

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work



API 47 - 051 - 01709 County Marshall District Clay
Quad Glen Easton Pad Name Berger Field/Pool Name _____
Farm name Berger Well Number 10H
Operator (as registered with the OOG) Chevron Appalachia, LLC
Address 800 Mountain View Drive City Smithfield State PA Zip 15478

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4413857.76 Easting 520982.62
Landing Point of Curve Northing 441.474.32 Easting 520694.54
Bottom Hole Northing 4412051.71 Easting 521749.12

Elevation (ft) 1292' GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
Surface section was drilled on air. Intermediate and Production sections were drilled on SBM fluid loss control emulsifier, and shale stabilizer additives.

Date permit issued 2/26/2014 Date drilling commenced 6/22/2014 Date drilling ceased 12/24/2014
Date completion activities began 8/4/2015 Date completion activities ceased 12/28/2015
Verbal plugging (Y/N) N Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 169' Open mine(s) (Y/N) depths _____
Salt water depth(s) ft _____ Void(s) encountered (Y/N) depths _____
Coal depth(s) ft 768'-769', 784'-785', 830'-837', 1411'-1413', 1415'-1418' Cavern(s) encountered (Y/N) depths _____
Is coal being mined in area (Y/N) No but not sealed

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API 47- 051 - 01709 Farm name Berger Well number 10H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	36	30	40	New	X-42; 118.76		
Surface	17 1/2	13 3/8	297	New	J-55; 54.50		
Coal							
Intermediate 1							
Intermediate 2	12 1/4	9 5/8	2678	New	L-80; 40/N-80; 40		
Intermediate 3							
Production	8 1/2	5 1/2	13050	New	P-110; 20		
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	Bulk	60				Surface	8
Surface	Bulk	382	15.60	1.21	462	Surface	8
Coal							
Intermediate 1							
Intermediate 2	A	900	15.60	1.24	1116	Surface	8
Intermediate 3							
Production	A	2478	15.20	1.31	3246	Surface	8
Tubing							

Drillers TD (ft) 13067 Loggers TD (ft) 13067
 Deepest formation penetrated _____ Plug back to (ft) N/A
 Plug back procedure _____

Kick off depth (ft) 4305

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING Bow spring centralizer every two joints
on the Water and Intermediate strings. Production string has two centralizers every joint in the lateral and curve, then one every two joints from KOP to surface.

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS Please see attached Perforation and Stimulation reports

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
		SEE	ATTACHED		

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
		SEE	ATTACHED					

Please insert additional pages as applicable.

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PERFORATION RECORD					
Stage No.	Perforation Date	Perforated From TMD Ft.	Perforated To TMD Ft.	Number of Perforations	Formation(s)
1	11/4/15	13007	12847	50	Marcellus
2	11/4/15	12759	12557	50	Marcellus
3	11/5/15	12504	12309	50	Marcellus
4	11/6/15	12256	12060	50	Marcellus
5	11/6/15	12009	11802	50	Marcellus
6	11/7/15	11759	11554	50	Marcellus
7	11/9/15	11509	11305	50	Marcellus
8	11/9/15	11257	11057	50	Marcellus
9	11/10/15	11009	10807	50	Marcellus
10	11/11/15	10759	10557	50	Marcellus
11	11/11/15	10509	10307	50	Marcellus
12	11/12/15	10259	10057	50	Marcellus
13	11/13/15	10007	9807	50	Marcellus
14	11/13/15	9759	9557	50	Marcellus
15	11/14/15	9509	9307	50	Marcellus
16	11/14/15	9259	9057	50	Marcellus
17	11/15/15	9010	8807	50	Marcellus
18	11/16/15	8763	8557	50	Marcellus
19	11/18/15	8512	8307	50	Marcellus
20	11/18/15	8254	8061	50	Marcellus
21	11/18/15	8007	7802	50	Marcellus
22	11/18/15	7756	7557	50	Marcellus
23	11/19/15	7509	7305	50	Marcellus
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Please insert additional copies of this page if additional rows/stages are needed.

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STIMULATION INFORMATION / STAGE								
Complete a separate record for each stimulation stage. (Please insert additional lines for additional stages or additional pages as applicable).								
Stg No.	Stimulation Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/ other (units)
1	11/4/15	97	8612	--	4180	400805	11149	n/a
2	11/4/15	98	8341	7161	4141	499935	13079	n/a
3	11/5/15	97	8433	6555	4444	458059	12266	n/a
4	11/6/15	98	8229	6210	4777	469013	12278	n/a
5	11/6/15	98	8271	6161	4884	501062	12387	n/a
6	11/7/15	99	8347	5934	4848	501015	12676	n/a
7	11/9/15	95	8872	6445	5050	503821	12597	n/a
8	11/9/15	97	8504	6045	4413	498710	12479	n/a
9	11/10/15	94	8253	5964	4851	504568	12711	n/a
10	11/11/15	98	8013	6406	5097	499811	12693	n/a
11	11/11/15	98	8079	6294	4908	501617	12366	n/a
12	11/12/15	98	8183	5991		500686	12740	n/a
13	11/13/15	99	7725	6276	4917	488360	12088	n/a
14	11/13/15	97	7526	6147	4505	500657	12342	n/a
15	11/14/15	99	7774	6411	4550	502899	12387	n/a
16	11/14/15	99	7592	6662	4706	501740	12262	n/a
17	11/15/15	99	7517	6393	5286	503849	12382	n/a
18	11/16/15	97	6868	5857	4346	504358	13094	n/a
19	11/18/15	97	7227	6874	4851	501340	12548	n/a
20	11/18/15	97	7781	6809	4951	503700	12280	n/a
21	11/18/15	98	7680	6475	4515	500569	12234	n/a
22	11/18/15	98	7813	6766	4616	499571	12485	n/a
23	11/19/15	97	7766	6686	4773	497240	13452	n/a
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PRODUCING FORMATION(S)	DEPTHS	
	TVD	MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump
 SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs
 OPEN FLOW Gas _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY
 Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
Dunkard Group Sand	160	169	169	169	Fresh Water 169' MD 1" stream
Pittsburgh Coal	830	837	830	837	Coal
Salt Sand	1538	1568	1540	1570	Gas Show @ 1550' 6101 units
Big Lime	1848	1928	1850	1930	Limestone: crm-wh, hd, crpxln
Burgoon (Big Injun)	1927	2117	1930	2120	SS: offwh, wh, cons, clr, trans, lcemt, fg-mg
Weir Sand	2277	2297	2280	2300	SLTST: ltgy-mgy, occ mgy, hrd, vf-fg, tcmt, bio, arg, sl calc
Berea Sand	2507	2530	2510	2533	SS: wh, clr, trans, ltgy-gy, cns, lcmt, mg-fg, sbang-ang, arg, msph, non calc, tr flor, ext fast cut, fnt odr, lse pyr
Burket Shale	6284	6302	6840	6871	SH: drkgy, v. drkgy, frm, slty, grty, sbblky-sbfiss, modcalc, embd calc, lse calct
Tully Limestone	6302	6340	6871	6944	LS: ltgy, gy, mgy, frm-hrd, dns, cln, mic-fxln, v. arg
Hamilton Shale	6340	6384	6944	7057	SH: drkgy, v. drkgy, frm, slty, grty, sbblky-sbfiss, carb, modv. calc, lse calct, w/LS
Marcellus Shale	6384		7057		SH: drkgy, v. drkgy, frm, slty, grty, sbblky-sbfiss, non calc, lse calct, lse pyr, w/LS: gy, ltgy, hrd, mott, mic, fxl n, v. arg

Please insert additional pages as applicable.

Drilling Contractor SEE ATTACHED
 Address _____ City _____ State _____ Zip _____

Logging Company ALS Group USA Corp
 Address 3352 128th Avenue City Holland State MI Zip 49424

Cementing Company SEE ATTACHED
 Address _____ City _____ State _____ Zip _____

Stimulating Company Schlumberger Technology Corp
 Address 4600 J Barry Court, Suite 200 City Canonsburg State PA Zip 15307

Please insert additional pages as applicable.

Completed by Jackie M. Scholar Telephone 724-564-3721
 Signature [Signature] Title Regulatory Compliance Team Lead Date 1/12/2016

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

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API: 47-5101709	Well Name: Berger	Well Number: 10H
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DRILLING CONTRACTORS		
Driller	Driller	Driller
Name Rocky Mountain Drilling	Name Highlands Drilling LLC	Name Nabors Drilling USA
Address 185 North Vernal Avenue, Suite 2	Address 900 Virginia Street East	Address 10100 NW 10th Street
City - State - Zip Vernal, UT 84078	City - State - Zip Charlestown, WV 25301	City - State - Zip Oklahoma City, OK 73127

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CEMENTING CONTRACTORS		
Name Schlumberger Technology Corp	Name Baker Hughes	Name
Address Two Robinson Plaza, Suite 200	Address 5373 West Alabama, Suite 300	Address
City - State - Zip Pittsburgh, PA 15205	City - State - Zip Houston, TX 77056	City - State - Zip

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Well is located on topo map 171' feet south of Latitude: 39° 52' 30"

AS DRILLED PLAT

NOTES:

- There are no water wells or developed springs within 250' of proposed well.
- There are no existing buildings within 625' of proposed well.
- Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
- There are no native trout streams within 300' of proposed well.
- Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
- It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.



PARCEL	LESSOR
A	GARY & LINDA BERGER
B	GEORGE E. VUCELICK
C	GEORGE E. VUCELICK
D	PATRICIA A. SMITHSON
E	GEORGE E. & REBECCA D. VUCELICK
F	CHARLES L. THIELE
G	PRESLEY C. RINE, ET AL.
H	ROBERT M. SPRINGER, ET AL.
I	GREGG T. DAMS
J	GEORGE E. & REBECCA VUCELICK
K	STEVEN L. & KAREN HIGGINBOTHAM
L	BYRON & KATHERINE FREELAND
M	KENNETH D. & SHARON D. TUCKER
N	MICHAEL A. & LEE ANN DAVOLIO
O	MICHAEL A. & LEE ANN DAVOLIO

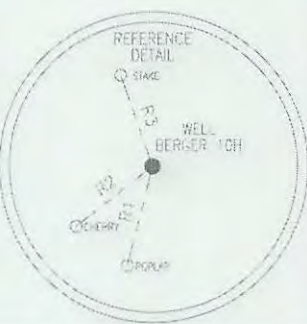
LEGEND	
	TOPO MAP POINT
	WELL
	ALL ACRE POINTS UNLESS OTHERWISE NOTED
	LEASE LETTER
	MINERAL TRACT BOUNDARY
	PARCEL LINES
	WELL REFERENCE
	PROPOSED HORIZONTAL WELL
	ROAD
	STREAM CENTER LINE
	AS DRILLED
EXISTING WELLS	
	EXISTING WELLS
	PLUGGED WELLS

Well is located on topo map 1292' feet west of Longitude: 80° 45' 00"

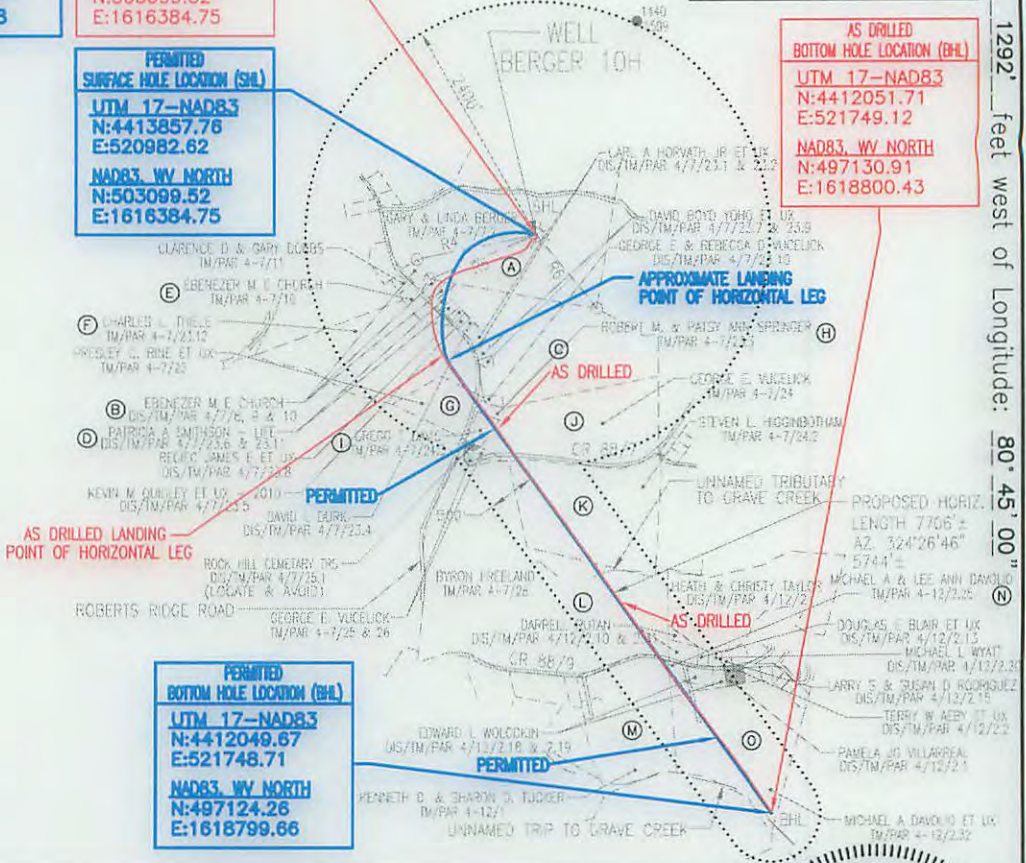
AS DRILLED APPROX. LANDING POINT UTM 17-NAD83 N:4413474.32 E:520694.54 NAD83, WV NORTH N:501857.06 E:1615417.83	PERMITTED APPROX. LANDING POINT UTM 17-NAD83 N:4413456.31 E:520707.41 NAD83, WV NORTH N:501797.24 E:1615459.88	AS DRILLED SURFACE HOLE LOCATION (SHL) UTM 17-NAD83 N:4413857.76 E:520982.62 NAD83, WV NORTH N:503099.52 E:1616384.75
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PERMITTED SURFACE HOLE LOCATION (SHL) UTM 17-NAD83 N:4413857.76 E:520982.62 NAD83, WV NORTH N:503099.52 E:1616384.75

AS DRILLED BOTTOM HOLE LOCATION (BHL) UTM 17-NAD83 N:4412051.71 E:521749.12 NAD83, WV NORTH N:497130.91 E:1618800.43



LINE	BEARING	DISTANCE
R1	S 14°44'46" W	210.31
R2	S 52°26'46" W	201.10
R3	N 19°11'21" W	200.32
R4	S 78°24'09" W	1262.04
R5	S 67°24'22" W	1196.29
R6	S 39°01'22" E	982.74



PERMITTED BOTTOM HOLE LOCATION (BHL) UTM 17-NAD83 N:4412049.67 E:521748.71 NAD83, WV NORTH N:497124.26 E:1618799.66
--

Blue Mountain Inc.
 10125 MASON DIXON HIGHWAY
 BURTON, WV 26562
 PHONE: (304) 662-6486

FILE #: BERGER 10H-AS DRILLED
 DRAWING #: BERGER 10H-AS DRILLED
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: 1/2500
 PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: *[Signature]*
 R.P.E.: _____ L.L.S.: P.S. No. 2000

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP
 OFFICE OF OIL & GAS
 601 57TH STREET
 CHARLESTON, WV 25304



DATE: SEPTEMBER 28, 2015
 OPERATOR'S WELL #: BERGER 10H-AS DRILLED
 API WELL #: 47 51 01709
 STATE COUNTY PERMIT

Well Type: Oil Waste Disposal Production Deep
 Gas Liquid Injection Storage Shallow

WATERSHED: MIDDLE GRAVE CREEK - GRAVE CREEK ELEVATION: 1287.57'
 COUNTY/DISTRICT: MARSHALL / CLAY QUADRANGLE: POWHATAN, OH-WV 7.5'
 SURFACE OWNER: GARY & LINDA BERGER ACREAGE: 51.753±
 OIL & GAS ROYALTY OWNER: GARY & LINDA BERGER ACREAGE: 373.924±

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG & ABANDON
 CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,538'± TMD: 13,325'±
 WELL OPERATOR CHEVRON APPALACHIA, LLC DESIGNATED AGENT KENNETH E. TAWNEY
 Address 800 MOUNTAIN VIEW DRIVE Address 500 LEE STREET, EAST SUITE 1600
 City SMITHFIELD State PA Zip Code 15478 City CHARLESTON State WV Zip Code 25301-3202

02/26/2016

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	11/4/2015
Job End Date:	11/19/2015
State:	West Virginia
County:	Marshall
API Number:	47-051-01709-00-00
Operator Name:	Chevron USA Inc.
Well Name and Number:	Berger 10H
Longitude:	-80.75463500
Latitude:	39.87450800
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,459
Total Base Water Volume (gal):	11,861,384
Total Base Non Water Volume:	



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Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Base Fluid	Chevron	Carrier/Base Fluid					
			Water (Including Mix Water Supplied by Client)	7732-18-5	100.00000	89.61408	
Proppant	Schlumberger	Proppant					
			Crystalline Silica	14808-60-7	100.00000	10.27584	
7.5% Acid	Schlumberger	Perf Cleanup					
			Hydrochloric Acid	7647-01-0	8.00000	0.00693	
J580	Schlumberger	Gelling Agent					
			Carbohydrate Polymer	Proprietary	100.00000	0.00285	
M300	BASF Corporation	Biocide					
			Water	7732-18-5	75.00000	0.00167	
			Glutaral	111-30-8	25.00000	0.00056	
U042	Schlumberger	Iron Chelating Agent					
			Tetrasodium ethylenediaminetetraacetate	64-02-8	60.00000	0.00164	
			Trisodium nitrilotriacetate (impurity)	5064-31-3	10.00000	0.00027	
			Sodium hydroxide	1310-73-2	5.00000	0.00014	
L058	Schlumberger	Iron Stabilizer					
			Sodium erythorbate	6381-77-7	100.00000	0.00031	
B317	Schlumberger	Scale Inhibitor					

			Trisodium ortho phosphate	7601-54-9	5.00000	0.00010
			Ethane-1,2-diol	107-21-1	5.00000	0.00010
A264	Schlumberger	Corrosion Inhibitor				
			Methanol	67-56-1	40.00000	0.00004
			Aliphatic acids	Proprietary	30.00000	0.00003
			Aliphatic alcohols, ethoxylated #1	Proprietary	30.00000	0.00003
			Prop-2-yn-1-ol	107-19-7	10.00000	0.00001
J134	Schlumberger	Gel Breaker				
			Hemicellulase enzyme	9012-54-8	100.00000	0.00008

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

- * Total Water Volume sources may include fresh water, produced water, and/or recycled water
- ** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

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