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FORM NO. 22 R 10/09		SUBMIT IN QUADRUPPLICATE TO:		ARM 36.22.307 ARM 36.22.601	Lease Name: Jill 26-25
<b>MONTANA BOARD OF OIL AND GAS CONSERVATION</b> 2535 ST. JOHNS AVENUE, BILLINGS, MONTANA 59102					Lease Type (Private/State/Federal): Private
Application for Permit To:					Well Number: #3H
Drill <input checked="" type="checkbox"/>	Deepen <input type="checkbox"/>	Re-enter <input type="checkbox"/>			
Oil <input checked="" type="checkbox"/>	Gas <input type="checkbox"/>	Other <input type="checkbox"/>			
Operator: Kraken Operating, LLC Address: 9821 Katy Freeway, Suite 460 City: Houston State: TX Zip: 77024 Telephone Number: 713-360-7705				Field Name or Wildcat: Wildcat	
Surface Location of Well (quarter-quarter and footage measurements): 2526' FSL & 280' FEL of NESE Sec 27-T27N-R57E				Unit Name (if applicable): N/A	
Proposed Total Depth and Bottom-hole Location(s) if directional or horizontal well: TD: 19,930' MD, 10,022' TVD BHL: 2640' FNL & 205' FEL NESE Sec 25-T27N-R57E				Objective Formation(s): Bakken	
				Township, Range, and Section: T27N, R57E, Section 27	
				County: Roosevelt	
				Elevation (indicate GL or KB): GL: 1907'	
Size and description of drilling/spacing unit and applicable order, if any: 1280 acres ( Sections 25 & 26, T27N-R57E) / Order: 2016-050			Formation at total depth: Bakken		Anticipated Spud Date: 4/7/2018

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Hole Size	Casing Size	Weight / Foot	Grade (API)	Depth	Sacks of Cement	Type of Cement
13 1/2	9 5/8	36	J-55	1,735'	571	See Attached
8 3/4	7	32	P-110	10,192'	678	See Attached
6	4 1/2	11.6 & 13.5	P-110	19,930'	545	See Attached

**Describe Proposed Operations:**  
Describe or attach labeled diagram of blowout preventer equipment. Indicate if air drilled or describe mud program.

Kraken Operating, LLC requests variance to not run open hole logs on the Jill 26-25 #3H. Offset logs will be the Harmon-State 1 (API: 25-085-21511), SHL: 660' FSL & 800' FWL Section 27-T27N-R57E.

<b>BOARD USE ONLY</b>		The undersigned hereby certifies that the information contained on this application is true and correct:
Approved (date) <u>MAR 15 2018</u>	Permit Fee <u>\$150.00</u>	
By <u>[Signature]</u>	Check Number <u>232600</u>	
Title <u>Petroleum Engineer</u>	Permit Expires <u>SEP 15 2018</u>	
	Permit Number <u>322104</u>	Signed (Agent) <u>[Signature]</u>
	API Number: 25 - <u>085</u> - <u>21995</u>	Title <u>Sr. Drilling Engineer</u>
THIS PERMIT IS SUBJECT TO THE CONDITIONS OF APPROVAL STATED ON THE BACK		Date <u>2/19/18</u>
		Telephone Number <u>713-494-4049</u>

Samples Required: NONE  ALL \_\_\_\_\_ FROM \_\_\_\_\_ feet to \_\_\_\_\_ feet

Core chips to address below, full cores to USGS, Core Laboratory, Arvada, CO. Required samples must be washed, dried and delivered prepaid to:

Montana Board of Oil and Gas Conservation  
2535 St. Johns Avenue  
Billings, MT 59102

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**SUPPLEMENTAL INFORMATION**

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Note: Additional information or attachments may be required by Rule or by special request.

1. Attach a survey plat certified by a registered surveyor. The survey plat must show the location of the well with reference to the nearest lines of an established public survey.
2. Attach an 8 1/2 x 11" photocopy of that portion of a topographic map showing the well location, the access route from county or other established roads, residences, and water wells within a 1/2 mile radius of the well.
3. Attach a sketch of the well site showing the dimensions and orientation of the site, the size and location of pits, topsoil stockpile, and the estimated cut/fill at the corners and centerstake. (Note: the diagram need not be done by an engineer or surveyor). Attach a sketch of a top view and two side views of the reserve pit(s), if utilized. The reserve pit sketch must show the length, width, depth, cut and fill, amount of freeboard, area of topsoil stockpile, and the height and width of berms.
4. Describe the type and amount of material or liner, if any, to be used to seal the reserve pit. If a synthetic liner is used, indicate the liner thickness (mils), bursting strength, tensile strength, tear strength, puncture resistance, hydrostatic resistance, or attach the manufacturer's specifications.
5. Describe the proposed plan for the treatment and/or the disposal of reserve pit fluids and solids after the well is drilled. If the operator intends to dispose of or treat the reserve pit contents off-site, specify the location and the method of waste treatment and disposal. (Note: The operator must comply with all applicable federal, state, county, and local laws and regulations with regard to the handling, transportation, treatment, and disposal of solid wastes.)
6. Does construction of the access road or location, or some other aspect of the drilling operation require additional federal, state, or local permits or authorizations? If yes, indicate the type of permit or authorization required:
  - No additional permits needed
  - 310 Permit (apply through county conservation district)
  - Air quality permit (apply through Montana Department of Environmental Quality)
  - Water discharge permit (apply through Montana Department of Environmental Quality)
  - Water use permit (apply through Montana Department of Natural Resources and Conservation)
  - Solid waste disposal permit (apply through Montana Department of Environmental Quality)
  - State lands drilling authorization (apply through Montana Department of Natural Resources and Conservation)
  - Federal drilling permit (specify agency)
  - Other federal, state, county, or local permit or authorization: (specify type) \_\_\_\_\_

**NOTICES:**

1. Date and time of spudding must be reported to the Board verbally or in writing within 72 hours after the commencement of drilling operations.
2. The operator must give notice of drilling operations to the surface owner as required by Section 82-10-503, MCA, before the commencement of any surface activity.

**BOARD USE ONLY**

**CONDITIONS OF APPROVAL**

The operator must comply with the following condition(s) of approval:

**WARNING: Failure to comply with conditions of approval may void this permit.**



## **Typical Completion Procedure Bakken or Three Forks**

### **After Drilling Rig Moves Off Location**

1. MIRU wire line, RIH with gauge ring to at least 100 ft beyond liner top, POOH.
2. RIH and set retrievable plug in liner hanger or in completion liner, POOH with wireline. Run CBL-CCL-GR and casing inspection tool from liner top to surface.
3. Pressure test 7" (intermediate) casing and frac valve. Retrieve plug in liner top.
4. MI and fill frac tanks with fresh water to ensure there will be enough water for the designed frac job.
5. MIRU flowback company. Rig flowback iron from wellhead to 4 phase separator to open top tank.
6. MIRU all frac company equipment, wire line, and all ancillary equipment necessary to frac well.
7. Pump frac job as designed. RDMO frac equipment and wire line.
8. MIRU coiled tubing to mill out frac plugs.
9. Begin flowback of well. Once well has cleaned up, direct full well stream to production battery.
10. RDMO flowback equipment and crew.
11. Turn well over to production department.

### **Note:**

If casing inspection log indicates excessive wear in 7" casing or other conditions require a frac string to be run, the CBL-GR-CCL and casing inspection tool will be run and the 7" casing pressure tested to a lower rating. After the frac string is run, a retrievable plug will be set and the frac string tested prior to the frac.

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Kraken Operating, LLC

## 48 Stage P&P Design

State: MT  
County: Roosevelt County  
API#: TBD  
AFE#: TBD

Prepared for: Matt Bauerschlag  
Prepared by: Alejandro Haiek

February 4, 2016

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**Completion Data**

**Contact Information**

Company:	<b>Kraken Operating, LLC</b>
Company Rep.:	Matt Bauerschlag
Billing Address:	9821 Katy Freeway Suite 460 Houston, TX 77024
Sales Engineer:	Alejandro Haiek
Contact Info:	(661) 345-3450

**Well Information**

Well Name:	<b>48 Stage P&amp;P Design</b>
State:	MT
County:	Roosevelt County
API No.:	TBD
Legal:	S - T - R
Formation:	Middle Bakken

**Completion Information**

Completion Type:	Plug & Perf
No. Stages:	48
Stimulation Fluid:	XL Borate
BHST:	200 F
AFE No.:	TBD

**Intermediate Casing**

Depth	Size & Weight	Grade	Vol. (bbl)
9,000'	7.0" - 29 lb/ft	P-110	334.3
			0.0
			0.0
			0.0
			0.0

**Liner/Production String**

Type	Depth	Size & Weight	Grade	Vol. (bbl)
<b>Liner Top</b>	9,000'			<b>139.9</b>
Liner	20,000'	4.5" - 11.6 lb/ft	P-110	
Frac String	9,000'	4.5" - 11.6 lb/ft	L-80	

**Stage Intervals**

Stage #	Top	Btm	Vol. (bbl)
Stage 1	19,700'	19,875'	307.5
Stage 2	19,500'	19,675'	304.4
Stage 3	19,300'	19,475'	301.3
Stage 4	19,100'	19,275'	298.2
Stage 5	18,900'	19,075'	295.1
Stage 6	18,700'	18,875'	292.0
Stage 7	18,500'	18,675'	288.8
Stage 8	18,300'	18,475'	285.7
Stage 9	18,100'	18,275'	282.6
Stage 10	17,900'	18,075'	279.5
Stage 11	17,700'	17,875'	276.4
Stage 12	17,500'	17,675'	273.3
Stage 13	17,300'	17,475'	270.2
Stage 14	17,100'	17,275'	267.1
Stage 15	16,900'	17,075'	264.0
Stage 16	16,700'	16,875'	260.9
Stage 17	16,500'	16,675'	257.8
Stage 18	16,300'	16,475'	254.7
Stage 19	16,100'	16,275'	251.6
Stage 20	15,900'	16,075'	248.4
Stage 21	15,700'	15,875'	245.3
Stage 22	15,500'	15,675'	242.2
Stage 23	15,300'	15,475'	239.1
Stage 24	15,100'	15,275'	236.0
Stage 25	14,900'	15,075'	232.9

Stage #	Top	Btm	Vol. (bbl)
Stage 26	14,700'	14,875'	229.8
Stage 27	14,500'	14,675'	226.7
Stage 28	14,300'	14,475'	223.6
Stage 29	14,100'	14,275'	220.5
Stage 30	13,900'	14,075'	217.4
Stage 31	13,700'	13,875'	214.3
Stage 32	13,500'	13,675'	211.1
Stage 33	13,300'	13,475'	208.0
Stage 34	13,100'	13,275'	204.9
Stage 35	12,900'	13,075'	201.8
Stage 36	12,700'	12,875'	198.7
Stage 37	12,500'	12,675'	195.6
Stage 38	12,300'	12,475'	192.5
Stage 39	12,100'	12,275'	189.4
Stage 40	11,900'	12,075'	186.3
Stage 41	11,700'	11,875'	183.2
Stage 42	11,500'	11,675'	180.1
Stage 43	11,300'	11,475'	177.0
Stage 44	11,100'	11,275'	173.9
Stage 45	10,900'	11,075'	170.7
Stage 46	10,700'	10,875'	167.6
Stage 47	10,500'	10,675'	164.5
Stage 48	10,300'	10,475'	161.4
Stage 49			0.0
Stage 50			0.0

*Estimated completions data only.*

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Operator: Kraken Operating, LLC  
Well Name: 48 Stage P&P Design  
County: Roosevelt County  
API#: TBD

**Stimulation Summary**

<u>Horsepower Requirements</u>	
Max Pressure:	TBD
Anticipated Treating Pressure:	7,000 psi
Annulus Pressure Required:	TBD
Design Rate:	45 bpm
Min. HHP Required:	7,721 hhp

<u>Fluid Requirements</u>	
Acid Volume:	24,000 gal
Pump Down Volume:	bbbl
Total Clean Fluid:	131,314 bbl
Tanks Required:	292

<u>Chemical Requirements</u>			
Gel	83,760 lb	Corr. Inhib.	240 gal
I - XL	4,734 gal	FE Cont.	120 gal
pH	1,578 gal		
FR	429 gal		
Surf.	5,045 gal	Cap AP	1,578 lb
Bio.	1,261 lb	AP	258 lb

<u>Proppant Requirements</u>	
40-70 Mesh White Sand	192,000 lb
30-50 Mesh White Sand	9,808,000 lb

Notes:

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Operator: Kraken Operating, LLC  
Well Name: 48 Stage P&P Design  
County: Roosevelt County  
API#: TBD

**Fluid Descriptions**

15% HCl		per 1,000 gal
Corrosion Inhibitor		10.0 gal
Iron Control		5.0 gal

SlickRock		per 1,000 gal
Anionic Friction Reducer		0.50 gal
Surfactant		1.00 gal
Dry Biocide (DAZOMET)		0.25 lb

20# Linear		per 1,000 gal
PSG Polymer		20.00 lb
Surfactant		1.00 gal
Dry Biocide (DAZOMET)		0.25 lb
AP Breaker		0.25 lb

20# RockSolid		per 1,000 gal
PSG Polymer		20.00 lb
Instant Borate Crosslinker		1.50 gal
High pH Activator		0.50 gal
Surfactant		1.00 gal
Dry Biocide (DAZOMET)		0.25 lb
Encapsulated AP Breaker		0.50 lb

**NOTE:** Fluid descriptions are based upon lab results from previous treatments. Actual systems will be determined from lab tests conducted prior to the treatment.

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Operator: Kraken Operating, LLC  
 Well Name: 48 Stage P&P Design  
 County: Roosevelt County  
 API#: TBD

**Pump Schedule**

Treatment No.	Stage Name	Fluid Type	Rate (bpm)	Fluid Volume (gal)	Comm. Fluid Volume (gal)	Slurry Volume (gal)	Comm. Slurry Volume (gal)	Stage Time (mm:ss)	Comm. Pump Time (h:mm:ss)	Prop Conc. (ppa)	Proppant Type	Prop Stage Volume (lbs)	Comm. Prop Volume (lbs)
1	Injection	SlickRock	12	500	500	500	500	01:00	0:01:00			-	-
	Acid	15% HCl	12	500	1,000	500	1,000	01:00	0:01:59			-	-
	Pad	SlickRock	45	8,000	9,000	8,000	9,000	04:14	0:06:13			-	-
	Scour	20# Linear	45	8,000	17,000	8,181	17,181	04:20	0:10:33	0.50	40-70 Mesh White Sand	4,000	4,000
	Pad	20# Linear	45	13,500	30,500	13,500	30,681	07:09	0:17:41			-	4,000
	1.0 PPA	20# RockSolid	45	9,500	40,000	9,930	40,611	05:15	0:22:57	1.00	30-50 Mesh White Sand	9,500	13,500
	2.0 PPA	20# RockSolid	45	9,500	49,500	10,360	50,971	05:29	0:28:25	2.00	30-50 Mesh White Sand	19,000	32,500
	3.0 PPA	20# RockSolid	45	11,167	60,667	12,683	63,653	06:43	0:35:08	3.00	30-50 Mesh White Sand	33,501	66,001
	4.0 PPA	20# RockSolid	45	25,500	86,167	30,115	93,769	15:56	0:51:04	4.00	30-50 Mesh White Sand	102,000	168,001
	4.0 PPA	20# RockSolid	45	10,083	96,250	11,908	105,676	06:18	0:57:22	4.00	30-50 Mesh White Sand	40,332	208,333
Flush	SlickRock	45	12,915	109,165	12,915	118,591	06:50	1:04:12			-	208,333	
2-48	Pumpdown	SlickRock	12	10,000	5,436,641	10,000	5,879,682	19:50	63:49:44			-	9,791,651
	Acid	15% HCl	12	500	5,437,141	500	5,880,182	01:00	63:50:43			-	9,791,651
	Pad	SlickRock	45	8,000	5,445,141	8,000	5,888,182	04:14	63:54:57			-	9,791,651
	Scour	20# Linear	45	8,000	5,453,141	8,181	5,896,363	04:20	63:59:17	0.50	40-70 Mesh White Sand	4,000	9,795,651
	Pad	20# Linear	45	13,500	5,466,641	13,500	5,909,863	07:09	64:06:25			-	9,795,651
	1.0 PPA	20# RockSolid	45	9,500	5,476,141	9,930	5,919,793	05:15	64:11:41	1.00	30-50 Mesh White Sand	9,500	9,805,151
	2.0 PPA	20# RockSolid	45	9,500	5,485,641	10,360	5,930,153	05:29	64:17:09	2.00	30-50 Mesh White Sand	19,000	9,824,151
	3.0 PPA	20# RockSolid	45	11,167	5,496,808	12,683	5,942,836	06:43	64:23:52	3.00	30-50 Mesh White Sand	33,501	9,857,652
	4.0 PPA	20# RockSolid	45	25,500	5,522,308	30,115	5,972,951	15:56	64:39:48	4.00	30-50 Mesh White Sand	102,000	9,959,652
	4.0 PPA	20# RockSolid	45	10,083	5,532,391	11,908	5,984,859	06:18	64:46:06	4.00	30-50 Mesh White Sand	40,332	9,999,984
Flush	SlickRock	45	6,780	5,539,171	6,780	5,991,638	03:35	64:49:41			-	9,999,984	

Fluid Type	Volume
15% HCl	24,000 gal
SlickRock	1,327,171 gal
20# Linear	1,032,000 gal
20# RockSolid	3,156,000 gal
<b>Total</b>	<b>131,885 bbl</b>

Proppant Type	Total
40-70 Mesh White Sand	192,000 lb
30-50 Mesh White Sand	9,808,000 lb
	lb
	lb
<b>Total</b>	<b>10,000,000 lb</b>

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Operator: Kraken Operating, LLC  
 Well Name: 48 Stage P&P Design  
 County: Roosevelt County  
 API#: TBD

**Additives**

Treatment No.	Stage Name	Fluid Type	Fluid Volume (gal)	Gel (ppt)	I-XL (gpt)	pH (gpt)	FR (gpt)	Surf. (gpt)	Bio. (ppt)	Corr. Inhib. (gpt)	FE Cont. (gpt)	Add 9 (gpt)	Add 10 (gpt)	Breaker		
														Cap AP (ppt)	AP (ppt)	
1	Injection	SlickRock	500				0.5	1	0.25							
	Acid	15% HCl	500							10	5					
	Pad	SlickRock	8,000				0.5	1	0.25							
	Scour	20# Linear	8,000	20				1	0.25							0.25
	Pad	20# Linear	13,500	20				1	0.25							0.25
	1.0 PPA	20# RockSolid	9,500	20	1.5	0.5		1	0.25							0.5
	2.0 PPA	20# RockSolid	9,500	20	1.5	0.5		1	0.25							0.5
	3.0 PPA	20# RockSolid	11,167	20	1.5	0.5		1	0.25							0.5
	4.0 PPA	20# RockSolid	25,500	20	1.5	0.5		1	0.25							0.5
	4.0 PPA	20# RockSolid	10,083	20	1.5	0.5		1	0.25							0.5
Flush	SlickRock	12,915					0.5	1	0.25							
2-48	Pumpdown	SlickRock	10,000													
	Acid	15% HCl	500							10	5					
	Pad	SlickRock	8,000				0.5	1	0.25							
	Scour	20# Linear	8,000	20				1	0.25							0.25
	Pad	20# Linear	13,500	20				1	0.25							0.25
	1.0 PPA	20# RockSolid	9,500	20	1.5	0.5		1	0.25							0.5
	2.0 PPA	20# RockSolid	9,500	20	1.5	0.5		1	0.25							0.5
	3.0 PPA	20# RockSolid	11,167	20	1.5	0.5		1	0.25							0.5
	4.0 PPA	20# RockSolid	25,500	20	1.5	0.5		1	0.25							0.5
	4.0 PPA	20# RockSolid	10,083	20	1.5	0.5		1	0.25							0.5
Flush	SlickRock	6,780					0.5	1	0.25							

	Gel	I-XL	pH	FR	Surf.	Bio.	Corr. Inhib.	FE Cont.	Add 9	Add 10	Cap AP	AP
	lb	gal	gal	gal	gal	lb	gal	gal	gal	gal	lb	lb
<b>Total</b>	<b>83,760</b>	<b>4,734</b>	<b>1,578</b>	<b>429</b>	<b>5,045</b>	<b>1,261</b>	<b>240</b>	<b>120</b>	<b>-</b>	<b>-</b>	<b>1,578</b>	<b>258</b>

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**Hydraulic Fracturing Fluid Product Component Information Disclosure**

Standard Operating, LLC 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)**
Water	Operator	Carrier	Water	7732-18-5	100.00000	84.15251
Crystalline Silica, Quartz / Unimin Corp	Frac Vendor	Sand	Crystalline Silica in the form of Quartz	14808-60-7	99.90000	14.80390
Produced Brine Water	Operator	Carrier	Produced Brine Water	7732-18-5	100.00000	0.69021
FRP-1S	Frac Vendor	Friction reduction	Petroleum distillates, hydrotreated light	64742-47-8	45.00000	0.03147
HCL-15	Frac Vendor	Solvent	Poly(oxy-1,2-ethanediyl), a-iridecy-l-w-hydroxy-, branched	69011-36-5	3.00000	0.00210
B-2512WA	Aquaserv	Biocide	Water	7732-18-5	85.00000	0.01603
			Hydrochloric Acid	7647-01-0	15.00000	0.00283
			Acetone	67-64-1	40.00000	0.00144
			Glutaraldehyde	111-30-8	30.00000	0.00108
			Didecyl dimethyl ammonium	7173-51-5	10.00000	0.00036
			Quaternary ammonium compounds, benzyl-C12-C16-	68424-85-1	5.00000	0.00018
			Ethanol	64-17-5	3.00000	0.00011
SFT-92W	Frac Vendor	Flowback Additive	Methanol	67-56-1	30.00000	0.00138
			Benzenesulfonic acid, mono-c10-14-alkyl derivs	68584-22-5	10.00000	0.00046
			Sulfonic acids, C14-16-alkane hydroxy and C14-16-alkene, sodium	68439-57-6	5.00000	0.00023
Liberty Clean Out Fluid	Frac Vendor	Cleanup Solution	Sodium Hydroxide	1310-73-2	1.00000	0.00005
Bioclear 5000	Lubrizol	Biocide	Naphtha (petroleum) hydrotreated heavy	64742-96-7	100.00000	0.00119
ACI-102HT	WST	Acid Corrosion Inhibitor	2,2-dibromo-3-nitriopropanamide	10222-01-2	10.00000	0.00010
			Ethylene Glycol	107-21-1	40.00000	0.00003
			Water	7732-18-5	25.00000	0.00002
			Dimethyl Formamide	68-12-2	15.00000	0.00001
			Isoquinoline	119-65-3	10.00000	0.00001
			2-Butoxyethanol	111-76-2	5.00000	0.00000

			C8-C10 Alcohol	35566-12-7	5.00000	0.00000
			Cinnamaldehyde	104-55-2	5.00000	0.00000
			2-Methyl Quinoline	91-53-4	5.00000	0.00000
			Nonyphenol 15-Mole Ethoxylate	9016-45-9	5.00000	0.00000
			Triethyl Phosphate	78-40-0	5.00000	0.00000
			Quinoline	91-22-5	2.00000	0.00000
IC-50S	WST		Iron Control			
			2-hydroxypropane-1,2,3-tricarboxylic acid	77-92-9	60.00000	0.00008
DVA-75	Frac Vendor		Diverting Agent			
			Polyacide Resin	9051-89-2	100.00000	0.00007
WA-100	WST		Wetting Agent			
			Ethoxylated Decyl Alcohol	78330-20-8	40.00000	0.00001

\* 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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