SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

Received
FEB 22 2016
ND Oil & Gas Division

Well File No. **30789**

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

- [ ] Notice of Intent — Approximate Start Date
- [x] Report of Work Done — Date Work Completed: **November 22, 2015**
- [ ] Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. — Approximate Start Date

- [ ] Drilling Prognosis
- [ ] Redrilling or Repair
- [ ] Casing or Liner
- [ ] Plug Well
- [ ] Supplemental History
- [ ] Temporarily Abandon
- [ ] Other **Well is now on pump**
- [ ] Spill Report
- [ ] Shooting
- [ ] Acidizing
- [ ] Fracture Treatment
- [x] Change Production Method
- [ ] Reclamation

Well Name and Number				
Kline Federal 5300 31-18 15T				
Footages	Qtr-Qtr	Section	Township	Range
2556 F S L 238 F W L	**LOT3**	**18**	**153 N**	**100 W**
Field	Pool	County		
Baker	**Bakken**	**McKenzie**		

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

Effective 11/22/2015 the above referenced well is on pump.

End of Tubing: 2-7/8" L-80 tubing @ 10075'

Pump: ESP @ 9790'

Company		Telephone Number
Oasis Petroleum North America LLC		**281-404-9436**
Address		
1001 Fannin, Suite 1500		
City	State	Zip Code
Houston	**TX**	**77002**
Signature	Printed Name	
	Jennifer Swenson	
Title	Date	
Regulatory Specialist	**February 17, 2016**	
Email Address		
jswenson@oasispetroleum.com		

FOR STATE USE ONLY

- [x] Received
- [ ] Approved

Date: 3-8-2016

By: Taylor Roth

Title: TAYLOR ROTH
Engineering Technician

TH

AUTHORIZATION TO PURCHASE AND TRANSPORT OIL FROM LEASE – Form 8

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5698 (03-2000)

Well File No.
30789
NDIC CTB No.
0

228651

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND FOUR COPIES.

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
KLINE FEDERAL 5300 31-18 15T	LOT 3	18	153	100	Mckenzie

Operator	Telephone Number	Field
Oasis Petroleum North America LLC	(281) 404-9573	BAKER

Address	City	State	Zip Code
1001 Fannin, Suite 1500	Houston	TX	77002

Name of First Purchaser	Telephone Number	% Purchased	Date Effective
Oasis Petroleum Marketing LLC	(281) 404-9627	100%	September 24, 2015

Principal Place of Business	City	State	Zip Code
1001 Fannin, Suite 1500	Houston	TX	77002

Field Address	City	State	Zip Code

Transporter	Telephone Number	% Transported	Date Effective
Hiland Crude, LLC	(580) 616-2058	75%	September 24, 2015

Address	City	State	Zip Code
P.O. Box 3886	Enid	OK	73702

The above named producer authorizes the above named purchaser to purchase the percentage of oil stated above which is produced from the lease designated above until further notice. The oil will be transported by the above named transporter.

Other First Purchasers Purchasing From This Lease	% Purchased	Date Effective
Other First Purchasers Purchasing From This Lease	**% Purchased**	**Date Effective**
Other Transporters Transporting From This Lease	**% Transported**	**Date Effective**
Power Crude Transport	25%	September 24, 2015
Other Transporters Transporting From This Lease	**% Transported**	**Date Effective**
		September 24, 2015

Comments

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.		Date
		October 22, 2015
Signature	Printed Name	Title
	Brianna Salinas	Marketing Assistant

Above Signature Witnessed By:

Signature	Printed Name	Title
Laura Whitten	Laura Whitten	Marketing Analyst II

OCT 2015
RECEIVED
ND OIL & GAS
DIVISION

FOR STATE USE ONLY

Date Approved	OCT 27 2015
By	Eric Roberson
Title	Oil & Gas Production Analyst

WELL COMPLETION OR RECOMPLETION REPORT - FORM 6

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 2468 (04-2010)

OCT 2015 RECEIVED ND OIL & GAS DIVISION

TH

Well File No. 30789

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Designate Type of Completion
☑ Oil Well ☐ EOR Well ☐ Recompletion ☐ Deepened Well ☐ Added Horizontal Leg ☐ Extended Horizontal Leg
☐ Gas Well ☐ SWD Well ☐ Water Supply Well ☐ Other:

Well Name and Number **Kline Federal 5300 31-18 15T**			Spacing Unit Description **Sec. 17/18 T153N R100W**
Operator **Oasis Petroleum North America**		Telephone Number **(281) 404-9591**	Field **Baker**
Address **1001 Fannin, Suite 1500**			Pool **Bakken**
City **Houston**	State **TX**	Zip Code **77002**	Permit Type ☐ Wildcat ☑ Development ☐ Extension

LOCATION OF WELL

At Surface	Qtr-Qtr	Section	Township	Range	County
2556 F **S** L **238** F **W** L	**Lot 3**	**18**	**153 N**	**100 W**	**McKenzie**

Spud Date	Date TD Reached	Drilling Contractor and Rig Number	KB Elevation (Ft)	Graded Elevation (Ft)
March 7, 2015	**May 8, 2015**	**Nabors B22**	**2033**	**2008**

Type of Electric and Other Logs Run (See Instructions)
MWD/GR from KOP; CBL from int TD to surface

CASING & TUBULARS RECORD (Report all strings set in well)

Well Bore	String Type	String Size (Inch)	Top Set (MD Ft)	Depth Set (MD Ft)	Hole Size (Inch)	Weight (Lbs/Ft)	Anchor Set (MD Ft)	Packer Set (MD Ft)	Sacks Cement	Top of Cement
Surface Hole	**Surface**	**13 3/8**	**0**	**2073**	**17 1/2**	**54.5**			**922**	**0**
Vertical Hole	**Intermediate**	**7**	**0**	**11104**	**8 3/4**	**32**			**1453**	**4890**
Lateral1	**Liner**	**4 1/2**	**10125**	**20531**	**6**	**13.5**			**465**	

PERFORATION & OPEN HOLE INTERVALS

Well Bore	Well Bore TD Drillers Depth (MD Ft)	Completion Type	Open Hole/Perforated Interval (MD,Ft) Top	Bottom	Kick-off Point (MD Ft)	Top of Casing Window (MD Ft)	Date Perf'd or Drilled	Date Isolated	Isolation Method	Sacks Cement
Lateral1	**20542**	**Perforations**	**11104**	**20531**	**10200**		**07/13/2015**			

PRODUCTION

Current Producing Open Hole or Perforated Interval(s), This Completion, Top and Bottom, (MD Ft)							Name of Zone (If Different from Pool Name)
Lateral 1- 11104' to 20531'							Three Forks B1
Date Well Completed (SEE INSTRUCTIONS) **September 24, 2015**	Producing Method **Flowing**	Pumping-Size & Type of Pump				Well Status (Producing or Shut-In) **Producing**	
Date of Test **09/24/2015**	Hours Tested **24**	Choke Size **36 /64**	Production for Test	Oil (Bbls) **1479**	Gas (MCF) **1259**	Water (Bbls) **3586**	Oil Gravity-API (Corr.) °	Disposition of Gas **Sold**
Flowing Tubing Pressure (PSI)	Flowing Casing Pressure (PSI) **1500**	Calculated 24-Hour Rate	Oil (Bbls) **1479**	Gas (MCF) **1259**	Water (Bbls) **3586**	Gas-Oil Ratio **851**	

GEOLOGICAL MARKERS

Formation	MD (Ft)	TVD (Ft)
Dakota	5426	5426
Kibbey Lime	8321	8320
First Charles Salt	8467	8466
UB	9111	9110
Base Last Salt	9153	9152
Ratcliffe	9181	9180
Mission Canyon	9391	9390
Lodgepole	9947	9946
False Bakken	10722	10660
Scallion	10724	10662
Upper Bakken	10737	10671
Middle Bakken	10766	10687
Lower Bakken	10850	10729
Pronghorn	10876	10740
Three Forks	10916	10754

PLUG BACK INFORMATION

Well Bore	Type of Plug	Top (Ft)	Bottom (Ft)	Sacks Cement

CORES CUT

Top (Ft)	Bottom (Ft)	Formation	Top (Ft)	Bottom (Ft)	Formation

Drill Stem Test

Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								
Test Date	Formation	Top (Ft)	Bottom (Ft)	BH Temp (°F)	CL ppm	H2S ppm	Shut-in 1 (PSIG)	Shut-in 2 (PSIG)
Drill Pipe Recovery								
Sample Chamber Recovery								

Well Specific Stimulations

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
07/13/2015	Three Forks	19506	20531	4	13837	Barrels

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)
Sand Frac		404000	8765	36.2

Details
100 Mesh White: 35300
40/70 White: 144160
30/50 Ceramic: 224540

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units
07/31/2015	Three Forks	11104	19374	32	112321	Barrels

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)
Sand Frac		3721420	9222	72.0

Details
100 Mesh White: 272780
40/70 White: 1374400
30/50 Ceramic: 2074240

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

Date Stimulated	Stimulated Formation	Top (Ft)	Bottom (Ft)	Stimulation Stages	Volume	Volume Units

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)

Details

ADDITIONAL INFORMATION AND/OR LIST OF ATTACHMENTS

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.	Email Address	Date
	jswenson@oasispetroleum.com	10/20/2015
Signature	Printed Name	Title
	Jennifer Swenson	Regulatory Specialist

RYAN DIRECTIONAL SERVICES, INC.
A NABORS COMPANY

19510 Oil Center Blvd
Houston, TX 77073
Bus 281.443.1414
Fax 281.443.1676

Monday, May 11, 2015

State of North Dakota

Subject: **Surveys**

Re: **Oasis**
Kline Federal 5300 31-18 15T
McKenzie, ND

Enclosed, please find the original and one copy of the survey performed on the above-referenced well by Ryan Directional Services, Inc.. Other information required by your office is as follows:

Surveyor Name	*Surveyor Title*	*Borehole Number*	*Start Depth*	*End Depth*	*Start Date*	*End Date*	*Type of*	*TD Straight Line Projection*
Mike McCammond	MWD Operator	O.H.	0'	11058'	03/07/15	03/16/15	MWD	11058'
Sammy Hayman	MWD Operator	O.H.	11058'	20478'	05/02/15	05/07/15	MWD	20542'

If any other information is required please contact the undersigned at the letterhead address or phone number.

Douglas Hudson

Douglas Hudson
Well Planner

RYAN DIRECTIONAL SERVICES, INC.

Ryan Directional Services, Inc.
19510 Oil Center Blvd.
Houston, Texas 77073
Bus: 281.443.1414
Fax: 281.443.1676

Monday, March 16, 2015

State of North Dakota
County of McKenzie

Subject: **Survey Certification Letter**

Survey Company: **Ryan Directional Services, Inc.**
Job Number: **8762**
Survey Job Type: **Ryan MWD**
Customer: **Oasis Petroleum**
Well Name: **Kline Federal 5300 31-18 15T**
Rig Name: **Nabors B-22**

Surface: **48 4' 28.490 N / 103 36' 11.380 W**
A.P.I. No: **33-053-06755**
Location: **McKenzie, ND**
RKB Height: **2033'**
Distance to Bit: **62'**

Surveyor Name	*Surveyor Title*	*Borehole Number*	*Start Depth*	*End Depth*	*Start Date*	*End Date*	*Type of*	*TD Straight Line Projection*
Mike McCammond	MWD Supervisor	OH	114'	11058'	03/07/15	03/16/15	MWD	11120'

The data and calculations for this survey have been checked by me and conform to the calibration standards and operational procedures set forth by Ryan Directional Services, Inc. I am authorized and qualified to review the data, calculations and these reports; the reports represents true and correct Directional Surveys of this well based on the original data, the minimum curvature method, corrected to True North and obtained at the well site.

Mike McCammond
MWD Supervisor
Ryan Directional Services, Inc.

RYAN DIRECTIONAL SERVICES, INC.
A NABORS COMPANY

Ryan Directional Services, Inc.
19510 Oil Center Blvd.
Houston, Texas 77073
Bus: 281.443.1414
Fax: 281.443.1676

Thursday, May 07, 2015

State of North Dakota
County of McKenzie

Subject: **Survey Certification Letter**

Survey Company: **Ryan Directional Services, Inc.**
Job Number: **8833**
Survey Job Type: **Ryan MWD**
Customer: **Oasis Petroleum**
Well Name: **Kline Federal 5300 31-18 15 T**
Rig Name: **Nabors B-22**

Surface: **48° 4' 28.490 N / 103° 36' 11.380 W**
A.P.I. No: **33-053-06755**
Location: **McKenzie, North Dakota**
RKB Height: **2033'**
Distance to Bit: **64'**

Surveyor Name	*Surveyor Title*	*Borehole Number*	*Start Depth*	*End Depth*	*Start Date*	*End Date*	*Type of*	*TD Straight Line Projection*
Sammy Hayman	MWD Supervisor	OH	11058'	20478'	05/02/15	05/07/15	MWD	20542'

The data and calculations for this survey have been checked by me and conform to the calibration standards and operational procedures set forth by Ryan Directional Services, Inc. I am authorized and qualified to review the data, calculations and these reports; the reports represents true and correct Directional Surveys of this well based on the original data, the minimum curvature method, corrected to True North and obtained at the well site.

Sammy Hayman
MWD Supervisor
Ryan Directional Services, Inc.

Report #: 1

Date:

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 8762

SURVEY REPORT

Customer:	Oasis Petroleum
Well Name:	Kline Federal 5300 31-18 15T
Rig #:	Nabors B-22
API #:	33-053-06755
Calculation Method:	Minimum Curvature Calculation

MWD Operator:	M McCammond / S Hayman
Directional Drillers:	D Rakstad / M Bader
Survey Corrected To:	True North
Vertical Section Direction:	90
Total Correction:	8.30
Temperature Forecasting Model (Chart Only):	Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
Tie in to Gyro Surveys									
Tie In	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	114	0.70	51.90	33.00	114.00	0.55	0.43	0.55	0.61
2	176	1.10	69.30	33.00	175.99	1.40	0.87	1.40	0.77
3	238	1.10	67.20	39.00	237.98	2.51	1.31	2.51	0.07
4	300	1.70	78.20	41.00	299.96	3.96	1.73	3.96	1.06
5	**362**	**0.90**	**64.70**	**44.00**	**361.94**	**5.30**	**2.13**	**5.30**	**1.37**
6	424	0.90	76.80	48.00	423.94	6.21	2.45	6.21	0.31
7	486	0.90	73.70	53.00	485.93	7.15	2.70	7.15	0.08
8	520	0.60	83.10	57.00	519.92	7.59	2.79	7.59	0.95
9	580	0.90	74.70	60.00	579.92	8.35	2.96	8.35	0.53
10	**640**	**0.40**	**93.70**	**64.00**	**639.92**	**9.02**	**3.07**	**9.02**	**0.90**
11	700	0.40	30.60	69.00	699.91	9.33	3.23	9.33	0.70
12	760	0.30	118.80	73.00	759.91	9.58	3.34	9.58	0.82
13	820	0.30	107.40	75.00	819.91	9.86	3.21	9.86	0.10
14	880	0.20	184.00	77.00	879.91	10.01	3.06	10.01	0.53
15	**940**	**0.40**	**244.60**	**78.00**	**939.91**	**9.81**	**2.87**	**9.81**	**0.58**
16	1000	0.80	222.00	78.00	999.91	9.34	2.47	9.34	0.76
17	1060	0.80	219.10	78.00	1059.90	8.80	1.83	8.80	0.07
18	1120	0.70	240.80	82.00	1119.90	8.21	1.33	8.21	0.50
19	1181	0.70	233.20	84.00	1180.89	7.59	0.92	7.59	0.15
20	**1244**	**0.70**	**254.40**	**84.00**	**1243.89**	**6.91**	**0.59**	**6.91**	**0.41**
21	1337	0.80	219.10	82.00	1336.88	5.95	-0.07	5.95	0.50
22	1430	0.70	227.10	86.00	1429.87	5.13	-0.96	5.13	0.16
23	1524	1.10	199.60	88.00	1523.86	4.40	-2.20	4.40	0.61
24	1617	0.60	204.00	95.00	1616.85	3.91	-3.49	3.91	0.54
25	**1710**	**0.90**	**248.20**	**102.00**	**1709.84**	**3.03**	**-4.20**	**3.03**	**0.68**
26	1803	0.80	256.00	105.00	1802.83	1.72	-4.63	1.72	0.16
27	1897	0.90	226.00	109.00	1896.82	0.55	-5.30	0.55	0.48
28	1990	1.00	234.40	95.00	1989.81	-0.63	-6.28	-0.63	0.18
29	2016	1.10	238.30	96.00	2015.81	-1.03	-6.54	-1.03	0.47
30	**2077**	**1.20**	**236.60**	**71.00**	**2076.79**	**-2.06**	**-7.20**	**-2.06**	**0.17**
31	2170	1.30	308.30	78.00	2169.78	-3.70	-7.09	-3.70	1.58
32	2263	1.40	317.70	82.00	2262.75	-5.29	-5.59	-5.29	0.26
33	2357	1.60	324.40	86.00	2356.72	-6.83	-3.68	-6.83	0.28
34	2450	0.90	311.60	89.00	2449.70	-8.13	-2.13	-8.13	0.81
35	**2544**	**0.90**	**306.50**	**91.00**	**2543.69**	**-9.28**	**-1.21**	**-9.28**	**0.09**
36	2637	1.20	331.50	93.00	2636.67	-10.33	0.08	-10.33	0.58
37	2730	1.10	335.80	95.00	2729.65	-11.16	1.75	-11.16	0.14
38	2824	0.90	359.80	98.00	2823.64	-11.53	3.32	-11.53	0.49
39	2917	1.10	7.30	100.00	2916.62	-11.42	4.93	-11.42	0.26
40	**3010**	**0.90**	**18.20**	**102.00**	**3009.61**	**-11.08**	**6.51**	**-11.08**	**0.30**
41	3104	0.70	2.80	104.00	3103.60	-10.82	7.79	-10.82	0.31
42	3197	0.50	8.70	104.00	3196.59	-10.73	8.75	-10.73	0.22
43	3290	0.40	10.80	104.00	3289.59	-10.61	9.47	-10.61	0.11
44	3384	0.60	16.60	105.00	3383.59	-10.41	10.27	-10.41	0.22
45	**3477**	**0.50**	**28.10**	**105.00**	**3476.58**	**-10.08**	**11.09**	**-10.08**	**0.16**
46	3571	0.60	31.00	109.00	3570.58	-9.63	11.88	-9.63	0.11
47	3664	0.40	21.40	111.00	3663.58	-9.26	12.60	-9.26	0.23
48	3758	0.40	24.90	113.00	3757.57	-9.00	13.20	-9.00	0.03
49	3851	0.50	28.40	114.00	3850.57	-8.67	13.85	-8.67	0.11
50	**3944**	**0.40**	**18.30**	**114.00**	**3943.57**	**-8.38**	**14.52**	**-8.38**	**0.14**
51	4038	0.30	19.90	116.00	4037.57	-8.19	15.06	-8.19	0.11
52	4131	0.30	9.60	118.00	4130.56	-8.07	15.53	-8.07	0.06
53	4225	0.50	2.90	120.00	4224.56	-8.01	16.18	-8.01	0.22
54	4318	0.40	350.50	122.00	4317.56	-8.04	16.91	-8.04	0.15
55	**4411**	**0.40**	**15.10**	**120.00**	**4410.56**	**-8.01**	**17.54**	**-8.01**	**0.18**
56	4505	0.50	353.40	120.00	4504.55	-7.97	18.26	-7.97	0.21
57	4598	0.40	23.10	122.00	4597.55	-7.89	18.97	-7.89	0.27
58	4692	0.50	10.70	125.00	4691.55	-7.69	19.67	-7.69	0.15
59	4785	0.60	33.40	127.00	4784.54	-7.34	20.48	-7.34	0.26
60	**4878**	**0.60**	**52.90**	**118.00**	**4877.54**	**-6.69**	**21.18**	**-6.69**	**0.22**
61	4972	0.70	39.30	123.00	4971.53	-5.93	21.92	-5.93	0.19
62	5065	0.50	43.80	123.00	5064.53	-5.29	22.65	-5.29	0.22
63	5159	0.40	47.90	125.00	5158.53	-4.76	23.17	-4.76	0.11
64	5252	0.50	80.10	127.00	5251.52	-4.12	23.45	-4.12	0.29
65	**5345**	**0.40**	**84.60**	**131.00**	**5344.52**	**-3.40**	**23.55**	**-3.40**	**0.11**

Report #: 1

Date:

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 8762

SURVEY REPORT

Customer:	Oasis Petroleum
Well Name:	Kline Federal 5300 31-18 15T
Rig #:	Nabors B-22
API #:	33-053-06755
Calculation Method:	Minimum Curvature Calculation

MWD Operator:	M McCammond / S Hayman
Directional Drillers:	D Rakstad / M Bader
Survey Corrected To:	True North
Vertical Section Direction:	90
Total Correction:	8.30
Temperature Forecasting Model (Chart Only):	Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
66	5439	0.40	83.20	132.00	5438.52	-2.75	23.62	-2.75	0.01
67	5532	0.50	68.60	134.00	5531.52	-2.04	23.81	-2.04	0.16
68	5625	0.50	70.40	134.00	5624.51	-1.28	24.09	-1.28	0.02
69	5718	0.50	82.50	134.00	5717.51	-0.50	24.28	-0.50	0.11
70	**5812**	**0.60**	**78.50**	**138.00**	**5811.50**	**0.39**	**24.43**	**0.39**	**0.11**
71	5905	0.50	74.80	140.00	5904.50	1.26	24.64	1.26	0.11
72	5999	0.50	66.80	143.00	5998.50	2.03	24.91	2.03	0.07
73	6085	0.40	126.20	127.00	6084.49	2.62	24.88	2.62	0.53
74	6178	0.20	341.10	134.00	6177.49	2.83	24.84	2.83	0.62
75	**6272**	**0.40**	**304.00**	**136.00**	**6271.49**	**2.50**	**25.18**	**2.50**	**0.29**
76	6365	0.60	192.30	140.00	6364.49	2.13	24.88	2.13	0.90
77	6458	0.00	187.60	143.00	6457.49	2.02	24.41	2.02	0.65
78	6552	0.60	37.00	145.00	6551.49	2.32	24.80	2.32	0.64
79	6645	0.60	130.70	149.00	6644.48	2.98	24.87	2.98	0.94
80	**6738**	**1.30**	**150.40**	**152.00**	**6737.47**	**3.87**	**23.64**	**3.87**	**0.82**
81	6832	0.70	125.60	154.00	6831.46	4.87	22.38	4.87	0.77
82	6925	0.60	86.70	158.00	6924.45	5.82	22.07	5.82	0.48
83	7018	1.00	9.10	159.00	7017.44	6.43	22.90	6.43	1.13
84	7111	1.20	355.70	163.00	7110.43	6.49	24.68	6.49	0.35
85	**7205**	**1.50**	**355.30**	**165.00**	**7204.40**	**6.31**	**26.88**	**6.31**	**0.32**
86	7298	1.70	348.40	167.00	7297.36	5.93	29.45	5.93	0.30
87	7391	1.60	352.40	168.00	7390.32	5.48	32.09	5.48	0.16
88	7485	1.50	7.80	170.00	7484.29	5.48	34.61	5.48	0.45
89	7578	1.20	9.20	172.00	7577.26	5.80	36.77	5.80	0.32
90	**7671**	**1.40**	**6.00**	**174.00**	**7670.24**	**6.07**	**38.86**	**6.07**	**0.23**
91	7765	1.10	8.30	176.00	7764.22	6.32	40.90	6.32	0.32
92	7858	0.90	357.00	177.00	7857.20	6.41	42.51	6.41	0.30
93	7951	0.80	348.50	176.00	7950.19	6.25	43.88	6.25	0.17
94	8045	0.80	342.00	177.00	8044.18	5.91	45.14	5.91	0.10
95	**8138**	**1.20**	**339.00**	**179.00**	**8137.17**	**5.36**	**46.67**	**5.36**	**0.43**
96	8231	0.40	359.90	181.00	8230.16	5.01	47.90	5.01	0.90
97	8325	0.60	7.20	183.00	8324.16	5.07	48.72	5.07	0.22
98	8418	0.60	16.30	185.00	8417.15	5.27	49.67	5.27	0.10
99	8512	0.70	15.60	185.00	8511.15	5.56	50.70	5.56	0.11
100	**8605**	**0.70**	**13.00**	**186.00**	**8604.14**	**5.85**	**51.80**	**5.85**	**0.03**
101	8698	0.20	342.70	188.00	8697.14	5.92	52.51	5.92	0.58
102	8791	0.20	17.30	190.00	8790.14	5.92	52.82	5.92	0.13
103	8885	0.30	104.50	192.00	8884.14	6.21	52.91	6.21	0.37
104	8978	0.40	131.00	194.00	8977.13	6.69	52.64	6.69	0.20
105	**9071**	**0.40**	**155.70**	**194.00**	**9070.13**	**7.07**	**52.13**	**7.07**	**0.18**
106	9164	0.50	146.20	194.00	9163.13	7.43	51.50	7.43	0.13
107	9258	0.50	137.00	195.00	9257.12	7.94	50.85	7.94	0.09
108	9351	0.40	138.40	194.00	9350.12	8.43	50.31	8.43	0.11
109	9444	0.50	153.30	188.00	9443.12	8.83	49.71	8.83	0.16
110	**9538**	**0.40**	**164.10**	**188.00**	**9537.12**	**9.10**	**49.03**	**9.10**	**0.14**
111	9631	0.20	160.60	192.00	9630.11	9.25	48.56	9.25	0.22
112	9724	0.30	157.40	192.00	9723.11	9.39	48.18	9.39	0.11
113	9817	0.20	137.30	197.00	9816.11	9.60	47.84	9.60	0.14
114	9911	0.20	103.30	199.00	9910.11	9.87	47.68	9.87	0.12
115	**10004**	**0.20**	**29.00**	**201.00**	**10003.11**	**10.10**	**47.79**	**10.10**	**0.26**
116	10098	0.40	4.00	203.00	10097.11	10.21	48.26	10.21	0.25
117	10142	0.40	2.40	204.00	10141.11	10.22	48.56	10.22	0.03
118	10155	0.40	353.70	176.00	10154.11	10.22	48.65	10.22	0.47
119	10186	0.70	11.60	176.00	10185.11	10.25	48.95	10.25	1.10
120	**10217**	**3.00**	**59.40**	**179.00**	**10216.09**	**10.98**	**49.55**	**10.98**	**8.33**
121	10248	6.30	67.10	183.00	10246.98	13.25	50.62	13.25	10.81
122	10279	10.00	71.80	183.00	10277.67	17.37	52.12	17.37	12.12
123	10310	12.60	73.40	183.00	10308.06	23.17	53.93	23.17	8.45
124	10342	16.00	73.60	188.00	10339.07	30.75	56.17	30.75	10.63
125	**10373**	**18.40**	**74.70**	**190.00**	**10368.68**	**39.57**	**58.67**	**39.57**	**7.81**
126	10404	19.80	76.60	192.00	10397.97	49.40	61.18	49.40	4.94
127	10435	22.50	81.40	194.00	10426.88	60.37	63.28	60.37	10.34
128	10466	25.00	85.60	195.00	10455.26	72.77	64.67	72.77	9.73
129	10497	26.60	86.30	195.00	10483.17	86.23	65.62	86.23	5.25
130	**10528**	**29.60**	**86.40**	**194.00**	**10510.51**	**100.80**	**66.55**	**100.80**	**9.68**

Report #: 1

Date:

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 8762

SURVEY REPORT

Customer:	Oasis Petroleum	MWD Operator:	M McCammond / S Hayman
Well Name:	Kline Federal 5300 31-18 15T	Directional Drillers:	D Rakstad / M Bader
Rig #:	Nabors B-22	Survey Corrected To:	True North
API #:	33-053-06755	Vertical Section Direction:	90
Calculation Method:	Minimum Curvature Calculation	Total Correction:	8.30
		Temperature Forecasting Model (Chart Only):	Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
131	10560	32.00	85.90	194.00	10537.99	117.15	67.66	117.15	7.54
132	10591	35.30	84.90	194.00	10563.80	134.26	69.04	134.26	10.79
133	10622	38.70	83.10	194.00	10588.55	152.81	71.00	152.81	11.51
134	10653	41.50	82.00	195.00	10612.26	172.61	73.60	172.61	9.32
135	**10684**	**44.80**	**81.20**	**194.00**	**10634.88**	**193.58**	**76.70**	**193.58**	**10.79**
136	10715	49.10	81.20	194.00	10656.03	215.96	80.16	215.96	13.87
137	10746	52.50	81.30	194.00	10675.62	239.70	83.81	239.70	10.97
138	10778	56.70	81.60	194.00	10694.15	265.49	87.69	265.49	13.15
139	10809	60.20	81.90	194.00	10710.37	291.63	91.48	291.63	11.32
140	**10840**	**64.00**	**81.40**	**194.00**	**10724.88**	**318.73**	**95.46**	**318.73**	**12.34**
141	10871	66.40	80.90	194.00	10737.88	346.53	99.79	346.53	7.88
142	10902	69.70	81.70	195.00	10749.46	374.95	104.14	374.95	10.91
143	10933	74.00	82.50	195.00	10759.12	404.12	108.18	404.12	14.09
144	10964	77.70	83.60	194.00	10766.70	433.96	111.81	433.96	12.42
145	**10995**	**83.20**	**85.10**	**195.00**	**10771.84**	**464.37**	**114.82**	**464.37**	**18.37**
146	11026	87.20	85.10	195.00	10774.43	495.14	117.46	495.14	12.90
147	11058	91.30	85.40	195.00	10774.85	527.02	120.11	527.02	12.85
148	11109	92.70	85.80	226.00	10773.07	577.84	124.02	577.84	2.85
149	11138	91.50	86.30	226.00	10772.01	606.75	126.01	606.75	4.48
150	**11152**	**90.70**	**86.30**	**228.00**	**10771.74**	**620.72**	**126.92**	**620.72**	**5.71**
151	11168	90.80	86.40	226.00	10771.53	636.68	127.94	636.68	0.88
152	11198	90.80	86.40	226.00	10771.11	666.62	129.82	666.62	0.00
153	11230	90.20	86.40	226.00	10770.83	698.56	131.83	698.56	1.88
154	11261	89.50	86.70	266.00	10770.91	729.50	133.69	729.50	2.46
155	**11292**	**89.50**	**86.50**	**226.00**	**10771.18**	**760.44**	**135.53**	**760.44**	**0.65**
156	11322	89.10	86.30	226.00	10771.55	790.38	137.42	790.38	1.49
157	11352	88.90	86.50	226.00	10772.07	820.32	139.30	820.32	0.94
158	11382	88.70	87.30	226.00	10772.70	850.27	140.92	850.27	2.75
159	11414	88.60	88.50	226.00	10773.46	882.24	142.09	882.24	3.76
160	**11444**	**88.40**	**89.00**	**228.00**	**10774.24**	**912.22**	**142.75**	**912.22**	**1.79**
161	11475	88.40	89.70	228.00	10775.11	943.20	143.10	943.20	2.26
162	11507	89.50	91.00	228.00	10775.69	975.20	142.90	975.20	5.32
163	11597	89.10	90.20	230.00	10776.79	1065.18	141.96	1065.18	0.99
164	11691	88.20	89.90	228.00	10779.01	1159.16	141.88	1159.16	1.01
165	**11785**	**89.50**	**89.70**	**231.00**	**10780.89**	**1253.14**	**142.21**	**1253.14**	**1.40**
166	11879	89.70	88.40	231.00	10781.55	1347.12	143.77	1347.12	1.40
167	11970	91.20	88.10	235.00	10780.83	1438.07	146.54	1438.07	1.68
168	12062	90.80	88.50	237.00	10779.23	1530.02	149.27	1530.02	0.61
169	12157	90.80	89.40	237.00	10777.90	1624.99	151.01	1624.99	0.95
170	**12252**	**89.90**	**89.70**	**239.00**	**10777.32**	**1719.98**	**151.76**	**1719.98**	**1.00**
171	12347	88.90	89.50	237.00	10778.32	1814.98	152.42	1814.98	1.07
172	12442	90.40	90.40	240.00	10778.90	1909.97	152.51	1909.97	1.84
173	12537	90.20	90.40	242.00	10778.40	2004.97	151.84	2004.97	0.21
174	12631	90.00	89.90	244.00	10778.24	2098.97	151.60	2098.97	0.57
175	**12726**	**90.40**	**89.90**	**246.00**	**10777.90**	**2193.96**	**151.76**	**2193.96**	**0.42**
176	12821	90.90	89.60	246.00	10776.83	2288.96	152.18	2288.96	0.61
177	12916	88.40	88.50	246.00	10777.41	2383.93	153.75	2383.93	2.88
178	13011	89.20	88.60	248.00	10779.40	2478.88	156.16	2478.88	0.85
179	13106	89.90	89.40	249.00	10780.14	2573.86	157.81	2573.86	1.12
180	**13200**	**90.70**	**88.70**	**249.00**	**10779.65**	**2667.85**	**159.37**	**2667.85**	**1.13**
181	13295	89.50	88.90	249.00	10779.48	2762.82	161.36	2762.82	1.28
182	13390	89.80	88.90	251.00	10780.06	2857.80	163.18	2857.80	0.32
183	13485	90.00	88.80	253.00	10780.23	2952.79	165.09	2952.79	0.24
184	13580	89.10	89.00	251.00	10780.98	3047.76	166.92	3047.76	0.97
185	**13674**	**89.50**	**89.80**	**253.00**	**10782.13**	**3141.75**	**167.90**	**3141.75**	**0.95**
186	13769	89.70	89.90	255.00	10782.79	3236.75	168.15	3236.75	0.24
187	13864	90.30	90.20	255.00	10782.79	3331.75	168.07	3331.75	0.71
188	13959	91.00	90.10	257.00	10781.71	3426.74	167.82	3426.74	0.74
189	14054	88.90	90.50	255.00	10781.79	3521.73	167.32	3521.73	2.25
190	**14149**	**88.30**	**90.80**	**257.00**	**10784.11**	**3616.70**	**166.24**	**3616.70**	**0.71**
191	14244	88.70	90.70	258.00	10786.60	3711.66	165.00	3711.66	0.43
192	14338	88.90	89.50	258.00	10788.57	3805.63	164.83	3805.63	1.29
193	14433	90.30	89.00	258.00	10789.23	3900.62	166.08	3900.62	1.56
194	14528	88.70	90.00	258.00	10790.06	3995.61	166.91	3995.61	1.99
195	**14623**	**88.70**	**90.70**	**257.00**	**10792.22**	**4090.58**	**166.33**	**4090.58**	**0.74**

Report #: 1

Date:

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 8762

SURVEY REPORT

Customer:	Oasis Petroleum
Well Name:	Kline Federal 5300 31-18 15T
Rig #:	Nabors B-22
API #:	33-053-06755
Calculation Method:	Minimum Curvature Calculation

MWD Operator:	M McCammond / S Hayman
Directional Drillers:	D Rakstad / M Bader
Survey Corrected To:	True North
Vertical Section Direction:	90
Total Correction:	8.30
Temperature Forecasting Model (Chart Only):	Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
196	14718	91.10	90.10	258.00	10792.38	4185.57	165.66	4185.57	2.60
197	14813	90.20	89.90	258.00	10791.31	4280.57	165.66	4280.57	0.97
198	14907	88.60	90.30	260.00	10792.29	4374.56	165.50	4374.56	1.75
199	15002	89.80	90.70	260.00	10793.62	4469.54	164.67	4469.54	1.33
200	**15097**	**90.40**	**92.30**	**260.00**	**10793.45**	**4564.51**	**162.18**	**4564.51**	**1.80**
201	15192	90.50	91.40	260.00	10792.70	4659.45	159.12	4659.45	0.95
202	15287	90.60	92.10	262.00	10791.79	4754.40	156.22	4754.40	0.74
203	15381	91.70	92.30	262.00	10789.91	4848.31	152.61	4848.31	1.19
204	15476	91.10	91.30	260.00	10787.58	4943.24	149.63	4943.24	1.23
205	**15571**	**88.70**	**91.70**	**260.00**	**10787.75**	**5038.20**	**147.14**	**5038.20**	**2.56**
206	15666	90.00	91.60	262.00	10788.83	5133.15	144.40	5133.15	1.37
207	15761	88.90	91.50	260.00	10789.74	5228.11	141.83	5228.11	1.16
208	15856	89.50	91.80	262.00	10791.07	5323.06	139.10	5323.06	0.71
209	15950	91.20	91.10	262.00	10790.49	5417.02	136.72	5417.02	1.96
210	**16045**	**91.00**	**89.90**	**262.00**	**10788.67**	**5512.00**	**135.89**	**5512.00**	**1.28**
211	16140	88.60	90.70	262.00	10789.00	5606.99	135.39	5606.99	2.66
212	16235	90.50	89.00	260.00	10789.75	5701.98	135.64	5701.98	2.68
213	16330	87.80	88.20	262.00	10791.16	5796.93	137.96	5796.93	2.96
214	16425	86.70	87.80	260.00	10795.71	5891.76	141.28	5891.76	1.23
215	**16519**	**88.00**	**88.10**	**260.00**	**10800.06**	**5985.60**	**144.63**	**5985.60**	**1.42**
216	16614	88.90	88.00	260.00	10802.63	6080.51	147.87	6080.51	0.95
217	16709	89.80	88.50	262.00	10803.71	6175.46	150.77	6175.46	1.08
218	16804	91.90	88.70	262.00	10802.30	6270.41	153.09	6270.41	2.22
219	16898	92.40	89.10	264.00	10798.77	6364.33	154.89	6364.33	0.68
220	**16993**	**93.20**	**89.20**	**264.00**	**10794.13**	**6459.21**	**156.30**	**6459.21**	**0.85**
221	17088	91.40	89.80	264.00	10790.32	6554.12	157.13	6554.12	2.00
222	17120	90.10	91.00	264.00	10789.90	6586.12	156.90	6586.12	5.53
223	17183	90.30	90.80	262.00	10789.68	6649.11	155.91	6649.11	0.45
224	17278	89.40	89.90	266.00	10789.93	6744.10	155.33	6744.10	1.34
225	**17376**	**89.50**	**89.10**	**251.00**	**10790.87**	**6842.10**	**156.19**	**6842.10**	**0.82**
226	17471	90.30	88.90	255.00	10791.03	6937.08	157.85	6937.08	0.87
227	17566	88.20	89.70	257.00	10792.28	7032.06	159.01	7032.06	2.37
228	17660	87.40	90.00	258.00	10795.89	7125.99	159.25	7125.99	0.91
229	17755	88.40	89.70	258.00	10799.37	7220.92	159.50	7220.92	1.10
230	**17850**	**89.60**	**89.90**	**257.00**	**10801.03**	**7315.91**	**159.83**	**7315.91**	**1.28**
231	17945	89.10	88.50	257.00	10802.10	7410.89	161.16	7410.89	1.56
232	18040	92.40	88.70	258.00	10800.86	7505.84	163.48	7505.84	3.48
233	18135	92.00	91.40	258.00	10797.21	7600.76	163.40	7600.76	2.87
234	18229	89.00	92.90	258.00	10796.39	7694.68	159.87	7694.68	3.57
235	**18324**	**88.40**	**92.10**	**258.00**	**10798.55**	**7789.56**	**155.73**	**7789.56**	**1.05**
236	18419	91.40	92.10	258.00	10798.71	7884.48	152.25	7884.48	3.16
237	18513	91.40	91.90	260.00	10796.42	7978.40	148.97	7978.40	0.21
238	18608	90.90	91.80	260.00	10794.51	8073.33	145.90	8073.33	0.54
239	18703	89.90	91.80	260.00	10793.85	8168.28	142.92	8168.28	1.05
240	**18798**	**91.00**	**91.30**	**260.00**	**10793.10**	**8263.24**	**140.35**	**8263.24**	**1.27**
241	18892	90.50	90.30	260.00	10791.87	8357.22	139.03	8357.22	1.19
242	18987	89.70	90.40	262.00	10791.70	8452.22	138.45	8452.22	0.85
243	19082	91.50	89.20	260.00	10790.71	8547.21	138.79	8547.21	2.28
244	19177	91.20	88.70	262.00	10788.47	8642.17	140.53	8642.17	0.61
245	**19272**	**90.90**	**88.70**	**262.00**	**10786.73**	**8737.12**	**142.68**	**8737.12**	**0.32**
246	19366	90.30	88.70	262.00	10785.75	8831.09	144.81	8831.09	0.64
247	19461	88.20	88.00	262.00	10786.99	8926.04	147.55	8926.04	2.33
248	19556	89.10	89.40	260.00	10789.23	9020.99	149.70	9020.99	1.75
249	19588	89.00	89.30	260.00	10789.76	9052.98	150.07	9052.98	0.44
250	**19651**	**89.10**	**90.40**	**258.00**	**10790.80**	**9115.97**	**150.23**	**9115.97**	**1.75**
251	19682	90.90	90.80	258.00	10790.80	9146.97	149.91	9146.97	5.95
252	19746	90.50	91.20	260.00	10790.02	9210.95	148.79	9210.95	0.88
253	19840	91.00	90.60	260.00	10788.79	9304.93	147.31	9304.93	0.83
254	19935	90.50	89.90	262.00	10787.55	9399.92	146.90	9399.92	0.91
255	**20030**	**90.30**	**90.10**	**262.00**	**10786.88**	**9494.92**	**146.90**	**9494.92**	**0.30**
256	20125	91.60	90.90	260.00	10785.31	9589.90	146.07	9589.90	1.61
257	20220	92.00	90.60	262.00	10782.32	9684.85	144.83	9684.85	0.53
258	20314	92.40	90.70	262.00	10778.72	9778.77	143.76	9778.77	0.44
259	20409	90.90	89.70	262.00	10775.98	9873.73	143.43	9873.73	1.90
260	**20478**	**90.90**	**89.70**	**262.00**	**10774.90**	**9942.72**	**143.79**	**9942.72**	**0.00**
Projection	20542	90.90	89.70	262.00	10773.89	10006.71	144.13	10006.71	0.00

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

JUL 2015
RECEIVED
ND OIL & GAS
DIVISION

Well File No.
30789

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☑ Notice of Intent	Approximate Start Date **July 14, 2015**	☐ Drilling Prognosis	☐ Spill Report
☐ Report of Work Done	Date Work Completed	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☐ Other	**Waiver from tubing/packer requirement**

Well Name and Number					
Kline Federal 5300 31-18 15T					
Footages	Qtr-Qtr	Section	Township	Range	
2556 F S L 238 F W L	**LOT 3**	**18**	**153 N**	**100 W**	
Field	Pool	County			
Baker	**Bakken**	**McKenzie**			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

Oasis Petroleum North America LLC requests a variance to NDAC 43-02-03-21 for the tubing/packer requirement: Casing, tubing, and cementing requirements during the completion period immediately following the upcoming fracture stimulation.

The following assurances apply:

1. the well is equipped with new 29# and 32# casing at surface with an API burst rating of 11,220 psi;
2. The Frac design will ise a safety factor of 0.85 API burst rating to determine the maximum pressure;
3. Damage to the casing during the frac would be detected immediately by montioring equipement;
4. The casing is exposed to significantly lower rates and pressures during flowback than during the frac job;
5. The frac fluid and formation fluids have very low corrosion and erosion rates;
6. Production equipment will be installed as soon as possible after the well ceases flowing;
7. A 300# gauge will be installed on the surface casing during the flowback period

Company **Oasis Petroleum North America LLC**			Telephone Number **281-404-9436**
Address **1001 Fannin, Suite 1500**			
City **Houston**	State **TX**	Zip Code **77002**	
Signature	Printed Name **Jennifer Swenson**		
Title **Regulatory Specialist**	Date **July 14, 2015**		
Email Address **jswenson@oasispetroleum.com**			

FOR STATE USE ONLY

☐ Received	☑ Approved
Date July 31 2015	
By	
Title PETROLEUM ENGINEER	

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

RECEIVED AUG 12 2015 ND OIL & GAS DIVISION

Well File No. 30789

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

- [x] Notice of Intent — Approximate Start Date: August 12, 2015
- [ ] Report of Work Done — Date Work Completed:
- [ ] Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03. — Approximate Start Date:

- [ ] Drilling Prognosis
- [ ] Redrilling or Repair
- [ ] Casing or Liner
- [ ] Plug Well
- [ ] Supplemental History
- [ ] Temporarily Abandon
- [ ] Spill Report
- [ ] Shooting
- [ ] Acidizing
- [ ] Fracture Treatment
- [ ] Change Production Method
- [ ] Reclamation
- [x] Other: Change well status to CONFIDENTIAL

Well Name and Number					
Kline Federal 5300 31-18 15T					
Footages	Qtr-Qtr	Section	Township	Range	
2556 F S L 238 F W L	LOT3	18	153 N	100 W	
Field	Pool	County			
Baker	Bakken	McKenzie			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

Effective immediately, we request CONFIDENTIAL STATUS for the above referenced well.

This well has not been completed

OFF CONFIDENTIAL 2/12/16

Company	Telephone Number
Oasis Petroleum North America LLC	281-404-9436
Address: 1001 Fannin, Suite 1500	
City: Houston	State: TX / Zip Code: 77002
Signature	Printed Name: Jennifer Swenson
Title: Regulatory Specialist	Date: August 12, 2015
Email Address: jswenson@oasispetroleum.com	

FOR STATE USE ONLY

- [ ] Received
- [x] Approved

Date: 8/13/15

By: Alice D. Webber

Title: Engineering Technician

Oasis Petroleum North America, LLC
Kline Federal 5300 31-18 15T

2,556' FSL & 238' FWL
Lot 3 Section 18, T153N, R100W
Baker Field / Three Forks
McKenzie County, North Dakota

BOTTOM HOLE LOCATION:
144.13' north & 10,006.71' east of surface location or approx.
2,543.87' FNL & 244.44' FEL, SE NE Section 17, T153N, R100W

Prepared for:
Brendan Hargrove
Oasis Petroleum North America, LLC
1001 Fannin Suite 1500
Houston, TX 77002

Prepared by:
G. Wayne Peterson, Michelle R. Baker,
Zachary Moses
PO Box 80507; Billings, MT 59108
2150 Harnish Blvd., Billings, MT 59101
(406) 259-4124
geology@sunburstconsulting.com
www.sunburstconsulting.com

WELL EVALUATION

Nabors Drilling Rig B22 at the Oasis Petroleum Kline Federal 5300 31-18 15T; May, 2015 McKenzie County, North Dakota.

INTRODUCTION

The ***Oasis Petroleum North America, LLC Kline Federal 5300 31-18 15T*** [Lot 3 Section 18, T153N, R100W] is located in Baker Field of the Williston Basin in western North Dakota. This section lies approximately 7 miles south of the town of Williston and adjacent to Lake Sakakawea in McKenzie County. The Kline Federal 5300 31-18 15T is a horizontal First Bench Three Forks well, in a double-section, laydown spacing unit permitted to drill to the east from the surface location within Section 18, continuing through Section 17 to the proposed bottom-hole location (PBHL) in that section. There are 200' setbacks along the north and south borders and 500' setbacks from the east and west borders within the 1,280 acre spacing unit. The well consists of one Three Forks lateral. The vertical hole was planned to be drilled to approximately 10,293'. The curve would be built at 12 degrees per 100' to land within the First Bench Three Forks. Directional drilling technologies and geo-steering techniques were used to land in the Three Forks reservoir and maintain exposure to the ideal target rock. Oasis Petroleum is targeting a dolomite shale facies of the Three Forks Formation with intent to intersect porosity and fracture trends enhancing reservoir quality.

OFFSET WELLS

Offset well data used for depth correlation during curve operations are found in the 'Control Data' section appended to this report. Offset well control was essential in providing control data, making it possible to develop a prognosis of formation tops and landing target depth. By referencing the gamma signature of these offsets, a model was formed for the target interval pinpointing a strategic landing. Formation thicknesses expressed by gamma ray signatures in these wells were compared to gamma data collected during drilling operations in order to successfully land the curve. The target landing true vertical depth (TVD) was periodically updated during drilling to ensure accurate landing of the curve.

GEOLOGY

The Mission Canyon Formation [Mississippian Madison Group] was logged 9,391' MD 9,390' TVD (-7,357' SS). The Mission Canyon Formation consisted of a lime mudstone that was described as light gray, light brown to brown, gray brown, trace dark gray in color. The lime mudstone was predominately friable to firm, with an earthy to rare crystalline texture. Some intervals contained a trace of black-brown algal material, traces of fossil fragments, and traces of disseminated pyrite. Also present was an argillaceous lime mudstone that was described as light gray, occasional medium gray, rare gray tan, rare off white, trace dark gray in color. The argillaceous lime mudstone was predominately firm to friable, crystalline to chalky texture. Some intervals contained a trace of disseminated pyrite. The highest gas shows were 71 to 112 units and 53 units of connection gas in the Mission Canyon. Rare intercrystalline porosity was noted as well as trace *spotty light brown oil stain* while logging the Mission Canyon Formation.

The Upper Bakken Shale Member [Mississippian-Bakken Formation] was drilled at 10,737' MD 10,671' TVD (-8,638' SS). Entry into this member was characterized by high gamma, elevated background gas and increased rates of penetration. The black to black gray carbonaceous and *petroliferous* shale was hard with a sub blocky to sub platy texture. Fracture porosity was noted, and trace minerals were observed including disseminated pyrite and calcite fracture fill. Hydrocarbons evaluated in this interval reached a maximum of 367 units of drilling gas.

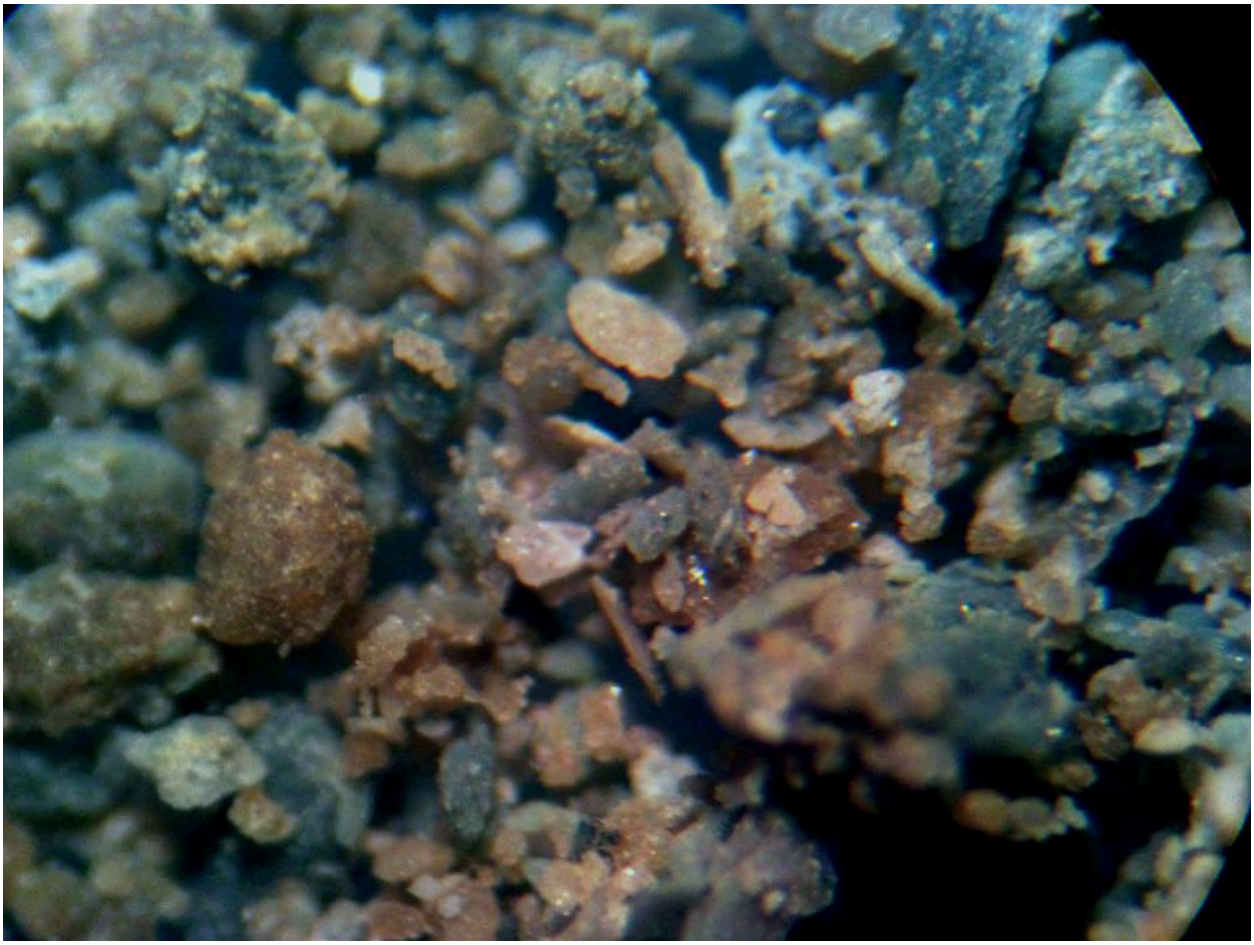
The Middle Bakken Member [Mississippian-Devonian Bakken Formation] was drilled at 10,766' MD 10,687' TVD (-8,654' SS) which was 9' high to the Oasis Petroleum North America LLC Chalmers 5300 21-19 8T. Samples in the Middle Bakken Member were predominantly silty sandstone which was described as light gray brown, light brown, trace light gray in color. It was very fine grained, friable, subrounded, smooth, moderately sorted, and moderately calcite cemented. A trace of disseminated and nodular pyrite was noted as was fair intergranular porosity. Also noted was *common light to medium brown spotty to even oil stain*. Hydrocarbons evaluated in this interval reached a maximum of 292 units of drilling gas.

The Lower Bakken Shale Member [Mississippian-Bakken Formation] was drilled at 10,850' MD 10,729' TVD (-8,696' SS). Entry into this interval was characterized by high gamma, elevated background gas and increased rates of penetration. The carbonaceous black, black gray shale is *petroliferous*, hard, splintery, smooth and exhibits possible fracture porosity. Trace minerals included disseminated pyrite. Drilling gas in this interval reached a maximum of 339 units.

The Pronghorn Member [Devonian-Bakken Formation] was reached at 10,876' MD 10,740' TVD (-8,707' SS). Entry into this interval was characterized by lower gamma, and slightly slower penetration rates. Samples from the Pronghorn were described as siltstone which was dark gray trace gray black and friable to firm. This siltstone was moderately dolomite cemented and included disseminated and nodular pyrite. Also noted was a trace of *spotty light brown oil stain*. Drilling gas in this interval reached a maximum of 250 units.

The Three Forks [Devonian] was reached at 10,916' MD 10,754' TVD (-8,721' SS) which was -16' high to the Oasis Petroleum North America LLC Chalmers 5300 21-19 8T. The target zone of the Three Forks was to be drilled in a predominately 16 foot zone beginning 12 feet into the Three Forks and representing the 1st Bench.

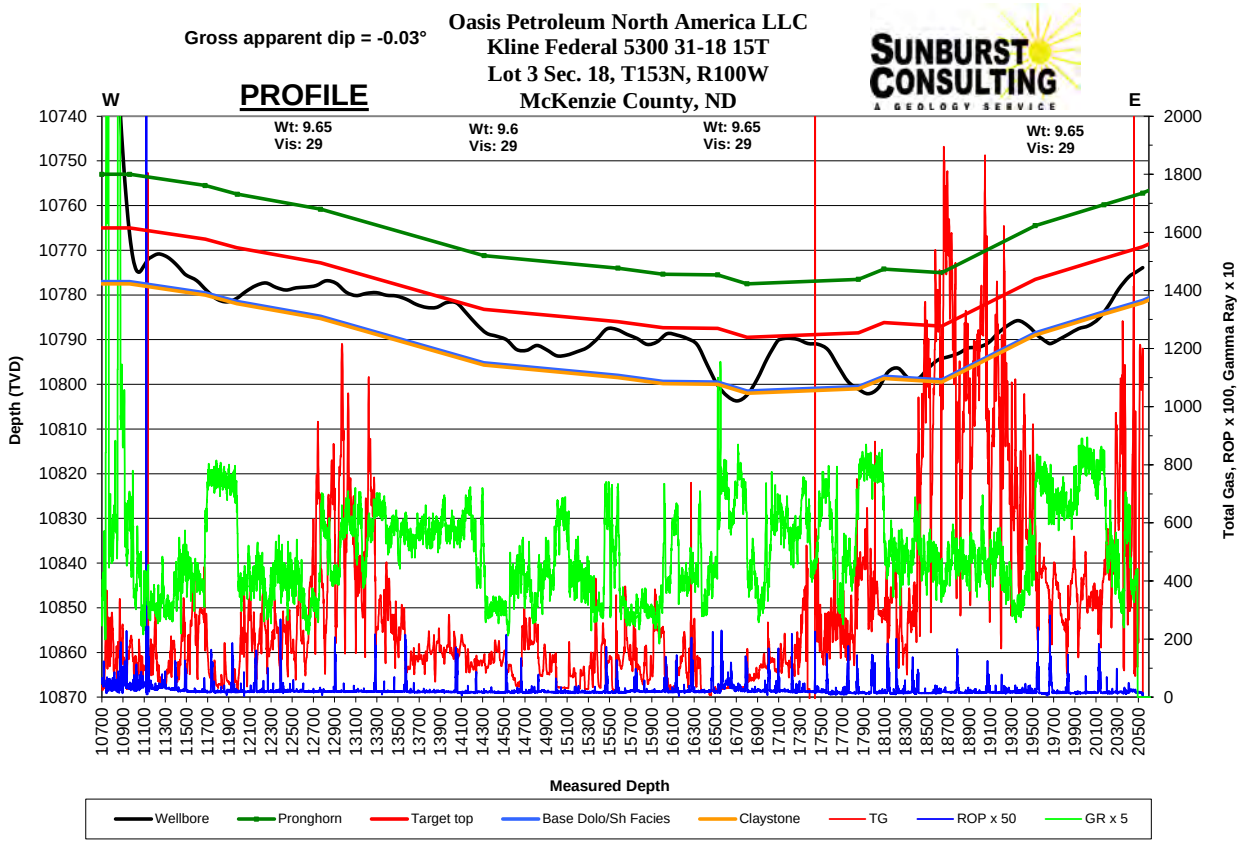
Samples in the Three Forks were predominantly dolomite which was described as light brown-light brown gray, tan-cream, trace pink in color. It was firm, laminated, with a microsucrosic texture. Rare disseminated pyrite was noted as was occasional intercrystalline porosity. Also noted was *common spotty to rare even light brown oil stain*. Also observed was light green-light gray green, mint green shale that was firm, sub blocky, with an earthy texture. Occasional disseminated pyrite was noted as was possible intergranular porosity.



Dry sample of predominantly dolomite and shale from the Three Forks 1st Bench target zone.

Hydrocarbon Shows

Gas monitoring and fluid gains provided evidence of a hydrocarbon saturated reservoir during the drilling of the Kline Federal 5300 31-18 15T. Oil and gas shows at the shakers and in samples were continuously monitored. In the closed mud system, hydrostatic conditions were maintained near balance, this allowed for gas and fluid gains from the well to be evaluated. Gas varied according to stratigraphic position and penetration rates which may have reflected increased porosity. During the vertical, gas peaks of 42 to 301 units were noted, against a 9.7-10.4 ppg diesel-invert mud weight. Background concentrations in the lateral ranged from 132 to 1,895 units, against a 9.6-9.65 lb/gal saltwater gel drilling fluid. Chromatography of gas revealed typical concentrations of methane, characteristic of First Bench Three Forks gas.



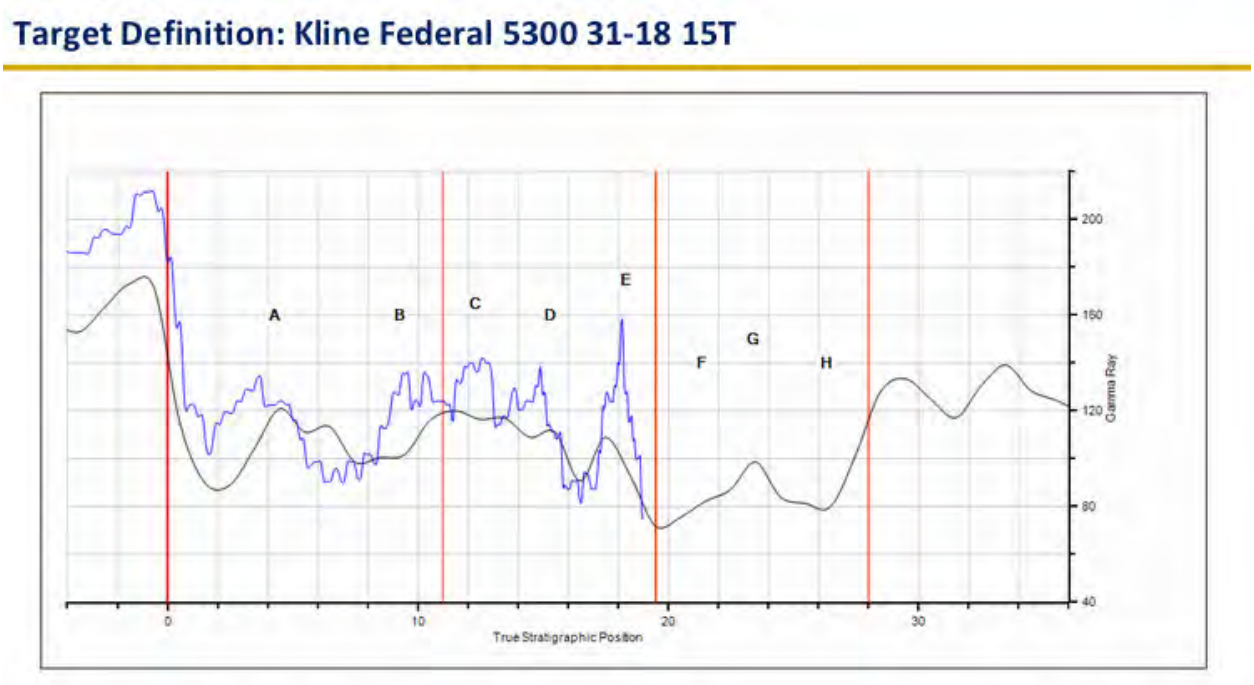
Profile displaying trends in total gas, gamma ray and rate of penetration.

Geosteering

Ryan Energy Technologies provided personnel and equipment for measurement-while-drilling (MWD) services. The RPM directional drillers, MWD, and Sunburst Consulting personnel worked closely together throughout the project to evaluate data and make steering decisions to maximize the amount of borehole in the targeted zones and increase rate of penetration (ROP) of the formation.

The 920’ curve was drilled in 24 hours, circulating time. The assembly used to complete the curve consisted of bit #5; a Security MMD55M PDC bit, attached to a 2.38 degree fixed NOV stage 7/8 5.0 motor and MWD tools. The curve was successfully landed at 11,120’ MD and 10,772’ TVD, approximately 18’ into the Three Forks. Seven inch diameter 32# HCP-110 intermediate casing was set to 11,095’ MD.

Geologic structure maps of the Kline Federal 5300 31-18 15T and surrounding control wells had estimated gross formation dip to be down at approximately 0.2º. The preferred drilling interval consisted of a thirteen foot zone of dolomite and shale and a 3’ zone of Claystone located approximately twelve feet into the Three Forks. Penetration rates, gas shows, gamma ray data, and sample observations were utilized to keep the wellbore in the preferred stratigraphic position in the target zone. Using offset well data provided by Oasis representatives, projected porosity zones were identified in the preferred drilling areas.



Offset well target definition for the Three Forks 1st Bench, Indian Hills Prospect (Oasis).

Steering decisions were made by using the low gamma in the lower portion of the target zone to establish the well-bore’s position in the target zone. If the well-bore moved lower, the higher gamma of the underlying claystone (G) was observed, as was the presence of claystone in collected samples. Slides were then utilized to move the well-bore back up into the target zone. As the well-bore moved higher, approaching the top of the target zone the high to medium fluctuating gamma (D) was noted. Samples in the lower gamma portion of the target zone contained noticeably greater concentrations of the light brown-light brown gray, tan-cream, trace pink dolomite; as the well-bore moved higher in zone the samples tended to have more of the light gray, off white, gray brown dolomite. This lateral was drilled in 4 and a half days from casing exit to TD, with two lateral assemblies. The TD of 20,542’ MD was achieved at 17:15 hours CDT May 7, 2015. The wellbore was completed with 100% of the lateral in target,

opening 9,447' (measurement taken from uncased lateral portion) of potentially productive reservoir rock. The hole was then circulated and reamed for completion.

SUMMARY

The Kline Federal 5300 31-18 15T is a successful well in Oasis Petroleum's horizontal 1st Bench Three Forks development program in Baker Field. The project was drilled from surface casing to TD in a little over 17 days. The TD of 20,542' MD was achieved at 17:15 hours CDT May 7, 2015. The well site team worked together to maintain the well bore in the desired target interval for 100% of the lateral, opening 9,447' of potentially productive reservoir rock.

Samples in the First Bench Three Forks were predominantly dolomite which was described as light brown-light brown gray, tan-cream, trace pink in color. It was firm, laminated, with a microsucrosic texture. Rare disseminated pyrite was noted as was occasional intercrystalline porosity. Also noted was *common spotty to rare even light brown oil stain*. Also observed was light green-light gray green, mint green shale that was firm, sub blocky, with an earthy texture. Occasional disseminated pyrite was noted as was possible intergranular porosity.

Gas on the Kline Federal 5300 31-18 15T varied according to stratigraphic position and penetration rates which may have reflected increased porosity. The overall gas and hydrocarbon shows were encouraging and indicate a hydrocarbon rich system in the Three Forks.

The Oasis Petroleum North America, LLC. Kline Federal 5300 31-18 15T awaits completion operations to determine its ultimate production potential.

Respectfully submitted,

Michelle R. Baker
Sunburst Consulting, Inc.
May 10, 2015

WELL DATA SUMMARY

OPERATOR:	**Oasis Petroleum North America, LLC**
ADDRESS:	1001 Fannin Suite 1500 Houston, TX 77002
WELL NAME:	**Kline Federal 5300 31-18 15T**
API #:	33-053-06755
WELL FILE #:	30789
SURFACE LOCATION:	2,556' FSL & 238' FWL Lot 3 Section 18, T153N, R100W
FIELD/ PROSPECT:	Baker Field / Three Forks
COUNTY, STATE	McKenzie County, North Dakota
BASIN:	Williston
WELL TYPE:	1st Bench Three Forks Horizontal Lateral
ELEVATION:	GL: 2,008' KB: 2,033'
SPUD/ RE-ENTRY DATE:	March 7, 2015
BOTTOM HOLE LOCATION	144.13' north & 10,006.71' east of surface location or approx. 2,543.87' FNL & 244.44' FEL, SE NE Section 17, T153N, R100W
CLOSURE COORDINATE	Closure Direction: 89.17° Closure Distance: 10,007.75'
TOTAL DEPTH / DATE:	20,542' on May 7, 2015 100% within target interval
TOTAL DRILLING DAYS:	17.5 days
CONTRACTOR:	Nabors #B22

PUMPS:	H&H Triplex (stroke length - 12")
TOOLPUSHERS:	Jessie Tibbets, Darren Birkeland
FIELD SUPERVISORS:	Jon Gordon, Doug Rakstad, Mike Bader, Dan Thompson
CHEMICAL COMPANY:	NOV
MUD ENGINEER:	Ken Rockeman, Adam Fallis
MUD TYPE:	Fresh water in surface hole Diesel invert in curve; Salt water in lateral
MUD LOSSES:	Invert Mud: 540 bbls, Salt Water: not recorded
PROSPECT GEOLOGIST:	Brendan Hargrove
WELLSITE GEOLOGISTS:	G. Wayne Peterson, Michelle R. Baker, Zachary Moses
GEOSTEERING SYSTEM:	Sunburst Digital Wellsite Geological System
ROCK SAMPLING:	100' from 4,700'-8,240; 30' from 8,214' - 20,542' (TD)
SAMPLE EXAMINATION:	Binocular microscope & fluoroscope
SAMPLE CUTS:	Trichloroethylene (Carbo-Sol)
GAS DETECTION:	MSI (Mudlogging Systems, Inc.) TGC - total gas with chromatograph Serial Number(s): ML-134
DIRECTIONAL DRILLERS:	RPM, Inc. Jon Gordon, Doug Rakstad, Mike Bader, Dan Thompson
MWD:	Ryan Mike McCammond, Sammy Hayman
CASING:	Surface: 13 3/8" 54# J-55 set to 2,065' Intermediate: 7" 32# P-110 set to 11,095'

KEY OFFSET WELLS:

Oasis Petroleum North America, LLC
Chalmers 5300 21-19 8T
Lot 2 Sec. 19, 153N, 100W
McKenzie County, ND

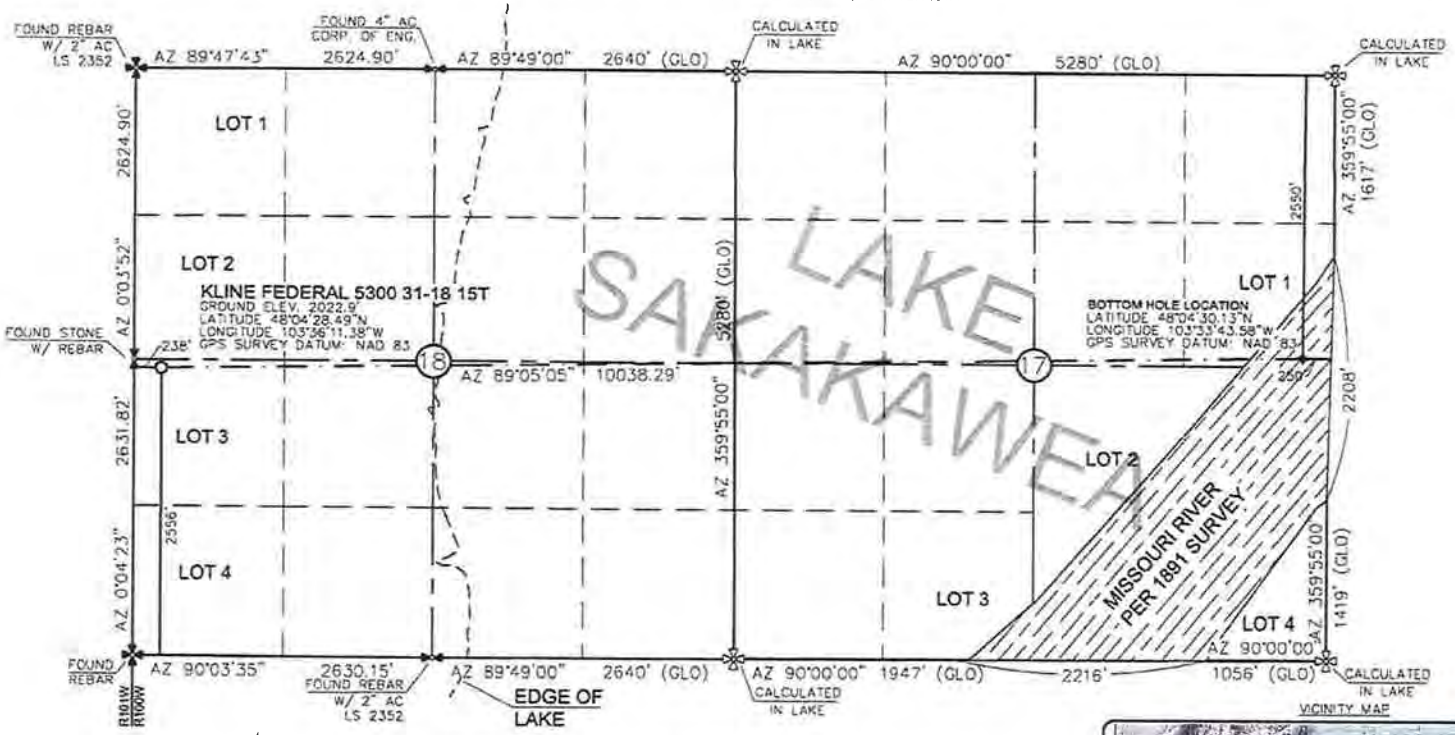
Earthstone Energy, Inc.
Dahl Edwin M 23-1
SWSE Section 23, T153N R101W
McKenzie County, ND

Oasis Petroleum North America, LLC
Ash Federal 5300 11-18T
Lot 1 Section 18, T153N, R100W
McKenzie County, ND

Oasis Petroleum North America, LLC
Kline 5300 11-18H
NENE Section 18 T153N R100W
McKenzie County, ND

WELL LOCATION PLAT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



VICINITY MAP

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 ON 2/05/15 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC

0 1000
1" = 1000

✠ - MONUMENT - RECOVERED
✠ - MONUMENT - NOT RECOVERED

STAKED ON 1/29/15
VERTICAL CONTROL DATUM WAS BASED UPON CONTROL POINT 4 WITH AN ELEVATION OF 2090.8'

THIS SURVEY AND PLAT IS BEING PROVIDED AT THE REQUEST OF ERIC BAYES OF OASIS PETROLEUM. I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DARYL D. KASEMAN LS-3880

REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE 2/05/15
NORTH DAKOTA

© 2015, INTERSTATE ENGINEERING, INC.

Number	Date	By	Description
REV 1	1/28/15	AB	PER GLO ACCESS ROAD REQUEST

OASIS PETROLEUM NORTH AMERICA, LLC
WELL LOCATION PLAT
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.M.S. Project No.: 215-09-092
Checked By: D.D.K. Date: JAN 2015

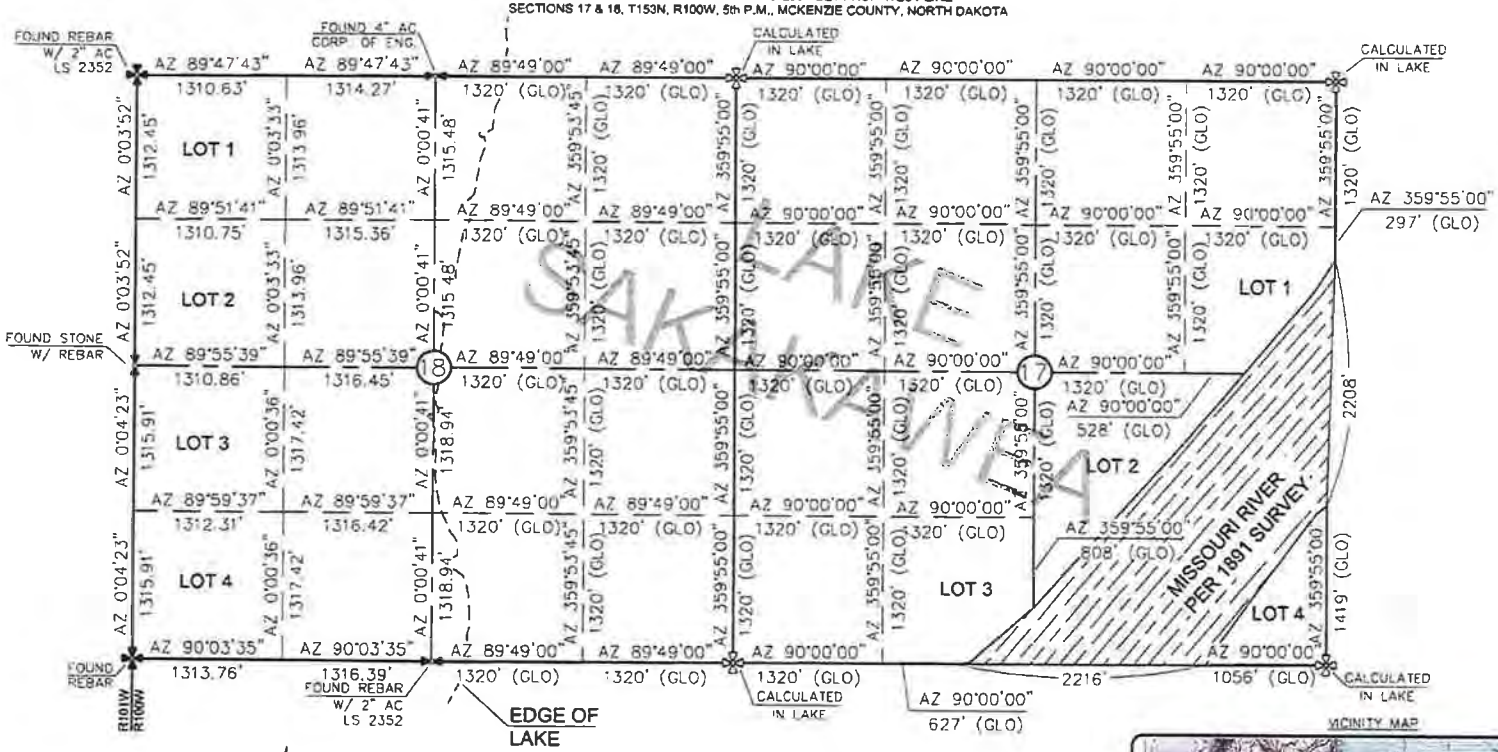
Interstate Engineering, Inc.
P.O. Box 648
425 East Main Street
Sidney, Montana 59270
Ph (406) 433-5617
Fax (406) 433-5618
www.interstateeng.com

INTERSTATE ENGINEERING

1/8

SECTION BREAKDOWN

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTIONS 17 & 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



0 1000
1" = 1000'

MONUMENT – RECOVERED
MONUMENT – NOT RECOVERED

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ALL AZIMUTHS ARE BASED ON G.P.S OBSERVATIONS. THE ORIGINAL SURVEY OF THIS AREA FOR THE GENERAL LAND OFFICE (G.L.O.) WAS 1891. THE CORNERS FOUND ARE AS INDICATED AND ALL OTHERS ARE COMPUTED FROM THOSE CORNERS FOUND AND BASED ON G.L.O. DATA. THE MAPPING ANGLE FOR THIS AREA IS APPROXIMATELY 0°03'

REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

VICINITY MAP

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Revision No.	Date	By	Description
REV 1	2/24/15	AS	UPDATE ACCESS ROAD ROUTE

OASIS PETROLEUM NORTH AMERICA, LLC
SECTION BREAKDOWN
SECTIONS 17 & 18, T153N, R100W
MKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.K. Project No.: S12-09-109
Checked By: D.D.K. Date: JAN. 2013

Interstate Engineering, Inc.
P.O. Box 648
425 East Main Street
Sidney, Montana 59270
Ph (406) 433-5617
Fax (406) 433-5618
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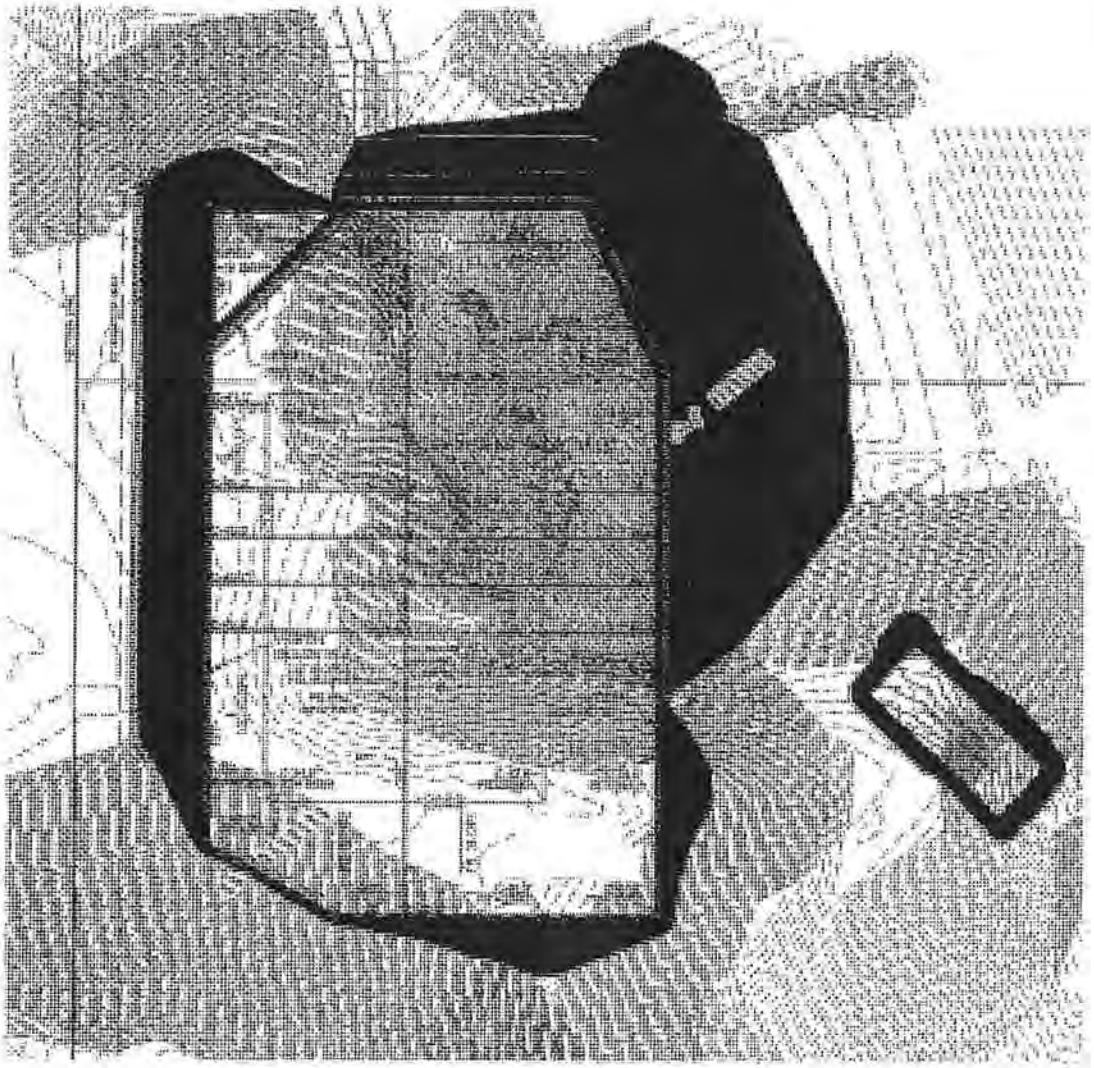
INTERSTATE ENGINEERING

2/8

PAD LAYOUT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA



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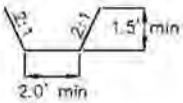
REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

NOTE: Pad dimensions shown are to usable area, the v-ditch and berm areas shall be built to the outside of the pad dimensions.

V-DITCH DETAIL



Proposed Contours
Original Contours
BERM
DITCH

NOTE: All utilities shown are preliminary only, a complete utilities location is recommended before construction.

0 80
1" = 80'

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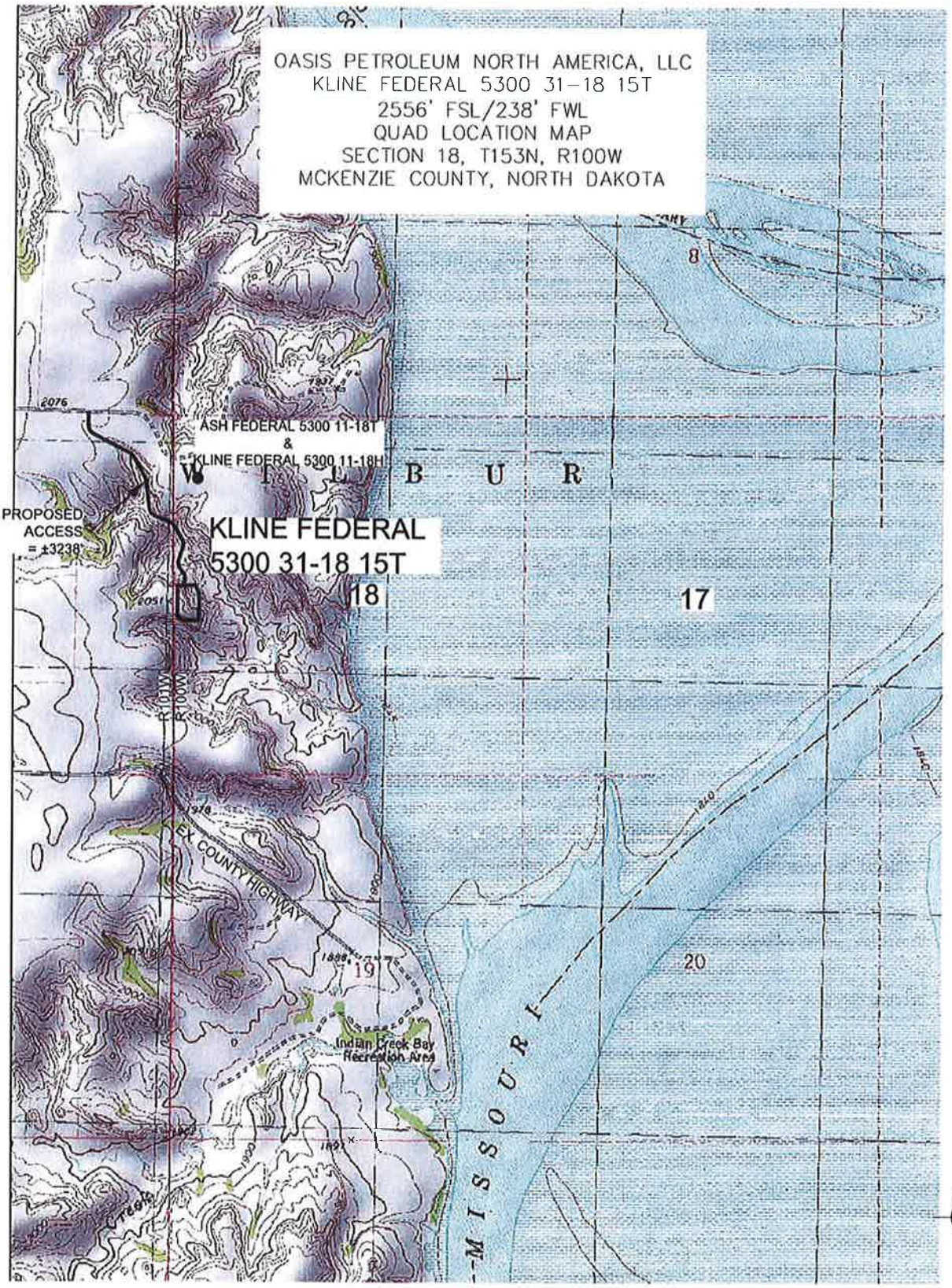
OASIS PETROLEUM NORTH AMERICA, LLC
PAD LAYOUT
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED AS-BUILT PAD LAYOUT



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Offices in Montana, North Dakota and South Dakota

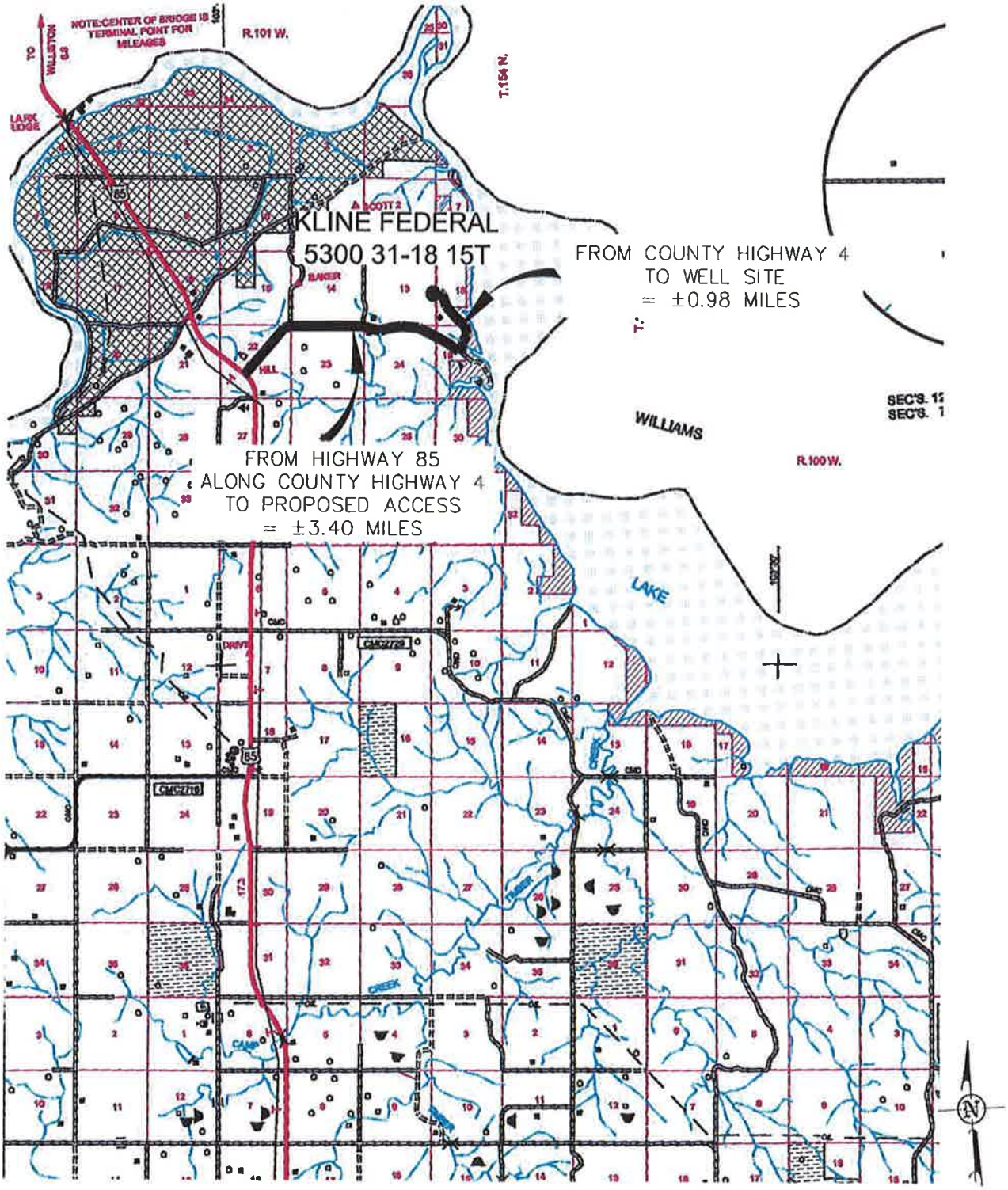
OASIS PETROLEUM NORTH AMERICA, LLC
QUAD LOCATION MAP
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. | Project No.: S14-09-109.05
Checked By: D.D.K. | Date: JAN. 2015

Revision No.	Date	By	Description
REV II	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

COUNTY ROAD MAP

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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SCALE: 1" = 2 MILE

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OASIS PETROLEUM NORTH AMERICA, LLC
COUNTY ROAD MAP
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

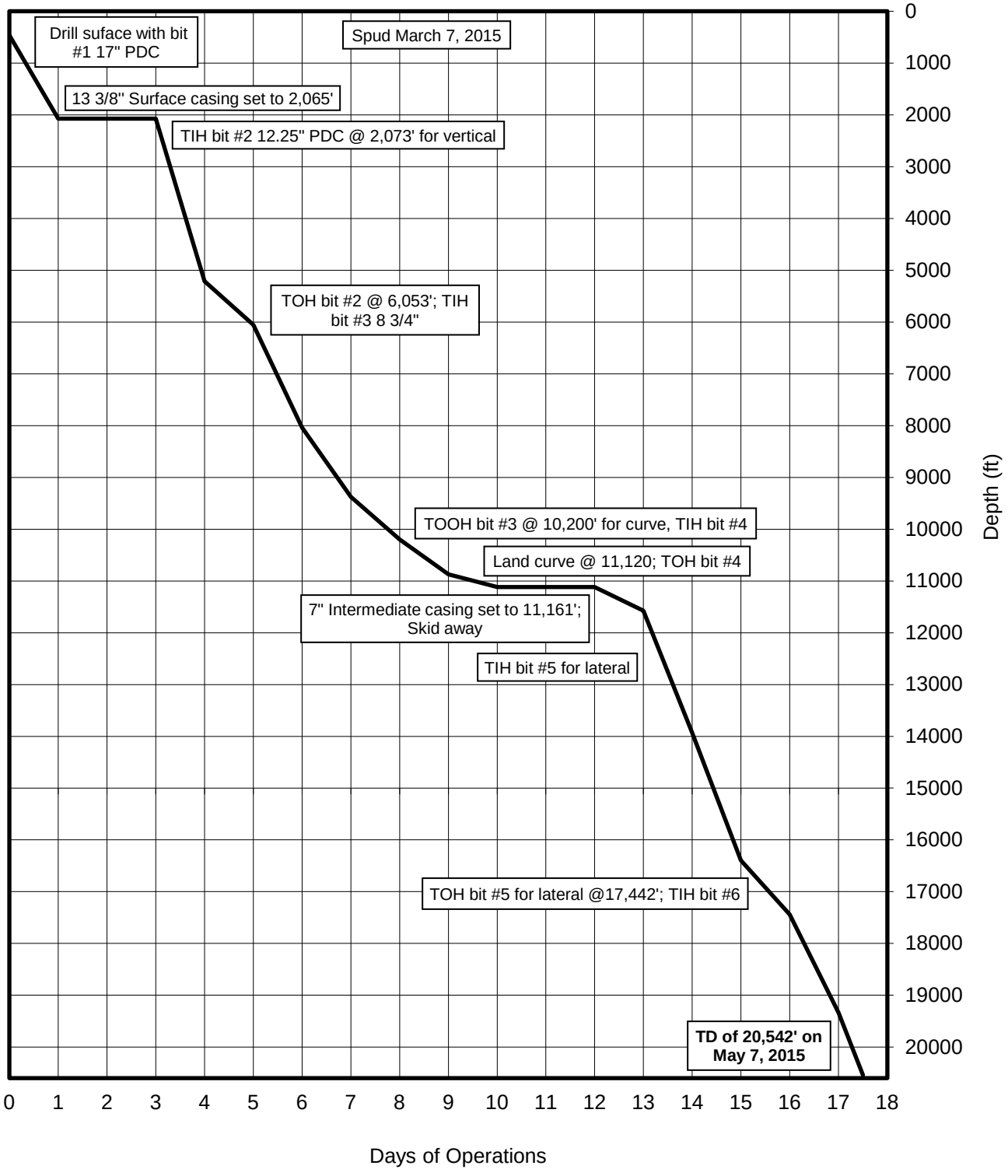
Drawn By: B.H.H.	Project No.: S14-09-109.05		
Checked By: D.D.K.	Date: JAN. 2015		

Revision No.	Date	By	Description
REV 1	7/15/15	JJS	UPDATED ACCESS ROAD ROUTE

TIME VS DEPTH

Oasis Petroleum North America, LLC

Kline Federal 5300 31-18 15T



DAILY DRILLING SUMMARY

Day	Date 2015	Depth (0600 Hrs)	24 Hr Footage	Bit #	WOB (Klbs) RT	RPM (RT)	WOB (Klbs) MM	RPM (MM)	PP	SPM 1	SPM 2	GPM	24 Hr Activity	Formation
0	3/7	464'	404.'	1	15	80	-	-	1,250	90	90	680	Rig up. Rig accept 3/6/2015 @ 21:00 hrs. Pick up BHA. Drill 60'-238'. Trouble shoot MWD. TOH. Change out MWD. TIH. Drill 238'-464'.	-
1	3/8	2,073'	1,609.'	1	30	80	-	-	3950	105	105	710	Drill 464'-545'. Service rig. Down time top drive. Drill 545'-745'. Lay down 2 joints heavy weight. Drill 745'-1,207'. Drill 1,207'-1,985'. TOH. Wiper trip surface. TIH.	Pierre
2	3/9	2,073'	.'	1	30	80	-	-	3950	105	105	710	TIH. Circulate and condition. Circulate clean water for cellar pump. Drill 1,985'-2,073'. Circulate and conditon 30 min to clean hole. Short trip 5 stands. Circulate and condition. TOH Lay down BHA. Service rig. Rig up to run casing. Safety meeting. Rig up casing crew. Run 13 3/8" casing. Wash casing to bottom. Circulate and condition. Rig up cement head/bail extensions. Held safety meeting. Cement. Rig down cementers. Rig down surface pump. Install wellheads, cut off conductor. put on wellhead.	Pierre
3	3/10	2,073'	.'	-	-	-	-	-	-	-	-	-	Cut off and dress up casing. Install welhead, weld on. Install and tighten up B section. Set BOP. Nipple up BOPS. Test BOPS. Service rig. Install wear bushing. Lay down BHA.	Pierre
4	3/11	5,214'	3,141.'	2	14	35	80	35	4000	93	93	655	Lay down BHA. Pick up BHA. Service rig. Service draw works and brakes; down time. TIH. Drill out cement, float and shoe. FIT to 250 psi. Test good. Drill ahead rotating from 2,073'-3,159'. Service rig. Drill ahead rotating from 3,159'-5,214'	Mowry
5	3/12	6,053'	839.'	2	15	70	-	85	3200	93	93	655	Drill ahead rotating from 5,214'-6,053' Flow check every stand through Dakota. BOP drill. Circulate and condition. Circulate bottoms up, twice. TOOH. TIH. Fill backside and flow check. Circulate bottoms up, twice. Condition, circulate. TOOH. Remove rotating head rubber. Install trip nipple. Lay down BHA. Pick up BHA. TIH. Service rig. Trouble shoot draw-works	Swift
6	3/13	8,040'	1,987.'	3	20	40	15	144	3900	85	85	598	Working on draw-works. TIH, install rotating head rubber. Service rig and draw works. Drill and survey vertical hole, sliding as needed, from 6,064'-6,890' Service rig. Drill and survey sliding as needed 6,064'-8,040'.	Tyler
7	3/14	9,378'	1,338.'	3	40	40	20	135	3900	80	80	563	Drill and survey, sliding as needed, from 8,040'-8,849'. Rig service. Drill and survey, sliding as needed, from 8,849'-9,378'.	Mission Canyon
8	3/15	10,200'	822.'	3	40	40	20	135	3900	80	80	563	Drill and survey, sliding as needed, from 9,378'-10,156'. Rig service. Drill and survey from 10,156'-10,200' Circulate and conditon. Prepare to come out of the hole to pick up curve assembly. Circulate bottoms up twice. Send dry job. TOOH. Circulate and condition weighted sweep at 6,000'. Slip and cut drill line. TOH. Remove rotating head rubber, install trip nipple. Rig service. Lay down BHA. Pick up curve assembly. TIH.	Lodgepole
9	3/16	10,871'	405.'	4	30	10	20	147	3400	72	72	507	TIH with curve assembly. Install rotating head rubber. Fill pipe. Ream through salts. Drill and survey curve, sliding as needed, from 10,200-10,382'. Rig service. Drill and survey curve from 10,382'-10,871'	Middle Bakken

DAILY DRILLING SUMMARY

Day	Date 2015	Depth (0600 Hrs)	24 Hr Footage	Bit #	WOB (Klbs) RT	RPM (RT)	WOB (Klbs) MM	RPM (MM)	PP	SPM 1	SPM 2	GPM	24 Hr Activity	Formation
10	3/17	11,120'	249.'	4	30	10	20	147	3400	72	72	507	Orientate and survey curve, rotating as needed, from 10,871'-11,120'. Reach intermediate casing point of 11,120'. Circulate and condition. Short trip to KOP. Circulate and conditon. Circulate full bottoms up. Rig service. TOH. Pump weighted viscosity sweep. Remove rotating head rubber and install trip nipple. TOH. Lay down BHA. Rig service. Rig up casing crew. Hold safety meeting. Start running 7" casing.	Three Forks
11	3/18	11,120'	.'	-	-	-	-	-	-	-	-	-	Run casing. Rig down casing crew. Rig up cement crew. Hold safety meeting. Circulate casing. Primary cementing. Suck out cellar and drain stack. Nipple down BOPs. Rig service. Rig up Greenie's and pick up stack. Set slips, cut casing. Layout casing elevator and bale extensions. Rig down all 3rd party tools. Rig down catwalk, flow line, etc. and prepare to walk rig. Rig released at 18:00 hrs CT on March 18, 2015.	Three Forks
12	5/2	11,120'	.'	-	-	-	-	-	-	-	-	-	Rig released to walk to Oasis Kline Federal 5300 31-18 8B at 00:00 hrs on May 2, 2015. Skid rig. Rig up cat walk and flow line. Nipple up BOPs.	Three Forks
13	5/3	11,575'	455.'	5	22	40	24	242	3200	-	86	303	Nipple up BOPS. Test BOPS. Service rig. Cut drilling line 15 wraps. Pick up BHA-activated blinds, bit, motor, pony, 3 monels, UBHO, reamer. TIH. Test tool, change quill. TIH. Drill out cement; float at 11,011', shoe at 11,095'. Drill and survey lateral, sliding as needed, from 11,137'-11,575'.	Three Forks
14	5/4	13,932'	2,357.'	5	20	40	41	242	3700	-	86	303	BOP drill. Drill and survey lateral, sliding as needed, from 11,575'-12,510'. Service rig. Drill and survey lateral, sliding as needed, from 12,510'-13,268'. Service rig. Drill and survey lateral, sliding as needed, from 13,268'-13,932'.	Three Forks
15	5/5	16,398'	2,466.'	5	28	40	35	237	3900	0	84	296	Drill and survey lateral, sliding as needed, from 13,932'-15,165'. Service rig. Drill and survey lateral, sliding as needed, from 15,165'-16,398'. Rig service.	Three Forks
16	5/6	17,442'	1,044.'	5	28	40	35	226	3900	-	80	282	Drill and survey lateral, sliding as needed, from 16,398'-17,124'. Rig service. Drill and survey lateral, sliding as needed, from 17,124'-17,442'. Service top drive. Trouble shot MWD tool. TOH for tool failure. Lay down BHA. Pick up BHA. TIH.	Three Forks
17	5/7	19,336'	1,894.'	6	22	40	60	220	4000	-	78	275	TIH. Directional work relog gamma from 17,355'-17,442'. Drill and survey lateral, sliding as needed, from 17,441'-18,104'. Service top drive. Drill and survey lateral, sliding as needed, from 18,104'-19,336'.	Three Forks
17.5	5/7	20,542'	406.'	6	22	40	60	220	4000	-	78	275	Drill and survey lateral, sliding as needed, from 19,336'-20,542'. Reach TD of 20,542' at 17:15 hours CDT on May 7, 2015. Wiper trip/short trip. Circulate bottoms up twice. Circulate and condition. Pump pill. Install trip nipple. TOOH to set line and start completion operations.	Three Forks

DAILY MUD SUMMARY

Day	Date 2015	Mud Depth	Drilling Fluid	Mud WT (ppg)	VIS (sec/qt)	PV (cP)	YP (lbs/ 100 ft2)	Gels (lbs/ 100 ft^2)	600/ 300	NAP/ H_20 (ratio)	NAP/ H20 (% by vol)	Cake (API/ HTHP)	Cor. Solids (%)	Alk	pH	Excess Lime (lb/bbl)	Cl^- (mg/L)	HGS/ LGS (%)	Salinity (ppm)	ES	Gain/ Loss (bbls)
0	03/07	464'	fresh water	8.55	25	2	1	1/1/1	5/3	-	0.98.4	1	1.6	-	7	-	4,000	0/1.3	-	-	-
1	03/08	2,073'	fresh water	8.55	25	2	1	1/1/1	5/3	-	0.98.4	1	1.6	-	7	-	4,000	0/1.3	-	-	-
2	03/09	2,073'	fresh water	8.55	25	2	1	1/1/1	5/3	-	0.98.4	1	1.6	-	7	-	4,000	0/1.3	-	-	-
3	03/10	2,073'	invert	9.65	123	22	6	7/10/11	50/28	75/25	66/22	2	12	2.7	-	3.5	50k	5.3/3.8	264,320	435	-/-
4	03/11	5,214'	invert	9.95	98	22	12	11/17/-	56/34	70.1/29.9	61/26	2	13	2.4	-	3.1	65k	5.7/3.8	250,796	302	-/99
5	03/12	6,053'	invert	9.85	90	19	13	14/20/-	51/32	64.6/35.1	56.5/30.5	2	13	2.1	-	2.7	55k	4.6/5.1	229,097	320	-/90
6	03/13	8,250'	invert	9.7	60	18	9	11/17/-	45/27	71.6/28.4	63/25	2	8.8	1.5	-	1.9	52k	5.6/3.2	255,279	400	-/112
7	03/14	9,689'	invert	9.8	60	22	11	11/16/-	55/33	74.6/25.4	64.5/22	2	10.6	1.5	-	1.9	53k	5.7/4.9	264,320	510	-/87
8	03/15	10,200'	invert	10.1	69	9	12	12/18/-	50/31	76.7/23.3	66/20	2	11.3	2.4	-	3.1	52k	6.7/4.7	264,320	630	-/96
9	03/16	11,120'	invert	10.2	63	21	11	11/17/-	53/32	77.2/22.8	66/19.5	2	11.9	2.4	-	3.1	52k	6.9/5	264,320	610	-/56
10	03/17	11,120'	invert	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	03/18	11,120'	invert	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	05/02	11,120'	saltwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	05/03	11,575'	saltwater	9.65	29	1	3	-	5/4	-	0/90.6	-	9.2	-	8.5	-	157k	0/0.1	-	-	-/-
14	05/04	13,932'	saltwater	9.65	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-/-
15	05/05	16,398'	saltwater	9.6	29	1	3	-	5/4	-	0/90.6	-	9.4	-	8.5	-	168k	0/0.3	-	-	-/-
16	05/06	11,427'	saltwater	9.65	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-/-
17	05/07	19,336'	saltwater	9.65	29	1	1	-	3/2	-	0/90.5	-	9.5	-	9	-	165k	0.1/0.3	-	-	-/-

BOTTOM HOLE ASSEMBLY RECORD

BHA Run	Depth In	Depth Out	Footage	Hours	Accum. Hours	Vert. Dev.	Bit Data								Motor Data					
							Bit #	Size (in.)	Type	Make	Model	Serial #	Jets	Hours	Motor #	Make	Model	Bend	Hours	Rev/Gal
1	0'	2,073'	2,073'	24	24.00	Surface	1	17 1/2	PDC	NOV	Milltooth	D74160	4x22	24	-	-	-	-	-	-
2	2,073'	6,053'	3,980'	24	48.00	Vertical	2	12 1/4	PDC	Atlas Copco	-	B0109	6x20	24	2	NOV	6/5 5.0	1.50°	24	0.13
3	6,053'	10,200'	4,147'	49	97.00	Vertical	3	8 3/4	PDC	Security	MM65D	12404209	6x14	49	3	Hunting	7/8 5.7	1.50°	49	0.24
4	10,200'	11,120'	920'	23.5	120.50	Curve	4	8 3/4	PDC	Security	MMD55M	12460655	6x14	23.5	4	NOV	7/8 5.0	2.38°	23.5	0.29
5	11,120'	17,442'	6,322'	69	189.50	Vertical	5	8 3/4	PDC	Smith	Z1605	JK1605	6x14	69	5	Ryan	6/7 8.0	1.50°	69	0.80
6	17,442'	20,542'	3,100'	28	217.50	Vertical	6	8 3/4	PDC	Smith	Z613	JK0844	6x14	28	6	Ryan	6/7 8.0	1.50°	28	0.80

SUNBURST CONSULTING
A GEOLOGY SERVICE

PLAN VIEW

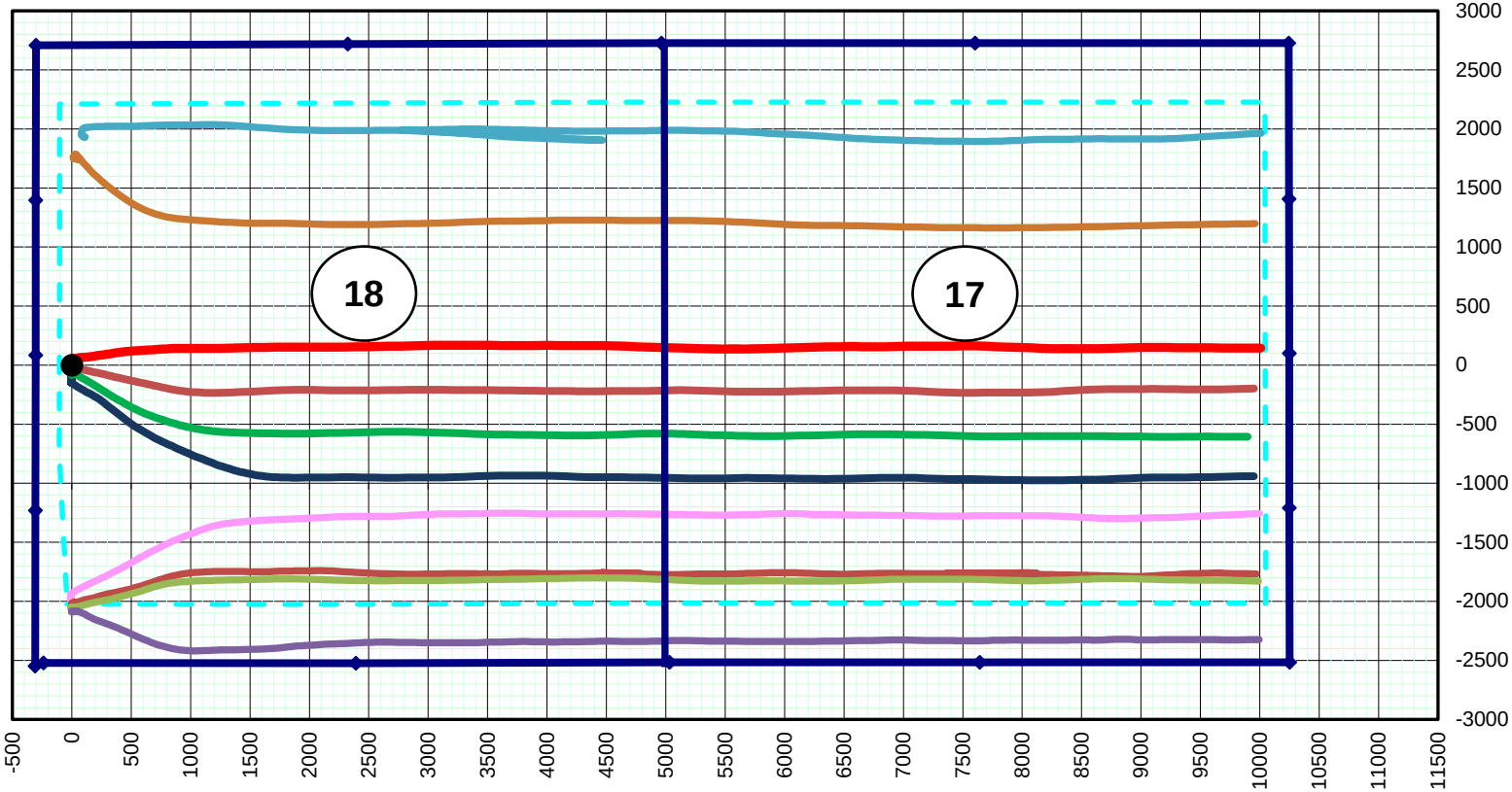
Note: 1,280 acre laydown spacing unit with 200' N/S & 500' E/W setbacks

Oasis Petroleum North America LLC
Kline Federal 5300 31-18 15T
Surface Location
2,556' FSL & 238' FWL
Lot 3 Sec. 18, T153N, R100W

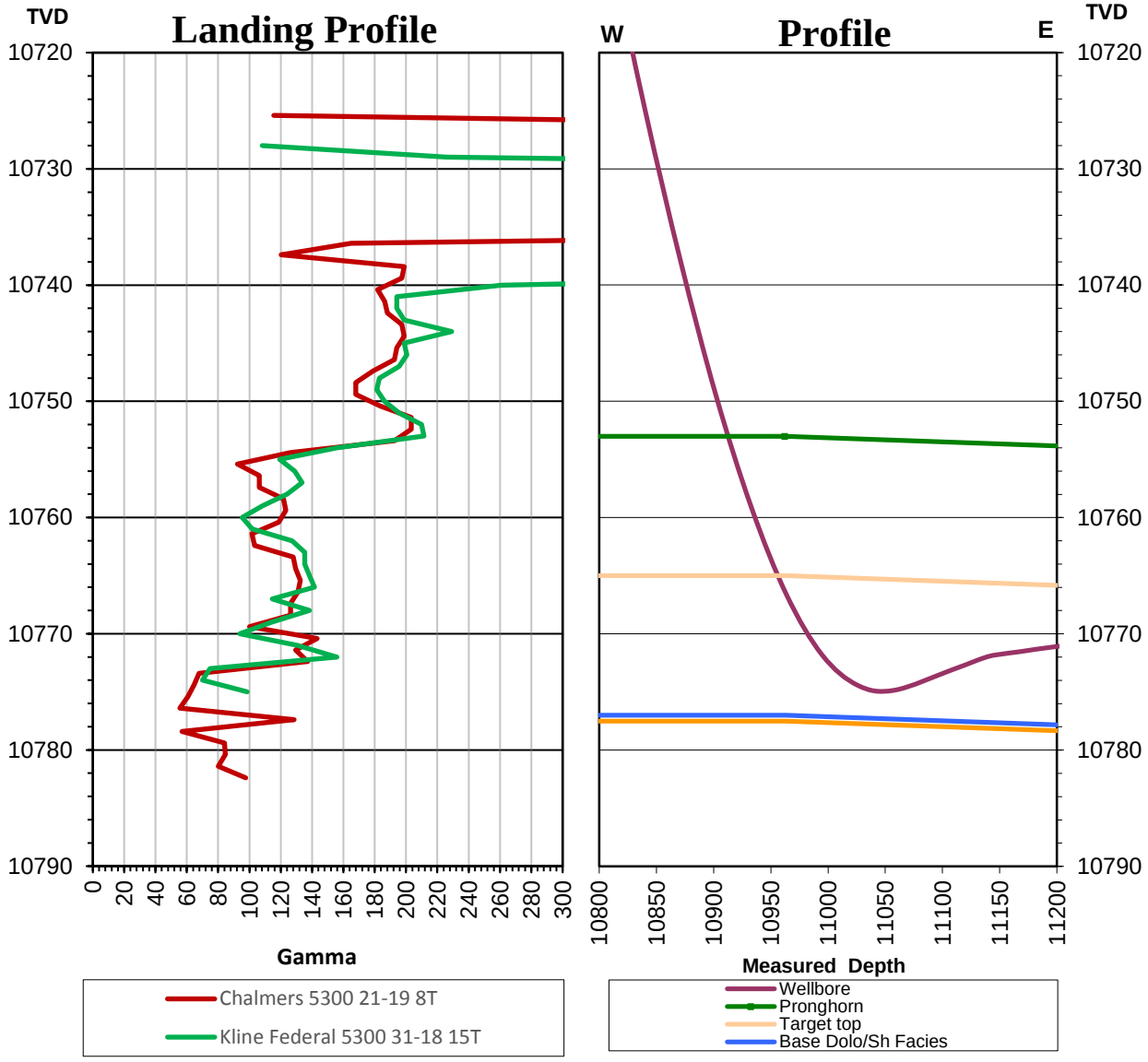
- Surface
- Hardline
- Subject Well
- Kline Federal 5300 41-18 9T
- Kline Federal 5300 41-18 11T2
- Ash Federal 5300 11-18T
- Kline Federal 5300 31-18 7T
- Section Line
- Proposed lateral:
- Kline Federal 5300 11-18H
- Kline Federal 5300 41-18 10B
- Kline Federal 5300 41-18 12TX
- Kline Federal 5300 31-18 6B
- Kline Federal 5300 31-18 8B

N W E S

Bottom Hole Location
144.13' N & 10,006.71' E
of surface location or approx.
2,543.87' FNL & 244.44' FEL
SE NE Sec. 17, T153N, R100W



Oasis Petroleum
Kline Federal 5300 31-18 15T
2,556' FSL & 238' FWL
McKenzie County, ND
Lot 3 Sec. 18, T153N, R100W



Oasis Petroleum North America LLC
Kline Federal 5300 31-18 15T
Lot 3 Sec. 18, T153N, R100W
McKenzie County, ND

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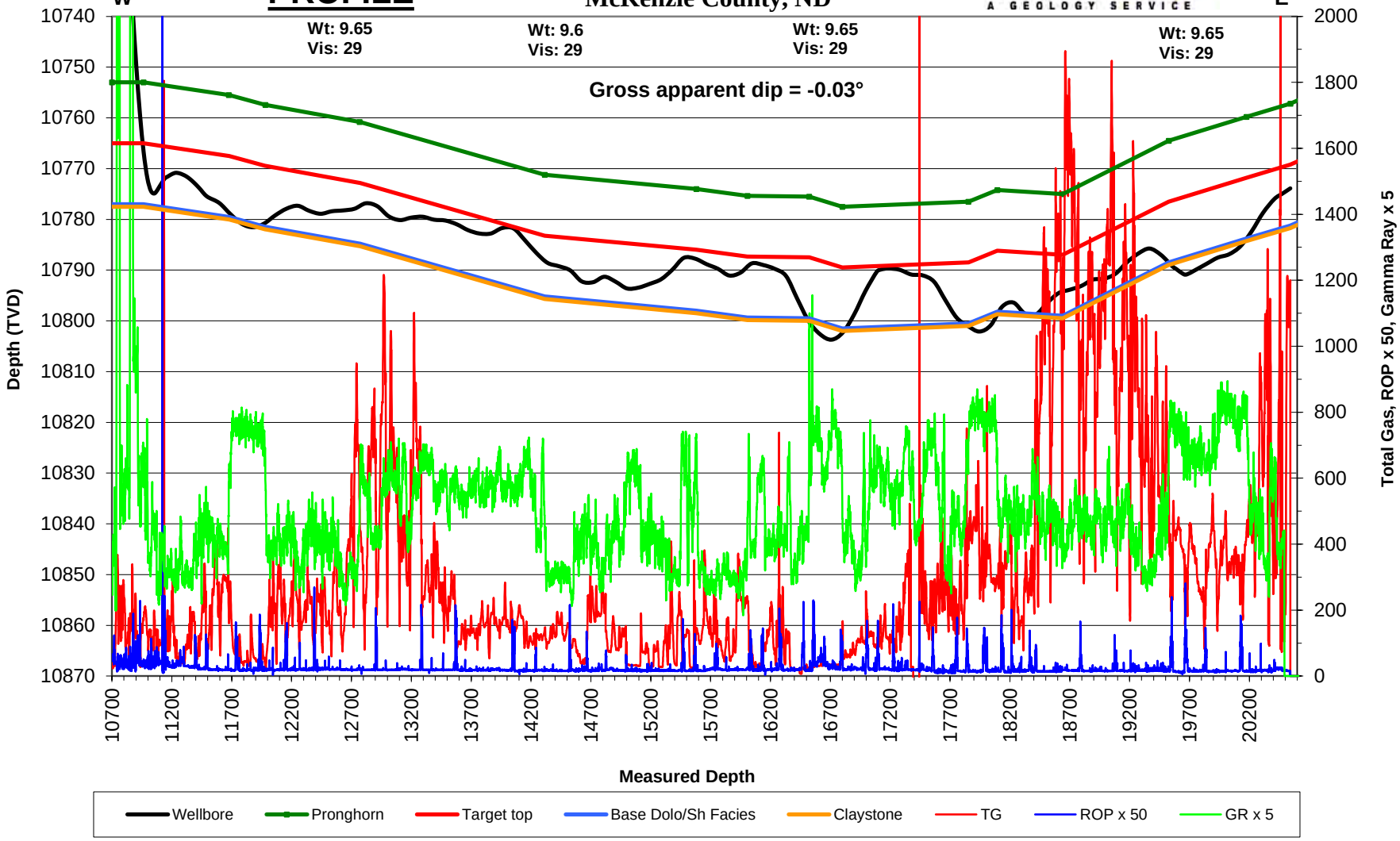
PROFILE



FORMATION MARKERS & DIP ESTIMATES

Oasis Petroleum North America LLC - Kline Federal 5300 31-18 15T

Dip Change Points	MD	TVD	TVD diff.	MD diff.	Dip	Dipping up/down	Type of Marker
Marker							
	10,700'	10,765.00					Gamma
Target Entry	10,962'	10,765.00	0.00	262.00	***0.00***	Flat	Gamma
Claystone Entry	11,676'	10,767.50	2.50	714.00	***-0.20***	Down	Gamma
Claystone Exit	11,981'	10,769.45	1.95	305.00	***-0.37***	Down	Gamma
Marker E	12,768'	10,772.80	3.35	787.00	***-0.24***	Down	Gamma
Marker E	14,314'	10,783.20	10.40	1546.00	***-0.39***	Down	Gamma
Marker D	15,580'	10,786.00	2.80	1266.00	***-0.13***	Down	Gamma
Marker D	16,006'	10,787.35	1.35	426.00	***-0.18***	Down	Gamma
Claystone Entry	16,523'	10,787.50	0.15	517.00	***-0.02***	Down	Gamma
Claystone Exit	16,802'	10,789.50	2.00	279.00	***-0.41***	Down	Gamma
Claystone Entry	17,853'	10,788.50	-1.00	1051.00	***0.05***	Up	Gamma
Claystone Exit	18,095'	10,786.20	-2.30	242.00	***0.54***	Up	Gamma
Marker F	18,640'	10,787.00	0.80	545.00	***-0.08***	Down	Gamma
Claystone Entry	19,525'	10,776.50	-10.50	885.00	***0.68***	Up	Gamma
Claystone Exit	20,175'	10,771.80	-4.70	650.00	***0.41***	Up	Gamma
Cool gamma between E &D	20,542'	10,769.20	-2.60	367.00	***0.41***	Up	Gamma
Gross Dip							
Initial Target Contact	10,962'	10,765.00					
Projected Final Target Contact	20,542'	10,769.20	4.20	9580.00	***-0.03***	Down	Projection

Oasis Petroleum North America LLC
Kline Federal 5300 31-18 15T
Lot 3 Sec. 18, T153N, R100W
McKenzie County, ND

SUNBURST CONSULTING
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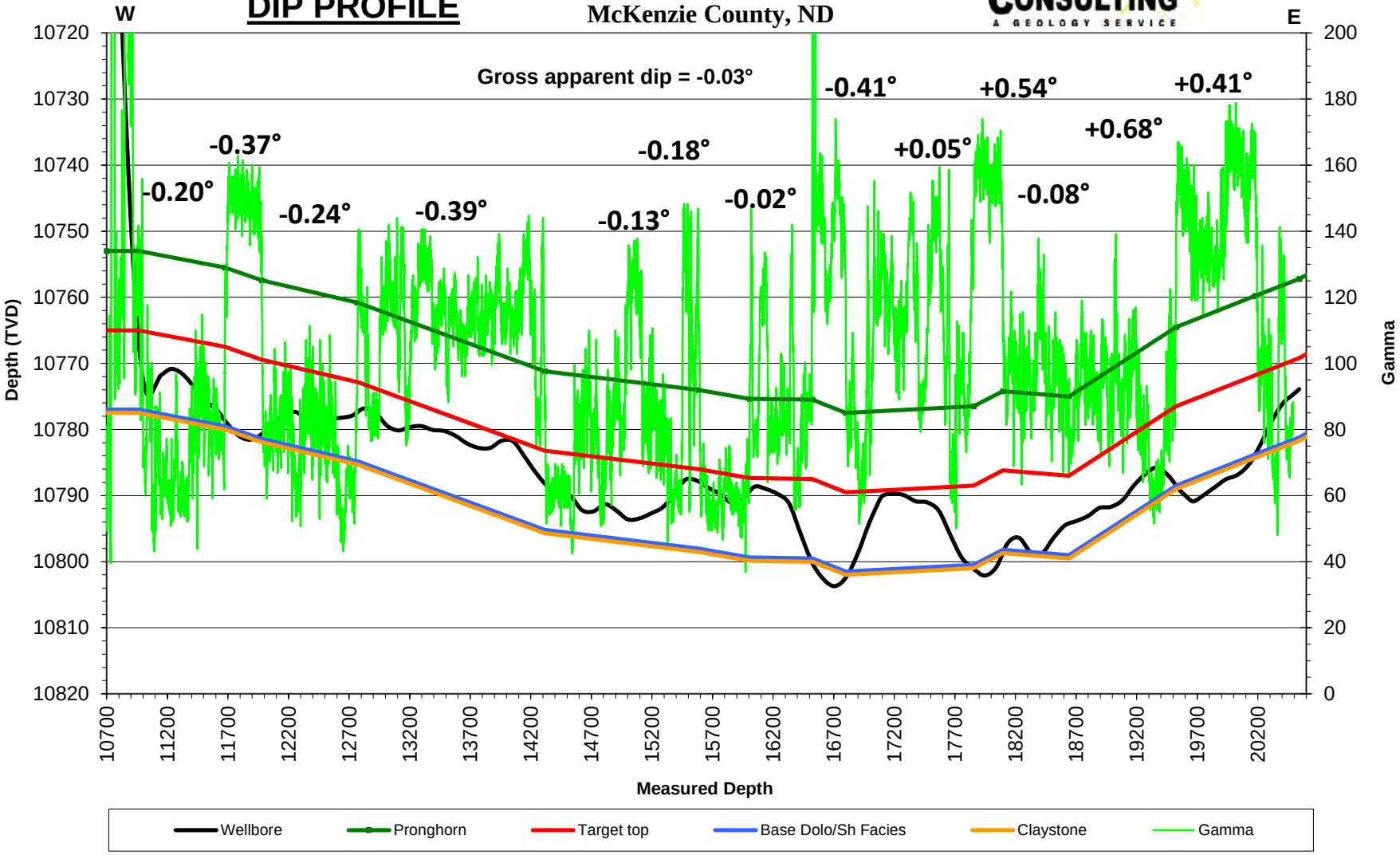
DIP PROFILE



SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
Tie	0.00	0.00	0.00					
1	114.00	0.70	51.90	114.00	0.43	0.55	0.55	0.61
2	176.00	1.10	69.30	175.99	0.87	1.40	1.40	0.77
3	238.00	1.10	67.20	237.98	1.31	2.51	2.51	0.07
4	300.00	1.70	78.20	299.96	1.73	3.96	3.96	1.06
5	362.00	0.90	64.70	361.94	2.13	5.30	5.30	1.37
6	424.00	0.90	76.80	423.94	2.45	6.21	6.21	0.31
7	486.00	0.90	73.70	485.93	2.70	7.15	7.15	0.08
8	520.00	0.60	83.10	519.92	2.79	7.59	7.59	0.95
9	580.00	0.90	74.70	579.92	2.96	8.35	8.35	0.53
10	640.00	0.40	93.70	639.92	3.07	9.02	9.02	0.90
11	700.00	0.40	30.60	699.91	3.23	9.33	9.33	0.70
12	760.00	0.30	118.80	759.91	3.34	9.58	9.58	0.82
13	820.00	0.30	107.40	819.91	3.21	9.86	9.86	0.10
14	880.00	0.20	184.00	879.91	3.06	10.01	10.01	0.53
15	940.00	0.40	244.60	939.91	2.87	9.81	9.81	0.58
16	1000.00	0.80	222.00	999.91	2.47	9.34	9.34	0.76
17	1060.00	0.80	219.10	1059.90	1.83	8.80	8.80	0.07
18	1120.00	0.70	240.80	1119.90	1.33	8.21	8.21	0.50
19	1181.00	0.70	233.20	1180.89	0.92	7.59	7.59	0.15
20	1244.00	0.70	254.40	1243.89	0.59	6.91	6.91	0.41
21	1337.00	0.80	219.10	1336.88	-0.07	5.95	5.95	0.50
22	1430.00	0.70	227.10	1429.87	-0.96	5.13	5.13	0.16
23	1524.00	1.10	199.60	1523.86	-2.20	4.40	4.40	0.61
24	1617.00	0.60	204.00	1616.85	-3.49	3.91	3.91	0.54
25	1710.00	0.90	248.20	1709.84	-4.20	3.03	3.03	0.68
26	1803.00	0.80	256.00	1802.83	-4.63	1.72	1.72	0.16
27	1897.00	0.90	226.00	1896.82	-5.30	0.55	0.55	0.48
28	1990.00	1.00	234.40	1989.81	-6.28	-0.63	-0.63	0.18
29	2016.00	1.10	238.30	2015.81	-6.54	-1.03	-1.03	0.47
30	2077.00	1.20	236.60	2076.79	-7.20	-2.06	-2.06	0.17
31	2170.00	1.30	308.30	2169.78	-7.09	-3.70	-3.70	1.58
32	2263.00	1.40	317.70	2262.75	-5.59	-5.29	-5.29	0.26
33	2357.00	1.60	324.40	2356.72	-3.68	-6.83	-6.83	0.28
34	2450.00	0.90	311.60	2449.70	-2.13	-8.13	-8.13	0.81
35	2544.00	0.90	306.50	2543.69	-1.21	-9.28	-9.28	0.09
36	2637.00	1.20	331.50	2636.67	0.08	-10.33	-10.33	0.58
37	2730.00	1.10	335.80	2729.65	1.75	-11.16	-11.16	0.14

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
38	2824.00	0.90	359.80	2823.64	3.32	-11.53	-11.53	0.49
39	2917.00	1.10	7.30	2916.62	4.93	-11.42	-11.42	0.26
40	3010.00	0.90	18.20	3009.61	6.51	-11.08	-11.08	0.30
41	3104.00	0.70	2.80	3103.60	7.79	-10.82	-10.82	0.31
42	3197.00	0.50	8.70	3196.59	8.75	-10.73	-10.73	0.22
43	3290.00	0.40	10.80	3289.59	9.47	-10.61	-10.61	0.11
44	3384.00	0.60	16.60	3383.59	10.27	-10.41	-10.41	0.22
45	3477.00	0.50	28.10	3476.58	11.09	-10.08	-10.08	0.16
46	3571.00	0.60	31.00	3570.58	11.88	-9.63	-9.63	0.11
47	3664.00	0.40	21.40	3663.58	12.60	-9.26	-9.26	0.23
48	3758.00	0.40	24.90	3757.57	13.20	-9.00	-9.00	0.03
49	3851.00	0.50	28.40	3850.57	13.85	-8.67	-8.67	0.11
50	3944.00	0.40	18.30	3943.57	14.52	-8.38	-8.38	0.14
51	4038.00	0.30	19.90	4037.57	15.06	-8.19	-8.19	0.11
52	4131.00	0.30	9.60	4130.56	15.53	-8.07	-8.07	0.06
53	4225.00	0.50	2.90	4224.56	16.18	-8.01	-8.01	0.22
54	4318.00	0.40	350.50	4317.56	16.91	-8.04	-8.04	0.15
55	4411.00	0.40	15.10	4410.56	17.54	-8.01	-8.01	0.18
56	4505.00	0.50	353.40	4504.55	18.26	-7.97	-7.97	0.21
57	4598.00	0.40	23.10	4597.55	18.97	-7.89	-7.89	0.27
58	4692.00	0.50	10.70	4691.55	19.67	-7.69	-7.69	0.15
59	4785.00	0.60	33.40	4784.54	20.48	-7.34	-7.34	0.26
60	4878.00	0.60	52.90	4877.54	21.18	-6.69	-6.69	0.22
61	4972.00	0.70	39.30	4971.53	21.92	-5.93	-5.93	0.19
62	5065.00	0.50	43.80	5064.53	22.65	-5.29	-5.29	0.22
63	5159.00	0.40	47.90	5158.53	23.17	-4.76	-4.76	0.11
64	5252.00	0.50	80.10	5251.52	23.45	-4.12	-4.12	0.29
65	5345.00	0.40	84.60	5344.52	23.55	-3.40	-3.40	0.11
66	5439.00	0.40	83.20	5438.52	23.62	-2.75	-2.75	0.01
67	5532.00	0.50	68.60	5531.52	23.81	-2.04	-2.04	0.16
68	5625.00	0.50	70.40	5624.51	24.09	-1.28	-1.28	0.02
69	5718.00	0.50	82.50	5717.51	24.28	-0.50	-0.50	0.11
70	5812.00	0.60	78.50	5811.50	24.43	0.39	0.39	0.11
71	5905.00	0.50	74.80	5904.50	24.64	1.26	1.26	0.11
72	5999.00	0.50	66.80	5998.50	24.91	2.03	2.03	0.07
73	6085.00	0.40	126.20	6084.49	24.88	2.62	2.62	0.53
74	6178.00	0.20	341.10	6177.49	24.84	2.83	2.83	0.62
75	6272.00	0.40	304.00	6271.49	25.18	2.50	2.50	0.29

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
76	6365.00	0.60	192.30	6364.49	24.88	2.13	2.13	0.90
77	6458.00	0.00	487.60	6457.49	24.41	2.02	2.02	0.65
78	6552.00	0.60	37.00	6551.49	24.80	2.32	2.32	0.64
79	6645.00	0.60	130.70	6644.48	24.87	2.98	2.98	0.94
80	6738.00	1.30	150.40	6737.47	23.64	3.87	3.87	0.82
81	6832.00	0.70	125.60	6831.46	22.38	4.87	4.87	0.77
82	6925.00	0.60	86.70	6924.45	22.07	5.82	5.82	0.48
83	7018.00	1.00	9.10	7017.44	22.90	6.43	6.43	1.13
84	7111.00	1.20	355.70	7110.43	24.68	6.49	6.49	0.35
85	7205.00	1.50	355.30	7204.40	26.88	6.31	6.31	0.32
86	7298.00	1.70	348.40	7297.36	29.45	5.93	5.93	0.30
87	7391.00	1.60	352.40	7390.32	32.09	5.48	5.48	0.16
88	7485.00	1.50	7.80	7484.29	34.61	5.48	5.48	0.45
89	7578.00	1.20	9.20	7577.26	36.77	5.80	5.80	0.32
90	7671.00	1.40	6.00	7670.24	38.86	6.07	6.07	0.23
91	7765.00	1.10	8.30	7764.22	40.90	6.32	6.32	0.32
92	7858.00	0.90	357.00	7857.20	42.51	6.41	6.41	0.30
93	7951.00	0.80	348.50	7950.19	43.88	6.25	6.25	0.17
94	8045.00	0.80	342.00	8044.18	45.14	5.91	5.91	0.10
95	8138.00	1.20	339.00	8137.17	46.67	5.36	5.36	0.43
96	8231.00	0.40	359.90	8230.16	47.90	5.01	5.01	0.90
97	8325.00	0.60	7.20	8324.16	48.72	5.07	5.07	0.22
98	8418.00	0.60	16.30	8417.15	49.67	5.27	5.27	0.10
99	8512.00	0.70	15.60	8511.15	50.70	5.56	5.56	0.11
100	8605.00	0.70	13.00	8604.14	51.80	5.85	5.85	0.03
101	8698.00	0.20	342.70	8697.14	52.51	5.92	5.92	0.58
102	8791.00	0.20	17.30	8790.14	52.82	5.92	5.92	0.13
103	8885.00	0.30	104.50	8884.14	52.91	6.21	6.21	0.37
104	8978.00	0.40	131.00	8977.13	52.64	6.69	6.69	0.20
105	9071.00	0.40	155.70	9070.13	52.13	7.07	7.07	0.18
106	9164.00	0.50	146.20	9163.13	51.50	7.43	7.43	0.13
107	9258.00	0.50	137.00	9257.12	50.85	7.94	7.94	0.09
108	9351.00	0.40	138.40	9350.12	50.31	8.43	8.43	0.11
109	9444.00	0.50	153.30	9443.12	49.71	8.83	8.83	0.16
110	9538.00	0.40	164.10	9537.12	49.03	9.10	9.10	0.14
111	9631.00	0.20	160.60	9630.11	48.56	9.25	9.25	0.22
112	9724.00	0.30	157.40	9723.11	48.18	9.39	9.39	0.11
113	9817.00	0.20	137.30	9816.11	47.84	9.60	9.60	0.14

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
114	9911.00	0.20	103.30	9910.11	47.68	9.87	9.87	0.12
115	10004.00	0.20	29.00	10003.11	47.79	10.10	10.10	0.26
116	10098.00	0.40	4.00	10097.11	48.26	10.21	10.21	0.25
117	10142.00	0.40	2.40	10141.11	48.56	10.22	10.22	0.03
118	10155.00	0.40	353.70	10154.11	48.65	10.22	10.22	0.47
119	10186.00	0.70	11.60	10185.11	48.95	10.25	10.25	1.10
120	10217.00	3.00	59.40	10216.09	49.55	10.98	10.98	8.33
121	10248.00	6.30	67.10	10246.98	50.62	13.25	13.25	10.81
122	10279.00	10.00	71.80	10277.67	52.12	17.37	17.37	12.12
123	10310.00	12.60	73.40	10308.06	53.93	23.17	23.17	8.45
124	10342.00	16.00	73.60	10339.07	56.17	30.75	30.75	10.63
125	10373.00	18.40	74.70	10368.68	58.67	39.57	39.57	7.81
126	10404.00	19.80	76.60	10397.97	61.18	49.40	49.40	4.94
127	10435.00	22.50	81.40	10426.88	63.28	60.37	60.37	10.34
128	10466.00	25.00	85.60	10455.26	64.67	72.77	72.77	9.73
129	10497.00	26.60	86.30	10483.17	65.62	86.23	86.23	5.25
130	10528.00	29.60	86.40	10510.51	66.55	100.80	100.80	9.68
131	10560.00	32.00	85.90	10537.99	67.66	117.15	117.15	7.54
132	10591.00	35.30	84.90	10563.80	69.04	134.26	134.26	10.79
133	10622.00	38.70	83.10	10588.55	71.00	152.81	152.81	11.51
134	10653.00	41.50	82.00	10612.26	73.60	172.61	172.61	9.32
135	10684.00	44.80	81.20	10634.88	76.70	193.58	193.58	10.79
136	10715.00	49.10	81.20	10656.03	80.16	215.96	215.96	13.87
137	10746.00	52.50	81.30	10675.62	83.81	239.70	239.70	10.97
138	10778.00	56.70	81.60	10694.15	87.69	265.49	265.49	13.15
139	10809.00	60.20	81.90	10710.37	91.48	291.63	291.63	11.32
140	10840.00	64.00	81.40	10724.88	95.46	318.73	318.73	12.34
141	10871.00	66.40	80.90	10737.88	99.79	346.53	346.53	7.88
142	10902.00	69.70	81.70	10749.46	104.14	374.95	374.95	10.91
143	10933.00	74.00	82.50	10759.12	108.18	404.12	404.12	14.09
144	10964.00	77.70	83.60	10766.70	111.81	433.96	433.96	12.42
145	10995.00	83.20	85.10	10771.84	114.82	464.37	464.37	18.37
146	11026.00	87.20	85.10	10774.43	117.46	495.14	495.14	12.90
147	11058.00	91.30	85.40	10774.85	120.11	527.02	527.02	12.85
148	11109.00	92.70	85.80	10773.07	124.02	577.84	577.84	2.85
149	11138.00	91.50	86.30	10772.01	126.01	606.75	606.75	4.48
150	11152.00	90.70	86.30	10771.74	126.92	620.72	620.72	5.71
151	11168.00	90.80	86.40	10771.53	127.94	636.68	636.68	0.88

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
152	11198.00	90.80	86.40	10771.11	129.82	666.62	666.62	0.00
153	11230.00	90.20	86.40	10770.83	131.83	698.56	698.56	1.88
154	11261.00	89.50	86.70	10770.91	133.69	729.50	729.50	2.46
155	11292.00	89.50	86.50	10771.18	135.53	760.44	760.44	0.65
156	11322.00	89.10	86.30	10771.55	137.42	790.38	790.38	1.49
157	11352.00	88.90	86.50	10772.07	139.30	820.32	820.32	0.94
158	11382.00	88.70	87.30	10772.70	140.92	850.27	850.27	2.75
159	11414.00	88.60	88.50	10773.46	142.09	882.24	882.24	3.76
160	11444.00	88.40	89.00	10774.24	142.75	912.22	912.22	1.79
161	11475.00	88.40	89.70	10775.11	143.10	943.20	943.20	2.26
162	11507.00	89.50	91.00	10775.69	142.90	975.20	975.20	5.32
163	11597.00	89.10	90.20	10776.79	141.96	1065.18	1065.18	0.99
164	11691.00	88.20	89.90	10779.01	141.88	1159.16	1159.16	1.01
165	11785.00	89.50	89.70	10780.89	142.21	1253.14	1253.14	1.40
166	11879.00	89.70	88.40	10781.55	143.77	1347.12	1347.12	1.40
167	11970.00	91.20	88.10	10780.83	146.54	1438.07	1438.07	1.68
168	12062.00	90.80	88.50	10779.23	149.27	1530.02	1530.02	0.61
169	12157.00	90.80	89.40	10777.90	151.01	1624.99	1624.99	0.95
170	12252.00	89.90	89.70	10777.32	151.76	1719.98	1719.98	1.00
171	12347.00	88.90	89.50	10778.32	152.42	1814.98	1814.98	1.07
172	12442.00	90.40	90.40	10778.90	152.51	1909.97	1909.97	1.84
173	12537.00	90.20	90.40	10778.40	151.84	2004.97	2004.97	0.21
174	12631.00	90.00	89.90	10778.24	151.60	2098.97	2098.97	0.57
175	12726.00	90.40	89.90	10777.90	151.76	2193.96	2193.96	0.42
176	12821.00	90.90	89.60	10776.83	152.18	2288.96	2288.96	0.61
177	12916.00	88.40	88.50	10777.41	153.75	2383.93	2383.93	2.88
178	13011.00	89.20	88.60	10779.40	156.16	2478.88	2478.88	0.85
179	13106.00	89.90	89.40	10780.14	157.81	2573.86	2573.86	1.12
180	13200.00	90.70	88.70	10779.65	159.37	2667.85	2667.85	1.13
181	13295.00	89.50	88.90	10779.48	161.36	2762.82	2762.82	1.28
182	13390.00	89.80	88.90	10780.06	163.18	2857.80	2857.80	0.32
183	13485.00	90.00	88.80	10780.23	165.09	2952.79	2952.79	0.24
184	13580.00	89.10	89.00	10780.98	166.92	3047.76	3047.76	0.97
185	13674.00	89.50	89.80	10782.13	167.90	3141.75	3141.75	0.95
186	13769.00	89.70	89.90	10782.79	168.15	3236.75	3236.75	0.24
187	13864.00	90.30	90.20	10782.79	168.07	3331.75	3331.75	0.71
188	13959.00	91.00	90.10	10781.71	167.82	3426.74	3426.74	0.74
189	14054.00	88.90	90.50	10781.79	167.32	3521.73	3521.73	2.25

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
190	14149.00	88.30	90.80	10784.11	166.24	3616.70	3616.70	0.71
191	14244.00	88.70	90.70	10786.60	165.00	3711.66	3711.66	0.43
192	14338.00	88.90	89.50	10788.57	164.83	3805.63	3805.63	1.29
193	14433.00	90.30	89.00	10789.23	166.08	3900.62	3900.62	1.56
194	14528.00	88.70	90.00	10790.06	166.91	3995.61	3995.61	1.99
195	14623.00	88.70	90.70	10792.22	166.33	4090.58	4090.58	0.74
196	14718.00	91.10	90.10	10792.38	165.66	4185.57	4185.57	2.60
197	14813.00	90.20	89.90	10791.31	165.66	4280.57	4280.57	0.97
198	14907.00	88.60	90.30	10792.29	165.50	4374.56	4374.56	1.75
199	15002.00	89.80	90.70	10793.62	164.67	4469.54	4469.54	1.33
200	15097.00	90.40	92.30	10793.45	162.18	4564.51	4564.51	1.80
201	15192.00	90.50	91.40	10792.70	159.12	4659.45	4659.45	0.95
202	15287.00	90.60	92.10	10791.79	156.22	4754.40	4754.40	0.74
203	15381.00	91.70	92.30	10789.91	152.61	4848.31	4848.31	1.19
204	15476.00	91.10	91.30	10787.58	149.63	4943.24	4943.24	1.23
205	15571.00	88.70	91.70	10787.75	147.14	5038.20	5038.20	2.56
206	15666.00	90.00	91.60	10788.83	144.40	5133.15	5133.15	1.37
207	15761.00	88.90	91.50	10789.74	141.83	5228.11	5228.11	1.16
208	15856.00	89.50	91.80	10791.07	139.10	5323.06	5323.06	0.71
209	15950.00	91.20	91.10	10790.49	136.72	5417.02	5417.02	1.96
210	16045.00	91.00	89.90	10788.67	135.89	5512.00	5512.00	1.28
211	16140.00	88.60	90.70	10789.00	135.39	5606.99	5606.99	2.66
212	16235.00	90.50	89.00	10789.75	135.64	5701.98	5701.98	2.68
213	16330.00	87.80	88.20	10791.16	137.96	5796.93	5796.93	2.96
214	16425.00	86.70	87.80	10795.71	141.28	5891.76	5891.76	1.23
215	16519.00	88.00	88.10	10800.06	144.63	5985.60	5985.60	1.42
216	16614.00	88.90	88.00	10802.63	147.87	6080.51	6080.51	0.95
217	16709.00	89.80	88.50	10803.71	150.77	6175.46	6175.46	1.08
218	16804.00	91.90	88.70	10802.30	153.09	6270.41	6270.41	2.22
219	16898.00	92.40	89.10	10798.77	154.89	6364.33	6364.33	0.68
220	16993.00	93.20	89.20	10794.13	156.30	6459.21	6459.21	0.85
221	17088.00	91.40	89.80	10790.32	157.13	6554.12	6554.12	2.00
222	17120.00	90.10	91.00	10789.90	156.90	6586.12	6586.12	5.53
223	17183.00	90.30	90.80	10789.68	155.91	6649.11	6649.11	0.45
224	17278.00	89.40	89.90	10789.93	155.33	6744.10	6744.10	1.34
225	17376.00	89.50	89.10	10790.87	156.19	6842.10	6842.10	0.82
226	17471.00	90.30	88.90	10791.03	157.85	6937.08	6937.08	0.87
227	17566.00	88.20	89.70	10792.28	159.01	7032.06	7032.06	2.37

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America LLC	Kick-off:	3/15/2015
Well:	Kline Federal 5300 31-18 15T	Finish:	5/7/2015
Surface Coordinates:	2,556' FSL & 238' FWL		
Surface Location:	Lot 3 Sec. 18, T153N, R100W	Directional Supervision:	
County State:	McKenzie County, ND	Ryan Directional Services	

Minimum Curvature Method (SPE-3362) Proposed dir 90

[North and East are positive and South and West are negative, relative to surface location]

No.	MD	INC	TRUE AZM	TVD	N-S	E-W	SECT	DLS/ 100
228	17660.00	87.40	90.00	10795.89	159.25	7125.99	7125.99	0.91
229	17755.00	88.40	89.70	10799.37	159.50	7220.92	7220.92	1.10
230	17850.00	89.60	89.90	10801.03	159.83	7315.91	7315.91	1.28
231	17945.00	89.10	88.50	10802.10	161.16	7410.89	7410.89	1.56
232	18040.00	92.40	88.70	10800.86	163.48	7505.84	7505.84	3.48
233	18135.00	92.00	91.40	10797.21	163.40	7600.76	7600.76	2.87
234	18229.00	89.00	92.90	10796.39	159.87	7694.68	7694.68	3.57
235	18324.00	88.40	92.10	10798.55	155.73	7789.56	7789.56	1.05
236	18419.00	91.40	92.10	10798.71	152.25	7884.48	7884.48	3.16
237	18513.00	91.40	91.90	10796.42	148.97	7978.40	7978.40	0.21
238	18608.00	90.90	91.80	10794.51	145.90	8073.33	8073.33	0.54
239	18703.00	89.90	91.80	10793.85	142.92	8168.28	8168.28	1.05
240	18798.00	91.00	91.30	10793.10	140.35	8263.24	8263.24	1.27
241	18892.00	90.50	90.30	10791.87	139.03	8357.22	8357.22	1.19
242	18987.00	89.70	90.40	10791.70	138.45	8452.22	8452.22	0.85
243	19082.00	91.50	89.20	10790.71	138.79	8547.21	8547.21	2.28
244	19177.00	91.20	88.70	10788.47	140.53	8642.17	8642.17	0.61
245	19272.00	90.90	88.70	10786.73	142.68	8737.12	8737.12	0.32
246	19366.00	90.30	88.70	10785.75	144.81	8831.09	8831.09	0.64
247	19461.00	88.20	88.00	10786.99	147.55	8926.04	8926.04	2.33
248	19556.00	89.10	89.40	10789.23	149.70	9020.99	9020.99	1.75
249	19588.00	89.00	89.30	10789.76	150.07	9052.98	9052.98	0.44
250	19651.00	89.10	90.40	10790.80	150.23	9115.97	9115.97	1.75
251	19682.00	90.90	90.80	10790.80	149.91	9146.97	9146.97	5.95
252	19746.00	90.50	91.20	10790.02	148.79	9210.95	9210.95	0.88
253	19840.00	91.00	90.60	10788.79	147.31	9304.93	9304.93	0.83
254	19935.00	90.50	89.90	10787.55	146.90	9399.92	9399.92	0.91
255	20030.00	90.30	90.10	10786.88	146.90	9494.92	9494.92	0.30
256	20125.00	91.60	90.90	10785.31	146.07	9589.90	9589.90	1.61
257	20220.00	92.00	90.60	10782.32	144.83	9684.85	9684.85	0.53
258	20314.00	92.40	90.70	10778.72	143.76	9778.77	9778.77	0.44
259	20409.00	90.90	89.70	10775.98	143.43	9873.73	9873.73	1.90
260	20478.00	90.90	89.70	10774.90	143.79	9942.72	9942.72	0.00
261	20542.00	90.90	89.70	10773.89	144.13	10006.71	10006.71	0.00

DEVIATION SURVEYS

Depth	Inclination	Azimuth
147	0.30	295.90
240	0.30	298.40
333	0.40	273.50
427	0.10	334.70
520	0.30	337.70
613	0.30	347.50
702	0.60	288.80
790	0.50	326.20
880	0.50	276.40
970	0.20	304.50
1063	0.70	292.90
1156	0.70	290.30
1250	0.50	326.00
1343	0.80	327.20
1436	1.10	347.00
1530	0.70	171.00
1623	1.70	181.60
1717	1.60	197.20
1810	1.60	154.70
1903	1.80	109.10
1997	1.00	91.90

FORMATION TOPS & STRUCTURAL RELATIONSHIPS

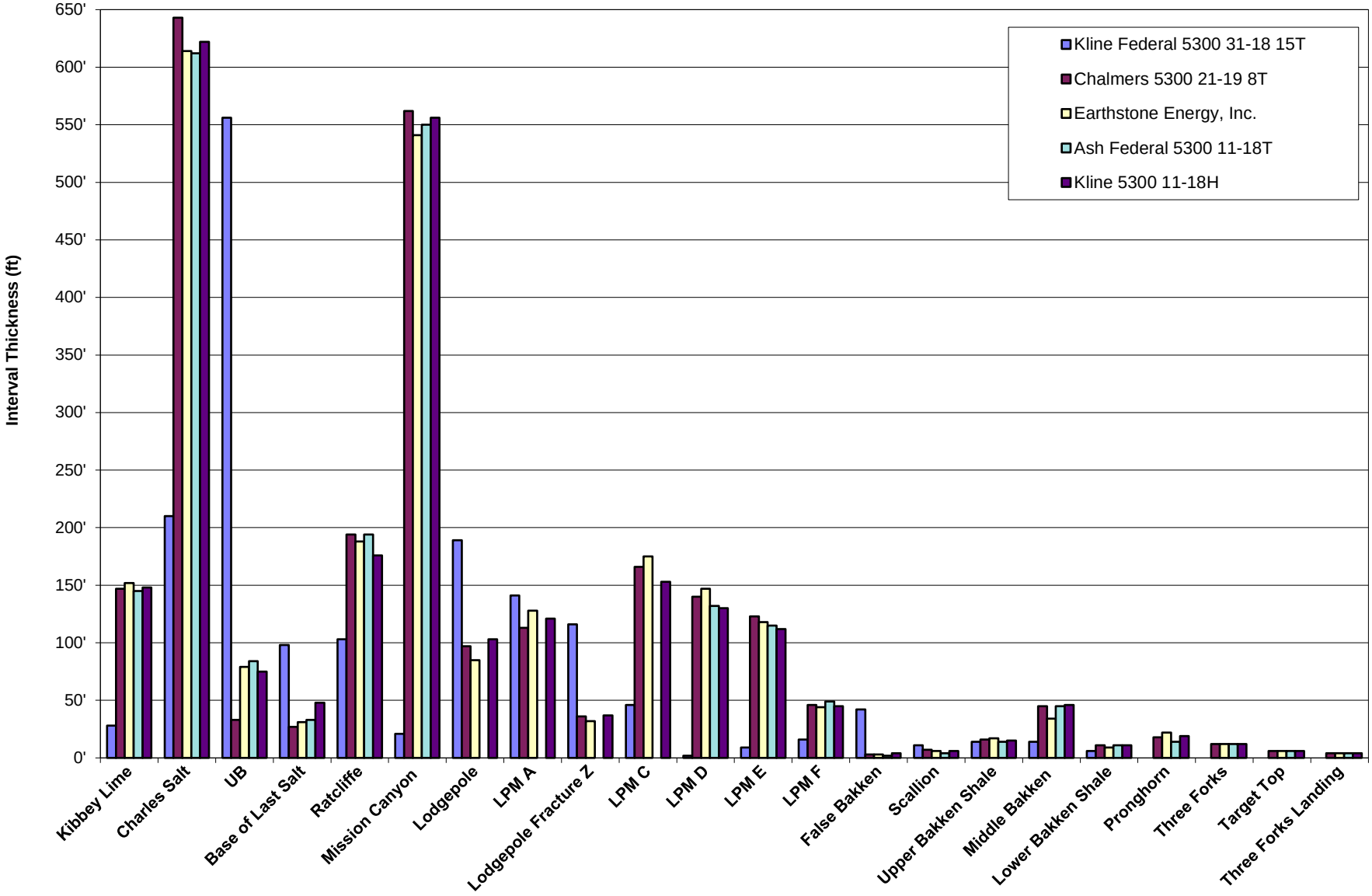
	Subject Well:								Offset Wells:			
Operator:	**Oasis Petroleum North America, LLC**											
Well Name:	**Kline Federal 5300 31-18 15T**											
Location:	2,556' FSL & 238' FWL											
	Lot 3 Section 18, T153N, R100W											
Elevation:	GL: 2,008'	Sub: 25'	KB: 2,033'									
Formation/ Zone	**Prog. Top**	**Prog. Datum (MSL)**	**Driller's Depth Top (MD)**	**Driller's Depth Top (TVD)**	**Datum (MSL)**	**Interval Thickness**	**Thickness to Target Landing**	**Dip To Prog.**	**Dip To Chalmers 5300 21-19 8T**	**Dip To Earthstone Energy, Inc.**	**Dip To Ash Federal 5300 11-18T**	**Dip To Kline 5300 11-18H**
Mowry	4,976'	-2,943'	4,983'	4,983'	-2,950'	443'	5,791'	-7'	19'	-	-	-
Dakota	5,403'	-3,370'	5,426'	5,426'	-3,393'	962'	5,348'	-23'	15'	-	-	-
Rierdon	6,402'	-4,369'	6,388'	6,388'	-4,355'	423'	4,386'	14'	53'	-	-	-
Dunham Salt	6,740'	-4,707'	6,812'	6,811'	-4,778'	12'	3,963'	-71'	46'	-	-	-
Dunham Salt Base	6,851'	-4,818'	6,824'	6,823'	-4,790'	-	3,951'	28'	49'	-	-	-
Spearfish	6,948'	-4,915'	-	-	-	-	-	-	-	-	-	-
Pine Salt	7,203'	-5,170'	7,218'	7,217'	-5,184'	36'	3,557'	-14'	5'	-	-	-
Pine Salt Base	7,251'	-5,218'	7,254'	7,253'	-5,220'	70'	3,521'	-2'	-1'	-	-	-
Opeche Salt	7,296'	-5,263'	7,324'	7,323'	-5,290'	57'	3,451'	-27'	4'	-	-	-
Opeche Salt Base	7,326'	-5,293'	7,381'	7,380'	-5,347'		3,394'	-54'	3'	-	-	-
Broom Creek	7,528'	-5,495'										
Amsden	7,608'	-5,575'	7,617'	7,617'	-5,584'	178'	3,157'	-9'	9'	-	-	-
Tyler	7,776'	-5,743'	7,796'	7,795'	-5,762'	175'	2,979'	-19'	-1'	-	-	-
Otter/Base Minnelusa	7,967'	-5,934'	7,971'	7,970'	-5,937'	350'	2,804'	-3'	27'	-	-	-
Kibbey Lime	8,322'	-6,289'	8,321'	8,320'	-6,287'	146'	2,454'	2'	23'	-62'	-19'	6'
Charles Salt	8,472'	-6,439'	8,467'	8,466'	-6,433'	644'	2,308'	6'	24'	-56'	-20'	8'
UB	9,096'	-7,063'	9,111'	9,110'	-7,077'	42'	1,664'	-14'	23'	-86'	-52'	-14'
Base of Last Salt	9,171'	-7,138'	9,153'	9,152'	-7,119'	28'	1,622'	19'	14'	-49'	-10'	19'
Ratcliffe	9,219'	-7,186'	9,181'	9,180'	-7,147'	210'	1,594'	39'	13'	-46'	-5'	39'
Mission Canyon	9,395'	-7,362'	9,391'	9,390'	-7,357'	556'	1,384'	5'	-3'	-68'	-21'	5'
Lodgepole	9,957'	-7,924'	9,947'	9,946'	-7,913'	98'	828'	11'	3'	-83'	-27'	5'
LP A	-	-	10,045'	10,044'	-8,011'	103'	730'	-	2'	-96'	-	10'
LP Fracture Zone	-	-	10,148'	10,147'	-8,114'	21'	627'	-	12'	-71'	-	28'
LP C	10,163'	-8,130'	10,169'	10,168'	-8,135'	189'	606'	-5'	27'	-60'	-	44'
LP D	-	-	10,362'	10,357'	-8,324'	141'	417'	-	4'	-74'	-9'	8'
LP E	-	-	10,514'	10,498'	-8,465'	116'	276'	-	3'	-68'	-18'	-3'
LP F	-	-	10,655'	10,614'	-8,581'	46'	160'	-	10'	-66'	-19'	-7'
False Bakken	10,658'	-8,625'	10,722'	10,660'	-8,627'	2'	114'	-2'	10'	-68'	-16'	-8'
Scallion	-	-	10,724'	10,662'	-8,629'	9'	112'	-	11'	-67'	-16'	-6'
Upper Bakken Shale	10,668'	-8,635'	10,737'	10,671'	-8,638'	16'	103'	-3'	9'	-70'	-21'	-9'
Middle Bakken	10,682'	-8,649'	10,766'	10,687'	-8,654'	42'	87'	-5'	9'	-69'	-23'	-10'
Lower Bakken	10,727'	-8,694'	10,850'	10,729'	-8,696'	11'	45'	-2'	12'	-77'	-20'	-6'
Pronghorn	10,741'	-8,708'	10,876'	10,740'	-8,707'	14'	34'	1'	12'	-79'	-20'	-6'
Three Forks	10,753'	-8,720'	10,916'	10,754'	-8,721'	14'	20'	-1'	16'	-71'	-20'	-1'
Target Top	10,765'	-8,732'	10,974'	10,768'	-8,735'	6'	6'	-3'	14'	-73'	-22'	-3'
Target Landing	-	-	11,120'	10,774'	-8,741'	-	0'	-	14'	-73'	-22'	-3'
Target Base/Claystone	10,775'	-8,742'	-	-	-	-	-	-	-	-	-	-
Claystone	10,776'	-8,743'	-	-	-	-	-	-	-	-	-	-

CONTROL DATA

Operator:	Oasis Petroleum North America, LLC				Earthstone Energy, Inc.				Oasis Petroleum North America, LLC				Oasis Petroleum North America, LLC			
Well Name:	Chalmers 5300 21-19 8T				Dahl Edwin M 23-1				Ash Federal 5300 11-18T				Kline 5300 11-18H			
Location:	Lot 2 Sec. 19, 153N, 100W McKenzie County, ND ~4,782' S of Kline 5300 31-18 15T				SWSE Section 23, T153N R101W McKenzie County, ND ~1.7 Miles SW of Kline 5300 31-18 15T				Lot 1 Section 18, T153N, R100W McKenzie County, ND ~1,900' N of Kline 5300 31-18 15T				NENE Section 18 T153N R100W McKenzie County, ND ~900' N of Kline 5300 31-18 15T			
Elevation:	KB: 2,076'				KB: 2,035'				KB: 2,078'				KB: 2,079'			
Formation/ Zone	E-Log Top	Datum (MSL)	Interval Thickness	Thickness to Target Landing	E-Log Top	Datum (MSL)	Interval Thickness	Thickness to Target Landing	TVD Top	Datum (MSL)	Interval Thickness	Thickness to Target Landing	TVD Top	Datum (MSL)	Interval Thickness	Thickness to Target Landing
Kibbey Lime	8,386'	-6,310'	147'	2,445'	8,260'	-6,225'	152'	2,443'	8,346'	-6,268'	145'	2,451'	8,371'	-6,293'	148'	2,445'
Charles Salt	8,533'	-6,457'	643'	2,298'	8,412'	-6,377'	614'	2,291'	8,491'	-6,413'	612'	2,306'	8,519'	-6,441'	622'	2,297'
UB	9,176'	-7,100'	33'	1,655'	9,026'	-6,991'	79'	1,677'	9,103'	-7,025'	84'	1,694'	9,141'	-7,063'	75'	1,675'
Base of Last Salt	9,209'	-7,133'	27'	1,622'	9,105'	-7,070'	31'	1,598'	9,187'	-7,109'	33'	1,610'	9,216'	-7,138'	48'	1,600'
Ratcliffe	9,236'	-7,160'	194'	1,595'	9,136'	-7,101'	188'	1,567'	9,220'	-7,142'	194'	1,577'	9,264'	-7,186'	176'	1,552'
Mission Canyon	9,430'	-7,354'	562'	1,401'	9,324'	-7,289'	541'	1,379'	9,414'	-7,336'	550'	1,383'	9,440'	-7,362'	556'	1,376'
Lodgepole	9,992'	-7,916'	97'	839'	9,865'	-7,830'	85'	838'	9,964'	-7,886'	-	833'	9,996'	-7,918'	103'	820'
LPM A	10,089'	-8,013'	113'	742'	9,950'	-7,915'	128'	753'	-	-	-	-	10,099'	-8,021'	121'	717'
Lodgepole Fracture Z	10,202'	-8,126'	36'	629'	10,078'	-8,043'	32'	625'	-	-	-	-	10,220'	-8,142'	37'	596'
LPM C	10,238'	-8,162'	166'	593'	10,110'	-8,075'	175'	593'	-	-	-	-	10,257'	-8,179'	153'	559'
LPM D	10,404'	-8,328'	140'	427'	10,285'	-8,250'	147'	418'	10,393'	-8,315'	132'	404'	10,410'	-8,332'	130'	406'
LPM E	10,544'	-8,468'	123'	287'	10,432'	-8,397'	118'	271'	10,525'	-8,447'	115'	272'	10,540'	-8,462'	112'	276'
LPM F	10,667'	-8,591'	46'	164'	10,550'	-8,515'	44'	153'	10,640'	-8,562'	49'	157'	10,652'	-8,574'	45'	164'
False Bakken	10,713'	-8,637'	3'	118'	10,594'	-8,559'	3'	109'	10,689'	-8,611'	2'	108'	10,697'	-8,619'	4'	119'
Scallion	10,716'	-8,640'	7'	115'	10,597'	-8,562'	6'	106'	10,691'	-8,613'	4'	106'	10,701'	-8,623'	6'	115'
Upper Bakken Shale	10,723'	-8,647'	16'	108'	10,603'	-8,568'	17'	100'	10,695'	-8,617'	14'	102'	10,707'	-8,629'	15'	109'
Middle Bakken	10,739'	-8,663'	45'	92'	10,620'	-8,585'	34'	83'	10,709'	-8,631'	45'	88'	10,722'	-8,644'	46'	94'
Lower Bakken Shale	10,784'	-8,708'	11'	47'	10,654'	-8,619'	9'	49'	10,754'	-8,676'	11'	43'	10,768'	-8,690'	11'	48'
Pronghorn	10,795'	-8,719'	18'	36'	10,663'	-8,628'	22'	40'	10,765'	-8,687'	14'	32'	10,779'	-8,701'	19'	37'
Three Forks	10,813'	-8,737'	12'	18'	10,685'	-8,650'	12'	18'	10,779'	-8,701'	12'	18'	10,798'	-8,720'	12'	18'
Target Top	10,825'	-8,749'	6'	6'	10,697'	-8,662'	6'	6'	10,791'	-8,713'	6'	6'	10,810'	-8,732'	6'	6'
Three Forks Landing	10,831'	-8,755'	4'	0'	10,703'	-8,668'	4'	0'	10,797'	-8,719'	4'	0'	10,816'	-8,738'	4'	0'
Base of Target	10,835'	-8,759'	1'	-	10,707'	-8,672'	1'	-	10,801'	-8,723'	1'	-	10,820'	-8,742'	1'	-
Claystone	10,836'				10,708'	-8,673'			10,802'	-8,724'	-	-	10,821'	-	-	-

INTERVAL THICKNESS

Oasis Petroleum North America, LLC - Kline Federal 5300 31-18 15T

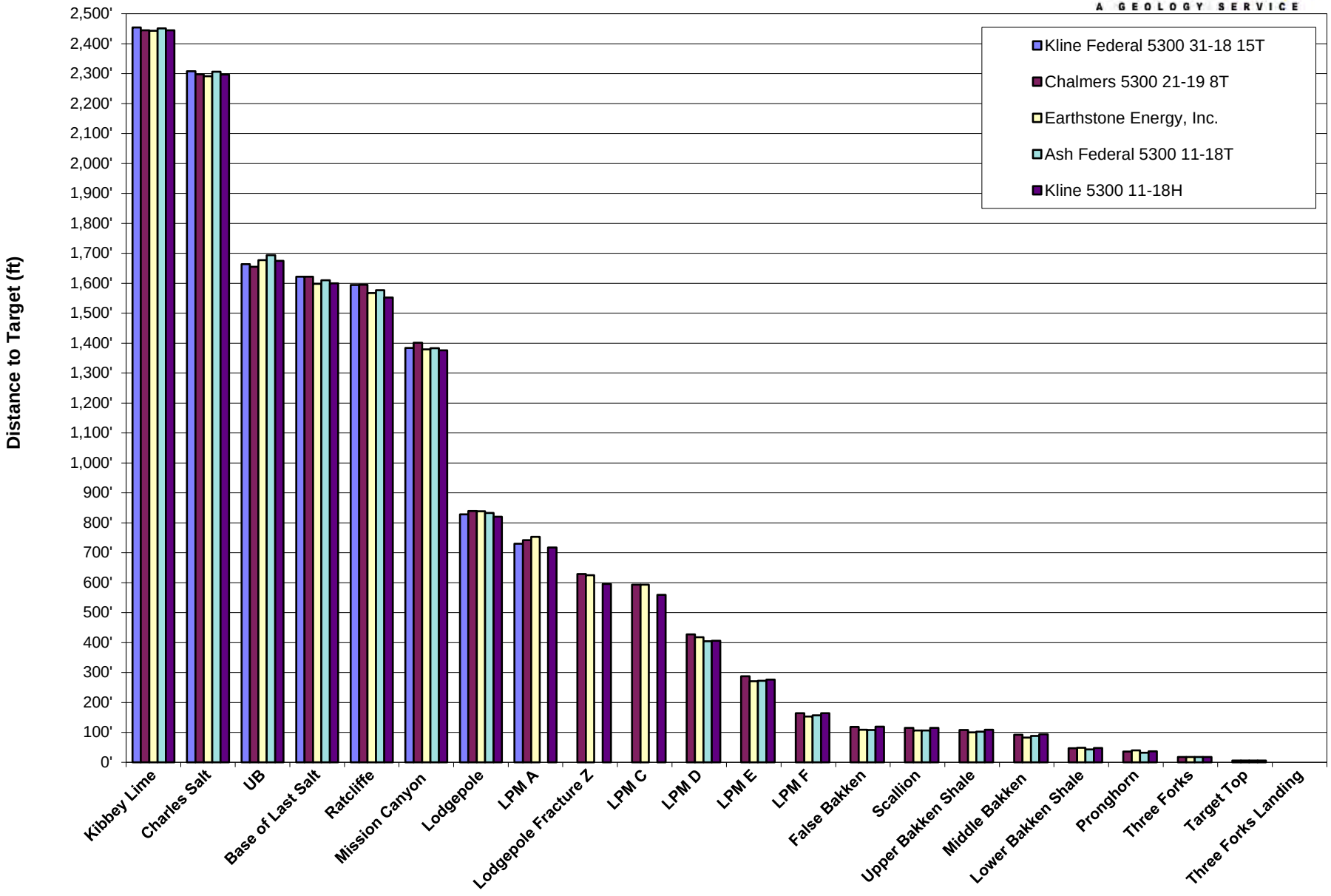


LANDING PROJECTION

Formation/ Zone:	Proposed Target Landing From:				
	Chalmers 5300 21-19 8T	Earthstone Energy, Inc.	Ash Federal 5300 11-18T	Kline 5300 11-18H	Average of Offset Wells
Kibbey Lime	10,765'	10,763'	10,771'	10,765'	10,766'
Charles Salt	10,764'	10,757'	10,772'	10,763'	10,764'
UB	10,765'	10,787'	10,804'	10,785'	10,785'
Base of Last Salt	10,774'	10,750'	10,762'	10,752'	10,760'
Ratcliffe	10,775'	10,747'	10,757'	10,732'	10,753'
Mission Canyon	10,791'	10,769'	10,773'	10,766'	10,775'
Lodgepole	10,785'	10,784'	10,779'	10,766'	10,779'
LPM A	10,786'	10,797'	-	10,761'	10,781'
Lodgepole Fracture Z	10,776'	10,772'	-	10,743'	10,764'
LPM C	10,761'	10,761'	-	10,727'	10,750'
LPM D	10,784'	10,775'	10,761'	10,763'	10,771'
LPM E	10,785'	10,769'	10,770'	10,774'	10,775'
LPM F	10,778'	10,767'	10,771'	10,778'	10,774'
False Bakken	10,778'	10,769'	10,768'	10,779'	10,774'
Scallion	10,777'	10,768'	10,768'	10,777'	10,773'
Upper Bakken Shale	10,779'	10,771'	10,773'	10,780'	10,776'
Middle Bakken	10,779'	10,770'	10,775'	10,781'	10,776'
Lower Bakken Shale	10,776'	10,778'	10,772'	10,777'	10,776'
Pronghorn	10,776'	10,780'	10,772'	10,777'	10,776'
Three Forks	10,772'	10,772'	10,772'	10,772'	10,772'
Target Top	10,774'	10,774'	10,774'	10,774'	10,774'
Three Forks Landing	10,774'	10,774'	10,774'	10,774'	10,774'

ISOPACH TO TARGET

Oasis Petroleum North America, LLC - Kline Federal 5300 31-18 15T



LITHOLOGY

Oasis Petroleum North America, LLC
Kline Federal 5300 31-18 15T

Rig crews caught 100' sample intervals, under the supervision of Sunburst geologists, from 4,700' to 8,240'; 30' intervals from 8,240', to the TD of the lateral at 20,542'. Formation tops and lithologic markers have been inserted into the sample descriptions below for reference. Sample descriptions begin in the Belle Fourche Formation. Samples were examined wet and dry under a binocular microscope. Sample fluorescent cuts are masked by invert mud through intermediate casing. Quantifiers in order of increasing abundance are trace, rare, occasional, common and abundant.

Vertical Log Descriptions: MD / TVD (MSL Datum)

Drilling in the Belle Fourche Formation [Cretaceous Colorado Group]

4,700-4,800 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

4,800-4,900 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

4,900-5,000 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

Mowry Formation [Cretaceous Dakota Group] 4,983'MD (-2,943')

5,000-5,100 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5,100-5,200 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; rare SILTSTONE: light gray, friable, sub blocky, calcite cement moderately cemented

5,200-5,300 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5,300-5,400 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

Dakota Formation [Dakota Group] 5,426' MD (-3,393')

5,400-5,500 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; rare SILTY SANDSTONE: light gray, very fine grained, friable-loose, sub rounded, vitreous, moderately sorted, calcite cement moderately cemented

5,500-5,600 SILTSTONE: light gray, light brown, friable, sub blocky, calcite cement moderately cemented; rare SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5,600-5,700 SILTSTONE: light gray, light brown, friable, sub blocky, calcite cement moderately cemented; rare SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5,700-5,800 SILTY SANDSTONE: light gray, light brown, friable, sub blocky, calcite cement moderately cemented; rare SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5,800-5,900 SILTY SANDSTONE: light gray, very fine grained, friable-loose, sub rounded, vitreous, moderately sorted, calcite cement moderately cemented; rare SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

Swift Formation [Jurassic] 5,907' MD (-3,874')

5,900-6,000 SHALE: light blue-green, common medium gray-brown, firm, earthy, calcareous, common disseminated pyrite, no visible porosity, no visible oil stain

6,000-6,100 SHALE: light blue-green, common medium gray-brown, firm, earthy, calcareous, common disseminated pyrite, no visible porosity, no visible oil stain

6,100-6,200 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

6,200-6,300 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; trace SILTY SANDSTONE: light gray, very fine grained, friable-loose, sub rounded, vitreous, moderately sorted, calcite cement moderately cemented

Rierdon Formation [Jurassic Period] 6,388' MD (-4,355')

6,300-6,400 LIMESTONE: mudstone, off white, light gray, very fine crystalline, friable, dense, earthy, possible intercrystalline porosity, no visible oil stain; trace SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

6,400-6,500 LIMESTONE: mudstone, dark-medium gray-brown, very fine crystalline, friable, dense, earthy, possible intercrystalline porosity, no visible oil stain; trace SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

6,500-6,600 LIMESTONE: mudstone, off white, light gray, very fine crystalline, friable, dense, earthy, possible intercrystalline porosity, no visible oil stain; trace SHALE: dark-medium gray, rare red brown, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

6,600-6,700 LIMESTONE: mudstone, off white, light gray, very fine crystalline, friable, dense, earthy, possible intercrystalline porosity, no visible oil stain; trace SHALE: dark-medium gray, rare red brown, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

6,700-6,800 LIMESTONE: mudstone, off white, light gray, very fine crystalline, friable, dense, earthy, possible intercrystalline porosity, no visible oil stain; common SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; occasional ANHYDRITE: milky white, microcrystalline, soft-friable, massive, amorphous, no visible porosity

Dunham Salt Member [Piper Formation] 6,812' MD / 6,811' TVD (-4,778')

Dunham Salt Base [Piper Formation] 6,824' MD / 6,823' TVD (-4,790')

6,800-6,900 SHALE: dark-medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; rare LIMESTONE: tan-off white, white, brown, very fine crystalline, firm, dense, crystalline-chalky, no visible porosity; rare SALT: translucent, milky, crystalline, firm, dense, crystalline, rare ANHYDRITE: as above

6,900-7,000 SILTSTONE: orange, brick red, soft, blocky, calcareous and argillaceous cement, poorly cement, no visible porosity, no visible oil stain; rare SHALE: as above; rare ANHYDRITE: off white, light orange-pink, microcrystalline, soft, massive, earthy

7,000-7,100 SILTSTONE: orange, brick red, soft, blocky, calcareous and argillaceous cement, poorly cement, trace clear quartz, no visible porosity, no visible oil stain; rare SHALE: as above; rare ANHYDRITE: off white, light orange-pink, microcrystalline, soft, massive, earthy

7,100-7,200 SILTSTONE: orange, brick red, soft, blocky, calcareous and argillaceous cement, poorly cement, trace clear quartz, no visible porosity, no visible oil stain; rare SHALE: as above; rare ANHYDRITE: off white, light orange-pink, microcrystalline, soft, massive, earthy

Pine Salt Member [Spearfish Formation] 7,218' MD / 7,217' TVD (-5,184')

Pine Salt Base [Spearfish Formation] 7,254' MD / 7,253' TVD (-5,220')

7,200-7,300 SILTSTONE: orange, brick red, soft, blocky, calcareous and argillaceous cement, poorly cement, trace clear quartz, no visible porosity, no visible oil stain; SALT: translucent, milky, crystalline, firm, dense, crystalline, rare ANHYDRITE: as above

7,200-7,300 SILTSTONE: orange, brick red, soft, blocky, calcareous and argillaceous cement, poorly cement, trace clear quartz, no visible porosity, no visible oil stain; SALT: translucent, milky, crystalline, firm, dense, crystalline, rare ANHYDRITE: as above

Opeche Salt Member [Opeche Formation] 7,324' MD / 7,323' TVD (-5,290')

7,300-7,400 SILTSTONE: orange, brick red, soft, blocky, calcareous and argillaceous cement, poorly cement, trace clear quartz, no visible porosity, no visible oil stain; rare SALT: translucent, milky, crystalline, firm, dense, crystalline, trace ANHYDRITE: orange, pink orange, microcrystalline, soft, massive, earthy

Opeche Salt Base [Opeche Formation] 7,381' MD / 7,380' TVD (-5,347')

7,400-7,500 SILTSTONE: orange, brick red, brown orange, soft- rarely firm, blocky-sub blocky, calcareous cement, poorly cement, no visible porosity, no visible oil stain

7,500-7,600 SILTSTONE: orange-red brown, brick orange red, soft-firm, sub blocky-blocky, calcareous cement, moderately cemented, trace clear quartz grains, possible intergranular porosity, no visible oil stain; CALCAREOUS DOLOMITE: mudstone, light pink-off white, trace red, microcrystalline, soft-friable, laminated, crystalline-micro sucrosic, calcareous, no visible porosity, no visible oil stain

Amsden Formation [Pennsylvanian Minnelusa Group] 7,617' MD / 7,616' TVD (-5,583')

7,600-7,700 DOLOMITE: mudstone, light pink-off white, gray, trace red, microcrystalline, soft-friable, laminated, crystalline-micro sucrosic, calcareous, no visible porosity, no visible oil stain; rare SHALE: dark gray, friable, sub blocky, earthy no visible porosity, no visible oil stain

7,700-7,800 DOLOMITE: mudstone, light pink-off white, trace red, microcrystalline, soft-friable, laminated, crystalline-micro sucrosic, calcareous, no visible porosity, no visible oil stain: occasional SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, trace clear quartz grains, possible intergranular porosity, no visible oil stain; rare SHALE: dark gray, friable, sub blocky, earthy no visible porosity, no visible oil stain

Tyler Formation [Pennsylvanian Minnelusa Group] 7,796' MD / 7,795' TVD (-5,762')

7,800-7,900 SHALE: dark gray, friable, sub blocky, earthy, no visible porosity, no visible oil stain; rare SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, trace clear quartz grains, possible intergranular porosity, no visible oil stain

7,900-8,000 SHALE: dark gray, friable, sub blocky, earthy, no visible porosity, no visible oil stain; rare SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, trace clear quartz grains, possible intergranular porosity, no visible oil stain

Otter [Mississippian Big Snowy Group] 7,971' MD / 7,970' TVD (-5,937')

8,000-8,100 SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, trace clear quartz grains, possible intergranular porosity, no visible oil stain; occasional SHALE: dark gray, firm, sub blocky, earthy no visible porosity, no visible oil stain

8,100-8,200 SHALE: light gray-gray, red gray, friable, sub blocky, earthy, no visible porosity, no visible oil stain; LIMESTONE: mudstone-wackestone, light gray, microcrystalline, friable, dense, earthy, no visible porosity, no visible oil stain; ANHYDRITE: off white, soft, amorphous texture

8,200-8,240 SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, trace clear quartz grains, no visible oil stain; ANHYDRITE: off white, soft, amorphous texture

8,240-8,270 SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, possible intergranular porosity, no visible oil stain; SILTY SANDSTONE: tan-off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented; rare; ANHYDRITE: off white, light red, soft, amorphous texture

8,270-8,300 SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, possible intergranular porosity, no visible oil stain; SILTY SANDSTONE: tan-off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented; ANHYDRITE: off white, light red, soft, amorphous texture

Kibbey Lime 8,321' MD / 8,320' TVD (-6,287')

8,300-8,330 ANHYDRITE: off white, light red, soft, amorphous texture rare SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, possible intergranular porosity, no visible oil stain; trace LIMESTONE: mudstone-wackestone, light brown, light gray brown, microcrystalline, friable, dense, earthy-chalky, trace vuggy porosity

8,330-8,360 LIMESTONE: mudstone-wackestone, light brown, light gray brown, microcrystalline, friable, dense, earthy-chalky, trace vuggy porosity, trace dead oil stain, ANHYDRITE: off white, light red, soft, amorphous texture trace SILTSTONE: orange-red brown, friable-firm, sub blocky, calcareous cement moderately cemented, possible intergranular porosity, no visible oil stain

8,360-8,390 SILTSTONE: dark orange-light brown, tan, pink, soft, sub blocky, calcite cement, poorly cement; trace SILTY SANDSTONE: tan-off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

8,390-8,420 SILTSTONE: dark orange-light brown, tan, pink, soft, sub blocky, calcite cement, poorly cement; trace SILTY SANDSTONE: tan-off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

8,420-8,450 SILTSTONE: dark orange-light brown, tan, pink, soft, sub blocky, calcite cement, poorly cement; trace SILTY SANDSTONE: tan-off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

8,450-8,480 SILTSTONE: dark orange-light brown, tan, pink, soft, sub blocky, calcite cement, poorly cement; trace SILTY SANDSTONE: tan-off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented; common SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline

Charles Formation [Mississippian Madison Group] 8,463' MD / 8,462' TVD (-6,429')

8,480-8,510 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline; trace ARGILLACEOUS LIMESTONE: mudstone-wackestone, light-medium brown, tan, rare light-medium gray, rare gray tan, micro crystalline, friable, earthy

8,510-8,540 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline

8,540-8,570 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline

8,570-8,600 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline

8,600-8,630 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline

8,630-8,660 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline

8,660-8,690 LIMESTONE: mudstone-wackestone, light-medium gray brown, tan, rare light-medium gray, micro crystalline, firm, earthy, argillaceous in part, no visible porosity, no visible porosity; rare SALT: as above; trace DOLOMITE: mudstone, tan, light gray, micro crystalline, firm, earthy, argillaceous in part, no visible porosity, no visible oil stain

8,690-8,720 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline, massive; rare LIMESTONE: mudstone-wackestone, light-medium gray , tan, rare light-medium gray brown, micro crystalline, firm, earthy, argillaceous in part, no visible porosity, no visible porosity; trace DOLOMITE: as above

8,729 SALT: clear-translucent, rarely frosted, crystalline, firm, euhedral, crystalline, massive; rare LIMESTONE: mudstone-wackestone, light-medium gray , tan, rare light-medium gray brown, micro crystalline, firm, earthy, argillaceous in part, no visible porosity, no visible porosity; trace DOLOMITE: as above

8,750-8,780 SALT: translucent-transparent, clear, micro crystalline, hard, euhedral, crystalline; occasional LIMESTONE: mudstone, tan, off white-cream, light gray, light brown, fine crystalline, firm, dense, earthy-crystalline texture, rare white-clear calcite, no visible porosity, no visible oil stain; rare ANHYDRITE: off white-cream, tan, white, microcrystalline, soft, massive, earthy

8,780-8,810 LIMESTONE: mudstone, tan, off white-cream, light gray, light brown, fine crystalline, firm, dense, earthy-crystalline texture, rare white-clear calcite, no visible porosity, no visible oil stain; ANHYDRITE: off white-cream, tan, white, microcrystalline, soft, massive, earthy; rare SALT: translucent-transparent, clear, micro crystalline, hard, euhedral, crystalline; rare DOLOMITE: light brown-tan, very fine crystalline, firm, dense, crystalline, no visible porosity, no visible oil stain

8,810-8,840 SALT: translucent-transparent, clear, microcrystalline, hard, euhedral, crystalline

8,840-8,870 LIMESTONE: mudstone, light brown, light gray brown, off white-cream, microcrystalline, firm, laminated, earthy, possible intercrystalline porosity, no oil stain; occasional SALT: translucent-transparent, clear, microcrystalline, hard, euhedral, crystalline

8,870-8,900 LIMESTONE: mudstone, light brown, light gray brown, off white-cream, microcrystalline, firm, laminated, earthy, possible intercrystalline porosity, no oil stain; common DOLOMITE: mudstone, light brown, light gray brown, microcrystalline, friable-firm, laminated, earthy, possible intercrystalline porosity, no visible oil stain

8,900-8,930 ANHYDRITE: off white-cream, tan-pink, white, microcrystalline, soft, massive, earthy; LIMESTONE: mudstone, light brown, light gray brown, off white-cream, microcrystalline, firm, laminated, earthy, possible intercrystalline porosity, no oil stain; DOLOMITE: mudstone, light brown, light gray brown, microcrystalline, friable-firm, laminated, earthy, calcareous in part, possible intercrystalline porosity, no visible oil stain

8,930-8,960 SALT: translucent-transparent, clear, microcrystalline, hard, euhedral, crystalline; common CALCAREOUS DOLOMITE: light gray, off white, light brown gray, very fine crystalline, firm, dense, earthy, no visible porosity, no visible oil stain; ANHYDRITE: off white, micro crystalline, soft, massive, earthy

8,960-8,990 SALT: translucent-transparent, clear, microcrystalline, hard, euhedral, crystalline; common DOLOMITE-CALCAREOUS DOLOMITE: light gray, off white, light brown gray, very fine crystalline, firm, dense, earthy, no visible porosity, no visible oil stain; ANHYDRITE: off white, micro crystalline, soft, massive, earthy

8,990-9,020 ANHYDRITE: cream-off white, microcrystalline, soft-firm, massive, earthy; LIMESTONE: mudstone, tan, light brown, cream, very fine crystalline, firm-soft, dense, earthy-crystalline texture, argillaceous in part, no visible porosity, no visible oil stain

9,020-9,050 LIMESTONE: mudstone, tan, light brown, cream, very fine crystalline, firm-soft, dense, earthy-crystalline texture, no visible porosity, no visible oil stain; DOLOMITE: mudstone, light brown, light gray brown, microcrystalline, friable-firm, laminated, earthy, possible intercrystalline porosity, no visible oil stain

9,050-9,080 ANHYDRITE: cream-off white, microcrystalline, soft-firm, massive, earthy; LIMESTONE-ARGILLACEOUS LIMESTONE: mudstone, tan, light brown, cream, very fine crystalline, firm-soft, dense, earthy-crystalline texture, argillaceous in part, no visible porosity, no visible oil stain

9,080-9,110 ANHYDRITE: cream-off white, microcrystalline, soft-firm, massive, earthy; LIMESTONE-ARGILLACEOUS LIMESTONE: mudstone, off white-cream, tan-light brown, very fine crystalline, firm-soft, dense, earthy-crystalline texture, argillaceous in part, no visible porosity, no visible oil stain; DOLOMITE: mudstone, light brown, tan, rare light gray brown, microcrystalline, friable-firm, laminated, earthy, calcareous in part, possible intercrystalline porosity, no visible oil stain

9,110-9,140 SALT: translucent-transparent, clear, micro crystalline, hard, euhedral, crystalline

9,140-9,170 SALT: as above; common DOLOMITIC LIMESTONE-DOLOMITE: mudstone, light brown, tan, microcrystalline, firm-friable, dense, crystalline-earthy texture, possible intercrystalline porosity, trace light brown spotty oil stain

Base Last Salt [Charles Formation] 9,153' MD / 9,152' TVD (-7,119')

9,170-9,200 DOLOMITIC LIMESTONE-DOLOMITE: mudstone, light brown, tan, microcrystalline, firm-friable, dense, crystalline-earthy texture, possible intercrystalline porosity, trace light brown spotty; rare ANHYDRITE: cream-tan, off white, microcrystalline, soft, massive, earthy

Ratclife [Charles Formation] 9,181' MD / 9,180' TVD (-7,147')

9,200-9,230 LIMESTONE: mudstone, light brown-brown, microcrystalline, firm, earthy-crystalline texture, trace intercrystalline porosity, trace spotty light brown oil stain; rare ANHYDRITE: off white, cream, soft, microcrystalline, massive, earthy-amorphous

9,230-9,260 LIMESTONE: mudstone, light gray, light gray brown, rare light brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, no visible oil stain; trace ANHYDRITE: off white, cream, soft, microcrystalline, massive, earthy-amorphous

9,260-9,290 LIMESTONE: mudstone, light gray, light gray brown, rare light brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, no visible oil stain; trace ANHYDRITE: off white, cream, soft, microcrystalline, massive, earthy-amorphous

9,290-9,320 LIMESTONE: mudstone, tan, light gray, light gray brown, rare light brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, no visible oil stain; trace ANHYDRITE: off white, cream, soft, microcrystalline, massive, earthy-amorphous

9,320-9,350 ARGILLACEOUS LIMESTONE: mudstone, tan, light gray, light gray brown, rare light brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, no visible oil stain; trace ANHYDRITE: off white, cream, soft, microcrystalline, massive, earthy-amorphous

9,350-9,380 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, light gray brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, trace light brown oil stain

Mission Canyon Formation [Mississippian Madison Group] 9,391' MD / 9,390' TVD (-7,357')

9,380-9,410 LIMESTONE: mudstone, light gray-gray, light gray brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, trace fossil fragments, trace spotty light brown oil stain

9,410-9,440 LIMESTONE: mudstone, light gray-gray, light gray brown, firm, earthy-crystalline texture, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, trace spotty light brown oil stain

9,440-9,470 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, light gray brown, firm, earthy-crystalline texture, possible intercrystalline porosity, trace fossil fragments, trace disseminated pyrite, trace spotty light brown oil stain

9,470-9,500 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, light gray brown, rare tan, firm-friable, earthy-crystalline texture, trace fossil fragments, possible intercrystalline porosity, trace spotty disseminated pyrite, trace light brown oil stain

9,500-9,530 ARGILLACEOUS LIMESTONE: mudstone, light gray, light gray brown, rare light brown, firm-friable, earthy-crystalline texture, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, trace spotty light brown oil stain

9,530-9,560 ARGILLACEOUS LIMESTONE: mudstone, light gray, light gray brown, rare light brown, firm-friable, earthy-crystalline texture, trace fossil fragments, trace Algal material, possible intercrystalline porosity, trace disseminated pyrite, trace spotty light brown oil stain

9,560-9,590 ARGILLACEOUS LIMESTONE: mudstone, light gray, light gray brown, rare light brown, firm-friable, earthy-crystalline texture, trace fossil fragments, trace Algal material, possible intercrystalline porosity, trace disseminated pyrite, trace spotty light brown oil stain

9,590-9,620 ARGILLACEOUS LIMESTONE: mudstone, light brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, trace fossil fragments, trace Algal material, trace vuggy porosity, possible intercrystalline porosity, trace spotty disseminated pyrite, trace light brown oil stain

9,620-9,650 ARGILLACEOUS LIMESTONE: mudstone, light brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, trace fossil fragments, trace Algal material, trace vuggy porosity, possible intercrystalline porosity, trace spotty disseminated pyrite, trace light brown oil stain

9,650-9,680 LIMESTONE: mudstone, light brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, occasional spotty light brown oil stain

9,680-9,710 LIMESTONE: mudstone, light brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, possible intercrystalline porosity, trace disseminated pyrite, occasional spotty light brown oil stain

9,710-9,740 LIMESTONE: mudstone, light brown-rarely brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, trace Algal material, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, occasional spotty light brown oil stain

9,740-9,770 LIMESTONE: mudstone, light brown-rarely brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, trace Algal material, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, occasional spotty light brown oil stain

9,770-9,800 LIMESTONE: mudstone, light brown-rarely brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, trace Algal material, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, occasional spotty light brown oil stain

9,800-9,830 LIMESTONE: mudstone, brown-light brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, common Algal material, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, trace spotty light brown oil stain

9,830-9,860 LIMESTONE: mudstone, brown-light brown, light gray brown, rare light gray, firm-friable, earthy-crystalline texture, common Algal material, trace fossil fragments, possible intercrystalline porosity, trace disseminated pyrite, trace spotty light brown oil stain

9,860-9,890 LIMESTONE: mudstone, light gray-gray, rare light gray brown, trace dark brown, firm-friable, earthy-crystalline texture, trace fossil fragments, trace disseminated pyrite, trace spotty light brown oil stain

9,890-9,920 LIMESTONE: mudstone, light gray-gray, rare light gray brown, trace dark gray, firm-friable, earthy-crystalline texture, trace fossil fragments, trace disseminated pyrite, trace spotty light brown oil stain

9,920-9,950 LIMESTONE: mudstone, light gray-gray, rare light gray brown, trace dark gray, firm-friable, earthy-crystalline texture, trace fossil fragments, trace disseminated pyrite, no visible oil stain

Lodgepole [Mississippian Madison Group] 9,947' MD / 9,946' TVD (-7,913')

9,950-9,980 LIMESTONE: mudstone, light gray-gray, rare gray brown, trace dark gray, firm-friable, earthy-crystalline texture, trace disseminated pyrite, no visible porosity, no visible oil stain

9,980-10,010 LIMESTONE: mudstone, light gray-gray, rare gray brown, trace dark gray, firm-friable, earthy-crystalline texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,010-10,040 ARGILLACEOUS LIMESTONE: mudstone, off white, light gray, light gray tan, microcrystalline, firm, dense earthy-crystalline texture, trace disseminated pyrite, no visible porosity no visible oil stain

10,040-10,070 ARGILLACEOUS LIMESTONE: mudstone, light gray, light gray tan, trace cream-off white, microcrystalline, firm, dense, earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,070-10,100 ARGILLACEOUS LIMESTONE: mudstone, light-medium gray, tan gray, trace light brown, micro crystalline, firm, dense, earthy-trace crystalline texture, no visible porosity, no visible oil stain

10,100-10,130 ARGILLACEOUS LIMESTONE: mudstone, light gray, light gray tan, trace cream-off white, microcrystalline, firm, dense, earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,130-10,160 ARGILLACEOUS LIMESTONE: mudstone, light gray-medium gray, light gray tan, trace cream-off white, microcrystalline, firm, dense, earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

101,060-10,190 ARGILLACEOUS LIMESTONE: mudstone, light gray-medium gray, light gray tan, trace cream-off white, microcrystalline, firm, dense, earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,190-10,200 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, rare gray brown, trace dark gray, firm-friable, earthy-crystalline texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,200-10,220 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, occasional gray brown, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,220-10,250 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, occasional gray brown, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,250-10,280 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, occasional gray brown, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,280-10,310 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, occasional gray brown, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,310-10,340 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, light gray brown, trace dark gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,340-10,370 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, light gray brown, trace dark gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,370-10,400 ARGILLACEOUS LIMESTONE: mudstone, light gray-gray, light gray brown, trace dark gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,400-10,430 ARGILLACEOUS LIMESTONE: mudstone, medium gray-light gray, rare light gray brown, trace dark gray AND off white, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,430-10,460 ARGILLACEOUS LIMESTONE: mudstone, light-medium gray, rare light gray brown, trace dark gray AND off white, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,460-10,490 ARGILLACEOUS LIMESTONE: mudstone, medium gray-light gray, rare light gray brown, trace dark gray AND off white, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,490-10,520 ARGILLACEOUS LIMESTONE: mudstone, light-medium gray, rare light gray brown, trace dark gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,520-10,550 ARGILLACEOUS LIMESTONE: mudstone, light gray brown, light gray, tan, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,550-10,580 ARGILLACEOUS LIMESTONE: mudstone, light brown gray, tan, rare light gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,580-10,610 ARGILLACEOUS LIMESTONE: mudstone, light brown gray, tan, rare light gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,610-10,640 ARGILLACEOUS LIMESTONE: mudstone, light gray, medium gray, rare light brown gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,640-10,670 ARGILLACEOUS LIMESTONE: mudstone, light gray, medium gray, rare light brown gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

10,670-10,700 ARGILLACEOUS LIMESTONE: mudstone, light gray, medium gray, rare light brown gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

False Bakken Member [Lodgepole Formation] 10,722' MD / 10,660' TVD (-8,627')

10,700-10,730 ARGILLACEOUS LIMESTONE: mudstone, light gray, medium gray, rare light brown gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

Scallion [Lodgepole Formation] 10,724' MD / 10,662' TVD (-8,629')

10,700-10,730 ARGILLACEOUS LIMESTONE: mudstone, light gray, medium gray, rare light brown gray, trace medium gray, firm, crystalline-earthy texture, trace disseminated pyrite, no visible porosity, no visible oil stain

Upper Bakken Shale [Bakken Formation] 10,737' MD / 10,671' TVD (-8,638')

10,730-10,760 SHALE: black, black gray, hard, splintery, smooth, pyritic, carbonaceous, fracture porosity

Middle Bakken Member [Bakken Formation] 10,766' MD / 10,687' TVD (-8,654')

10,760-10,790 SILTY SANDSTONE: light gray brown, light brown, trace light gray, very fine grained, friable sub rounded, smooth, moderately sorted, calcite cement moderately cemented, trace disseminated and nodular pyrite, fair intercrystalline porosity, occasional light brown spotty oil stain

10,790-10,820 SILTY SANDSTONE: light gray brown, light brown, trace light gray, very fine grained, friable sub rounded, smooth, moderately sorted, calcite cement moderately cemented, trace disseminated and nodular pyrite, fair intercrystalline porosity, occasional light brown spotty oil stain

10,820-10,850 SILTY SANDSTONE: light gray brown, light brown, trace light gray, very fine grained, friable sub rounded, smooth, moderately sorted, calcite cement moderately cemented, trace disseminated and nodular pyrite, fair intercrystalline porosity, occasional light brown spotty oil stain

Lower Bakken Shale [Bakken Formation] 10,850' MD / 10,729' TVD (-8,696')

10,850-10,880 SHALE: black, black gray, hard, splintery, smooth, pyritic, carbonaceous, fracture porosity; SILTSTONE: dark gray, trace gray black, friable-firm, sub blocky-sub splintery, moderately dolomite cemented, trace disseminated and nodular pyrite, trace spotty light brown oil stain

Pronghorns [Bakken Formation] 10,876' MD / 10,740' TVD (-8,707')

10,850-10,880 SHALE: black, black gray, hard, splintery, smooth, pyritic, carbonaceous, fracture porosity; SILTSTONE: dark gray, trace gray black, friable-firm, sub blocky-sub splintery, moderately dolomite cemented, trace disseminated and nodular pyrite, trace spotty light brown oil stain

Three Forks [Devonian] 10,916' MD / 10,754' TVD (-8,721')

10,880-10,910 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

10,910-10,940 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

10,940-10,970 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

10,970-11,000 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,000-11,030 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,030-11,060 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,060-11,090 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,090-11,120 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,120-11,150 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,150-11,180 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,180-11,210 DOLOMITE: mudstone, light brown-light brown gray, tan-cream, trace pink, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; rare SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,210-11,240 DOLOMITE: mudstone, light peach, occasional tan-cream, trace light brown gray, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,240-11,270 DOLOMITE: mudstone, light peach, occasional tan-cream, trace light brown gray, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,270-11,300 DOLOMITE: mudstone, light tan-brown, common peach, occasional cream-of white, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,300-11,330 DOLOMITE: mudstone, light tan-brown, common peach, occasional cream-of white, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,330-11,360 DOLOMITE: mudstone, light tan-brown, common peach, occasional cream-of white, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,360-11,390 DOLOMITE: mudstone, light tan-brown, common peach, occasional cream-of white, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,390-11,420 DOLOMITE: mudstone, light tan-brown, common peach, occasional cream-of white, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,420-11,450 DOLOMITE: mudstone, light tan-brown, common peach, occasional cream-of white, firm, laminated, micro sucrosic, rare disseminated pyrite, occasional intercrystalline porosity, trace light brown spotty oil stain; trace SHALE: light green-light gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,450-11,480 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, trace medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,480-11,510 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, trace medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,510-11,540 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, trace medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,540-11,570 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, trace medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,570-11,600 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, trace medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,600-11,630 DOLOMITE: mudstone, tan-light brown, common light peach, occasional cream-off white, trace medium brown, trace gray, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,630-11,660 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, trace medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

11,660-11,690 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain; common DOLOMITE and SHALE: as above

11,690-11,720 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain; rare DOLOMITE and SHALE: as above

11,720-11,750 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,750-11,780 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,780-11,810 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,810-11,840 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,840-11,870 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,870-11,900 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,900-11,930 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,930-11,960 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

11,960-11,990 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain; common DOLOMITE and SHALE: as above

11,990-12,020 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,020-12,050 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,050-12,080 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,080-12,110 DOLOMITE: mudstone, light brown-tan, occasional light peach, rare cream and medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,110-12,140 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,140-12,170 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,170-12,200 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,200-12,230 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,230-12,260 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,260-12,290 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,290-12,320 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,320-12,350 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,350-12,380 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,380-12,410 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,410-12,440 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,440-12,470 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,470-12,500 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,500-12,530 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, rare medium brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,530-12,560 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,560-12,590 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,590-12,620 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,620-12,650 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,650-12,680 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,680-12,710 DOLOMITE: mudstone, light brown-tan, common light peach, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,710-12,740 DOLOMITE: mudstone, light tan-peach, common cream-off white, rare light brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,740-12,770 DOLOMITE: mudstone, light tan-peach, common cream-off white, rare light brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,770-12,800 DOLOMITE: mudstone, light tan-peach, common cream-off white, rare light brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,800-12,830 DOLOMITE: mudstone, light tan-peach, common cream-off white, rare light brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,830-12,860 DOLOMITE: mudstone, light tan-peach, common cream-off white, rare light brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,860-12,890 DOLOMITE: mudstone, light tan-peach, common cream-off white, rare light brown, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,890-12,920 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,920-12,950 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,950-12,980 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

12,980-13,010 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,010-13,040 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,040-13,070 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,070-13,100 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,100-13,130 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,130-13,160 DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,160-13,190 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,190-13,220 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,220-13,250 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,250-13,280 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,280-13,310 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,310-13,340 DOLOMITE: mudstone, light tan-brown, occasional light peach, rare cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,340-13,370 DOLOMITE: mudstone, light tan-brown, occasional light peach, rare cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,370-13,400 DOLOMITE: mudstone, light tan-brown, occasional light peach, rare cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,400-13,430 DOLOMITE: mudstone, light tan-brown, occasional light peach, rare cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,430-13,460 DOLOMITE: mudstone, light tan-brown, occasional light peach, rare cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,460-13,490 DOLOMITE: mudstone, light tan-brown, occasional light peach, rare cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain; rare SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

13,490-13,520 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,520-13,550 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,550-13,580 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,580-13,610 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,610-13,640 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,610-13,640 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,640-13,670 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,700-13,730 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,730-13,760 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,760-13,790 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

13,790-13,820 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

13,820-13,850 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

13,850-13,880 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

13,880-13,910 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

13,910-13,940 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

13,940-13,970 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

13,970-14,000 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,000-14,030 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,030-14,060 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,060-14,090 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,090-14,120 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,120-14,150 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,150-14,180 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,180-14,210 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,210-14,240 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

14,240-14,270 DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain

14,270-14,300 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

14,300-14,330 SHALE: light green-mint green, blue green-gray green, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; common DOLOMITE: mudstone, light-medium brown, light tan-peach, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain

14,330-14,360 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,360-14,390 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,390-14,420 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,420-14,450 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,450-14,480 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,480-14,510 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,510-14,540 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,540-14,570 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,570-14,600 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,600-14,630 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,630-14,660 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,660-14,690 DOLOMITE: mudstone, light brown-tan, rare cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, possible intergranular porosity, no visible oil stain

14,690-14,720 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,720-14,750 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,750-14,780 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,780-14,810 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,810-14,840 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,840-14,870 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,870-14,900 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,900-14,930 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,930-14,960 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,960-14,990 DOLOMITE: mudstone, light brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

14,990-15,020 DOLOMITE: mudstone, light-medium gray brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,020-15,050 DOLOMITE: mudstone, light-medium gray brown, tan-cream, trace peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,050-15,080 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,080-15,110 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,110-15,140 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,140-15,170 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,170-15,200 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,200-15,230 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,230-15,260 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,260-15,290 DOLOMITE: mudstone, light brown-tan, occasional peach orange, rare cream-off white soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,290-15,320 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,320-15,350 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,350-15,380 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,380-15,410 DOLOMITE: mudstone, light-medium tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,410-15,440 DOLOMITE: mudstone, light-medium tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,440-15,470 DOLOMITE: mudstone, light-medium tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,470-15,500 DOLOMITE: mudstone, light-medium tan-brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,500-15,530 DOLOMITE: mudstone, light-medium tan-brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,530-15,560 DOLOMITE: mudstone, light-medium tan-brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,560-15,590 DOLOMITE: mudstone, light-medium tan-brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,590-15,620 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,620-15,650 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,650-15,680 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,680-15,710 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,710-15,740 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,740-15,770 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,770-15,800 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,800-15,830 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,830-15,860 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,860-15,890 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,890-15,920 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,920-15,950 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,950-15,980 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,980-16,010 DOLOMITE: mudstone, light tan, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,010-16,040 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,040-16,070 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,070-16,100 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,100-16,130 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,130-16,160 SHALE: light green-light green gray, firm, sub blocky, earthy, occasional disseminated pyrite, possible intergranular porosity, no visible oil stain; rare DOLOMITE: mudstone, light tan-peach, common light brown, occasional cream-off white, firm-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, occasional light brown spotty oil stain

16,160-16,190 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,190-16,220 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,220-16,250 DOLOMITE: mudstone, light tan-gray brown, occasional peach orange, rare cream-off white, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,250-16,280 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,280-16,310 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,310-16,340 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,340-16,370 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,370-16,400 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,400-16,430 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,430-16,460 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,460-16,490 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,490-16,520 DOLOMITE: mudstone, light gray, light gray brown, light orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, rare light brown spotty oil stain; SHALE: gray green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,520-16,550 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,550-16,580 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,580-16,610 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,610-16,640 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,640-16,670 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,670-16,700 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,700-16,730 CLAYSTONE: medium-light gray, rare gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,730-16,760 CLAYSTONE: medium-light gray, rare gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,760-16,790 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

16,790-16,820 DOLOMITE: mudstone, light gray, light gray brown, light orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, rare light brown spotty oil stain; SHALE: gray green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain; rare CLAYSTONE: as above

16,820-16,850 DOLOMITE: mudstone, light gray, light gray brown, light orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, rare light brown spotty oil stain; SHALE: gray green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,850-16,880 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,880-16,910 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,910-16,940 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,940-16,970 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

16,970-17,000 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,000-17,030 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,030-17,060 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,060-17,090 DOLOMITE: mudstone, light brown, tan, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,090-17,120 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,120-17,150 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,150-17,180 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,180-17,210 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,210-17,240 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,240-17,270 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,270-17,300 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,300-17,330 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,330-17,360 DOLOMITE: mudstone, light gray-brown, tan, trace peach orange, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,360-17,390 No Sample

17,390-17,442 No Sample

17,442-17,450 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,450-17,480 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,480-17,510 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,510-17,540 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,540-17,570 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,570-17,600 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,600-17,630 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,630-17,660 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,660-17,690 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,690-17,720 DOLOMITE: mudstone, light brown, tan, rare medium brown, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,720-17,750 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,750-17,780 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,780-17,810 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

17,810-17,840 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

17,840-17,870 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

17,870-17,900 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

17,900-17,930 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

17,930-17,960 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

17,960-17,990 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

17,990-18,020 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

18,020-18,050 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

18,050-18,080 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

18,080-18,110 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,110-18,140 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,140-18,170 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,170-18,200 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,200-18,230 DOLOMITE: mudstone, light-medium brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,230-18,260 DOLOMITE: mudstone, light brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,260-18,290 DOLOMITE: mudstone, light brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,290-18,320 DOLOMITE: mudstone, light brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,320-18,350 DOLOMITE: mudstone, light brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,350-18,380 DOLOMITE: mudstone, light brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,380-18,410 DOLOMITE: mudstone, light brown, tan, trace peach orange-cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,410-18,440 DOLOMITE: mudstone, light brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,440-18,470 DOLOMITE: mudstone, light brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,470-18,500 DOLOMITE: mudstone, light brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,500-18,530 DOLOMITE: mudstone, light-medium brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,530-18,560 DOLOMITE: mudstone, light-medium brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,560-18,590 DOLOMITE: mudstone, light-medium brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,590-18,620 DOLOMITE: mudstone, light-medium brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,620-18,650 DOLOMITE: mudstone, light-medium brown, tan, rare peach orange, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,650-18,680 DOLOMITE: mudstone, light-medium brown, tan, common peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,680-18,710 DOLOMITE: mudstone, light-medium brown, tan, common peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,710-18,740 DOLOMITE: mudstone, light-medium brown, tan, common peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,740-18,770 DOLOMITE: mudstone, light-medium brown, tan, common peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,770-18,800 DOLOMITE: mudstone, light-medium brown, tan, occasional peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,800-18,830 DOLOMITE: mudstone, light-medium brown, tan, occasional peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,830-18,860 DOLOMITE: mudstone, light-medium brown, tan, occasional peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,860-18,890 DOLOMITE: mudstone, light-medium brown, tan, occasional peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,890-18,920 DOLOMITE: mudstone, light-medium brown, tan, occasional peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,920-18,950 DOLOMITE: mudstone, light-medium brown, tan, occasional peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,950-18,980 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

18,980-19,010 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,010-19,040 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,040-19,070 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,070-19,100 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,100-19,130 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,130-19,160 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,160-19,190 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,190-19,220 DOLOMITE: mudstone, light brown, tan, rare peach, trace cream, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,220-19,250 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,250-19,280 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,280-19,310 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,310-19,340 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,340-19,370 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,370-19,400 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,400-19,430 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,430-19,460 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,460-19,490 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

19,490-19,520 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

15,920-15,950 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain; common DOLOMITE and SHALE: as above

19,550-19,580 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,580-19,610 LYST: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,610-19,640 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,640-19,670 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,670-19,700 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,700-19,730 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,730-19,760 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,760-19,790 CLAYSTONE: light gray, common gray brown, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,790-19,820 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,820-19,850 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,850-19,880 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,880-19,910 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,910-19,940 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,940-19,970 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

19,970-20,000 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,000-20,030 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,030-20,060 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,060-20,090 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,090-20,120 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,120-20,150 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,150-20,180 CLAYSTONE: light gray, gray brown, rare medium gray, trace off white, firm, sub blocky, earthy, occasional disseminated pyrite, no visible porosity, no visible oil stain

20,180-20,210 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,210-20,240 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,240-20,270 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,270-20,300 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,300-20,330 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,330-20,360 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,360-20,390 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,390-20,420 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,420-20,450 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,450-20,480 DOLOMITE: mudstone, light brown, tan gray, rare peach orange, rare medium brown, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,480-20,510 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

20,510-20,542 DOLOMITE: mudstone, light-medium brown, tan gray, rare peach orange, trace cream and medium brown, soft-friable, laminated, micro sucrosic texture, trace disseminated pyrite, common intercrystalline porosity, common light brown spotty oil stain; SHALE: mint green, blue green, firm, sub blocky, earthy, rare disseminated pyrite, trace nodular pyrite, possible intergranular porosity, no visible oil stain

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

Well File No. 30789

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☑ Notice of Intent	Approximate Start Date: March 19, 2015	☐ Drilling Prognosis	☐ Spill Report
☐ Report of Work Done	Date Work Completed:	☐ Redrilling or Repair	☐ Shooting
		☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date:	☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other	Suspension of Drilling

Well Name and Number					
Kline Federal 5300 31-18 15T					
Footages	Qtr-Qtr	Section	Township	Range	
2556 F S L 238 F E L	Lot 3	18	153 N	100 W	
Field	Pool	County			
Baker	Bakken	McKenzie			

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

Oasis Petroleum North America LLC (OPNA) requests permission for suspension of drilling for up to 90 days for the referenced well under NDAC 43-02-03-55. OPNA intends to drill the surface hole with freshwater based drilling mud and set surface casing with a small drilling rig and move off within 3 to 5 days. The casing will be set at a depth pre-approved by the NDIC per the Application for Permit to Drill NDAC 43-02-03-21. No saltwater will be used in the drilling and cementing operations of the surface casing. Once the surface casing is cemented, a plug or mechanical seal will be placed at the top of the casing to prevent any foreign matter from getting into the well. A rig capable of drilling to TD will move onto the location within the 90 days previously outlined to complete the drilling and casing plan as per the APD. The undersigned states that this request for suspension of drilling operations in accordance with the Subsection 4 of Section 43-02-03-55 of the NDAC, is being requested to take advantage of the cost savings and time savings of using an initial rig that is smaller than the rig necessary to drill a well to total depth but is not intended to alter or extend the terms and conditions of, or suspend any obligation under, any oil and gas lease with acreage in or under the spacing or drilling unit for the above-referenced well. OPNA understands NDAC 43-02-03-31 requirements regarding confidentiality pertaining to this permit. The drilling pit will be fenced immediately, as site conditions allow, after construction if the well pad is located in a pasture (NDAC 43-02-03-19 & 19.1). OPNA will notify the NDIC and work on an alternative solution if unforeseen circumstances prevent the rig from returning to drill prior to the 90 extension expiration.

NOTIFY NDIC INSPECTOR RICHARD DUNN AT 701-770-3554 WITH SPUD + TD INFO.

Company: Oasis Petroleum North America LLC		Telephone Number: (281) 404-9652
Address: 1001 Fannin, Suite 1500		
City: Houston	State: TX	Zip Code: 77002
Signature:	Printed Name: Victoria Siemieniewski	
Title: Regulatory Specialist	Date: February 5, 2015	
Email Address:		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date: 3/25/15	
By: Alice D. Webber	
Title: Engineering Technician	

Oil and Gas Division 30789

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.dmr.nd.gov/oilgas/

BRANDI TERRY
OASIS PETROLEUM NORTH AMERICA LLC
1001 FANNIN STE 1500
HOUSTON, TX 77002 USA

Date: **3/2/2015**

RE: CORES AND SAMPLES

Well Name: **KLINE FEDERAL 5300 31-18 15T** Well File No.: **30789**
Location: **LOT3 18-153-100** County: MCKENZIE
Permit Type: **Development - HORIZONTAL**
Field: **BAKER** Target Horizon: THREE FORKS B1

Dear BRANDI TERRY:

North Dakota Century Code Section 38-08-04 provides for the preservation of cores and samples and their shipment to the State Geologist when requested. The following is required on the above referenced well:

1) All cores, core chips and samples must be submitted to the State Geologist as provided for under North Dakota Century Code: Section 38-08-04 and North Dakota Administrative Code: Section 43-02-03-38.1.

2) Samples: The Operator is to begin collecting sample drill cuttings no lower than the:

Base of the Last Charles Salt

- Sample cuttings shall be collected at:
  - 30' maximum intervals through all vertical and build sections.
  - 100' maximum intervals through any horizontal sections.
- Samples must be washed, dried, placed in standard sample envelopes (3" x 4.5"), packed in the correct order into standard sample boxes (3.5" x 5.25" x 15.25").
- Samples boxes are to be carefully identified with a label that indicates the operator, well name, well file number, American Petroleum Institute (API) number, location and depth of samples; and forwarded in to the state core and sample library within 30 days of the completion of drilling operations.

3) Cores: Any cores cut shall be preserved in correct order, boxed in standard core boxes (4.5", 4.5", 35.75"), and the entire core forwarded to the state core and samples library within 180 days of completion of drilling operations. Any extension of time must have approval on a Form 4 Sundry Notice.

All cores, core chips, and samples must be shipped, prepaid, to the state core and samples library at the following address:

ND Geological Survey Core Library
2835 Campus Road, Stop 8156
Grand Forks, ND 58202

North Dakota Century Code Section 38-08-16 allows for a civil penalty for any violation of Chapter 38 08 not to exceed $12,500 for each offense, and each day's violation is a separate offense.

Sincerely

Stephen Fried
Geologist

SUNDRY NOTICES AND REPORTS ON WELLS - FORM 4

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 5749 (09-2006)

FEB 2015
RECEIVED
ND OIL & GAS DIVISION

Well File No. 30789

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

☑ Notice of Intent	Approximate Start Date **March 19, 2015**	☐ Drilling Prognosis	☐ Spill Report
☐ Report of Work Done	Date Work Completed	☐ Redrilling or Repair	☐ Shooting
☐ Notice of Intent to Begin a Workover Project that may Qualify for a Tax Exemption Pursuant to NDCC Section 57-51.1-03.	Approximate Start Date	☐ Casing or Liner	☐ Acidizing
		☐ Plug Well	☐ Fracture Treatment
		☐ Supplemental History	☐ Change Production Method
		☐ Temporarily Abandon	☐ Reclamation
		☑ Other	**Waiver to rule Rule 43-02-03-31**

Well Name and Number				
Kline Federal 5300 31-18 15T				
Footages	Qtr-Qtr	Section	Township	Range
2556 F S L 238 F W L	Lot 3	18	153 N	100 W
Field	Pool	County		
Baker	**Bakken**	**McKenzie**		

24-HOUR PRODUCTION RATE

Before		After	
Oil	Bbls	Oil	Bbls
Water	Bbls	Water	Bbls
Gas	MCF	Gas	MCF

Name of Contractor(s)			
Address	City	State	Zip Code

DETAILS OF WORK

Oasis Petroleum respectfully requests a waiver to Rule 43-02-03-31 in regards to running open hole logs for the above referenced well. Justification for this request is as follows:

Oasis Petroleum; Kline Federal 5300 11-18H (File No. 20275, API No. 33-053-03426-0000) located within a mile of the subject well.

If this exception is approved, Oasis Petroleum will run a CBL on the intermediate string, and we will also run GR to surface. Oasis Petroleum will also submit two digital copies of each cased hole log and a copy of the mud log containing MWD gamma ray.

Company **Oasis Petroleum North America LLC**			Telephone Number **281-404-9500**
Address **1001 Fannin, Suite 1500**			
City **Houston**	State **TX**	Zip Code **77002**	
Signature	Printed Name **Victoria Siemieniewski**		
Title **Regulatory Specialist**	Date **February 5, 2015**		
Email Address **vsiemieniewski@oasispetroleum.com**			

FOR STATE USE ONLY

☐ Received	☒ Approved
Date 2-25-2015	
By	
Title Stephen Fried Geologist	

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.oilgas.nd.gov

February 25, 2015

Victoria Siemieniewski
Regulatory Specialist
OASIS PETROLEUM NORTH AMERICA LLC
1001 Fannin St, Suite 1500
Houston, TX 77002

RE: HORIZONTAL WELL
KLINE FEDERAL 5300 31-18 15T
LOT3 Section 18-153N-100W
McKenzie County
Well File # 30789

Dear Victoria:

Pursuant to Commission Order No. 23752, approval to drill the above captioned well is hereby given. The approval is granted on the condition that all portions of the well bore not isolated by cement, be no closer than the 500' setback from the north & south boundaries and 200' setback from the east & west boundaries within the 1280 acre spacing unit consisting of Sections 17 & 18 T153N R100W.

PERMIT STIPULATIONS: Effective June 1, 2014, a covered leak-proof container (with placard) for filter sock disposal must be maintained on the well site beginning when the well is spud, and must remain on-site during clean-out, completion, and flow-back whenever filtration operations are conducted. OASIS PETRO NO AMER must contact NDIC Field Inspector Richard Dunn at 701-770-3554 prior to location construction. Due to surficial water adjacent to the well site, a dike is required surrounding the entire location.

Drilling pit

NDAC 43-02-03-19.4 states that "a pit may be utilized to bury drill cuttings and solids generated during well drilling and completion operations, providing the pit can be constructed, used and reclaimed in a manner that will prevent pollution of the land surface and freshwaters. Reserve and circulation of mud system through earthen pits are prohibited. All pits shall be inspected by an authorized representative of the director prior to lining and use. Drill cuttings and solids must be stabilized in a manner approved by the director prior to placement in a cuttings pit."

Form 1 Changes & Hard Lines

Any changes, shortening of casing point or lengthening at Total Depth must have prior approval by the NDIC. The proposed directional plan is at a legal location. Based on the azimuth of the proposed lateral the maximum legal coordinate from the well head is: 10108 E.

Location Construction Commencement (Three Day Waiting Period)

Operators shall not commence operations on a drill site until the 3rd business day following publication of the approved drilling permit on the NDIC - OGD Daily Activity Report. If circumstances require operations to commence before the 3rd business day following publication on the Daily Activity Report, the waiting period may be waived by the Director. Application for a waiver must be by sworn affidavit providing the information necessary to evaluate the extenuating circumstances, the factors of NDAC 43-02-03-16.2 (1), (a)-(f), and any other information that would allow the Director to conclude that in the event another owner seeks revocation of the drilling permit, the applicant should retain the permit.

Permit Fee & Notification

Payment was received in the amount of $100 via credit card .The permit fee has been received. It is requested that notification be given immediately upon the spudding of the well. This information should be relayed to the Oil & Gas Division, Bismarck, via telephone. The following information must be included: Well name, legal location, permit number, drilling contractor, company representative, date and time of spudding. Office hours are 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 5:00 p.m. Central Time. Our telephone number is (701) 328-8020, leave a message if after hours or on the weekend.

Survey Requirements for Horizontal, Horizontal Re-entry, and Directional Wells

NDAC Section 43-02-03-25 (Deviation Tests and Directional Surveys) states in part (that) the survey contractor shall file a certified copy of all surveys with the director free of charge within thirty days of completion. Surveys must be submitted as one electronic copy, or in a form approved by the director. However, the director may require the directional survey to be filed immediately after completion if the survey is needed to conduct the operation of the director's office in a timely manner. Certified surveys must be submitted via email in one adobe document, with a certification cover page to certsurvey@nd.gov.

Survey points shall be of such frequency to accurately determine the entire location of the well bore.

Specifically, the Horizontal and Directional well survey frequency is 100 feet in the vertical, 30 feet in the curve (or when sliding) and 90 feet in the lateral.

Surface casing cement

Tail cement utilized on surface casing must have a minimum compressive strength of 500 psi within 12 hours, and tail cement utilized on production casing must have a minimum compressive strength of 500 psi before drilling the plug or initiating tests.

Logs

NDAC Section 43-02-03-31 requires the running of (1) a suite of open hole logs from which formation tops and porosity zones can be determined, (2) a Gamma Ray Log run from total depth to ground level elevation of the well bore, and (3) a log from which the presence and quality of cement can be determined (Standard CBL or Ultrasonic cement evaluation log) in every well in which production or intermediate casing has been set, this log must be run prior to completing the well. All logs run must be submitted free of charge, as one digital TIFF (tagged image file format) copy and one digital LAS (log ASCII) formatted copy. Digital logs may be submitted on a standard CD, DVD, or attached to an email sent to digitallogs@nd.gov

Thank you for your cooperation.

Sincerely,

David Burns
Engineering Technician

APPLICATION FOR PERMIT TO DRILL HORIZONTAL WELL - FORM 1H

INDUSTRIAL COMMISSION OF NORTH DAKOTA
OIL AND GAS DIVISION
600 EAST BOULEVARD DEPT 405
BISMARCK, ND 58505-0840
SFN 54269 (08-2005)

PLEASE READ INSTRUCTIONS BEFORE FILLING OUT FORM.
PLEASE SUBMIT THE ORIGINAL AND ONE COPY.

Type of Work	Type of Well	Approximate Date Work Will Start	Confidential Status
New Location	Oil & Gas	3 / 1 / 2015	No

Operator	Telephone Number
OASIS PETROLEUM NORTH AMERICA LLC	281-404-9500

Address	City	State	Zip Code
1001 Fannin St, Suite 1500	Houston	TX	77002

☑ Notice has been provided to the owner of any permanently occupied dwelling within 1,320 feet.

☑ This well is not located within five hundred feet of an occupied dwelling.

WELL INFORMATION (If more than one lateral proposed, enter data for additional laterals on page 2)

Well Name	Well Number
KLINE FEDERAL	5300 31-18 15T

Surface Footages	Qtr-Qtr	Section	Township	Range	County
2556 F S L 238 F W L	LOT3	18	153 N	100 W	McKenzie
Longstring Casing Point Footages	**Qtr-Qtr**	**Section**	**Township**	**Range**	**County**
2579 F N L 708 F W L	LOT2	18	153 N	100 W	McKenzie

Longstring Casing Point Coordinates From Well Head	Azimuth	Longstring Total Depth
121 N From WH 470 E From WH	81 °	11041 Feet MD 10770 Feet TVD

Bottom Hole Footages From Nearest Section Line	Qtr-Qtr	Section	Township	Range	County
2534 F N L 250 F E L	LOT1	17	153 N	100 W	McKenzie

Bottom Hole Coordinates From Well Head	KOP Lateral 1	Azimuth Lateral 1	Estimated Total Depth Lateral 1
154 N From WH 10058 E From WH	10293 Feet MD	90 °	20630 Feet MD 10804 Feet TVD

Latitude of Well Head	Longitude of Well Head	NAD Reference	Description of (Subject to NDIC Approval)
48 ° 04 ' 28.49 "	-103 ° 36 ' 11.38 "	NAD83	Spacing Unit: Sections 17 & 18 T153N R100W

Ground Elevation	Acres in Spacing/Drilling Unit	Spacing/Drilling Unit Setback Requirement	Industrial Commission Order
2023 Feet Above S.L.	1280	500 Feet N/S 200 Feet E/W	23752

North Line of Spacing/Drilling Unit	South Line of Spacing/Drilling Unit	East Line of Spacing/Drilling Unit	West Line of Spacing/Drilling Unit
10544 Feet	10489 Feet	5244 Feet	5256 Feet

Objective Horizons	Pierre Shale Top
Three Forks B1	1923

Proposed	Size	Weight	Depth	Cement Volume	
Surface Casing	13 - 3/8 "	55 Lb./Ft.	2023 Feet	977 Sacks	NOTE: Surface hole must be drilled with fresh water and surface casing must be cemented back to surface.

Proposed	Size	Weight(s)	Longstring Total Depth	Cement Volume	Cement Top	Top Dakota Sand
Longstring Casing	7 - "	32 Lb./Ft.	11041 Feet MD 10770 Feet TVD	763 Sacks	4903 Feet	5403 Feet

Base Last Charles Salt (If Applicable)	
9171 Feet	NOTE: Intermediate or longstring casing string must be cemented above the top Dakota Group Sand.

Proposed Logs
Triple Combo: KOP to Kibbey GR/RES to BSC GR to surf: CND through Dakota

Drilling Mud Type (Vertical Hole - Below Surface Casing)	Drilling Mud Type (Lateral)
Invert	Salt Water Gel

Survey Type in Vertical Portion of Well	Survey Frequency: Build Section	Survey Frequency: Lateral	Survey Contractor
MWD Every 100 Feet	30 Feet	90 Feet	RYAN

NOTE: A Gamma Ray log must be run to ground surface and a CBL must be run on intermediate or longstring casing string if set.

Surveys are required at least every 30 feet in the build section and every 90 feet in the lateral section of a horizontal well. Measurement inaccuracies are not considered when determining compliance with the spacing/drilling unit boundary setback requirement except in the following scenarios: 1) When the angle between the well bore and the respective boundary is 10 degrees or less; or 2) If Industry standard methods and equipment are not utilized. Consult the applicable field order for exceptions.

If measurement inaccuracies are required to be considered, a 2° MWD measurement inaccuracy will be applied to the horizontal portion of the well bore. This measurement inaccuracy is applied to the well bore from KOP to TD.

REQUIRED ATTACHMENTS: Certified surveyor's plat, horizontal section plat, estimated geological tops, proposed mud/cementing plan, directional plot/plan, $100 fee.

See Page 2 for Comments section and signature block.

COMMENTS, ADDITIONAL INFORMATION, AND/OR LIST OF ATTACHMENTS

Lateral 2

KOP Lateral 2 Feet MD	Azimuth Lateral 2 °	Estimated Total Depth Lateral 2 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

Lateral 3

KOP Lateral 3 Feet MD	Azimuth Lateral 3 °	Estimated Total Depth Lateral 3 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

Lateral 4

KOP Lateral 4 Feet MD	Azimuth Lateral 4 °	Estimated Total Depth Lateral 4 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

Lateral 5

KOP Lateral 5 Feet MD	Azimuth Lateral 5 °	Estimated Total Depth Lateral 5 Feet MD / Feet TVD	KOP Coordinates From Well Head From WH / From WH	
Formation Entry Point Coordinates From Well Head From WH / From WH		Bottom Hole Coordinates From Well Head From WH / From WH		
KOP Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County
Bottom Hole Footages From Nearest Section Line F L / F L	Qtr-Qtr	Section	Township N	Range W / County

I hereby swear or affirm the information provided is true, complete and correct as determined from all available records.

Date: 2 / 6 / 2015

ePermit	Printed Name: Victoria Siemieniewski	Title: Regulatory Specialist

FOR STATE USE ONLY

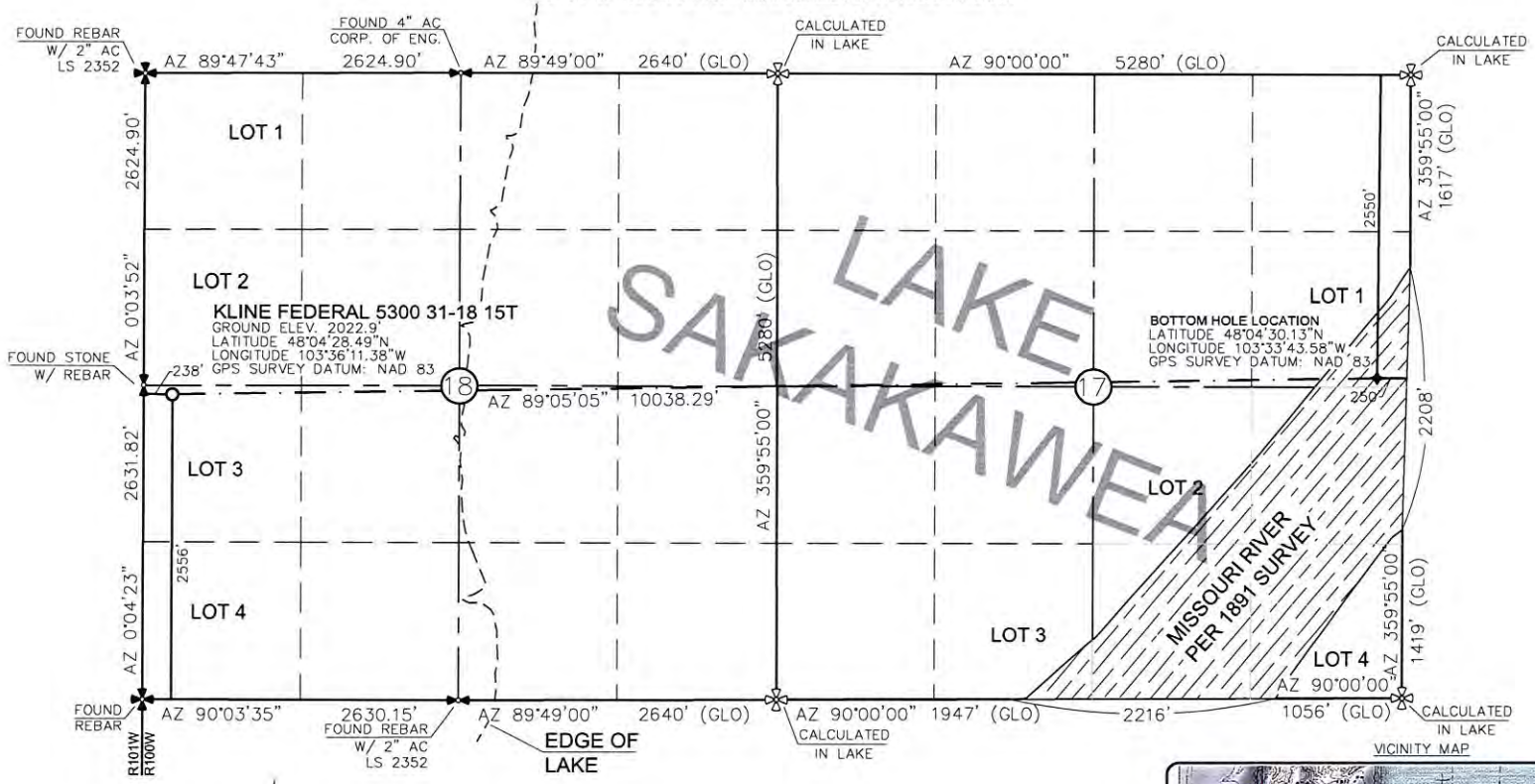
Permit and File Number	API Number
30789	33 - 053 - 06755
Field: BAKER	
Pool: BAKKEN	Permit Type: DEVELOPMENT

FOR STATE USE ONLY

Date Approved
2 / 25 / 2015
By: David Burns
Title: Engineering Technician

WELL LOCATION PLAT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 ON 2/05/15 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC.

0 1000
1" = 1000'

✠ - MONUMENT - RECOVERED
✠ - MONUMENT - NOT RECOVERED

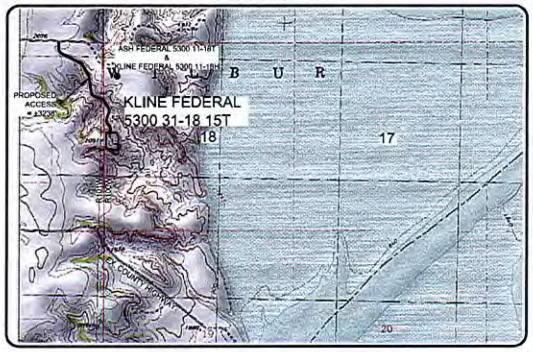
STAKED ON 1/29/15
VERTICAL CONTROL DATUM WAS BASED UPON CONTROL POINT 4 WITH AN ELEVATION OF 2090.8'

THIS SURVEY AND PLAT IS BEING PROVIDED AT THE REQUEST OF ERIC BAYES OF OASIS PETROLEUM. I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DARYL D. KASEMAN LS-3880

REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

VICINITY MAP



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Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

OASIS PETROLEUM NORTH AMERICA, LLC
WELL LOCATION PLAT
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-109.06
Checked By: D.D.K. Date: JAN. 2015

Interstate Engineering, Inc.
P.O. Box 648
425 East Main Street
Sidney, Montana 59270
Ph: (406) 433-5617
Fax: (406) 433-5618
www.interstateeng.com
Other offices in Minnesota, North Dakota and South Dakota

INTERSTATE ENGINEERING
Professionals you need, people you trust

SHEET NO. 1/8

Oil and Gas Division

Lynn D. Helms - Director Bruce E. Hicks - Assistant Director

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.oilgas.nd.gov

April 9, 2014

RE: **Filter Socks and Other Filter Media**
Leakproof Container Required
Oil and Gas Wells

Dear Operator,

North Dakota Administrative Code Section 43-02-03-19.2 states in part that all waste material associated with exploration or production of oil and gas must be properly disposed of in an authorized facility in accord with all applicable local, state, and federal laws and regulations.

Filtration systems are commonly used during oil and gas operations in North Dakota. The Commission is very concerned about the proper disposal of used filters (including filter socks) used by the oil and gas industry.

Effective June 1, 2014, a container must be maintained on each well drilled in North Dakota beginning when the well is spud and must remain on-site during clean-out, completion, and flow-back whenever filtration operations are conducted. The on-site container must be used to store filters until they can be properly disposed of in an authorized facility. Such containers must be:

- leakproof to prevent any fluids from escaping the container
- covered to prevent precipitation from entering the container
- placard to indicate only filters are to be placed in the container

If the operator will not utilize a filtration system, a waiver to the container requirement will be considered, but only upon the operator submitting a Sundry Notice (Form 4) justifying their request.

As previously stated in our March 13, 2014 letter, North Dakota Administrative Code Section 33-20-02.1-01 states in part that every person who transports solid waste (which includes oil and gas exploration and production wastes) is required to have a valid permit issued by the North Dakota Department of Health, Division of Waste Management. Please contact the Division of Waste Management at (701) 328-5166 with any questions on the solid waste program. Note oil and gas exploration and production wastes include produced water, drilling mud, invert mud, tank bottom sediment, pipe scale, filters, and fly ash.

Thank you for your cooperation.

Sincerely,

Bruce E. Hicks

Assistant Director

600 E Boulevard Ave - Dept 405, Bismarck, North Dakota 58505-0840 Phone (701)328-8020 Fax (701)328-8022

Oasis Petroleum
Well Summary
Kline Federal 5300 31-18 15T
Section 18 T153N R100W
McKenzie County, ND

SURFACE CASING AND CEMENT DESIGN

							Make-up Torque (ft-lbs)		
Size	Interval	Weight	Grade	Coupling	I.D.	Drift	Minimum	Optimum	Max
13-3/8"	0' - 2023'	54.5	J-55	STC	12.615"	12.459"	4100	5470	6840

Interval	Description	Collapse	Burst	Tension
		(psi) / a	(psi) / b	(1000 lbs) / c
0' - 2023'	13-3/8", 54.5#, J-55, LTC, 8rd	1130 / 1.19	2730 / 1.99	514 / 2.63

API Rating & Safety Factor

a) Collapse based on full casing evacuation with 9 ppg fluid on backside (2023' setting depth).
b) Burst pressure based on 13 ppg fluid with no fluid on backside (2023' setting depth).
c) Based on string weight in 9 ppg fluid at 2023' TVD plus 100k# overpull. (Buoyed weight equals 95k lbs.)

Cement volumes are based on 13-3/8" casing set in 17-1/2 " hole with 60% excess to circulate cement back to surface.
Mix and pump the following slurry.

Pre-flush (Spacer): **20 bbls** fresh water

Lead Slurry: **677 sks** (350 bbls), 11.5 lb/gal, 2.97 cu. Ft./sk Varicem Cement with 0.125 il/sk Lost Circulation Additive

Tail Slurry: **300 sks** (62 bbls), 13.0 lb/gal, 2.01 cu.ft./sk Varicem with .125 lb/sk Lost Circulation Agent

Oasis Petroleum
Well Summary
Kline Federal 5300 31-18 15T
Section 18 T153N R100W
McKenzie County, ND

Contingency INTERMEDIATE CASING AND CEMENT DESIGN

							Make-up Torque (ft-lbs)		
Size	Interval	Weight	Grade	Coupling	I.D.	Drift	Minimum	Optimum	Max
9-5/8"	0' - 6402'	36	HCL-80	LTC	8.835"	8.75"	5450	7270	9090

Interval	Description	Collapse	Burst	Tension
		(psi) / a	(psi) / b	(1000 lbs) / c
0' - 6402'	9-5/8", 36#, J-55, LTC, 8rd	2020 / 2.17	3520 / 1.29	453 / 1.54

API Rating & Safety Factor

a) Collapse based on full casing evacuation with 10.4 ppg fluid on backside (6402' setting depth).

b) Burst pressure calculated from a gas kick coming from the production zone (Bakken Pool) at 9,000psi and a subsequent breakdown at the 9-5/8" shoe, based on a 15.2#/ft fracture gradient. Backup of 9 ppg fluid..

c) Tension based on string weight in 10.4 ppg fluid at 6402' TVD plus 100k# overpull. (Buoyed weight equals 194k lbs.)

Cement volumes are based on 9-5/8" casing set in 12-1/4 " hole with 10% excess to circulate cement back to surface.

Pre-flush (Spacer): **20 bbls** Chem wash

Lead Slurry: **562 sks** (290 bbls), 2.90 ft3/sk, 11.5 lb/gal Conventional system with 94 lb/sk cement, 4% D079 extender, 2% D053 expanding agent, 2% CaCl2 and 0.250 lb/sk D130 lost circulation control agent.

Tail Slurry: **610 sks** (126 bbls), 1.16 ft3/sk 15.8 lb/gal Conventional system with 94 lb/sk cement, 0.25% CaCl2, and 0.250 lb/sk lost circulation control agent

Oasis Petroleum
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Kline Federal 5300 31-18 15T
Section 18 T153N R100W
McKenzie County, ND

INTERMEDIATE CASING AND CEMENT DESIGN

							Make-up Torque (ft-lbs)		
Size	**Interval**	**Weight**	**Grade**	**Coupling**	**I.D.**	**Drift****	**Minimum**	**Optimum**	**Max**
7"	0' - 11041'	32	HCP-110	LTC	6.094"	6.000"**	6730	8970	9870

****Special Drift 7"32# to 6.0"**

Interval	Length	Description	Collapse	Burst	Tension
			(psi) a	(psi) b	(1000 lbs) / c
0' - 11041'	11041'	7", 32#, HCP-110, LTC, 8rd	11820 / 2.11*	12460 / 1.28	897 / 2.24
6740' - 9171'	2431'	7", 32#, HCP-110, LTC, 8rd	11820 / 1.07**	12460 / 1.30	

API Rating & Safety Factor

a) *Assume full casing evacuation with 10 ppg fluid on backside. **Assume full casing evacuation with 1.2 psi/ft equivalent fluid gradient across salt intervals.

b) Burst pressure based on 9000 psig max press for stimulation plus 10.2 ppg fluid in casing and 9 ppg fluid on backside-to 10770' TVD.

c) Based on string weight in 10 ppg fluid, (299k lbs buoyed weight) plus 100k lbs overpull.

Cement volumes are estimates based on 7" casing set in an 8-3/4" hole with 30% excess.
Mix and pump the following slurry

Pre-flush (Spacer): **100 bbls** Saltwater
20 bbls Tuned Spacer III

Lead Slurry: **176 sks** (81 bbls), 11.8 ppg, 2.55 cu. ft./sk Econocem Cement with .3% Fe-2 and .25 lb/sk Lost Circulation Additive

Tail Slurry: **587 sks** (171 bbls), 14.0 ppg, 1.55 cu. ft./sk Extendcem System with .2% HR-5 Retarder and .25 lb/sk Lost Circulation Additive

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PRODUCTION LINER

							Make-up Torque (ft-lbs)		
Size	Interval	Weight	Grade	Coupling	I.D.	Drift	Minimum	Optimum	Max
4-1/2"	10243' - 20630'	13.5	P-110	BTC	3.920"	3.795"	2270	3020	3780

Interval	Length	Desctiption	Collapse	Burst	Tension
			(psi) a	(psi) b	(1000 lbs) c
10243' - 20630'	10387	4-1/2", 13.5 lb, P-110, BTC	10670 / 1.99	12410 / 1.28	443 / 2.01

API Rating & Safety Factor

a) Based on full casing evacuation with 9.5 ppg fluid on backside @ 10804' TVD.

b) Burst pressure based on 9000 psi treating pressure with 10.2 ppg internal fluid gradient and 9 ppg external fluid gradient @ 10804' TVD.

c) Based on string weight in 9.5 ppg fluid (Buoyed weight: 120k lbs.) plus 100k lbs overpull.

DRILLING PLAN

OPERATOR	Oasis Petroleum	**COUNTY/STATE**	McKenzie Co., ND
WELL NAME	Kline Federal 5300 31-18 15T	**RIG**	0
WELL TYPE	Horizontal Upper Three Forks		
LOCATION	NWSW 18-153N-100W Surface Location (survey plat): 2556' fsl	238' fwl	
EST. T.D.	20,630'	**GROUND ELEV:**	2008 Finished Pad Elev. **Sub Height:** 25
	TOTAL LATERA 9,589'	**KB ELEV:**	2033

PROGNOSIS: Based on 2,033' KB(est)

MARKER		DEPTH (Surf Loc)	DATUM (Surf Loc)
Pierre	NDIC MAP	1,923	110
Greenhorn		4,570	(2,537)
Mowry		4,976	(2,943)
Dakota		5,403	(3,370)
Rierdon		6,402	(4,369)
Dunham Salt		6,740	(4,707)
Dunham Salt Base		6,851	(4,818)
Spearfish		6,948	(4,915)
Pine Salt		7,203	(5,170)
Pine Salt Base		7,251	(5,218)
Opeche Salt		7,296	(5,263)
Opeche Salt Base		7,326	(5,293)
Broom Creek (Top of Minnelusa Gp.)		7,528	(5,495)
Amsden		7,608	(5,575)
Tyler		7,776	(5,743)
Otter (Base of Minnelusa Gp.)		7,967	(5,934)
Kibbey Lime		8,322	(6,289)
Charles Salt		8,472	(6,439)
UB		9,096	(7,063)
Base Last Salt		9,171	(7,138)
Ratcliffe		9,219	(7,186)
Mission Canyon		9,395	(7,362)
Lodgepole		9,957	(7,924)
Lodgepole Fracture Zone		10,163	(8,130)
False Bakken		10,658	(8,625)
Upper Bakken		10,668	(8,635)
Middle Bakken		10,682	(8,649)
Lower Bakken		10,727	(8,694)
Pronghorn		10,741	(8,708)
Three Forks		10,753	(8,720)
TF Target Top		10,765	(8,732)
TF Target Base		10,775	(8,742)
Claystone		10,776	(8,743)

Dip Rate: -0.3

Max. Anticipated BHP: 4665

LOGS:

	Type	Interval
OH Logs:	Triple Combo KOP to Kibby (or min run of 1800' whichever is greater); GR/Res to BSC; GR to surf; CND through the Dakota	
CBL/GR:	Above top of cement/GR to base of casing	
MWD GR:	KOP to lateral TD	

DEVIATION:

Surf: 3 deg. max., 1 deg / 100'; srvy every 500'
Prod: 5 deg. max., 1 deg / 100'; srvy every 100'

DST'S: None planned

CORES: None planned

MUDLOGGING:

Two-Man: 8,272'
~200' above the Charles (Kibbey) to Casing point; Casing point to TD
30' samples at direction of wellsite geologist; 10' through target @ curve land

BOP: 11" 5000 psi blind, pipe & annular

Surface Formation: *Glacial till*

MUD:	Interval		Type	WT	Vis	WL	Remarks
Surface:	0' -	2,023'	FW/Gel - Lime Sweeps	8.4-9.0	28-32	NC	Circ Mud Tanks
Intermediate:	2,023' -	11,041'	Invert	9.5-10.4	40-50	30+HtHp	Circ Mud Tanks
Lateral:	11,041' -	20,630'	Salt Water	9.8-10.2	28-32	NC	Circ Mud Tanks

CASING:	Size	Wt ppf	Hole	Depth		Cement	WOC	Remarks
Surface:	13-3/8"	54.5#	17-1/2"	2,023'		To Surface	12	100' into Pierre
Dakota Contingency:	9-5/8"	40#	12-1/4"	6,402'		To Surface	12	Below Dakota
Intermediate:	7"	29/32#	8-3/4"	11,041'		4903	24	500' above Dakota
Production Liner:	4-1/2"	13.5#	6"	20,630'	TOL @ 10,243'			50' above KOP

PROBABLE PLUGS, IF REQ'D:

OTHER:

	MD	TVD	FNL/FSL	FEL/FWL	S-T-R	AZI
Surface:	2,023	2,023	2556' FSL	238' FWL	SEC 18-T153N-R100W	Survey Company:
KOP:	10,293'	10,293'	2606' FSL	238' FWL	SEC 18-T153N-R100W	Build Rate: 12 deg /100'
EOC:	11,041'	10,770'	2677' FSL	708' FWL	SEC 18-T153N-R100W	81.40
Casing Point:	11,041'	10,770'	2677' FSL	708' FWL	SEC 18-T153N-R100W	81.40
Upper Threeforks Lateral TD:	20,630'	10,804'	2550' FNL	250' FEL	SEC 17-T153N-R100W	90.00

Comments:

Request a Sundry for an Open Hole Log Waiver

Exception well: Oasis Petroleum's Kline 5300 11-18H

Completion Notes: 35 packers, 35 sleeves, no frac string

Oasis Petroleum does not use Diesel Fuel, as defined by the US EPA in the list below, in our hydraulic fracture operations.
68334-30-5 (Primary Name: Fuels, diesel) 68476-34-6 (Primary Name: Fuels, diesel, No. 2)68476-30-2 (Primary Name: Fuel oil No. 2)
68476-31-3 (Primary Name: Fuel oil, No. 4)8008-20-6 (Primary Name: Kerosene)

OASIS PETROLEUM

Geology: M. Steed (5/5/2014) **Engineering:** hlbader rpm 7/18/14 TR 2-3-15

Project: Indian Hills
Site: 153N-100W-17/18
Well: Kline Federal 5300 31-18 15T
Wellbore: Kline Federal 5300 31-18 15T
Design: Design #1

OASIS PETROLEUM

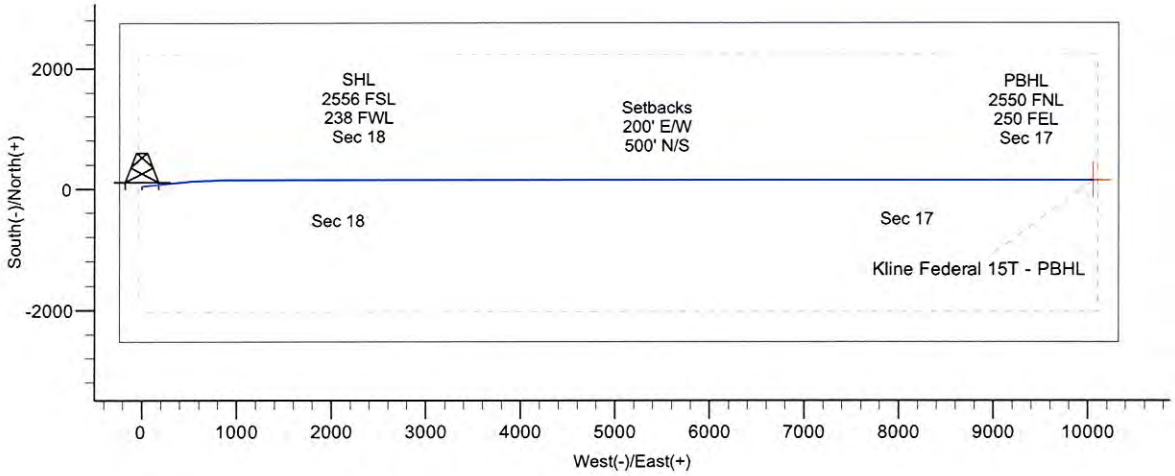
WELL DETAILS: Kline Federal 5300 31-18 15T

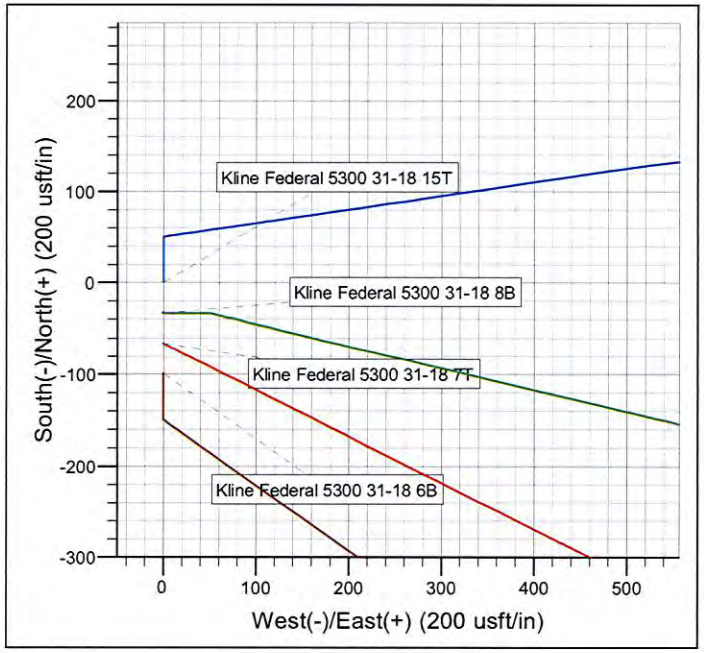
Ground Level: 2008.0

Northing	Easting	Latitude	Longitude
407255.15	1210092.38	48° 4' 28.490 N	103° 36' 11.380 W

Azimuths to True North
Magnetic North: 8.31°

Magnetic Field
Strength: 56281.2snT
Dip Angle: 72.95°
Date: 1/27/2015
Model: IGRF2015



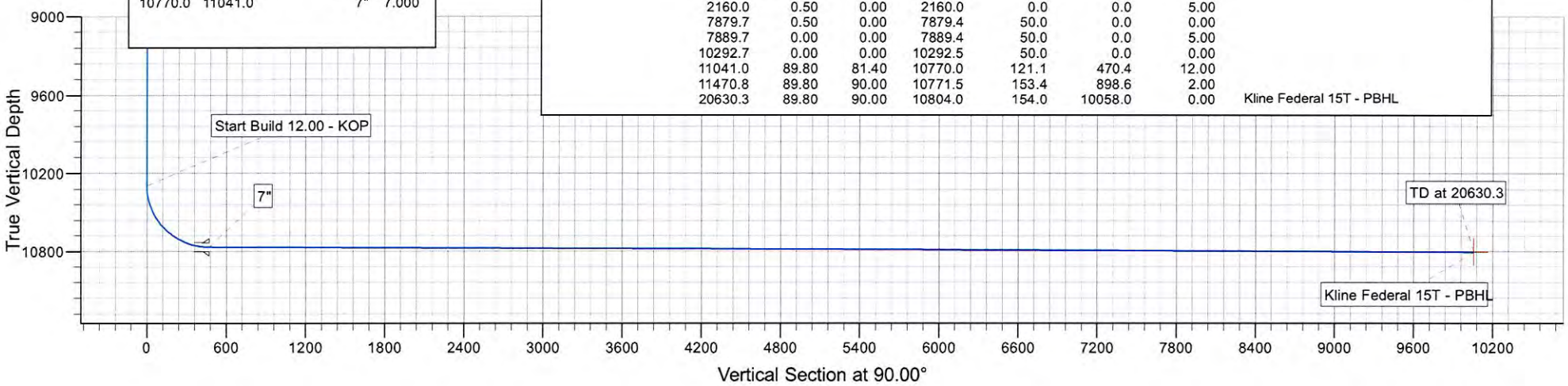


CASING DETAILS

TVD	MD	Name	Size
2023.0	2023.0	13 3/8"	13.375
6402.0	6402.2	9 5/8"	9.625
10770.0	11041.0	7"	7.000

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	
2150.0	0.00	0.00	2150.0	0.0	0.0	0.00	
2160.0	0.50	0.00	2160.0	0.0	0.0	5.00	
7879.7	0.50	0.00	7879.4	50.0	0.0	0.00	
7889.7	0.00	0.00	7889.4	50.0	0.0	5.00	
10292.7	0.00	0.00	10292.5	50.0	0.0	0.00	
11041.0	89.80	81.40	10770.0	121.1	470.4	12.00	
11470.8	89.80	90.00	10771.5	153.4	898.6	2.00	
20630.3	89.80	90.00	10804.0	154.0	10058.0	0.00	Kline Federal 15T - PBHL



Oasis

Indian Hills
153N-100W-17/18
Kline Federal 5300 31-18 15T

Plan: Design #1

Standard Planning Report

03 February, 2015

Oasis Petroleum

Planning Report

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Kline Federal 5300 31-18 15T
Company:	Oasis	**TVD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Site:	153N-100W-17/18	**North Reference:**	True
Well:	Kline Federal 5300 31-18 15T	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Kline Federal 5300 31-18 15T		
Design:	Design #1		

Project Indian Hills

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	North Dakota Northern Zone		

Site 153N-100W-17/18

Site Position:		**Northing:**	407,189.34 usft	**Latitude:**	48° 4' 27.840 N
From:	Lat/Long	**Easting:**	1,210,089.73 usft	**Longitude:**	103° 36' 11.380 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-2.31 °

Well Kline Federal 5300 31-18 15T

Well Position	**+N/-S**	65.9 usft	**Northing:**	407,255.14 usft	**Latitude:**	48° 4' 28.490 N
	+E/-W	0.0 usft	**Easting:**	1,210,092.38 usft	**Longitude:**	103° 36' 11.380 W
Position Uncertainty		2.0 usft	**Wellhead Elevation:**		**Ground Level:**	2,008.0 usft

Wellbore Kline Federal 5300 31-18 15T

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/27/2015	8.31	72.95	56,281

Design Design #1

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	90.00

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,150.0	0.00	0.00	2,150.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,160.0	0.50	0.00	2,160.0	0.0	0.0	5.00	5.00	0.00	0.00	
7,879.7	0.50	0.00	7,879.4	50.0	0.0	0.00	0.00	0.00	0.00	
7,889.7	0.00	0.00	7,889.4	50.0	0.0	5.00	-5.00	0.00	180.00	
10,292.7	0.00	0.00	10,292.5	50.0	0.0	0.00	0.00	0.00	0.00	
11,041.0	89.80	81.40	10,770.0	121.1	470.4	12.00	12.00	0.00	81.40	
11,470.8	89.80	90.00	10,771.5	153.4	898.6	2.00	0.00	2.00	90.04	
20,630.3	89.80	90.00	10,804.0	154.0	10,058.0	0.00	0.00	0.00	0.00	Kline Federal 15T - PI

Oasis Petroleum

Planning Report

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Kline Federal 5300 31-18 15T
Company:	Oasis	**TVD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Site:	153N-100W-17/18	**North Reference:**	True
Well:	Kline Federal 5300 31-18 15T	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Kline Federal 5300 31-18 15T		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,150.0	0.00	0.00	2,150.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 5.00									
2,160.0	0.50	0.00	2,160.0	0.0	0.0	0.0	5.00	5.00	0.00
Start 5719.7 hold at 2160.0 MD									
2,200.0	0.50	0.00	2,200.0	0.4	0.0	0.0	0.00	0.00	0.00
2,300.0	0.50	0.00	2,300.0	1.3	0.0	0.0	0.00	0.00	0.00
2,400.0	0.50	0.00	2,400.0	2.1	0.0	0.0	0.00	0.00	0.00
2,500.0	0.50	0.00	2,500.0	3.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.50	0.00	2,600.0	3.9	0.0	0.0	0.00	0.00	0.00
2,700.0	0.50	0.00	2,700.0	4.8	0.0	0.0	0.00	0.00	0.00
2,800.0	0.50	0.00	2,800.0	5.6	0.0	0.0	0.00	0.00	0.00
2,900.0	0.50	0.00	2,900.0	6.5	0.0	0.0	0.00	0.00	0.00
3,000.0	0.50	0.00	3,000.0	7.4	0.0	0.0	0.00	0.00	0.00
3,100.0	0.50	0.00	3,100.0	8.2	0.0	0.0	0.00	0.00	0.00
3,200.0	0.50	0.00	3,200.0	9.1	0.0	0.0	0.00	0.00	0.00
3,300.0	0.50	0.00	3,300.0	10.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.50	0.00	3,400.0	10.9	0.0	0.0	0.00	0.00	0.00
3,500.0	0.50	0.00	3,499.9	11.7	0.0	0.0	0.00	0.00	0.00
3,600.0	0.50	0.00	3,599.9	12.6	0.0	0.0	0.00	0.00	0.00
3,700.0	0.50	0.00	3,699.9	13.5	0.0	0.0	0.00	0.00	0.00
3,800.0	0.50	0.00	3,799.9	14.4	0.0	0.0	0.00	0.00	0.00
3,900.0	0.50	0.00	3,899.9	15.2	0.0	0.0	0.00	0.00	0.00
4,000.0	0.50	0.00	3,999.9	16.1	0.0	0.0	0.00	0.00	0.00
4,100.0	0.50	0.00	4,099.9	17.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.50	0.00	4,199.9	17.8	0.0	0.0	0.00	0.00	0.00
4,300.0	0.50	0.00	4,299.9	18.7	0.0	0.0	0.00	0.00	0.00
4,400.0	0.50	0.00	4,399.9	19.6	0.0	0.0	0.00	0.00	0.00
4,500.0	0.50	0.00	4,499.9	20.5	0.0	0.0	0.00	0.00	0.00
4,600.0	0.50	0.00	4,599.9	21.3	0.0	0.0	0.00	0.00	0.00
4,700.0	0.50	0.00	4,699.9	22.2	0.0	0.0	0.00	0.00	0.00
4,800.0	0.50	0.00	4,799.9	23.1	0.0	0.0	0.00	0.00	0.00
4,900.0	0.50	0.00	4,899.9	24.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.50	0.00	4,999.9	24.8	0.0	0.0	0.00	0.00	0.00
5,100.0	0.50	0.00	5,099.9	25.7	0.0	0.0	0.00	0.00	0.00
5,200.0	0.50	0.00	5,199.9	26.6	0.0	0.0	0.00	0.00	0.00
5,300.0	0.50	0.00	5,299.9	27.4	0.0	0.0	0.00	0.00	0.00
5,400.0	0.50	0.00	5,399.9	28.3	0.0	0.0	0.00	0.00	0.00
5,500.0	0.50	0.00	5,499.9	29.2	0.0	0.0	0.00	0.00	0.00
5,600.0	0.50	0.00	5,599.9	30.1	0.0	0.0	0.00	0.00	0.00
5,700.0	0.50	0.00	5,699.9	30.9	0.0	0.0	0.00	0.00	0.00
5,800.0	0.50	0.00	5,799.9	31.8	0.0	0.0	0.00	0.00	0.00
5,900.0	0.50	0.00	5,899.9	32.7	0.0	0.0	0.00	0.00	0.00
6,000.0	0.50	0.00	5,999.9	33.6	0.0	0.0	0.00	0.00	0.00
6,100.0	0.50	0.00	6,099.8	34.4	0.0	0.0	0.00	0.00	0.00
6,200.0	0.50	0.00	6,199.8	35.3	0.0	0.0	0.00	0.00	0.00
6,300.0	0.50	0.00	6,299.8	36.2	0.0	0.0	0.00	0.00	0.00
6,400.0	0.50	0.00	6,399.8	37.0	0.0	0.0	0.00	0.00	0.00
6,402.2	0.50	0.00	6,402.0	37.1	0.0	0.0	0.00	0.00	0.00
9 5/8"									
6,500.0	0.50	0.00	6,499.8	37.9	0.0	0.0	0.00	0.00	0.00
6,600.0	0.50	0.00	6,599.8	38.8	0.0	0.0	0.00	0.00	0.00
6,700.0	0.50	0.00	6,699.8	39.7	0.0	0.0	0.00	0.00	0.00
6,800.0	0.50	0.00	6,799.8	40.5	0.0	0.0	0.00	0.00	0.00
6,900.0	0.50	0.00	6,899.8	41.4	0.0	0.0	0.00	0.00	0.00
7,000.0	0.50	0.00	6,999.8	42.3	0.0	0.0	0.00	0.00	0.00

Oasis Petroleum

Planning Report

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Kline Federal 5300 31-18 15T
Company:	Oasis	**TVD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Site:	153N-100W-17/18	**North Reference:**	True
Well:	Kline Federal 5300 31-18 15T	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Kline Federal 5300 31-18 15T		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,100.0	0.50	0.00	7,099.8	43.2	0.0	0.0	0.00	0.00	0.00
7,200.0	0.50	0.00	7,199.8	44.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.50	0.00	7,299.8	44.9	0.0	0.0	0.00	0.00	0.00
7,400.0	0.50	0.00	7,399.8	45.8	0.0	0.0	0.00	0.00	0.00
7,500.0	0.50	0.00	7,499.8	46.6	0.0	0.0	0.00	0.00	0.00
7,600.0	0.50	0.00	7,599.8	47.5	0.0	0.0	0.00	0.00	0.00
7,700.0	0.50	0.00	7,699.8	48.4	0.0	0.0	0.00	0.00	0.00
7,800.0	0.50	0.00	7,799.8	49.3	0.0	0.0	0.00	0.00	0.00
7,879.7	0.50	0.00	7,879.4	50.0	0.0	0.0	0.00	0.00	0.00
Start Drop -5.00									
7,889.7	0.00	0.00	7,889.4	50.0	0.0	0.0	5.00	-5.00	0.00
Start 2403.1 hold at 7889.7 MD									
10,292.7	0.00	0.00	10,292.5	50.0	0.0	0.0	0.00	0.00	0.00
Start Build 12.00 - KOP									
10,300.0	0.87	81.40	10,299.8	50.0	0.1	0.1	12.00	12.00	0.00
10,400.0	12.87	81.40	10,398.9	51.8	11.9	11.9	12.00	12.00	0.00
10,500.0	24.87	81.40	10,493.3	56.6	43.8	43.8	12.00	12.00	0.00
10,600.0	36.87	81.40	10,579.0	64.3	94.4	94.4	12.00	12.00	0.00
10,700.0	48.87	81.40	10,652.2	74.4	161.6	161.6	12.00	12.00	0.00
10,800.0	60.87	81.40	10,709.6	86.6	242.3	242.3	12.00	12.00	0.00
10,900.0	72.87	81.40	10,748.8	100.4	333.1	333.1	12.00	12.00	0.00
11,000.0	84.87	81.40	10,768.1	115.0	429.9	429.9	12.00	12.00	0.00
11,041.0	89.79	81.40	10,770.0	121.1	470.4	470.4	12.00	12.00	0.00
Start DLS 2.00 TFO 90.04 - EOC - 7"									
11,100.0	89.80	82.58	10,770.2	129.4	528.8	528.8	2.00	0.01	2.00
11,200.0	89.80	84.58	10,770.5	140.5	628.2	628.2	2.00	0.00	2.00
11,300.0	89.80	86.58	10,770.9	148.3	727.9	727.9	2.00	0.00	2.00
11,400.0	89.80	88.58	10,771.2	152.5	827.8	827.8	2.00	0.00	2.00
11,470.8	89.80	90.00	10,771.5	153.4	898.6	898.6	2.00	0.00	2.00
Start 9159.4 hold at 11470.8 MD									
11,500.0	89.80	90.00	10,771.6	153.4	927.8	927.8	0.00	0.00	0.00
11,600.0	89.80	90.00	10,771.9	153.4	1,027.8	1,027.8	0.00	0.00	0.00
11,700.0	89.80	90.00	10,772.3	153.4	1,127.8	1,127.8	0.00	0.00	0.00
11,800.0	89.80	90.00	10,772.6	153.4	1,227.8	1,227.8	0.00	0.00	0.00
11,900.0	89.80	90.00	10,773.0	153.4	1,327.8	1,327.8	0.00	0.00	0.00
12,000.0	89.80	90.00	10,773.4	153.4	1,427.8	1,427.8	0.00	0.00	0.00
12,100.0	89.80	90.00	10,773.7	153.4	1,527.8	1,527.8	0.00	0.00	0.00
12,200.0	89.80	90.00	10,774.1	153.4	1,627.8	1,627.8	0.00	0.00	0.00
12,300.0	89.80	90.00	10,774.4	153.4	1,727.8	1,727.8	0.00	0.00	0.00
12,400.0	89.80	90.00	10,774.8	153.4	1,827.8	1,827.8	0.00	0.00	0.00
12,500.0	89.80	90.00	10,775.1	153.4	1,927.8	1,927.8	0.00	0.00	0.00
12,600.0	89.80	90.00	10,775.5	153.4	2,027.8	2,027.8	0.00	0.00	0.00
12,700.0	89.80	90.00	10,775.8	153.4	2,127.8	2,127.8	0.00	0.00	0.00
12,800.0	89.80	90.00	10,776.2	153.5	2,227.8	2,227.8	0.00	0.00	0.00
12,900.0	89.80	90.00	10,776.6	153.5	2,327.8	2,327.8	0.00	0.00	0.00
13,000.0	89.80	90.00	10,776.9	153.5	2,427.8	2,427.8	0.00	0.00	0.00
13,100.0	89.80	90.00	10,777.3	153.5	2,527.8	2,527.8	0.00	0.00	0.00
13,200.0	89.80	90.00	10,777.6	153.5	2,627.8	2,627.8	0.00	0.00	0.00
13,300.0	89.80	90.00	10,778.0	153.5	2,727.8	2,727.8	0.00	0.00	0.00
13,400.0	89.80	90.00	10,778.3	153.5	2,827.8	2,827.8	0.00	0.00	0.00
13,500.0	89.80	90.00	10,778.7	153.5	2,927.8	2,927.8	0.00	0.00	0.00
13,600.0	89.80	90.00	10,779.0	153.5	3,027.8	3,027.8	0.00	0.00	0.00
13,700.0	89.80	90.00	10,779.4	153.5	3,127.8	3,127.8	0.00	0.00	0.00
13,800.0	89.80	90.00	10,779.7	153.5	3,227.8	3,227.8	0.00	0.00	0.00

Oasis Petroleum

Planning Report

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Kline Federal 5300 31-18 15T
Company:	Oasis	**TVD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Site:	153N-100W-17/18	**North Reference:**	True
Well:	Kline Federal 5300 31-18 15T	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Kline Federal 5300 31-18 15T		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
13,900.0	89.80	90.00	10,780.1	153.5	3,327.8	3,327.8	0.00	0.00	0.00
14,000.0	89.80	90.00	10,780.5	153.5	3,427.8	3,427.8	0.00	0.00	0.00
14,100.0	89.80	90.00	10,780.8	153.5	3,527.8	3,527.8	0.00	0.00	0.00
14,200.0	89.80	90.00	10,781.2	153.5	3,627.8	3,627.8	0.00	0.00	0.00
14,300.0	89.80	90.00	10,781.5	153.6	3,727.8	3,727.8	0.00	0.00	0.00
14,400.0	89.80	90.00	10,781.9	153.6	3,827.8	3,827.8	0.00	0.00	0.00
14,500.0	89.80	90.00	10,782.2	153.6	3,927.8	3,927.8	0.00	0.00	0.00
14,600.0	89.80	90.00	10,782.6	153.6	4,027.8	4,027.8	0.00	0.00	0.00
14,700.0	89.80	90.00	10,782.9	153.6	4,127.8	4,127.8	0.00	0.00	0.00
14,800.0	89.80	90.00	10,783.3	153.6	4,227.8	4,227.8	0.00	0.00	0.00
14,900.0	89.80	90.00	10,783.7	153.6	4,327.8	4,327.8	0.00	0.00	0.00
15,000.0	89.80	90.00	10,784.0	153.6	4,427.8	4,427.8	0.00	0.00	0.00
15,100.0	89.80	90.00	10,784.4	153.6	4,527.8	4,527.8	0.00	0.00	0.00
15,200.0	89.80	90.00	10,784.7	153.6	4,627.8	4,627.8	0.00	0.00	0.00
15,300.0	89.80	90.00	10,785.1	153.6	4,727.8	4,727.8	0.00	0.00	0.00
15,400.0	89.80	90.00	10,785.4	153.6	4,827.8	4,827.8	0.00	0.00	0.00
15,500.0	89.80	90.00	10,785.8	153.6	4,927.8	4,927.8	0.00	0.00	0.00
15,600.0	89.80	90.00	10,786.1	153.6	5,027.8	5,027.8	0.00	0.00	0.00
15,700.0	89.80	90.00	10,786.5	153.7	5,127.8	5,127.8	0.00	0.00	0.00
15,800.0	89.80	90.00	10,786.8	153.7	5,227.8	5,227.8	0.00	0.00	0.00
15,900.0	89.80	90.00	10,787.2	153.7	5,327.8	5,327.8	0.00	0.00	0.00
16,000.0	89.80	90.00	10,787.6	153.7	5,427.8	5,427.8	0.00	0.00	0.00
16,100.0	89.80	90.00	10,787.9	153.7	5,527.8	5,527.8	0.00	0.00	0.00
16,200.0	89.80	90.00	10,788.3	153.7	5,627.8	5,627.8	0.00	0.00	0.00
16,300.0	89.80	90.00	10,788.6	153.7	5,727.8	5,727.8	0.00	0.00	0.00
16,400.0	89.80	90.00	10,789.0	153.7	5,827.8	5,827.8	0.00	0.00	0.00
16,500.0	89.80	90.00	10,789.3	153.7	5,927.8	5,927.8	0.00	0.00	0.00
16,600.0	89.80	90.00	10,789.7	153.7	6,027.7	6,027.7	0.00	0.00	0.00
16,700.0	89.80	90.00	10,790.0	153.7	6,127.7	6,127.7	0.00	0.00	0.00
16,800.0	89.80	90.00	10,790.4	153.7	6,227.7	6,227.7	0.00	0.00	0.00
16,900.0	89.80	90.00	10,790.8	153.7	6,327.7	6,327.7	0.00	0.00	0.00
17,000.0	89.80	90.00	10,791.1	153.7	6,427.7	6,427.7	0.00	0.00	0.00
17,100.0	89.80	90.00	10,791.5	153.8	6,527.7	6,527.7	0.00	0.00	0.00
17,200.0	89.80	90.00	10,791.8	153.8	6,627.7	6,627.7	0.00	0.00	0.00
17,300.0	89.80	90.00	10,792.2	153.8	6,727.7	6,727.7	0.00	0.00	0.00
17,400.0	89.80	90.00	10,792.5	153.8	6,827.7	6,827.7	0.00	0.00	0.00
17,500.0	89.80	90.00	10,792.9	153.8	6,927.7	6,927.7	0.00	0.00	0.00
17,600.0	89.80	90.00	10,793.2	153.8	7,027.7	7,027.7	0.00	0.00	0.00
17,700.0	89.80	90.00	10,793.6	153.8	7,127.7	7,127.7	0.00	0.00	0.00
17,800.0	89.80	90.00	10,794.0	153.8	7,227.7	7,227.7	0.00	0.00	0.00
17,900.0	89.80	90.00	10,794.3	153.8	7,327.7	7,327.7	0.00	0.00	0.00
18,000.0	89.80	90.00	10,794.7	153.8	7,427.7	7,427.7	0.00	0.00	0.00
18,100.0	89.80	90.00	10,795.0	153.8	7,527.7	7,527.7	0.00	0.00	0.00
18,200.0	89.80	90.00	10,795.4	153.8	7,627.7	7,627.7	0.00	0.00	0.00
18,300.0	89.80	90.00	10,795.7	153.8	7,727.7	7,727.7	0.00	0.00	0.00
18,400.0	89.80	90.00	10,796.1	153.8	7,827.7	7,827.7	0.00	0.00	0.00
18,500.0	89.80	90.00	10,796.4	153.9	7,927.7	7,927.7	0.00	0.00	0.00
18,600.0	89.80	90.00	10,796.8	153.9	8,027.7	8,027.7	0.00	0.00	0.00
18,700.0	89.80	90.00	10,797.1	153.9	8,127.7	8,127.7	0.00	0.00	0.00
18,800.0	89.80	90.00	10,797.5	153.9	8,227.7	8,227.7	0.00	0.00	0.00
18,900.0	89.80	90.00	10,797.9	153.9	8,327.7	8,327.7	0.00	0.00	0.00
19,000.0	89.80	90.00	10,798.2	153.9	8,427.7	8,427.7	0.00	0.00	0.00
19,100.0	89.80	90.00	10,798.6	153.9	8,527.7	8,527.7	0.00	0.00	0.00
19,200.0	89.80	90.00	10,798.9	153.9	8,627.7	8,627.7	0.00	0.00	0.00
19,300.0	89.80	90.00	10,799.3	153.9	8,727.7	8,727.7	0.00	0.00	0.00

Oasis Petroleum

Planning Report

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Kline Federal 5300 31-18 15T
Company:	Oasis	**TVD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Site:	153N-100W-17/18	**North Reference:**	True
Well:	Kline Federal 5300 31-18 15T	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Kline Federal 5300 31-18 15T		
Design:	Design #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
19,400.0	89.80	90.00	10,799.6	153.9	8,827.7	8,827.7	0.00	0.00	0.00
19,500.0	89.80	90.00	10,800.0	153.9	8,927.7	8,927.7	0.00	0.00	0.00
19,600.0	89.80	90.00	10,800.3	153.9	9,027.7	9,027.7	0.00	0.00	0.00
19,700.0	89.80	90.00	10,800.7	153.9	9,127.7	9,127.7	0.00	0.00	0.00
19,800.0	89.80	90.00	10,801.1	153.9	9,227.7	9,227.7	0.00	0.00	0.00
19,900.0	89.80	90.00	10,801.4	153.9	9,327.7	9,327.7	0.00	0.00	0.00
20,000.0	89.80	90.00	10,801.8	154.0	9,427.7	9,427.7	0.00	0.00	0.00
20,100.0	89.80	90.00	10,802.1	154.0	9,527.7	9,527.7	0.00	0.00	0.00
20,200.0	89.80	90.00	10,802.5	154.0	9,627.7	9,627.7	0.00	0.00	0.00
20,300.0	89.80	90.00	10,802.8	154.0	9,727.7	9,727.7	0.00	0.00	0.00
20,400.0	89.80	90.00	10,803.2	154.0	9,827.7	9,827.7	0.00	0.00	0.00
20,500.0	89.80	90.00	10,803.5	154.0	9,927.7	9,927.7	0.00	0.00	0.00
20,600.0	89.80	90.00	10,803.9	154.0	10,027.7	10,027.7	0.00	0.00	0.00
20,630.3	89.80	90.00	10,804.0	154.0	10,058.0	10,058.0	0.00	0.00	0.00

TD at 20630.3 - Kline Federal 15T - PBHL

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Kline Federal 15T - PBH - plan hits target center - Point	0.00	0.00	10,804.0	154.0	10,058.0	407,003.77	1,220,148.42	48° 4' 29.983 N	103° 33' 43.264 W

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)
2,023.0	2,023.0	13 3/8"	13.375	17.500
6,402.2	6,402.0	9 5/8"	9.625	12.250
11,041.0	10,770.0	7"	7.000	8.750

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Kline Federal 5300 31-18 15T
Company:	Oasis	**TVD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 2033.0usft (Original Well Elev)
Site:	153N-100W-17/18	**North Reference:**	True
Well:	Kline Federal 5300 31-18 15T	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Kline Federal 5300 31-18 15T		
Design:	Design #1		

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,923.0	1,923.0	Pierre			
4,570.1	4,570.0	Greenhorn			
4,976.1	4,976.0	Mowry			
5,403.1	5,403.0	Dakota			
6,402.2	6,402.0	Rierdon			
6,740.2	6,740.0	Dunham Salt			
6,851.2	6,851.0	Dunham Salt Base			
6,948.2	6,948.0	Spearfish			
7,203.2	7,203.0	Pine Salt			
7,251.2	7,251.0	Pine Salt Base			
7,296.2	7,296.0	Opeche Salt			
7,326.2	7,326.0	Opeche Salt Base			
7,528.2	7,528.0	Broom Creek (Top of Minnelusa Gp.)			
7,608.2	7,608.0	Amsden			
7,776.2	7,776.0	Tyler			
7,967.2	7,967.0	Otter (Base of Minnelusa Gp.)			
8,322.2	8,322.0	Kibbey Lime			
8,472.2	8,472.0	Charles Salt			
9,096.2	9,096.0	UB			
9,171.2	9,171.0	Base Last Salt			
9,219.2	9,219.0	Ratcliffe			
9,395.2	9,395.0	Mission Canyon			
9,957.2	9,957.0	Lodgepole			
10,163.2	10,163.0	Lodgepole Fracture Zone			
10,709.0	10,658.0	False Bakken			
10,724.8	10,668.0	Upper Bakken			
10,748.2	10,682.0	Middle Bakken			
10,838.6	10,727.0	Lower Bakken			
10,875.6	10,741.0	Pronghorn			
10,915.1	10,753.0	Three Forks			
10,973.8	10,765.0	TF Target Top			
12,463.0	10,775.0	TF Target Base			
12,744.7	10,776.0	Claystone			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
2,150.0	2,150.0	0.0	0.0	Start Build 5.00
2,160.0	2,160.0	0.0	0.0	Start 5719.7 hold at 2160.0 MD
7,879.7	7,879.4	50.0	0.0	Start Drop -5.00
7,889.7	7,889.4	50.0	0.0	Start 2403.1 hold at 7889.7 MD
10,292.7	10,292.5	50.0	0.0	Start Build 12.00 - KOP
11,041.0	10,770.0	121.1	470.4	Start DLS 2.00 TFO 90.04 - EOC
11,470.8	10,771.5	153.4	898.6	Start 9159.4 hold at 11470.8 MD
20,630.3	10,804.0	154.0	10,058.0	TD at 20630.3

2/6/2015

Oasis Petroleum
1001 Fannin St.
Suite 1500
Houston, TX 77002

Todd Holweger
Mineral Resources Permit Manager
North Dakota Industrial Commission
600 East Boulevard Avenue Dept. 405
Bismarck, ND 58505-0840

RE: Kline Federal 5300 31-18 15T

Dear Mr. Holweger:

Pursuant to NDCC 43-02-03-16, Oasis respectfully submits the Kline Federal 5300 31-18 15T well APD for your consideration. Included with the application are all necessary attachments; an itemized list is included on the following page.

This well is located in Section 18 of Township 153 N, Range 100 W. This location is part of Indian Hills, Baker field and is in a generally rural area. An aerial overview has been provided with this application. Additionally, there are federal minerals associated with this well and Oasis has submitted a federal APD. The landowners, Stewart and Alicia Kline, have been fully apprised of Oasis' development plans. Pursuant to safety regulation NDAC 43-02-03-28, there are no occupied dwellings within 500 feet of the well head or production equipment associated with this well. The drill cuttings, solids and liquids from the drilling process will be disposed at the Indian Hill Disposal facility.

Please do not hesitate to contact me should you have any additional questions or concerns regarding this well. Thank you for your consideration.

Respectfully,

Michael Kukuk

Michael Kukuk
Regulatory Supervisor
281.404.9575
Oasis Petroleum

From: Tschosik, Lisa M.
To: "Victoria Siemieniewski"
Cc: Holweger, Todd L.; lwickstr@blm.gov
Subject: Federal minerals
Date: Monday, February 09, 2015 10:04:00 AM
Attachments: image001.png

Dear Victoria,

It appears that the below captioned permits are within the 1280 acre spacing unit consisting of Sections 17 & 18 T153N R100W and may be subject to a Federal permit. Please contact the BLM office in Dickinson (701) 227-7713 to ensure that all documentation has been properly filed.

OASIS PETROLEUM	H	OG	KLINE FEDERAL 5300 31-18 15T		153	100	18	APD	03/01/2015	02/06/2015

Thank You.

Todd L. Holweger
Mineral Resources Permit Manager
NDIC, DMR, Oil and Gas Div.
(701) 328-8024
https://www.dmr.nd.gov/oilgas/

2/5/2014

Victoria Siemieniewski
Regulatory Specialist
Oasis Petroleum
1001 Fannin St.
Suite 1500
Houston, TX 77002

Todd Holweger
Mineral Resources Permit Manager
North Dakota Industrial Commission
600 East Boulevard Avenue Dept. 405
Bismarck, ND 58505-0840

RE: Kline Federal 5300 31-18 15T
Request for a legal street address

Dear Mr. Holweger:

Oasis Petroleum has received the following physical street address for the subject well/well facility:

13767 45th Street NW
Alexander, ND 58831

Thank you for your consideration.

Respectfully,

Victoria Siemieniewski
Regulatory Specialist
Oasis Petroleum
281-404-9652

July 10, 2014

UPDATED: February 4, 2015

Proposed Address for:

Oasis Petroleum North America, LLC

Kline Federal 5300 31-18 6B, 7T, 8B & 15T Pad

Attn: Kristy Aasheim

Section: 18 Township: 153 N Range: 100 W

McKenzie County, ND

This address will be located within Alexander, ND 58831

The following address is **assuming** that the driveway or access road connects with **45th Street NW**. If this is not the case, then the address will need to be re-evaluated.

1.) Physical Address for Kline Federal 5300 31-18 6B, 7T, 8B & 15T Pad:

13767 45th Street NW
Alexander, ND 58831

Approximate Geographical Location:

103° 36' 10.401" W 48° 4' 28.178" N

Sincerely,

Aaron Chisholm

GIS Coordinator
McKenzie County, ND
701 – 444- 7417
achisholm@co.mckenzie.nd.us

Oasis Petroleum North America, LLC

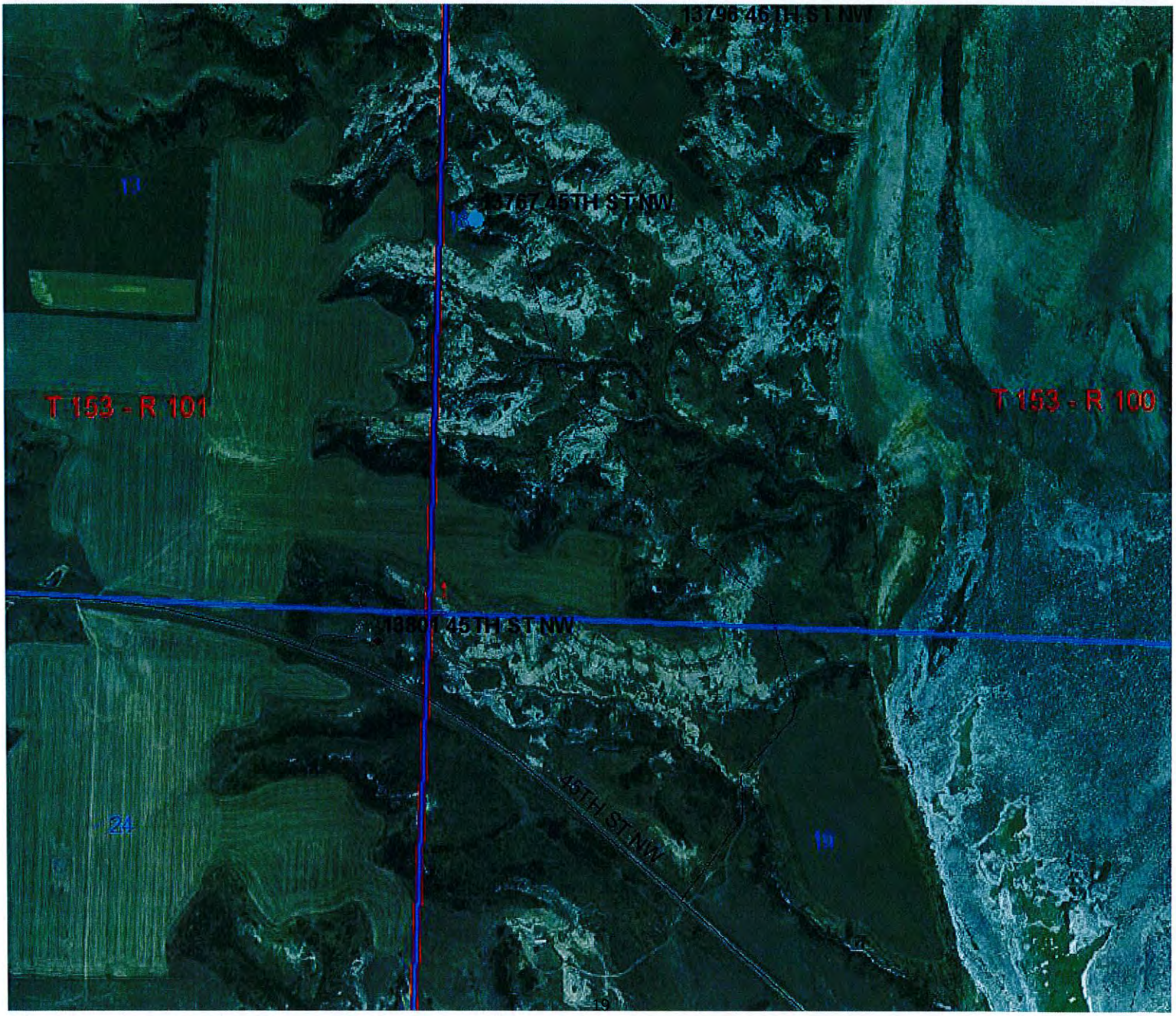
Kline Federal 5300 31-18 6B, 7T, 8B & 15T Pad

Attn: Kristy Aasheim

Section: 18 Township: 153 N Range: 100 W

McKenzie County, ND

This image is meant to be used as a visual aid and is not intended to be used for geographical accuracy



GAS CAPTURE PLAN AFFIDAVIT

STATE OF TEXAS §
§
COUNTY OF HARRIS §

Robert Eason, being duly sworn, states as follows:

1. He is employed by Oasis Petroleum North America LLC ("Oasis") as Marketing Manager, is over the age of 21 and has personal knowledge of the matters set forth in this affidavit.

2. This affidavit is submitted in conjunction with the Application for Permit to Drill for the Kline Federal 5300 31-18 15T well, with a surface location in the SW NW of Section 18, Township 153 North, Range 100 West, McKenzie County, North Dakota (the "Well").

3. Oasis currently anticipates that gas to be produced from the Well will be gathered by Hiland Partners (the "Gathering Company"). Oasis has advised the Gathering Company of its intent to drill the Well and has advised the Gathering Company that it currently anticipates that the Well will be completed in Quarter 3 of 2015, with an initial gas production rate of approximately 580 mcf/day.

Robert Eason
Marketing Manager

Subscribed and sworn to before me this 5 day of February, 2015.

Notary Public in and for the State of Texas
My Commission expires: 6·5·18

ARMANDINA BARRON
Notary Public, State of Texas
My Commission Expires
June 05, 2018

GAS CAPTURE PLAN – OASIS PETROLEUM

Kline Federal 5300 31-18 15T

Section 18-T153N-R100W
Baker Field
McKenzie County, North Dakota

Anticipated first flow date	Q3 of 2015
Gas Gatherer:	Hiland Partners
Gas to be processed at*:	Hiland Operated Watford City Plant
Maximum Daily Capacity of Existing Gas Line*:	55,000 MCFD
Current Throughput of Existing Gas Line*:	33,000 MCFD
Anticipated Daily Capacity of Existing Gas Line at Date of First Gas Sales*:	66,000 MCFD
Anticipated Throughput of Existing Gas Line at Date of First Gas Sales*:	65,000 MCFD
Gas Gatherer's Issues or Expansion Plans for the Area*:	Line looping and compression
Map:	Attached
Affidavit:	Attached

*Provided by Gatherer

Flowback Strategy

Total Number of Wells at Location: 7

Multi-Well Start-up Plan: Initial production from the 1st new well at the CTB is anticipated in May 2015 with each following well making 1st production aproximately every 5th day thereafter

Estimated Flow Rate:

	Kline Federal 5300 31-18 15T (well)		Kline DSU South CTB (7 wells)	
	MCFD	BOPD	MCFD	BOPD
30 Days:	579	643	5,100	5,646
60 Days:	497	552	6,302	6,982
180 Days:	297	330	3,543	3,918

Oasis Flaring Percentage

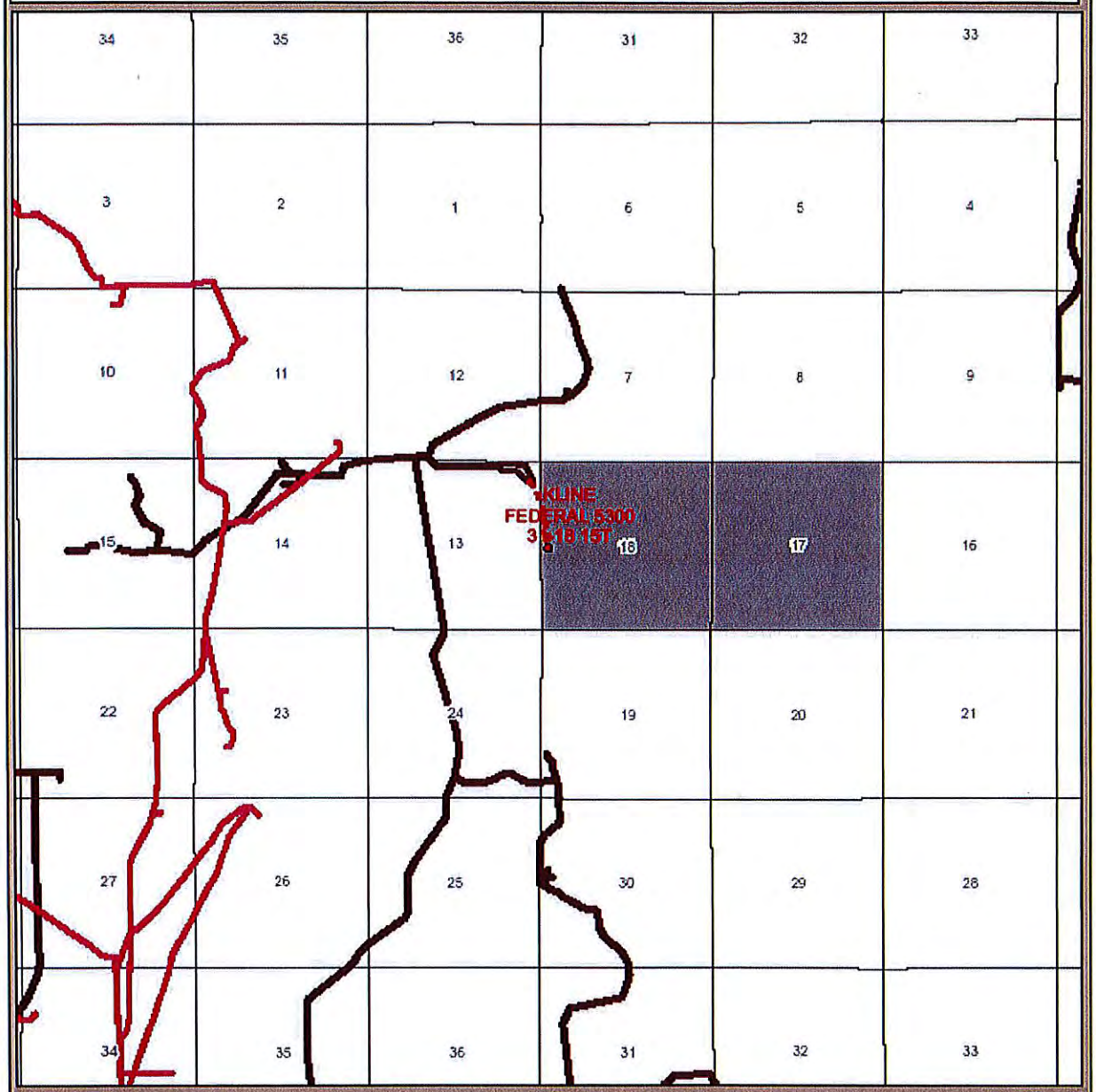
	Statewide	Baker Field
Oasis % of Gas Flared:	**21%**	**19%**

As of December 2014

Alternatives to Flaring

Source: Oasis Marketing (281) 404-9435

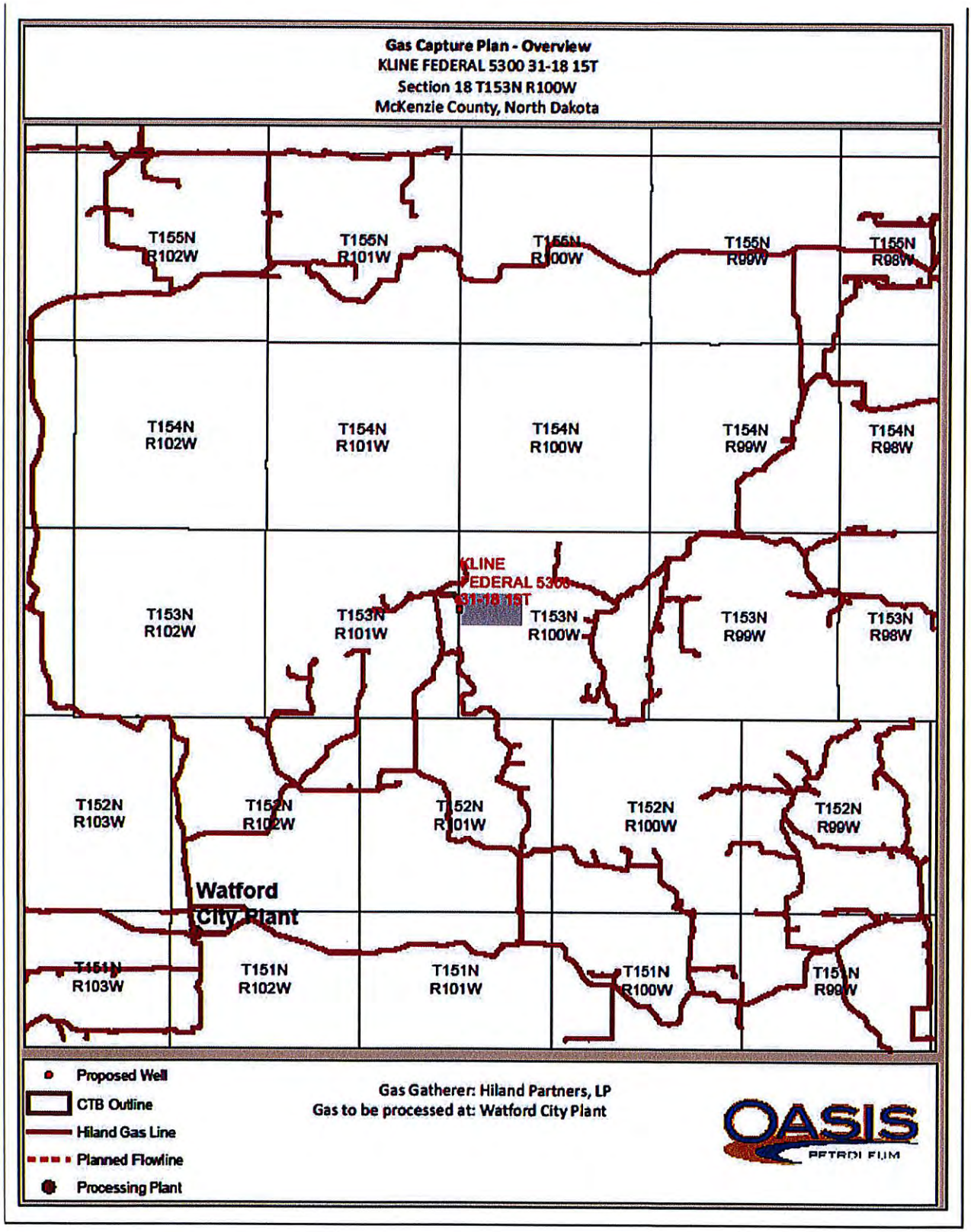
Gas Capture Plan - Detail View
KLINE FEDERAL 5300 31-18 15T
Section 18 T153N R100W
McKenzie County, North Dakota



Proposed Well
CTB Outline
Planned Flowline
Hiland Gas Line
Oneok Gas Line

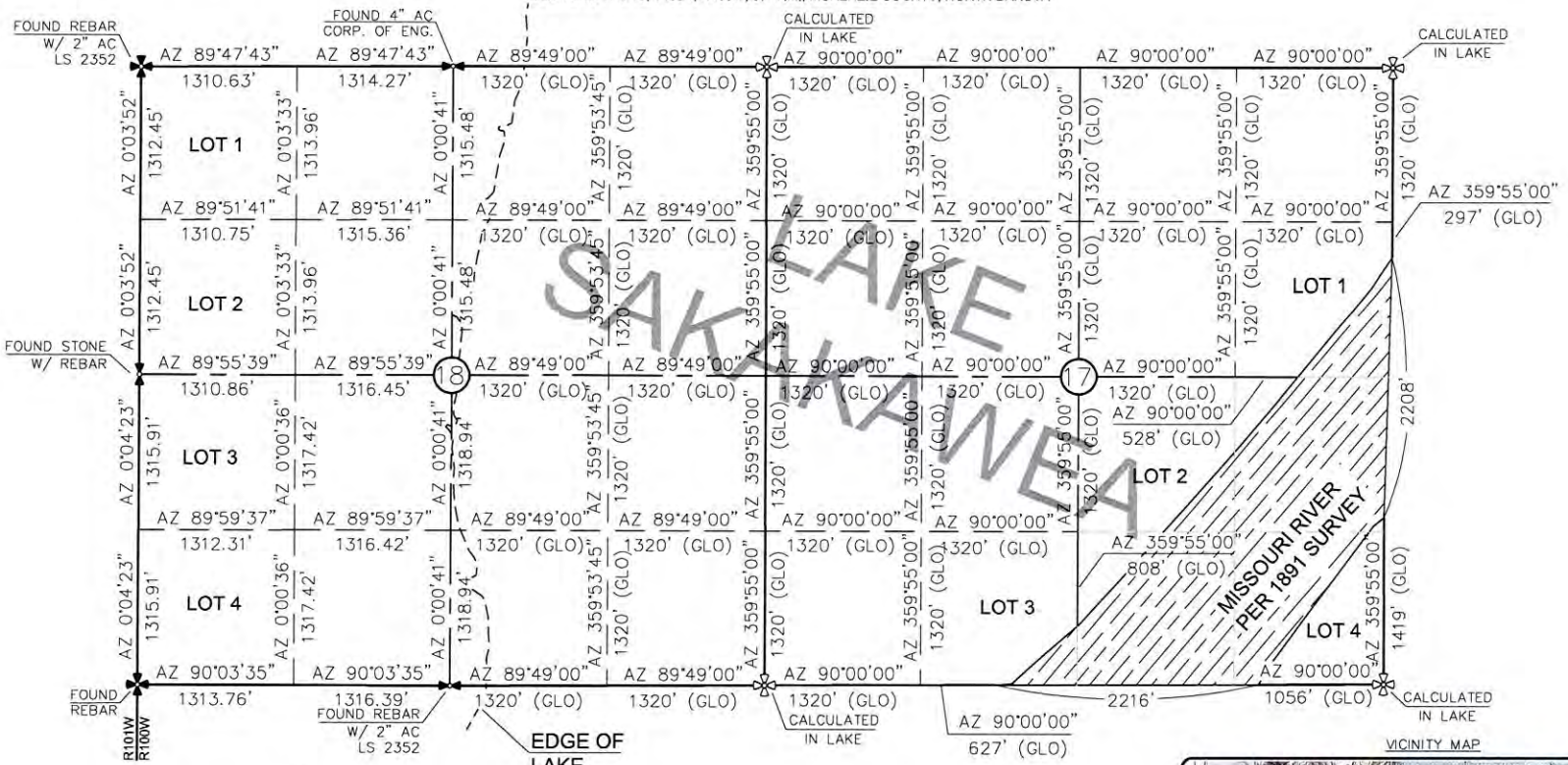
Gas Gatherer: Hiland Partners, LP
Gas to be processed at: Watford City Plant

OASIS PETROLEUM


Gas Capture Plan - Overview
KLINE FEDERAL 5300 31-18 15T
Section 18 T153N R100W
McKenzie County, North Dakota
T155N R102W
T155N R101W
T155N R100W
T155N R99W
T155N R98W
T154N R102W
T154N R101W
T154N R100W
T154N R99W
T154N R98W
T153N R102W
T153N R101W
KLINE FEDERAL 5300 31-18 15T
T153N R100W
T153N R99W
T153N R98W
T152N R103W
T152N R102W
T152N R101W
T152N R100W
T152N R99W
Watford City Plant
T151N R103W
T151N R102W
T151N R101W
T151N R100W
T151N R99W
Proposed Well
CTB Outline
Hiland Gas Line
Planned Flowline
Processing Plant
Gas Gatherer: Hiland Partners, LP
Gas to be processed at: Watford City Plant
OASIS
PETROLEUM

SECTION BREAKDOWN

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTIONS 17 & 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



0 1000
1" = 1000'

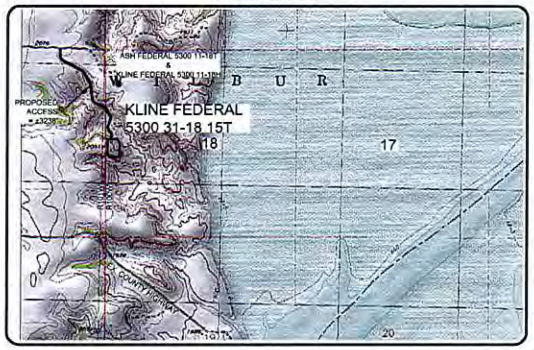
– MONUMENT – RECOVERED
– MONUMENT – NOT RECOVERED

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 ON 2/05/15 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC.

ALL AZIMUTHS ARE BASED ON G.P.S. OBSERVATIONS. THE ORIGINAL SURVEY OF THIS AREA FOR THE GENERAL LAND OFFICE (G.L.O.) WAS 1891. THE CORNERS FOUND ARE AS INDICATED AND ALL OTHERS ARE COMPUTED FROM THOSE CORNERS FOUND AND BASED ON G.L.O. DATA. THE MAPPING ANGLE FOR THIS AREA IS APPROXIMATELY 0°03'.

REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

VICINITY MAP



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Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

OASIS PETROLEUM NORTH AMERICA, LLC
SECTION BREAKDOWN
SECTIONS 17 & 18, T153N, R100W
MKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-105.05
Checked By: D.D.K. Date: JAN. 2015

Interstate Engineering, Inc.
P.O. Box 648
425 East Main Street
Sidney, Montana 59270
Ph (406) 433-5617
Fax (406) 433-5618
www.interstateeng.com
Other offices in Minnesota, North Dakota and South Dakota

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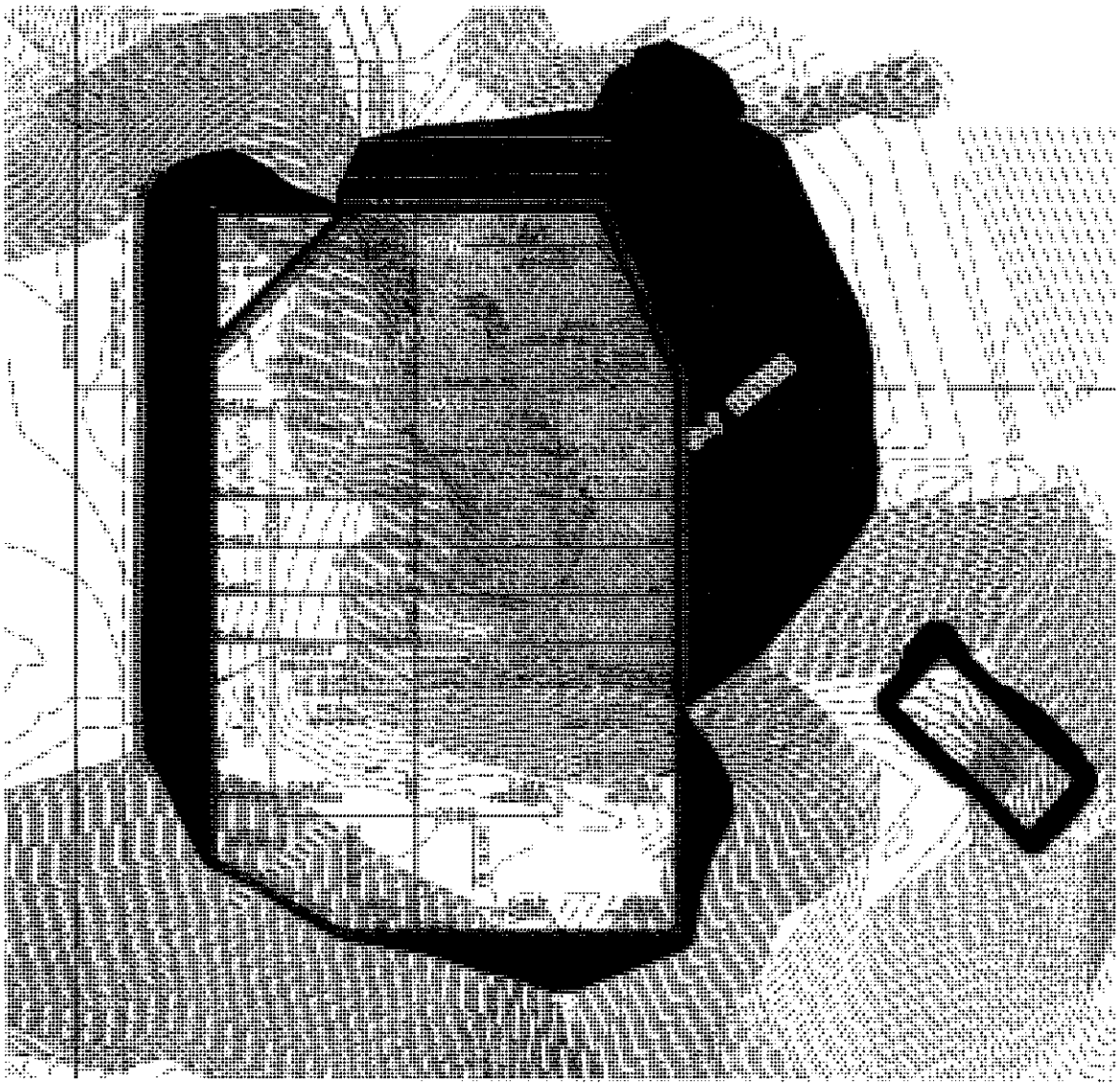
SHEET NO. 2/8

PAD LAYOUT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA



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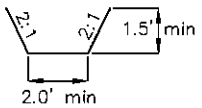
REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

NOTE: Pad dimensions shown are to usable area, the v-ditch and berm areas shall be built to the outside of the pad dimensions.

V-DITCH DETAIL



Proposed Contours
Original Contours
BERM
DITCH

NOTE: All utilities shown are preliminary only, a complete utilities location is recommended before construction.

0 80
1" = 80'

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Other offices in Minnesota, North Dakota and South Dakota

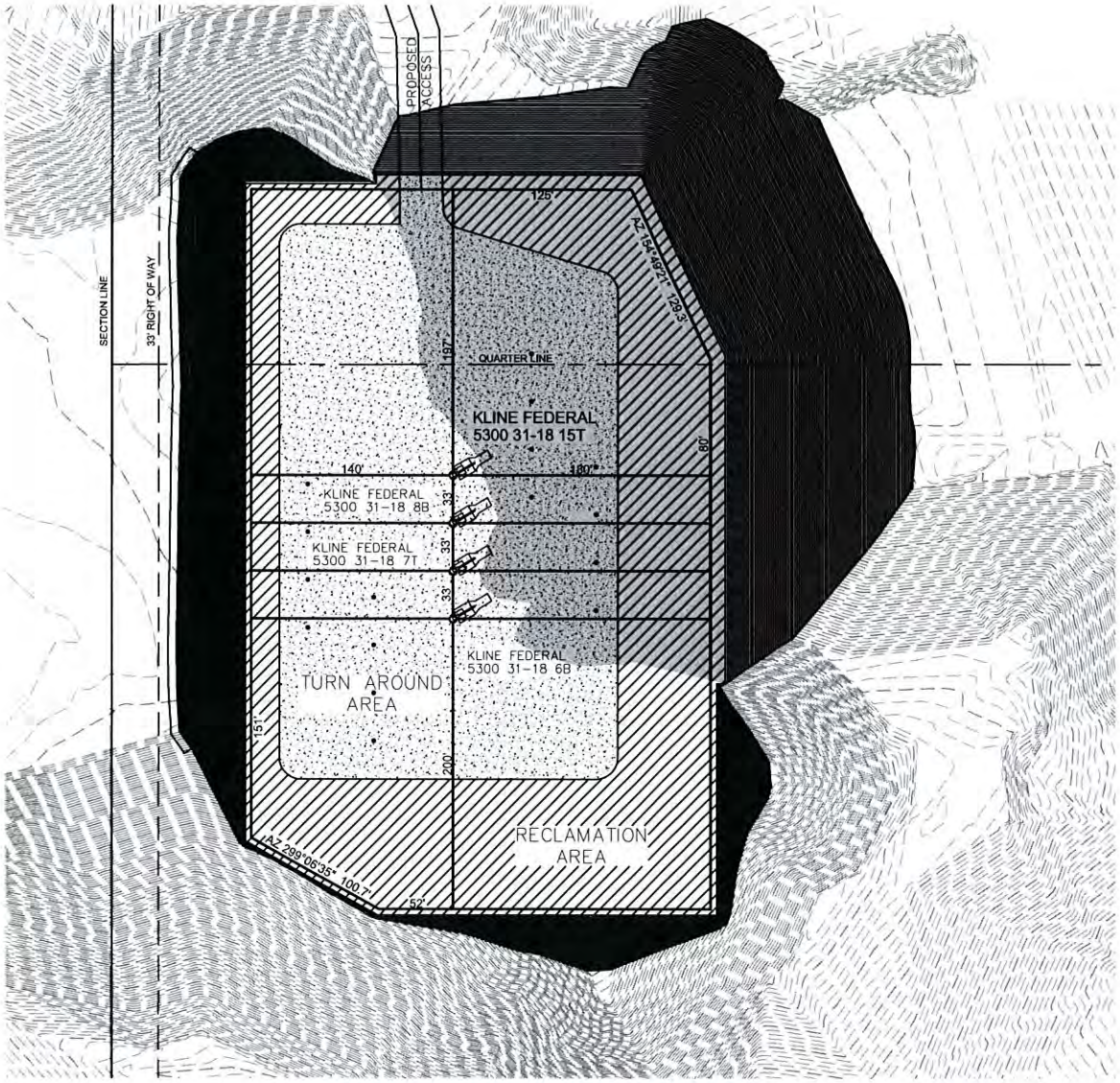
OASIS PETROLEUM NORTH AMERICA, LLC
PAD LAYOUT
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-109.05
Checked By: D.D.K. Date: JAN. 2015

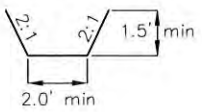
Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

WELL LAYOUT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA



V-DITCH DETAIL



Proposed Contours — BERM

Original Contours — DITCH

0 80
1" = 80'

NOTE: All utilities shown are preliminary only, a complete utilities location is recommended before construction.

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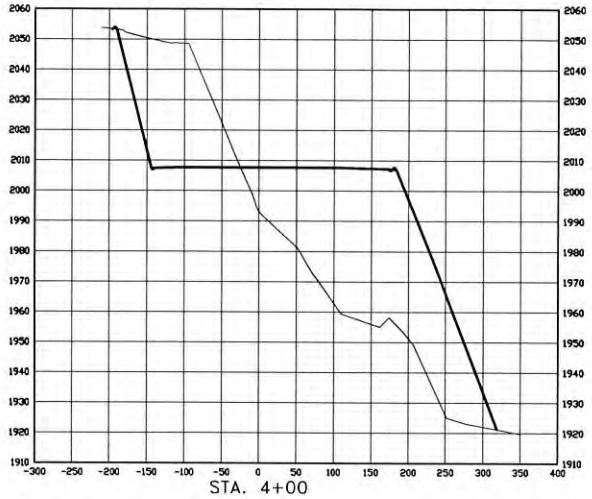
OASIS PETROLEUM NORTH AMERICA, LLC
WELL LAYOUT
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

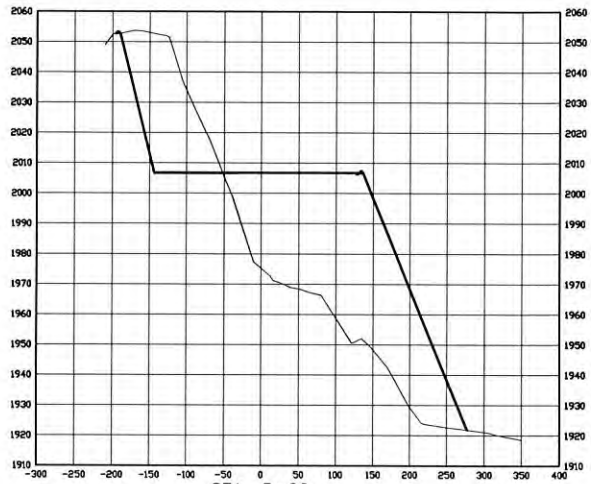
Drawn By: B.H.H. | Project No.: S14-09-109.05
Checked By: D.D.K. | Date: JAN. 2015

Revision No.	Date	By	Description
REV 1	2/2/15	BHH	UPDATED ACCESS

CROSS SECTIONS

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA


STA. 4+00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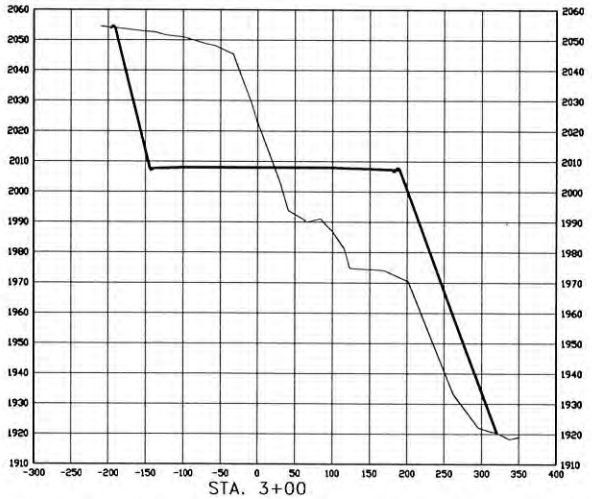
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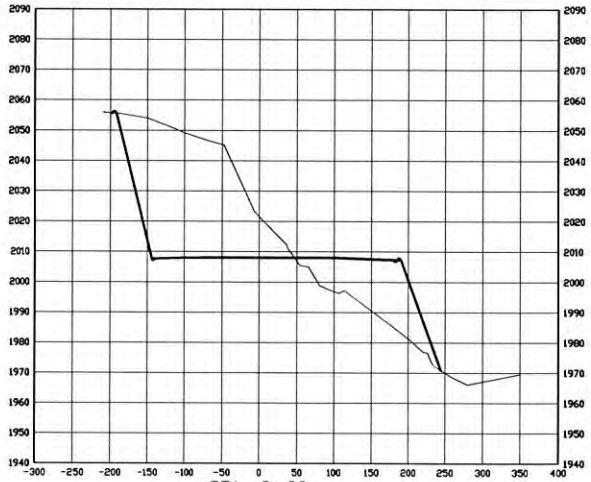
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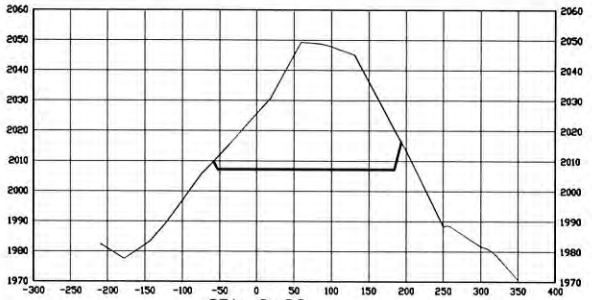
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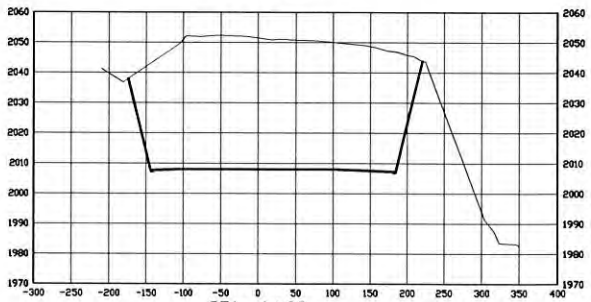
STA. 1+00

REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

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SCALE
HORIZ 1"=160'
VERT 1"=40'

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Other offices in Minnesota, North Dakota and South Dakota

OASIS PETROLEUM NORTH AMERICA, LLC
CROSS SECTIONS
SECTION 18, T153N, R100W
MKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. | Project No.: S14-09-109.05
Checked By: D.D.K. | Date: JAN. 2015

Revision No.	Date	By	Description
REV 1	2/05/15	A.S	UPDATED ACCESS ROAD ROUTE

WELL LOCATION SITE QUANTITIES

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA

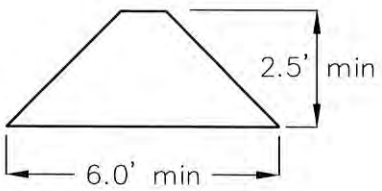
WELL SITE ELEVATION	2022.9
WELL PAD ELEVATION	2008.0

EXCAVATION	146,179
PLUS PIT	0
	146,179
EMBANKMENT	113,287
PLUS SHRINKAGE (25%)	28,322
	141,609
STOCKPILE PIT	0
STOCKPILE TOP SOIL (6")	4,701
BERMS	1,076 LF = 349 CY
DITCHES	1,350 LF = 207 CY
CONTAINMENT AREA	1,238 CY
STOCKPILE MATERIAL	965
DISTURBED AREA FROM PAD	5.83 ACRES

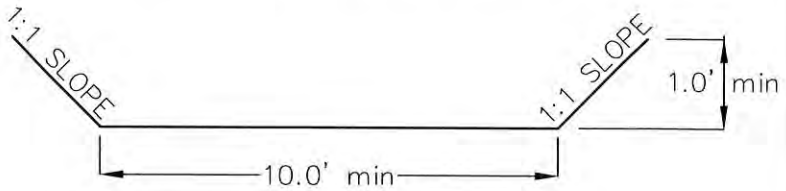
NOTE: ALL QUANTITIES ARE IN CUBIC YARDS (UNLESS NOTED)
CUT END SLOPES AT 1:1
FILL END SLOPES AT 1.5:1

WELL SITE LOCATION
2556' FSL
238' FWL

BERM DETAIL



DIVERSION DITCH DETAIL



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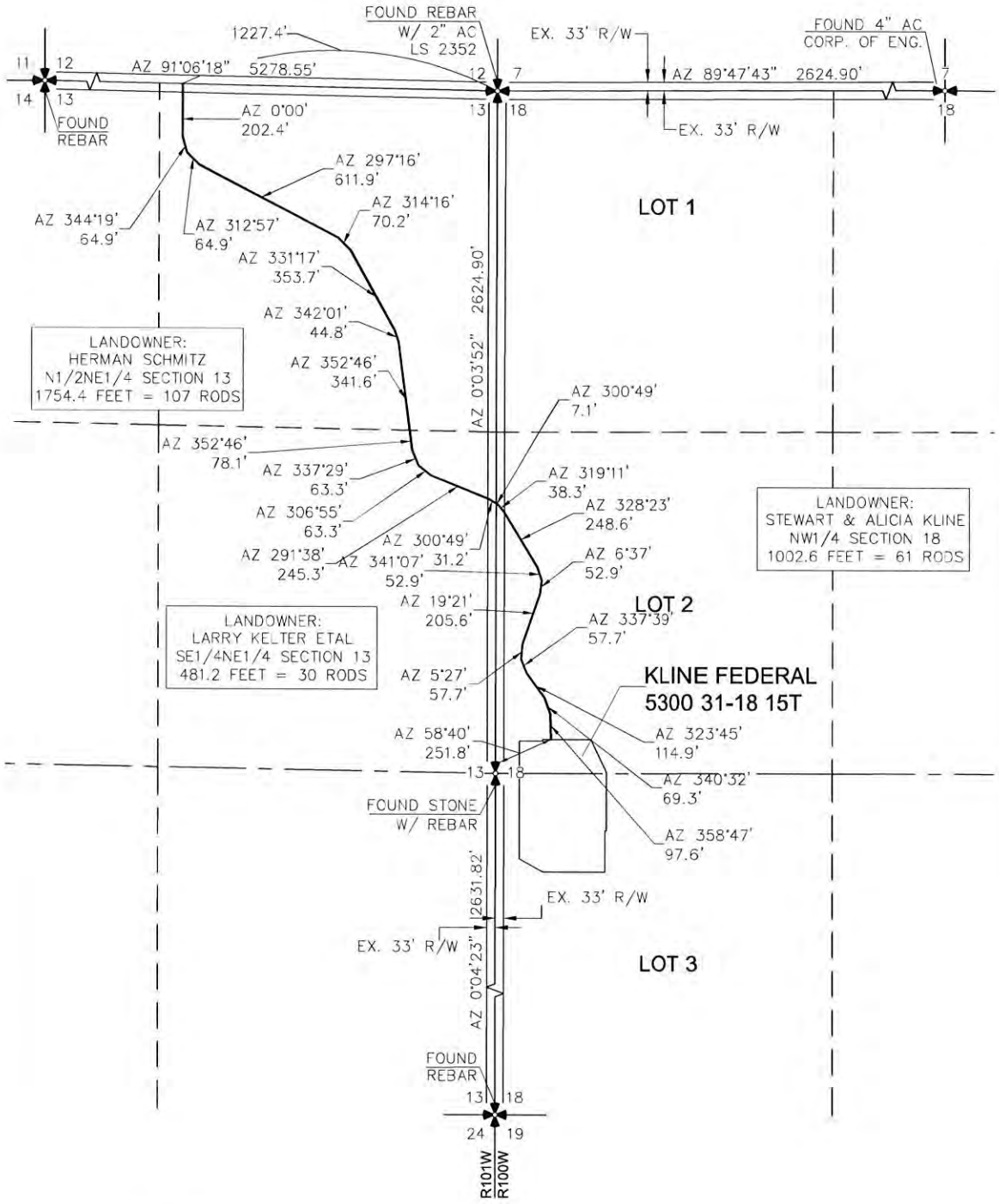
OASIS PETROLEUM NORTH AMERICA, LLC
QUANTITIES
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. | Project No.: S14-09-109.05
Checked By: D.D.K. | Date: JAN. 2015

Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

ACCESS APPROACH

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 2/05/15
NORTH DAKOTA

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NOTE: All utilities shown are preliminary only, a complete utilities location is recommended before construction.

0 500
1" = 500'

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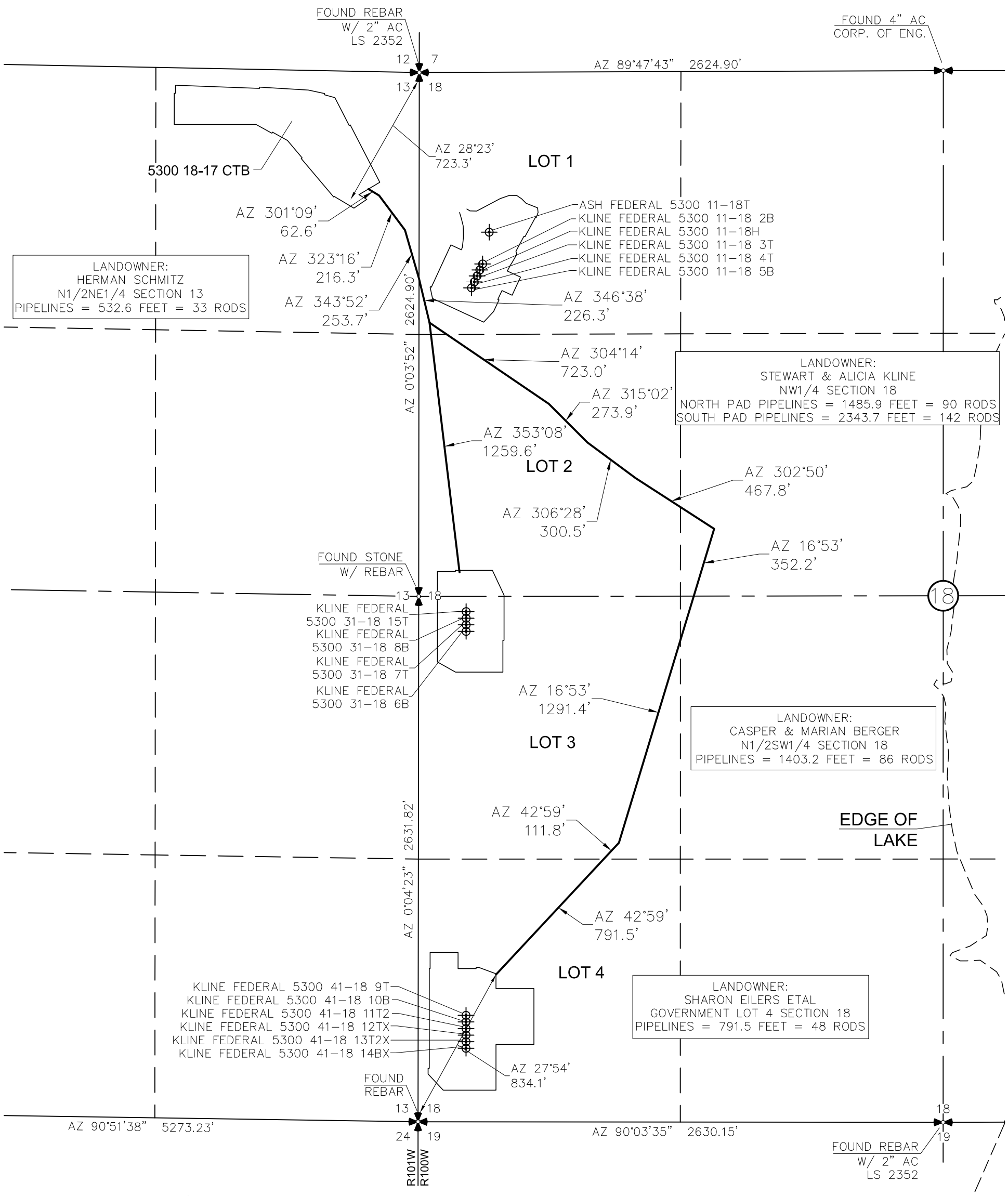
OASIS PETROLEUM NORTH AMERICA, LLC
ACCESS APPROACH
SECTION 18, T153N, R100W
MKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-109.06
Checked By: D.D.K. Date: JAN. 2015

Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

AS-STAKED FLOWLINES

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA



REGISTERED LAND SURVEYOR
DARYL D.
KASEMAN
LS-3880
DATE: 2/2/15
NORTH DAKOTA

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0 500
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OASIS PETROLEUM NORTH AMERICA, LLC
AS-STAKED FLOWLINES
SECTION 18, T153N, R100W

MCKENZIE COUNTY, NORTH DAKOTA

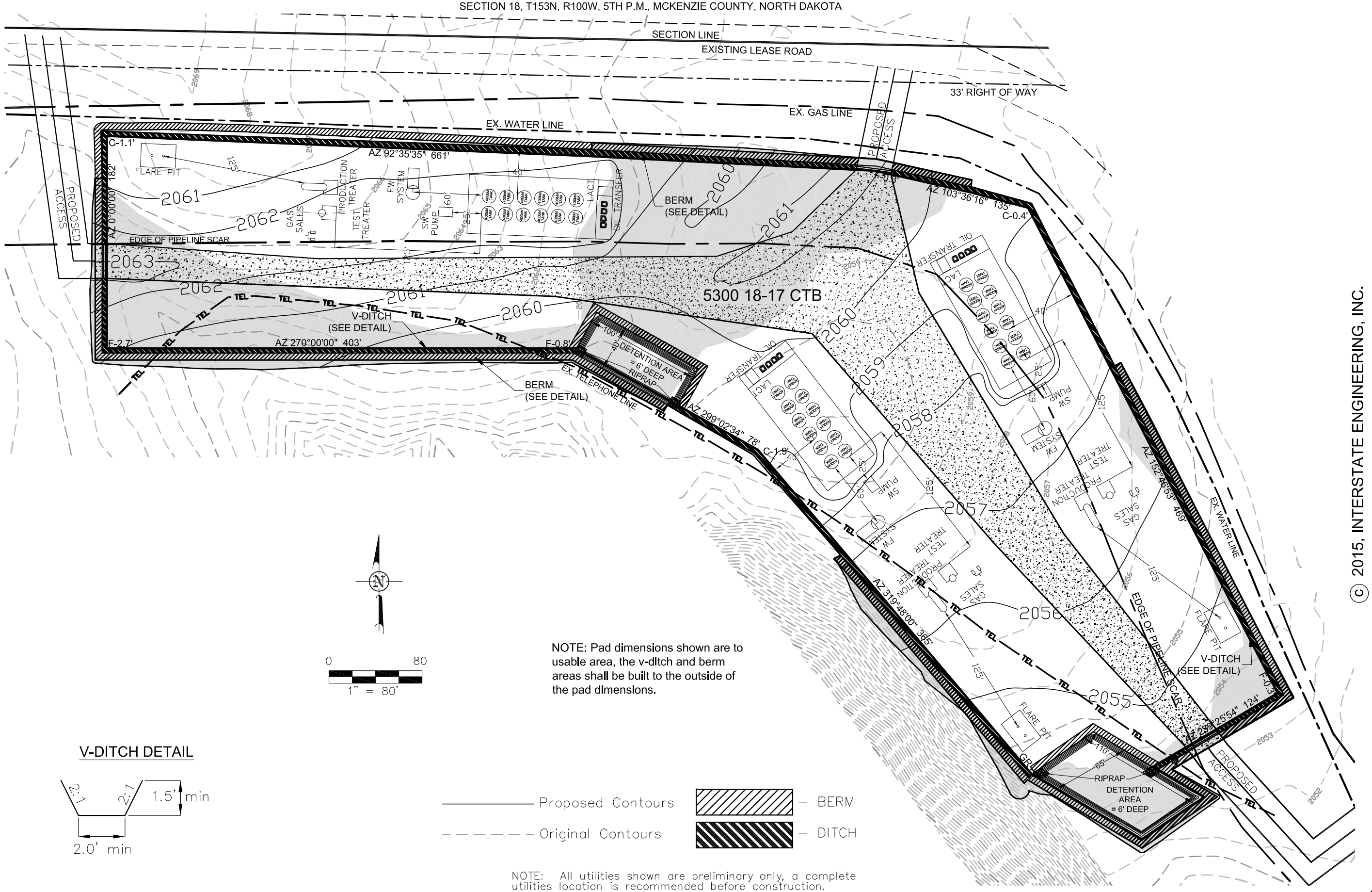
Drawn By: B.H.H.	Project No.: S14-09-109.05
Checked By: D.D.K.	Date: JAN. 2015

Revision No.	Date	By	Description
REV 1	2/2/15	BHH	UPDATED ACCESS

S:\CAD\Kline Federal 5300 31-18 15T\Kline Federal 5300 31-18 15T BLM Plats Revised 2-2-15.dwg - 2/3/2015 9:20 AM josh schmierer

CENTRAL TANK BATTERY

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA



NOTE: Pad dimensions shown are to usable area, the v-ditch and berm areas shall be built to the outside of the pad dimensions.

V-DITCH DETAIL

Proposed Contours — BERM
Original Contours — DITCH

NOTE: All utilities shown are preliminary only, a complete utilities location is recommended before construction.

Revision No.	Date	By	Description
REV 1	2/2/15	BHH	UPDATED ACCESS

OASIS PETROLEUM NORTH AMERICA, LLC
CENTRAL TANK BATTERY
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-109.05
Checked By: D.D.K. Date: JAN. 2015

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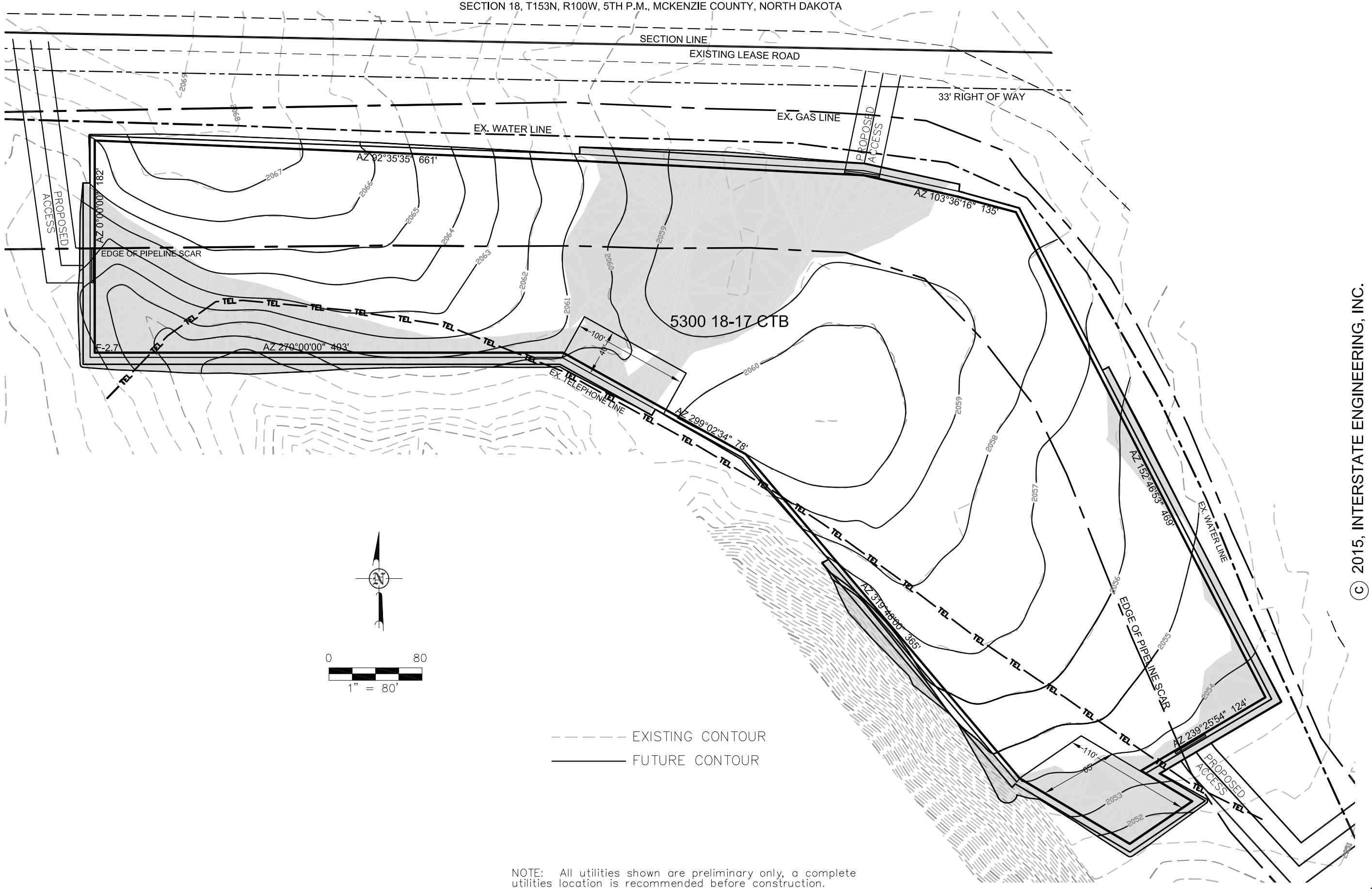
CENTRAL TANK BATTERY FINAL RECLAMATION

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA



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Revision No.	Date	By	Description
REV 1	2/2/15	BHH	UPDATED ACCESS

OASIS PETROLEUM NORTH AMERICA, LLC
CENTRAL TANK BATTERY FINAL RELCAMATION
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-109.05
Checked By: D.D.K. Date: JAN. 2015

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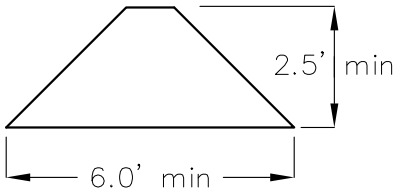
CENTRAL TANK BATTERY QUANTITIES

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"KLINE FEDERAL 5300 31-18 15T"
2556 FEET FROM SOUTH LINE AND 238 FEET FROM WEST LINE
SECTION 18, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA

EXCAVATION	9,280
PLUS PIT	0
	9,280
EMBANKMENT	3,866
PLUS SHRINKAGE (30%)	1,160
	5,026
STOCKPILE PIT	0
STOCKPILE TOP SOIL (6")	5,131
BERMS	2,696 LF = 874 CY
DITCHES	2,441 LF = 374 CY
DETENTION AREA	1,490 CY
STOCKPILE MATERIAL	678
DISTURBED AREA FROM PAD	6.36 ACRES

NOTE: ALL QUANTITIES ARE IN CUBIC YARDS (UNLESS NOTED)
CUT END SLOPES AT 1:1
FILL END SLOPES AT 1.5:1

BERM DETAIL



DIVERSION DITCH DETAIL

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CENTRAL TANK BATTERY QUANTITIES
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. Project No.: S14-09-109.05
Checked By: D.D.K. Date: JAN. 2015

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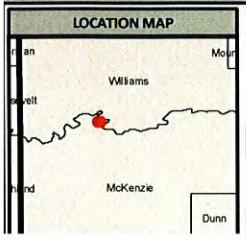
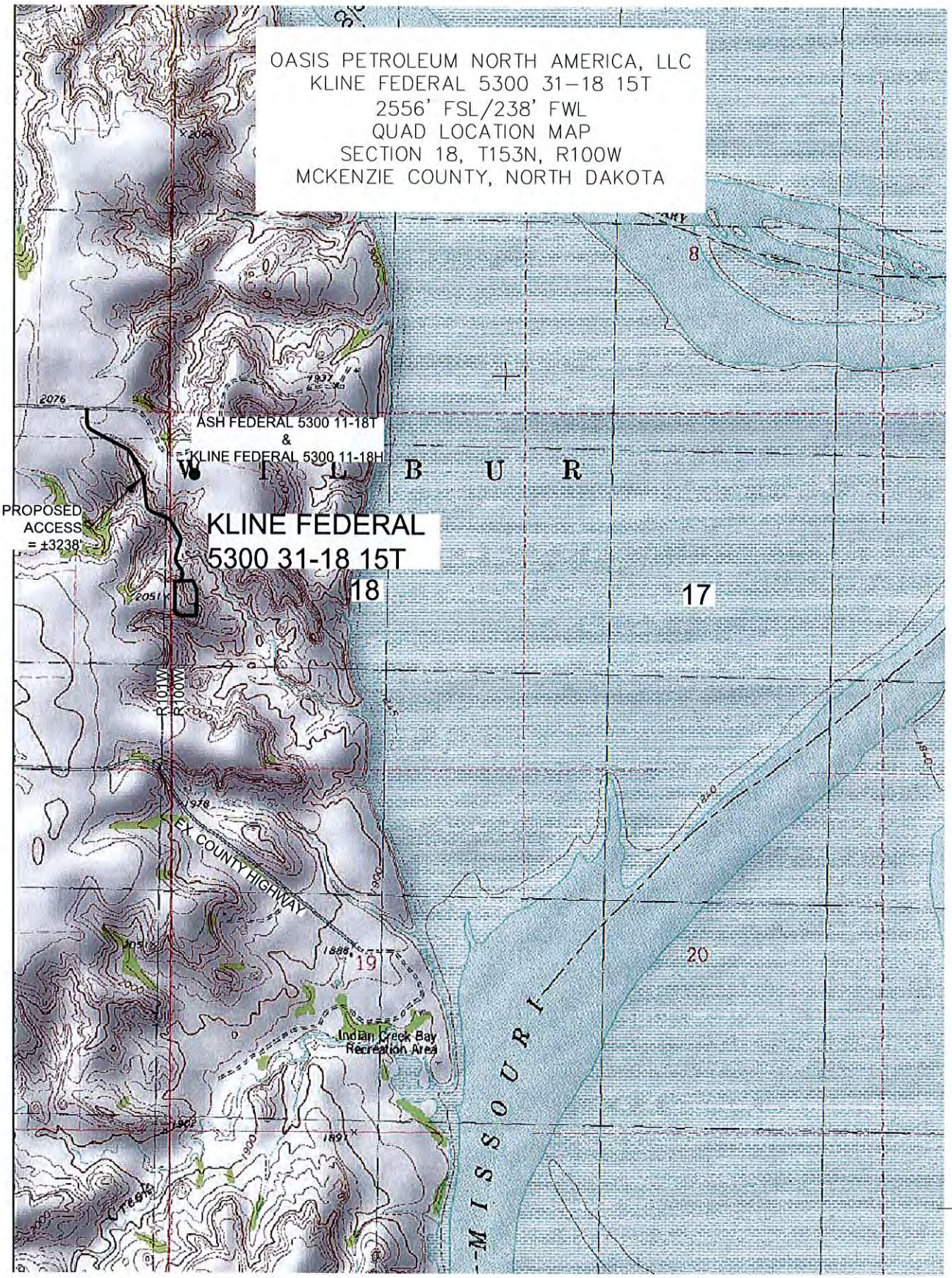
REV 1	2/2/15	BHH	UPDATED ACCESS



Pad (approx)
Proposed Well
Pad Buffers

KLINE FEDERAL 5300 31-18 15T
153N - 100W, Section 18
McKenzie County, ND

OASIS PETROLEUM



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OASIS PETROLEUM NORTH AMERICA, LLC
QUAD LOCATION MAP
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. | Project No.: S14-09-109.05
Checked By: D.D.K. | Date: JAN. 2015

Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE

COUNTY ROAD MAP

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
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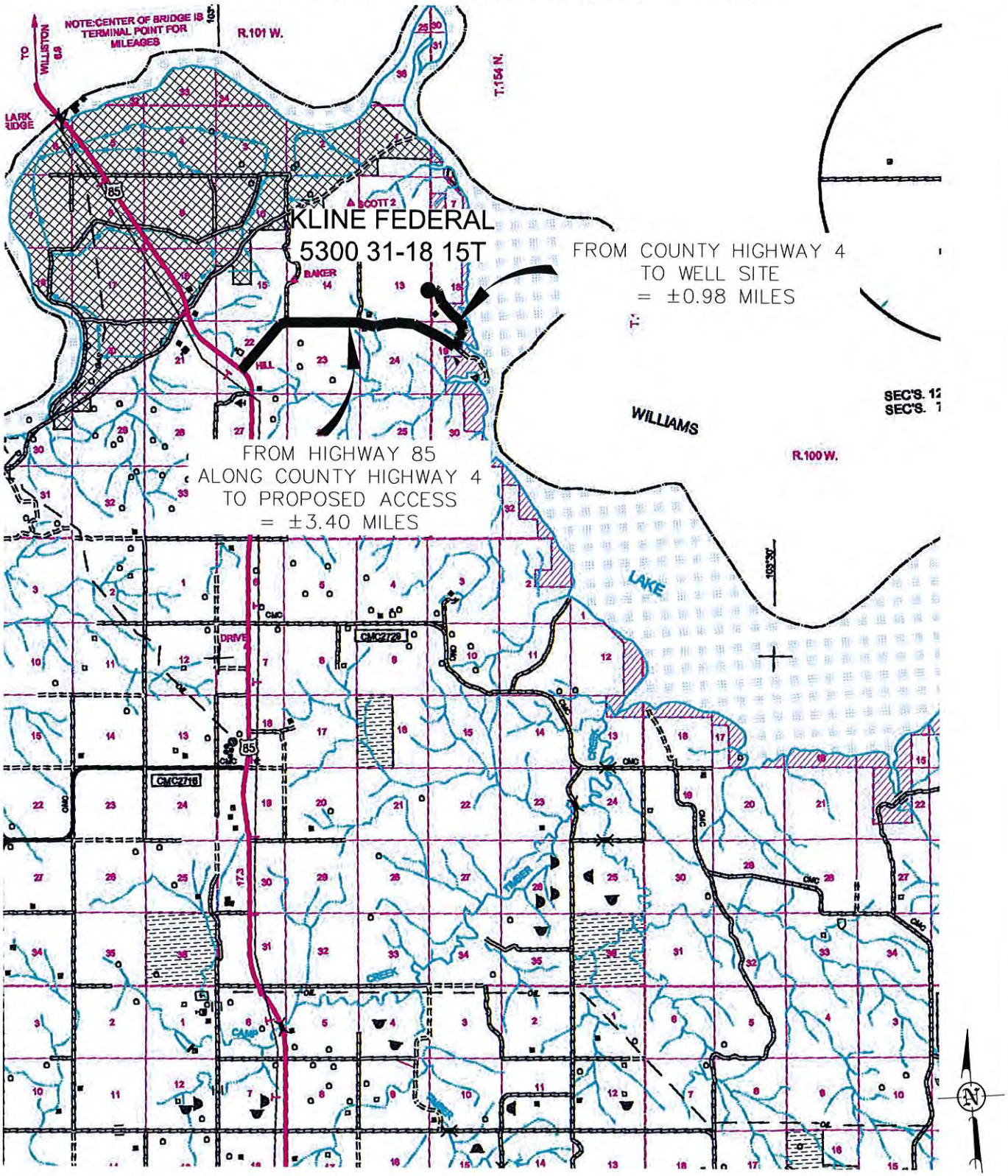

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SCALE: 1" = 2 MILE

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OASIS PETROLEUM NORTH AMERICA, LLC
COUNTY ROAD MAP
SECTION 18, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: B.H.H. | Project No.: S14-09-109.05
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Revision No.	Date	By	Description
REV 1	2/05/15	JJS	UPDATED ACCESS ROAD ROUTE