30-015-39791

Weatherford®
LABORATORIES

ROTARY SIDEWALL CORE ANALYSIS REPORT

FOR

COG OPERATING, LLC.

COPPERHEAD 31 FED COM # 2H

EDDY COUNTY, NEW MEXICO

COG OPERATING, LLC.
COPPERHEAD 31 FED COM # 2H
EDDY COUNTY, NEW MEXICO
U.S.A.
File: MD-56951

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LABORATORIES

March 28, 2012

COG OPERATING, LLC.
550 W. Texas Street, Suite 100
Midland, TX. 79701

Attn: ANDREW McCARTHY

RE: COPPERHEAD 31 FED COM # 2H
Rotary Sidewall Core Analysis

Mr. McCARTHY:

The core analysis data from the above referenced well is enclosed in the following pages.

All quality control data is enclosed in a separate section of the report. The data, results, and digital images will be maintained in our files for your future reference. If you have any questions regarding our results or procedures, please do not hesitate to contact us. We appreciate the opportunity to analyze the core from the above referenced well and look forward to working with you again in the future.

DISTRIBUTION

COG OPERATING, LLC.
Attn: ANDREW McCARTHY
550 W. Texas Street, Suite 100
Midland, TX. 79701
4 Copies of the Report 1 with Photographs and 1 USB Drive

OXY PERMIAN, LTD.
Attn: SALLY DEHN
5 Greenway Plaza, Suite 110
Houston, TX. 77046-0521
1 Copy of the Report

COG OPERATING, LLC.
Attn: CONCHO WEST FIELD OFFICE
2208 West Main Street
Artesia, NM. 88210
1 Copy of the Report

Sincerely,

Wayne Helms, General Manager
Weatherford Laboratories

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CORE ANALYSIS PROCEDURES

FOR

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The Rotary Sidewalls were picked up by Weatherford Laboratories.

Gases from the Sidewalls were measured by Hot Wire Chromatography and reported in Gas Units.

A brief Lithological Description of the Sidewalls was recorded.

A description of the Fluorescence of the Sidewalls was recorded.

Ultraviolet Light Photographs were taken of the Sidewalls for a permanent record.

Natural Light Photographs were taken of the Sidewalls for a permanent record.

Composite Photographs of the Sidewall End Trims were taken under Natural and Ultraviolet Light.

The Sidewalls were extracted utilizing the Dean Stark method.

The fluids were measured by the Dean Stark method.

Porosities were measured in a Boyle's Law Porosimeter utilizing Helium.

Permeabilities were measured in a Hassler Sleeve Permeameter utilizing Nitrogen at 300 psi confining pressure.

Test samples of a known permeability were measured before and after the Sidewall permeabilities were measured.

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ROTARY SIDEWALL CORE ANALYSIS

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COG PRODUCTION, LLC
COPPERHEAD 31 FED COM NO. 2H
EDDY COUNTY, NEW MEXICO

A.P.I. NUMBER : 30-015-39791
FIELD : Hay Hollow (Bone Spring)
LOCATION: 480' FSL, 2140' FEL,
Section 31, T-26-S, R-29-E

FILE NO. : MD-56951
DATE : April 11, 2012
ANALYSTS : WH, SB, JR

DEAN STARK EXTRACTION

SAMPLE	DEPTH	GRAIN	POR	PERM	SATURATIONS		GAS	FLUORESCENCE		
NO.	ft	DENSITY	%	mD	Sw	So	UNITS	%		LITHOLOGY
1	6900.0						937	0		Sh dk gy-blk slty sc sml ls incl
2	7000.5						919	0		Sh dk gy-blk slty calc fd frac
3	7050.5						60	0	Mf	Ls gy-dk gy dns sslty sshy
4	7210.0	2.56	3.0	tbfa	65.0	0.0	946	0	Mf	Sh dk gy-blk slty ls x-bd
5	7252.0	2.50	6.7	tbfa	55.6	0.0	478	0		Sh dk gy-blk slty sc pyr
6	7305.0	2.70	4.7	<.001	50.3	8.0	585	60	Yl-dl gld	Ss opaq-gy-tn vf-fgr sbrnd-sbang sslty scalc abd shy lam
7	7375.0	2.64	1.3	<.001	88.0	0.0	51	0		Sh dk gy-blk slty sdy sc sml ls incl sc pyr
8	7417.0	2.61	1.8	<.001	98.1	0.0	156	0		Sh dk gy-blk slty sc slty lam tr pyr
9	7453.5	2.68	3.1	<.001	76.8	0.0	301	0		Sh gy-dk gy-blk slty sdy
10	7515.0	2.56	2.5	<.001	47.4	0.0	230	0		Sh dk gy-blk slty tr pyr
11	7690.0	2.69	1.0	tbfa	87.5	0.0	45	0	Mf	Ls brn-dk gy dns sslty sshy sc pyr
12	7861.0	2.67	0.7	<.001	79.3	0.0	79	0	Mf	Ls brn-dk gy dns sslty sshy sc pyr
13	7962.0	2.69	6.0	<.001	67.2	0.0	57	0	Mf	Ss opaq-tn-gy vf-fgr sbrnd-sbang sslty scalc sc shy intrbd
14	8000.0	2.68	0.7	<.001	87.5	0.0	186	0		Ls brn-dk gy dns sslty sshy lrg shy x-bd sc pyr
15	8032.8	2.68	0.4	<.001	95.1	0.0	21	0		Ls brn-dk gy dns sslty sshy tr pyr
16	8055.0	2.66	2.8	<.001	80.0	0.0	98	0		Sh dk gy-blk slty sc sml ls incl
17	8080.0	2.69	3.5	<.001	78.5	0.0	349	0		Ss opaq-gy-tn vf-fgr sbrnd-sbang sslty mod calc abd shy lam
18	8137.5	2.65	1.5	<.001	88.1	0.0	43	0	Mf	Ls brn-gy sslty abd shy lam
19	8162.0	2.69	7.5	<.001	63.9	7.0	125	60	Dl yl-blu	Ss opaq-gy-tn vf-fgr sbrnd-sbang sslty mod calc abd slty lam

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DEAN STARK EXTRACTION

SAMPLE	DEPTH	GRAIN	POR	PERM	SATURATIONS		GAS	FLUORESCENCE		
NO.	ft	DENSITY	%	mD	Sw	So	UNITS	%		LITHOLOGY
20	8218.0	2.67	5.3	<.001	82.0	0.0	320	0		Sh dk gy-blk slty
21	8230.0	2.70	8.9	<.001	69.8	0.0	130	0	Mf	Ss opaq-tn-gy vf-fgr sbrnd-sbang sslty scalc sc slty intrbd
22	8260.0	2.68	11.1	0.120	37.0	17.0	725	80	Wht-blu	Ss opaq-tn-gy vf-fgr sbrnd-sbang sslty scalc
23	8270.0	2.72	8.0	0.064	42.7	16.8	533	80	Wht-blu	Ss opaq-tn-gy vf-fgr sbrnd-sbang sslty scalc
24	8278.0	2.69	8.3	<.001	71.2	0.0	236	0	Mf	Ss opaq-gy-tn vf-fgr sbrnd-sbang sslty scalc abd shy lam
25	8295.0	2.59	5.2	<.001	69.6	0.0	142	0		Sh dk gy-blk slty tr pyr
26	8325.0	2.68	6.5	<.001	67.5	0.0	488	0	Mf	Sh gy-dk gy-blk slty sdy sc slty intrbd
27	8340.0	2.62	4.9	<.001	74.5	0.0	928	0		Sh dk gy-blk slty tr pyr
28	8375.0	2.68	1.0	<.001	40.8	0.0	285	0		Ls gy-dk gy dns sslty sshy abd slty intrbd sc pyr

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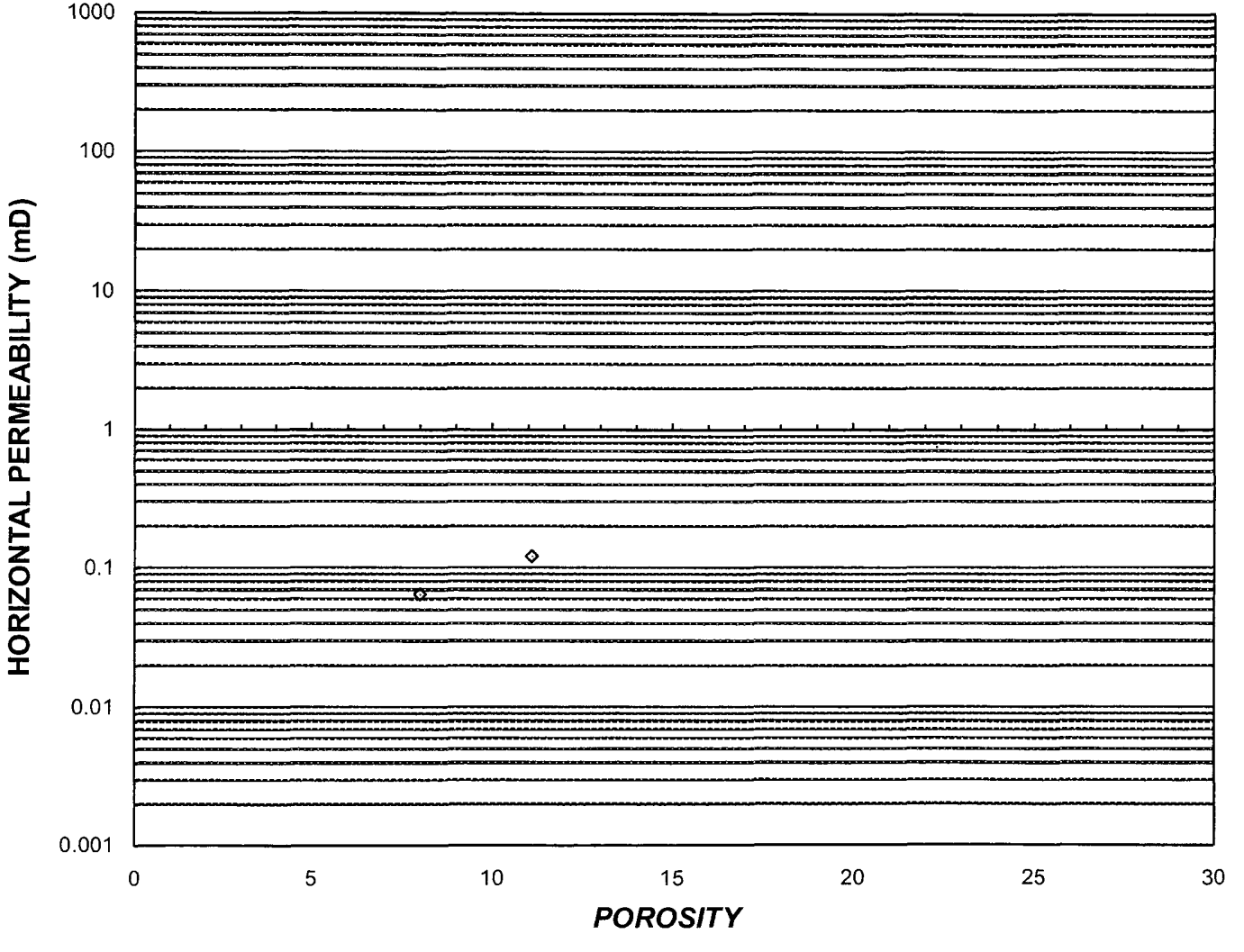

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COG PRODUCTION,LLC
COPPERHEAD 31 FED COM NO. 2H
4/25/2012

QUALITY CONTROL RERUN DATA

Sample	GRAIN DENSITY		POROSITY		*kstandard*	PERMEABILITY	
No.	original	reruns	original	reruns	Test Sample	original	reruns
6	2.700	2.700	4.68	4.67	**2.615**	<.001	<.001
9	2.681	2.682	3.14	3.17		<.001	<.001
14	2.681	2.679	0.65	0.59		<.001	<.001
19	2.687	2.688	7.49	7.53		<.001	<.001
22	2.679	2.680	11.10	11.12		0.120	0.123
27	2.625	2.624	4.94	4.92	**2.622**	<.001	<.001

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LITHOLOGICAL ABBREVIATIONS

Anhydrite (-ic)	anhy, anhyd	Filled	fd	Poor	pr
Anhydrite inclusion	A/I	Fine (-ly)	f, fnly	Pyrite	pyr
Bentonite (-ic)	bent	Fluorescence	flu	Quartz (-itic)	qtz
Black (-ish)	blk, blksh	Fossil (-iferous)	foss	Red	rd
Bleeding Oil	B/O	Fracture	frac	Round	rnd
Brecciated	brec	Fragments	frag	Residual Oil	So
Bright	brt	Friable	fri	Residual Water	Sw
Brittle	brit	Fusulinid	fus	Sample	Spl
Broken	brkn	Gilsonite	gil	Sandstone	Ss
Brown	brn	Gold	gld	Sandy	sdy
Buff	bf	Good	gd	Scattered	sc
Calcite (-ic)	calc, calctc	Grain (-s)	gr	Shaley	shy
Calcareous	calc	Granular	gran	Shale	sh
Carbonaceous	carb	Gray	gy	Shale parting	s/p
Cement	cmt	Gypsum	gyp	Silt (-y)	slt, slty
Chalk (-y)	chk, chky	Hair line(frac)	hl	Slight (-ly)	sli, s
Chert	cht	Halite	hal	Small	sml
Clay	cl	Inclusion	incl	Spotted (-y)	sp
Coal	c	Laminations (ated)	lam	Stringer	strgr
Coarse	crs	Large	lrg	Stylolite (-itic)	sty, styl
Conglemerate	cgl	Light	lt	Subround	sbrnd
Consolidated	consol	Limestone	ls	Subangular	sbang
Contaminated	contam	Limey	lmy	Sucrosic	suc
Crinoid (-al)	crin, crinal	Lithology	lith	Sulphur	su
Cross-bedded	x-bd	Medium	m	Tan	tn
Crystal (-line)	Xl, xln	Mineral Fluorescence	mf	Too broken (for Analysis)	tbfa
Dark	dk	Moderate	mod		
Dense	dns	Mudcake	m/c	Thin	thn
Diameter	dia	No Show	N/S	Trace	Tr
Dolomite (ic)	dol, dolm	Oolite (-itic)	ool	Tripolitic	trip
Dull	dl	Pale	pl	Very	v
Faint	fnt	Permeability	Perm, K	Vertical	vert, vt
Fair	fr	Pin-Point Porosity	ppp	Vug (-gy)	vug