

drill hole: MGS-2 / MDDP-2 / BIWABIK #2 Grid Name: MESABI Deep Drilling Project, Hole #2

angle & Direction: VERT

Location: SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec 22, T.58N, R.16W.

548569 E 5259590 N (NAD 27 UTM)

SAMPLED BY:
M. LUCCAS
B. BONNICHSEN
SIDNEY HEMMING (SH)
ROBERT THERIAULT (RT)
RAO
GERLACK, SHIELLY + CARLSON
ABRAJANO

Page 1 Of 6

Logged by: M. SEVERSON

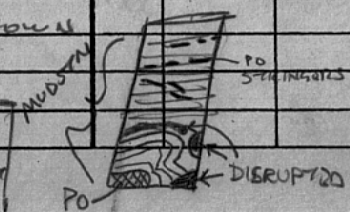
Date: 11-10-93

footage				rock type and description	grn size	% plag	% olv.	% pyrox	% graph	% sulf.	% oxide	% other	% other	rel. magnet	fractures/ layering	alteration/ comments
From	to	ft	rec													
0	103			OVERBURDEN												
103	1623			VIRGINIA FM - INTERFINGERED SHALE & MUDSTONE (BLACK → MOD GRAY) THAT DIFFER ALTERNATE												
				103 - WELL LAMINATED BLACK SHALE → FINE GRAINED WHITE LT. GRAY GRAYWACKES BEDS (2mm-1') + SLTS BEDS.											70-85 w/ RAID MILDLY CONTORTED ZONES (SOFT-SWD)	
				GRAYWACKES = BOUMA B, B → C, B → D, E, C, C → D, E. 3 GRAYWACKES / MUDSTONE N 60/60												
				SEDIMENTARY FEATURES = SHARP BASES OF GRAYWACKES + SCOURED BASES + INTRACLAST SCOUR ZONES + CROSS-BEDS + GRADUATED BDD + CONVOLUTED C												
				@ 175 2 1/2" CROSS-BEDDED BDD (BOUMA C) + FLASER BDD + RARE ELONGATED CALCITE CONCRETIONS.												
				@ 205.5 SH SAMPLE (3") = 70% GRAYWACKES w/ THIN WELL LAMINATED SHALE BEDS UP TO 1 CM THICK												
				@ 213-218 70% GRAYWACKES												
				@ 229-254 > 60% "												
				@ 280 VUGGY CALCITE VN												
				@ 300-323 > 60% GRAYWACKES												
				@ 349-373 " "												
				@ 415 SH SAMPLE (4") = BDD GRAYWACKES												
				@ 433-443 70% GRAYWACKES												
				@ 447 RT SAMPLE (4") = BDD GRAYWACKES-SILTSTONE w/ 10% BLK MUDSTONE BEDS (< 1 cm THICK)												
				@ 460-481 > 60% GRAYWACKES												
				@ 504-518 > 80% " (THICK BEDS; UP TO 4' COMPOSITES)												
				@ 542-545 > 90% " (" ")												
				@ 569-584 > 85% " (" ")												
				@ 624-630 > 90% " (" " UP TO 3' INDIVIDUALLY)												
				@ 630 SH SAMPLE (3") FROM A 6" GRAYWACKES BED												
				@ 637-685 70% GRAYWACKES OVERALL; NOT MUCH BLK PELAGIC MUDSTNS (UP TO 1' THICK THOUGH)												
				@ 764-773 " "												
				@ 787' RAO SAMPLE - BLK MUDSTONE												
				@ 807 RT SAMPLE (4") SILT-MUDSTONE												
				@ 810-818 70% GRAYWACKES												
				@ 874- 4" w/ 5% PO AS 2mm STRINGERS SUBPARALLEL TO BDD / IN SAND 5% MOD												
				AREAS THEY DEFINITELY X-CUT BDD. BDD IS STRONGLY CONTORTED AT ONE END OF THE PIECE w/ 1 cm THICK												
				PO LOOSE AS SHOWN												
				@ 931 SH SAMPLE (3") = MUDSTONE w/ THIN SILT INTBEDS.												

NOTE: MANY OF THE GRAYWACKES BEDS (BUT NOT ALL!) ARE CALCAREOUS - RANSG FROM WK TO STRONG REACTION TO HCL
MJS 6-30-99

ADJACENT TO B74' RUN BLOCK BUT B84' RUN BLOCK IS ONLY 2 1/2' AWAY!

BOY SAYS "SCRAMBLED CORE"!!



drill hole: MGS-2

Grid Name: _____

angle & Direction: _____

Location: _____

Page 3 of 6

Logged by:

Date: _____

[illegible]

drill hole: MGS-2

Grid Name: _____

RUN BLOCK @ 1796'
CAN'T BE RIGHT!

Page 4 Of 6

Logged by: _____

angle & Direction: _____

Location: _____

Date: 4-29-99

NOTE: THIS HOLE HAS BEEN HANDLED + SAMPLED SO MUCH THAT THIS CORE, + RUN BLOCKS, ARE PROBABLY MIXED UP TO SOME DEGREE.

footage				rock type and description	grn size	% plag	% olv.	% pyrox	% graph	% sulf.	% oxide	% other	% other	rel. magnet	fractures/ layering	alteration/ comments
From	to	ft	rec													
1623	2219			BIWABIK IRON-FORMATION												
				A 1623-1641 1/2 A - well bedded "marble" + chert, with LOCAL ROUNDED CIRCULAR TO ELIPSOIDAL CHERT CLASTS (RIP-UP FRAGMENTS THAT UNDERWENT ROUNDING).												
				↓ FIRST APPEARANCE OF GREEN BEDS												
				B 1644'-1657 B - well bedded chert, green-silicate beds, + "dolomite"											WK	
				@ 1649-1657 CHERT - GRANULAR TEXTURE + GREEN TINTED-BEDS (SAME GRANULAR TEXTURE)												
				C 1657-1678 C + D - well bedded chert + sideritic slate											WK-MOD → MOD w/ DEPTH → STRONG	
				SH samples: 1655, 1661 (1665), 1666 (1670)												
				@ 1665-1675 DEFINITELY C/D											MOD	REDISH GRANULAR JASPERY CHERT @ 1666 (3" in large clasts) + APPROX 1671-1671 1/2
				D 1678-1686 CHERT w/ ABUND. QTZ + RED JASP GRANULOS; SOME WAVY MAGNET-RICH BEDS, SOME CHERT RIP UPS (O O)												
				@ 1680-1682 ABRAY AND SAMPLES												
				? 1686-1692 ? = ALTERNATING 8-15" THIN-BED CHERT (w/ GRANULE TEXTURE AS ABOVE) + THIN-MOD THICK BEDDED GREEN-GLAUC-MGT-RICH BANDS											STRONG!	
				SH samples: 1689 (= 1692), 1701 (= 1705)												
				? 1697-1704 MOTTLED CHERT w/ SIDERTS + MOTTLED TO DISSEM. MGT.												
				E 1704-1710 WAVY-BEDDED CHERT + MGT ± SIDERTS - @ 1700 3" ZONE w/ GOOD CHERT RIP-UPS!												
				F 1710-1713 85% THIN-BED MGT-SIDERTS w/ 15% IRREG. WHITE CHERT BANDS / CLASTS												
				GH 1713-1737 THIN, THICK-BED, IRREG-BED + MOTTLED GRANULAR CHERT BEDS w/ WAVY TO IRREG. MGT-RICH-BANDS (SIDERTIC)												
				I 1737-1738 I PARTIALLY OX MGT-RICH BAND												
				I 1738-1746 I MEMBER = w/ STROMATOLITES + INTRAFORMATIONAL CONGL.												
				J 1746-1784 WAVY-BEDD, GREENISH GRANULAR CHERT w/ IRREG. MAGNETIC + SIDERTS BANDS; THICK-BED - LOCALLY MOTTLED + VERY LOCALLY w/ SIDERTS, MGT, +												
				K 1784-1798 THICK-BED GRAY ± GREEN GRANULAR CHERT w/ DISSEM. MGT (UNEVEN DISTRIBUTION) THAT CHERTY-JASPERY CLASTS (UPS)												
				K OCCASIONALLY FORMS CRUDS IRREG. + THIN BEDS, CHERT												
				@ 1789-1798 w/ IRREG-LENSOIDAL MGT BEDS (<2mm), SIDERTS BEDS (<2cm) + RARE INTRAFORMATIONAL CLASTS												
				? 1798-1801 1/2 THIN-BED (EVEN) BROWN SID-MGT BANDS w/ SCATTERED CHERT BEDS UP TO 4" THICK												
				@ 1799 1/2 (3") + 1801 (2" + 3") = ONCOLITIC CHERT w/ RND OVIDS + DISK-LIKE CLASTS (<3mm) OF RED (JASPER), WHITE + BLACK CHERT FRAGS												
				L 1801 1/2-1804 MED BDD, GRANULAR CHERT + WKLY WAVY MGT BEDS (<6" EACH)												
				? 1804-1811 GRAN. CHERT (w/ HEN + JASPER CLASTS - ONLY A FEW AT A TIME) + IRREG-BED + DISSEM MGT												
				M? 1811-1821 THIN-BED, RED, SLATY TACONITE w/ MINOR GRAN. CHERT BEDS (<2") - MAGNETIC!												
				@ 1813.2-1813.8 CHL - GREEN ZONE w/ SLICKS (STILL MAGNETIC)												
				@ 1820 4" QTZ VEIN DOWN CORE AXIS (AT LEAST 2" THICK)												
				N? 1821-1825 THIN-BED (EVEN) MOD. GREEN SLATY TACONITE w/ SCATTERED GRAN. WHITE CHERT (<4") + JASPER (<1") BANDS												
				N? 1825-1839 " " " " " " " " w/ RARE THIN CHERT BEDS												
				O 1839-1875 MOD-BDD (1cm to 8" - CHERT) GRAN CHERT (THICK-BED ± INTRAFORM. CLASTS) + GREEN THIN BDD (EVEN TO FLASER TO WKLY WAVY TACONITE												
				JASPERY INTRAFORM. CONG. / ONCOLITE ZONES @ 1844 (2"), 1859 --- 1859 1/2 (SEVERAL) + ~ 1873 (2") - IN DROPPED BOX.												
				CONVULSED / SLUMPED BDD @ 1839-1839 1/2 (POSSIBLY SOME LOCAL FEATURES)												

BECAUSE OF SOME MIXING OF CORE, + RUN BLOCKS, THESE FOOTAGES ARE APPROX.

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Page 6 Of 6

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Date: 4-29-99

footage				rock type and description	%	%	%	FT	BDD	CLEARV	CLEARV	fractures/ ETC.	alteration/ comments
From	to	ft	rec										
				(1623-2219 BIF CONTINUED)									
			S	2064-2090 WAVY TO IRREG. BDD MGT, W/ ^{TO LOCALLY} MOD SIDERITE MOTTLING (AS ABOVE), LIGHT-GRN TO BRN SPECIFIED CHERTY TACONITE									
			T	2090-2098 WAVY TO IRREG BDD TO MOTTL'D MGT ± SIDERITES (DECR ↓) MOD-THICK BDD CHERTY TACONITE									
			T?	2098-2166 MOD-THICK, WEAKLY-WAVY TO ^{HIGHLY} IRREGULAR (± INFURCATIONS), GREEN, GRANULAR CHERTY IF ((STYLOLITES)). 2166-2197 AS ABOVE BUT W/ ± SIDERITE MOTTLES									
				↖ From G.B. MOREY'S LOC. <div>NO CORJ 2193.5-2202!</div> 2197-2202 ↓ ALSO A UNIT ON MORSEY'S LOC.									
			U	2202-2211 MOD-THICK BEDDED (EVEN TO SLIGHTLY WAVY) GRANULAR ± CARBONATE CHERT W/ MGT-RICH THIN-BDD SETS (UP TO 1") WITH HEMATITOUS BEDS (BECOME MORE ^{COMMON} DEEPER IN)									
			V?	@ 2210-2211' DEPTH) @ : 2204-2204½, 2206-2207, 2208-2208½, 2210-2210.8									
			W	2211-2219 GRANULAR ONCOLYTIC (JASPER OVIDS < 0.7mm) CHERT W/ SCATTERED RED HEMATITE BDD SETS (THIN-BDD INTERNALLY; < 1" THICK) @ 2218-2219 MAGNETIC GREEN THIN-BDD TAC. INTBDS									
2219	2270			POKEQUA QTZITE - DK GRAY, MASSIVE, FN-MED-GRN RND QTZ GRAINS IN A GREENISH (CHLORITIC) MATRIX/CEMENT @ 2224 - TWO RED BEDS @ 2224-2234 W/ SCATTERED PALE RED-HEMATITIC + GREEN-CHLORITIC RIP-UPS @ 2232 " WHITE CHERT BDD W/ ALGAL STRUCTURES - HEAVILY SAMPLED ① ← @ 2257½-2263 MORE QTZ GRAINS, LESS CHL + CS-GRN W/ DEPTH/V. CS IN LAST 2" W/ ^{RND} CHL-FRASS (+VUGS) ② ← @ 2263-2264 CHL. MUDSTONE @ 2267-2270 V. CS-GRN W/ 10% PINK K-SPAR GRAINS.									RARE STYLOLITES ↓ MORE COMMON W/ DEPTH
				EOH = 2270'									