

DRILL HOLE RECORD

Drill Hole No.: MDDH-3 Inclination: 72° N25EDate: Started 10/18/1976, completed 10/22/1976Property: Fancy HillDrilled By: Sprague & Henwood - Bill Deininger

Co-ordinates: North _____ East _____

Logged By: Les Farrington

Elevation: _____

Total Depth: 135'

DEPTH		SAMPLE RECOVERY	SAMPLE NUMBER	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO			Sp. Gr.	BaSO4	Cond.	
							Interbedded sandstone, sandy shale, shale, and claystone. Sandstone is fine grained, micaceous, and lt. to dk. gray in color. Med. to dk. gray micaceous sandy shale and dk. gray to black shales are thinly laminated (<.01'). Shale lenses (.01'- 1.2', generally less than .5' wide) are irregularly spaced except as noted. Disseminated pyrite is pervasive in most members and is observed locally in heavy concentrations along bedding planes, between contacts, and surrounding or mostly comprising spherical and elongate nodules within the members as noted. Barite partially to completely replaces carbon (?) rich spherical and vermicular nodules (ama .04' diam.) and nodular lenses (ama .8' wide, mostly within sandy shale lenses) in the interbedded sandy shale and shale members. Locally, barite, massive in texture, is observed in widths in excess of 1'. Lower estimated percentages generally reflect larger amounts of unreplaced sandy shale/shale in the interval.
NOTE: 5/12/77 MINERAL REFERRED TO AS SCORODITE IS CHALDRITE							
"CARBON" IS INCLUSIONS OR DISCOLORATION OF CRYSTALLINE MATERIAL							
0.0	5.0	16%					Alluvium; chert and iron stained sandstone.
							11/70

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
5.0	8.5	0%					
8.5	10.0	46%		.6'			Alluvium; chert
				.1'			Lt. gray sandy shale, altered to clay and stained orange by iron oxides.
10.0	13.0	70%		1.0'			Lt. to med. gray sandy shale, altered to clay and stained orange by iron oxides.
				1.5'			Med. gray shale with black shale clasts (ama .02' wide). Heavily iron stained along bedding planes.
13.0	15.5	14%		.3'			Dk. gray sandy shale, altered to clay.
15.5	16.5	30%		.3'			Med. gray clay containing clasts of chert and iron stained sandstone. Fault gouge (?).
16.5	22.0	42%		2.0'			Med. gray sandy shale, partially altered to clay. Heavily iron stained along bedding.
				.3'			Med. gray sandy shale, partially altered to clay, with interbedded lt. gray sandstone, stained dk. orange by iron oxides.

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
22.0	31.0	29%		2.6'			Interbedded med. gray sandy shale and shale; sandy shale partially altered to clay. Heavy iron staining along bedding planes.
31.0	35.0	88%		3.5'			Med. to dk. gray sandy shale with black shale lenses (ama .15' wide). Contains scattered spherical and enlongate nodules (ama .01' diam.) partially replaced by barite. Closely spaced, heavily iron stained fractures.
35.0	42.0	21%		1.5'			Med. to dk. gray sandy shale with black shale lenses (ama .26' wide). Contains spherical nodules and nodular lenses (ama .01' diam./wide) partially replaced by barite. Very closely spaced, heavily iron stained fractures.
42.0	46.0	88%		1.5'			Med. to dk. gray sandy shale with black shale lenses (ama .08' wide). Contains spherical nodules and nodular lenses (ama .01' diam./wide)

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FROM	TO			Sp. Gr.	BaSO ₄	Cond.	
42.0	46.0						partially replaced by barite. Core very broken and locally very friable.
				2.0'			Interbedded med. to dk. gray and black shales with lenses (ama .02' wide) med. gray sandy shale. Banded appearance. Core very broken and locally friable. Closely spaced, unmineralized fractures.
46.0	52.0	92%		4.7'			Interbedded med. to dk gray and black shales with lenses med. gray sandy shale. Banded appearance. Contain scattered spherical and elongate carbon or pyrite rich nodules (ama .03' diam.). Closely spaced, unmineralized fractures. Very closely spaced, lt. yellow, limonite stained clay ^{barite} filled fractures (density ama 7/ft., mostly subparallel to bedding).
				.8'			Med. to dk. gray sandy shale with lenses med. gray sandstone (ss lenses ama .03'). Very closely spaced, lt. yellow, limonite stained clay ^{barite} filled fractures (density ama 7/ft., mostly subparallel to bedding).

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
52.0	56.0	100%		2.4'			Med. gray sandstone with irregular clasts black shale (ama .02' wide). Approx. .6' interval containing scattered carbon rich spherical nodules (ama .03' diam.).
							Closely spaced barite, carbon, quartz, limonite filled fractures (ama .01' wide). Very closely spaced limonite stained barite filled fractures
							54.0 - 54.5.
				1.6'			Med. to dk. gray sandy shale with black shale lenses. Pyrite locally heavily concentrated along bedding planes.
							Very closely spaced, unmineralized fractures.
56.0	59.0	100%		1.6'			Med. gray sandstone with sporadic clasts black shale.
							Very closely spaced, unmineralized fractures.
				1.4'			Med. to dk. gray sandy shale with lenses black shale (ama .06' wide) and lt. gray claystone (.01' - .02' wide). Banded appearance. Locally heavy concentrations of pyrite along bedding

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
56.0	59.0						planes. Contains carbon rich nodules (.01') 58.0. Very closely spaced fractures, barite and pyrite filled or unmineralized.
59.0	64.0	100%		3.2'			Med. to dk. gray sandy shale with lenses black shale (ama .1' wide), med. gray sandstone (ama .16' wide), and lt. gray claystone (ama .08' wide). Banded appearance. Contains ama 5% spherical, carbon rich nodules (≤.01' diam.). Very closely spaced, barite/barite, carbon, and pyrite filled/unmineralized fractures. Offset in bedding of .02' along fracture at 60.0.
				1.8'			Med. to dk. gray sandy shale with lenses dk. gray to black shale. Pyrite locally heavily disseminate or concentrated along bedding planes. Barite filled fracture at 62.5. Very closely spaced, unmineralized fractures.
64.0	74.0	100%		10.0'			Barite replacing nodules and nodular lenses in interbedded med. to dk. gray sandy shale and

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
64.0	74.0						black shale lenses (partially replaced black shale lenses approx. .08' wide).
							64.0 - 64.2 5%
							64.2 - 65.3 50-55%
							65.3 - 66.3 35-40%
							66.3 - 66.9 40-45%
							66.9 - 68.0 15-20%
							68.0 - 70.2 45-55%
							70.2 - 70.6 25-30%
							70.6 - 70.9 50-55%
							70.9 - 71.9 35-45%
							71.9 - 72.4 65-70%
							72.4 - 73.3 30-40%
							73.3 - 74.1 70-75%
							Very closely spaced, barite crystal lined fractures. Offset in bedding of approx. .01' along fracture at 74.0. Brecciated clasts, replaced by barite, 72.0 - 72.5.
74.0	79.0	100%		5.0'			Barite replacing nodules (approx. .08' diam.) and

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FROM	TO			Sp. Gr.	BaSO ₄	Cond.	
74.0	79.0						nodular lenses in med. to dk. gray sandy shale with black shale lenses (ama. 1' wide).
							74.1 - 75.5 40-50%
							75.5 - 76.4 55-60%
							76.4 - 76.9 45-55%
							76.9 - 78.3 40-45%
							78.3 - 78.5 10-15%
							78.5 - 79.0 35-45%
							Very closely spaced, barite crystal lined fractures.
79.0	82.5	97%		3.4'			Barite replacing nodules and nodular lenses in med. to dk. gray sandy shale with black shale lenses.
							79.0 - 79.6 50-55%
							79.6 - 82.3 40-45%
							82.3 - 82.4 black claystone
							82.4 - 82.5 core loss
							Core very friable 79.5 - 81.0. Shale stained purple by iron oxides 80.5 - 82.0.

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FROM	TO			Sp. Gr.	BaSO ₄	Cond.	
79.0	82.5						Very closely spaced, barite crystal lined fractures
82.5	85.5	93%		2.8'			Barite replacing nodules and nodular lenses in med. to dk. gray sandy shale with black shale lenses.
							82.5 - 82.7 core loss
							82.7 - 83.5 75-80%
							83.5 - 83.9 35-45%
							83.9 - 84.7 50-60%
							84.7 - 85.5 45-50%
							Core very friable 85.0 - 85.5. Shale locally stained purple by iron oxides.
							Very closely spaced, iron stained, barite crystal lined fractures. Offset in bedding along fracture of .03' at 83.5.
85.5	87.5	100%		2.0'			Barite replacing nodules and nodular lenses in med. to dk. gray sandy shale with black shale lenses (ama .07' wide).
							85.5 - 86.1 30-40%

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
85.5	87.5						86.1 - 86.9 70-80%
							86.9 - 87.3 45-55%
							87.3 - 87.5 70-80%
							Very closely spaced, barite crystal lined fractures
87.5	89.5	100%		2.0'			Barite replacing nodules and nodular lenses in
							med. to dk. gray sandy shale with black shale
							lenses (ama .05' wide).
							87.5 - 89.0 50-60%
							89.0 - 89.5 35-40%
							Core very friable 89.0 - 89.5.
							Very closely spaced, barite crystal lined fractures
89.5	93.0	80%		2.7'			Barite replacing nodules and nodular lenses in
							med. to dk. gray sandy shale with black shale
							lenses (ama .02' wide).
					89.5 - 90.2		.3' 15-20%
							core loss interval (?)
							.4' 40-50%
							core loss interval

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FROM	TO			Sp. Gr.	BaSO ₄	Cond.	
89.5	93.0						1.0' 60-70%
							Very closely spaced, iron stained, barite crystal lined fractures. Offset in bedding of approx .01' along one of fractures.
							.6' 15-20%
							.4' 70-80%
				2.5'			
93.0	95.5	80%		2.0'			Barite replacing nodules and nodular lenses in med. to dk. gray sandy shale with black shale lenses. Shale locally stained purple by iron oxide
							1.5' 75-85%
					94.5-95		0.5' core loss interval
							.5' 60-70%
							Very closely spaced, iron stained, barite crystal lined fractures. Carbon filled fracture (.01' wide) at 95.0.
95.5	99.0	68%		2.7'			Barite replacing nodules and nodular lenses in med. to dk. gray sandy shale with black shale lenses (and .02' wide).

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
95.5	99.0						.6' 55-65%
					96.9	77.7	0.8 core loss interval
							.8' 50-60%
							.4' 40-45% Very friable.
							.7' 50-60%
							.2' black shale, very friable.
							Very closely spaced, barite crystal lined fractures
							Preminalization (?) fault contact observable
							95.5 - 101.5 (?).
99.0	104.0	60%		3.0'			Barite replacing nodules and nodular lenses in
							med. to dk. gray sandy shale with black shale
							lenses. Shale locally stained purple by iron
							oxides.
							2.2' 55-65%
					101.2	103.2	2.0 core loss interval
							.4' dk. gray claystone
							.4' 30-35% very friable
							Very closely spaced, barite crystal lined fractures

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
104.0	108.0	63%		2.5'			Barite replacing nodules and nodular lenses in med. to dk. gray sandy shale with black shale lenses.
							.5' 45-55%
					104.5-106.0		1.5' core loss interval
							.2' 25-30% very friable
							1.2' 75-85% brecciated clasts ama .04' x .1' core loss interval
							.6' 10-15%
							Very closely spaced, barite crystal lined fractures
108.0	113.5	38%		.9'			Barite replacing nodules and nodular lenses in med to dk. gray sandy shale with black shale lenses.
							.2' 40-45%
							core loss interval
							.2' black shale
							.5' 15-20%
				1.2'			Interbedded lt. to med. to dk. gray and black shale (black shale lenses ama .04' wide).

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FROM	TO			Sp. Gr.	BaSO ₄	Cond.	
113.5	117.5	100%		2.2'			Med. to dk. gray sandy shale with black shale lenses (ama .15' wide). Contains carbon rich nodules (ama .02' diam.) partially replaced by barite.
							113.5 - 113.7 black shale
							113.7 - 114.4 10-20%
							114.4 - 114.9 black shale. Very closely spaced unmineralized fractures.
							114.9 - 115.4 5%. Heavy concentrations of pyrite disseminated, rimming nodules, and along bedding planes.
							Very closely spaced, barite crystal lined fractures
				1.8'			Interbedded med. to dk. gray and black shales (black shale lenses ama .04' wide). Contains scattered carbon rich nodules (ama .04' diam.) and nodular lenses (ama .01' wide) partially replaced by barite or pyrite filled. Locally heavy concentrations of pyrite along bedding.
							Closely spaced, unmineralized fractures.

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FROM	TO			Sp. Gr.	BaSO ₄	Cond.	
117.5	123.5	55%		3.3'			Interbedded dk. gray to black shales (black lenses ama .6' wide) with lenses (ama .13' wide) med. to dk gray sandy shale. Contains scattered nodules (ama .03' diam.) partially replaced by barite ($\leq 2\%$) or pyrite filled. Heavy concentrations of pyrite locally along bedding planes or disseminated Very closely spaced, unmineralized fractures.
123.5	126.5	87%		2.6'			Interbedded med. to dk. gray and black shales (lenses .2 - .5' wide) with lenses (ama .5' wide) med. gray sandy shale. Contains scattered, carbon rich nodules (ama .03' diam.), partially replaced by barite. Sandy shale very friable. Very closely spaced, unmineralized/carbon filled fractures.
126.5	131.5	96%		4.8'			Interbedded med. to dk. gray and black shales (lenses .01' - .5' wide) with lenses med. gray sandy shale and clasts lt. gray sandy shale. Locally heavy concentrations of pyrite along

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FROM	TO			Sp. Gr.	BaSO4	Cond.	
126.5	131.5						bedding planes.
							Close to very closely spaced, barite/pyrite filled fractures.
131.5	135.0	57%		1.6'			Interbedded med. to dk. gray and black shales (lenses .01' - .5' wide). Locally heavy concentrations of pyrite along bedding planes and sporadic pyrite filled nodules (ama .04' diam.
				.4'			Med. gray chert. Vuggy. Stained purple and red by iron oxides.
							TroPari survey at 121' 73°
							explanation: fractures
							very closely spaced = <1'
							closely spaced = 1' - 3'
							Moderately closely spaced = 73'
							note: mineralized fractures are mostly sealed fractures.

SAMPLE	LOG #	DEPTH	INTERVAL	A.P. SPECIFIC GRAVITY	CALCULATED % BaSO ₄
MDDH-3					
#1	608	64.2-68.0	3.80	3.510	55.80
#2	609	68.0-71.8	3.80	3.680	65.31
#3	633	71.8-75.6	3.80	3.720	67.42
#4	610	75.6-79.4	3.80	3.780	70.50
#5	611	79.4-83.2	3.80	3.780	70.50
#6	612	83.2-87.0	3.80	3.830	72.99
#7	613	87.0-90.8	3.80	3.830	72.99
#8	614	90.8-94.6	3.80	4.040	82.80
#9	615	94.6-98.4	3.80	4.050	83.24
#10	616	98.4-102.2	3.80	4.090	84.98
#11	617	102.2-106.0	3.80	4.050	83.24
#12	618	106.0-110.0	4.0	3.770	69.99
-	-	110.0-113.7	3.7	2.761	0.00
#1A		*113.7-115.4	1.7	3.170	33.72
-	-	115.4-117.5	2.1	2.761	0.00
#2A		*117.5-126.5	<u>9.0</u>	2.840	7.24
		TOTAL	62.3		
COMPOSITE	635	MEASURED		3.790	71.0
COMPOSITE		CALCULATED		3.580	59.80
*Not included in composite measured.					