

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
 - Engineering Bureau -
 1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

- [NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
- [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
- [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
- [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
- [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
- [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

- [1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]
- [A] Location - Spacing Unit - Simultaneous Dedication
 NSL NSP SD
- Check One Only for [B] or [C]
- [B] Commingling - Storage - Measurement
 DHC CTB PLC PC OLS OLM
- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
 WFX PMX SWD IPI EOR PPR
- [D] Other: Specify _____

- DHC 4682

- Cimarex Energy
 162-683
POOLS
 - Sage Draw;
 Wolfcamp, East
 96890
 - Cottonwood
 Draw, upper
 Penn
 97354
well
 - Liberty 24
 Federal com #2
 30-015-33683

- [2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or Does Not Apply
- [A] Working, Royalty or Overriding Royalty Interest Owners
- [B] Offset Operators, Leaseholders or Surface Owner
- [C] Application is One Which Requires Published Legal Notice
- [D] Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
- [E] For all of the above, Proof of Notification or Publication is Attached, and/or,
- [F] Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

David Catanach
 Print or Type Name

David Catanach
 Signature

Agent for Cimarex Energy Company of Colorado
 Title

2/10/14
 Date

drcatanach@netscape.com
 E-Mail Address

February 10, 2014

Hand Delivered

New Mexico Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Attention: Ms. Jami Bailey, CPG
Division Director

Re: Form C-107A
Cimarex Energy Company of Colorado
Liberty 24 Federal Com No. 2 (API No. 30-015-33683)
1475' FSL & 940' FWL (L) Section 24, T-25S, R-26E, NMPM
Eddy County, New Mexico

Dear Ms. Bailey:

Attached is a Form C-107A for the Cimarex Energy Company of Colorado ("Cimarex") Liberty 24 Federal Com No. 2. Cimarex proposes to downhole commingle East Sage Draw-Wolfcamp (Gas) and Cottonwood Draw Upper-Penn (Gas) Pool production within this well.

The subject well was recently abandoned in the Morrow interval and has been recompleted to the Wolfcamp and Cisco-Canyon intervals. Cimarex proposes to allocate production to the zones based upon the results of a production log that was conducted on the well on December 20, 2013.

The United States Bureau of Land Management ("BLM") has been notified of the proposed commingling.

If you should have any questions or need additional information, please call me at (505) 690-9453.

Sincerely,



David Catanach, Agent
Cimarex Energy Company of Colorado
600 N. Marienfeld, Suite 600
Midland, Texas 79701

Xc: OCD-Artesia

District I
1625 N. French Drive, Hobbs, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-107A
Revised August 1, 2011

District II
811 S. First St., Artesia, NM 88210

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

APPLICATION TYPE
 Single Well
 Establish Pre-Approved Pools
EXISTING WELLBORE
 Yes No

District III
1000 Rio Brazos Road, Aztec, NM 87410

District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

APPLICATION FOR DOWNHOLE COMMINGLING

Cimarex Energy Company of Colorado **600 North Marienfeld Street, Suite 600 Midland, Texas 79701**
Operator Address

Liberty 24 Federal Com **2** **1475' FSL & 940' FWL (Unit L) 24, T-25S, R-26E** **Eddy**
Lease Well No. Unit Letter-Section-Township-Range County

OGRID No. 162683 Property Code 33101 API No. 30-015-33683 Lease Type: Federal State Fee

DATA ELEMENT	UPPER ZONE	INTERMEDIATE ZONE	LOWER ZONE
Pool Name	East Sage Draw-Wolfcamp (Gas)		Cottonwood Draw-Upper Penn (Gas)
Pool Code	96890		97354
Top and Bottom of Pay Section (Perforated or Open-Hole Interval)	9,375'-9,877' (Perforated)		10,260'-10,538' (Perforated)
Method of Production (Flowing or Artificial Lift)	Flowing		Flowing
Bottomhole Pressure (Note: Pressure data will not be required if the bottom perforation in the lower zone is within 150% of the depth of the top perforation in the upper zone)	Not Required		Not Required
Oil Gravity or Gas BTU (Degree API or Gas BTU)	Oil Gravity: 56.4 Gas BTU: 14.73 Dry- 1.230 Gravity: .7016		Oil Gravity: 51.9 Gas BTU: 14.73 Dry- 1.008 Gravity: .572
Producing, Shut-In or New Zone	New Zone		New Zone
Date and Oil/Gas/Water Rates of Last Production. (Note: For new zones with no production history, applicant shall be required to attach production estimates and supporting data.)	Production Log Data: See Attached Date: 12/20/2013 Rates: 16.76 BOPD 607.12 MCFGD 177.7 BWPD	Date: Rates:	Production Log Data: See Attached Date: 12/20/2013 Rates: 6.76 BOPD 258.21 MCFGD 71.91 BWPD
Fixed Allocation Percentage (Note: If allocation is based upon something other than current or past production, supporting data or explanation will be required.)	Oil Gas Water 71% 70% 71%	Oil Gas % %	Oil Gas Water 29% 30% 29%

ADDITIONAL DATA

Are all working, royalty and overriding royalty interests identical in all commingled zones? Yes No
If not, have all working, royalty and overriding royalty interest owners been notified by certified mail? Yes No

Are all produced fluids from all commingled zones compatible with each other? Yes No

Will commingling decrease the value of production? Yes No
If this well is on, or communitized with, state or federal lands, has either the Commissioner of Public Lands or the **United States Bureau of Land Management** been notified in writing of this application? Yes No

NMOCD Reference Case No. applicable to this well: _____

Attachments:

- C-102 for each zone to be commingled showing its spacing unit and acreage dedication.
- Production curve for each zone for at least one year. (If not available, attach explanation.)
- For zones with no production history, estimated production rates and supporting data.
- Data to support allocation method or formula.
- Notification list of working, royalty and overriding royalty interests for uncommon interest cases.
- Any additional statements, data or documents required to support commingling.

PRE-APPROVED POOLS

If application is to establish Pre-Approved Pools, the following additional information will be required:

- List of other orders approving downhole commingling within the proposed Pre-Approved Pools
- List of all operators within the proposed Pre-Approved Pools
- Proof that all operators within the proposed Pre-Approved Pools were provided notice of this application.
- Bottomhole pressure data.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE David Catanach TITLE: Agent for Cimarex Energy Co. of Colorado DATE: 2/10/14

TYPE OR PRINT NAME David Catanach TELEPHONE NO. (505) 690-9453

E-MAIL ADDRESS drctanach@netscape.com

District I
 1625 N. French Dr., Hobbs, NM 88240
District II
 1301 W. Grand Avenue, Artesia, NM 88210
District III
 1000 Rio Brazos Rd., Aztec, NM 87410
District IV
 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
 Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
 1220 South St. Francis Dr.
 Santa Fe, NM 87505

Form C-102
 Revised July 16, 2010
 Submit one copy to appropriate
 District Office
 AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-33683		Pool Code 96890 & 97354		Pool Name East Sage Draw-Wolfcamp (Gas) & Cottonwood Draw-Upper Penn (Gas) Pools	
Property Code 33101	Property Name Liberty 24 Federal Com			Well Number 2	
OGRID No. 162683	Operator Name Cimarex Energy Company of Colorado			Elevation 3,227'	

Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	24	25 South	26 East		1475	South	940	West	Eddy

Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Dedicated Acres Wolfcamp: W/2 Upper Penn: W/2		Joint or Infill	Consolidate Code		Order No.				

No Allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the Division

<p>Liberty 24 Federal Com No. 2</p> <p>940'</p> <p>1475'</p>	<p align="center">OPERATOR CERTIFICATION</p> <p><i>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottomhole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the Division.</i></p> <p>Signature _____ Date _____</p> <p>Printed Name _____</p> <p>E-mail Address _____</p>
	<p align="center">SURVEYOR CERTIFICATION</p> <p><i>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</i></p> <p>Date of Survey _____</p> <p>Signature and Seal of Professional Surveyor: _____</p> <p>Originally surveyed by Gary Eidson on September 1, 2004. Certificate No. 12641</p> <p>Certificate Number _____</p>



KB - 18' above GL

Cimarex Energy Co. of Colorado

Liberty 24 Federal Com #2

1475' FSL & 940' FWL

Sec. 24, T-25-S, R-26-E, Eddy Co., NM

H. Eads

11/26/2013

13-3/8", 54.5# J-55 csg @ 220'
cmtd w/ 250 sx, cmt circ

9-5/8", 40# P-100 & N-80 csg @ 1935'
cmtd w/ 650 sx, cmt circ

← 282 jts 2-3/8" 4.7# L-80 Tbg

DV Tool @ 4900'
cmtd w/ 615 sx, cmt circ

Gas Lift Valves @ 1845', 3253',
4462', 5412', 6134', 6791', 7448',
8104', 8695', 9253'

TOC @ 7446' by CBL

7" 23# P-110 @ 9016'
cmtd w/ 500 sx, cmt circ

On-off Tool w/ 1.875" X Profile Nipple
Arrowset pkr @ 9294'
1.875" XN Profile Nipple
EOT @ 9306'

Wolfcamp perms (9375' - 9877')

Cisco Canyon perms (10260' - 10538')

PBTD @ 11,426'
CIBP @ 11,461' w/ 35' cmt

CIBP @ 11,506' w/ 35' cmt
Morrow perms (11556' - 11746')
Composite BP @ 11800'

Morrow perms (11839' - 11956')
PBTD @ 12180'
4-1/2" 11.6# P-110 @ 12330' cmtd w/ 400 sx
TD @ 12330'

Production Log Data 12/20/2013

Zones	Perfs	Water BWPD	Water %	Oil BOPD	Oil %	Gas MCFPD	Gas %
Wolfcamp	9,375' - 9,488'	57.44	23.01%	5.44	23.13%	199.01	23.00%
	9,535' - 9,699'	14.86	5.95%	1.4	5.95%	46.01	5.32%
	9,750' - 9,877'	105.4	42.23%	9.92	42.18%	362.1	41.85%
	9,375' - 9,877'	177.7	71.19%	16.76	71.26%	607.12	70.16%
Cisco Canyon	10,260' - 10,349'	33.76	13.53%	3.15	13.39%	116.77	13.49%
	10,383' - 10,538'	38.15	15.28%	3.61	15.35%	141.44	16.35%
	10,260' - 10,538'	71.91	28.81%	6.76	28.74%	258.21	29.84%
TOTAL	9,375' - 10,538'	249.61	100.00%	23.52	100.00%	865.33	100.00%

(Reservoir bbls)

Zones	Perfs	Water BWPD	Water %	Oil BOPD	Oil %	Gas MCFPD	Gas %
Wolfcamp	9,375' - 9,488'	58.38	22.97%	7.05	23.05%	230.95	23.40%
	9,535' - 9,699'	15.13	5.95%	1.82	5.95%	53.35	5.40%
	9,750' - 9,877'	107.36	42.24%	12.91	42.22%	417.29	42.28%
	9,375' - 9,877'	180.87	71.16%	21.78	71.22%	701.59	71.08%
Cisco Canyon	10,260' - 10,349'	34.41	13.54%	4.1	13.41%	131.17	13.29%
	10,383' - 10,538'	38.9	15.30%	4.7	15.37%	154.3	15.63%
	10,260' - 10,538'	73.31	28.84%	8.8	28.78%	285.47	28.92%
TOTAL	9,375' - 10,538'	254.18	100.00%	30.58	100.00%	987.06	100.00%

Zones	Perfs	Water BWPD	Water %	Oil BOPD	Oil %	Gas MCFPD	Gas %
Wolfcamp	9,375' - 9,488'	249.62	34.23%	23.53	34.26%	865.34	33.91%
	9,535' - 9,699'	192.17	26.36%	18.09	26.34%	666.33	26.11%
	9,750' - 9,877'	177.31	24.32%	16.69	24.30%	620.31	24.31%
	9,375' - 9,877'	619.1	84.91%	58.31	84.90%	2151.98	84.34%
Cisco Canyon	10,260' - 10,349'	71.9	9.86%	6.76	9.84%	258.21	10.12%
	10,383' - 10,538'	38.15	5.23%	3.61	5.26%	141.44	5.54%
	10,260' - 10,538'	110.05	15.09%	10.37	15.10%	399.65	15.66%
TOTAL	9,375' - 10,538'	729.15	100.00%	68.68	100.00%	2551.63	100.00%

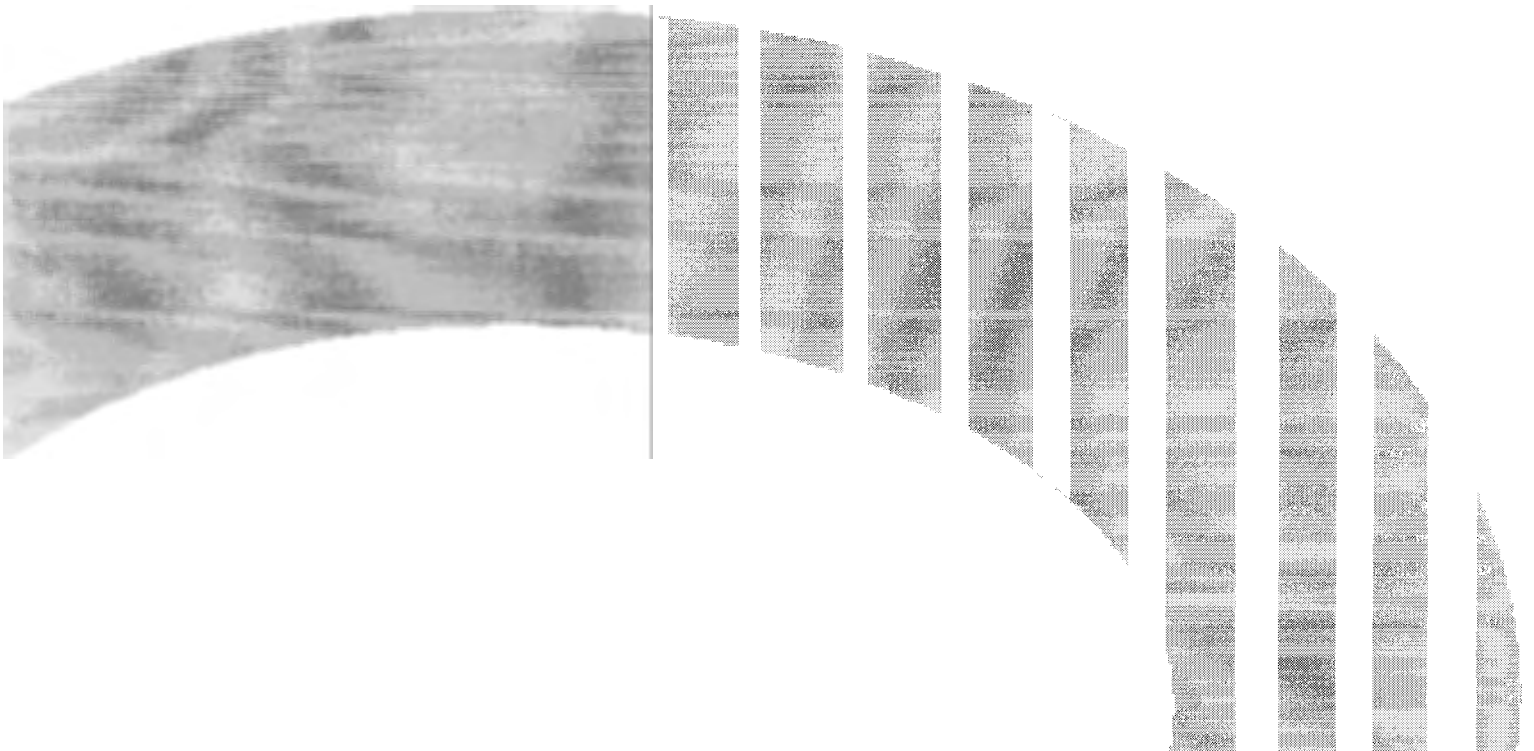
Form C-107-A
 Cimarex Energy Co. of Colorado
 Liberty 24 Federal Com # 2
 Section 24-25S-26E
 Production Log Data


Note:

Production Profile Interpretation
 Report Available Upon Request

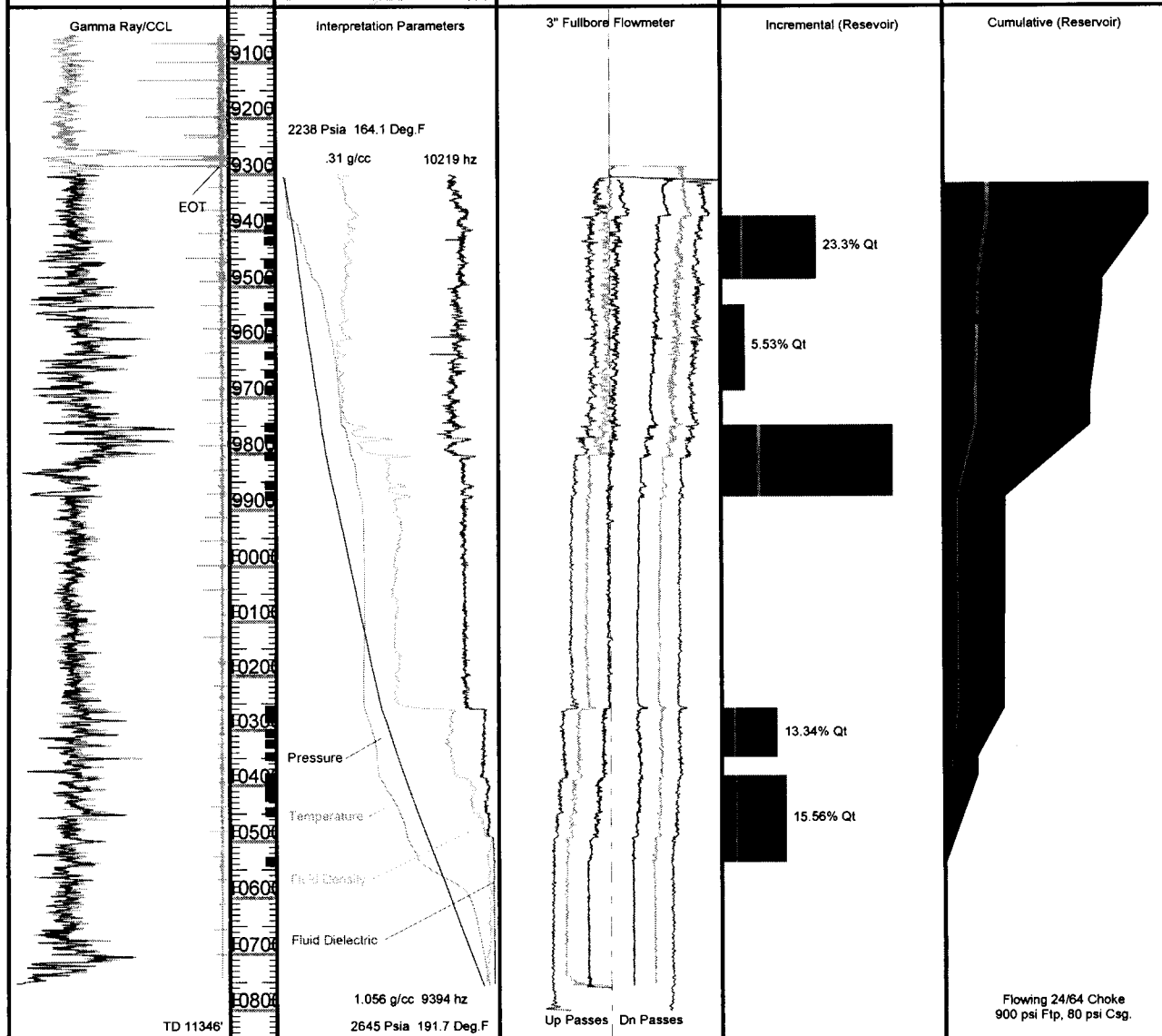
Production Profile Interpretation Report

Company: Cimarex Energy
Field: Ciscamp
Well: Liberty 24 Fed. Com. #2
Survey Date: 12-20-2013
Service Company: Techwell Surveys Corporation
Interpretation Date: 12-23-2013
Analyst: JD Taylor
Survey #1

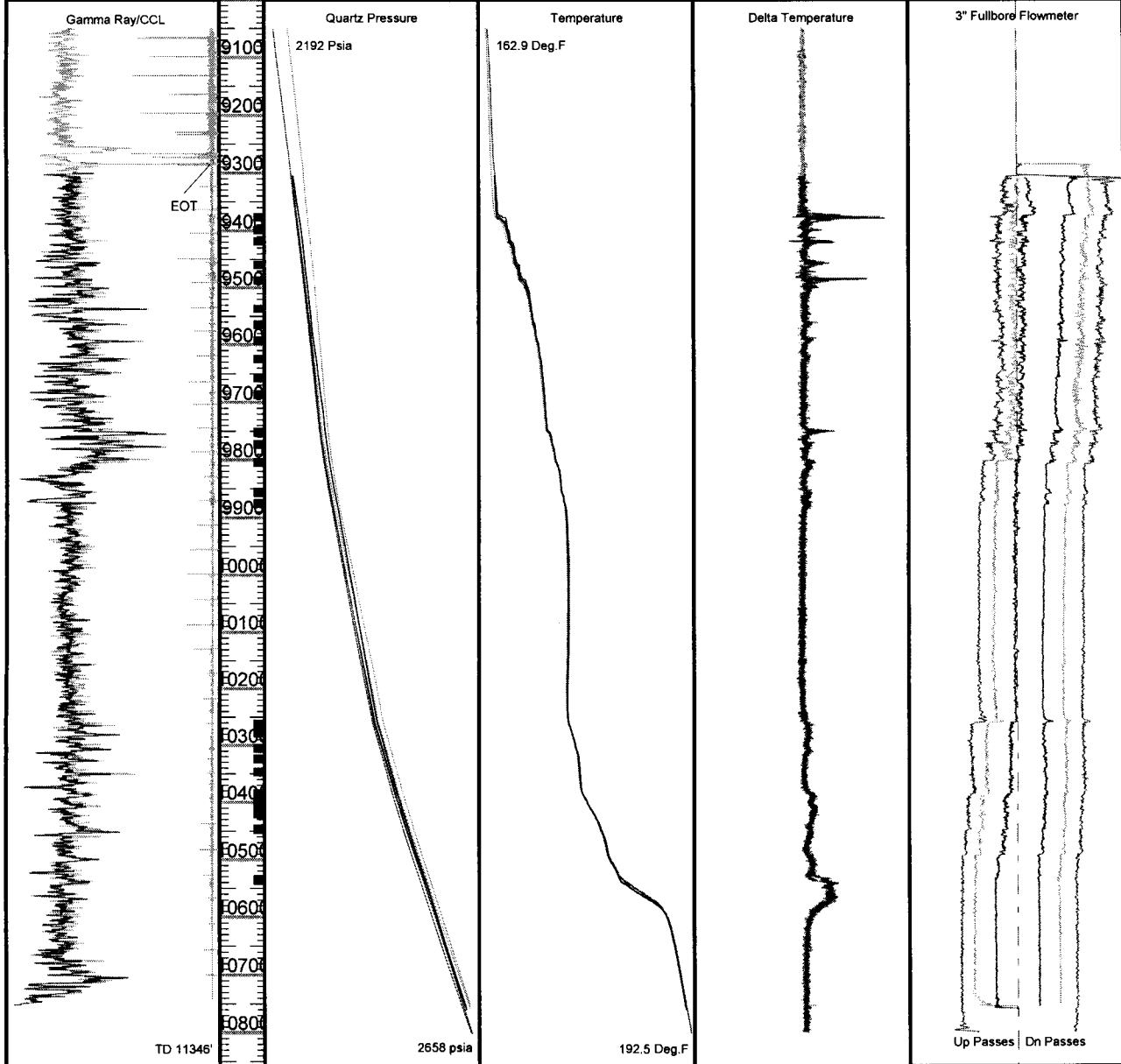


	Job Information		Liberty_24-2	
	Company: Cimarex Energy Field: Ciscamp Well: Liberty 24 Fed Com #2		Test: Flowing 24/64 Choke Date: 12-20-2013 Survey: Survey # 1	
Survey date	12-20-2013	Interpretation date	12/23/2013	
Service company	Techwell Surveys Corporation	Done by	JD Taylor	
SURVEY	Survey # 1			
Surface rates		Gas	865 Mscf/D	
Oil	24 STB/D	Water	250 STB/D	
TOOLS				
String O.D.	1.375 in	Capacitance		
Spinner blade O.D.	3. in	Calib. type	Yw vs norm. resp.	
Density	Corrected	Default chart	CWH Water-Hydrocarbon	
		100% Water	9394 cps	
		100% HC	13751 cps	
INTERPRETATION	Interpretation # 1			
Density offset	0 g/cc			
Capacitance offset	0 cps			
Flow type	3-Phase L-G			
Flow model L-G	Dukler			
Flow model W-O	ABB - Deviated			
Vpcf mult.	1			
Vslip mult.	1			
Vslip mult.W-O	1			
Comments				
<p>Run #1, Gauge run to TD @ 11346' with simulated tool string. Run #2, RIH with PL Stack, record multiple passes in both directions to obtain data for flow profile. The Wolfcamp was divided up into 3 sections for quantification with 71.1% of Qt. The Cisco Canyon was divided into 2 sections with an inflow of 28.9% of Qt. Inflow zones are numbered from the top - down. Depth corrected to Halliburton CBL dated 4-27-2005.</p> <p>Liberty 24 Fed. Com. #2 API # 30-015-33683 1475' FSL & 940' FWL of Sec. 24, T25S, R26E Eddy Co., New Mexico</p> <p>JD Taylor Techwell Surveys Corporation 432-664-4978</p>				
Emeraude v2.42.14		12/26/2013		Page 1/12

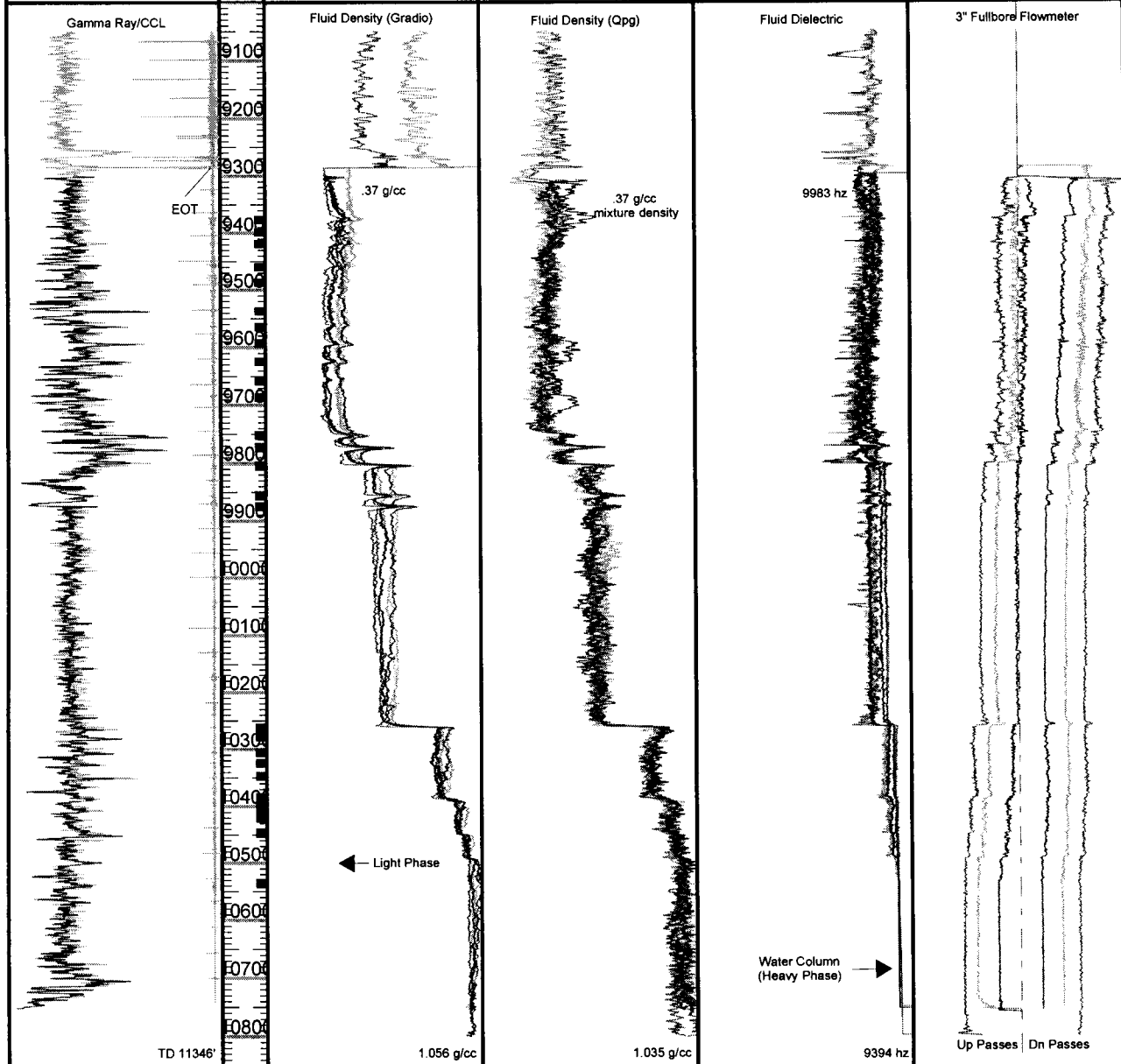
Gamma Ray/CCL	Depth (ft)	Interpretation # 1	Flowmeter CFLOW (rps)	Rates Rates (QZI) (B/D)	Rates Rates (QZT) (B/D)
GR S1,D80		TEMP S1,I1	-8 8	0 700	0 1400
0 GAPI 200		163 °F 193			
CCL S1,D80		PRESS S1,I1			
25000 50000		2225 psia 2675			
GR S1,U40		CWH S1,I1			
0 GAPI 200		13751 cps 9300			
		GRAD S1,I1			
		0 g/cc 1.1			



Gamma Ray/CCL	Depth	Pressure		Temperature		Temperature		Flowmeter	
GR S1,D80	(ft)	PRESS (psia)		TEMP (°F)		DTEMP (°F)		CFLOW (rps)	
0 GAPI 200		2175	2675	162	193	-0.5	0.5	-8	8
CCL S1,D80									
25000 50000									
GR S1,U40									
0 GAPI 200									

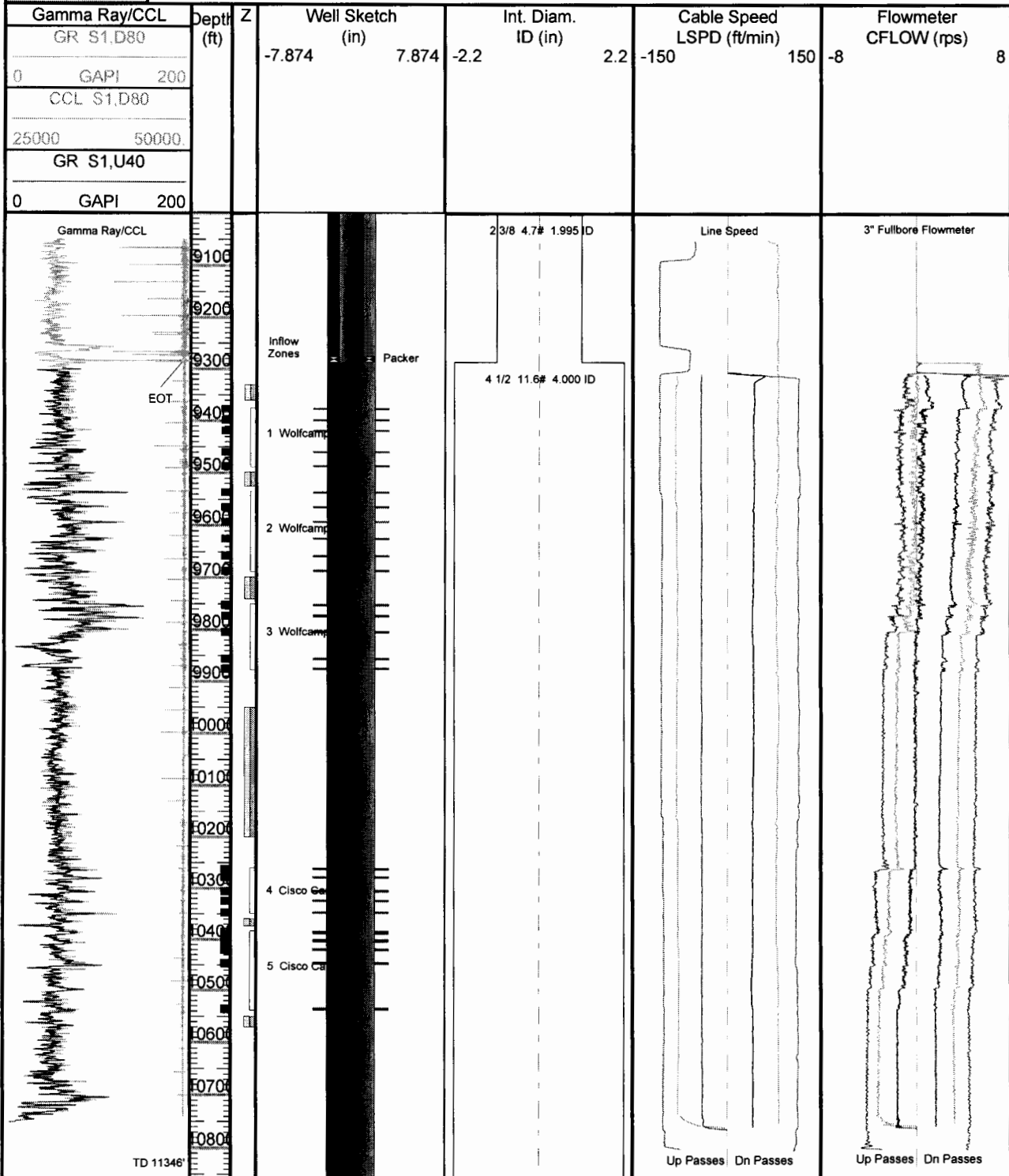


Gamma Ray/CCL	Depth (ft)	Density GRAD (g/cc)	Density PRESSSG (g/cc)	Capacitance CWH (cps)	Flowmeter CFLOW (rps)
GR S1,D80		1.1	1.1	13751 9100	-8 8
0 GAPI 200					
CCL S1,D80					
25000 50000					
GR S1,U40					
0 GAPI 200					



Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1



Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1







Zones ft	Water STB/D	Oil STB/D	Gas Mscf/D
9375.0-9488.0	57.44	5.44	199.01
9535.0-9688.0	14.86	1.40	46.01
9750.0-9877.0	105.40	9.92	362.10
10260.0-10349.0	33.76	3.15	116.77
10383.0-10538.0	38.15	3.61	141.44
Total	249.62	23.53	865.34

Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1

Zones ft	Qt res. B/D	Production %
9375.0-9488.0	296.38	23.30
9535.0-9688.0	70.30	5.53
9750.0-9877.0	537.56	42.27
10260.0-10349.0	169.68	13.34
10383.0-10538.0	197.90	15.56

Contributions by phase

Zones ft	Qw res. B/D	Qo res. B/D	Qg res. B/D	
9375.0-9488.0	58.38	7.05	230.95	
9535.0-9688.0	15.13	1.82	53.35	
9750.0-9877.0	107.36	12.91	417.29	
10260.0-10349.0	34.41	4.10	131.17	
10383.0-10538.0	38.90	4.70	154.30	

Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1

Zone ft	Corr. factor	Vm ft/min	Q downhole B/D	Contribution %
9375.0-9488.0	0.90	57.570	1288.50	23.30
9535.0-9688.0	0.90	44.385	993.40	5.53
9750.0-9877.0	0.90	40.989	917.40	42.27
10260.0-10349.0	0.89	16.634	372.30	13.34
10383.0-10538.0	0.88	8.842	197.90	15.56

Total rates by phase

Zone ft	Qw res. B/D	Qw s.c. STB/D	Qo res. B/D	Qo s.c. STB/D	Qg res. B/D	Qg s.c. Mscf/D
9375.0-9488.0	253.70	249.62	30.50	23.53	1004.30	865.34
9535.0-9688.0	195.60	192.17	23.50	18.09	774.30	666.33
9750.0-9877.0	180.60	177.31	21.70	16.69	715.10	620.31
10260.0-10349.0	73.30	71.90	8.80	6.76	290.20	258.21
10383.0-10538.0	38.90	38.15	4.70	3.61	154.30	141.44

Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1

#	From-To ft	ID in	Deviation °	Rt	T °F	P psia
1	9330.0-9360.0	4.0000	0.0000	4.500E-4	164.0000	2246.9000
2	9498.0-9525.0	4.0000	0.0000	4.500E-4	169.0000	2275.1000
3	9698.0-9740.0	4.0000	0.0000	4.500E-4	172.0000	2309.7000
4	9950.0-10200.0	4.0000	0.0000	4.500E-4	175.0000	2391.0000

#	Bw	Muw cp	Rhow g/cc	Bo	Muo cp	Rhoo g/cc	Bg	Mug cp	Rhog g/cc
1	1.0164	0.4202	0.9900	1.2965	0.3815	0.6700	0.0066	0.0176	0.1300
2	1.0179	0.4040	0.9900	1.2993	0.3720	0.6600	0.0066	0.0176	0.1300
3	1.0186	0.3960	0.9900	1.3005	0.3682	0.6600	0.0066	0.0178	0.1300
4	1.0194	0.3860	0.9900	1.3014	0.3651	0.6600	0.0064	0.0180	0.1300

#	Correl.	Correl. W-O	Regime	Slip ft/min	Slip W-O ft/min
1	Dukler	ABB - Deviated	Slug liquid-gas	57.134	20.867
2	Dukler	ABB - Deviated	Slug liquid-gas	57.140	20.882
3	Dukler	ABB - Deviated	Slug liquid-gas	57.139	20.886
4	Dukler	ABB - Deviated	Bubble	58.674	20.885

#	Yw	Yo	Yg	Vw ft/min	Vo ft/min	Vg ft/min
1	0.4500	0.0195	0.5300	25.3000	69.9000	84.3000
2	0.5200	0.0189	0.4600	16.8000	55.4000	75.3000
3	0.5400	0.0187	0.4400	14.8000	51.9000	73.2000
4	0.7800	0.0129	0.2000	4.1900	30.5000	63.3000

Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1

#	From-To ft	ID in	Deviation °	Rt	T °F	P psia
5	10359.0-10373.0	4.0000	0.0000	4.500E-4	177.0000	2476.6000
6	10550.0-10570.0	4.0000	0.0000	4.500E-4	185.0000	2559.2000

#	Bw	Muw cp	Rhow g/cc	Bo	Muo cp	Rhoo g/cc	Bg	Mug cp	Rhog g/cc
5	1.0198	0.3806	0.9900	1.3013	0.3653	0.6600	0.0062	0.0183	0.1300
6	1.0225	0.3568	0.9900	1.3059	0.3524	0.6600	0.0062	0.0185	0.1300

#	Correl.	Correl. W-O	Regime	Slip ft/min	Slip W-O ft/min
5	Dukler	ABB - Deviated	Bubble	59.596	20.877
6	Dukler	ABB - Deviated	No flow	0.000	N/A

#	Yw	Yo	Yg	Vw ft/min	Vo ft/min	Vg ft/min
5	0.8800	0.0082	0.1100	1.9700	25.5000	61.8000
6	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Company: Cimarex Energy
 Field: Ciscamp
 Well: Liberty 24 Fed Com #2

Test: Flowing 24/64 Choke
 Date: 12-20-2013
 Survey: Survey # 1

FLUID TYPE Water - Oil+Gas

GAS

Specific gravity 0.68
 N2 % 0
 CO2 % 0
 H2S % 0

Z Beggs and Brill

Mug Lee et al.

OIL

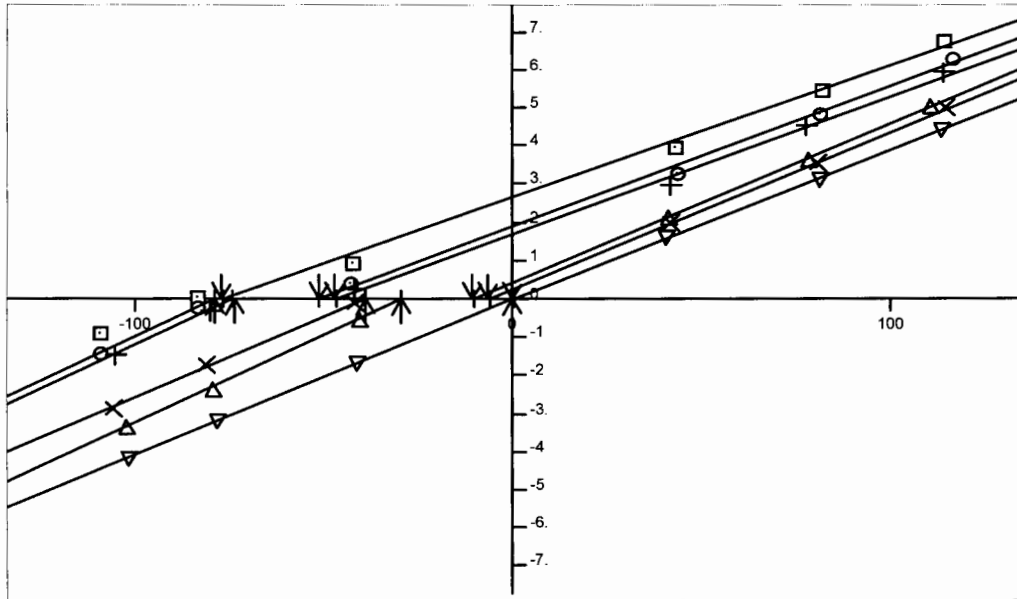
Gravity 0.78 sp. gr.
 GOR 561.458 cf/bbl
 Pb Standing
 Rs Standing
 Bo Standing
 co Vasquez and Beggs
 Muo Beggs and Robinson

WATER

Salinity, ppm 12000
 Rsw Katz
 cw Dodson and Standing
 Muw Van-Wingen+Frick

Company: Cimarex Energy
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rps versus ft/min

Threshold (+) 0.5515 ft/min

Threshold (-) -0.1912 ft/min

	Calib. Zone ft	Slope (+)	Slope (-)	Int (+) ft/min	Int (-) ft/min	Int. Diff. ft/min
□	9330.0-9360.0	0.035	N/A	-76.45	N/A	0.00
○	9498.0-9525.0	0.037	0.046	-50.77	-78.59	27.83
+	9698.0-9740.0	0.036	0.046	-46.12	-73.78	27.66
×	9950.0-10200.0	0.041	0.042	-5.87	-39.01	33.14
△	10359.0-10373.0	0.042	0.046	-10.20	-29.42	19.23
▽	10550.0-10570.0	0.039	0.041	0.55	-0.19	0.74