

## ARKANSAS

DRILL HOLE MH - 31

<u>DEPTH</u>	<u>DIP</u>	<u>TRUE BEARING</u>
100 '	54 1/2 N	N 15.5 E
200 '	55 N	N 22.5 E
300 '	52 N	N 27 E
380 '	51 N	N 28 E

Drill Hole No. MH-31

Date: \_\_\_\_\_

Bearing: \_\_\_\_\_ Inclination: \_\_\_\_\_

Drilled By: \_\_\_\_\_

Coordinates: North \_\_\_\_\_ East \_\_\_\_\_

Logged By: \_\_\_\_\_

Elevation: \_\_\_\_\_

Total Depth: \_\_\_\_\_

DEPTH		% RECOVERY	SAMPLE NUMBER	SAMPLE INTERVAL	ANALYSES		DESCRIPTION OF MATERIAL DRILLED
FROM	TO				Sp. Gr.	BaSO <sub>4</sub>	
368.0	371.0	95	2712	3.0'			Same as above barite.
371.0	378.0	50	2713	7.0'			Same as before, recovery was poor. Bed dip 80°S. Barite possibly higher grade? 60%.
378.0	383.0	50%					Gray shales, poorly consolidated. Weak dissiminated marcasite; fine-grained gypsum filling fractures. (
383.0	389.0						Same as above.
389.0	393.0						Gray shales, vuggs after leaching app. 3mm in dia.; carbonaceous locally; wisps of black shale; marcasite veneering fractures.
393.0	400.0						Gray shales; poorly consolidated Bed dip 70°S
400.0	405.0	90		5.5'			Gray shales; interbedded w/ black shales locally; wisps of black shale in gray shales. Gypsum filling fractures.
405.5	407.0	100%		1.5'			Arkansas Novaculite, chert fractures filled w/ marcasite.
				Bottom of Hole.			

TRAPPI  
DIP BEAR  
54N N155E  
62N N15.5E

200 55N N255E  
55N N15.5E

300 52N N24.5E  
52N N29.5E

320 51N N28.5E

Drill Hole No. MH-31

Date: 12/10/77

Bearing: N 20 E Inclination: 58°N (7)

Drilled By: Boyles Bros. Ralph Jex, Cogburn

Coordinates: North 629,460.00 East 1448,740.00

Logged By: Ferryl C. Gale & Lynn Burton

Elevation: 1131.26

Total Depth: 407.0  
Air Rotary 0.0-28.0  
Air Hammer 28.0-40.0  
Core 40.0-407.0

DEPTH		%	SAMPLE	SAMPLE	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO	RECOVERY	NUMBER	INTERVAL	Sp. Gr.	BaSO <sub>4</sub>		
0.0	5.0	0						Casing set. No sample recovered
5.0	10.0	90%	-10	5.0'				Air Rotary. Buff sandstone, tan. Iron oxide staining of individual grains. Highly weathered and oxidized zone.
10.0	15.0	90	-15	5.0'				" " " "
15.0	20.0	90	-20	5.0'				Buff sandstone grading into gray sandstone, fine grained.
20.0	25.0	90	-25	5.0'				Gray fine grained sandstone, closely spaced, very well silicified with siliceous cement. Carbon rich fracture fillings, interbedded with shale lenses 1-2 mm in width.
25.0	30.0	90	-30	5.0'				" " " "
								Began drilling with air hammer at 28.0'
								Same as above lithology
30.0	35.0							" " " "
35.0	40.0							" " " "
								Sample lost due to no circulation (water in hole)
40.0	46.0	100		6.0'				Dense fine-grained SS., gray w/ iron stain on fractures & pyrite, shale interbedded.

## DRILL HOLE LOG

Drill Hole No. MH-31  
 Bearing: N 20 E Inclination: 58°  
 Coordinates: North \_\_\_\_\_ East \_\_\_\_\_  
 Elevation: \_\_\_\_\_

Date: 12/12/77  
 Drilled By: \_\_\_\_\_  
 Logged By: \_\_\_\_\_  
 Total Depth: \_\_\_\_\_

DEPTH		% RECOVERY	SAMPLE NUMBER	SAMPLE INTERVAL	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO				Sp. Gr.	BaSO <sub>4</sub>		
46.0	49.0	100		3.0'				Dense gray sandstone, iron stain on fractures.
49.0	50.0	100		1.0'				Black shale, very carbonaceous interbedded
								w/ sandstone. bedding dip 80°N. Marcosite
								filling in fractures.
50.0	59.5	100		9.5'				Fine grained, gray sandstone with orange
								iron oxide staining along fractures, 51.0-
								51.4 heavy oxidized orange sandstone,
								iron oxide, friable, leached vugs
								Grades back into gray sandstone with
								manganese oxide filling micro fractures.
								Locally thread fractures have been filled
								with quartz. Weak Marcosite veneer on
								fracture surfaces.
59.5	70.4	100		10.9				Gray fine grained sandstone thread size
								fractures filled with qtz. Orange iron
								oxide staining along fractures. 66.0-
								66.2 sandstone appears vuggy due to
								ground water leaching. 66.2-66.3- a
								black shale bed 0.06' with small wisps of
								shale scattered through and grading into
								gray sandstone.

Drill Hole No. MH-31

Date: 12/12/77

Bearing: N 20 E Inclination: 58°

Drilled By:

Coordinates: North East

Logged By:

Elevation:

Total Depth:

DEPTH		%	SAMPLE	SAMPLE	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO	RECOVERY	NUMBER	INTERVAL	Sp. Gr.	BaSO <sub>4</sub>		
								Bedding Dip at 76°N. Bedding has a gnarled appearance. (Due to loading of the sandstone beds.)
70.4	73.7	100?		3.3				Gray fine grained sandstone, thread size fractures filled with qtz., wisps of black shale.
73.7	75.7	100		2.0				Black shale, mottled appearance due to gypsum interbedded with shale appearance of slicken sides.
75.7	83.9	100		8.2				Gray fine-grained sandstone threads of qtz. filling fractures some fractures are void giving a vuggy appearance. 80.0-81.0 fractures are rich in carbon & very vuggy or leached.
83.9	85.2			1.3				Black shale, carbon rich, fractures veneered with Marcasite.
85.2	87.3			2.1				Gray fine grained sandstone thread size fractures qtz. filled.
87.3	92.7			4.4				Black shale, carbon rich, fractures veneered with Marcasite locally lenses of sandstone. 0.05 ' interbedded with shale.



Drill Hole No. MH-31

Date: 12/18/77

Bearing: N 20 E Inclination: 58 N

Drilled By: \_\_\_\_\_

Coordinates: North \_\_\_\_\_ East \_\_\_\_\_

Logged By: \_\_\_\_\_

Elevation: \_\_\_\_\_

Total Depth: \_\_\_\_\_

DEPTH		% RECOVERY	SAMPLE NUMBER	SAMPLE INTERVAL	ANALYSES		DESCRIPTION OF MATERIAL DRILLED
FROM	TO				Sp. Gr.	BaSO <sub>4</sub>	
92.7	101.0			9.7			Gray fine grained sandstone gypsum filling thread fracture interbedded w/ 2mm width lamina of black shale. Bedding dip 76°N.
101.0	107.0			6.0'			Black shale, carbon rich, interbedded with 2 cm lamina of sandstone, fracture veneered w/ gray shales, Bedding dip 63°N.
107.0	118.0			11.0			Same as above
118.0	121.4			3.4			Gray sandstone fine grained grading into black shale.
121.4	131.3						Black shale, interbedded w/ small lamina of sandstone; carbon rich, marcasite veneer on fractures.
131.3	138.9						Gray, fine grained sandstone.
138.9	144.0						Black shale interbedded w/ lamina of sandstone, 1-2 cm in width, banded appearance or fissile bedding.
144.0	147.8						Gray fine grained sandstone. A shale lense 0.06 ft. at 146'. Bedding dip 86°N.
147.8	151.0						Black shale, interbedded w/ fine grained sandstone, fissile bedding.

Drill Hole No. MH-31

Date: 12/18/77

Bearing: N 20 E Inclination: 58 N

Drilled By:                     

Coordinates: North                      East                     

Logged By:                     

Elevation:                     

Total Depth:                     

DEPTH FROM	TO	%	SAMPLE RECOVERY	SAMPLE NUMBER	SAMPLE INTERVAL	ANALYSES		DESCRIPTION OF MATERIAL DRILLED
						Sp. Gr.	BaSO <sub>4</sub>	
151.0	152.0							Gray fine-grained sandstone.
152.0	154.6							Black shale, interbedded w/ sandstone, Marcasite along fractures.
154.6	163.9							Gray fine-grained sandstone interbedded w/ black shale. Bedding dip 90°.
163.8	165.0							Black shale w/ lenses of gray sandstone. Bedding dip 90°.
165.0	170.0							Gray fine-grained sandstone interbedded w/ lamina of shale.
170.0	181.5							Gray fine-grained sandstone, interbedded w/ small lamina of shale in thread fracture filled w/ Calcite locally. (171.3)
181.5	188.4							Gray, fine-grained sandstone, thread-like fracture have been leached giving a vuggy appearance.
188.4	189.7							Black shale, interbedded w/ sandstone, fissile bedding.
189.7	203.0							Gray, fine-grained sandstone, thread of calcite along fractures, locally inter- bedded w/ shale. (196.0-196.2) (202.7-203.0) interbedded shale is carbon rich weak to medium marcasite.

Drill Hole No. MH-31

Date: 12/18/77

Bearing: N 20 E Inclination: 58 N

Drilled By: \_\_\_\_\_

Coordinates: North \_\_\_\_\_ East \_\_\_\_\_

Logged By: \_\_\_\_\_

Elevation: \_\_\_\_\_

Total Depth: \_\_\_\_\_

DEPTH		%	SAMPLE	SAMPLE	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO	RECOVERY	NUMBER	INTERVAL	Sp. Gr.	BaSO <sub>4</sub>		
203.0	206.0							Dark gray, fine-grained sandstone, carbon along fractures, graphitic.
206.0	207.5							Black sandstone, vuggy due to leaching, blocky & broken from alteration, graphitic.
207.5	214.2							Gray, fine-grained sandstone.
214.2	225.0							Gray, fine-grained sandstone plus more leaching along fractures.
225.0	238.0	100%		13.0'				Gray fine-grained sandstone, closely spaced, (227.5 a shale bed 0.10 ft. wide; also a shale 0.05' wide at 237.5) Bed. dip 83 S.
238.0	247.0	100		11.0'				Gray fine grained sandstone closely spaced, (shale lamina at 246.9 grading into shale.
247.0	247.5	100		0.5'				Black shale, rich in carbon graphitic, and large nodules of Marcasite; grading into gray sandstone.
247.5	258.0			11.5				Gray, fine-grained sandstone closely spaced.
258.0	268.2			10.2				Gray fine-grained sandstone closely spaced. Locally has shaley & darker appearance.
268.2	270.0							Black & gray shales, interbedded w/ lamina of sandstone 2 cm in width; bed dip at contact of sandstone & shale 83°S.



Drill Hole No. MH-31

Date: 12/21/77

Bearing: N 20 E Inclination: 58°

Drilled By: \_\_\_\_\_

Coordinates: North \_\_\_\_\_ East \_\_\_\_\_

Logged By: \_\_\_\_\_

Elevation: \_\_\_\_\_

Total Depth: \_\_\_\_\_

DEPTH		% RECOVERY	SAMPLE NUMBER	SAMPLE INTERVAL	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO				Sp. Gr.	BaSO <sub>4</sub>		
270.0	271.4			1.4'				Dark gray shales grading into sandstone.
								Wisps of black shale fragments interbedded w/ sandstone.
271.4	278.5			7.1'				Gray fine grained sandstone gypsum filling thread fractures.
278.5	281.0							Gray & black sandy shale. Bedding dip at contact 80°S; graphitic; carbon rich.
281.0	291.0							Gray to black sandstone interbedded w/ wisps of black shale fragments.
291.0	291.8			0.8'				Gray sandstone, closely spaced.
291.8	296.8			5.0'				Gray to black shales interbedded w/ fine-grained gray sandstone locally; wisps of black shale fragments scattered through sandstone. Black carbon rich shales fractures veneered w/ marcasite.
296.8	303.5	100	2702	7.3				Gray fine-grained sandstone, interbedded w/ shales, banded appearance.
303.5	305.5							Same as above.
305.5	311.0							Gray sandstone; fine-grained close spaced.
311.0	311.3							Black sandstone, rich in carbon graphitic.

## DRILL HOLE LOG

Drill Hole No. MH-31

Date: 12/21/77

Bearing: N 20 E Inclination: 58°

Drilled By: \_\_\_\_\_

Coordinates: North \_\_\_\_\_ East \_\_\_\_\_

Logged By: \_\_\_\_\_

Elevation: \_\_\_\_\_

Total Depth: \_\_\_\_\_

DEPTH		%	SAMPLE	SAMPLE	ANALYSES			DESCRIPTION OF MATERIAL DRILLED
FROM	TO	RECOVERY	NUMBER	INTERVAL	Sp. Gr.	BaSO <sub>4</sub>		
311.3	312.8							Gray fine-grained sandstone closely spaced.
312.8	315.0							Black shales interbedded w/ gray sandstone, dip on contact of bedding 64°S; shales grade into gray sandstone.
315.0	320.0							Black shales interbedded w/ sand. Fault at 317.0 fractured, brecciated.
320.0	322.0							Gray sandstone fine-grained, closely spaced.
322.0	323.5		2702	1.5'				Barite zone, low grade, app. 20%, scattered barite nodules in gray and black shale.
323.0	325.0	100%	2703	2.0'				Barite zone, low to med. grade app. 30-40%. Banded in appearance w/ small lamina of barite interbedded w/ shale. Bed dip 78°S.
325.0	326.0	100	2704	1.0'				Medium grade barite app. 40-50% nodules 2-3cm. banded. Bed dip 76°S.
326.0	327	90	2705	1.0'				Low grade Barite, interbedded w/ shale, large nodules of Marcasite (2cm)
327.0	328.5	100	2706	1.5'				Low-Med grade app. 40% barite elongated nodules, elongated w/ bedding, bed dip 76°S.
328.5	333.0	80%	2707	4.5'				Low grade, scattered Barite nodules app. 10% interbedded w/ black & gray shales.

Drill Hole No. MH-31

Date: 1/3/78

Bearing: N 20E Inclination: 58°

Drilled By: Boyles Bros.

Coordinates: North East

Logged By: FCG

Elevation:

Total Depth:

DEPTH		% RECOVERY	SAMPLE NUMBER	SAMPLE INTERVAL	ANALYSES		DESCRIPTION OF MATERIAL DRILLED
FROM	TO				Sp. Gr.	BaSO <sub>4</sub>	
333.0	334.0	90%	2708	1.0'			Low grade scattered barite nodules interbedded silty gray shales, and black shales.
334.0	335.4	95	2709	1.4'			Low grade Barite <10% interbedded w/ silty gray shales, and black shales.
335.4	337.5	95		2.1'			Interbedded gray & black shale silty locally; predominantly gray down hole.
337.5	353.0	80%		15.3'			Gray shales, interbedded w/ gnarled black shale lamina. 1-2cm, silty locally. Bed dip 89°S.
353.0	361.0	95%					Gray shales, interbedded w/ gray-black shales. Fractures filled w/ powder gypsum; silty locally. Bedding dip 89°S., wisps of black shale locally.
361.0	362.0	90%					Black shale, carbonaceous disseminated marcasite; bedding slicken sides (minor movement)
362.0	365.0	95%	2710	3.0'			Barite contact, low to med. grade. app. 40% Barite, interbedded w/ gray shales; banded appearance, porous appearance or leached.
365.0	368.0	95%	2711	3.0'			Barite low to med. grade; app. 50% barite; banded appearance; somewhat broken up. Bed dip. 68°S.

# Samples sent to Houston

MH-31:

<u>Sample</u>	<u>Footage</u>	<u>Specific Gravity</u>	<u>% BaSO<sub>4</sub></u>
MH-31-2702	322.0-323.0		
MH-31-2703	323.0-325.0		
-31-2704	325.0-326.0		
-31-2705	326.0-327.0		
-31-2706	327.0-328.5		
-31-2707	328.5-333.0		
-31-2708	333.0-334.0		
-31-2709	334.0-335.4		
-31-2710	362.0-365.0		
-31-2711	365.0-368.0		
-31-2712	368.0-371.0		
-31-2713	371.0-378.0		

INDIVIDUAL CORE ANALYSES BY INTERVALS

SAMPLE	LOG #	DEPTH	INTERVAL	A.P. SPECIFIC GRAVITY	CALCULATED % BaSO <sub>4</sub>
MDDH-31 #2702	1800	322.0-323.0	1.0	2.855	8.58
2703	1801	323.0-325.0	2.0	3.040	23.98
2704	1802	325.0-326.0	1.0	2.996	20.49
2705	1803	326.0-327.0	1.0	2.886	11.30
2706	1804	327.0-328.5	1.5	2.921	14.30
2707	1805	328.5-333.0	4.5	2.874	10.25
2708	1806	333.0-334.0	1.0	2.878	10.60
2709	1807	334.0-335.4	1.4	2.815	4.98
2710	1808	362.0-365.0	3.0	3.844	73.68
2711	1809	365.0-368.0	3.0	3.409	49.70
2712	1810	368.0-371.0	3.0	3.507	55.62
2713	1811	371.0-378.0	<u>7.0</u>	3.468	53.31
TOTAL 29.4					
Weighted Average				3.25	39.23