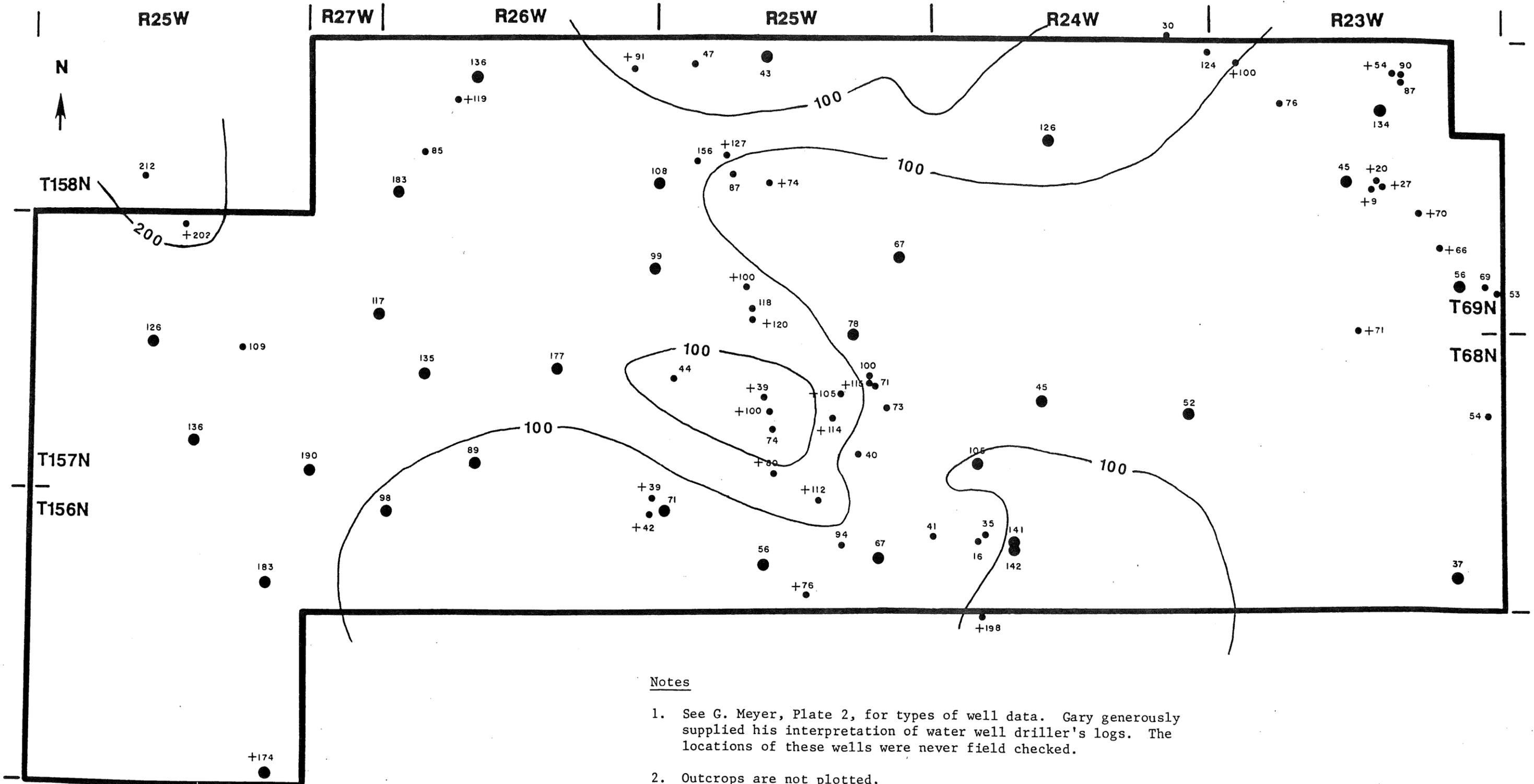
GOLD ASSAY (ppb)	RAINY LOBE DRIFT (OR SAMPLE) TYPE	-63um (g) / feed (g)
1100	T = Till G = Gravel FS = Fgr Sediment	15.7 / 619
		356

- DRILL HOLE LOCATION
- ↙ GENERAL DIRECTION OF RAINY LOBE FLOW

Notes: (1) Only Rainy Lobe samples are plotted.
(2) Feed wt was increased from approx 1 kg (Rotasonic) to 2 kg (Air Rotary). See feed wts listed above.

PROJECT 252

Estimated Depth to Bedrock
Contour interval 100 feet



Notes

1. See G. Meyer, Plate 2, for types of well data. Gary generously supplied his interpretation of water well driller's logs. The locations of these wells were never field checked.
2. Outcrops are not plotted.
3. The contours are crude estimates at best, with this sparse data. Bedrock surface relief on a detailed scale is often very dramatic.

Fig. 2

Bouguer gravity anomaly map of the Little Fork exploration area and environs. Solid dots represent gravity stations. Countour interval is 1.0 milligal.

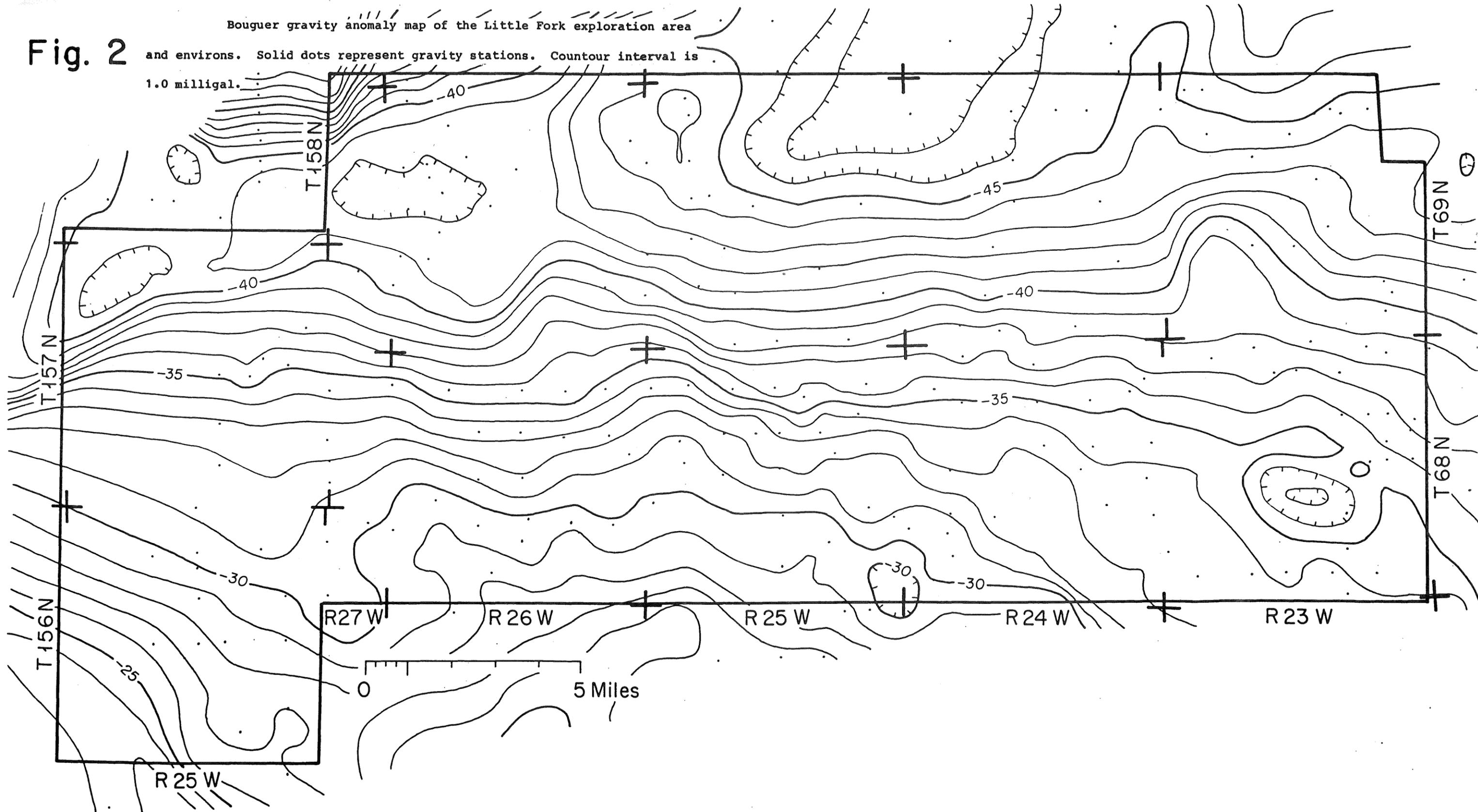


Fig. 3 The second vertical derivative (SVD) of the gravity anomaly in **MAP 50-5**

the Little Fork exploration area. Solid dots represent gravity stations.

Contour interval is 0.1 milligal/km².

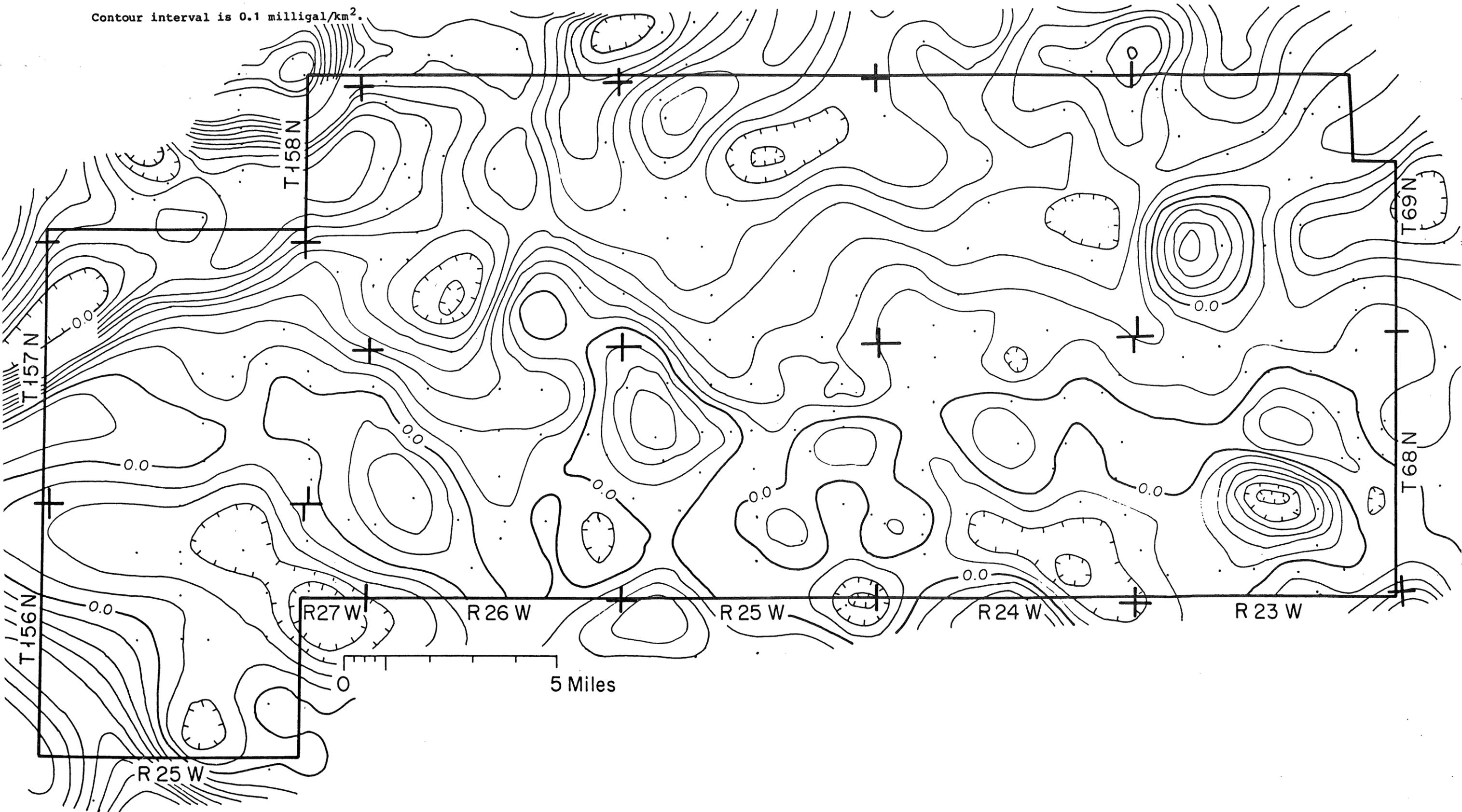


Figure 1-1. Dispersion pattern for two tills with gold source on a bedrock high (Developed by Overburden Drilling Management Ltd.).

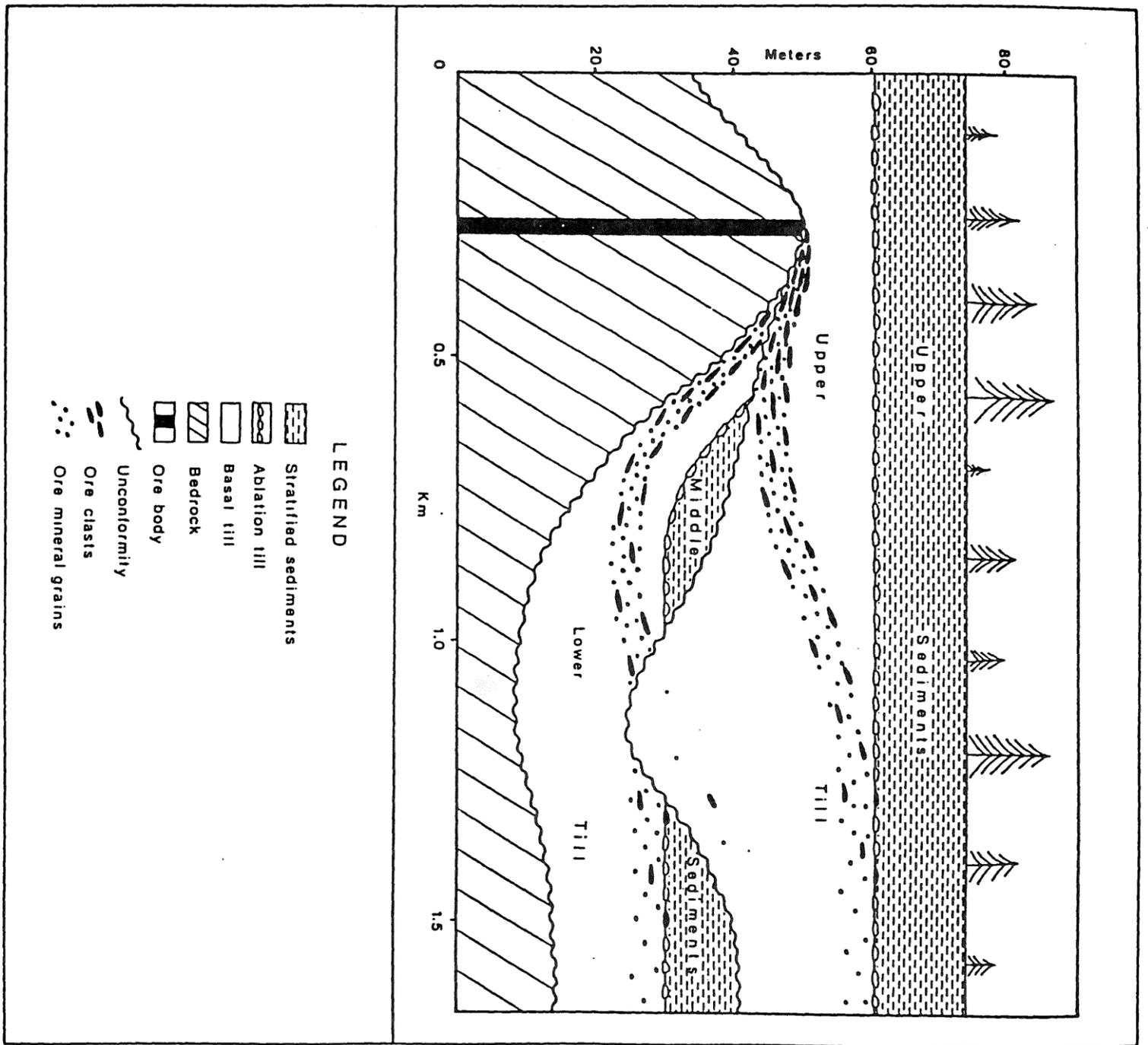


Figure 1-2. Example of actually found and idealized glacial dispersal curves. (Modified from Bolviken and Gleeson, 1979; after Shilts, 1976; and Strobel and Faure, 1987.)

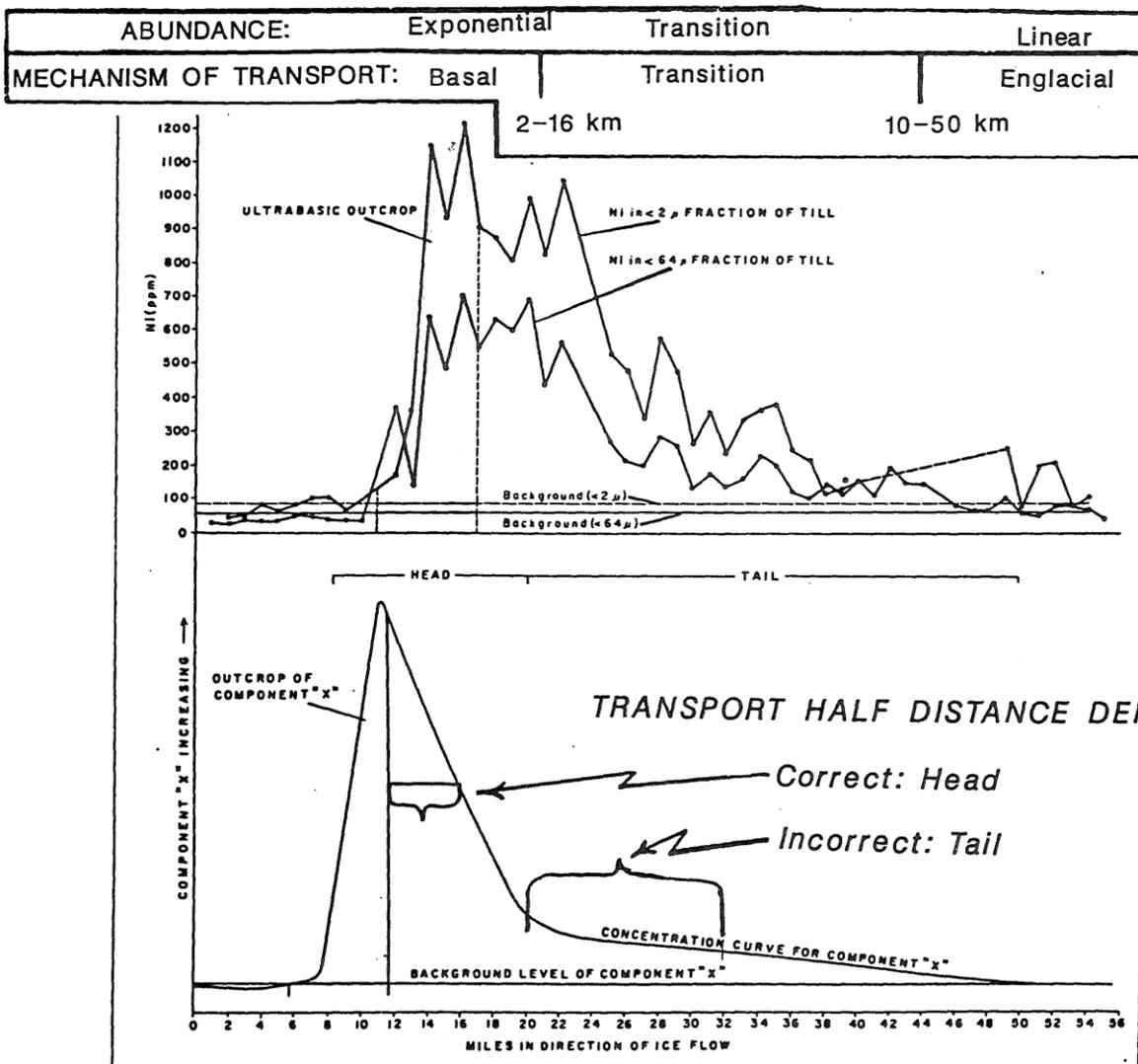
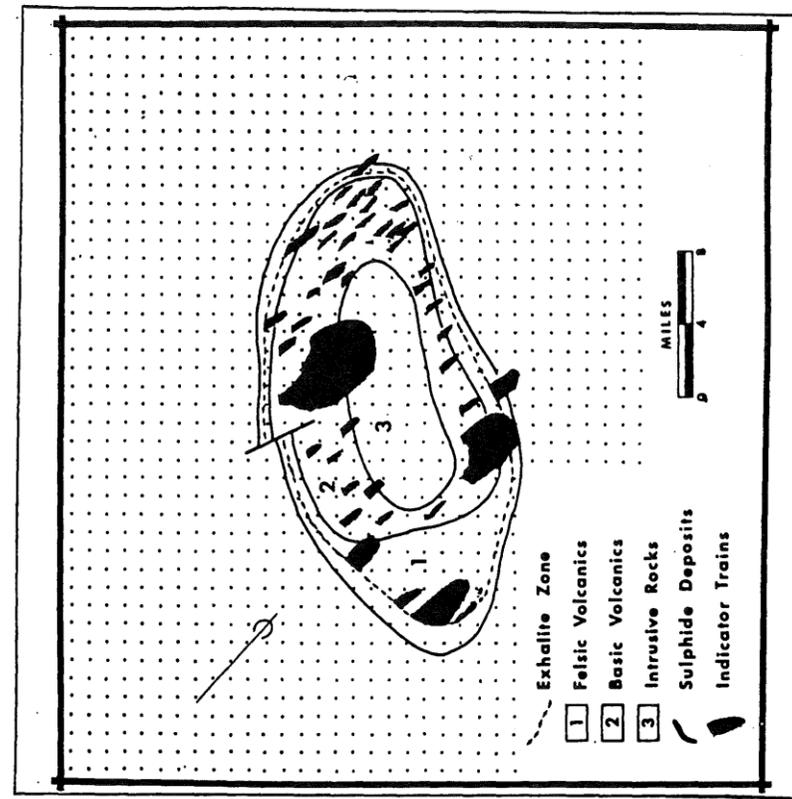


Figure 1-3. A cluster of dispersal trains of Cu-Ni showings in a regional survey in Archean terrane in the Rankin-Ennadai area, Canada (from Shilts, 1975).



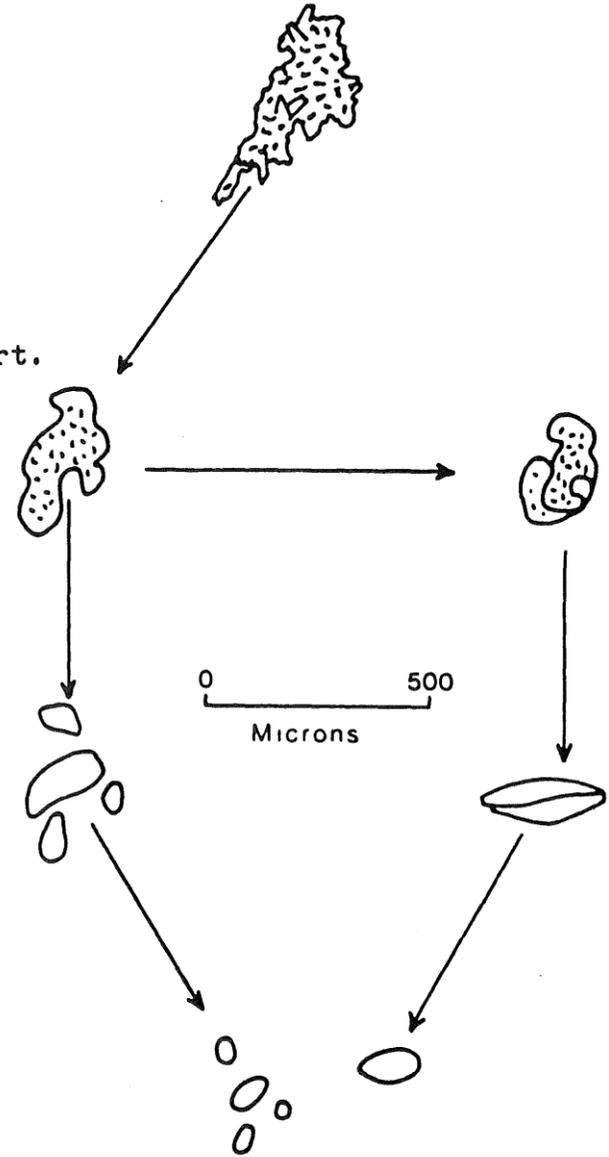
DELICATE
0-100 m ice transport.
Primary crystal faces, pitted leaf surfaces & ragged leaf edges intact.

IRREGULAR
100-1000 m ice transport.
Gross primary shape and pitted surface intact.

IRREGULAR
Curled leaf variety.

ABRADED
1000+ m ice transport.
Large primary leaf reduced to smaller flakes with polished surfaces.

ABRADED
Spindled leaf variety.



ROUNDED
1000+ m ice + stream transport.
Polished equidimensional grains.

Figure 1-4. Effects of glacial transport on gold particle size and shape. (Developed by Overburden Drilling Management Ltd.)

Figure 3-4. Sample prep flowsheet for Rotasonic samples.

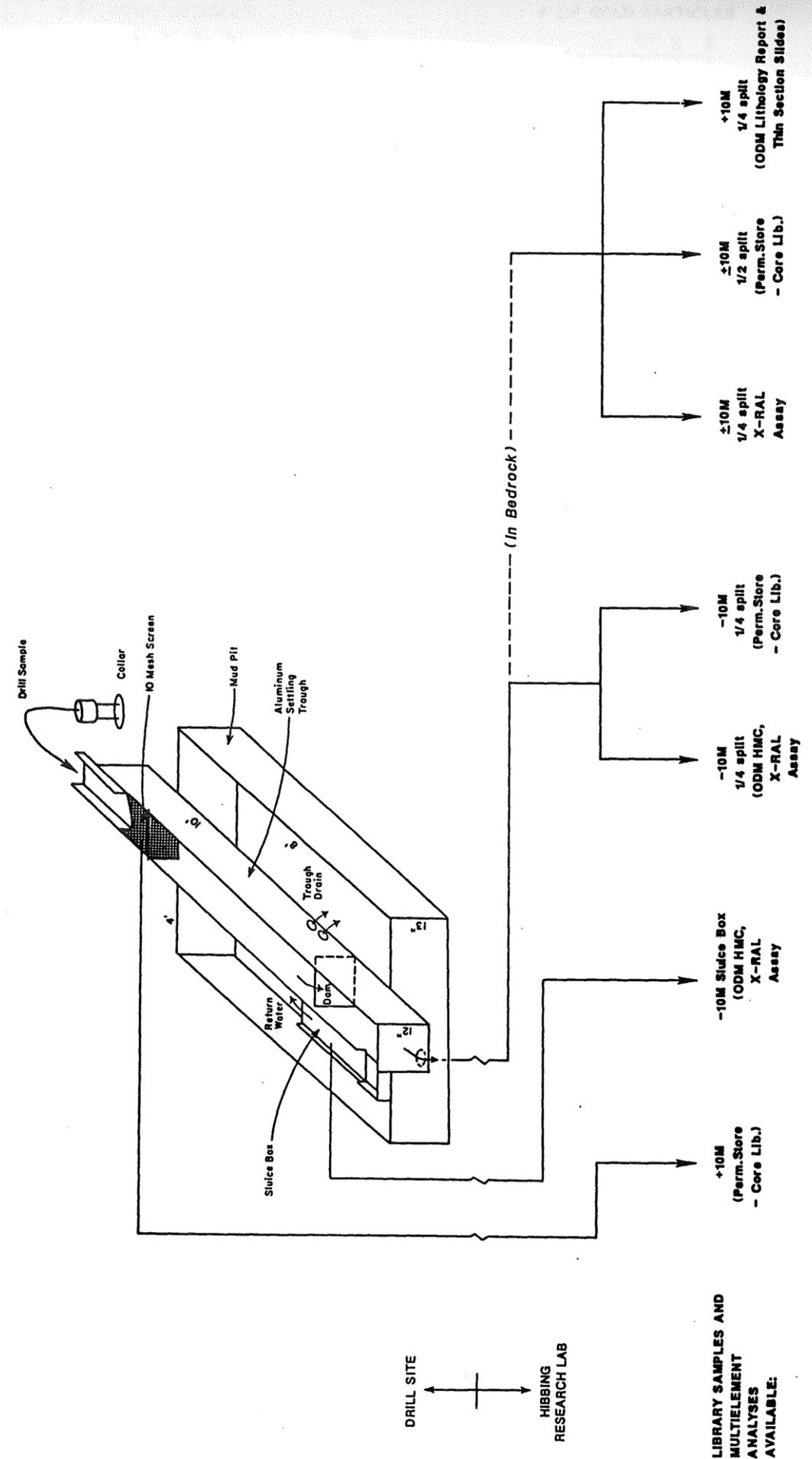
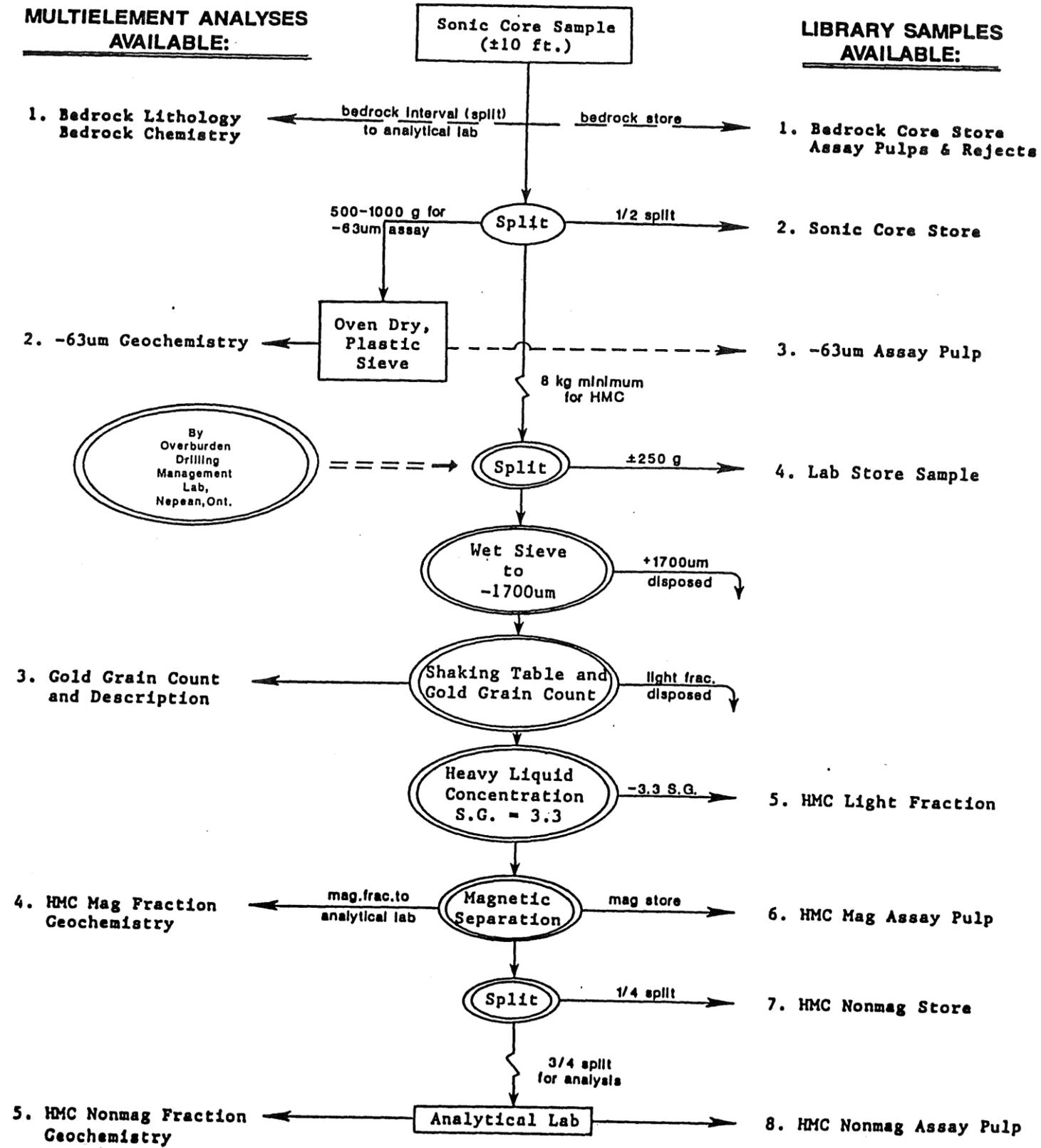


FIGURE 3-5. SAMPLE FLOW DIAGRAM FOR MUD ROTARY DRILLING.

Figure 3-6. Sample prep flowsheet for mud rotary samples.

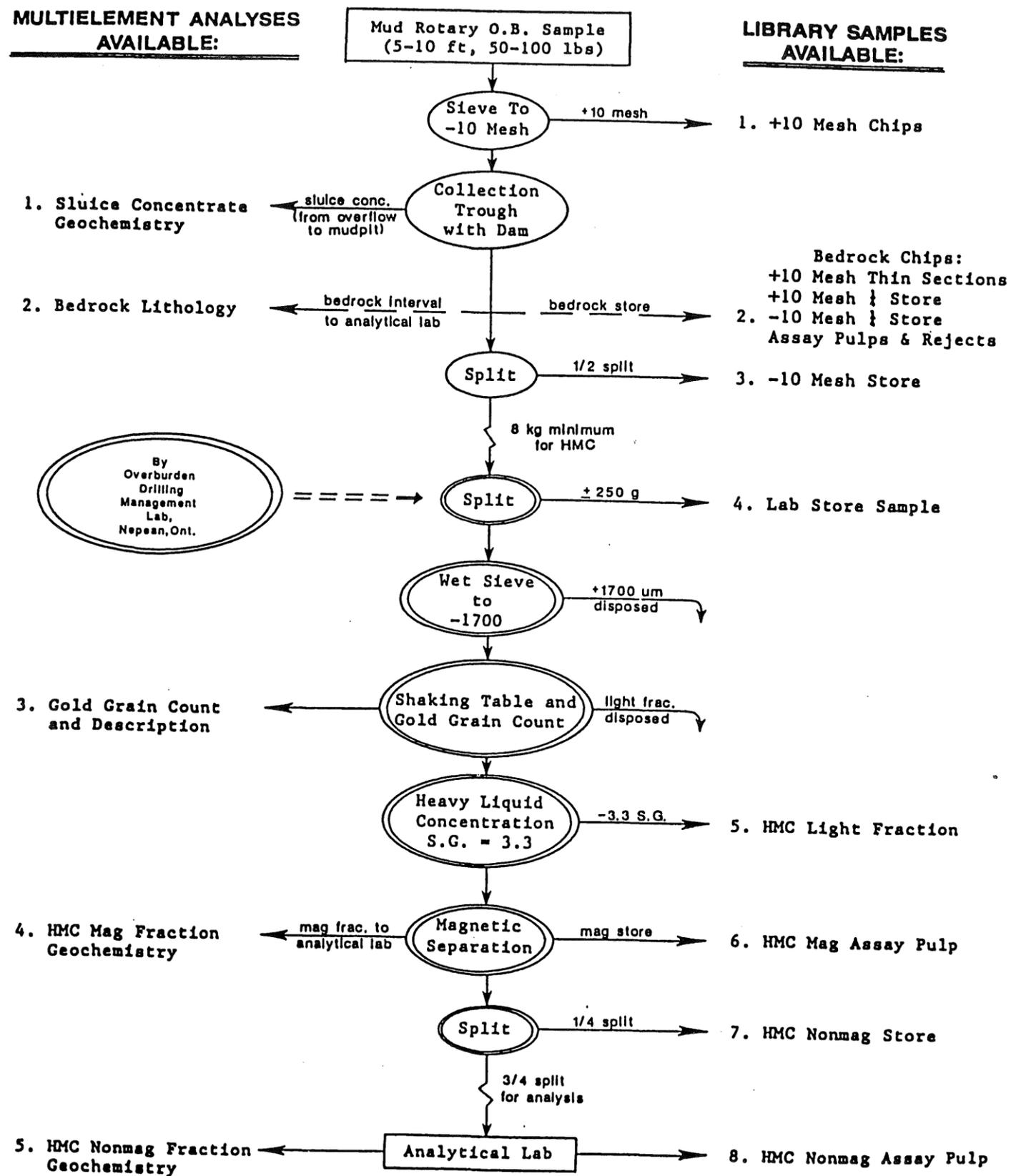


Figure 3-7. Sample prep flowsheet for air rotary samples.

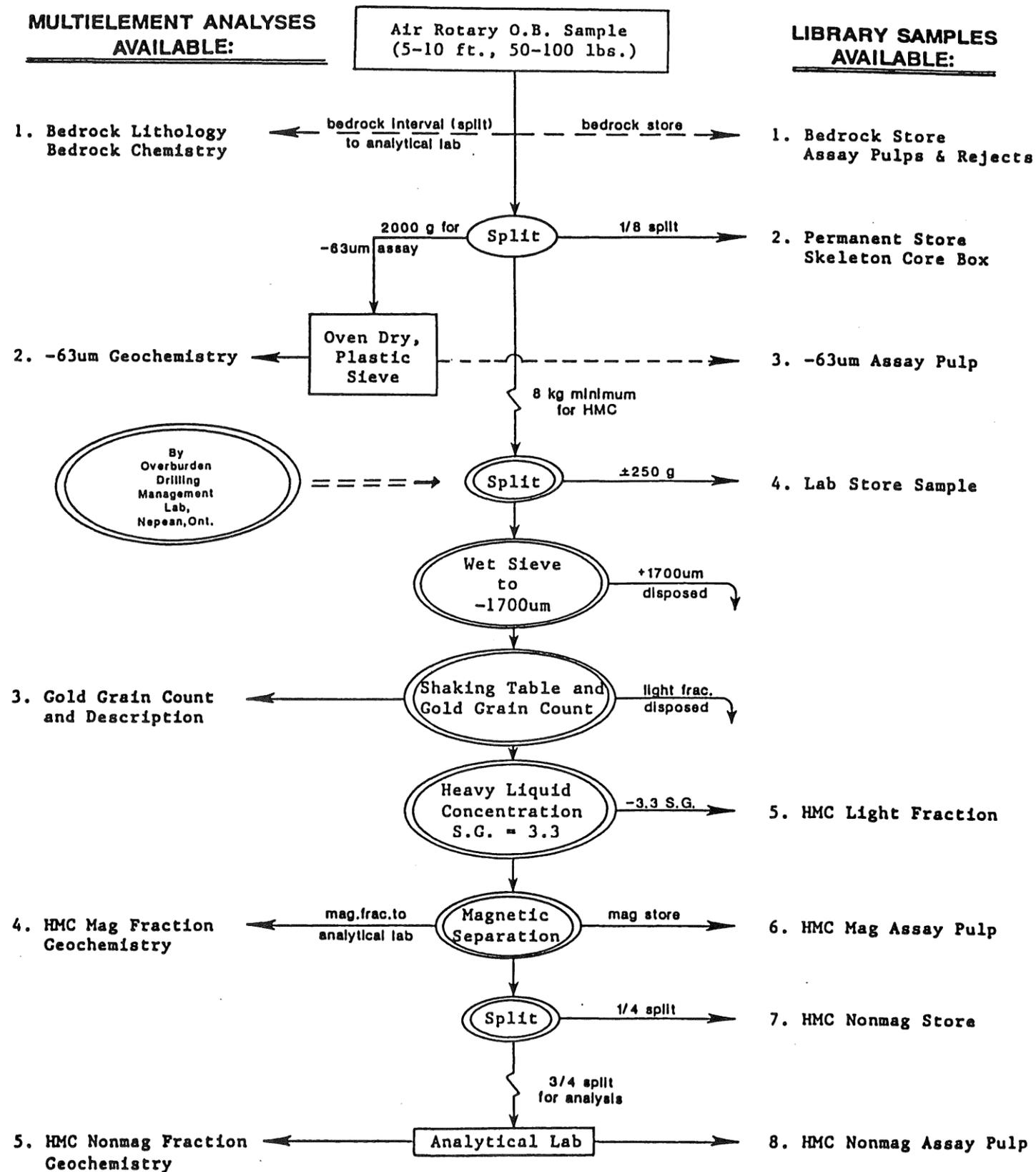
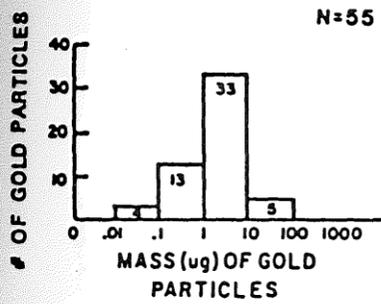
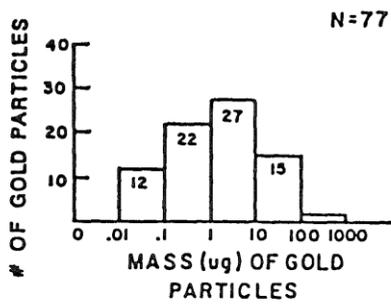


FIGURE 4-8. GOLD PARTICLE SIZE VS. FREQUENCY DISTRIBUTION

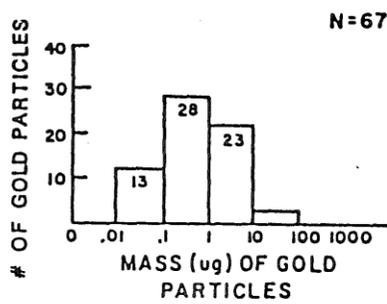
A. SONIC - TOTAL - ORR & LITTLEFORK AREA



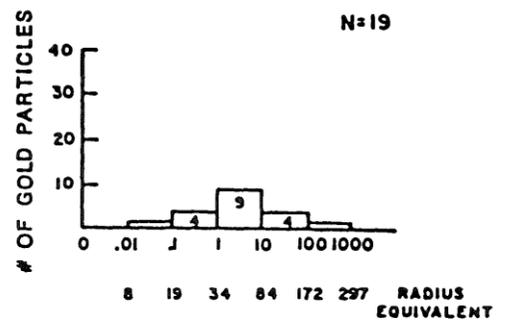
B. MUD ROTARY - ORR AREA



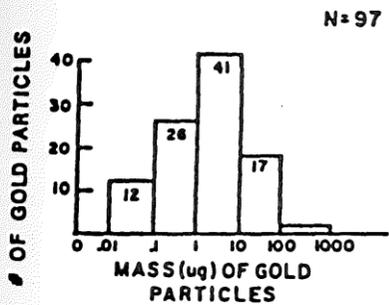
C. SLUICE BOX MUD ROTARY - ORR AREA



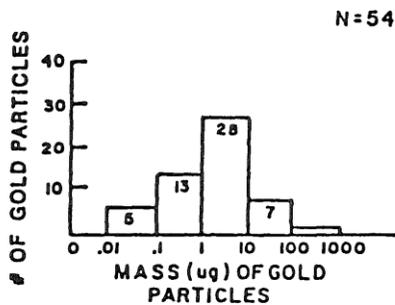
D. AIR ROTARY - LITTLEFORK AREA



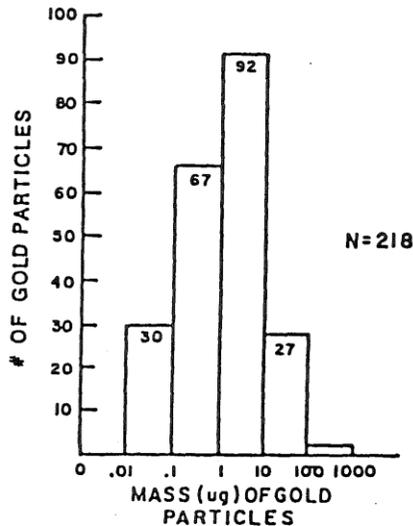
E. MUD AND SONIC - ORR AREA



F. AIR AND SONIC - LITTLEFORK AREA



G. TOTAL - BOTH AREAS



Radius Equivalent	Mass (ug) or Dimensions (um)
8	12 x 18 x 3
19	30 x 45 x 6
34	65 x 82 x 16
84	135 x 202 x 25
172	276 x 412 x 60
297	476 x 714 x 200
	1 x 1 x 1

EQUATIONS USED:

$$m = dv$$

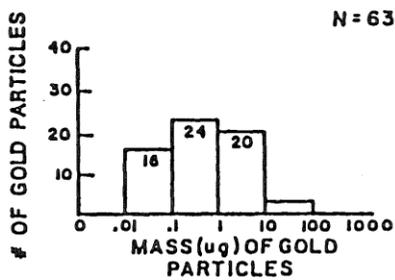
$$d(\text{gold}) = 18 \text{ g/cm}^3$$

$$v = \pi r^2 t$$

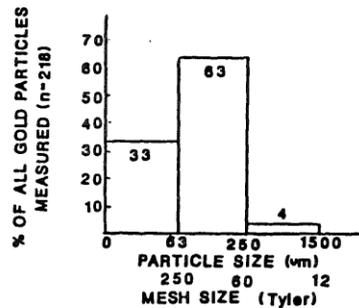
$$r = \frac{(1.5)t + w}{4}$$

$$t = \frac{[0.2 - 0.0(d-100)]2r}{100}$$

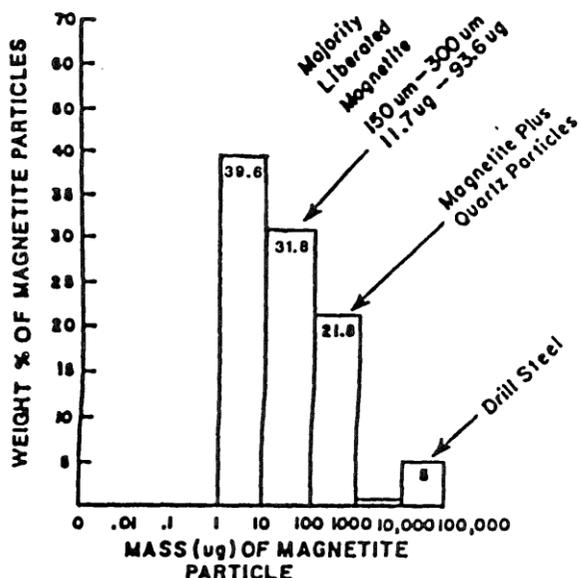
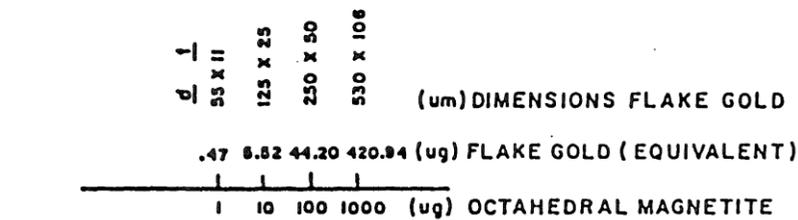
H. ALL GOLD GRAINS DRILL HOLE OB-20801



J. TOTAL - BOTH AREAS



I. MAGNETITE SIZE DISTRIBUTION - from mudpit sample collected from mud rotary hole 20200. This magnetite was not collected by our sample system. Note that this was not cleaned by heavy liquid separation as the HMC's are.



EQUATIONS USED:

$$m = dv$$

$$d(\text{gold}) = 18 \text{ g/cm}^3$$

$$d(\text{magnetite}) = 5.2 \text{ g/cm}^3$$

$$d(\text{quartz}) = 2.7 \text{ g/cm}^3$$

$$v(\text{cylinder}) = \pi r^2 t$$

$$v(\text{octahedron}) = \frac{A h^2}{3}$$

$$v(\text{sphere}) = \frac{4 \pi r^3}{3}$$

$$A = l x w$$

$$t = \frac{[0.2 - 0.0(d-100)] d}{100}$$

(FROM OVERBURDEN DRILLING MANAGEMENT LAB, 1988)

NOTE: Stokes' Law is not strictly applicable to diameters above about 0.14 mm (140um). Quartz, magnetite and gold equivalent particles were calculated using Stokes' Law (TOURTELOT, 1968, HYDRAULIC EQUIVALENCE OF QUARTZ AND HEAVIER MINERALS, AND IMPLICATIONS FOR THE STUDY OF PLACERS).

Figure 4-9. Plot of gold assays (ppb) of Rotasonic drilling, all till samples, nonmag HMC fraction vs. -63 micron fraction of same interval. Calculated correlation coefficient equals .06.

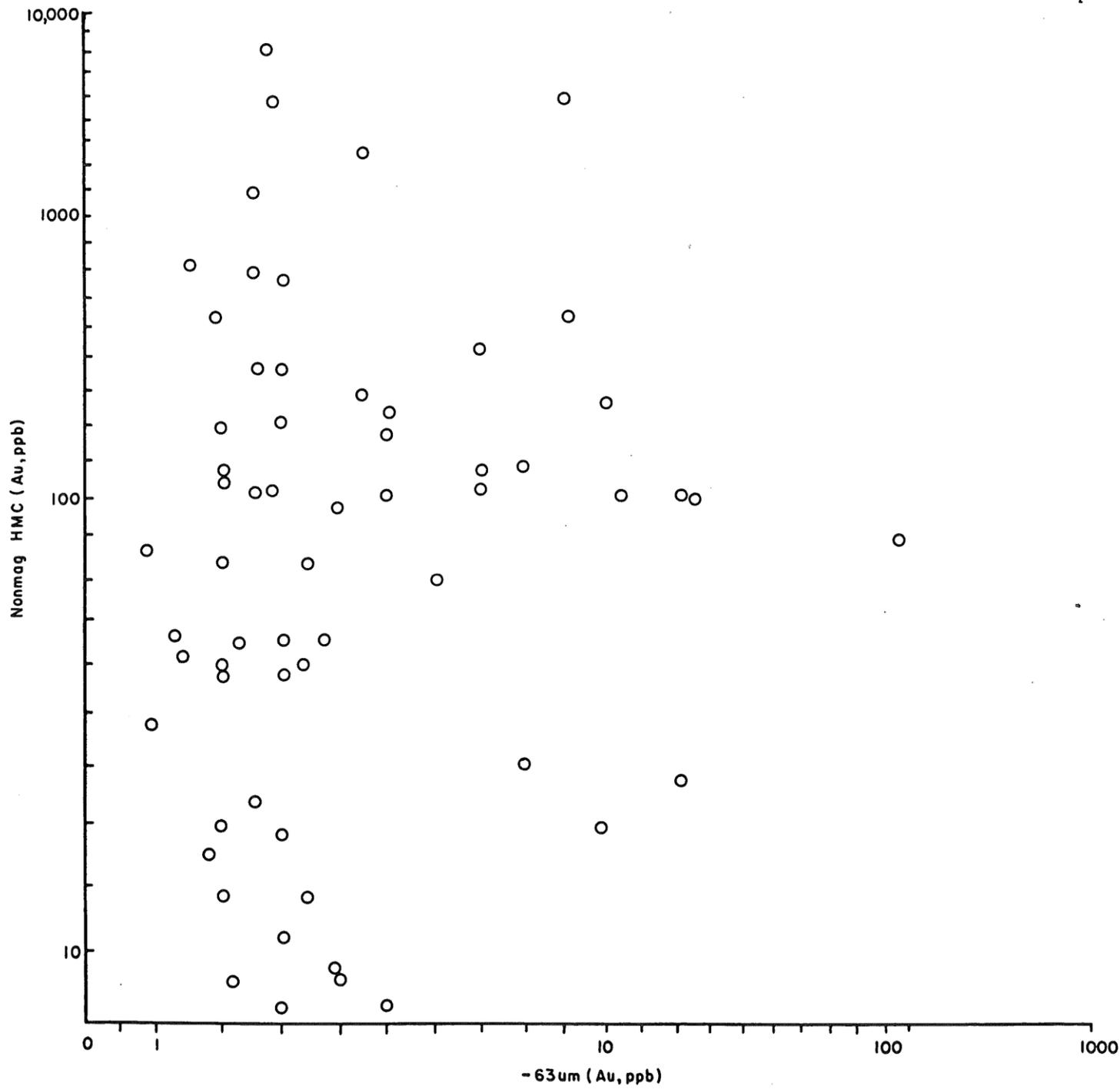
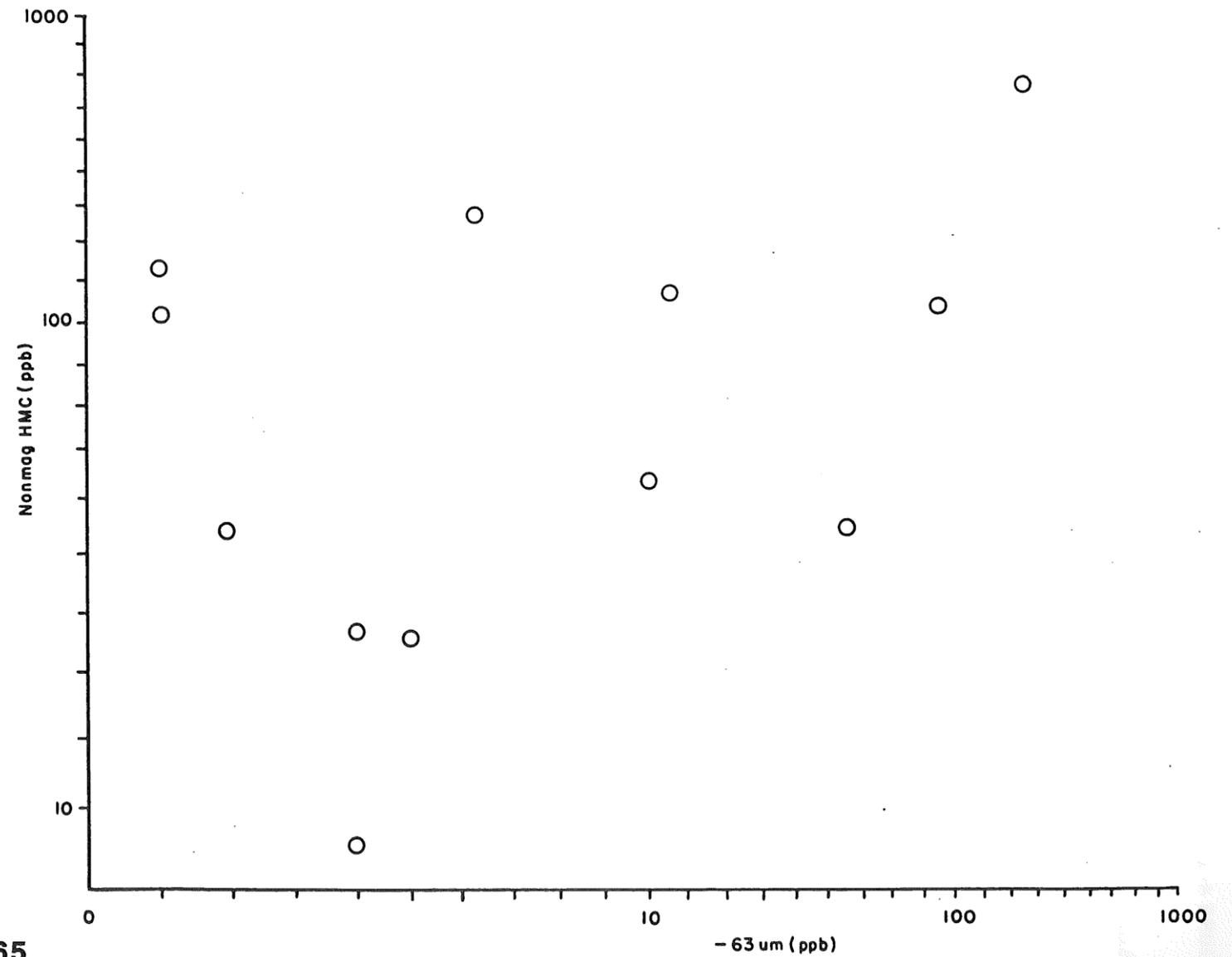
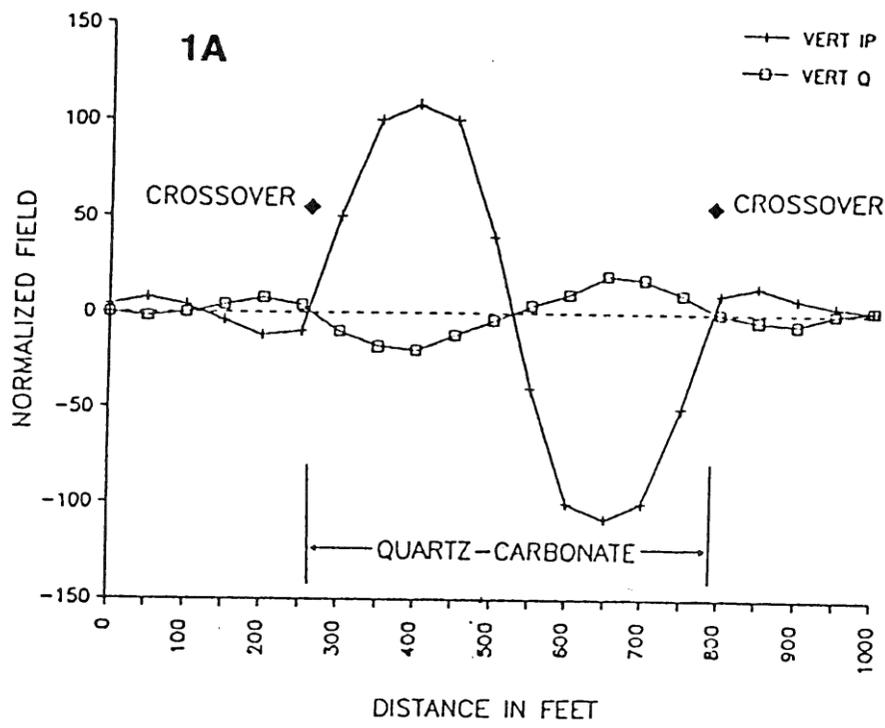


Figure 4-10. Plot of gold assays (ppb) of Air rotary drilling, all till samples, nonmag HMC fraction vs. -63 micron fraction of same interval. Calculated correlation coefficient equals .25.

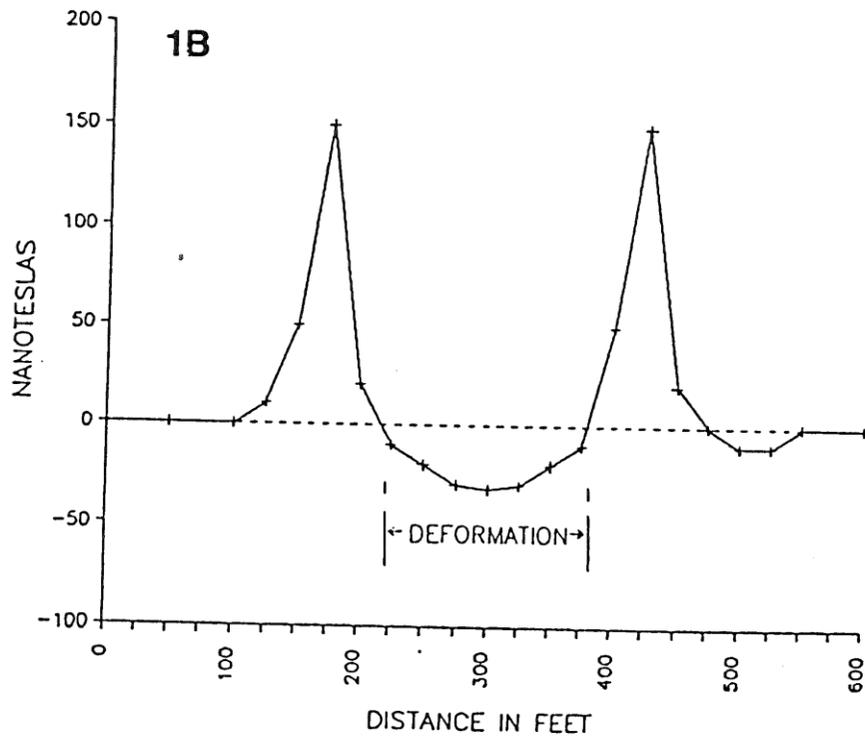


Note: Nonmag HMC samples normalized to 27g/10kg, and -63um samples normalized to 2000g.

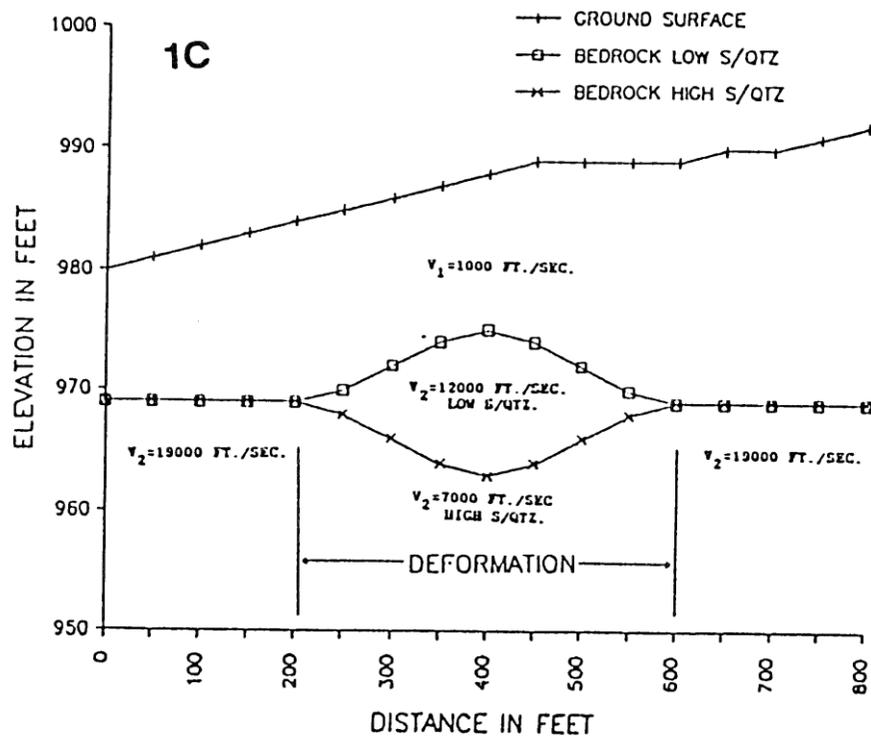
FIGURE 55-1: IDEALIZED GEOPHYSICAL PROFILES



Idealized very low frequency electromagnetic profile



Idealized magnetic susceptibility profile.



Idealized refraction seismic profile

FIGURE 55-2: BASAL TILL SAMPLING COOK AREA GEOPHYSICAL SURVEYS

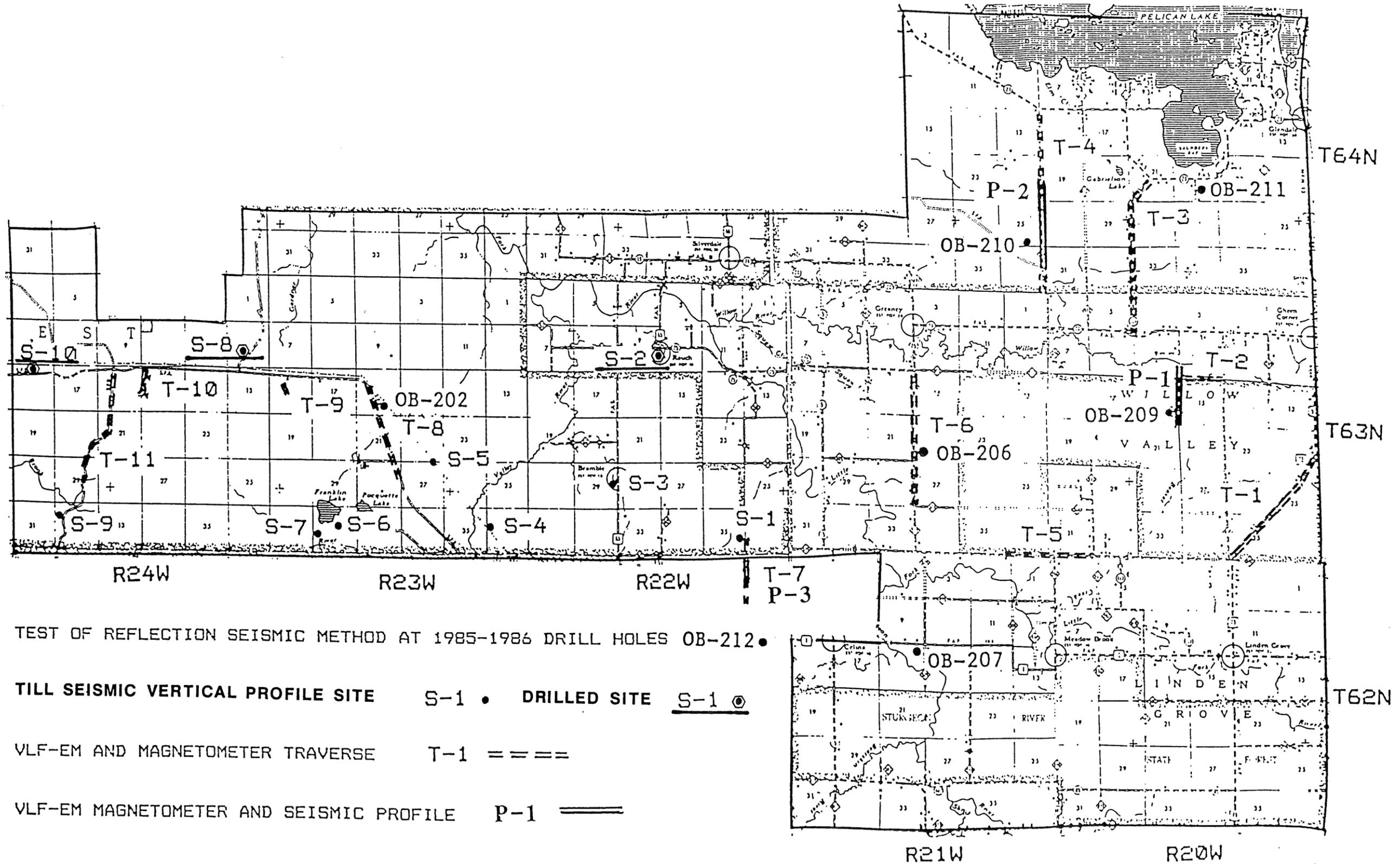
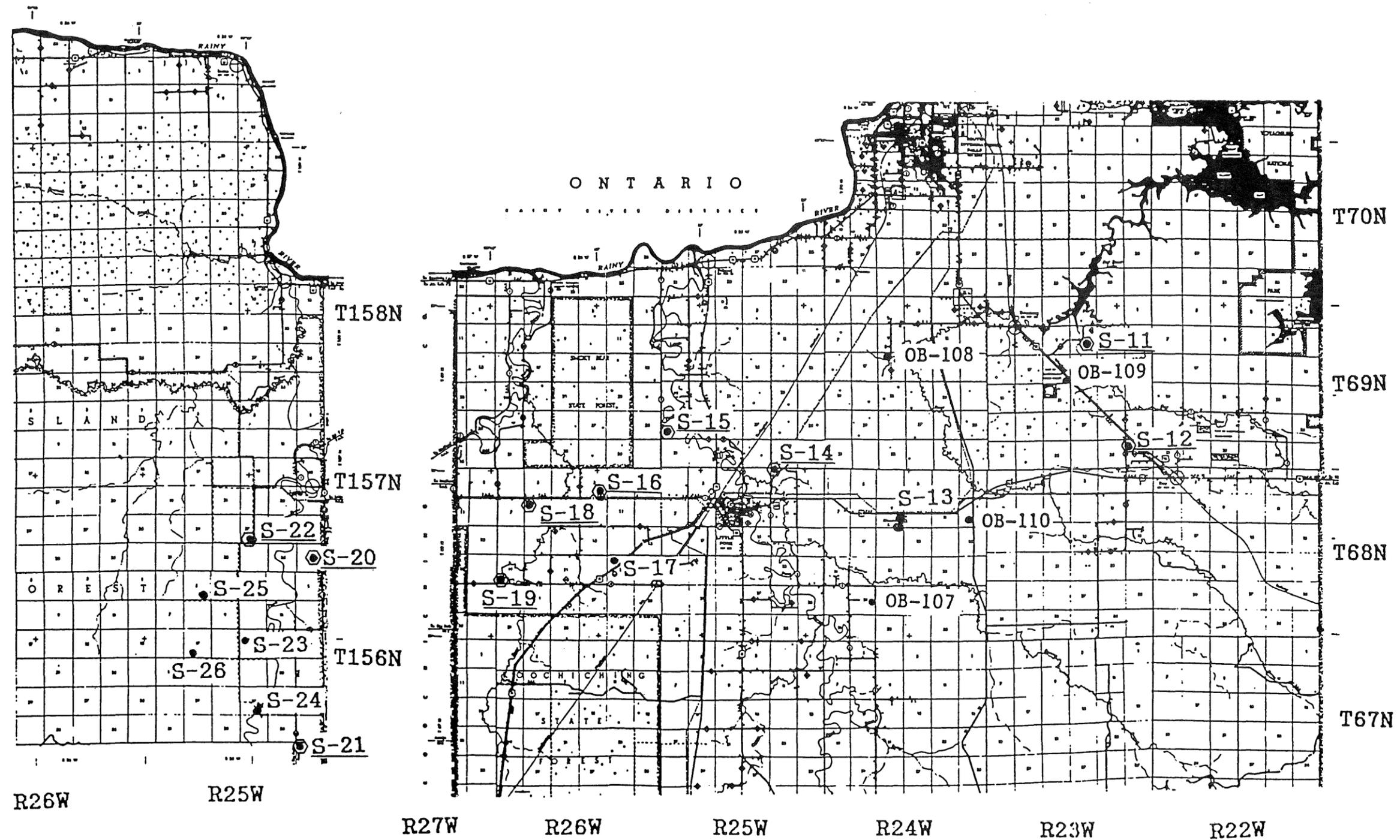


FIGURE 55-3: BASAL TILL SAMPLING LITTLE FORK AREA GEOPHYSICAL SURVEYS



TEST OF REFLECTION SEISMIC METHOD AT 1985-1986 DRILL HOLES • OB-105

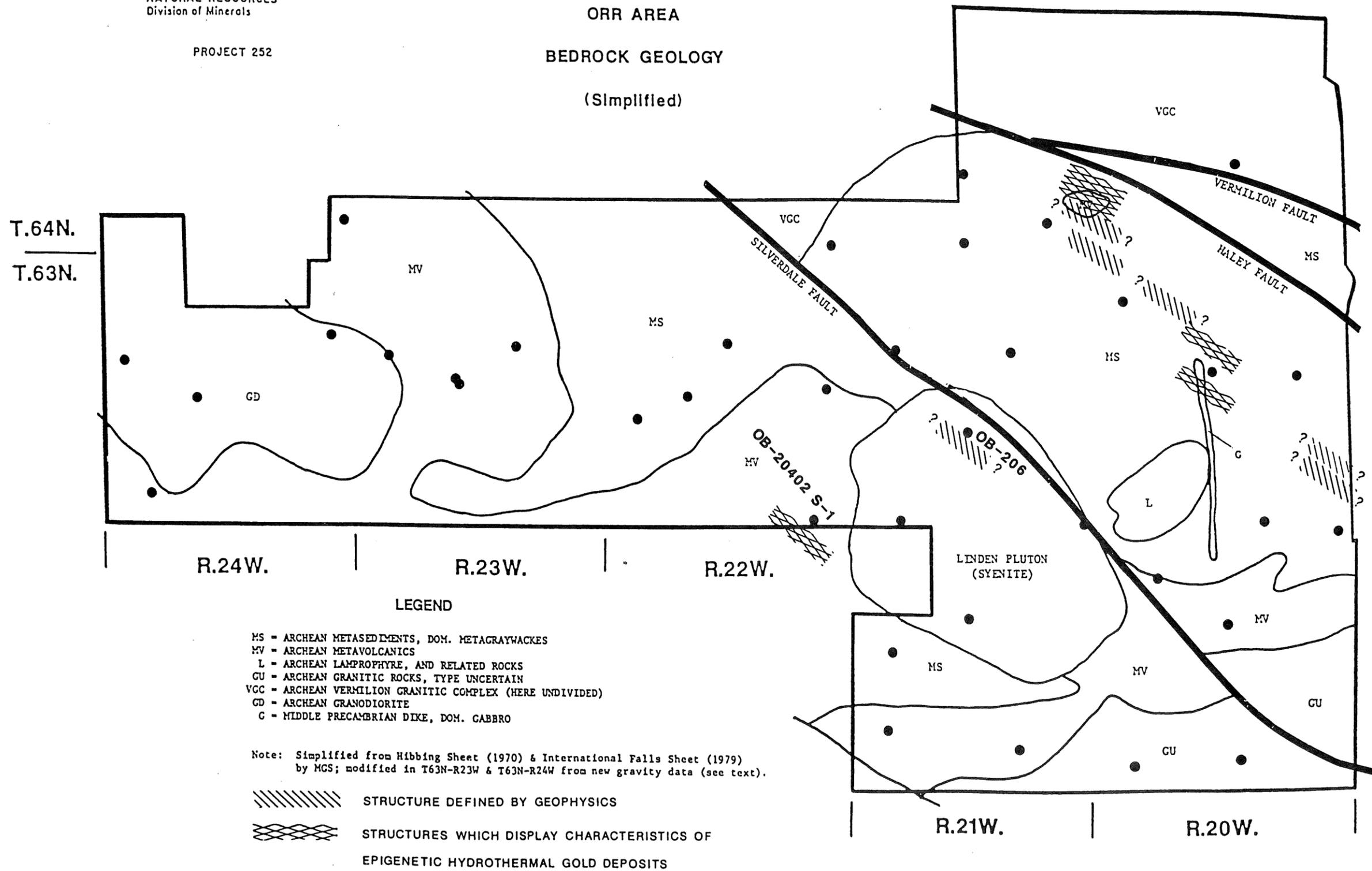
TILL SEISMIC VERTICAL PROFILE SITE • S-25 DRILLED SITE ◉ S-11

FIGURE 55-4: GEOLOGIC FEATURES DEFINED BY GEOPHYSICS

MINNESOTA DEPARTMENT OF
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Division of Minerals

PROJECT 252

ORR AREA
BEDROCK GEOLOGY
(Simplified)



- LEGEND**
- MS - ARCHEAN METASEDIMENTS, DOM. METAGRAYWACKES
 - MV - ARCHEAN METAVOLCANICS
 - L - ARCHEAN LAMPROPHYRE, AND RELATED ROCKS
 - GU - ARCHEAN GRANITIC ROCKS, TYPE UNCERTAIN
 - VGC - ARCHEAN VERMILION GRANITIC COMPLEX (HERE UNDIVIDED)
 - GD - ARCHEAN GRANODIORITE
 - G - MIDDLE PRECAMBRIAN DIKE, DOM. GABBRO

Note: Simplified from Hibbing Sheet (1970) & International Falls Sheet (1979) by MGS; modified in T63N-R23W & T63N-R24W from new gravity data (see text).

-  STRUCTURE DEFINED BY GEOPHYSICS
-  STRUCTURES WHICH DISPLAY CHARACTERISTICS OF EPIGENETIC HYDROTHERMAL GOLD DEPOSITS

FIGURE 55-5

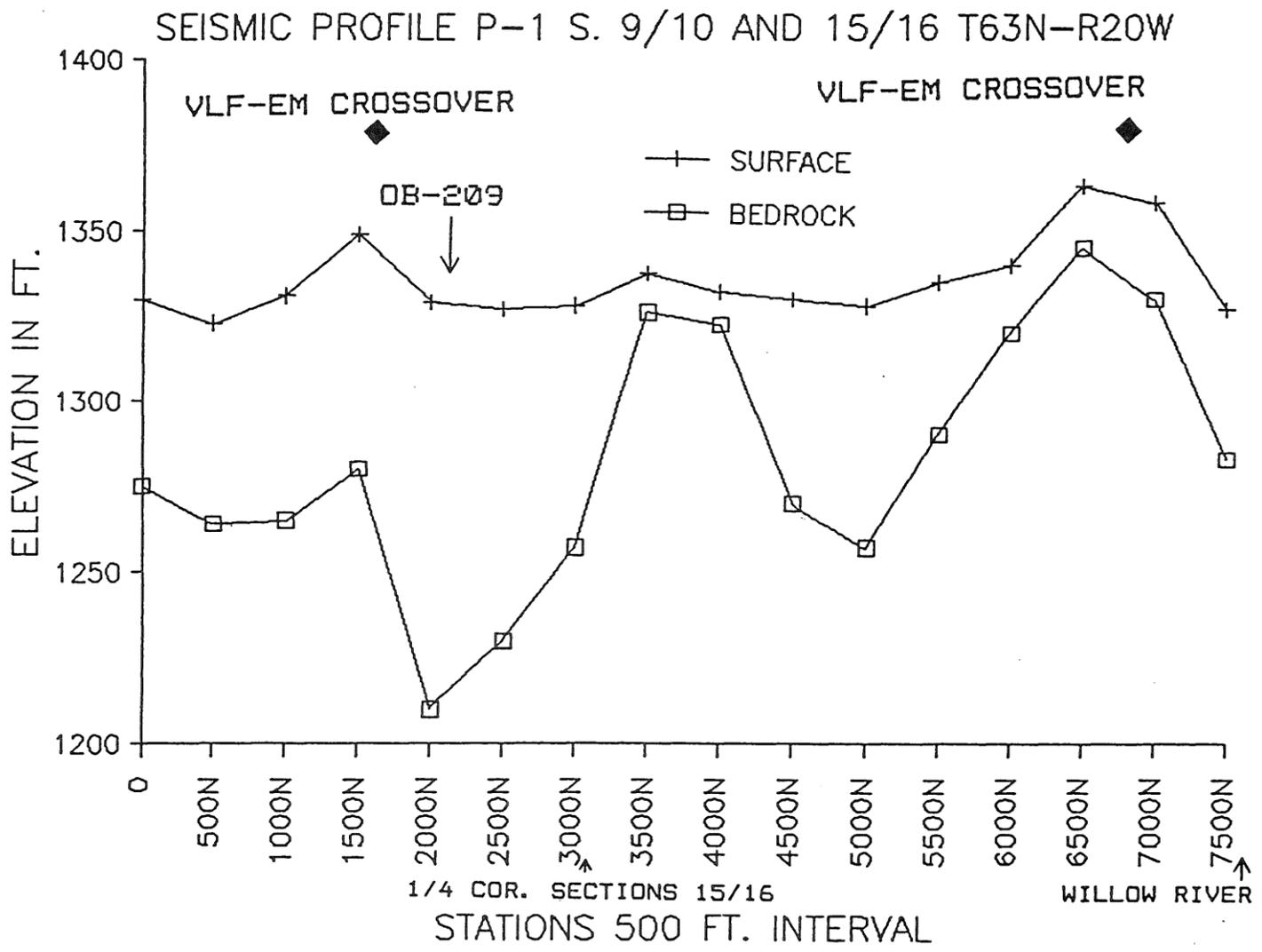


FIGURE 55-6

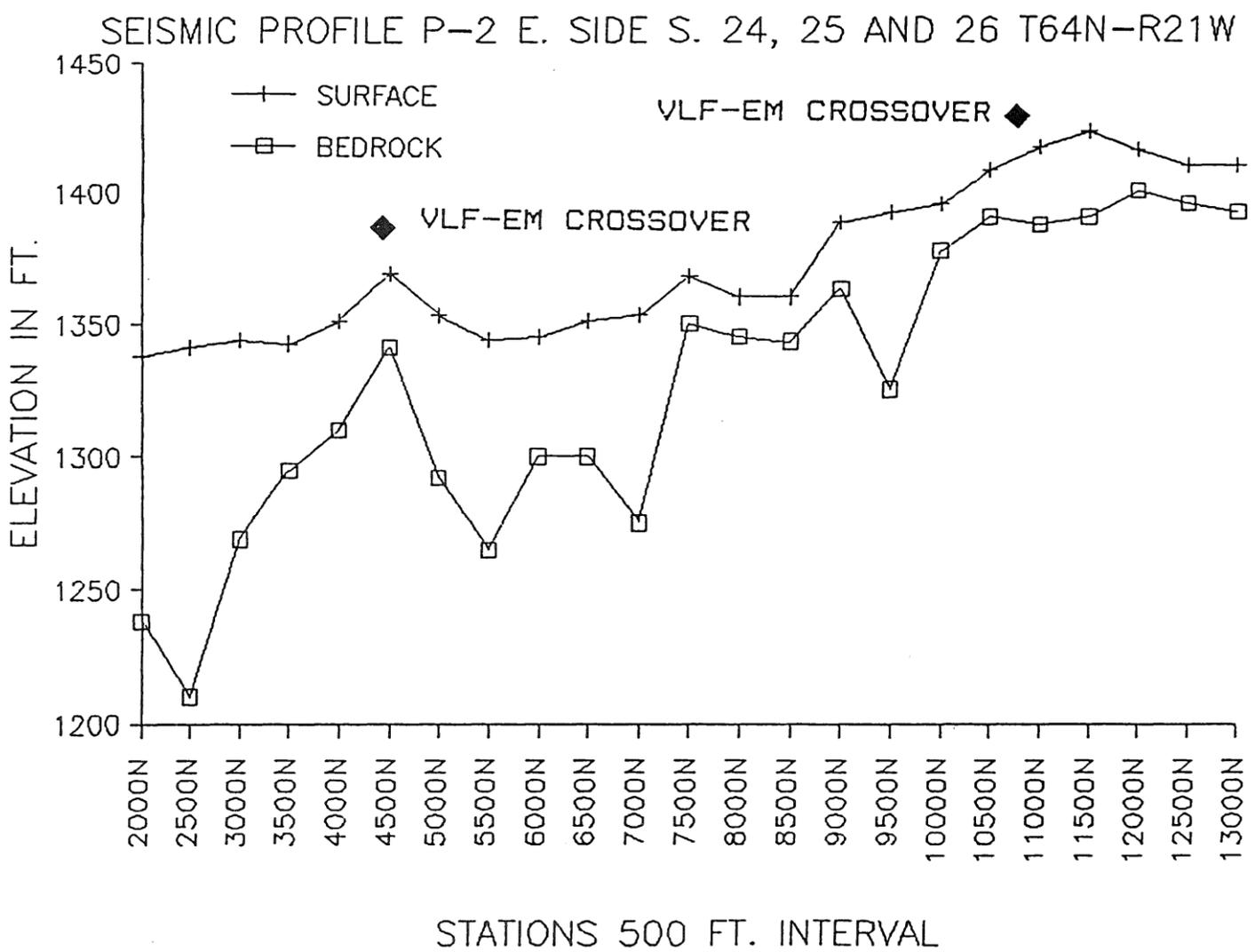
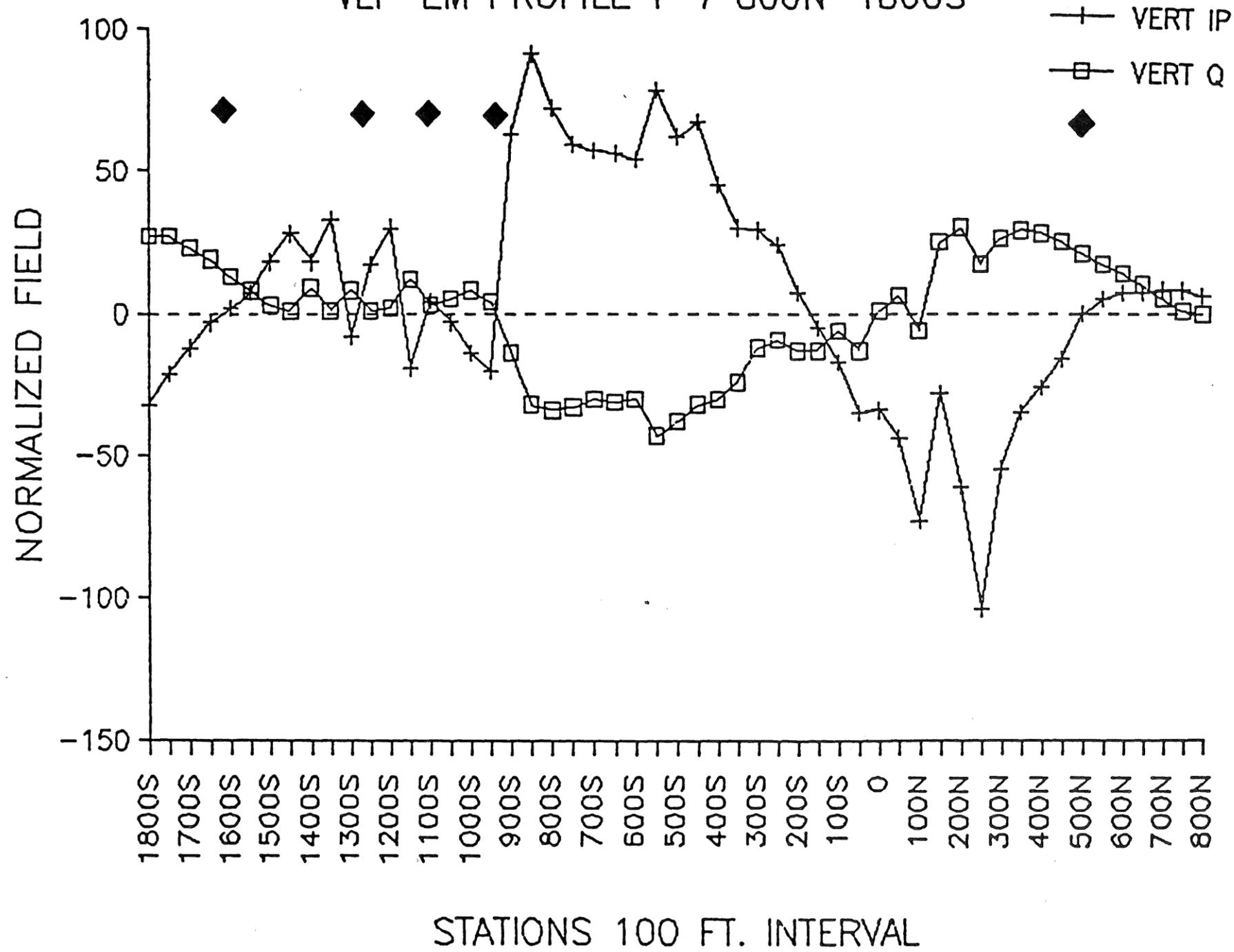


FIGURE 55-7

VLF-EM PROFILE T-7 800N-1800S



VLF-EM CROSSOVER ◆

FIGURE 55-8

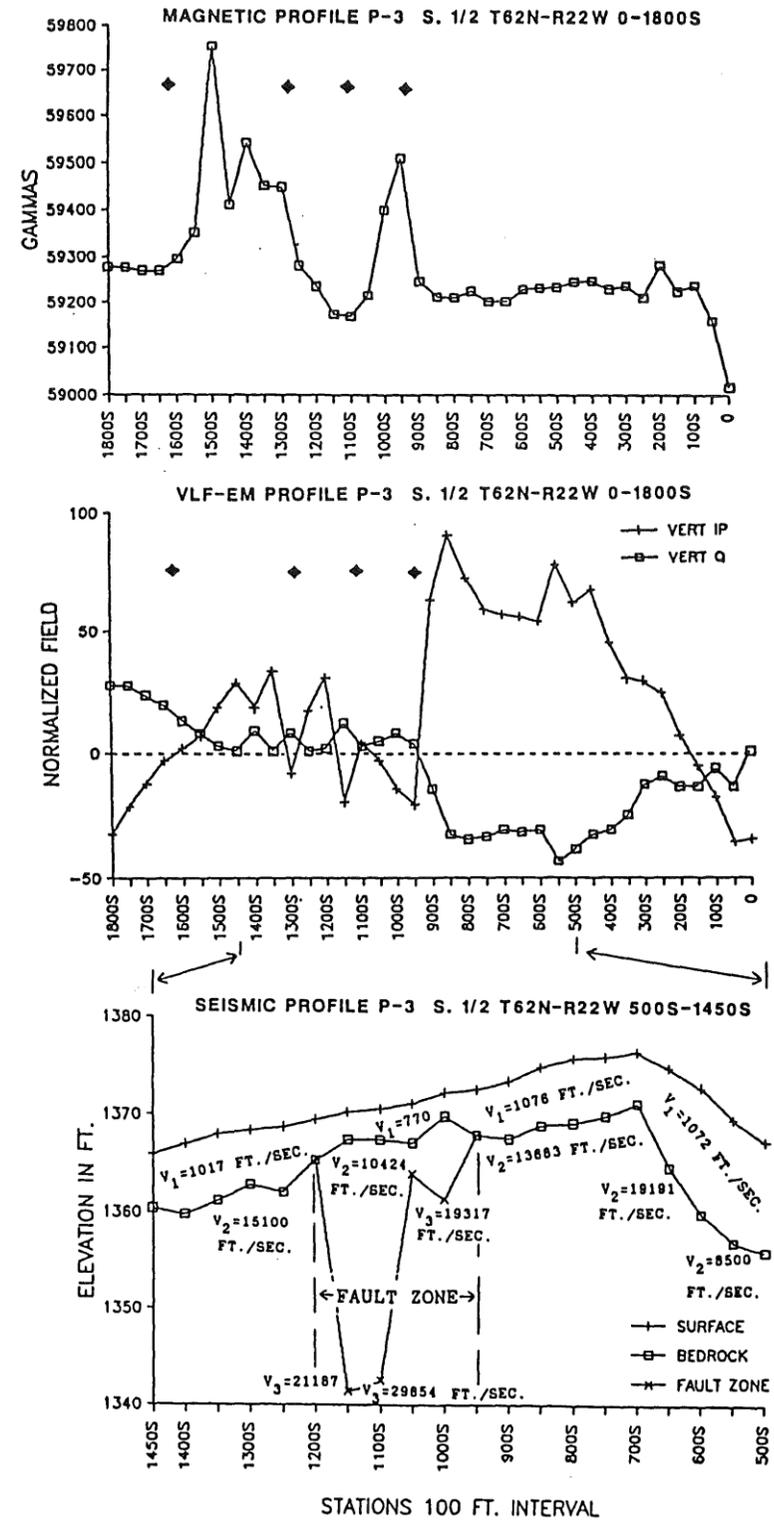


FIGURE 55-9

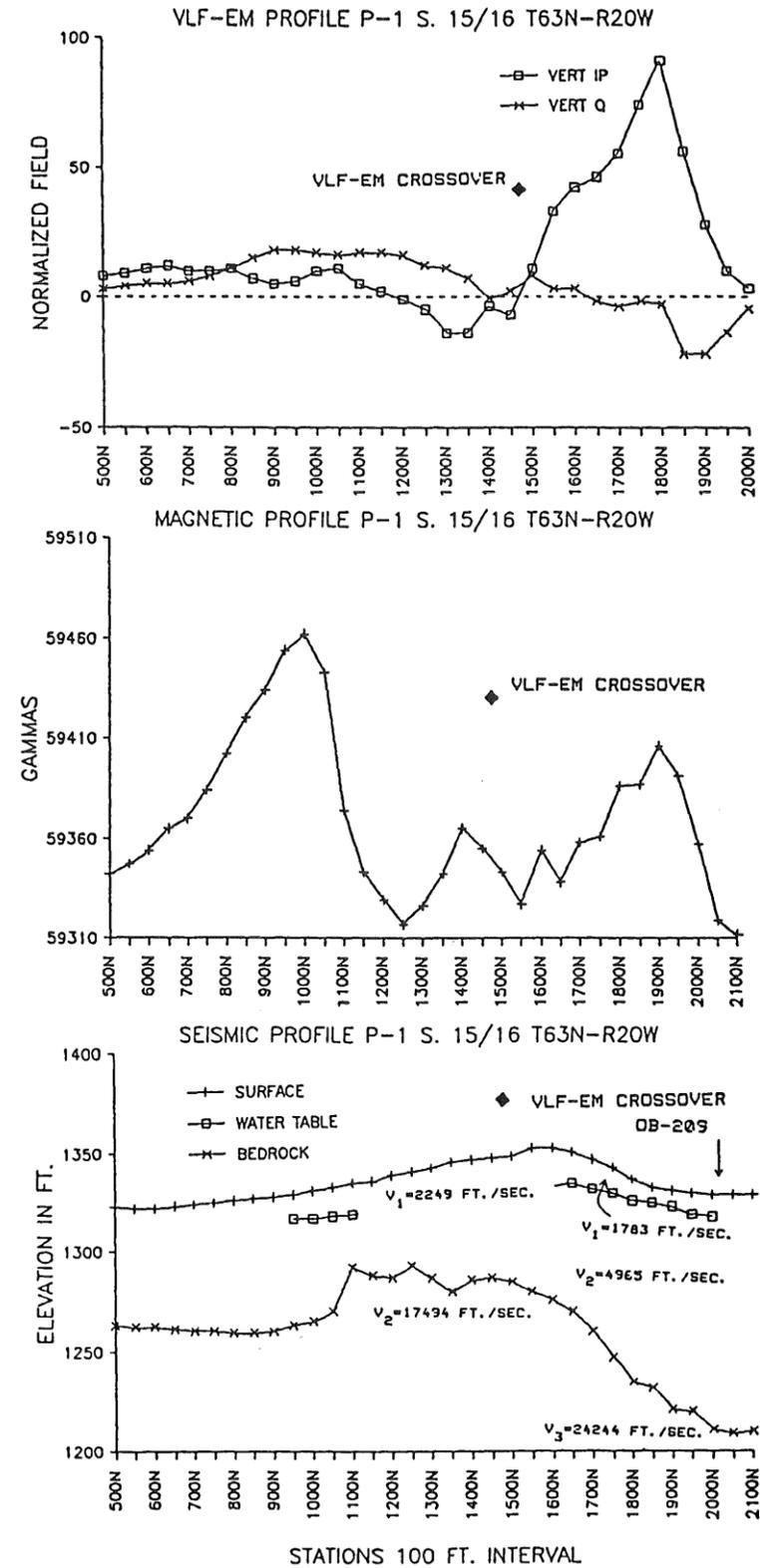


FIGURE 55-10

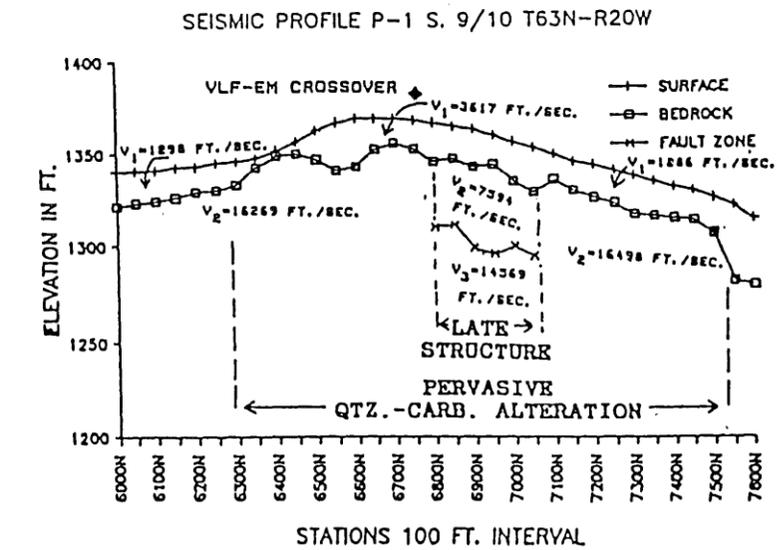
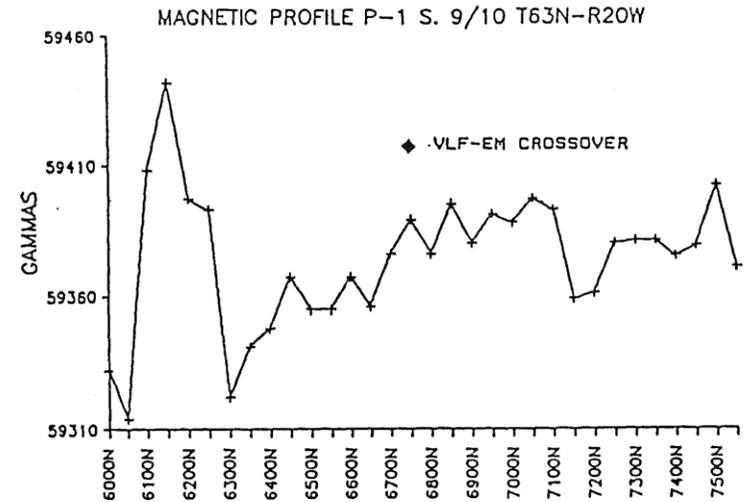
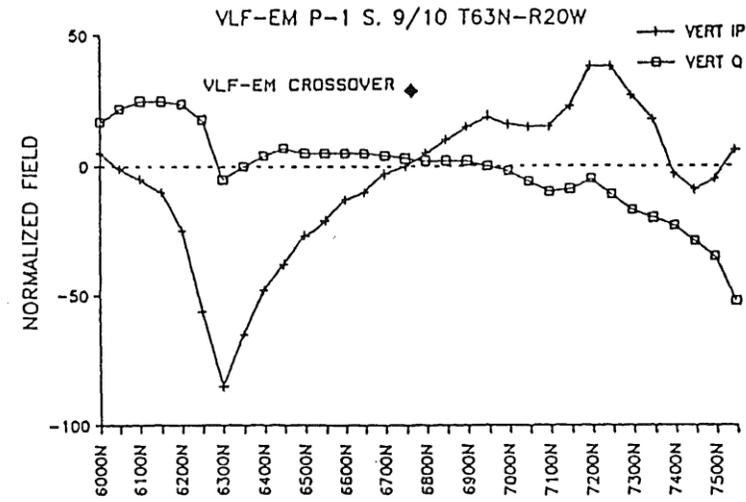


FIGURE 55-11

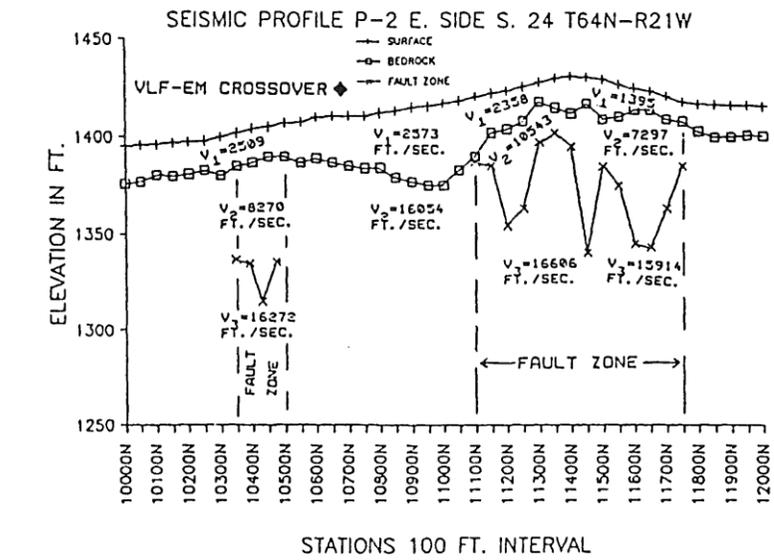
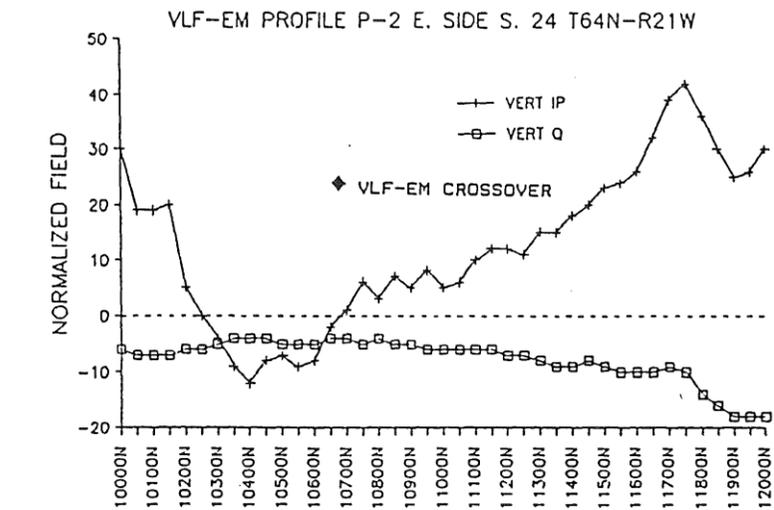
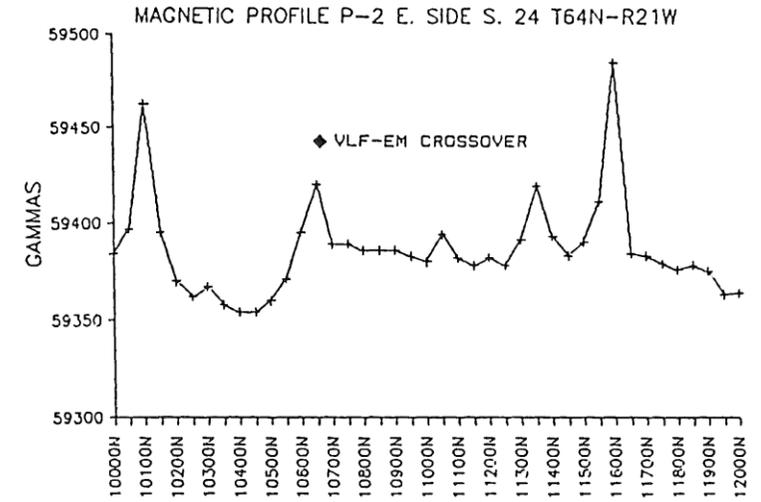


FIGURE 55-12

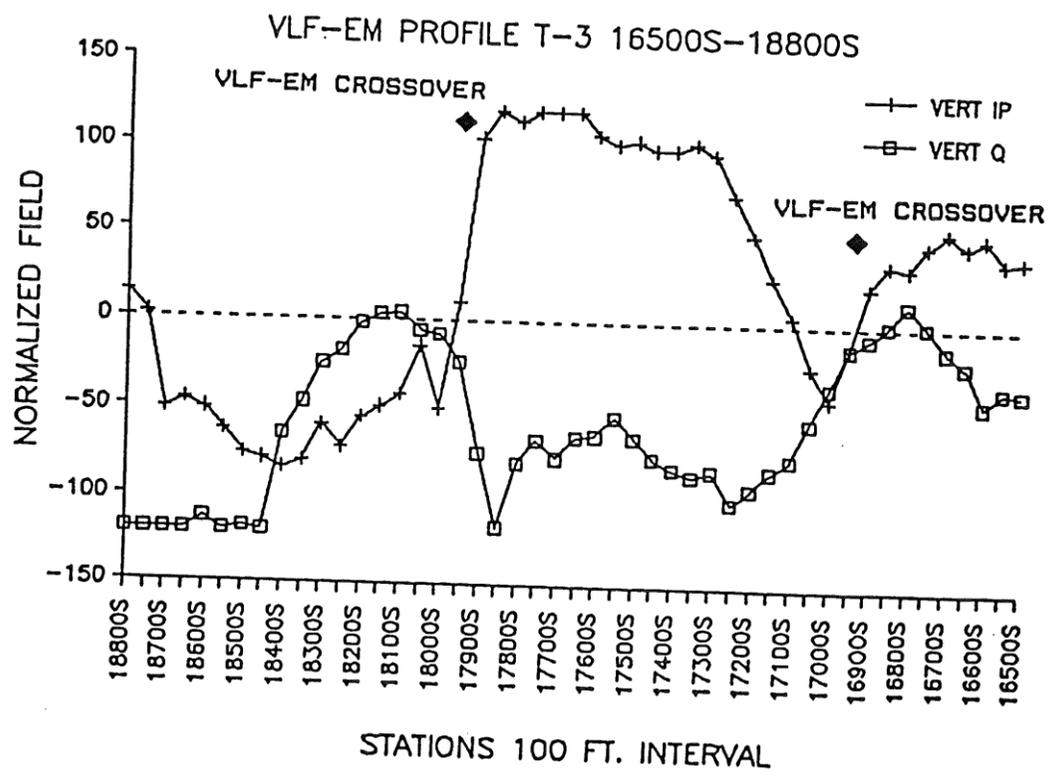
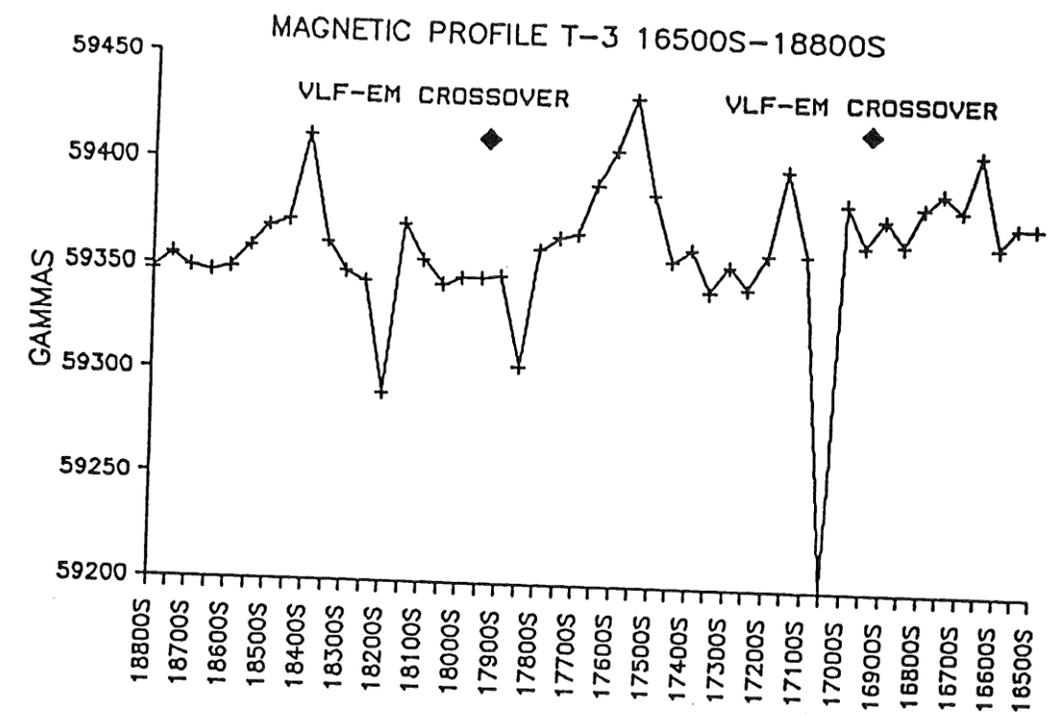


FIGURE 55-13

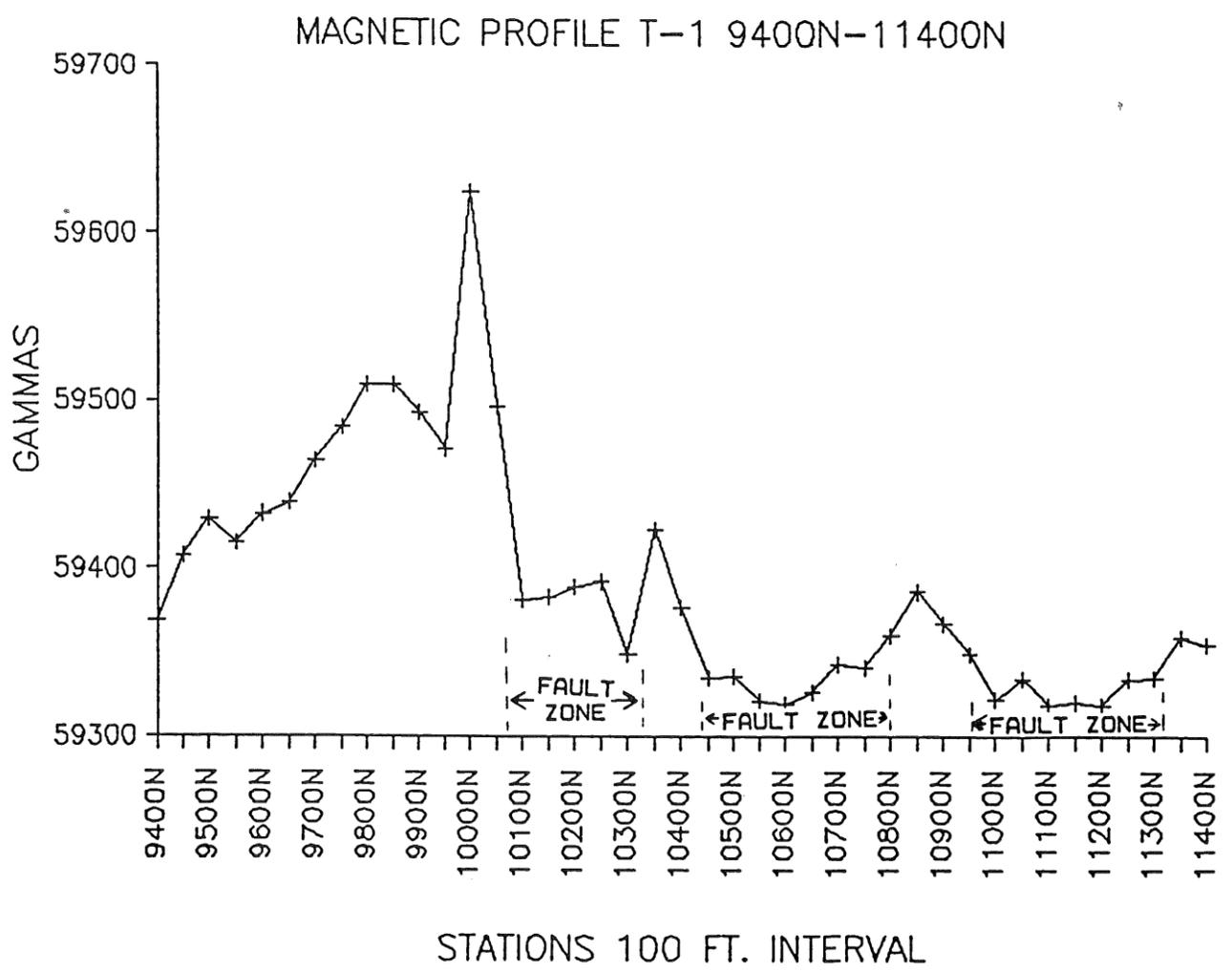


FIGURE 55-14

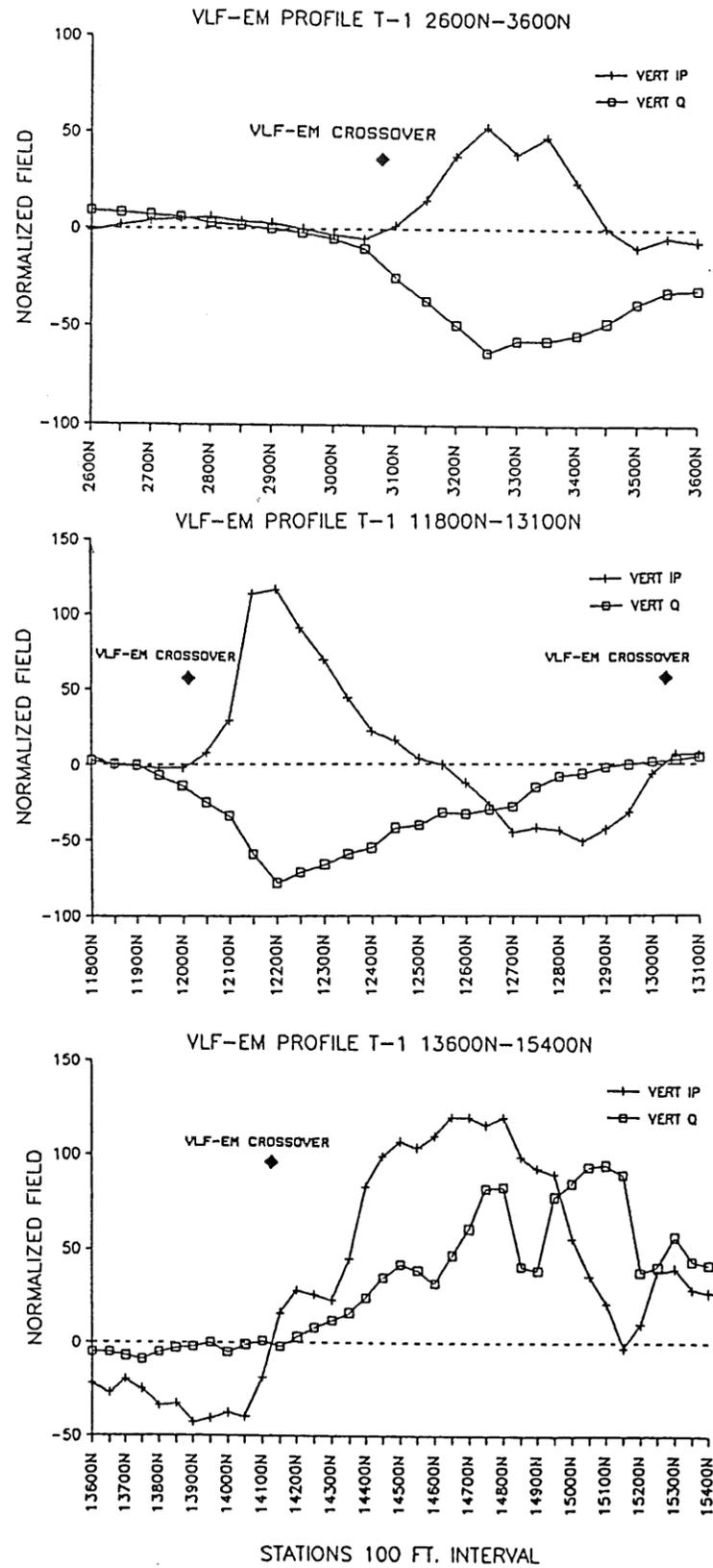
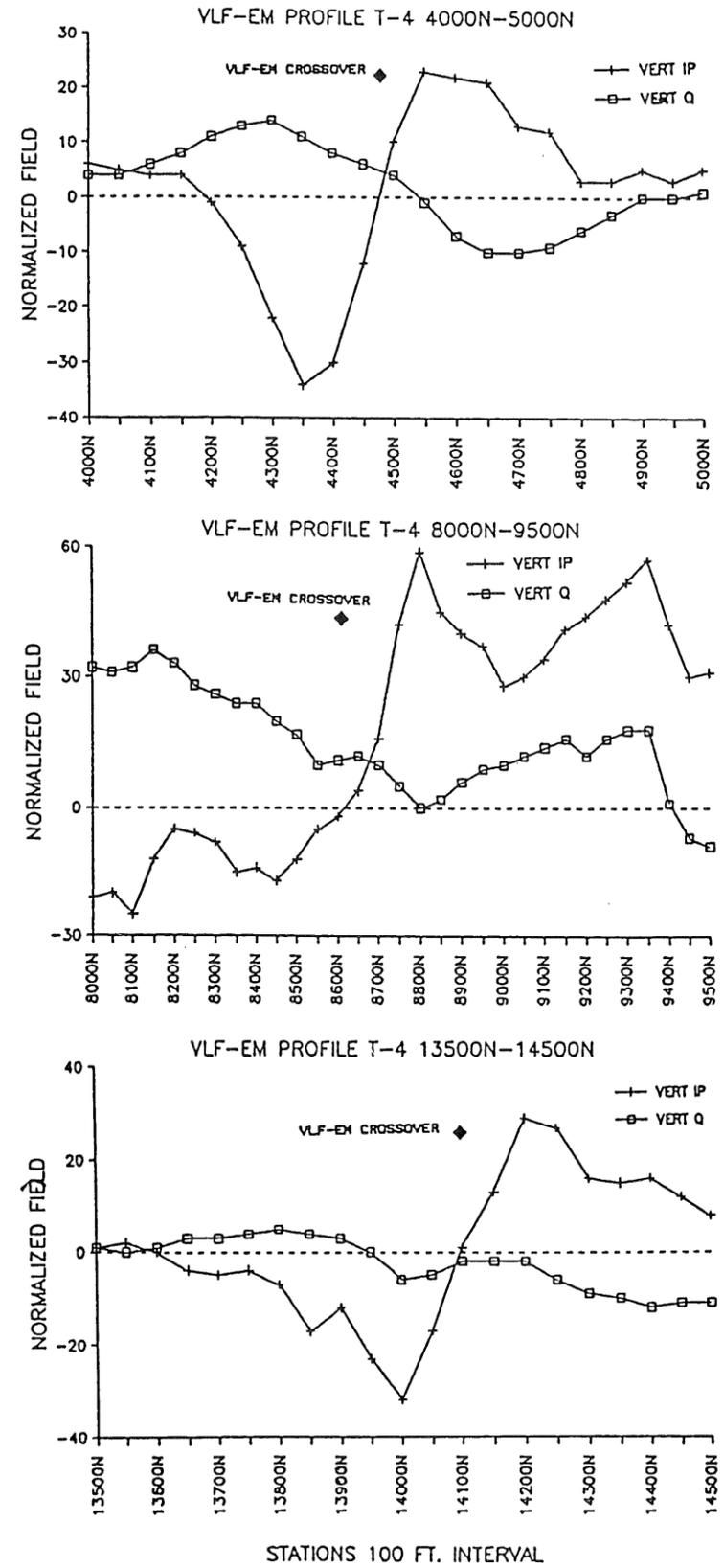


FIGURE 55-15



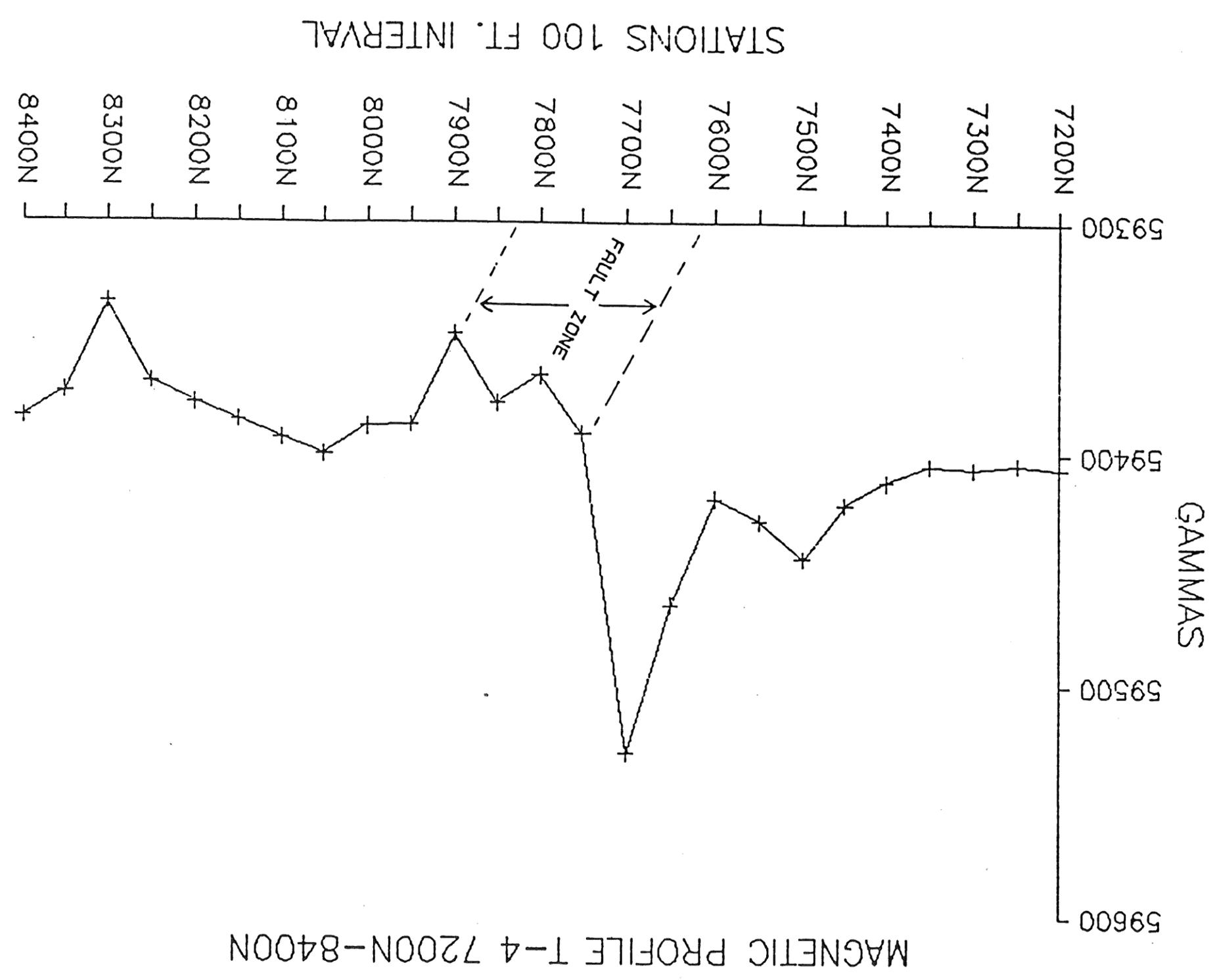


FIGURE 55-16

Table 30-1: Chronology of Events

1. July 1, 1985	Funding available. Geologist assigned to project. Detail design begins. Portable drill tested for possible niche.
2. October, 1985	Drilling contract written and obtained in record time.
3. November 1985	Natural resource specialist hired.
4. December, 1985	19-hole Rotasonic drilling program performed during 80-year record low temperatures.
5. April, 1986	Gary Meyer completes report on glacial stratigraphy from 19 drill cores.
6. August, 1986	Geochemical results are finally received from 19 drill cores. Design of next phase of drilling can proceed.
7. October, 1986	Second drilling contract written and sites in Orr area field checked. Gravity stations measured. Seismic work begins.
8. December, 1986 thru February, 1987	28-hole Mud Rotary drilling program performed in Orr area. New drilling contract for reverse circulation written.
9. March, 1987	Low bidder defaults on contract (for winter drill sites). Computer database work begins.
10. May to Oct., 1987	New contractor drills 20 holes with Air Rotary method at newly chosen summer drill sites.
11. October, 1987	Air Rotary samples shipped out of Hibbing for final processing and analysis. Final report work begins.
12. February, 1988	Final assay results received. Computer reporting of final results begins.
13. March to April, 1988	Final writing and drafting of report.

TABLE 30-2. SUMMARY OF DRILLING PROGRAMS

DRILLING METHOD:	<u>ROTASONIC CORING</u>	<u>MUD ROTARY</u>	<u>AIR ROTARY</u>
CONTRACTOR/OPERATOR:	Midwest/Northstar	M. Traut Wells	Graves Well Drilling
DRILL RIG:	Sicard 6WD	TH-60 (& Simco)	Schramm
SAMPLING DIAMETER:	3½"	4"	6"
SAMPLE:	Core	-½" chips (tricone bit, slurry)	-½" chips (tricone bit, slurry)
REGIONS (TWO):	Orr + Littlefork	Orr	Littlefork
NO. OF TOWNSHIPS:	19 (9 + 10)	9	10
TOTAL DRILL HOLES (67):	19 (9 + 10)	28	20
TOTAL FOOTAGE (7835.5):	2065 (925.5 + 1139.5)	3558.5	2212
AVG (HOLE) DEPTH:	109 (103 + 114)	127	111
CONTRACT COST:	\$35.50/ft	\$10/ft	\$20/ft
DATES DRILLED:	Dec 1985	Dec 1986/Jan-Feb 1987	May-Oct 1987
SITE TIME:	14 days	35 days	106 days
DRILLING TIME (APPROX):	13 days (11 hr/day)	32 days (10 hr/day)	44 days (9 hr/day)
AVG DRILL RATE (APPROX):	14 ft/hr	11 ft/hr	6 ft/hr
DOWN TIME (APPROX):	7%	10%	58%
O.B. SAMPLE QUALITY:	Excellent	Poor	Good to Poor
LITHOLOGICAL LOGGING:	Excellent	Very Difficult	Good to Poor
SUCCESS TO BEDROCK:	19 of 19	23 of 28	19 of 20
BEDROCK SAMPLE QUALITY:	Core, Excellent to Good	Chips (and sand), Good to Poor	Chips, Excellent to Poor
<u>ANALYSES (TOTAL)</u>			
HMC NONMAG (302):	120 (56 + 64)	128	54
HMC MAG (131):	63 (32 + 31)	42	26
-63 MICRON (310):	222 (106 + 116)	0	97
BEDROCK (58):	19 (9 + 10)	21	18
COBBLES (3):	2	1	0
SLUICE BOX (27):	0	27	0

Table 30-3. Test of variability of splitting of mud rotary samples as reflected by HMC gold grain counts of 10 sample pairs.

Sample No.	Weight (kg) Table Feed	No. of Gold Grains Counted in HMC
18602	19.4	0
18602R	8.3	4
18606	11.6	6
18606R	1.6	2
18609	13.7	3
18609R	10.5	3
18612	7.2	2
18612R	13.0	13
18618	30.8	6
18618R	9.7	2
18622	10.1	1
18622R	8.7	1
18628	13.3	3
18628R	10.7	0
18638	11.9	0
18638R	9.7	1
18660	6.0	1
18660R	10.0	0
18693	10.3	2
18693R	7.8	0

Table 30-4. Test of analytical variability, as reflected by a reference standard, S0-1 from CANMET, submitted as every 20th sample of -63 um assay pulps. The top line (V) lists the recommended values. Calculated precision adapted from Garret (1969). Sample S0-1 is a somewhat weathered Champlain Sea clay (C horizon) near Hull, Quebec.

S.N.	SI	S-T-R	CR	MN	FE%	CO	NI	CU	ZN	PB												
16812V	STD	S0-1	160	890	6.00	32	94	61	146	21												
S.N.	SI	S-T-R	V	CR	MN	FE%	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U
16812	STD	S0-1	140	210	870	6.9	44	93	84	210	2	-1	-1	-0.5	-1	2	-1	-1	-1	19	-1	2
16839	STD	S0-1	150	220	840	6.4	42	95	35	160	3	-1	2	-0.5	1	2	-1	-1	-1	18	-1	2
16867	STD	S0-1	150	220	900	6.8	44	96	68	160	3	-1	3	-0.5	-1	2	-1	-1	-1	17	-1	2
16908	STD	S0-1	150	220	850	6.3	42	95	65	150	3	-1	2	-0.5	1	2	-1	-1	-1	18	-1	1
16930	STD	S0-1	140	230	850	6.5	42	96	64	160	2	-1	2	-0.5	1	2	-1	-1	-1	27	-1	2
16963	STD	S0-1	140	230	820	6.6	45	100	68	170	3	-1	1	-0.5	1	2	-1	-1	-1	18	-1	1
16991	STD	S0-1	150	250	900	6.8	46	110	69	160	7	-1	2	-0.5	1	2	-1	-1	1	24	-1	2
17022	STD	S0-1	180	250	850	6.3	45	100	65	160	3	-1	1	-0.5	1	2	-1	-1	-1	26	-1	2
17061	STD	S0-1	150	230	750	6.4	43	97	35	170	3	1	4	-0.5	1	3	1	-1	1	19	-1	2
17074	STD	S0-1	150	220	870	6.8	45	100	67	180	2	-1	4	-0.5	1	3	1	-1	1	23	-1	2
18760	STD	S0-1	174	107	829	5.19	31	91	67	141	19	-5	7	-0.5	-1	-10	7	-10	-10	35	7	-10
18780	STD	S0-1	186	117	871	5.57	31	91	69	143	7	-5	7	-0.5	-1	-10	13	-10	-10	26	11	-10
18800	STD	S0-1	187	119	885	5.67	31	87	81	149	21	-5	7	-0.5	-1	-10	13	-10	-10	35	11	-10
18820	STD	S0-1	114	117	897	5.69	31	95	79	161	-5	-5	-1	-0.5	-1	-10	-5	-10	-10	11	11	-10
18840	STD	S0-1	111	119	889	5.91	31	103	75	157	-5	-5	1	-0.5	-1	-10	5	-10	-10	27	17	-10
18860	STD	S0-1	122	125	953	5.73	39	135	81	165	-5	-5	3	-0.5	-1	-10	25	-10	-10	51	5	-10
18880	STD	S0-1	100	111	903	5.39	37	125	77	153	-5	29	3	0.9	-1	-10	29	-10	-10	61	3	-10
Precision %			ND	10	1	8	10	4	9	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	21	ND	ND

Table 30-5. Re-analysis of the -63um fraction of an actual Rainy lobe fine sand sample, Littlefork area, air rotary drilling. Ten separate 20g subsamples were used for the gold assays, and ten 0.5g subsamples for total set of other elements. Calculated precision values are for the 95% confidence interval (adapted from Garret, 1973).

S.N.	AU	V	CR	MN	FE	FE%	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U
18767	7	87	39	423	0	1.91	9	17	19	29	9	-5	3	-0.5	-1	199	-5	-10	-10	15	3	-10
18767R	6	70	34	464	0	1.92	14	32	20	40	10	-5	2	-0.5	-1	-10	-5	-10	-10	18	3	-10
18767R	2	74	34	458	0	1.87	12	26	18	44	14	-5	2	-0.5	-1	-10	-5	-10	-10	14	3	-10
18767R	2	70	32	452	0	1.86	12	26	18	40	-5	-5	2	-0.5	-1	-10	-5	-10	-10	20	3	-10
18767R	2	68	38	454	0	2.16	12	40	18	38	12	-5	4	0.6	-1	-10	-5	-10	-10	18	3	-10
18767R	-1	70	38	454	0	1.87	12	26	18	42	22	-5	2	-0.5	-1	-10	-5	-10	-10	18	5	-10
18767R	-1	70	34	456	0	1.87	12	24	18	38	20	-5	2	-0.5	-1	-10	-5	-10	-10	12	5	-10
18767R	2	74	38	454	0	1.92	12	26	18	40	20	-5	2	-0.5	-1	-10	-5	-10	-10	10	3	-10
18767R	1	70	34	450	0	1.87	12	30	18	36	14	-5	2	-0.5	-1	-10	-5	-10	-10	8	5	-10
18767R	-1	74	34	454	0	1.87	12	26	18	40	14	-5	2	-0.5	-1	-10	-5	-10	-10	10	3	-10

Analytical

Precision %:	244	ND	5	12	ND	15	ND	27	3	14	51	ND	67	ND	ND	ND	ND	ND	ND	21	ND	ND
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Table 30-6. Test of total variability as reflected by 19 pairs of separate splits of Rotasonic samples. Calculated precision values are for the 95% confidence interval (adapted from Garret, 1973).

S.N.	AU	V	CR	MN	FE%	CO	NI	CU	ZN	AS	SE	MO	AG	CD	SN	SB	TE	W	PB	BI	U
16941	1	130	80	660	3.5	20	37	24	88	9	-1	4	-0.5	-1	1	-1	-1	-1	16	-1	3
13830R	-1	130	79	550	3.0	17	33	22	79	9	2	3	-0.5	1	8	-1	-1	1	13	-1	3
17051	1	140	89	660	3.7	21	40	25	92	6	-1	3	-0.5	-1	2	-1	-1	-1	15	-1	3
13831R	-1	140	91	570	3.2	18	38	26	90	9	-1	3	-0.5	-1	1	-1	-1	1	14	-1	3
17055	6	65	67	390	2.4	15	22	12	30	2	-1	1	-0.5	-1	-1	-1	-1	2	11	-1	-1
13832R	-1	71	77	410	2.5	15	24	17	37	7	-1	1	-0.5	-1	2	-1	-1	2	7	-1	-1
16911	-1	140	92	550	3.6	20	39	23	82	5	-1	4	-0.5	1	2	1	-1	1	18	-1	3
13833R	2	140	90	480	3.2	17	36	23	81	5	-1	3	-0.5	-1	1	-1	-1	-1	12	-1	3
17067	1	170	89	630	3.9	22	45	28	100	7	1	5	-0.5	1	3	-1	-1	-1	3	-1	-1
13834R	-1	150	100	580	3.6	20	42	28	100	7	-1	3	-0.5	-1	2	-1	-1	1	16	-1	3
17073	2	87	97	470	3.2	20	36	20	60	3	-1	5	-0.5	1	2	1	-1	5	18	-1	3
13835R	-1	99	110	530	3.4	22	41	28	65	3	-1	2	-0.5	-1	1	-1	-1	5	14	-1	2
17009	-1	78	130	470	3.3	22	40	44	270	4	-1	12	-0.5	1	2	-1	-1	3	15	-1	-1
17010	-1	75	220	520	4.1	23	53	53	92	4	1	30	-0.5	-1	2	-1	-1	3	19	-1	-1
16962	1	80	120	410	2.9	21	37	21	44	3	-1	2	-0.5	-1	1	-1	-1	5	11	-1	-1
13837R	-1	83	120	520	3.3	22	39	23	47	3	-1	1	-0.5	-1	1	-1	-1	3	9	-1	-1
16900	-1	180	100	670	4.3	25	48	31	110	11	3	4	-0.5	1	2	-1	-1	1	17	-1	3
13838R	-1	190	110	590	3.9	21	47	30	100	9	1	5	-0.5	-1	2	-1	-1	1	15	-1	3
16999	7	110	110	600	4.3	26	47	47	140	3	2	4	-0.5	-1	2	1	-1	3	22	-1	4
13839R	-1	120	130	280	4.3	23	47	52	170	5	-1	7	-0.5	-1	2	-1	-1	2	14	-1	3
16813	1	88	86	500	3.3	17	36	24	72	5	-1	2	-0.5	-1	1	-1	-1	-1	15	-1	2
13840R	8	97	92	520	3.4	18	38	25	77	5	-1	3	-0.5	-1	5	-1	-1	-1	12	-1	2
16824	1	49	58	320	1.8	11	19	12	33	1	-1	2	-0.5	-1	-1	-1	-1	3	13	-1	-1
13841R	-1	52	63	340	2.0	13	21	13	37	2	-1	1	-0.5	-1	9	-1	-1	3	9	-1	-1
16865	2	62	170	600	3.7	24	57	33	62	2	-1	2	-0.5	-1	-1	-1	-1	-1	14	-1	1
13842R	-1	92	180	530	3.3	23	58	32	62	2	-1	1	-0.5	-1	11	-1	-1	1	9	-1	-1
17031	1	150	120	760	5.4	36	64	54	130	1	-1	3	-0.5	-1	2	-1	-1	6	18	-1	2
13844R	1	130	180	790	5.6	37	70	63	160	2	-1	4	-0.5	1	12	-1	-1	5	18	-1	1
16853	1	76	120	450	3.1	19	36	29	51	3	-1	6	-0.5	-1	1	-1	-1	2	12	-1	-1
13845R	-1	92	130	400	3.1	18	38	31	55	2	-1	6	-0.5	-1	9	-1	-1	4	12	-1	-1
16884	-1	71	120	510	3.0	21	39	26	46	1	-1	-1	-0.5	-1	1	-1	-1	-1	18	-1	1
13846R	-1	77	110	430	2.7	17	36	29	43	1	-1	1	-0.5	-1	9	-1	-1	-1	14	-1	-1
17016	-1	52	120	400	2.3	20	43	28	42	3	-1	2	-0.5	-1	1	-1	-1	-1	20	-1	-1
13847R	-1	62	110	320	2.1	16	38	24	39	2	-1	2	-0.5	1	-1	-1	-1	1	13	-1	-1
16874	1	110	190	500	4.1	28	67	64	320	4	1	12	-0.5	1	2	-1	-1	7	14	-1	-1
13848R	-1	120	210	530	4.4	29	74	80	400	5	-1	14	-0.5	1	2	-1	-1	5	10	-1	-1
16835	-1	150	200	700	5.5	36	69	75	200	2	-1	5	-0.5	1	2	-1	-1	2	15	-1	2
13849R	-1	180	210	770	6.2	41	82	91	240	3	-1	4	-0.5	1	2	-1	-1	2	11	-1	2

Precision %: 167 ND 4 ND ND ND 4 7 4 52 ND NDND ND ND ND ND ND 28 ND ND

Table 40-7A. Summary averages of gold grains and HMC magnetic and nonmagnetic sample fraction weights. The data is sorted by area, by drift type, and by drilling method.

	# SA	HMC FEED WT (KG)	# GOLD GRAINS	GOLD GRAINS PER 10 KG	NONMAG HMC WT (G)	(G) NONMAG PER 10 KG	MAG HMC WT (G)	(G) MAG PER 10 KG
BY AREA:								
L.F.-R.L. TILL	39	391.8	19	.48	1579.2	40	389.5	10
ORR-R.L. TILL	89	908.4	58	.64	3615.8	40	839.5	9
BOTH AREAS-R.L. TILL	128	1300.2	77	.60	5195.0	40	1229.0	9.5
L.F.-DM.L. TILL	26	380.2	5	.13	206.2	5	61.2	2
ORR-DM.L. TILL	7	89.3	0	0	47.2	5	15.8	2
BY DRIFT TYPE:								
ORR-R.L. TILL	89	908.4	58	.64	3615.8	40	839.5	9
ORR-R.L. GRAVEL	11	109.4	4	.37	296.8	27	98.9	9
ORR-R.L. SAND	41	484.5	6	.12	1305.9	27	347.9	7
L.F.-R.L. TILL	39	391.8	19	.48	1579.2	40	389.5	10
L.F.-R.L. GRAVEL	24	344.6	22	.64	1966.1	57	417.8	12
L.F.-R.L. SAND	19	173.7	8	.46	1095.0	63	259.2	15
BY DRILLING METHOD:								
ORR-R.L. TILL-SONIC	32	345.1	20	.58	1092.6	32	265.3	8
ORR-R.L. TILL-MUD	57	563.3	38	.67	2523.2	45	574.2	10
L.F.-R.L. TILL-SONIC	10	113.2	4	.35	363.3	32	73.9	7
L.F.-R.L. TILL-AIR	29	278.6	15	.54	1215.9	44	315.6	11

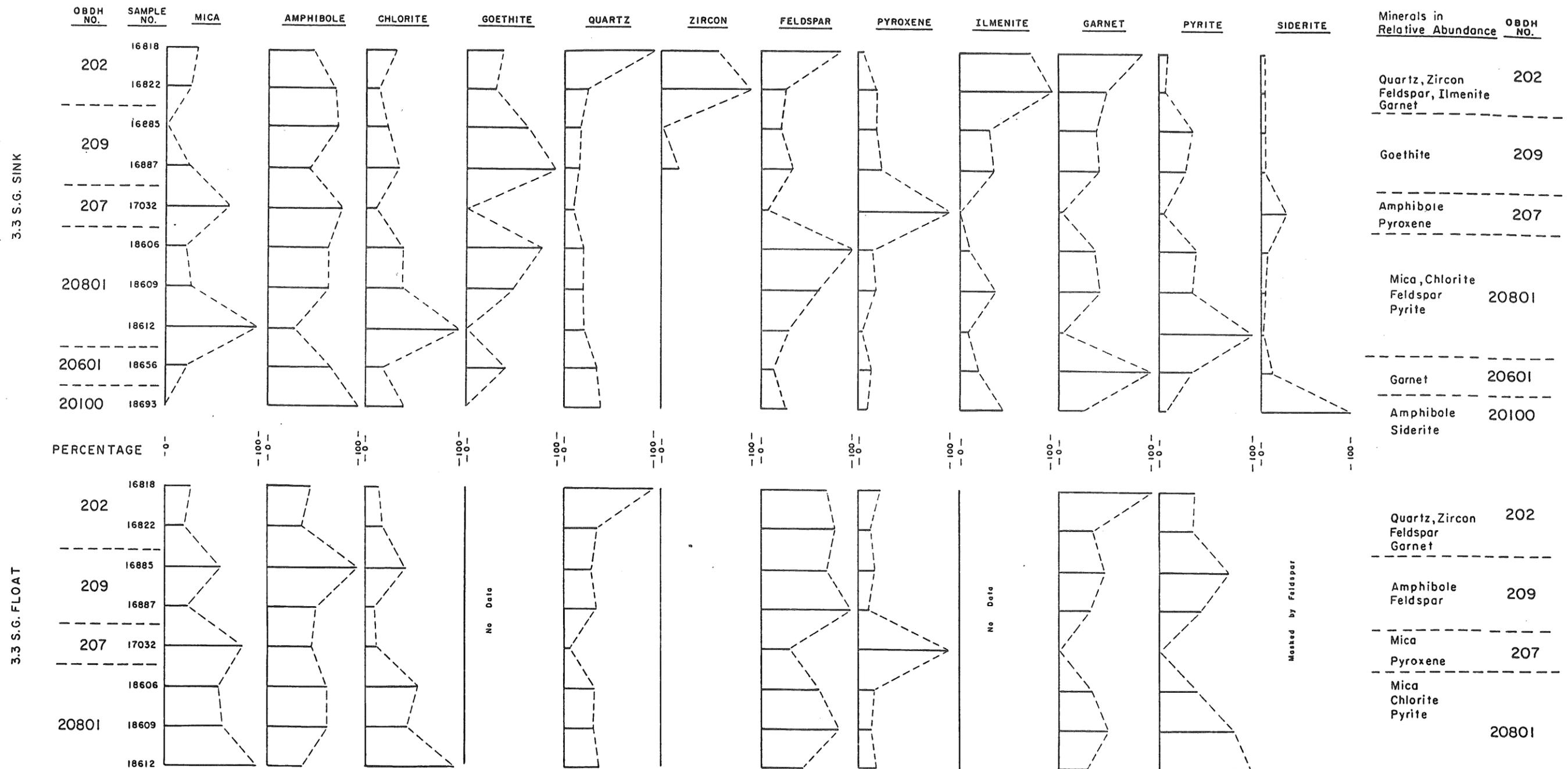
LEGEND:

- =====
- 1) ALL ASSAY RESULTS IN PPM (UNLESS INDICATED)
 - 2) SEE TABLE OF ANALYTICAL METHODS
 - 3) 245 - ARITHMETIC AVERAGE (DATA NOT NORMALIZED)
 - 4) (32/39) - (# SA. > DETECTION LIMIT / TOTAL # SA. INCLUDED)
 - 5) L.F. - LITTLEFORK
 - 6) R.L. - RAINY LOBE
 - 7) DM.L. - DES MOINES LOBE
 - 8) TILL - (ROTASONIC) TILL SAMPLES & (MUD & AIR ROTARY) TILL + GRAVELLY SAND SAMPLES
 - 9) GRAVEL - INCLUDES MGR, CGR, VCGR SAND & GRAVEL
 - 10) SAND - INCLUDES FGR SAND, SILTY SAND, SILT & CLAY
 - 11) SONIC - ROTASONIC CORE DRILLING
 - 12) MUD - MUD ROTARY DRILLING (NO -63 um OR DM.L. ASSAYS, +10M SCALPED AT DRILLSITE)
 - 13) AIR - AIR ROTARY DRILLING (-63 um ASSAYS EXCLUDED, NO DM.L. ASSAYS)
 - 14) ZN2 - ZINC ANALYZED BT DCP METHOD
 - 15) EXCLUDED - 120,00 PPB AU IN SA. # 16887, (NONMAG HMC)
1100 PPB AU IN SA. # 16891, (-63 um)

Table 40-8. Sieve analysis of magnetite removed from a 16.5 lb. split from sample #18727C, drillers mudpit. This material was lost from our mud rotary sample collection system from hole OB-20200, 71-117 feet.

<u>Held On (Microns)</u>	<u>Weight (g)</u>	<u>Weight (%)</u>	<u>Cum (%)</u>	<u>Remarks</u>
1,700	1.1	5.0	5.0	magnetite & quartz, visible steel particles
1,180	.4	1.8	6.8	magnetite & quartz, visible steel particles
600	1.7	7.7	14.5	magnetite & quartz, visible steel particles
300	3.1	14.1	28.6	magnetite & quartz particles
150	7.0	31.8	60.4	liberated magnetite
53	6.7	30.5	90.9	liberated magnetite
Pan	<u>2.0</u>	<u>9.1</u>	100.0	liberated magnetite
	22.0	100.0		

Table 43-1. This table shows the variation in mineralogy of selected Rainy Lobe till samples. The samples are in two groups, the sink and float products of 3.3 S.G. heavy liquid separation of the shaking table concentrate.



NOTE: An x-ray diffraction pattern was run on each sample with identical instrument parameters and the results graphed to compare the relative amounts of each mineral between samples. For each mineral, a specific peak is selected and the sample with that highest peak is assigned 100%. Every other sample is compared to that peak height. The results are semi-quantitative. For each mineral, relative variations between samples (and thus between drill holes) are shown by looking down columns. The mineralogy of each sample is shown by looking across rows.

Table 43-2. Bedrock group correlation to Rainy lobe till samples nonmag HMC assays.

Bedrock Group	No. DH's	HMC Nonmag "Till" Assays																				Weight of Nonmag HMC (grams per kg of feed)		
		AU	CR	MN	FEZ	CO	NI	CU	ZN	AS	SE	MO	AG	SB	BA	HF	W	PB	TH	U	ZN2		AG2	
SC	1	4	112	238	7950	28	590	363	365	135	23	8	20	.3	.75	3075	77	171	60	160	22	0	0	1.5
MV	9	18	287	682	8578	25	231	243	262	156	108	14	6	.5	2.2	422	49	254	77	108	13	0	0	3.78
MS	19	39	87	349	10095	21	186	228	312	146	27	10	7	.3	.60	523	39	301	62	96	11	.375	.06	2.91
LP	4	13	16	219	3915	15	73	107	192	158	6.3	12	4	.3	.65	877	63	5.5	19	48	9.7	0	0	12.5
GR	3	7	49	241	12471	23	189	263	203	127	17	6	5	.6	.29	407	37	12	45	99	11	0	0	3.23
DA	1	7	227	1099	13143	25	113	149	78	149	28	11	8	.3	1	486	81	17	49	250	22	0	0	1.69
QB	8	7	607	313	3589	26	336	364	373	150	72	7	12	1	.37	361	96	85	33	269	64	28.3	3.3	3.87
MG	4	8	260	330	1303	25	220	233	134	126	68	6	5	.8	.66	90	74	77	27	91	20	73.6	2.9	7.05
GP	11	17	165	451	3496	25	171	183	162	132	84	7	4	.6	.75	463	115	41	25	192	25	28	3.2	3.35
GM	4	7	60	307	5495	23	193	204	216	154	41	7	5	.4	.41	150	102	100	23	144	20	23.1	2.6	2.89

Legend

1. Gold assays in ppb. Other elements ppm.
2. Only the Rainy lobe till samples (and gravelly sand of mud rotary drilling) were included in these estimates.
3. The bedrock was grouped into the following categories:

Orr Area

SC = garnet-biotite schist
 MV = metavolcanics
 MS = metasediments
 LP = Linden Pluton
 GR = granodiorite
 DA = dacite

Littlefork Area

QB = quartz-biotite schist
 MG = metagraywacke
 GP = gneiss, paragneiss, and schist-rich migmatite
 GM = granite-rich migmatite, tonalite, and pegmatite

Table 43-3. Comparison of Two Sample Fractions

HMC	vs.	-63 Micron (250 mesh Tyler) Screened Fraction
1. Heavy liquid (3.3 SG) excludes most Middling particles & rock frags, so result is dominantly MONOMINERAL PARTICLES.		1. For Rainy Lobe this is a concentration process, since +33% gold grains will be in 6% of wt.
2. Every HMC Flowsheet produces a different CONCENTRATION RATIO. Concentration ratio 300 to 1500 (should be normalized to some value such as 1000).		2. Difficult to distinguish nugget effect vs. multiple gold grains.
3. # of gold grains is more important than the assay.		3. Large number of particles improves subsample assay statistics. But gold grains do not break down like silicate particles, into exponentially greater number of particles.
4. 8 kg sample of till shown by Stu Averill to be adequate size for reproducible results for gold: contains 10 particles if in dispersal train - reproducible.		4. Streaks of gold can occur on hard silicate particles by abrasion of soft gold.
5. Gold particles are classified to estimate (ex. delicate) transport distance.		5. Heterogenous tills may not be well represented by typical sample weights used.
6. Indicator and/or pathfinder heavy minerals helpful (ex. Aspy or supergene indicators native Cu & pyromorphite)		6. Au content in till does not appear to be as homogeneous vertically as HMC.
7. Magnetic fraction is available and can be helpful.		7. If oxidation has occurred, clays and hydrous iron oxides should "fix" cations such as CU, Pb, Zn.
8. Claims (ODM) ore grade estimate is possible.		8. If pre-glacial weathering: Secondary Gold in Regolith or Gossan or Cretaceous or Pre-Wisconsin oxidized (old) tills should be identified with this fraction.
9. Rainy Lobe Till with a relatively low silt and clay content should work well for HMC gold recovery. low silt and clay content should work well for HMC gold recovery.		9. Lower cost, but results indirect.
10. Probable gold grain loss if: occluded in silicates or quartz, native gold flakes 25 micron diameter.		10. Potential for larger dispersal target? Finland and works well there for base metals.
		11. Used exclusively by Geol. Survey Finland and works well there for base metals.

Both Fractions

- A. permit +10M clasts and chips to be examined visually to interpret local bedrock types and ore types. Example Zn as Sph in banded massive sulfides vs in veins; Au as stratiform vs vein.
- B. drill bit can grind up pebbles to liberate Au or other elements into HMC or -63 -63 um.

Table 43-4. List of some factors to consider for interpretation of distance of transport.

- A. Artificial
 - 1. Definition of transport distance used: the distance over which the percentage of the object of study proper diminishes to half measured from the distal contact (Salminen & Hartikainen, 1985).
- B. Probably Two Most Important Factors (Clark, 1987)
 - 1. Topography of bedrock subcrop: often directs path of basal debris toward topographic low
 - a. Scales - detailed vs local vs regional vs continental
 - b. Relief on detailed scale: 10 vs 100 feet
 - 2. Basal Ice (or sliding) Velocity: determine rates of entrainment, dilution and deposition; low velocity = short transport, lodging, new entrainment, high rate of mixing
 - a. Thickness of ice
 - b. Relative location, middle of lobe vs edge
 - c. Location proximal vs distal to a specific end moraine: (Salminen and Hartikainen, 1985)
 - d. Dilution by distal debris
- C. Site Landscape Factors
 - 1. Strike, dip, & topographic position of bedrock ore target: flame vs ribbon shape train
 - 2. Area, esp. width, of target ore zone subcrop
 - 3. Area & lithology of nearby unmineralized bedrock: dilution and trace element content
 - 4. Stratigraphic horizons of till
 - 5. Sampling depth
 - 6. Characteristics of target ore zone (Shilts, 1976)
 - a. Resistance to plucking, abrasion, & crushing
 - b. Grade of primary & pathfinder elements
 - c. Mineralogy affects both strength & size of dispersal train
 - d. Liberation size of ore minerals
 - 7. Presence of regolith or older drift at site: secondary gold in regolith
 - 8. Post-depositional weathering
 - 9. Fraction of till analyzed: -63 um, HMC, pebbles, boulders (Ex: Sulfides, chromite, magnetite often in sand sizes; gold often in sand & silt sizes; serpentine in silt & clay)
- D. Other Unnecessary Evils
 - 1. Complex transport: two ice directions or ice + water + ice
 - 2. Secondary interglacial processes: ODM example: fluvial gold anomaly
- E. Notes
 - 1. Variability of Results = sum of variability of till + drilling + processing + analytical
 - 2. Scale of Transport (Klassen, 1987)
 - a. Detailed: 100 m to few km's
 - b. Local: tens of km's
 - c. Regional: 100's km

Table 55-1: 1986 SEISMIC DEPTHS COMPARED WITH 1985-1986 DRILL DEPTHS

SITE	LOCATION	SEISMIC DEPTHS		DRILL DEPTHS		PERCENT DIFFERENCE	
		BEDROCK	GLACIAL	BEDROCK	GLACIAL	BEDROCK	GLACIAL
OB-107	NE1/4-SE1/4, S. 29, T68N-R24W	140 FT.	- FT.	142 FT.	- FT.	1.4%	- x
OB-108	NW1/4-NE1/4, S. 16, T69N-R24W	106	-	131.5	-	19.4%	-
OB-109	SE1/4-SE1/4, S. 16, T69N-R23W	64	-	45	-	29.7%	-
OB-110	NW1/4-SE1/4, S. 12, T68N-R24W	52	37	52	37.5	-	1.3%
OB-202	SE1/4-SW1/4, S. 16, T63N-R23W	87	64	122.5	69.5	29.0%	7.9%
OB-206	SW1/4-SW1/4, S. 22, T63N-R21W	103	45	108	37	4.6%	21.6%
OB-207	NE1/4-NE1/4, S. 16, T62N-R21W	102	86	108	70.5	5.6%	22.0%
OB-209	NE1/4-SE1/4, S. 16, T63N-R20W	104	73	105	52	1.0%	40.4%
OB-210	SW1/4-SE1/4, S. 25, T64N-R21W	48	-	48	-	-	-
OB-211	NW1/4-SE1/4, S. 22, T64N-R20W	54	-	56	-	3.6%	-

AVERAGE ERROR						9.4%	18.6%

Table 55-2: COOK AREA SEISMIC GLACIAL TILL PROFILES

SITE	LOCATION	SEISMIC DEPTHS		DRILL DEPTHS		PERCENT DIFFERENCE	
		BEDROCK	GLACIAL	BEDROCK	GLACIAL	BEDROCK	GLACIAL
S-1	E1/16 COR. SE1/4, S. 35 T63N-R22W	80 FT.	- FT.	- FT.	- FT.	-	-
S-2	E1/16 COR. SE1/4, S. 9 T63N-R22W	119	88	121	-	1.7%	-
S-3	E1/16 COR. SE1/4, S. 29 T63N-R22W	183	150	-	-	-	-
S-4	NW1/4-SW1/4, S. 36 T63N-R23W	138	90	-	-	-	-
S-5	NE1/4-NE1/4, S. 27 T63N-R23W	101	61	-	-	-	-
S-6	SW1/4-NE1/4, S. 32 T63N-R23W	143	-	-	-	-	-
S-7	SW1/4, S.32 T63N-R23W	140	112	-	-	-	-
S-8	E1/16 COR. SW1/4, S. 12 T63N-R24W	178	115	167	41	6.6%	-
S-9	SW1/4-NW1/4, S. 32 T63N-R24W	160	115	-	-	-	-
S-10	NW1/4-NE1/4, S. 18 T63N-R24W	155	111	-*	40	-	-

* Hole bottomed at 146 feet in glacial drift.

Table 55-3: LITTLE FORK AREA SEISMIC GLACIAL TILL PROFILES

SITE	LOCATION	SEISMIC DEPTHS		DRILL DEPTHS		PERCENT DIFFERENCE	
		BEDROCK	GLACIAL	BEDROCK	GLACIAL	BEDROCK	GLACIAL
S-11	CENTER S. 10 T69N-R23W	122 FT.	- FT.	134 FT.	113 FT.	9 x	- x
S-12	NW1/4-NW1/4, S. 36 T69N-R23W	31-51	-	56.5	56	10	-
S-13	E1/16 COR. SE1/4, S. 9 T68N-R24W	4-6	-	-	-	-	-
S-14	CENTER NW1/4, S. 2 T68N-R25W	75	-	78.5	62	5	-
S-15	W1/16 COR. SW1/4, S. 30 T69N-R25W	115	-	95	99	14*	-
S-16	S1/16 COR. SE1/4, S. 3 T68N-R26W	183	-	177	117	4	-
S-17	NW1/4-NE1/4, S. 23 T68N-R26W	37-41	-	-	-	-	-
S-18	NW COR., S. 8 T68N-R26W	165	66	135.5	-	18*	-
S-19	S1/16 COR. SW1/4, S. 19 T68N-R26W	100	80	92	98	2	13
S-20	E1/4 COR., S. 36 T157N-R25W	162	145	190	145	15	0
S-21	SW COR., S. 36 T156N-R25W	92	-	+174	102	47	-
S-22	S1/4 COR., S. 27 T157N-R25W	203	137	136.5	119	33	14
S-23	W1/16 COR. NW1/4, S. 15 T156N-R25W	85	-	-	-	-	-
S-24	SW1/4-SE1/4, S. 27 T156N-R25W	123	103	-	-	-	-
S-25	S1/16 COR. SE1/4, S. 5 T156N-R25W	170	144	-	-	-	-
S-26	S1/16 COR. SW1/4, S. 17 T156N-R25W	82	-	-	-	-	-

* Drill site is far enough away from seismic site to account for difference.



