

Apache Corporation
303 Veterans Airpark Lane, #3000
Midland, TX 79705

M - Sec. 3 T17S R31E 495 FSL 525 FWL

Crow Federal #37H
Eddy County, New Mexico

API # 3001542142

233
493

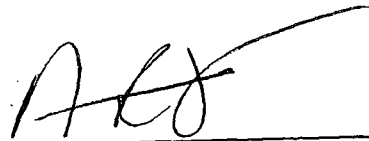
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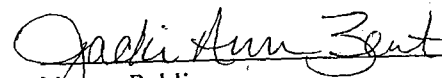
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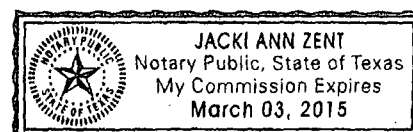
2.04
6.59



Archie Brown - General Manager

The attached instrument was acknowledged before me on the 7th day of July, 2014 by
Archie Brown - General Manager, CapStar Drilling, Inc.


Notary Public



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal — API- 3001542 142

#37H

WB1/Job #1410976 M-Sec. 3 T175 R31E 995 FSL 525 FWL

Survey: Phoenix MWD Survey

Survey Report

08 July, 2014

Survey Report

Company: Apache Corporation
Project: Eddy County, NM (NAD27 NME)
Site: Crow Federal
Well: #37H
Wellbore: WB1/Job #1410976
Design: Surveys (Capstar 114)

Local Co-ordinate Reference: Well #37H
TVD Reference: KB @ 3941.00usft (Capstar 114)
MD Reference: KB @ 3941.00usft (Capstar 114)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: GCR DB v5000

Project: Eddy County, NM (NAD27 NME)

Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site: Crow Federal

Site Position:		Northing:	671,130.90 usft	Latitude:	32° 50' 38.92796 N
From:	Map	Easting:	643,906.80 usft	Longitude:	103° 51' 53.16689 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.25 °

Well: #37H

Well Position	+N/-S	0.00 usft	Northing:	676,528.70 usft	Latitude:	32° 51' 32.32873 N
	+E/-W	0.00 usft	Easting:	644,151.00 usft	Longitude:	103° 51' 50.02332 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,930.00 usft

Wellbore: WB1/Job #1410976

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010-14	06/09/14	7.40	60.65	48,663

Design: Surveys (Capstar 114)

Audit Notes:

Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
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Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	89.61

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Survey Program Date 07/08/14

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	560.00	Gyrodata Gyro Survey (WB1/Job #141097	CB-GYRO-MS	Camera based gyro multishot
739.00	10,009.00	Phoenix MWD Survey (WB1/Job #141097	PHX+MWD+BGGM	PHX+MWD+BGGM v3:standard declination

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
560.00	0.80	101.82	-3,381.04	559.96	-2.62	5.93	5.91	0.00	676,526.08	644,156.93
Tie-on to Gyrodata Gyro Survey										
739.00	0.70	45.20	-3,202.05	738.95	-2.11	7.93	7.91	0.40	676,526.59	644,158.93
First Phoenix Survey										
871.00	0.90	16.90	-3,070.07	870.93	-0.55	8.80	8.80	0.33	676,528.15	644,159.80
999.00	1.00	24.70	-2,942.08	998.92	1.43	9.56	9.57	0.13	676,530.13	644,160.56
1,127.00	1.20	36.20	-2,814.11	1,126.89	3.53	10.82	10.84	0.23	676,532.23	644,161.82
1,256.00	0.50	45.20	-2,685.12	1,255.88	5.01	12.02	12.05	0.55	676,533.71	644,163.02
1,384.00	1.20	35.40	-2,557.14	1,383.86	6.50	13.19	13.23	0.56	676,535.20	644,164.19
1,513.00	1.20	62.40	-2,428.16	1,512.84	8.23	15.17	15.22	0.43	676,536.93	644,166.17
1,641.00	1.40	94.30	-2,300.19	1,640.81	8.73	17.92	17.98	0.58	676,537.43	644,168.92
1,769.00	1.50	105.40	-2,172.24	1,768.76	8.17	21.09	21.15	0.23	676,536.87	644,172.09
1,898.00	0.50	110.40	-2,043.26	1,897.74	7.52	23.25	23.30	0.78	676,536.22	644,174.25
2,026.00	0.60	256.00	-1,915.26	2,025.74	7.17	23.12	23.17	0.82	676,535.87	644,174.12
2,154.00	0.70	255.40	-1,787.27	2,153.73	6.81	21.71	21.76	0.08	676,535.51	644,172.71
2,282.00	1.10	282.00	-1,659.28	2,281.72	6.87	19.75	19.80	0.44	676,535.57	644,170.75
2,411.00	1.20	285.70	-1,530.31	2,410.69	7.49	17.24	17.29	0.10	676,536.19	644,168.24
2,539.00	1.30	284.30	-1,402.34	2,538.66	8.21	14.55	14.60	0.08	676,536.91	644,165.55
2,667.00	1.10	273.10	-1,274.37	2,666.63	8.64	11.91	11.97	0.24	676,537.34	644,162.91
2,796.00	1.30	286.80	-1,145.40	2,795.60	9.13	9.27	9.34	0.27	676,537.83	644,160.27
2,924.00	0.90	282.50	-1,017.42	2,923.58	9.76	6.90	6.97	0.32	676,538.46	644,157.90
3,052.00	1.40	276.50	-889.45	3,051.55	10.16	4.37	4.44	0.40	676,538.86	644,155.37

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 North Reference: Grid
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 Database: GCR DB v5000

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVDSS (usft)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
3,181.00	1.30	275.00	-760.48	3,180.52	10.46	1.34	1.42	0.08	676,539.16	644,152.34
3,309.00	0.70	261.90	-632.50	3,308.50	10.48	-0.88	-0.81	0.50	676,539.18	644,150.12
3,457.00	0.60	299.40	-484.51	3,456.49	10.73	-2.45	-2.37	0.29	676,539.43	644,148.55
3,556.00	0.70	307.60	-385.52	3,555.48	11.36	-3.38	-3.30	0.14	676,540.06	644,147.62
3,687.00	0.50	325.00	-254.52	3,686.48	12.31	-4.34	-4.26	0.20	676,541.01	644,146.66
3,816.00	0.20	334.80	-125.53	3,815.47	12.98	-4.76	-4.67	0.24	676,541.68	644,146.24
3,944.00	0.30	123.70	2.47	3,943.47	12.99	-4.57	-4.49	0.38	676,541.69	644,146.43
4,072.00	0.50	110.20	130.47	4,071.47	12.62	-3.77	-3.69	0.17	676,541.32	644,147.23
4,200.00	0.40	93.60	258.47	4,199.47	12.39	-2.80	-2.72	0.13	676,541.09	644,148.20
4,329.00	0.60	132.90	387.46	4,328.46	11.91	-1.86	-1.78	0.30	676,540.61	644,149.14
4,457.00	0.80	141.40	515.45	4,456.45	10.75	-0.81	-0.74	0.18	676,539.45	644,150.19
4,585.00	0.80	146.10	643.44	4,584.44	9.31	0.25	0.31	0.05	676,538.01	644,151.25
4,714.00	0.90	144.30	772.43	4,713.43	7.74	1.34	1.39	0.08	676,536.44	644,152.34
4,842.00	0.90	144.80	900.41	4,841.41	6.10	2.51	2.55	0.01	676,534.80	644,153.51
4,970.00	1.00	137.00	1,028.39	4,969.39	4.47	3.85	3.88	0.13	676,533.17	644,154.85
5,098.00	0.80	143.60	1,156.38	5,097.38	2.93	5.14	5.16	0.18	676,531.63	644,156.14
5,244.00	0.70	154.90	1,302.36	5,243.36	1.30	6.12	6.13	0.12	676,530.00	644,157.12
5,347.00	4.80	95.50	1,405.23	5,346.23	0.32	10.68	10.68	4.35	676,529.02	644,161.68
5,390.00	8.80	90.40	1,447.92	5,388.92	0.12	15.76	15.76	9.40	676,528.82	644,166.76
5,433.00	13.60	86.10	1,490.09	5,431.09	0.44	24.10	24.10	11.32	676,529.14	644,175.10
5,468.00	15.40	92.10	1,523.98	5,464.98	0.55	32.85	32.86	6.69	676,529.25	644,183.85
5,518.00	19.00	94.30	1,571.73	5,512.73	-0.30	47.61	47.61	7.32	676,528.40	644,198.61
5,561.00	24.10	92.00	1,611.71	5,552.71	-1.13	63.37	63.36	12.02	676,527.57	644,214.37
5,604.00	30.60	89.10	1,649.89	5,590.89	-1.27	83.11	83.10	15.43	676,527.43	644,234.11
5,647.00	37.20	88.70	1,685.56	5,626.56	-0.80	107.08	107.07	15.36	676,527.90	644,258.08
5,690.00	43.60	89.90	1,718.29	5,659.29	-0.48	134.93	134.92	14.99	676,528.22	644,285.93
5,732.00	50.40	91.30	1,746.92	5,687.92	-0.82	165.62	165.61	16.37	676,527.88	644,316.62

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5,775.00	56.80	92.60	1,772.42	5,713.42	-2.01	200.19	200.18	15.08	676,526.69	644,351.19
5,818.00	63.50	92.80	1,793.81	5,734.81	-3.77	237.43	237.40	15.59	676,524.93	644,388.43
5,861.00	70.60	92.60	1,810.57	5,751.57	-5.63	276.95	276.91	16.52	676,523.07	644,427.95
5,904.00	77.80	92.60	1,822.27	5,763.27	-7.51	318.26	318.20	16.74	676,521.19	644,469.26
5,946.00	84.60	92.50	1,828.69	5,769.69	-9.36	359.70	359.63	16.19	676,519.34	644,510.70
5,989.00	87.20	92.00	1,831.76	5,772.76	-11.04	402.55	402.47	6.16	676,517.66	644,553.55
6,032.00	86.80	91.70	1,834.01	5,775.01	-12.43	445.47	445.38	1.16	676,516.27	644,596.47
6,117.00	87.60	92.10	1,838.17	5,779.17	-15.24	530.32	530.21	1.05	676,513.46	644,681.32
6,245.00	88.60	92.40	1,842.41	5,783.41	-20.26	658.15	658.00	0.82	676,508.44	644,809.15
6,374.00	89.10	91.40	1,845.00	5,786.00	-24.54	787.05	786.87	0.87	676,504.16	644,938.05
6,502.00	89.30	89.10	1,846.79	5,787.79	-25.10	915.03	914.84	1.80	676,503.60	645,066.03
6,629.00	88.90	88.20	1,848.78	5,789.78	-22.11	1,041.98	1,041.80	0.78	676,506.59	645,192.98
6,758.00	88.60	88.00	1,851.60	5,792.60	-17.83	1,170.88	1,170.73	0.28	676,510.87	645,321.88
6,886.00	88.20	87.70	1,855.17	5,796.17	-13.03	1,298.74	1,298.62	0.39	676,515.67	645,449.74
7,017.00	88.30	88.30	1,859.17	5,800.17	-8.46	1,429.59	1,429.50	0.46	676,520.24	645,580.59
7,148.00	88.30	87.80	1,863.06	5,804.06	-4.00	1,560.46	1,560.40	0.38	676,524.70	645,711.46
7,276.00	88.50	87.90	1,866.63	5,807.63	0.80	1,688.32	1,688.29	0.17	676,529.50	645,839.32
7,405.00	87.90	88.20	1,870.68	5,811.68	5.18	1,817.18	1,817.17	0.52	676,533.88	645,968.18
7,533.00	87.50	88.20	1,875.82	5,816.82	9.20	1,945.01	1,945.03	0.31	676,537.90	646,096.01
7,661.00	86.10	89.00	1,882.96	5,823.96	12.32	2,072.77	2,072.81	1.26	676,541.02	646,223.77
7,789.00	86.90	90.60	1,890.78	5,831.78	12.77	2,200.53	2,200.56	1.40	676,541.47	646,351.53
7,918.00	88.20	91.00	1,896.29	5,837.29	10.97	2,329.39	2,329.42	1.05	676,539.67	646,480.39
8,046.00	88.50	90.50	1,899.98	5,840.98	9.29	2,457.33	2,457.34	0.46	676,537.99	646,608.33
8,174.00	89.50	89.80	1,902.21	5,843.21	8.96	2,585.31	2,585.31	0.95	676,537.66	646,736.31
8,303.00	89.10	88.90	1,903.79	5,844.79	10.42	2,714.29	2,714.30	0.76	676,539.12	646,865.29
8,431.00	89.40	89.00	1,905.47	5,846.47	12.77	2,842.26	2,842.28	0.25	676,541.47	646,993.26
8,559.00	89.10	88.40	1,907.14	5,848.14	15.67	2,970.21	2,970.25	0.52	676,544.37	647,121.21

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8,688.00	89.50	88.00	1,908.72	5,849.72	19.72	3,099.14	3,099.20	0.44	676,548.42	647,250.14
8,819.00	90.10	88.80	1,909.17	5,850.17	23.38	3,230.08	3,230.17	0.76	676,552.08	647,381.08
8,947.00	89.00	87.80	1,910.18	5,851.18	27.18	3,358.02	3,358.13	1.16	676,555.88	647,509.02
9,076.00	86.90	89.50	1,914.79	5,855.79	30.22	3,486.89	3,487.01	2.09	676,558.92	647,637.89
9,207.00	87.10	90.90	1,921.65	5,862.65	29.76	3,617.71	3,617.82	1.08	676,558.46	647,768.71
9,336.00	88.80	90.80	1,926.26	5,867.26	27.85	3,746.60	3,746.71	1.32	676,556.55	647,897.60
9,464.00	90.10	90.90	1,927.49	5,868.49	25.95	3,874.58	3,874.67	1.02	676,554.65	648,025.58
9,595.00	90.10	90.50	1,927.26	5,868.26	24.35	4,005.57	4,005.64	0.31	676,553.05	648,156.57
9,724.00	89.60	90.20	1,927.60	5,868.60	23.56	4,134.57	4,134.63	0.45	676,552.26	648,285.57
9,852.00	89.40	90.30	1,928.72	5,869.72	23.00	4,262.56	4,262.62	0.17	676,551.70	648,413.56
9,940.00	89.80	91.00	1,929.33	5,870.33	22.00	4,350.55	4,350.60	0.92	676,550.70	648,501.55
Final Phoenix Survey										
10,009.00	89.80	91.00	1,929.57	5,870.57	20.80	4,419.54	4,419.58	0.00	676,549.50	648,570.54
Projection to TD										

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
560.00	559.95	-2.62	5.93	Tie-on to Gyrodata Gyro Survey
739.00	738.94	-2.11	7.93	First Phoenix Survey
9,940.00	5,870.33	22.00	4,350.55	Final Phoenix Survey
10,009.00	5,870.57	20.80	4,419.54	Projection to TD

APACHE CORPORATION

WELLBORE DIAGRAM AND INFORMATION

Well Name: Crow Federal #37H

Date: 10/29/2014

County: Eddy

Field: Cedar Lake

State: New Mexico

Spud Date: 6/7/2014

Surface:	995' FSL & 525' FWL
	Lot M, Section 3, T-17-S, R-31-E
	Eddy County, New Mexico
BHL:	986' FSL & 337' FEL
	Lot P, Section 3, T-17-S, R-31-E
	Eddy County, New Mexico
Elevation:	3,930'
KB:	11'
TMD:	10,009'
API #:	30-015-42142

Hole Size
= 17-1/2"

Hole Size
= 12-1/4"

Hole Size =
8-3/4" to LP

KOP = 5,347'

Hole Size in
Lateral = 7-7/8"

13-3/8" 48# H-40 STC csg set @ 658'
Cmt w/ 920 sx (Circ Surf)

9-5/8" 36# J-55 csg set @ 3,507'
Cmt w/ 1,410 sx (Circ Surf)

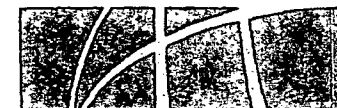
Tapered Casing String:
7" 29# L-80 LTC csg to x-over @ 5,321'
Tapering to 5-1/2" 20# L-80 LTC set @ 10,002'
Cmt w/ 765 sx (TOC @ 125')

Packer sleeve assembly interval: 6,166-9,834'

TVD = 5871'

PBMD = 9,980'
TMD = 10,009'

Hydraulic Fracturing Fluid Product Component Information Disclosure



**BAKER
HUGHES**

First Fracture Date:	10/9/2014
Last Fracture Date:	10/11/2014
State:	NEW MEXICO
County:	EDDY
API Number:	30015421420000
Operator Name:	APACHE CORP
Well Name and Number:	CROW FEDERAL 37H
Longitude:	-103.84926
Latitude:	32.85792
Long/Lat Projection:	NAD27
Production Type:	OIL
True Vertical Depth (TVD):	5,870
Total Water Volume (gal):	3,018,540

Total Chemical Mass (lbs):	28,401,846
Total Max. Ingredient Mass (lbs):	28,424,323
Total Base Non-Water Volume (gal):	0

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
Water	Operator	Carrier	Water	7732-18-5	100.00%	88.5438%	
HCl, 10.1 - 15%	Baker Hughes	Acidizing	Listed with Chemicals in Ingredients	N/A		2.0986%	SmartCare Product
Superset-W, 55 gal drum	Baker Hughes	Activator	Listed with Chemicals in Ingredients	N/A		0.0638%	
Alpha 125	Baker Hughes	Biocide	Listed with Chemicals in Ingredients	N/A		0.0171%	SmartCare Product
ClayCare, ClayTreat 2C, 330 gal tote	Baker Hughes	Clay Control	Listed with Chemicals in Ingredients	N/A		0.0883%	SmartCare Product
CI-27	Baker Hughes	Corrosion Inhibitor	Listed with Chemicals in Ingredients	N/A		0.0034%	
FRW-18	Baker Hughes	Friction Reducer	Listed with Chemicals in Ingredients	N/A		0.0945%	SmartCare Product
Ferrotrol 280L	Baker Hughes	Iron Control	Listed with Chemicals in Ingredients	N/A		0.0063%	
NE-35, 330 gal tote	Baker Hughes	Non-emulsifier	Listed with Chemicals in Ingredients	N/A		0.0039%	
Sand, White, 40/70	Baker Hughes	Proppant	Listed with Chemicals in Ingredients	N/A		3.2111%	
Sand, White, 100 mesh	Baker Hughes	Proppant	Listed with Chemicals in Ingredients	N/A		3.3748%	

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
Super LC, 40/70	Baker Hughes	Proppant	Listed with Chemicals in Ingredients	N/A		2.3336%	
S-200	Baker Hughes	Surfactant	Listed with Chemicals in Ingredients	N/A		0.0906%	
Chemical Ingredients	Baker Hughes	Treatment System	2-Mercaptoethanol	60-24-2	100.000000000%	0.006298%	
			Alcohols, C10-16, ethoxylated propoxylated	69227-22-1	5.000000000%	0.004528%	
			Alcohols, C12-16, ethoxylated	68551-12-2	2.000000000%	0.001889%	
			Alcohols, C6-12, ethoxylated propoxylated	68937-66-6	5.000000000%	0.004528%	
			Alcohols, ethoxylated	68551-12-2	4.000000000%	0.003623%	
			Amines, unsatd, alkyl, ethoxylated	68155-39-5	2.000000000%	0.001811%	
			Ammonium Chloride	12125-02-9	3.000000000%	0.002834%	
			Ammonium Hydroxide	1336-21-6	5.000000000%	0.000315%	
			Benzenesulfonic acid, hexadecyl(sulfophenoxy)-, disodium salt	65143-89-7	2.000000000%	0.000078%	
			Choline Chloride	67-48-1	75.000000000%	0.066197%	
			Crystalline Silica (Quartz)	14808-60-7	100.000000000%	6.580632%	
			Cupric Chloride	7447-39-4	5.000000000%	0.000315%	
			Ethanol	64-17-5	10.000000000%	0.009057%	
			Fatty Acids	61790-12-3	30.000000000%	0.001018%	
			Formaldehyde	50-00-0	0.050000000%	0.000002%	
			Glutaraldehyde	111-30-8	30.000000000%	0.005128%	
			Hexamethylenetetramine	100-97-0	0.010000000%	0.000233%	
			Hydrochloric Acid	7647-01-0	15.000000000%	0.314546%	
			Hydrotreated Light Distillate	64742-47-8	30.000000000%	0.028335%	
			Methanol	67-56-1	60.000000000%	0.033978%	
			Nonionic glycol ester	68400-71-5	25.000000000%	0.000974%	
			Oleamide, DEA	93-83-4	2.000000000%	0.001889%	
			Olefin	64743-02-8	5.000000000%	0.000170%	
			Phenolic Resin	9003-35-4	5.000000000%	0.116587%	
			Poly (Oxyethylene) Nonylphenol Ether	9016-45-9	50.000000000%	0.031900%	
			Poly (acrylamide-co-acrylic acid), partial sodium salt	62649-23-4	30.000000000%	0.028335%	
			Polyoxyalkylenes	68951-67-7	30.000000000%	0.001018%	
			Polyoxyethylene Sorbitan Monooleate	9005-65-6	0.500000000%	0.000472%	
			Propargyl Alcohol	107-19-7	10.000000000%	0.000339%	
			Propylene Glycol	57-55-6	15.000000000%	0.000584%	

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
			Silicon Dioxide (Silica Sand)	14808-60-7	97.000000000%	2.261783%	
			Sodium Chloride	7647-14-5	5.000000000%	0.004740%	
			Sodium lauriminodipropionate	14960-06-6	1.000000000%	0.000039%	
			Sodium octylimodipropionate	94441-92-6	3.000000000%	0.000117%	
			Sorbitan Monooleate	1338-43-8	0.500000000%	0.000472%	
			Thiourea Polymer	68527-49-1	30.000000000%	0.001018%	
			Water	7732-18-5	85.000000000%	1.940394%	
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%

All component information listed was obtained from the supplier's Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration's (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.