



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Wednesday, Sept. 25, 2019
PERMIT MODIFICATION APPROVAL
Horizontal 6A / New Drill

NORTHEAST NATURAL ENERGY LLC
707 VIRGINIA STREET EAST
STE 1200
CHARLESTON, WV 25301

Re: Permit Modification Approval for LEMLEY 14H
47-061-01861-00-00

Update Intermediate casing weight, thickness, burst pressure, and anticipated maximum internal pressure.

NORTHEAST NATURAL ENERGY LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: LEMLEY 14H
Farm Name: CLARENCE W. LEMLEY JR. & CHARLOTTE E. LEMLEY
U.S. WELL NUMBER: 47-061-01861-00-00
Horizontal 6A New Drill
Date Modification Issued: 09/25/2019

Promoting a healthy environment.



northeast

NATURAL ENERGY

August 13, 2019

WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Lemley Pad Modification

Dear Permit Reviewer,

Please find enclosed a permit modification request to update the casing plans on the intermediate casing string for the Lemley wells outlined below. These wells are located in Clay District, Monongalia County. Enclosed are WW-6B's with the updated changes.

- Lemley 1H - 47-061-01841
- Lemley 2H - 47-061-01850
- Lemley 3H - 47-061-01842
- Lemley 4H - 47-061-01846
- Lemley 5H - 47-061-01843
- Lemley 6H - 47-061-01847
- Lemley 7H - 47-061-01844
- Lemley 8H - 47-061-01835
- Lemley 9H - 47-061-01845
- Lemley 10H - 47-061-01860
- Lemley 12H - 47-061-01848
- Lemley 14H - 47-061-01861

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Environmental Protection

Should you have any questions please contact me at 304.212.0445 or by email at kbrooks@nne-llc.com.

Sincerely,

Kristen Brooks

Operations Analyst

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Northeast Natural Energy 494498281 Monongalia Clay Blacksville, WV
Operator ID County District Quadrangle

2) Operator's Well Number: 14H Well Pad Name: Lemley

3) Farm Name/Surface Owner: Clarence W Jr & Charlotte E Lemley Public Road Access: State Route 22

4) Elevation, current ground: 1,560' Elevation, proposed post-construction: 1540'

5) Well Type (a) Gas Oil Underground Storage

Other _____

(b) If Gas Shallow Deep

Horizontal

6) Existing Pad: Yes or No No *MDK 8/12/2019*

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus; 8,206'; 53'; 3,600 psi

8) Proposed Total Vertical Depth: 8,206'

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 19,732'

11) Proposed Horizontal Leg Length: 10,394'

12) Approximate Fresh Water Strata Depths: 50', 1,471'

13) Method to Determine Fresh Water Depths: Drillers Log from Offset Wells

14) Approximate Saltwater Depths: 2,361'; 2,511'

15) Approximate Coal Seam Depths: 501', 1,469'

16) Approximate Depth to Possible Void (coal mine, karst, other): N/A

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes No

(a) If Yes, provide Mine Info: Name: _____

Depth: _____

Seam: _____

Owner: _____

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18) CASING AND TUBING PROGRAM

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	24"	New	NA	94.71	40'	40'	GTS
Fresh Water	13-3/8"	New	J-55	54.5	1,551'	1,521'	CTS
Coal							
Intermediate	9-5/8"	New	J-55	36 ✓	2,591'	2,561'	CTS
Production	5-1/2"	New	P-110	20	19,732'	19,702'	4609 cu ft.
Tubing							
Liners							

MJK 8/12/2019

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	24"	38"	.375"	415		4,500 psi grout	NA
Fresh Water	13-3/8"	17-1/2"	.38"	2,760	2,000	Class A	1.23
Coal							
Intermediate	9-5/8"	12-1/4"	.352" ✓	3,520 ✓	2,800 ✓	Class A	1.3
Production	5-1/2"	8-3/4"	.361"	12,530	9,700	50:50 poz	1.21
Tubing	2-7/8"	NA	.217"	10,570	3,600	NA	NA
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

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19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drilling and completion of a horizontal Marcellus well. The well will be drilled on air to an approximate depth of 5,700 TVD/MD. The well will then be horizontally drilled on synthetic based mud from the KOP to approximately 8,206 TVD/19,732' MD along a 147.5° azimuth.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Multi-stage / high-rate slickwater fracture treatment using various size sands as proppant. First stage will be initiated via pressurization against a burst disc ran in the production casing string or perforated with coiled tubing. Subsequent stages will be perforated with pumped down guns ran on wireline. Individual stages will be isolated with composite frac plugs. Maximum pump rate during any stage will be 110 BPM with a maximum allowable surface pressure of 9,500 PSI. Composite bridge plugs will be set at the end of the last stage to isolate the treated formation.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 23.73

22) Area to be disturbed for well pad only, less access road (acres): 8.39

23) Describe centralizer placement for each casing string:

Surface and intermediate casing strings will have bow spring centralizers placed every third joint (~120') from the shoe joint to surface. Production casing will have rigid body centralizers placed at a minimum of every fourth joint (~160') from TD to surface.

24) Describe all cement additives associated with each cement type:

Surface string cement will be a Type 1 + Max 3% bwoc Calcium Chloride Fresh Water blend.
Intermediate string cement will be a Type 1 Cement + Max 3% bwoc Calcium Chloride + Fresh Water.
Production string cement will be (50:50) Poz (Fly Ash):Type I Cement with a gas migration additive.

25) Proposed borehole conditioning procedures:

Surface string will use a 25.0 bbls Gel Pill + LCM + 25 lbs Cello Flake + 20 lbs/bbl Bentonite @ 8.4 ppg & 10 bbls fresh water spacer prior to cement. Intermediate string will use a 25.0 bbls Gel Pill + LCM + 25 lbs Cello Flake + 20 lbs/bbl Bentonite @ 8.4 ppg & 10 bbls fresh water spacer prior to cement. Production string will use a 50.0 bbls SealBond 25 + 1 gal/bbl US-40 + 275 lbs/bbl Barite + 1 gal/bbl SS-2 Spacer @ 13.5 ppg prior to cement.

*Note: Attach additional sheets as needed.

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COMPUTERIZED MUDLOGGING SERVICE, LLC

LOCAL ROOTS – WORLD CLASS SERVICE

324 Deer Creek Drive, Struthers, Oh 44471

Office: (330) 397-5710

Mobile: (330) 506-8073

www.computerizedmudlogging.com

art@computerizedmudlogging.com

COMPANY: NORTHEAST NATURAL ENERGY

WELL: LEMLEY 14

FIELD: MARCELLUS COUNTY: MONONGALIA STATE: WV

LOCATION: LAT: 39.665146 N

LONG: 80.144298 W

Interval Logged: 60 To: _____ G.L.: 1540

Date Logged: 8/13/2019 To: _____ Spud Date: _____

Rig: DECKER Unit No.: 8

Loggers: M.HOMOLKA / M.YESKO

Api No.: 4706101861/AFE:100504

Filename: lemley_14.mlw

Geologist: BJ CARNEY

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Abbreviations

NB...New Bit	DST...Drill Stem Test
CO...Circ Out	DS...Directional Survey
NR...No Returns	CG...Connection gas
TG...Trip Gas	LAT...Logged After Trip
WOB...Wt on Bit	PP...Pump Pressure
RPM...Rev/Min	SPM...Strokes/Min
SG...Survey Gas	DTG...Down Time Gas

Mud Data

WT...Weight V...Viscosity

Lithology Symbols

	Anhydrite		Salt		Granite
	Siltstone		Chert		Sandstone
	Dolomite		Conglomerate		Limestone
	Coal		Shale		Bentonite
	Carb Shale		Granite Wash		Quartz Wash
	Red Sh		Org Sh		Green Sh
	CL 1		CL 2		CL 3
	CL 4		CL 6		Cust Sh6

Accessories

Accessories

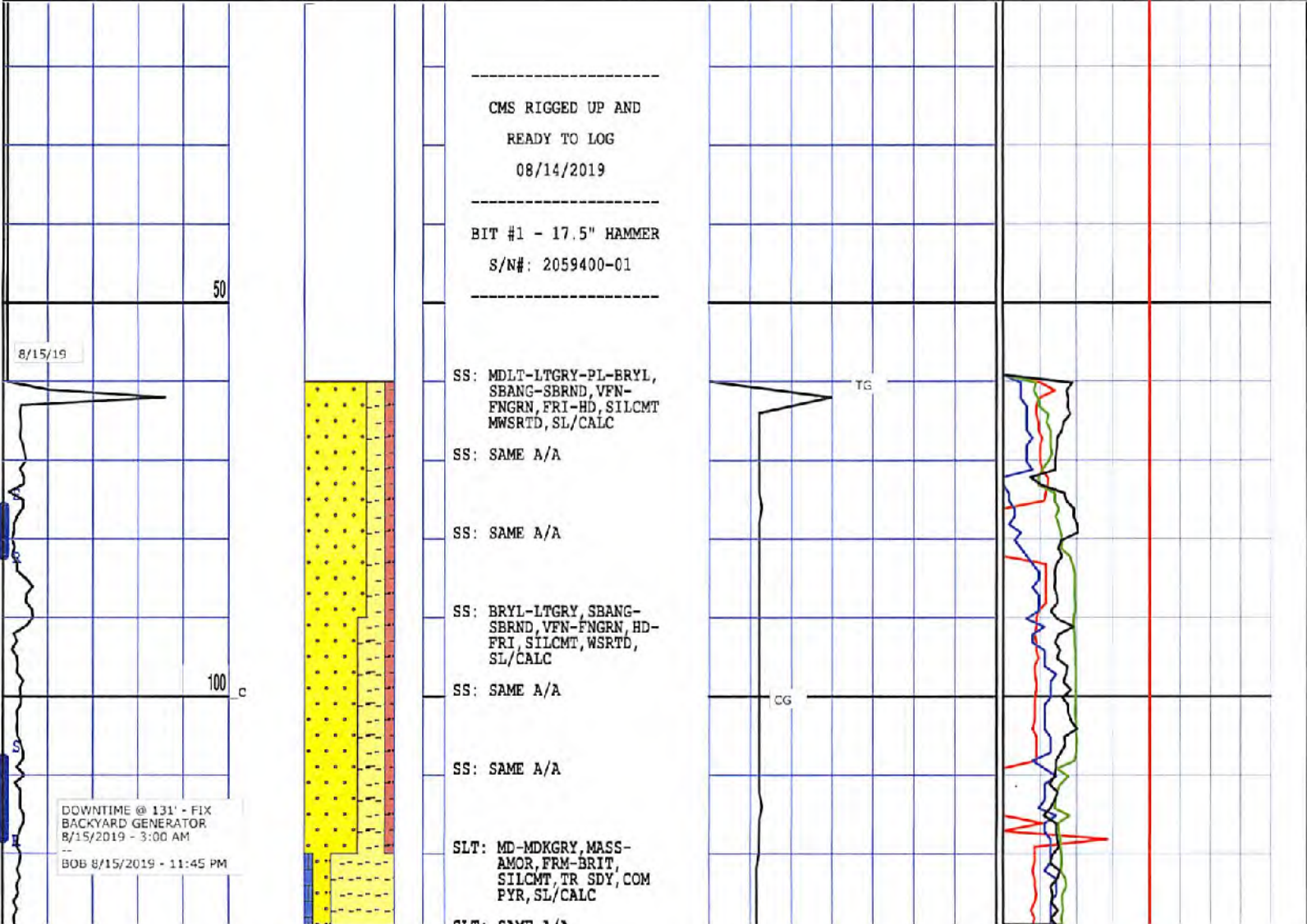
	Ammonoid		Bryzoans		Coal		Coral
	Crinoid		Forams		Fossils		Fracture
	Gastropod		Glauconite		Mollusk		Nautaloid
	Oolites		Pyrite		Radiolaria		Trilobite
	Worm Burrow						

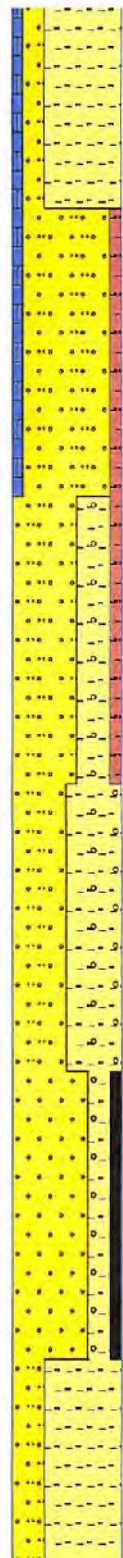
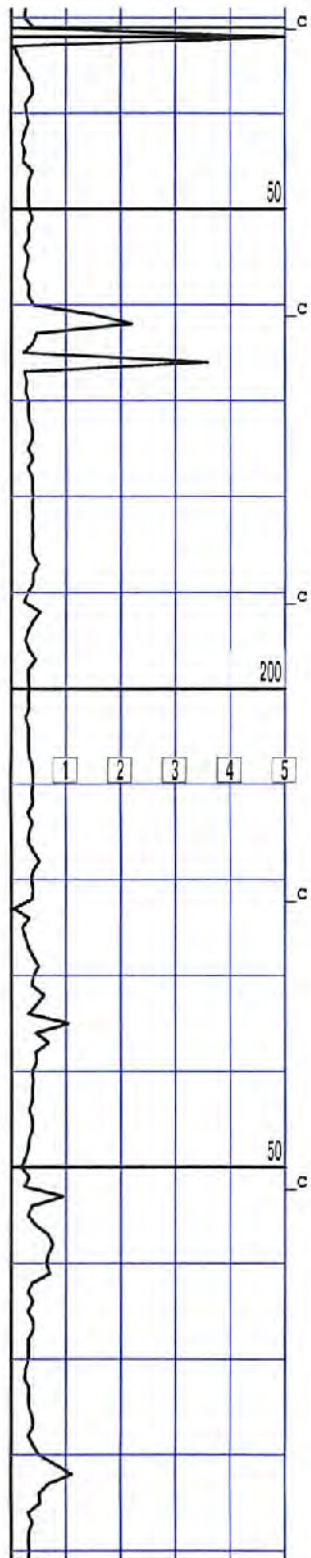
PH_Acidity
 CHL_Chlorides
 PV_Plastic Vis
 F_Filterate
 SC_Solids Content
 YP_Yield Point

Glauconite P P Pyrite Fossils Oolites
 Fractures Cement

Drilling Rate MIN/FT	Vis Por Tr / p f g	Lithology Tr / p f g	Descriptions/Remarks	DRILLING		FLARE			
				RPM	WOB	PP	TORQ	FLARE	50

GAS CURVES
 TG
 C1
 C2
 C3
 IC4
 NC4
 IC5
 NC5





SLT: SAME A/A

SS: MD-MDLTGRY-BRIYL,
RND-SBRND, FN-VFNGRN
HD, SILCMT, MSRTD, COM
MICA, SLTY IP, SL/
CALC

SS: SAME A/A

SS: SAME A/A

SS: LT-MDGRY-TR BRIYL,
SBRND, VFN-TR MDGRN,
FRM, SILCMT, MSRTD,
SLTY IP, RR PYR, SL/
CALC

SS: SAME A/A

SS: SAME A/A

SLT: LT-MDGRY, AMOR-BLKY
-MASS, FRM-SL/HD,
SILCMT, SDY, SL/CALC

SLT: SAME A/A

SLT: SAME A/A

SS: LT-MDLTGRY, SBRND-
RND, VFN-MDGRN, FRM-
HD, SILCMT, M-PSRTD,
TR PYR, CALC, 10% CO

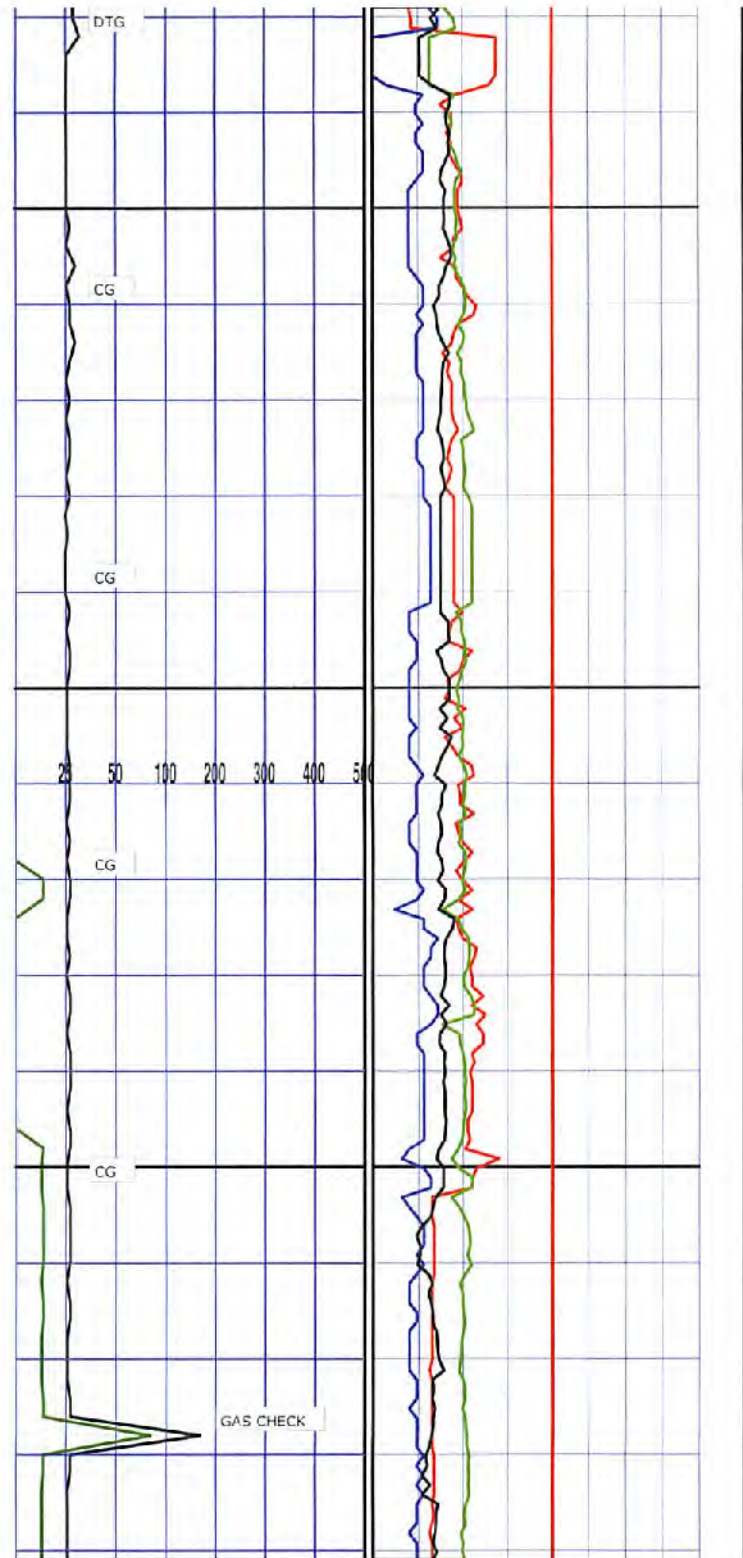
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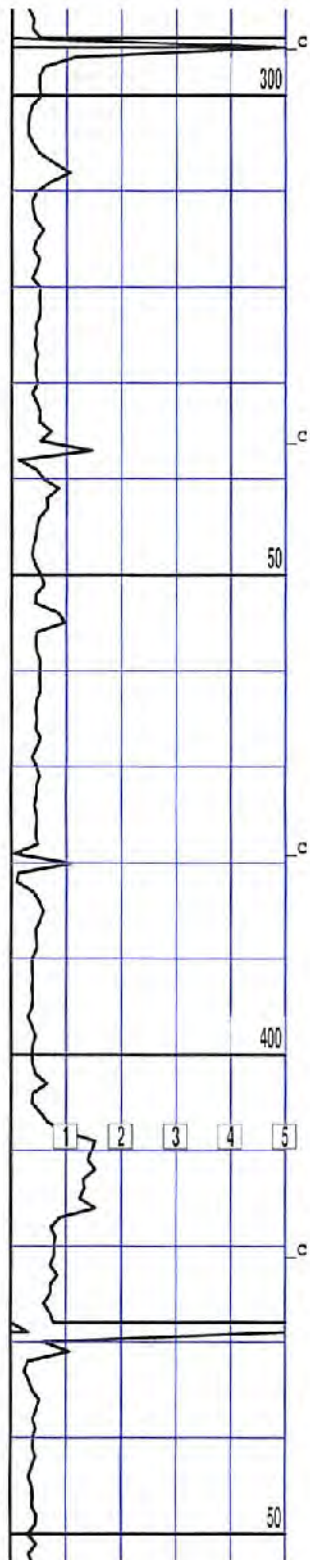
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SLT: LT-MDGRY, AMOR-MASS
FRM, SILCMT, TR SDY,
TR PYR, SL/CALC

SLT: SAME A/A

SLT: SAME A/A





SLT: MDLTGRY, AMOR-MASS,
FRM-SL/HD, SILCMT,
SDY, TR MICA, TR PYR
SL/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: LT-MDLT-RR DKGRY,
AMOR-MASS, FRM-SL/
HD, SILCMT, SDY, COM
PYR, TR MICA, SL/
CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: LT-MDGRY-TR RDGRY,
MASS-AMOR, BRIT-FRM
CALCMT, SDY, COM PYR
V/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: MDLTGRY, MASS-AMOR,
BRIT-FRM, CALCCMT,
ABNT PYR, SDY, CALC

SLT: SAME A/A

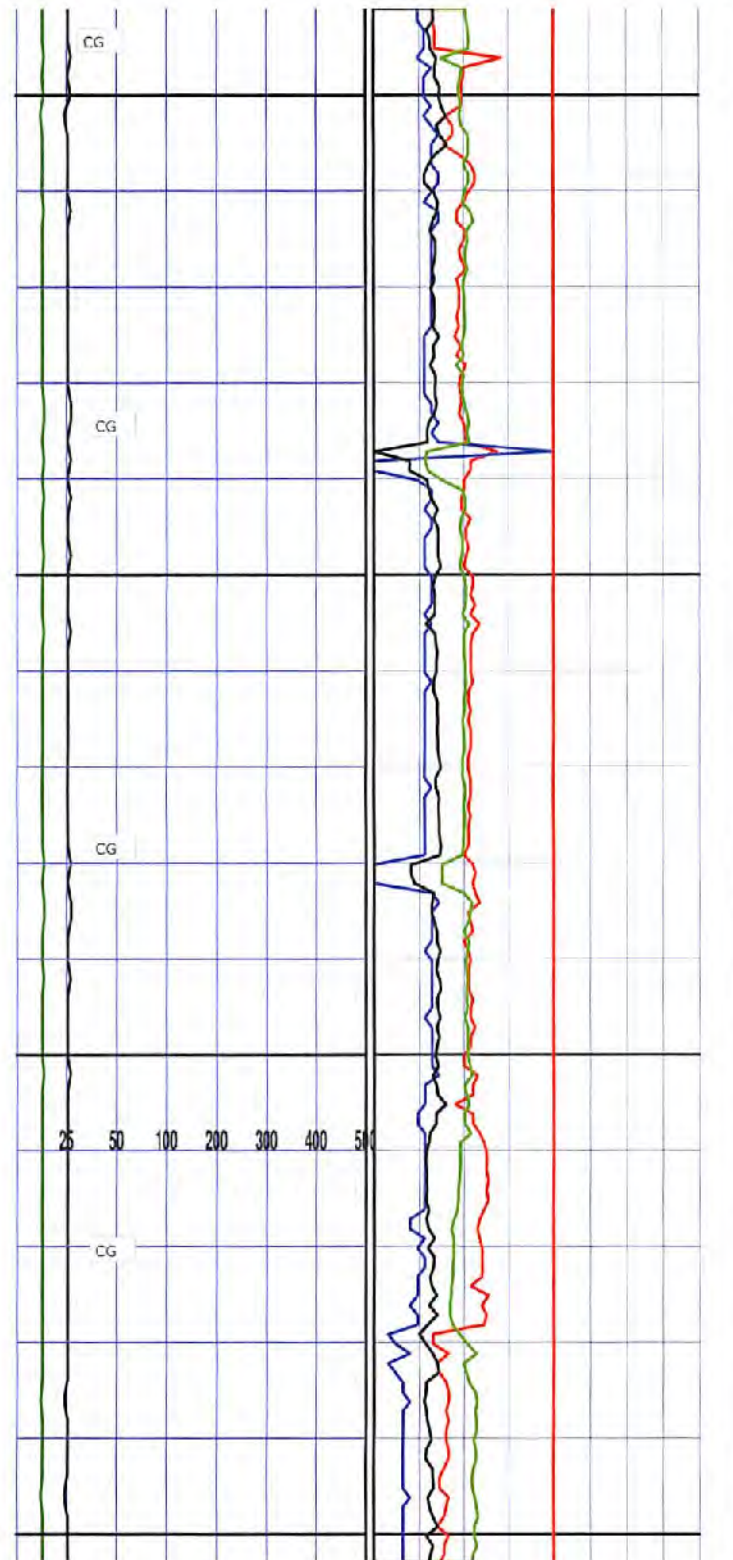
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SERND, VFN-MDGRN, FRI-
FRM, SILCMT, W-PSRTD
ABNT MICA, COM PYR,
SL/CALC

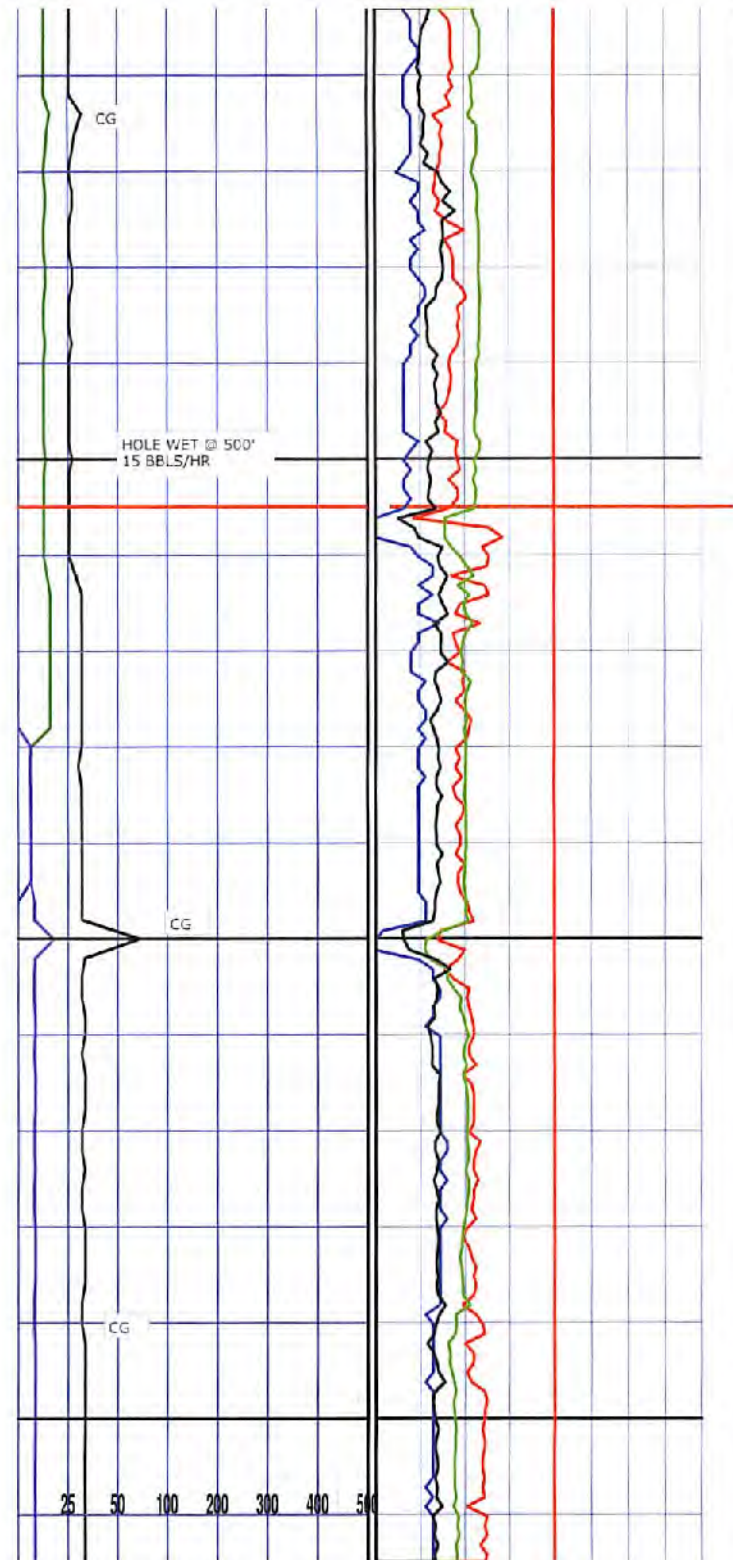
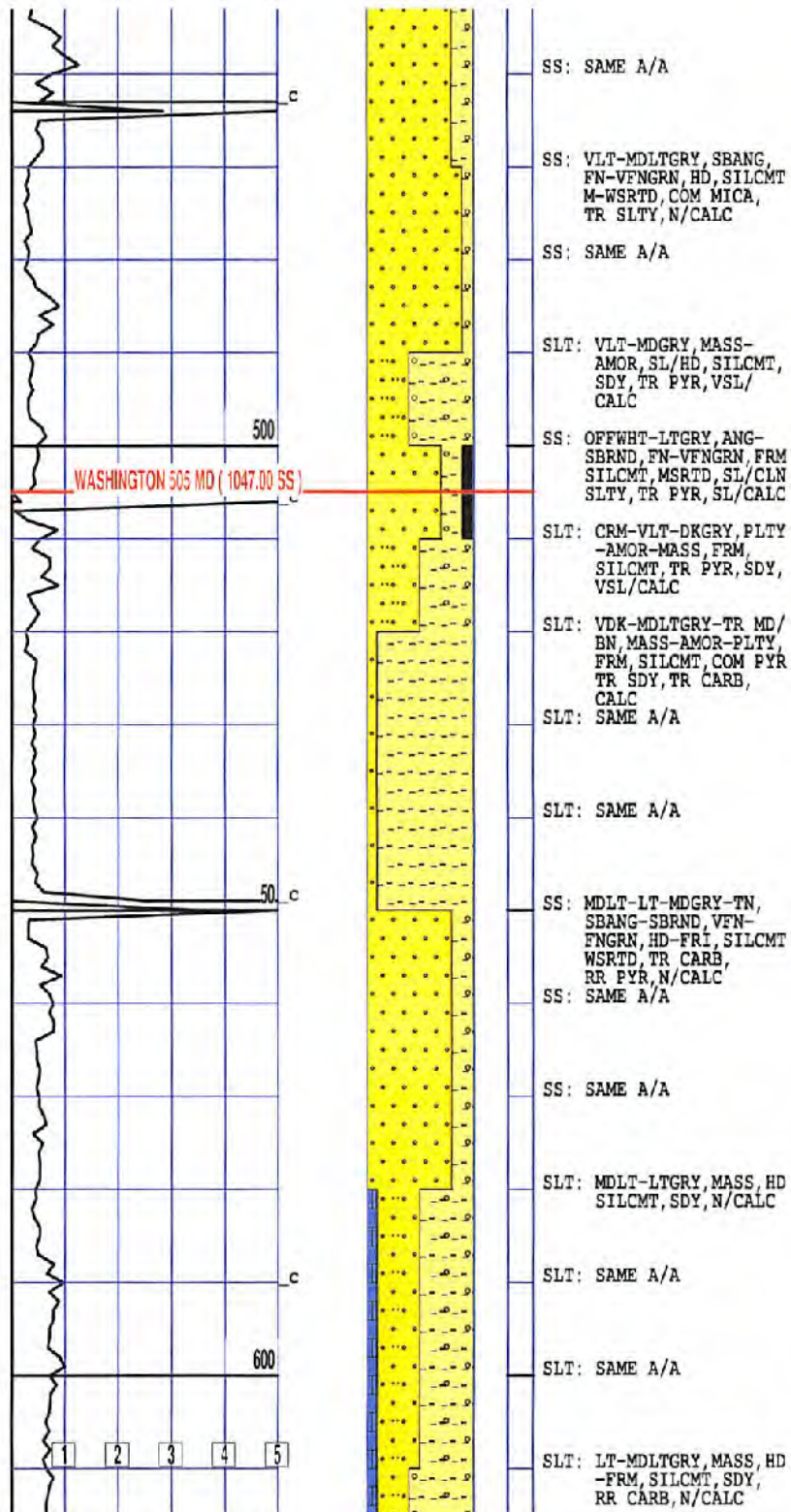
SS: OFFWHT-MDLTGRY, SB/
RND-SBANG, MD-VFNGRN
M-WSRTD, FRM, SILCMT,
TR SLTY, TR CLN, COM
PYR, VSL/CALC

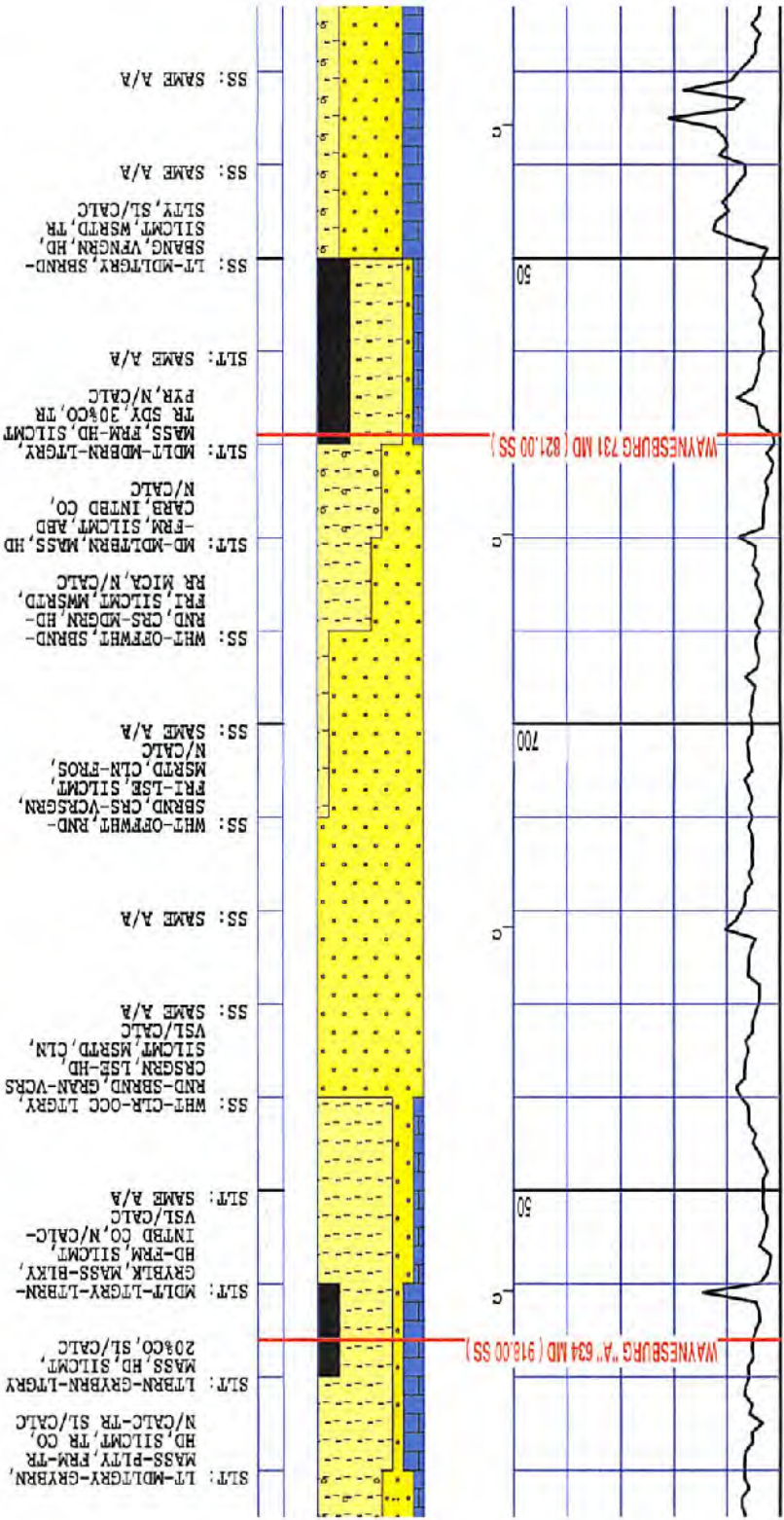
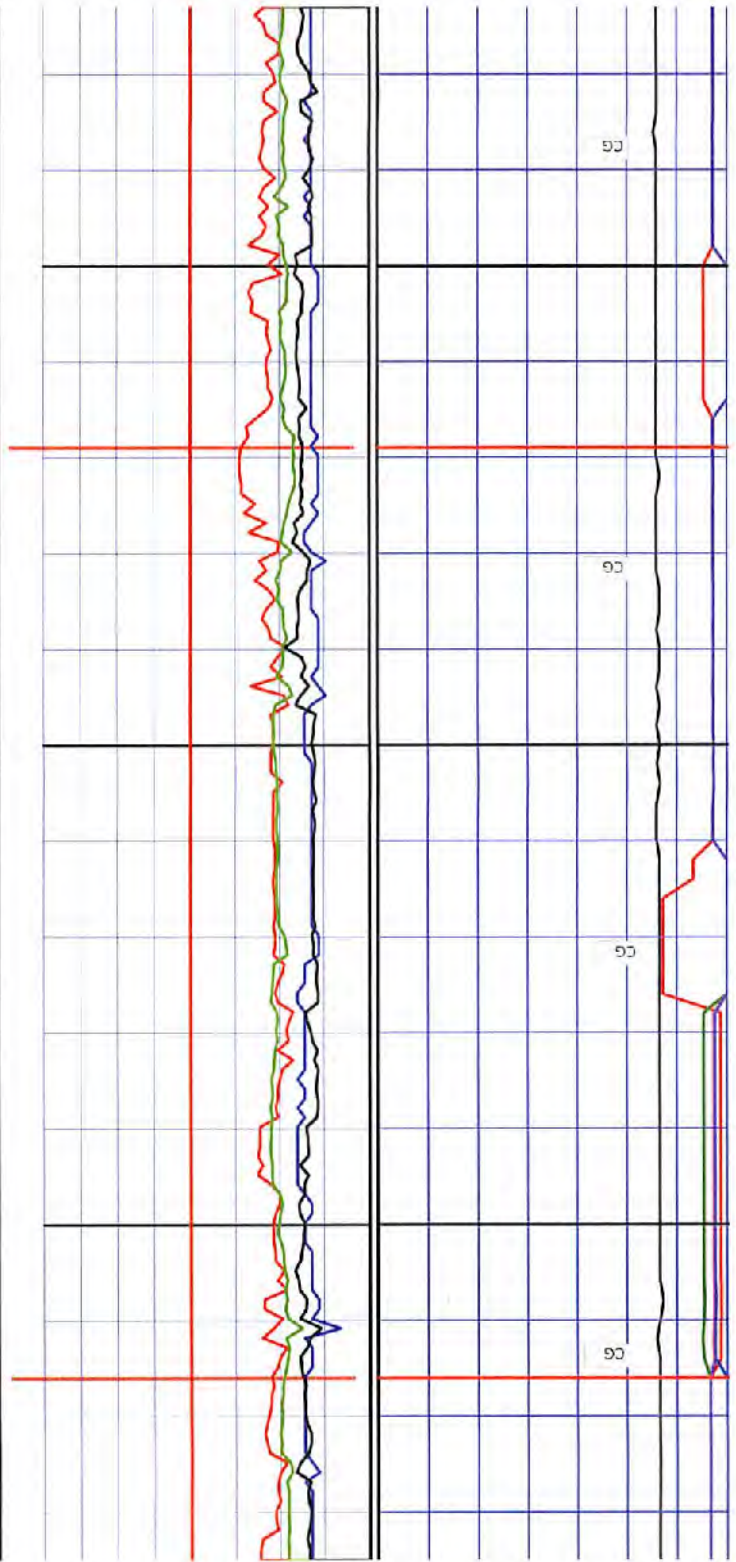
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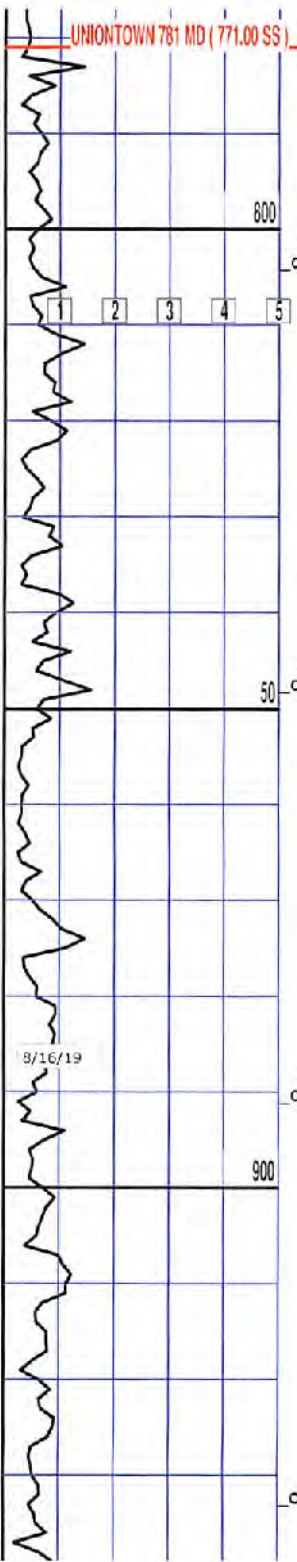
SS: OFFWHT-MDGRY, SBRND,
VFN-MDGRN, FRM, SIL/
CMT, P-WSRTD, RR CLN,
TR SLTY, TR MICA, TR
PYR, SL/CALC

SS: SAME A/A









SS: LT-MDLTGRY-LTBRN,
SBANG-SBRND,VFN-
FNGRN,HD,SILCMT,
WSRTD,TR CO,SL/CALC

SLT: MDLT-MDGRY-MDBRN,
MASS,HD-FRM,SILCMT
SL/CALC

SLT: SAME A/A

SLT: SAME A/A

SS: LTGRY,SBRND-SBANG,
FN-VFNGRN,HD,SILCMT
WSRTD,SL/CALC

SS: SAME A/A

SS: SAME A/A

SLT: MD-MDLT-DKGRY-BRN,
MASS,FRM-HD,SILCMT
TR SDY,RR PYR,
SL/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: GNSHGRY-LTGRY,MASS
HD-FRM,SILCMT,SDY,
SL/CALC

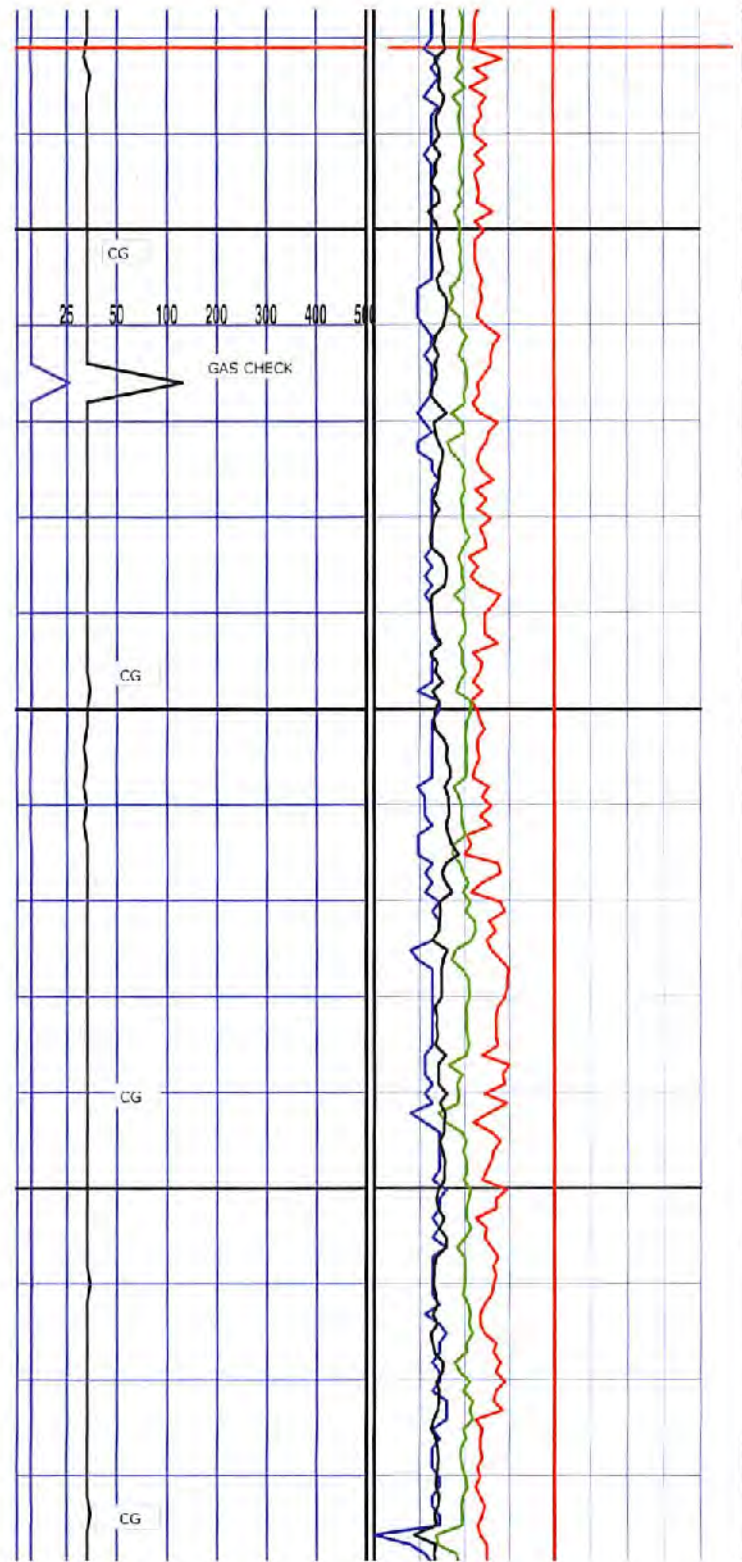
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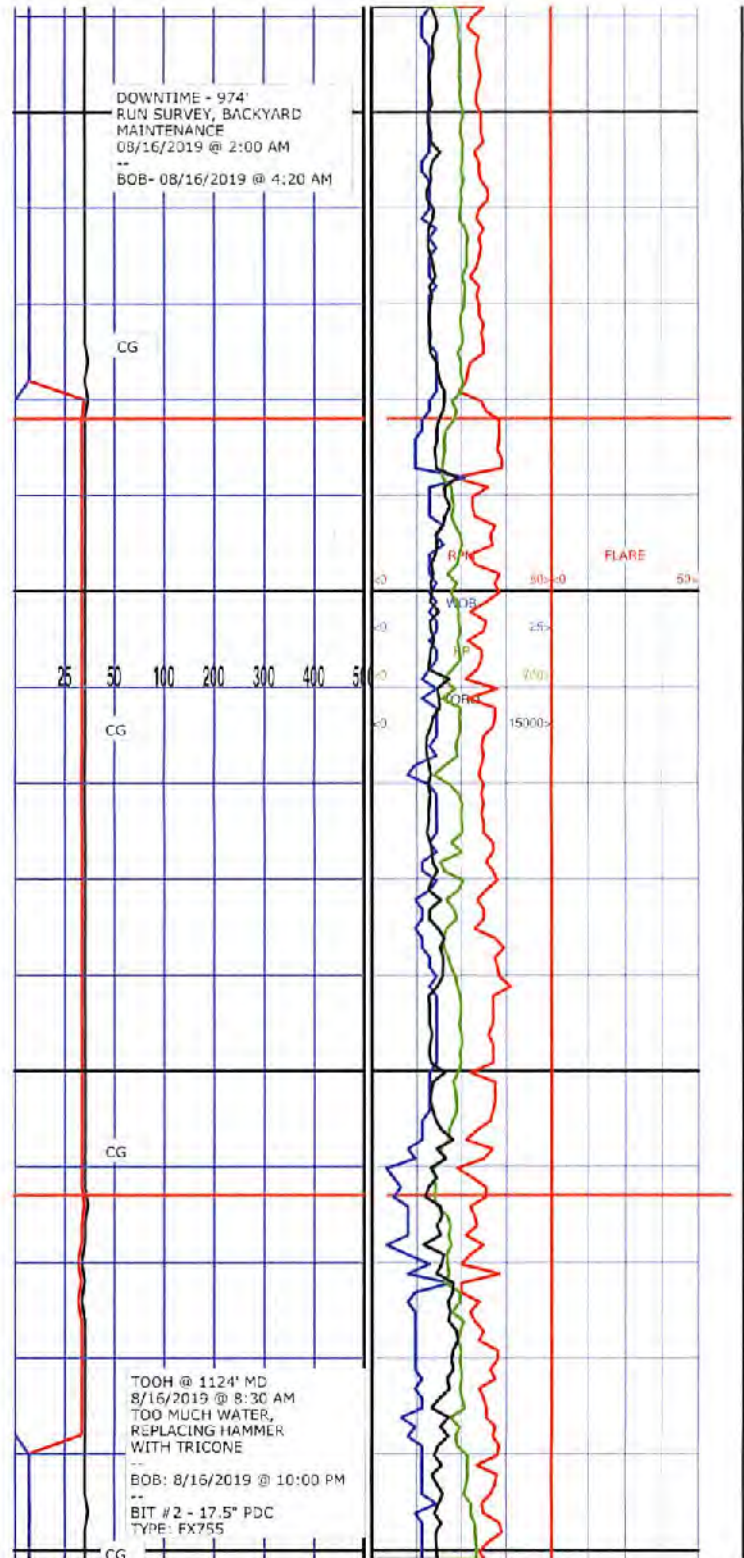
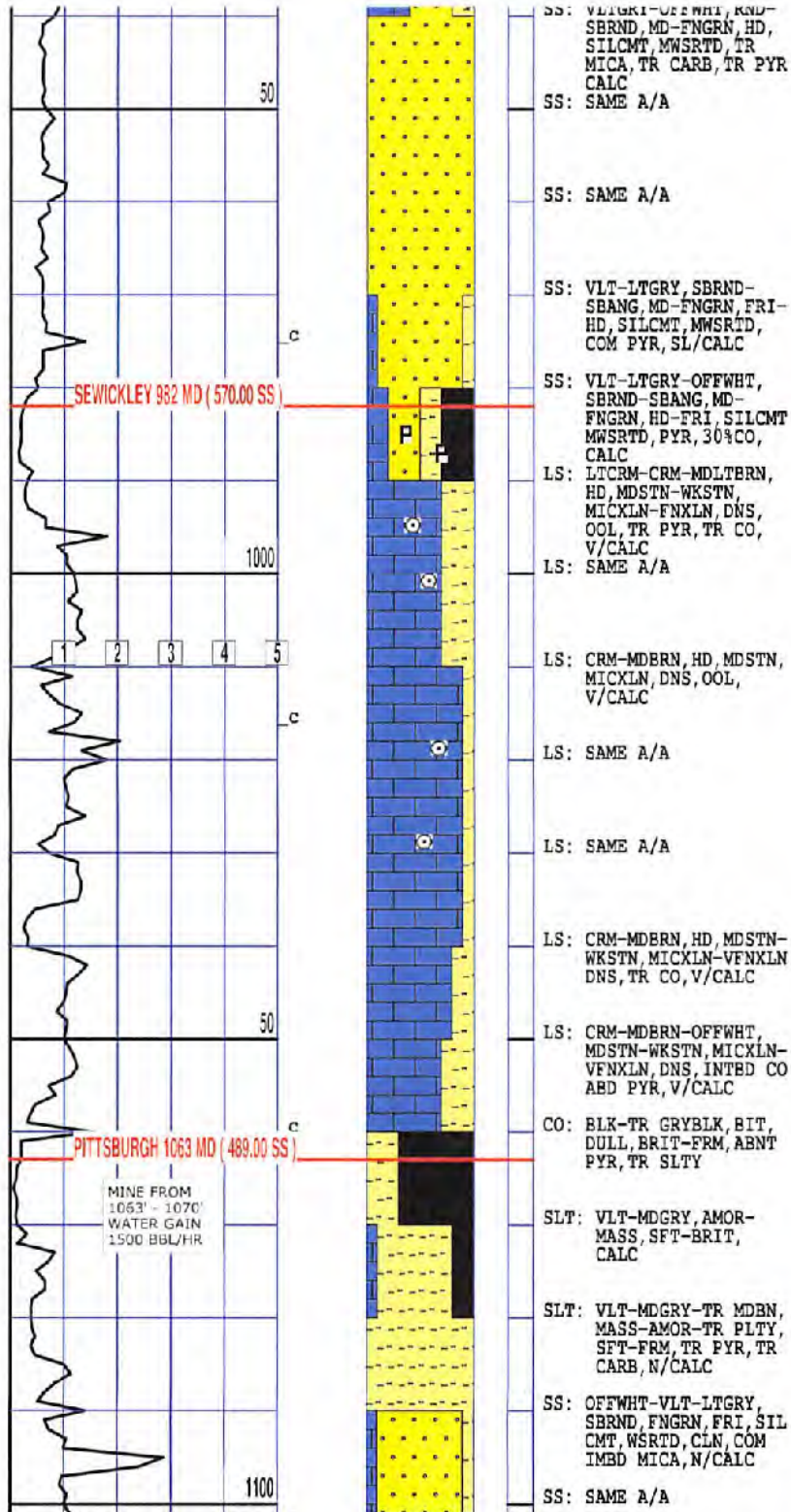
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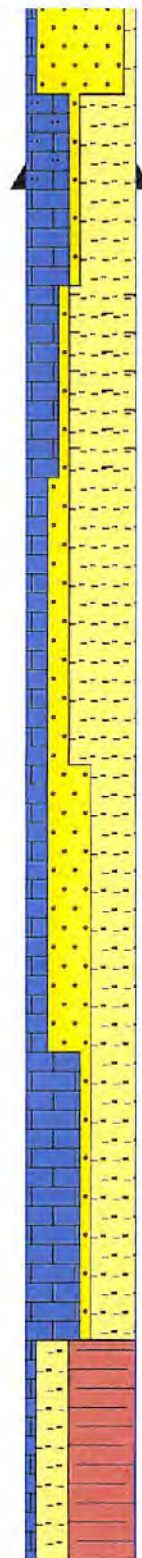
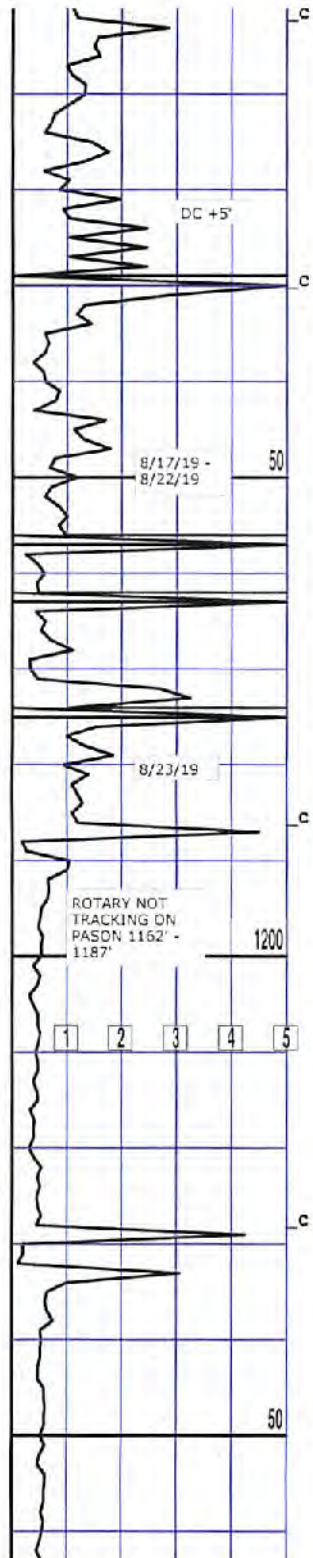
SS: LT-MDLTGRY,SBANG-
SBRND,VFNGRN,HD,
SILCMT,WSRTD,RR PYR
CALC

SS: SAME A/A

SS: SAME A/A







SLT: VLT-MDKGRY-TR DK/
GRYBN, MASS-PLTY,
FRI-FRM, SILCMT,
TR LMY, N/CALC-TR
CALC

SLT: SAME A/A

SLT: GRYBLK-VLTGRY-BRN,
PLTY-MASS, FRM,
SILCMT, SHY, TR PYR,
INTBD CO, N/CALC

SLT: SAME A/A

SLT: GRYBLK-DK-LTGRY-TR
CRM, AMOR-MASS, BRIT
SILCMT, TR PYR,
N/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: MD-LTGRY-OFFWHT,
MASS-AMOR, HD-FRM,
SILCMT, TR/PYR,
SL/CALC

SLT: SAME A/A

SLT: SAME A/A

LS: LTCRM-MDBRN, HD-
VHD, PKSTN, FNXLN, DNS
TR/PYR, V/CALC

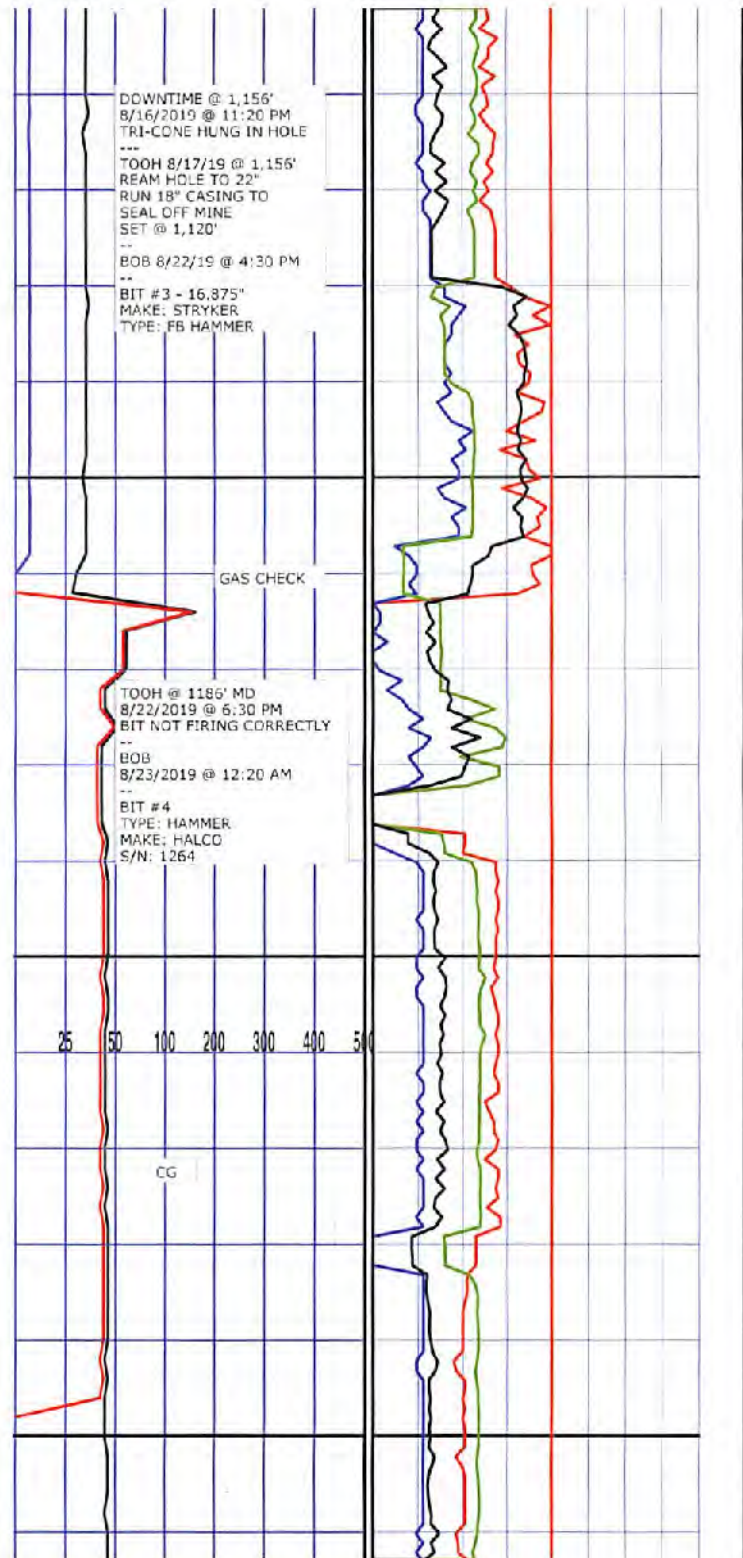
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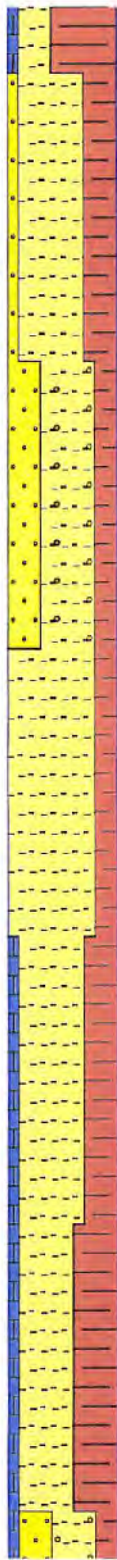
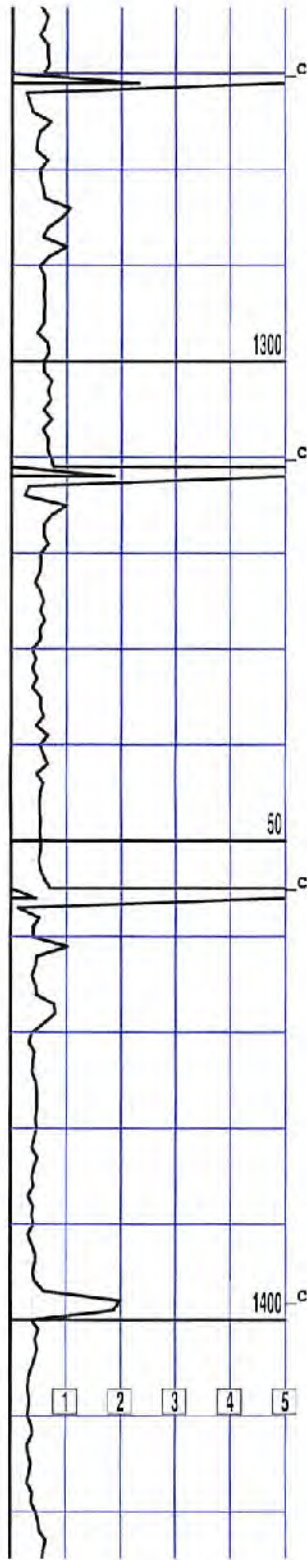
LS: SAME A/A

RSH: MDRD-MDKRD, MASS-
AMOR-ELKY, HD-FRM,
SLTY, LMY, SL/CALC

RSH: SAME A/A

RSH: SAME A/A





SLT: MLT-LTGRY-GNSHGRY,
 MASS-AMOR-BLKY,
 FRM-HD-TR/BRIT,
 ABNT PYR, SL/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: VLTGRY-OFFWHT-
 LTCRM, MASS-AMOR-
 BLKY, BRIT-FRM-HD,
 SDY, TR/PYR, SL/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: VLT-LTGRY, MASS-
 AMOR, FRM-BRIT, TR/
 PYR, TR/SDY, SILCMT
 N/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: LT-MDGRY, AMOR-MASS
 RR PYR, SILCMT, FRM-
 HD, LMY, VSL/CALC

SLT: SAME A/A

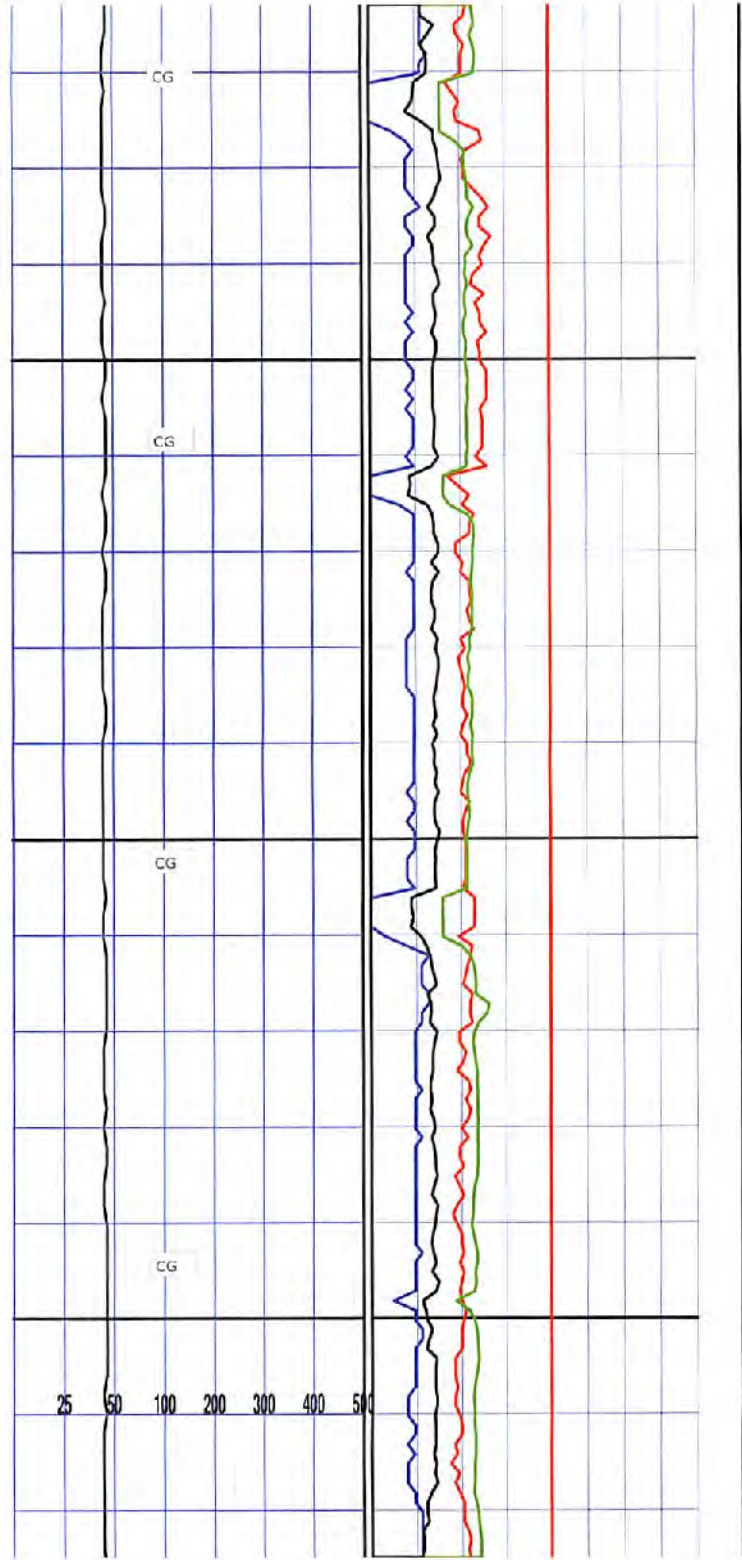
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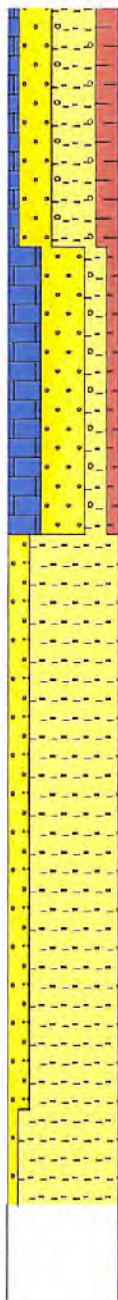
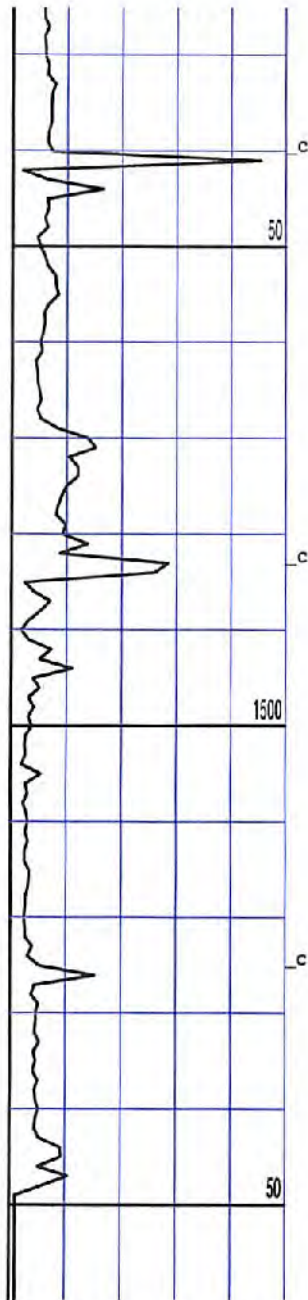
SLT: MD-LTGRY, AMOR-
 MASS-BLKY, FRM,
 SILCMT, N/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: MD-LTGRY, AMOR-
 MASS, FRM-HD, SDY,
 SILCMT, TR/PYR,





SL/ CALC

SLT: SAME A/A

SLT: SAME A/A

SS: VLT-MDLTGRY, SBRND,
FRM-HD, FN-VFNGRN,
SILCMT, MDSRTD, SLTY,
TR/PYR, SL/CALC

SS: SAME A/A

SS: SAME A/A

SLT: LT-MDGRY, MASS-AMOR,
FRM-SL/HD, SILCMT,
RR PYR, N/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: VLT-V/DKGRY-DKBN,
MASS-AMOR, FRM-SL/
HD, SILCMT, TR SDY,
RR PYR, N/CALC

SLT: SAME A/A

SLT: SAME A/A

SLT: LT-DKGRY-MDBNGRY,
AMOR-MASS, FRM, SIL/
CMT, COM PYR, N/CALC

