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)

MAR 2015 RECEIVED ND OIL & GAS DIVISION

Well File No. **28342**

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: **February 4, 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
- [ ] Spill Report
- [ ] Redrilling or Repair
- [ ] Shooting
- [ ] Casing or Liner
- [ ] Acidizing
- [ ] Plug Well
- [ ] Fracture Treatment
- [ ] Supplemental History
- [ ] Change Production Method
- [ ] Temporarily Abandon
- [ ] Reclamation
- [x] Other **Well on pump**

Well Name and Number					
Chalmers 5301 44-24 2TR					
Footages	Qtr-Qtr	Section	Township	Range	
959 F S L 245 F E L	**SESE**	**24**	**153 N**	**101 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 2/4/2015 the above referenced well is on pump.

End of Tubing: 2-7/8" L-80 tubing @ 9933'

Pump: 2-1/2" x 2.0" x 24' insert pump @ 9691'

Company		Telephone Number
Oasis Petroleum North America LLC		**281 404-9652**
Address		
1001 Fannin, Suite 1500		
City	State	Zip Code
Houston	**TX**	**77002**
Signature	Printed Name	
	Victoria Siemieniewski	
Title	Date	
Regulatory Specialist	**March 19, 2015**	
Email Address		
vsiemieniewski@oasispetroleum.com		

FOR STATE USE ONLY

[x] Received	[ ] Approved
Date	4-1-2015
By	
Title	JARED THUNE Engineering Technician

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)

JAN 2015 RECEIVED ND OIL & GAS DIVISION

Well File No. **28342**

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 **Chalmers 5301 44-24 2TR**			Spacing Unit Description **Sec. 19/20 T153N R101W**
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
959 F **S** L	**245** F **E** L	**SESE**	**24**	**153 N**	**101 W**	**McKenzie**

Spud Date	Date TD Reached	Drilling Contractor and Rig Number	KB Elevation (Ft)	Graded Elevation (Ft)
May 14, 2014	**June 12, 2014**	**Nabors B25**	~~1967~~ 1997	~~1942~~ 1972

Type of Electric and Other Logs Run (See Instructions)
MWD/GR run from KOP to TD; CBL from intermediate 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 5/8**	**0**	**2058**	**17 1/2**	**36**			**592**	**0**
Vertical Hole	**Intermediate**	**9 5/8**	**0**	**5993**	**12 1/4**	**40**			**974**	**3620**
Vertical Hole	**Production**	**7**	**0**	**11043**	**8 3/4**	**29/32**			**794**	**3600**
Lateral1	**Liner**	**4 1/2"**	**10250**	**20883**	**6**	**13.5**			**580**	

PERFORATION & OPEN HOLE INTERVALS

Well Bore	Well Bore TD Drillers Depth (MD Ft)	Completion Type	Open Hole/Perforated Interval (MD,Ft) Top	Open Hole/Perforated Interval (MD,Ft) Bottom	Kick-off Point (MD Ft)	Top of Casing Window (MD Ft)	Date Perf'd or Drilled	Date Isolated	Isolation Method	Sacks Cement
Lateral1	~~20883~~	**Perforations**	**11214**	~~20883~~	**10150**		**10/31/2014**			
	11374			11374						
ST 1	12987		11312	12987						
ST 2	20904		12704	20904						

PRODUCTION

Current Producing Open Hole or Perforated Interval(s), This Completion, Top and Bottom, (MD Ft) **Lateral 1- 11043' to 20883**							Name of Zone (If Different from Pool Name)
Date Well Completed (SEE INSTRUCTIONS) **December 18, 2014**		Producing Method **Flowing**	Pumping-Size & Type of Pump				Well Status (Producing or Shut-In) **Producing**
Date of Test **12/29/2014**	Hours Tested **24**	Choke Size **40 /64**	Production for Test	Oil (Bbls) **951**	Gas (MCF) **640**	Water (Bbls) **2231**	Oil Gravity-API (Corr.) °	Disposition of Gas **Sold**
Flowing Tubing Pressure (PSI)	Flowing Casing Pressure (PSI) **1575**		Calculated 24-Hour Rate	Oil (Bbls) **951**	Gas (MCF) **640**	Water (Bbls) **2231**	Gas-Oil Ratio **672**

GEOLOGICAL MARKERS

Formation	MD (Ft)	TVD (Ft)
Dakota	5344	5344
Kibbey Lime	8265	8265
First Charles Salt	8430	8430
UB	8983	8983
Base Last Salt	9064	9064
Ratcliffe	9111	9111
Mission Canyon	9288	9288
Lodgepole	9847	9847
False Bakken	10641	10641
Scallion		
Upper Bakken	10658	10585
Middle Bakken	10689	10602
Lower Target	10785	10644
Pronghorn	10821	10655
Three Forks	10906	10674

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
10/31/2014	Three Forks	11043	20883	36	207943	Barrels

Type Treatment	Acid %	Lbs Proppant	Maximum Treatment Pressure (PSI)	Maximum Treatment Rate (BBLS/Min)
Sand Frac		3775876	9936	73.0

Details
40/70 Ceramic: 1461677
30/50 Ceramic: 2271618
40/70 White: 42581

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	01/14/2015
Signature	Printed Name	Title
	Jennifer Swenson	Regulatory Assistant

Industrial Commission of North Dakota
Oil and Gas Division
Verbal Approval To Purchase and Transport Oil

Well or Facility No **28342**

Tight Hole **No**

OPERATOR

Operator	Representative	Rep Phone
OASIS PETROLEUM NORTH AMERICA LL	**Kelly Johnson**	**(701) 580-0524**

WELL INFORMATION

Well Name
CHALMERS 5301 44-24 2TR

Inspector
Richard Dunn

Well Location	QQ	Sec	Twp		Rng	
	SESE	**24**	**153**	**N**	**101**	**W**

County
MCKENZIE

Field
BAKER

Footages
959 Feet From the **S** Line
245 Feet From the **E** Line

Pool
BAKKEN

Date of First Production Through Permanent Wellhead **12/18/2014** **This Is Not The First Sales**

PURCHASER / TRANSPORTER

Purchaser	Transporter
OASIS PETROLEUM MARKETING LLC	**HILAND CRUDE, LLC**

TANK BATTERY

Central Tank Battery Number :

SALES INFORMATION **This Is Not The First Sales**

ESTIMATED BARRELS TO BE SOLD	ACTUAL BARRELS SOLD	DATE
5000 BBLS	**191** BBLS	**12/18/2014**
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	
BBLS	BBLS	

DETAILS

Start Date	**12/18/2014**
Date Approved	**12/18/2014**
Approved By	**Jessica Gilkey**

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)

DEC 2014 RECEIVED ND OIL & GAS DIVISION

Well File No.
28342
NDIC CTB No.
220407

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

Well Name and Number	Qtr-Qtr	Section	Township	Range	County
CHALMERS 5301 44-24 2TR	SESE	24	153	101	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%	December 18, 2014

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%	December 18, 2014

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
Prairie Field Services, LLC	25%	December 18, 2014
Other Transporters Transporting From This Lease	% Transported	Date Effective
		December 18, 2014

Comments

I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.		Date
		December 22, 2014
Signature	Printed Name	Title
	Brianna Salinas	Marketing Assistant

Above Signature Witnessed By:

Signature	Printed Name	Title
	Dina Barron	Mktg. Contracts Administrator

FOR STATE USE ONLY

Date Approved	JAN 23 2015
By	
Title	Oil & Gas Production Analyst

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)

NOV 2014 RECEIVED ND OIL & GAS DIVISION

Well File No. **28342**

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

- [x] Notice of Intent — Approximate Start Date: **October 31, 2014**
- [ ] 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
- [ ] Spill Report
- [ ] Redrilling or Repair
- [ ] Shooting
- [ ] 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					
Chalmers 5301 44-24 2TR					
Footages	Qtr-Qtr	Section	Township	Range	
959 F S L 245 F E L	**SESE**	**24**	**153 N**	**101 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		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 Assistant	**October 31, 2014**	
Email Address		
jswenson@oasispetroleum.com		

FOR STATE USE ONLY

- [ ] Received
- [x] Approved

Date: November 5, 2014

By: [signature]

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)

OCT 2014 RECEIVED ND OIL & GAS DIVISION

CTB
~~Well File~~ No. 22040 7-01

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

☑ Notice of Intent	Approximate Start Date **October 15, 2014**	☐ 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	**Central production facility-commingle prod**

Well Name and Number				
(see details)				
Footages F L F L	Qtr-Qtr	Section **20**	Township **153 N**	Range **100 W**
Field	Pool **Bakken**	County **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 approval to commingle oil and gas in a central production facility known as: 5300 19-20 CTB 2 with common ownership for the following wells:

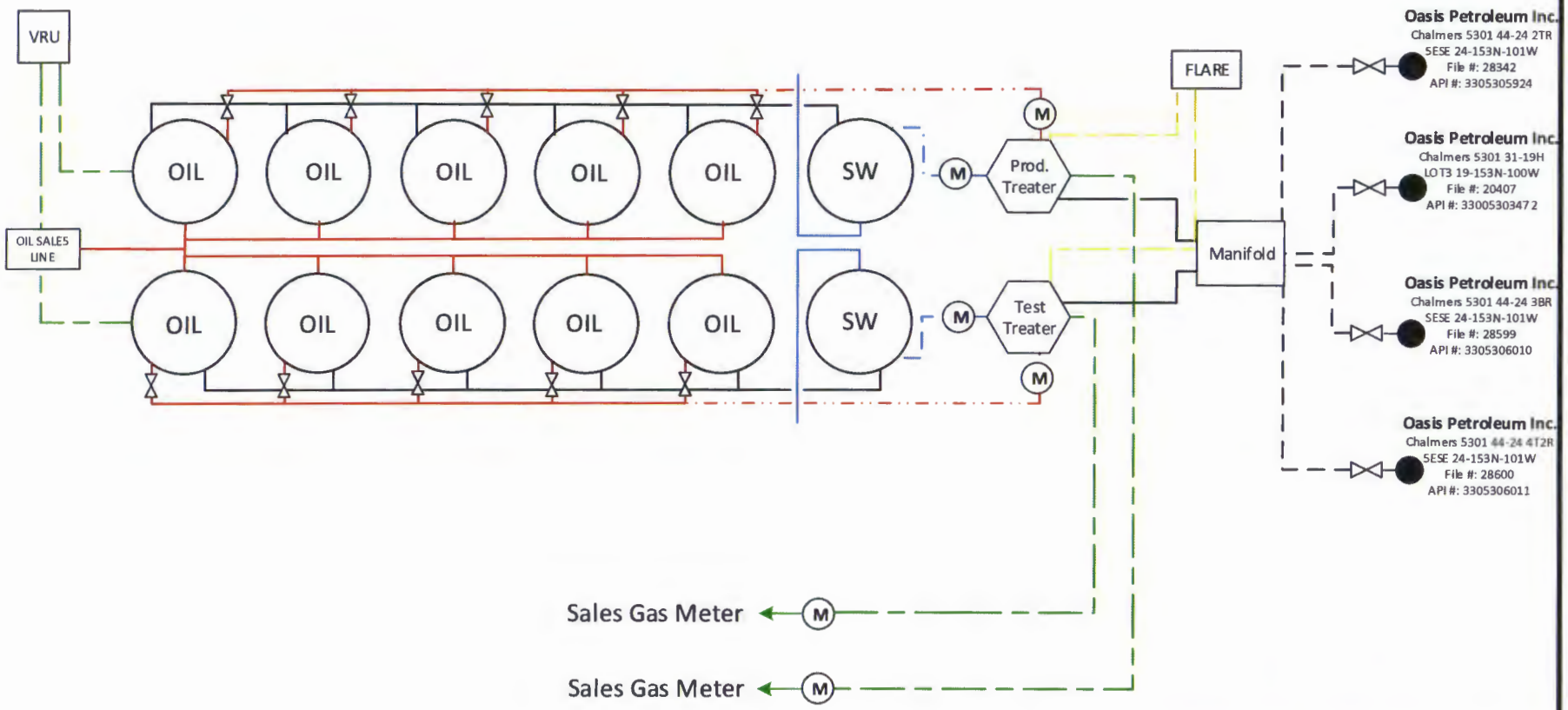
Well File #28342 Chalmes 5301 44-24 2TR SESE Sec 24-153N-R101W API 3305305924
Well File #20407 Chalmers 5301 31-19H LOT3 Sec 19-153N-101W API 33005303472
Well File #28599 Chalmers 5301 44-24 3BR SESE Sec 24 153N-101W API 3305306010
Well File #28600 Chalmers 5301 44-24 4T2R SESE Sec 21 153N-101W API 3305306011

Please find the following attachments:
1. A schematic drawing of the facility which diagrms the testing, treating, routing, and transferring of production. 2. A plat showing the location of the central facility 3. Affidavit of title indicating common ownership.Oasis will allocate production measured at the central production facility to the various wells on the basis of isolated production tests utilizing oil, gas and water meters on a test seperator at the central production facility. Oasis will measure the production from each well separately each month for a minimum of three days. Oasis believes that such allocation will result in an accurate determination of production from each well. Tank vapor gas is being recovered and burned by a 98% DRE enclosed combuster

Company **Oasis Petroleum North America LLC**		Telephone Number **281-404-9591**
Address **1001 Fannin, Suite 1500**		
City **Houston**	State **TX**	Zip Code **77002**
Signature Chelsea Covington	Printed Name **Chelsea Covington**	
Title **Regulatory Assistant**	Date **October 13, 2014**	
Email Address **ccovington@oasispetroleum.com**		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date 10-17-2014	
By David Tabor	
Title PETROLEUM ENGINEER	



OASIS PETROLEUM

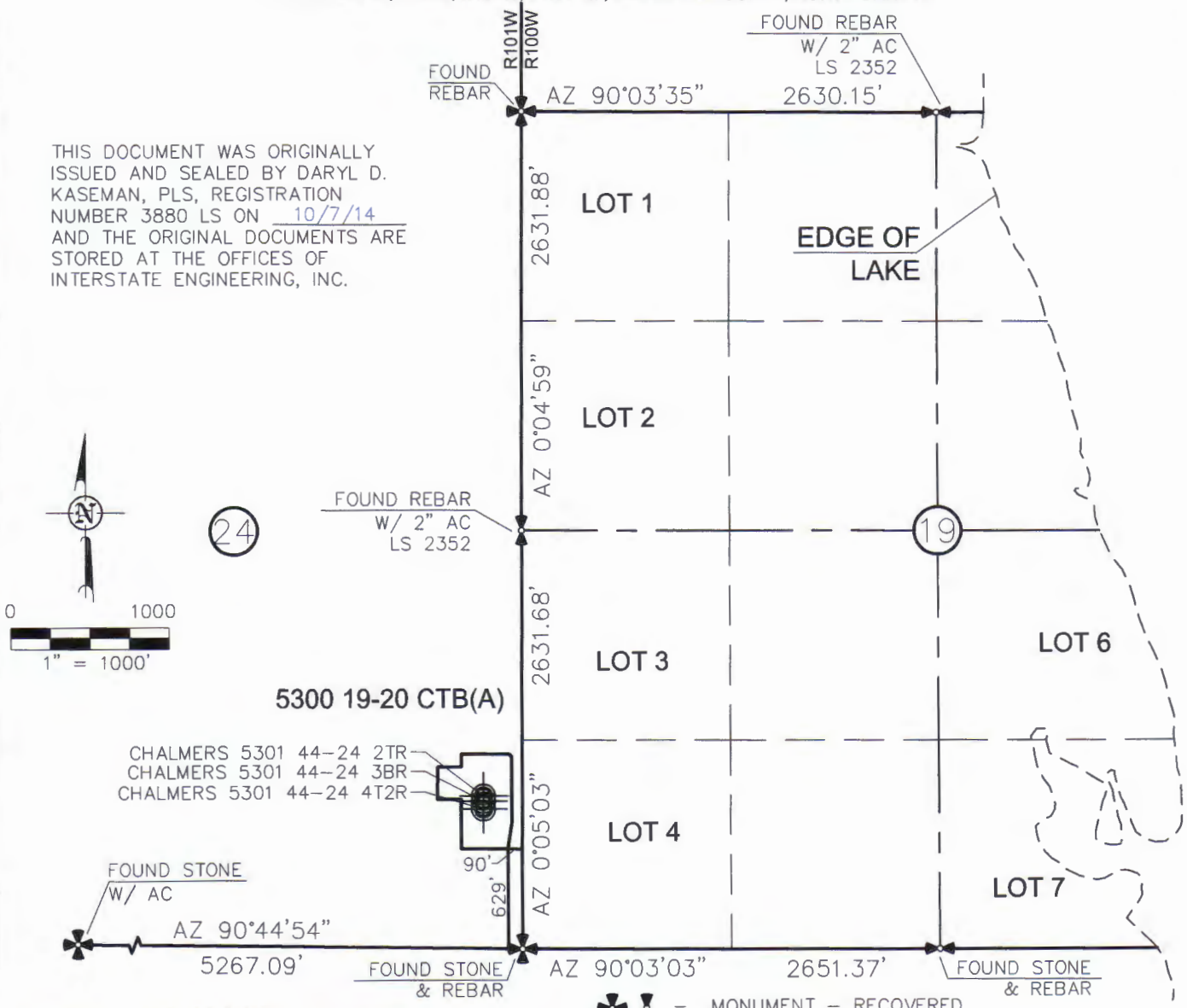
CHALMERS 5300 19-20 CENTRAL TANK BATTERY 2

DATE	REV.	BY	APPR.	SCALE
SEPTEMBER 23, 2014	0	LEE		NA
LOCATION		FIELD		
NORTH DAKOTA		BAKER		

BATTERY LOCATION PLAT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"5300 19-20 CTB(A)"
SECTION 24, T153N, R101W, 5TH P.M., MCKENZIE COUNTY, NORTH DAKOTA

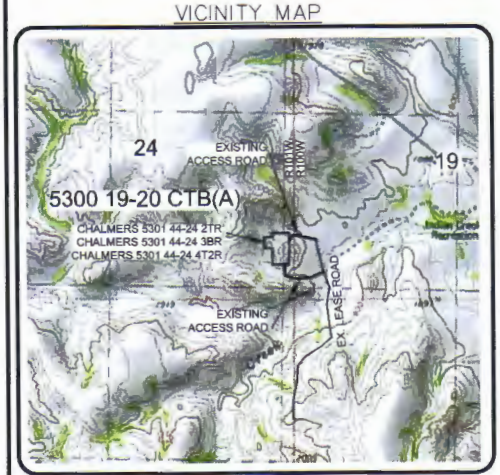
THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 LS ON 10/7/14 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC.



– MONUMENT – RECOVERED

– MONUMENT – NOT RECOVERED

VICINITY MAP



STAKED ON 9/3/2013
VERTICAL CONTROL DATUM WAS BASED UPON GPS CONTROL POINT 16 WITH AN ELEVATION OF 2014.2'

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.

REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 10/7/14
NORTH DAKOTA

DARYL D. KASEMAN LS-3880

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1/5
SHEET NO.

INTERSTATE ENGINEERING
Professionals you need, people you trust

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

OASIS PETROLEUM NORTH AMERICA, LLC
BATTERY LOCATION PLAT
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

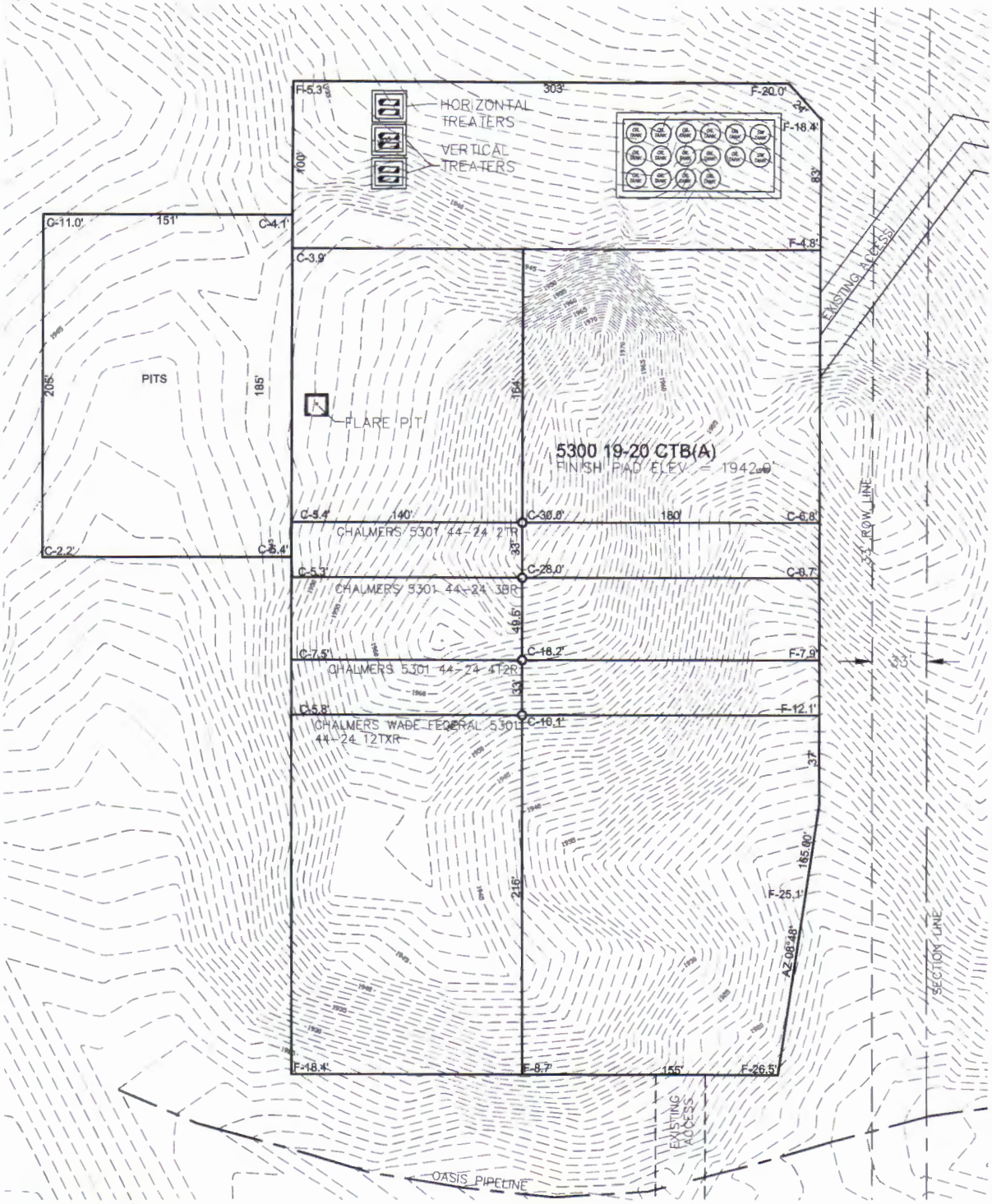
Drawn By:	J.D.M.	Project No.:	S14-09-241
Checked By:	D.D.K.	Date:	OCT. 2014

Revision No.	Date	By	Description

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 ON 10/7/14 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC.

PAD LAYOUT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"5300 19-20 CTB(A)"
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 10/7/14
NORTH DAKOTA

0 60
1" = 60'

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

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2/5
SHEET NO.

INTERSTATE ENGINEERING
Professionals you need, people you trust

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

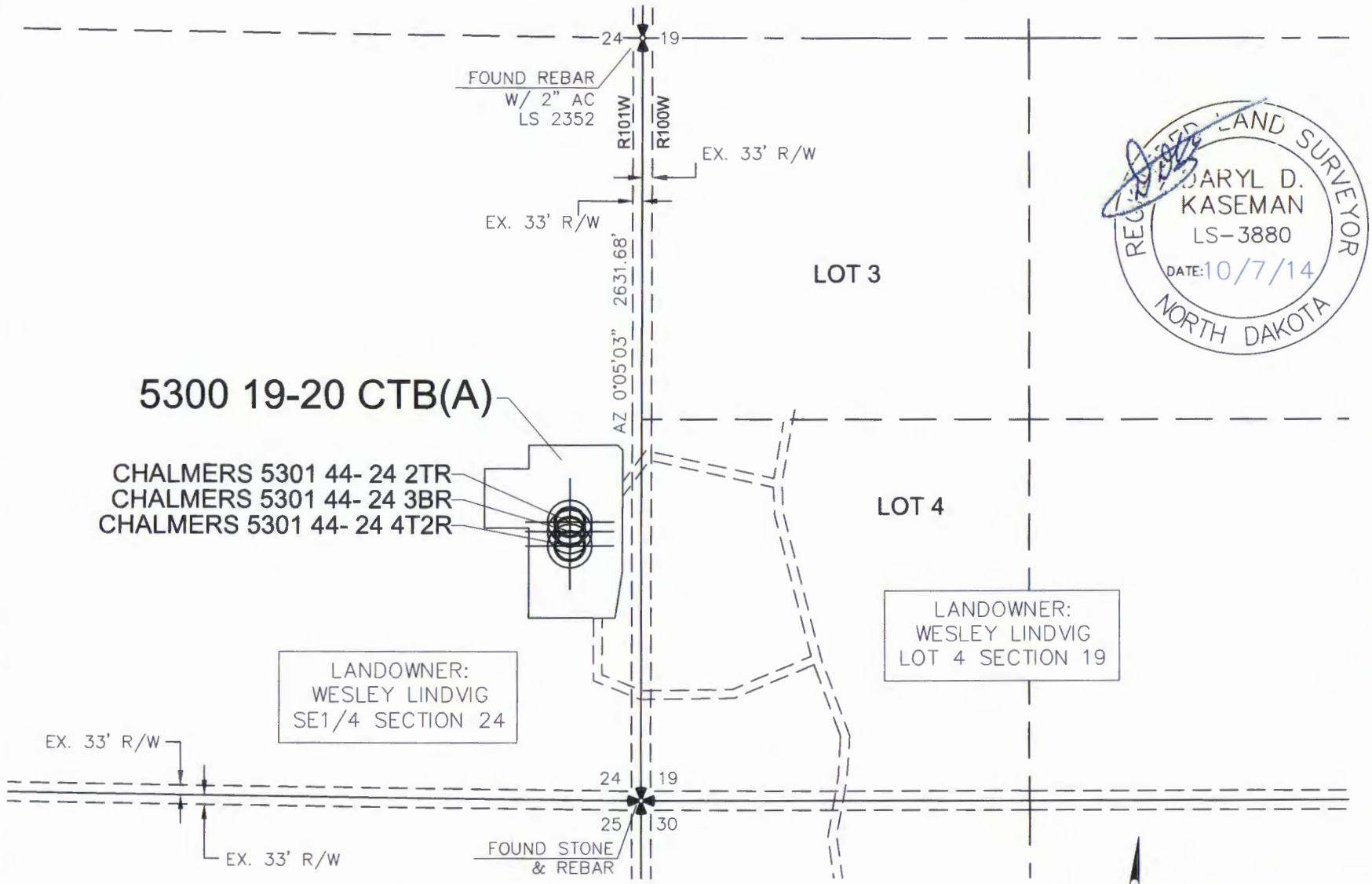
OASIS PETROLEUM NORTH AMERICA, LLC
PAD LAYOUT
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.D.M. | Project No.: S14-09-241
Checked By: D.D.K. | Date: OCT 2014

Revision No.	Date	By	Description

ACCESS APPROACH

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"5300 19-20 CTB(A)"
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



REGISTERED LAND SURVEYOR
DARYL D.
KASEMAN
LS-3880
DATE: 10/7/14
NORTH DAKOTA

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 ON 10/7/14 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC.

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

Revision No.	Date	By	Description

OASIS PETROLEUM NORTH AMERICA, LLC
ACCESS APPROACH
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.D.M. Project No.: S14-09-241
Checked By: D.D.K. Date: OCT. 2014

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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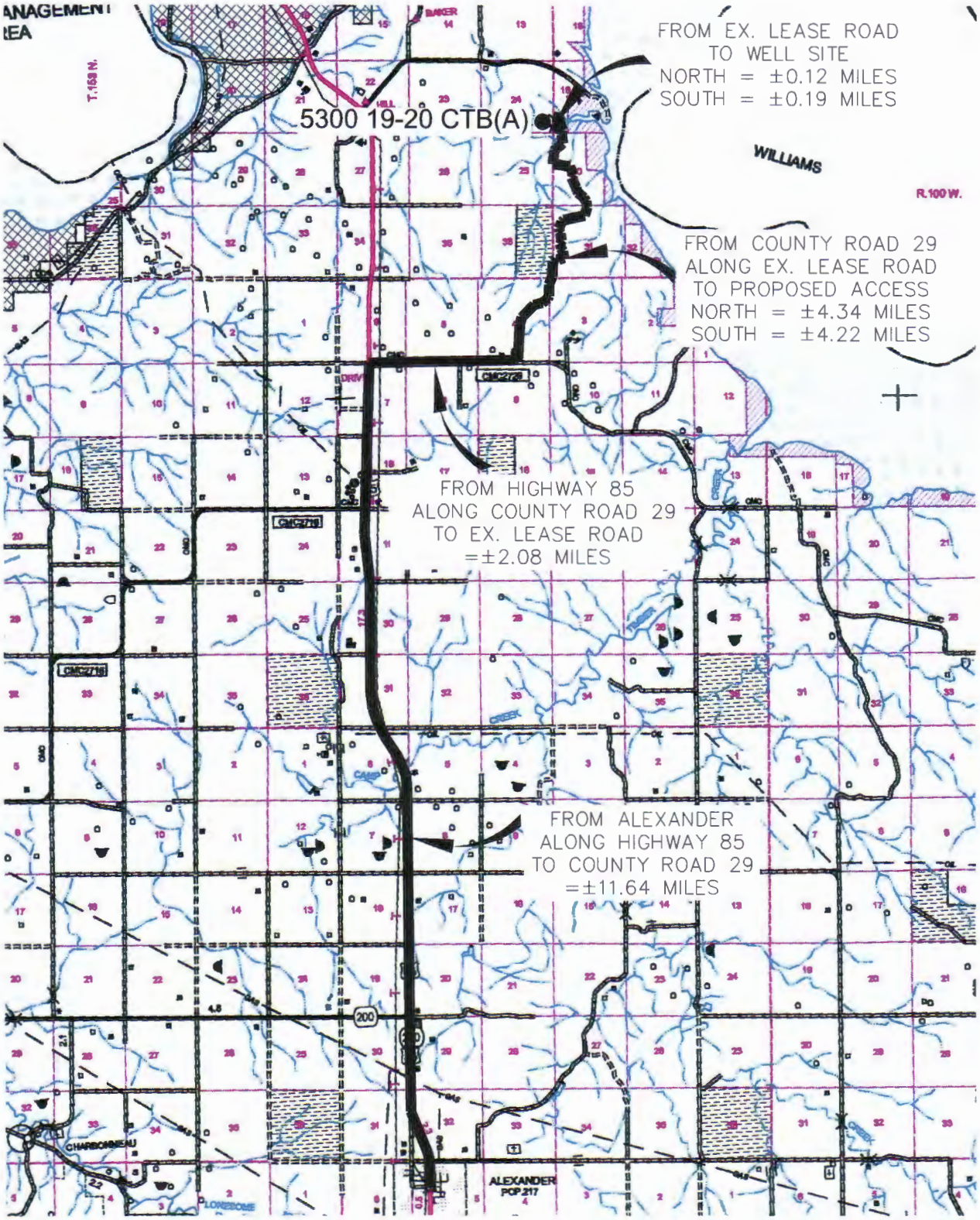
OASIS PETROLEUM NORTH AMERICA, LLC
QUAD LOCATION MAP
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.D.M.	Project No.: S14-09-251		
Checked By: D.D.K.	Date: OCT 2014		

Revision No.	Date	By	Description

COUNTY ROAD MAP

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"5300 19-20 CTB(A)"
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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SCALE: 1" = 2 MILE

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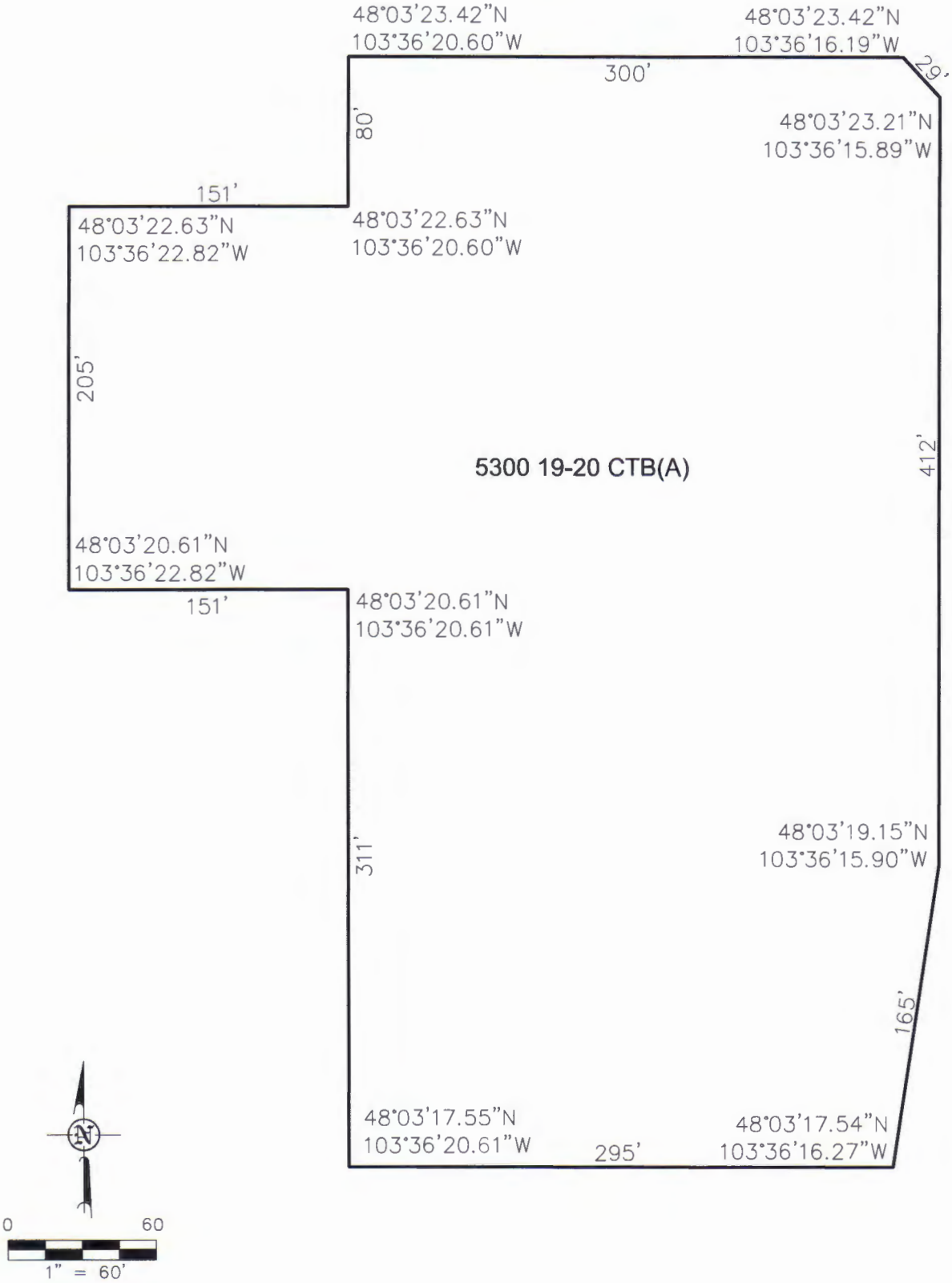
COUNTY ROAD MAP
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By:	J.D.M.	Project No.:	S14-09-241
Checked By:	D.D.K.	Date:	OCT 2014

Revision No.	Date	By	Description

LAT/LONG PAD CORNERS



COMMINGLING AFFIDAVIT

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF WILLIAMS)

The under signed, Alexandra Haley, of lawful age, being first duly sworn on her oath states that she is a duly authorized agent of Oasis Petroleum North America LLC, and that she has personal knowledge of the facts hereinafter set forth to make this Affidavit.

1. Sections 19 & 20, Township 153 North, Range 100 West, Williams County North Dakota constitute a spacing unit in accordance with the applicable orders for the Bakken pool.

2. Three wells have been drilled in the spacing unit, which are known as the Chalmers 5300 44-24 2TR, Chalmers 5300 44-24 3BR, and Chalmers 5300 44-24 4T2R.

3. By NDIC Order 19005 dated May 11, 2012 and recorded in Williams County as Document No. 737164, all oil and gas interest within the aforementioned spacing unit were pooled.

4. All Working Interests, Royalty Interests and Overriding Royalty Interests in the Chalmers 5300 44-24 2TR, Chalmers 5300 44-24 3BR, and Chalmers 5300 44-24 4T2R will be in common.

Dated this 15th day of September, 2014

Alex Haley

Alexandra Haley
Landman

STATE OF TEXAS)
) ss.
COUNTY OF HARRIS)

Subscribed to and sworn before me this 15th day of September, 2014

JEFFREY E. THOMPSON
Notary Public, State of Texas
My Commission Expires
February 14, 2018

Jeffrey E Thompson

Notary Public
State of Texas
My Commission Expires: 2-14-18

Oasis Petroleum North America, LLC

Chalmers 5301 44-24 2TR

959 FSL & 245 FEL

SE SE Section 24, T153N, R101W

Baker Field / Three Forks

McKenzie County, North Dakota

BOTTOM HOLE LOCATION:

68' north & 10,436' east of surface location or approx.

1,027' FSL & 323' FEL, SE SE Section 20, T153N, R100W

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

Prepared by:
Hannah Thatcher, Daniel Haynes
PO Box 80507; Billings, MT 59108
(406) 259-4124
geology@sunburstconsulting.com
www.sunburstconsulting.com

WELL EVALUATION

Chalmers 5301 44-24 2TR

Figure 1: Nabors B25 drilling the Oasis Petroleum North America Chalmers 5301 44-24 2TR during May and June 2014, south of Williston in McKenzie County, North Dakota. (Photos by Hannah Thatcher, wellsite geologist)

INTRODUCTION

The Oasis Petroleum North America, LLC Chalmers 5301 44-24 2TR [SE SE Section 24, T153N, R101W] is located approximately 30 miles south of Williston, North Dakota. The horizontal well was spud on May 09, 2014 and represents a continuation of Oasis Petroleum's development of the Three Forks Formation within Baker Field. The Chalmers 5301 44-24 2TR was planned to drill an approximately 9,985' lateral along a proposed azimuth of 89.61°. The well bore will be enhanced for production by multistage fracture stimulation.

OFFSET CONTROL INFORMATION

The Oasis Chalmers 5300 31-19H [NW SW Sec. 19, T153N, R100W] is located approximately 0.16 miles northeast of the subject well. The Chalmers 5300 31-19H was spud on the first of September 2011. The Missouri Basin Well Lynn 1 was spud on the 27th of April 2004 and is located 1.83 miles northwest [SW NW Sec. 23, T153N, R101W]. The Oasis Petroleum Kline Federal 5300 11-18H [NW NW Sec. 18, T153N, R100W] was spud on the 7th of May 2011 and is located approximately 1.63 miles north of the Chalmers 5301 44-24 2TR.

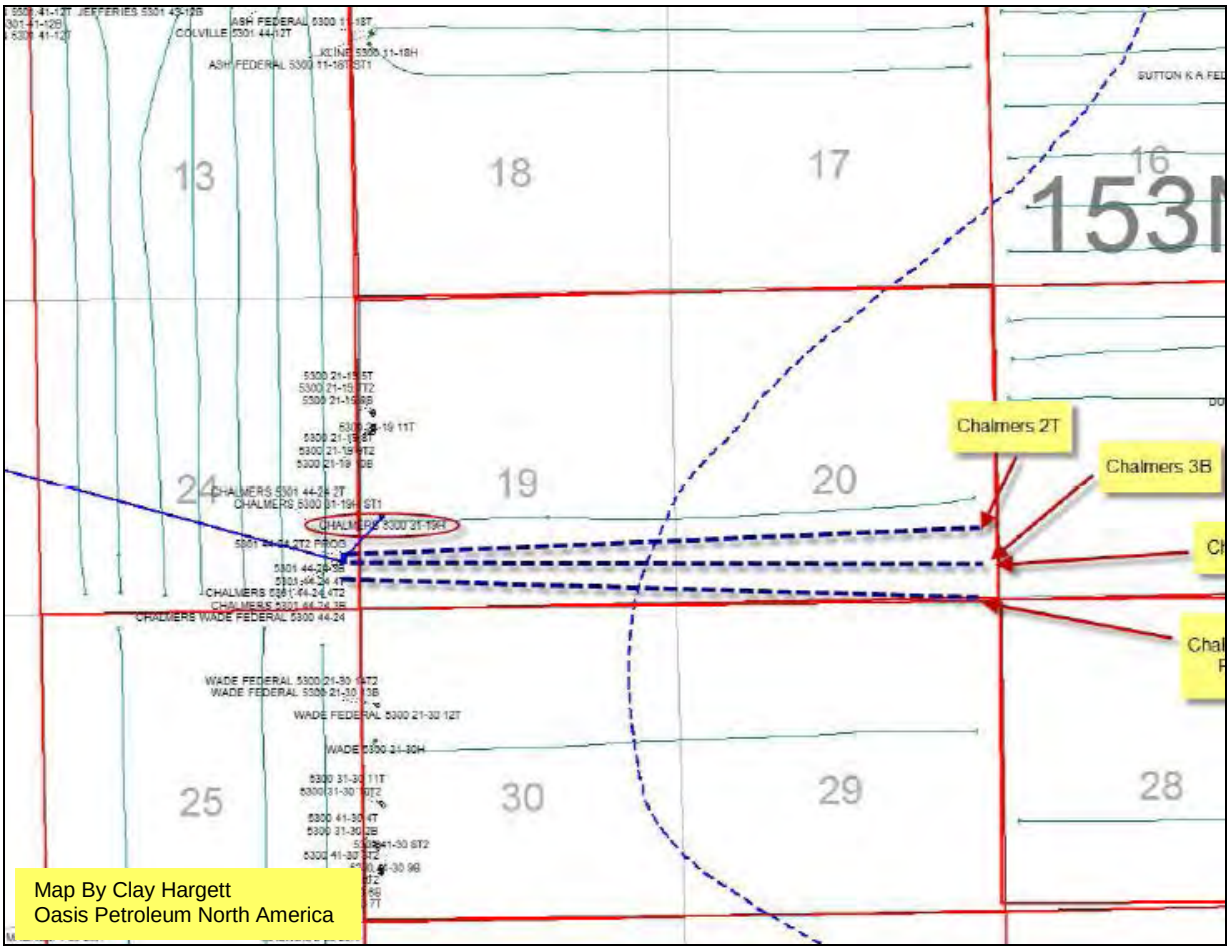


Figure 2: Offsetting control wells in relation to the Chalmers 5301 44-24 2TR well (Oasis Petroleum).

GEOLOGIC EVALUATION

Methods:

Geologic supervision of the Chalmers 5301 44-24 2TR was provided by Sunburst Consulting, Inc. with two well site geologists. A digital gas detector and chromatograph were interfaced with a Pason electronic data recorder system. The unit of measure for gas on this well was units (u), which was defined as 100 units equaling 1% methane equivalent in air. The EDR provided drill rate, on-off bottom and pump strokes to the gas detection computer and received total gas information from Sunburst for viewing around location. Lagged samples were caught by the rig crew in 30' intervals from 4,930' MD to 5,993' MD, 30' intervals from 8,170' MD to 10,870'MD, 10' intervals from 10,870' MD to 11,043' MD, and 30' intervals from 11,043' MD to 20,904' TD. Wet and dry cuttings were examined under a tri-ocular microscope and complete lithologic descriptions and sampling intervals are provided in the lithology document within this evaluation. The set of dry cuttings collected during the duration of the well were sent to the State of North Dakota. Evidence of light hydrocarbons present in the drilling fluid was reported by the gas chromatography equipment and documented on the mud log presented with this report.

Zones of Interest:

The Mission Canyon Formation (Mississippian; Madison Group) was drilled at 9,286' TVD (-7,318') and is comprised largely of light gray lime mudstone followed by gray to tan earthy textured argillaceous lime mudstone. Shows within the Mission Canyon ranged from 40 to 87 units against 10.0 ppg mud.

Figure 3 & 4: Wet cutting of the Lodgepole Formation (left) and False Bakken sub-interval (right) at 10X.

The top of the Lodgepole Formation was logged at 9,845' TVD (-7,877'). In general the Lodgepole can be described as a medium to dark gray brown argillaceous lime mudstone with a crystalline texture and trace amounts of disseminated pyrite (Figure 3). The False Bakken (Carrington Shale), drilled at 10,577' TVD (-8,609'), is comprised of very dark brown to black, slightly pyritic shale with an earthy texture, and was found to be soft to firm (Figure 4). Strong hydrocarbon shows in the lower 100' of the Lodgepole were as high as 168 total gas units; suggest that some of the oil and gas from the Upper Bakken Shale may be exploiting fractures thought to exist in the Lower Lodgepole.

The Bakken Formation (Devonian – Mississippian) has four formal members, an upper and lower black, fissile, organic-rich pyritic shale, separated by an arenaceous limestone, siltstone and silty sandstone middle member. These three members overlay a silty shale or siltstone of the Pronghorn Member toward the basin depositional center. The Upper Bakken Shale was drilled at 10,585' TVD (-8,617') with sample returns typically described as black, carbonaceous, petroliferous shale with trace amounts of disseminated pyrite (Figure 5). The Middle Bakken, penetrated at 10,602' TVD (-8,634'), consists of a varying thickness and sequence of interbedded siltstone, limestone and silty sandstone. Trace spotty light brown oil staining was present along with gas shows as high as 1325 TGU. This light brown spotty oil staining was common. Penetrated at 10,644' TVD (-8,676'), the Lower Bakken Shale was described as a black to dark brown carbonaceous shale with trace amounts of disseminated pyrite (Figure 6). Gas shows encountered in the Lower Bakken read as high as 550u (C1-C4). The Pronghorn was penetrated at 10,655 TVD (-8,687') and is commonly described as a dark to medium gray siltstone with calcite cement.

Figure 5 & 6: Wet cuttings of the Upper Bakken Shale (left), Lower Bakken Shale (right) at 10X.

The Three Forks Formation (Devonian; Kaskaskia Sequence) represents a regressive sequence deposited in a supratidal sabkha environment. The top of the Three Forks was drilled at 10,674' TVD (-8,706') and is comprised of a light to medium gray, cream to off white sucrosic dolomite with trace to occasional amounts of disseminated pyrite and light green shale also with trace amounts of disseminated pyrite (Figure 7 & 8). Shows within the Three Forks Formation ranged from 50 to 500 units in a drilling mud of 9.6-9.9 ppg.

Figure 7 & 8: Wet cuttings of the Three Forks dolomite and shale (left) and Three Forks dolomite and shale (right) at 10X.

Geo-steering:

Kick-off point for the curve was established from the isopach of the "base last salt" marker to the Three Forks "target" in the offset wells. The Chalmers 5300 31-19H was used as the primary offset through the vertical and curve sections. While drilling the curve, measured gamma ray signatures were compared to those of the three offsets and aided in the landing of the curve. The landing target was confirmed by the depth of the False Bakken, which was consistent with the offset wells. The curve was successfully landed within the Three Forks Formation at a depth of 11,043' MD (10,695' TVD) placing the well bore approximately 21' below the top of the Three Forks Formation. Directional tools were then pulled out of the hole and a string of 7" casing was set (11,043' MD) and then cemented by Schlumberger.

Samples from the target zone varied in porosity, oil staining, color, cementation, and pyrite content. Stratigraphic location in the target zone was based on these sample observations along with gas shows, drill rates and gamma ray values. Severe doglegs were to be avoided so as to obtain the desired vertical section and aid in a successful completion liner run at TD.

The Oasis Petroleum North America, LLC prospect geologist defined the an initial target zone as an 13' zone that began 8' below the top of the Three Forks Formation and ended four feet above the claystone member 21' below the Three Forks Formation. The target zone consisted of an upper dolomite and shale interval reading 100-140 count gamma (A marker). The center of the target interval was comprised of a warmer dolomite with greater amounts of shale reading 120-160 count gamma (B marker). The base of the target zone was characterized by a clean dolomite with trace amounts of shale with gamma readings of 50-100 (C marker). The A-C gamma markers were used for determining depth within the target interval and plotted on the Chalmers 5301 44-24 2TR dip profile (Figure 10).

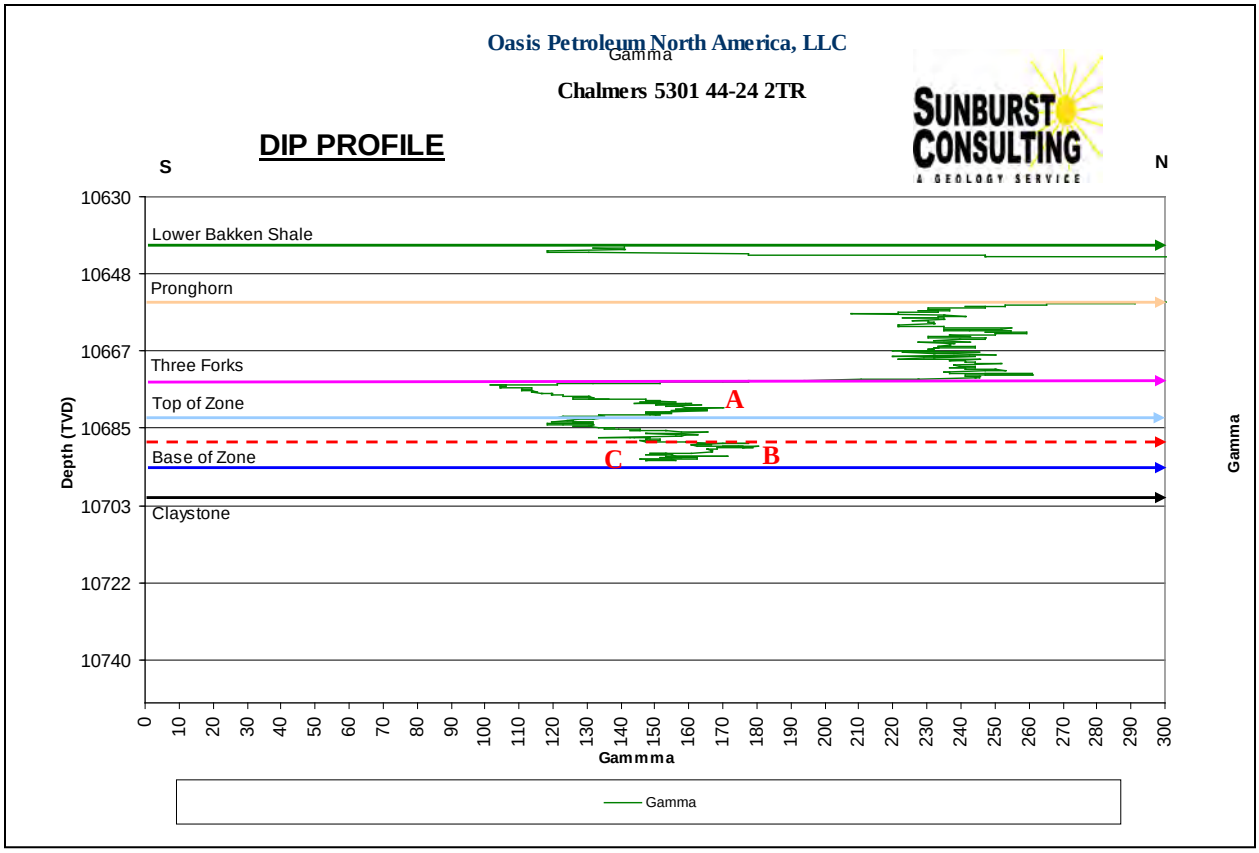


Figure 9: Offset gamma ray profile of the upper Three Forks (0-300 api. scale) *See dip profile (Figure 10) for marker presentation*

Using the aforementioned information gathered during drilling, offset log information and the structural data provided from Oasis Petroleum North America, LLC., well site geologists were able to anticipate, and interpret the local apparent dip during the drilling of the Chalmers 5301 44-24 2TR well. Upon drilling out of casing a misaligned MWD lead to a Pronghorn strike. After a successful sidetrack, the BHA only drill about 1,600' before

striking the Pronghorn again, due to a steep inclination caused by a deflection off a hard streak. After a second successful sidetrack a total depth of 20,904' MD was reached on June 11, 2014 at 10:30 CDT. The resulting structure of the Three Forks was a fall in TVD of 87' over 9,998' MD; resulting in an overall down dip of 0.50º as portrayed on the Chalmers 5301 44-24 2TR dip profile (Figure 10).

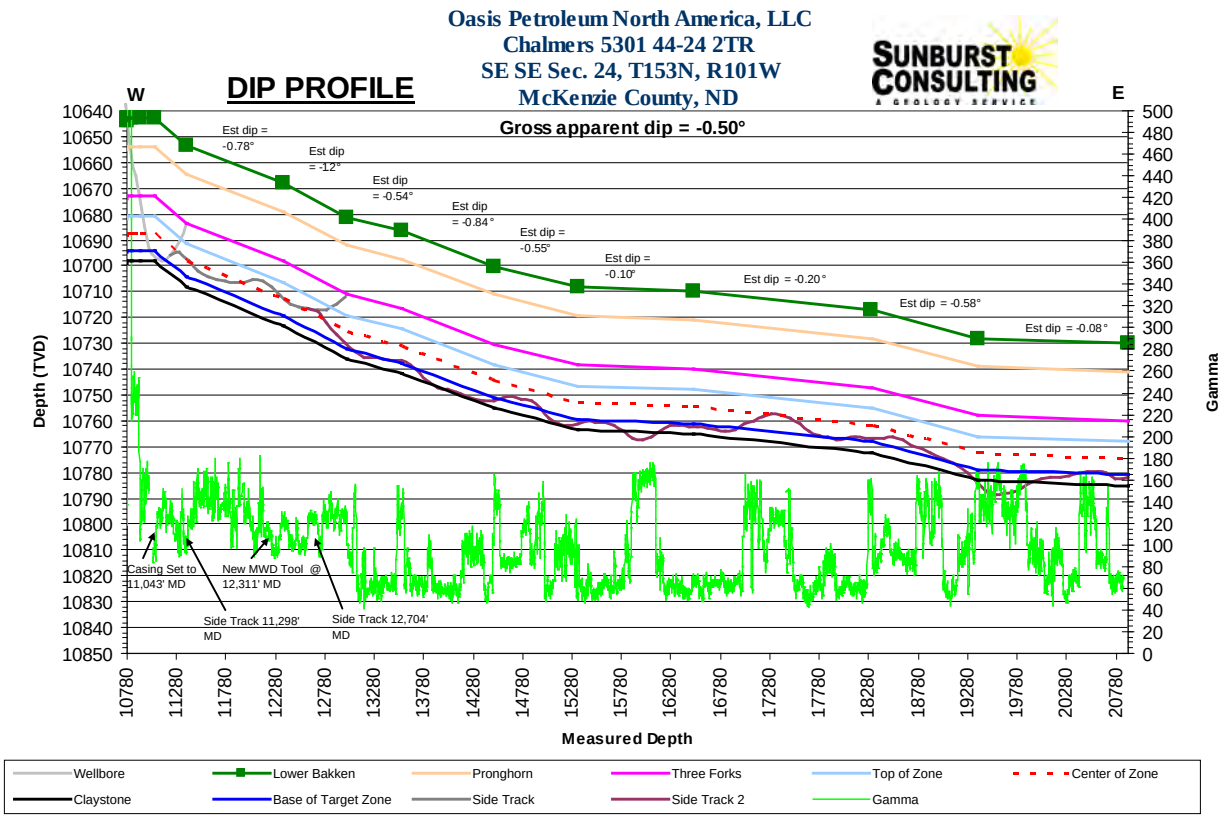


Figure 10: Well profile representing estimated dip value & gamma ray for the Chalmers 5301 44-24 2TR lateral.

Hydrocarbons:

Gas monitoring and fluid gains were monitored to evaluate the viability of this reservoir during the drilling of the Chalmers 5301 44-24 2TR well. In the invert mud system, hydrostatic conditions were maintained near balance. This allowed for gas and fluid gains from the well to be monitored. Gas shows were encountered in vertical, curve and lateral drilling of the well.

Background gas observed during the drilling of the lateral ranged from 50 to 200 units. Invert drilling fluid was used throughout the drilling of the vertical and curve weighing 10.0-11.6 ppg. The lateral was drilled with saline drilling fluid with a mud weight of 9.6-9.9 ppg. Gas shows ranged up to 852 units and connection gases were observed up to 508 units. C1-C4 gas components were observed throughout the course of the lateral. Trip gases were observed as high as 2,048 units. Oil shows were very light throughout the lateral ranging from 0-3% in sample. When present it was a *light brown spotty oil stain that yielded a slow to moderate streaming to diffuse light green cut fluorescence*.

SUMMARY

The Nabors B25 drilling rig successfully drilled a two-section horizontal well bore within the Three Forks Formation at the Chalmers 5301 44-24 2TR. A net of 9,998' was drilled within the Three Forks. A mud program consisting of diesel invert (10.0–11.6 ppg), during the vertical and curve build sections, and saline based mud (9.6-9.90 ppg), during the lateral maintained stable hole conditions and permitted adequate analysis of gas concentrations.

Projections of dip were successfully used to maintain the well bore in the Three Forks Formation target for 76% of the lateral. Samples from the target consisted of a light to medium gray, cream to off white dolomite with trace to occasional amounts of disseminated pyrite and light green shale also with trace amounts of disseminated pyrite. Intercrystalline porosity was generally seen throughout the entire lateral. Hydrocarbon shows in the target zone were high throughout the lateral. Samples from the ideal zone contained a spotty light brown oil stain.

The Chalmers 5301 44-24 2TR will be fitted with a 4 ½" production liner and swell packers in preparation for a fracture stimulation that will determine the true commercial value of the well. The well currently awaits fracture stimulation.

Respectfully submitted,

Hannah Thatcher
Sunburst Consulting, Inc.
June 11, 2014

WELL DATA SUMMARY

OPERATOR:	**Oasis Petroleum North America, LLC**
ADDRESS:	1001 Fannin, Suite 1500 Houston, TX 77002
WELL NAME:	**Chalmers 5301 44-24 2TR**
API #:	33-053-05924-00-00
WELL FILE #:	28342
SURFACE LOCATION:	959 FSL & 245 FEL SE SE Section 24, T153N, R101W
FIELD/ PROSPECT:	Baker Field / Three Forks
COUNTY, STATE	McKenzie County, North Dakota
BASIN:	Williston
WELL TYPE:	Three Forks Horizontal
ELEVATION:	GL: 1,943' KB:1,968'
SPUD/ RE-ENTRY DATE:	May 9, 2014
BOTTOM HOLE LOCATION:	68' north & 10,436' east of surface location or approx. 1,027' FSL & 323' FEL, SE SE Section 20, T153N, R100W
CLOSURE COORDINATES:	Closure Azimuth: 89.63° Closure Distance: 10,436.14'
TOTAL DEPTH / DATE:	20,904' on June 11, 2014 100% within Three Forks
TOTAL DRILLING DAYS:	35 days
CONTRACTOR:	Nabors B25

PUMPS:	H &H Triplex (stroke length - 12")
TOOLPUSHERS:	Casey Pippenger, Bruce Walter
FIELD SUPERVISORS:	Bob Brown, Mike Crow
CHEMICAL COMPANY:	Fluid Control
MUD ENGINEER:	Keith McCarty, Warren Carlson
MUD TYPE:	Fresh water in surface hole Diesel invert in curve; Salt water in lateral
MUD LOSSES:	Invert Mud: 1078 bbls, Salt Water: not recorded
PROSPECT GEOLOGIST:	Clay Hargett
WELLSITE GEOLOGISTS:	Hannah Thatcher, Daniel Haynes
GEOSTEERING SYSTEM:	Sunburst Digital Wellsite Geological System
ROCK SAMPLING:	30' from 4,930' - 10,870' 10' from 10,870' -11,043' 30' from 11,043' - 20,904' (TD)
SAMPLE EXAMINATION:	Trinocular microscope
SAMPLE CUTS:	Trichloroethylene
GAS DETECTION:	MSI (Mudlogging Systems, Inc.) TGC - total gas with chromatograph Serial Number(s): ML-440
DIRECTIONAL DRILLERS:	LEAM Drilling Systems / Oasis / RPM Bob Brown, Mike Crow, Bob Johnson, Tyler LeClaire
MWD:	Ryan Directional Service Inc. Henry Unger, Erik Matteson
CASING:	Surface: 13 3/4" 55# J-55 set to 2,153' Intermediate Surface: 9 5/8" 40# HCL-80 set to 5,980' Intermediate: 7" 32# HCL-80 set to 11,043'

KEY OFFSET WELLS:

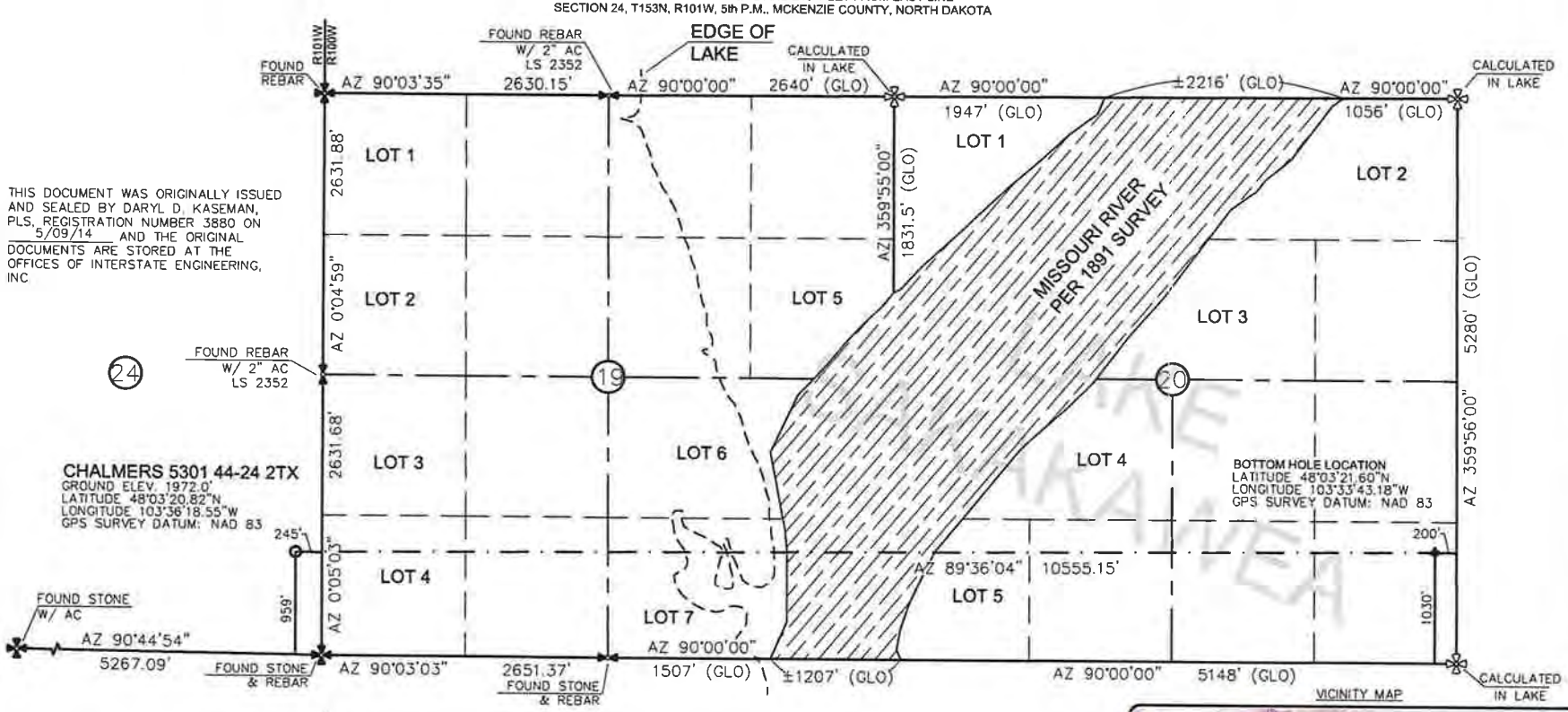
Oasis Petroleum North America
Chalmers 5300 31-19H
NW SW Sec.19, T153N, R100W
McKenzie Co., ND

Missouri Basin Well
Lynn 1
SW NW Sec. 23, T153N, R101W
McKenzie Co., ND

Oasis Petroleum North America
Kline Federal 5300 11-18H
NW NW Section 18, T153N, R100W
McKenzie Co., ND

WELL LOCATION PLAT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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DARYL D. KASEMAN LS-3880

RECORDED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 5/09/14
NORTH DAKOTA

VICINITY MAP

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Revision No.	Date	By	Description

OASIS PETROLEUM NORTH AMERICA, LLC
WELL LOCATION PLAT
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.H.S. | Project No.: S12-09-215.05
Checked By: D.D.K. | Date: MAY 2014

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SECTION BREAKDOWN

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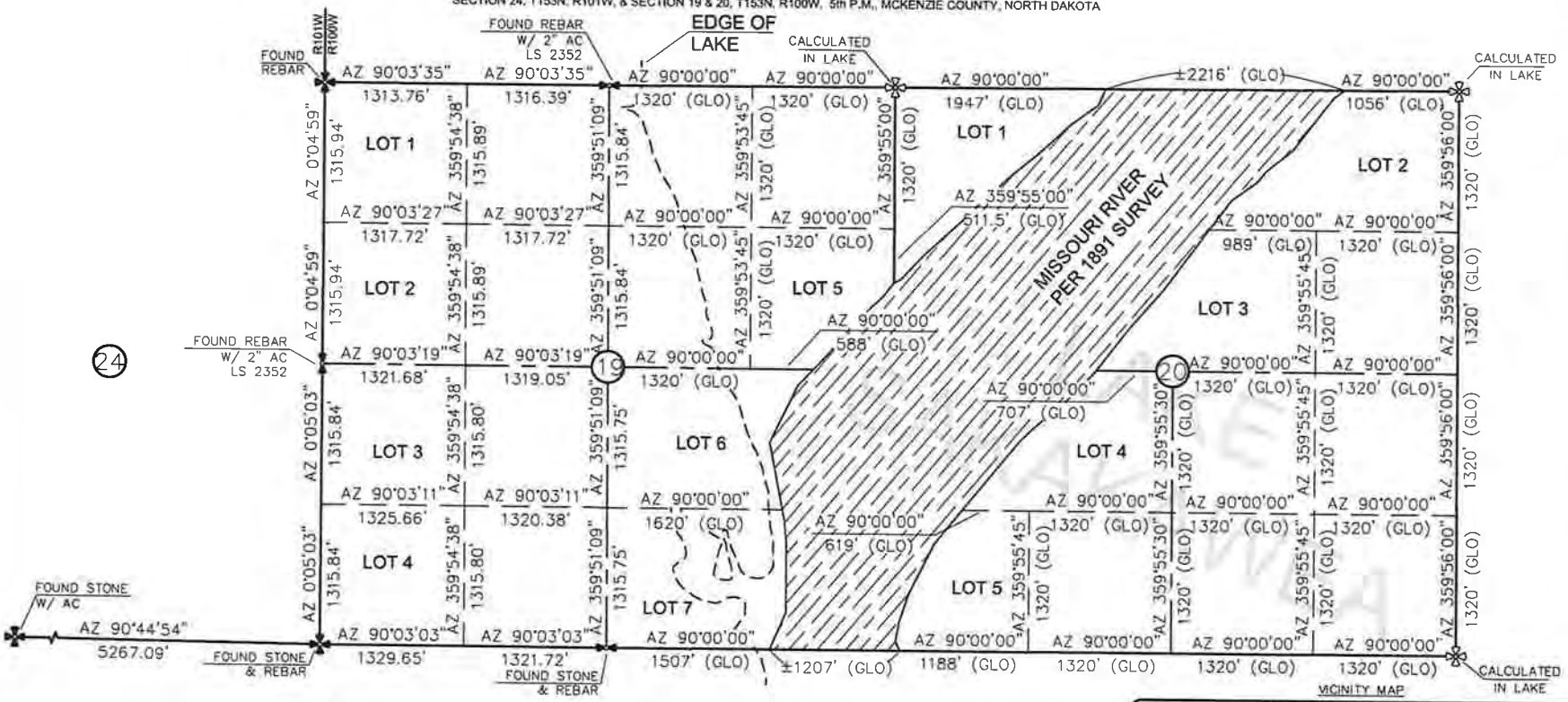
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, & SECTION 19 & 20, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 5/09/14
NORTH DAKOTA

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SECTION BREAKDOWN
SECTION 24, T153N, R101W, & SECTIONS 19 & 20, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.L.S. Project No.: S13-09-235.05
Checked By: D.D.K. Date: MAY 2014

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PAD LAYOUT

OASIS PETROLEUM NORTH AMERICA, LLC
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"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
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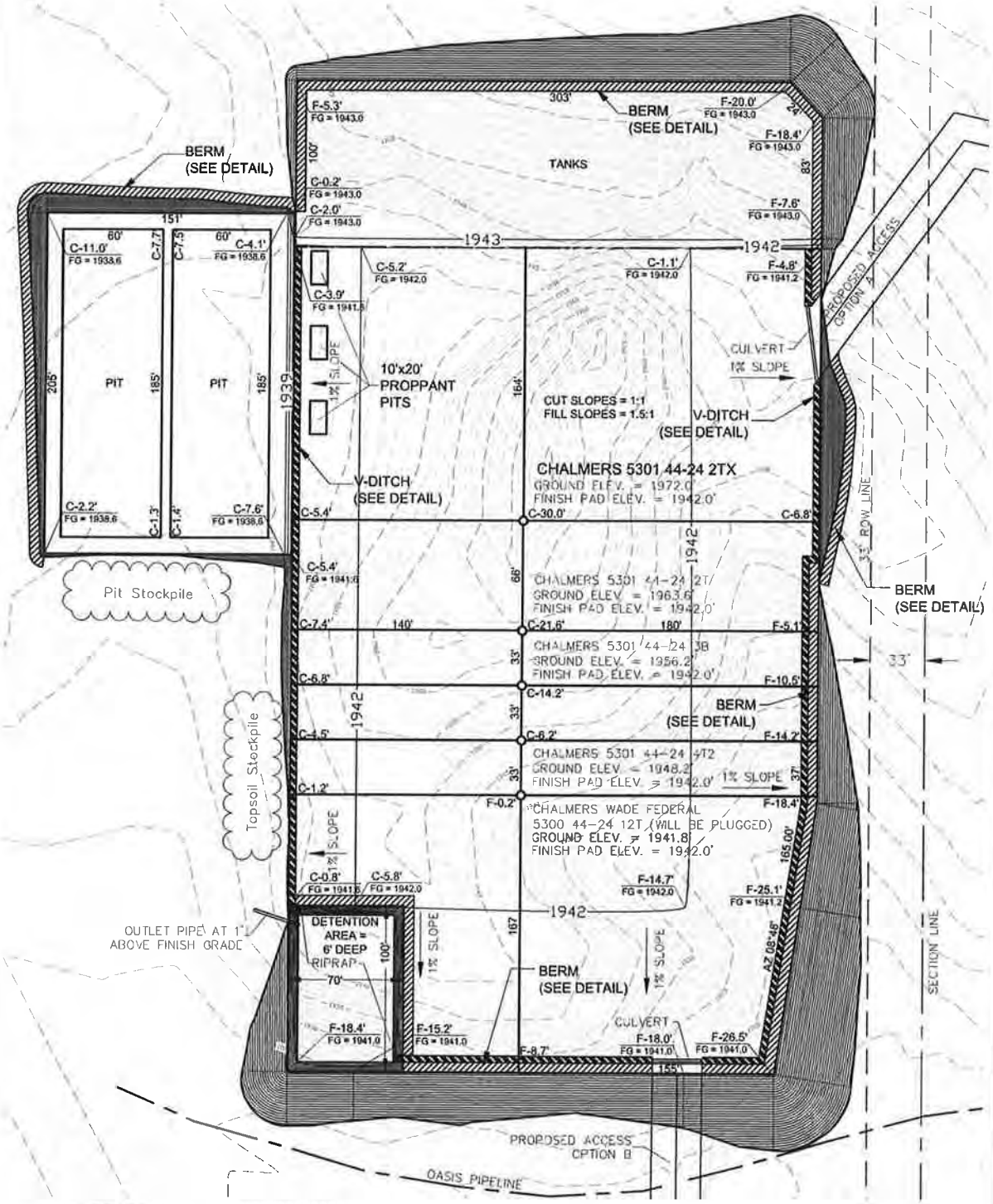

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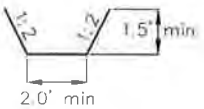
Proposed Contours
Original Contours

V-DITCH DETAIL



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DATE: 5/09/14
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OASIS PETROLEUM NORTH AMERICA, LLC
PAD LAYOUT
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. | Project No.: S13-09-235.05
Checked By: D.D.K. | Date: MAY 2014

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ACCESS APPROACH

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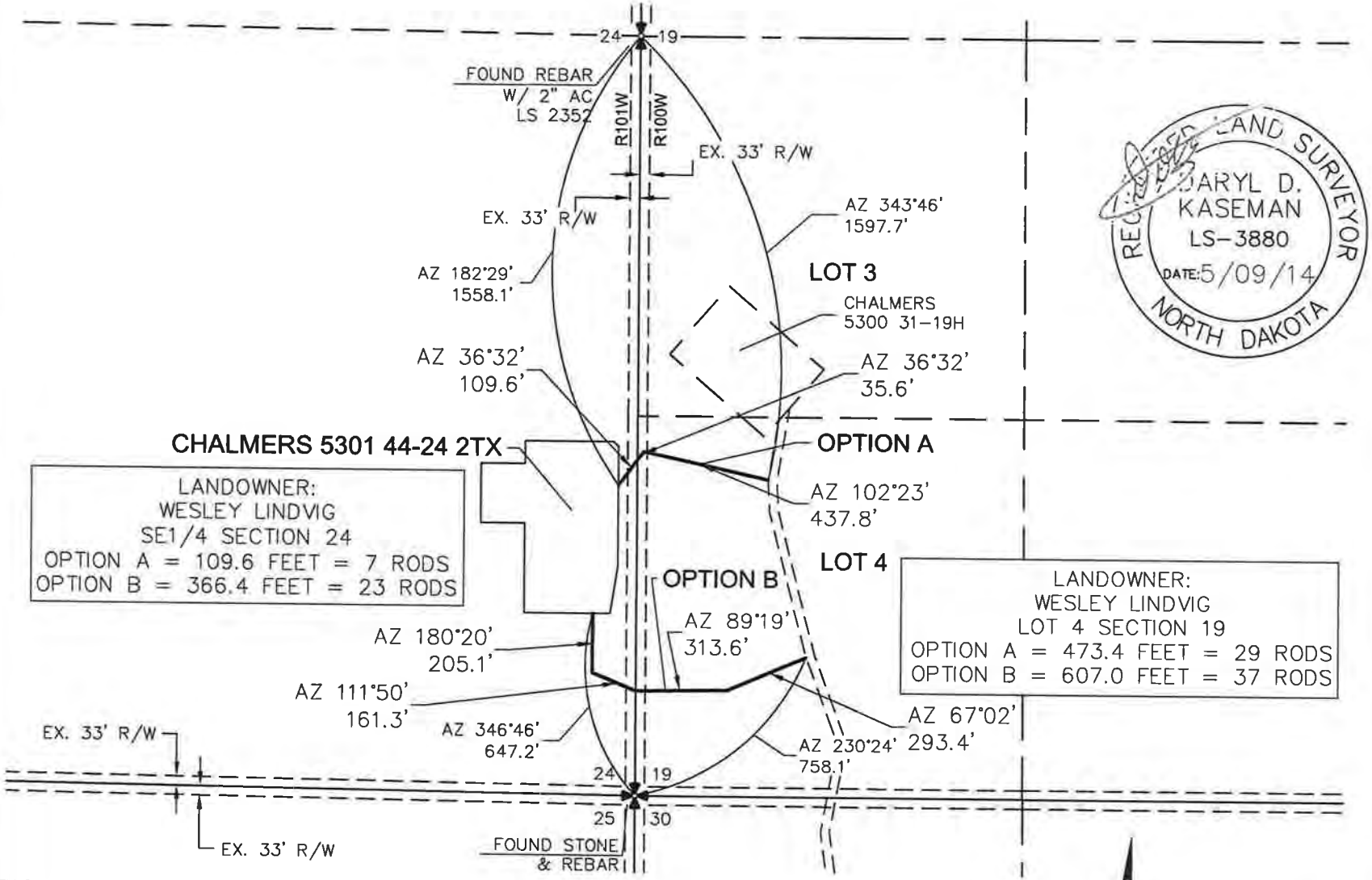
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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ACCESS APPROACH
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. Project No.: S13-09-238.06
Checked By: D.D.K. Date: MAY 2014

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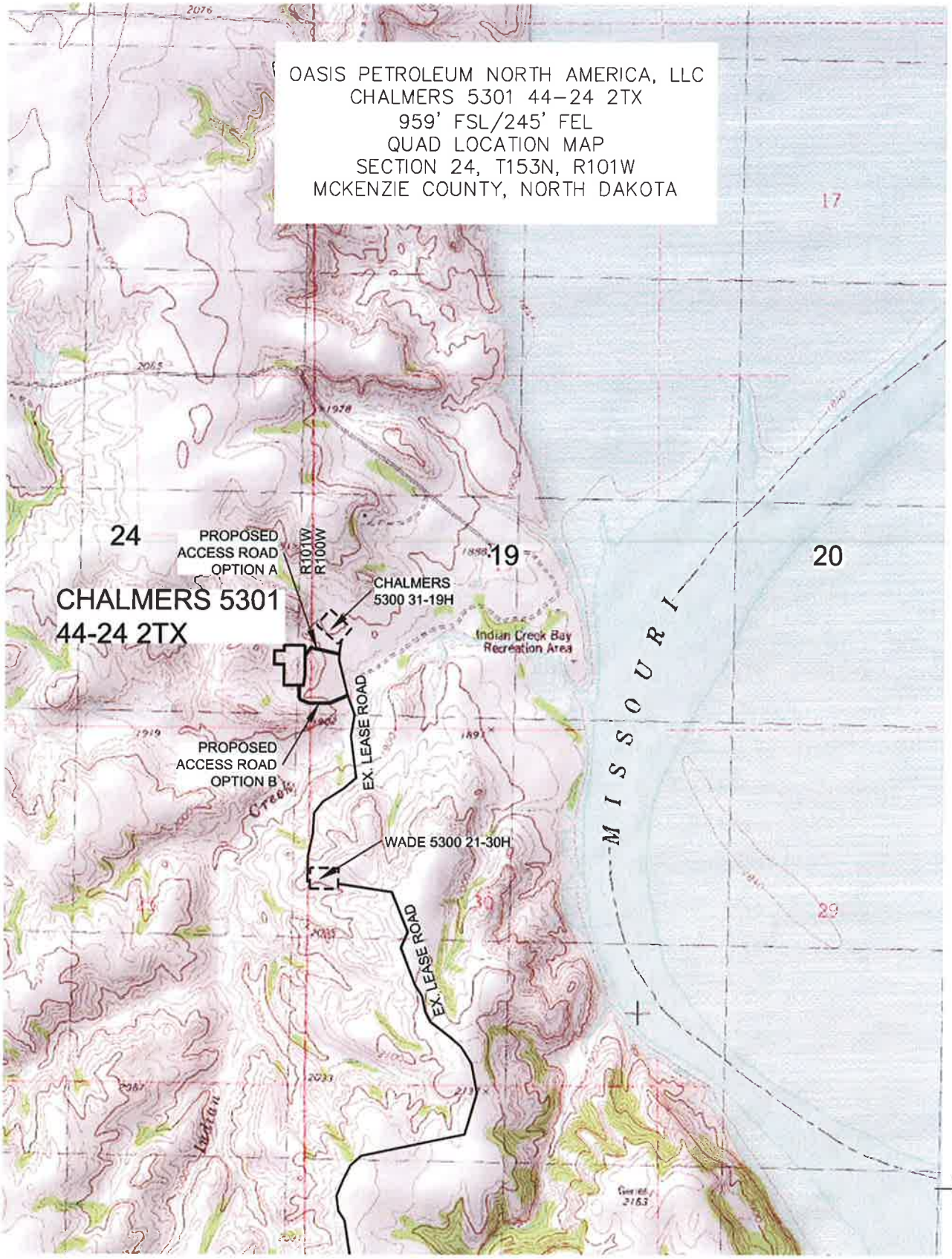

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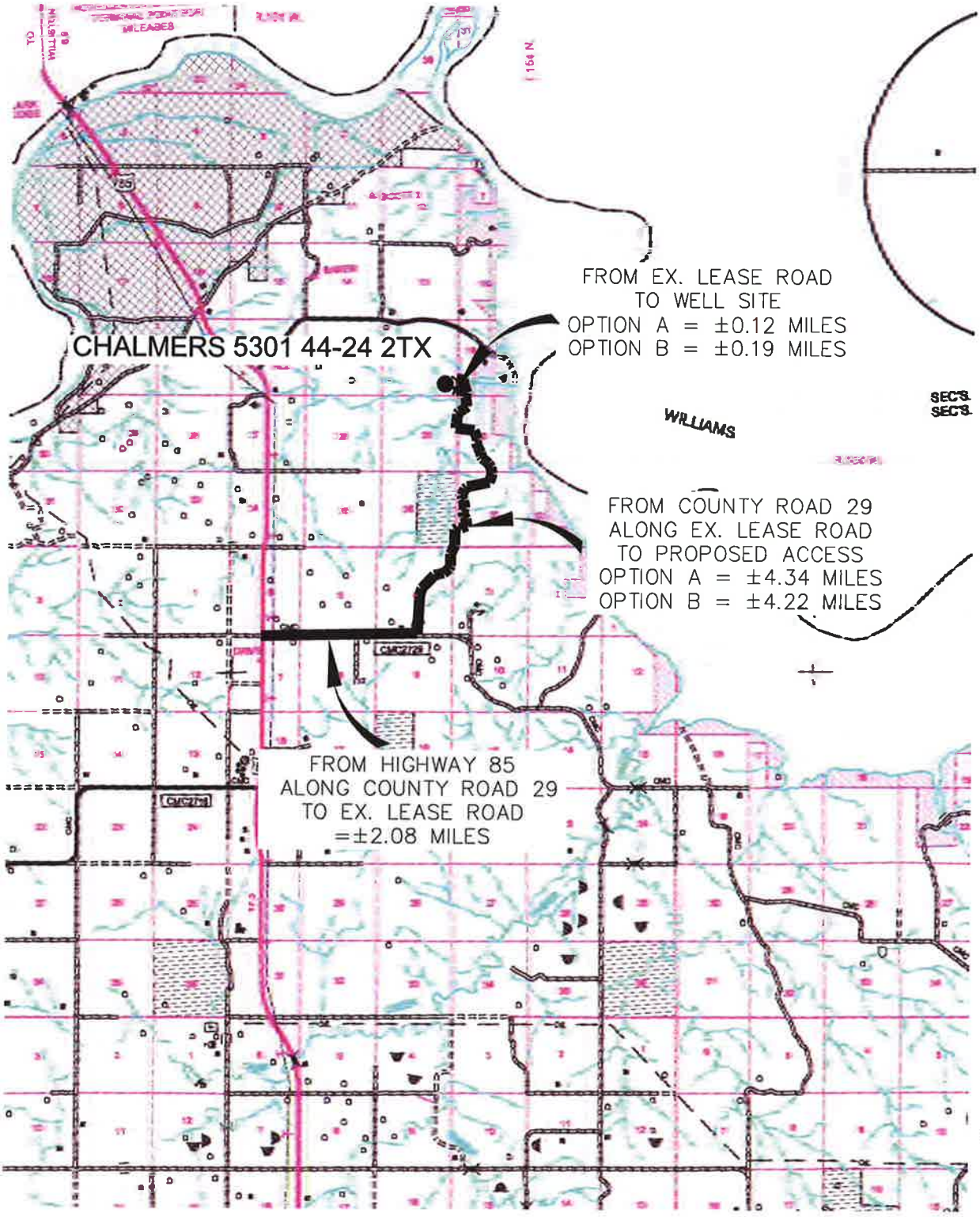
OASIS PETROLEUM NORTH AMERICA, LLC
QUAD LOCATION MAP
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. | Project No.: S13-09-235.05
Checked By: D.D.K. | Date: MAY 2014

Revision No.	Date	By	Description

COUNTY ROAD MAP

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 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 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

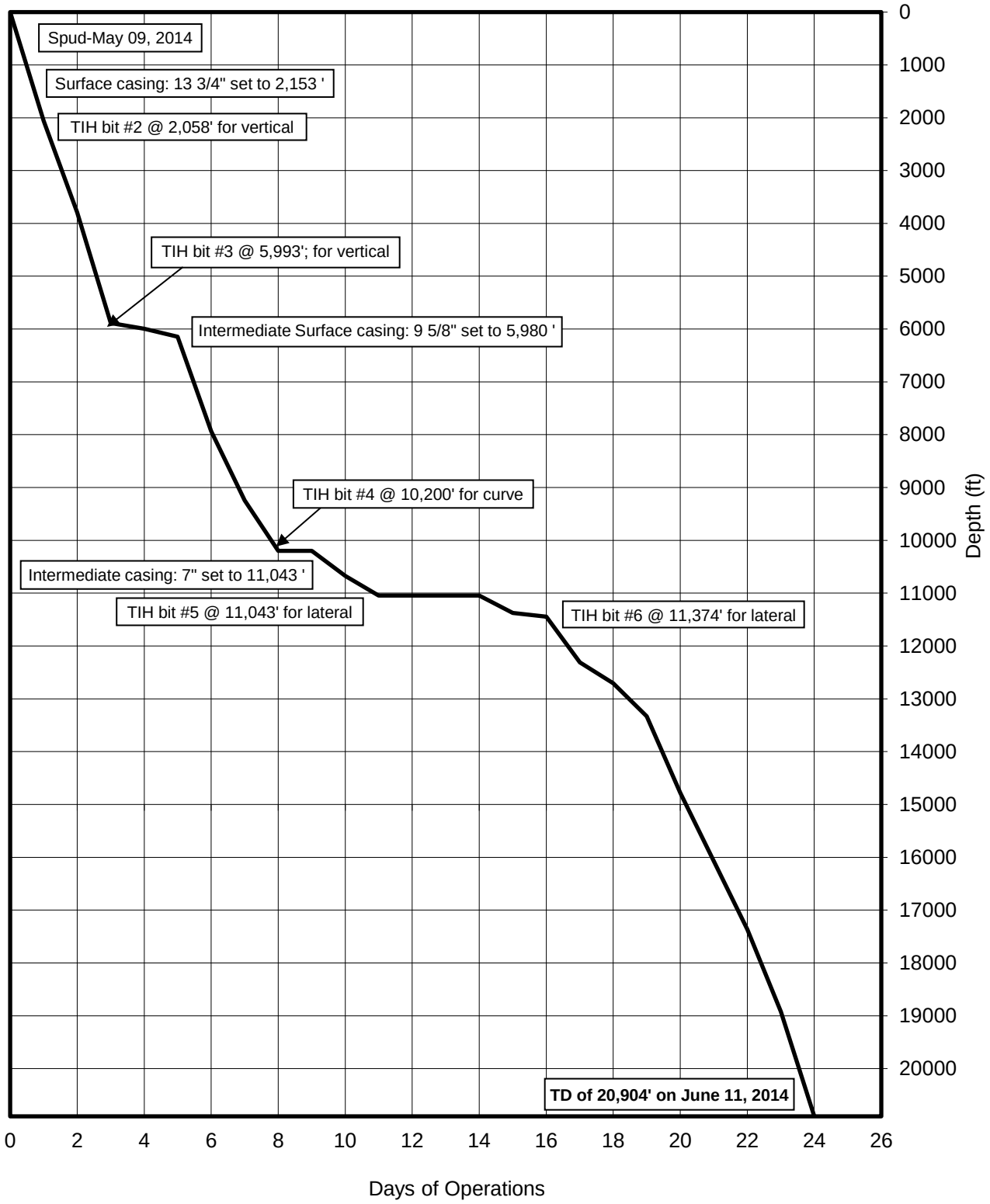
Drawn By: J.J.S.	Project No.: S13-09-235.05		
Checked By: D.D.K.	Date: MAY 2014		

Revision No.	Date	By	Description

TIME VS DEPTH

Oasis Petroleum North America, LLC

Chalmers 5301 44-24 2TR



DAILY DRILLING SUMMARY

Day	Date 2014	Depth (0600 Hrs)	24 Hr Footage	Bit #	WOB (Klbs) RT	WOB (Klbs) MM	RPM (RT)	RPM (MM)	PP	SPM 1	SPM 2	GPM	24 Hr Activity	Formation
0	5/18	-	-	-	-	-	-	-	-	-	-	-	-	-
1	5/19	2,058'	-	-	-	-	-	-	-	-	-	-	Nipple up BOPs (New stack configuration), Test BOPs/pressure test	-
2	5/20	3,795'	1,737	2	20	-	40	135	3365	80	80	551	Test BOPs/pressure test, Install/remove wear bushing/installed, Nipple up BOPs fill up line installed, Pick up BHA, TIH, Change rotating head/rubber/intalled rotating head, TIH/tagged cement @ 2001, Drilling cement/float at 2015/shoe at 2058, Rotary drilling 2058-2140, Service top drive, Rotary drilling 2140-3795	-
3	5/21	5,887'	2,092	2	25	10	55	135	3365	80	80	551	Rotary drilling 3819-5404, Service rig/fix boomer on upper box, Rotary drilling 5404-5887	Swift
4	5/22	5,993'	106	3	20	15	40	135	3365	80	80	551	Rotary drilling 5404-5993, Circulate and condition, Short trip /7 stands out and back in, Circulate and condition /mix & send pill, TOOH, Service rig /TM80 repairs, Downtime-powered wrench TM80 repairs/support brackets, Change rotating head/rubber remove rotating head and install trip nipple, TOOH, Lay down BHA, Install/remove wear bushing, Rig up/down to run casing, Pre job safety/running casing, Run casing	Swift
5	5/23	6,145'	152	3	30	15	40	135	3365	80	80	551	Waiting on 3rd party personnel/cementers, Rig up/down to run casing rig up cementers, Pre job safety rig up/cementing, Primary cementing, Rig up/down to run casing rig down cementers, working as directed by operator laying down landing joint and setting pack off tool, Install/remove wear bushing/install pack off, pick up BHA, TIH, Install/remove wear bushing, TIH, Change rotating head/rubber/install, TIH/tag cement at 5922, Circulate and condition/lighten mud, Drilling cement/float @ 5951 shoe at 5993, Rotaty drilling 5993-6145	Rierdon
6	5/24	7,930'	1,785	3	25	15	40	135	3365	80	80	551	Rotaty drilling 6242-7330, Service rig greased crown blocks blackjack lcw, Slide drilling and rotary drilling 7330-7930	Otter
7	5/25	9,246'	1,316	3	25	15	40	135	3365	80	80	551	Rotary drilling 7966-7982, Service top drive, Drilling 7982-9246	Ratcliffe
8	5/26	10,200'	954	3	20	12	35	135	3360	80	80	551	Rotary drilling 9271-10200	Lodgepole
9	5/27	10,200'	0	4	20	12	35	135	3360	80	80	551	Back reaming 10200-8032, Circulate and condition building dry job, TOOH F/8032 T/5654, Change rotating head/rubber pull ROT head install trip nipple, TOOH F/5654 T/3229, Service rig, TOOH T/BHA, Lay down drill pipe racking back collars, Lay down BHA, Cased hole logs, Rig up loggers, Open hole logs, Rig down loggers, Rig up make up BHA, TIH	Lodgepole
10	5/28	10,676'	476	4	15	30	40	135	3365	80	80	551	TIH F/6000 T/8404, Reaming/washing F/8404 T/9352, TIH F/9352 T/10200, Slide drilling F/10200 T/10676	False Bakken

DAILY DRILLING SUMMARY

Day	Date 2014	Depth (0600 Hrs)	24 Hr Footage	Bit #	WOB (Klbs) RT	WOB (Klbs) MM	RPM (RT)	RPM (MM)	PP	SPM 1	SPM 2	GPM	24 Hr Activity	Formation
11	5/29	11,043'	367	4	18	30	45	132	2516	74	-	255	Slide drilling F/10685 T/11043, TOOH 10 stands trip back in 10 stands pump 10 BLL slug trip out 5 stands and back in, Circulate and condition bottoms up, Lay down drill pipe, Service rig R&R catwalk, Downtime-powered catwalk, Lay down drill pipe	Three Forks
12	5/30	11,043'	0	4	18	30	45	132	2516	74	-	255	Lay down drill pipe, Lay down BHA, Install/remove wear bushing remove wear bushing, Rig up/down to run casing rig up casing crew, Pre job safety held safety meeting with casing crew and nabors for running casing, TIH with casing F/shoe T/ 5898	Three Forks
13	5/31	11,043'	0	4	18	30	45	132	2516	74	-	255	Working pipe/tight spot pipe stuck, free up, landed hanger @ 10989.66, Waiting on 3rd party personnel waiting on wire line truck, Rig up wire line and hold safety meeting, Multi-shot surveys, Lay down 3rd party tools rig down wire line truck, Circulate and condition, Primary cementing rig up cementers to cement held safety meeting, Primary cementing, Waiting on cement and laying 5" slips elevators lifting subs etc. picking up 4" slips elevators ect. changing rams	Three Forks
14	6/1	11,043'	0	4	18	30	45	132	2516	74	-	255	Lay down 3rd party tools RD cement head, casing elevator, bale ext 5 in quil change out 5 in bck up wrench to 4in put 4in quil on top drive, Pick up 3rd party tools pick up pack off and single joint of 4in dp set pack off, Pick up 3rd party tools test plug for testing, Test BOPs, done with obm @ 1400 on 5-31-14, Test BOPs/pressure test, Install/remove wear bushing, Pick up BHA, Pick up drill pipe, Rig up/down to run casing rigged up power tongs for running dp, Pick up drill pipe.	Three Forks
15	6/2	11,374'	331	6	15	30	45	135	3365	80	-	276	Pick up drill pipe, Change rotating head/rubber pull trip nipple install ROT head, changed gasket on ROT head, rig down power tongs, Drilling cement and shoe track, Formation integrity test (fit) 2425 PSI hold 15 min., Rotary drilling F/11024 T/11374, Reaming/washing, TOOH, Change rotating head/rubber /install trip nipple, TOOH, Lay down BHA, Pick up BHA, TIH	Three Forks
16	6/3	11,445'	71	6	12	30	45	135	1650	-	80	276	TIH, Change rotating head/rubber/pull trip nipple/install rotating head, TIH, Direction work/shoot surveys/prepare to side track, Directional work/trough 11261-11298, Slide drilling 11298-11303, Drills-BIOP etc/ time 4.75 Min., Slide drilling 11303-11315, Rotary drilling 11315-11445	Three Forks
17	6/4	12,311'	866	6	10	35	45	135	2250	-	80	276	Slide drilling 11306-11315, Rotary drilling 11315-12311, TOOH, Change rotating head/rubber/remove rotating head/install trip nipple, TOOH, Lay down BHA, Service rig/function HCR/greased blocks and crown, Waiting on 3rd party tools/motor, Pick up BHA, TIH	Three Forks

DAILY DRILLING SUMMARY

Day	Date 2014	Depth (0600 Hrs)	24 Hr Footage	Bit #	WOB (Klbs) RT	WOB (Klbs) MM	RPM (RT)	RPM (MM)	PP	SPM 1	SPM 2	GPM	24 Hr Activity	Formation
18	6/5	12,704'	393	6	16	35	45	135	2800	80	-	276	TIH, Change rotating head/rubber/remove trip nipple/install rotating head, TIH, Directional work/relog gamma, Rotary drilling 12311-12689, Service top drive/function super choke/electrician checked drawworks motors and brake HPU, Rotary drilling 12689-12987, Directional work/pull 3 stands/acquire normal pump pressure, Directional work orientate tool for trough/start troughing, Slide drilling/side track @ 12704, Stand 134	Three Forks
19	6/6	13,332'	628	6	19	40	45	135	2850	80	-	276	Slide drilling/time drill for sidestrack 12704-12728, Rotary drilling 12728-12861, Service top drive/function annular, Rotary drilling 12861-13331	Three Forks
20	6/7	14,777'	1,445	6	21	40	45	135	2850	-	80	276	Rotary drilling 13402-14777	Three Forks
21	6/8	16,071'	1,294	6	25	35	45	135	2650	-	80	276	Rotary drilling 14785-16071	Three Forks
22	6/9	17,365'	1,294	6	25	40	55	135	2850	80	-	276	Rotary drilling 16098-17365	Three Forks
23	6/10	18,923'	1,558	6	28	40	45	135	2850	80	-	276	Rotary drilling 17411-18923	Three Forks
24	6/11	20,904'	1,981	6	26	39	55	132	3250	-	78	269	Rotary drilling 18397-19780	Three Forks

DAILY MUD SUMMARY

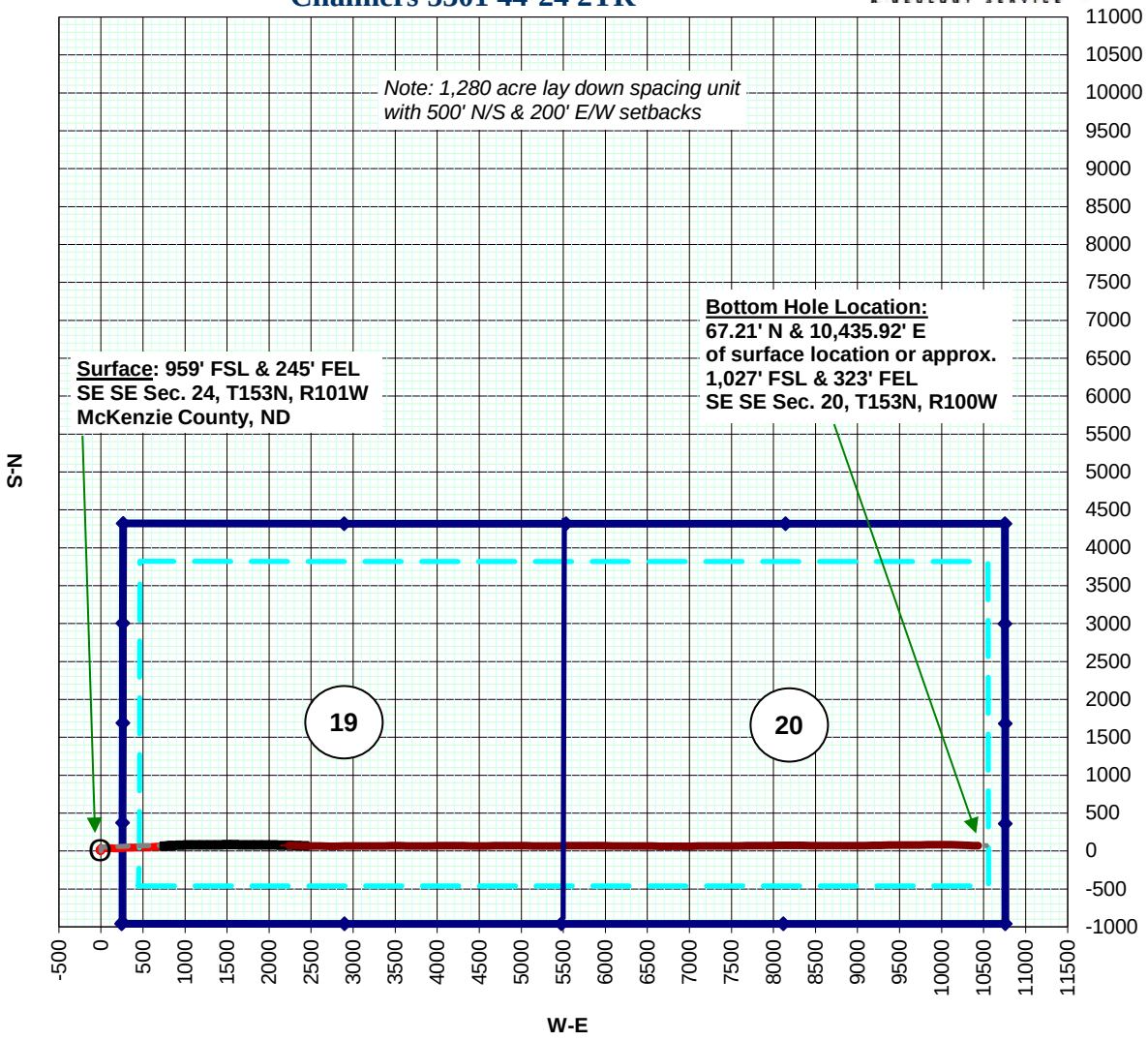
Day	Date 2014	Mud Depth	Mud WT (ppg)	VIS (sec/ qt)	PV (cP)	YP (lbs/ 100 ft2)	Gels (lbs/ 100 ft^2)	600/ 300	NAP/ H_20 (ratio)	NAP/ H20 (% by vol)	Cake (API/ HTHP)	Cor. Solids (%)	Oil/ H_20 (%)	Alk	pH	Excess Lime (lb/bbl)	Cl^- (mg/L)	LGS/ HGS (%)	Salinity (ppm)	ES	Gain/ Loss (bbls)
0	05/18	80'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-/-
1	05/19	2,058'	11.1	61	21	11	10/15/-	53/32	81/19	-	2	14.8	68/16	2.4	-	3.1	20k	11.6/3.2	170,813	550	-/-
2	05/20	3,950'	11.4	50	20	11	10/15/-	51/31	81.7/18.3	-	2	16.8	67/15	1.9	-	2.5	20k	13/3.8	180,149	571	-/323
3	05/21	5,963'	11.6	46	23	11	9/12/-	57/34	81.5/18.5	-	2	17.8	66/15	2	-	2.6	19k	13.3/4.6	172,697	549	-/106
4	05/22	5,993'	11.4	52	22	9	9/13/-	53/31	81.5/18.5	-	2	17.7	66/15	1.8	-	2.3	22k	12/5.7	194,657	525	-/115
5	05/23	6,479'	10	47	21	8	8/12/-	50/29	77.1/22.9	-	3	11.3	67.5/20	1.3	-	1.7	20k	7.2/4	180,149	426	-/50
6	05/24	8,188'	10	49	21	8	8/11/-	50/29	78.7/21.3	-	3	11.7	68.5/18.5	2.1	-	2.7	22k	6.9/4.8	153,461	456	-/208
7	05/25	9,450'	10	42	19	8	7/11/-	46/27	81.4/18.6	-	2	11.8	70.2/16	2	-	2.6	32k	6.2/5.6	247,894	0	-/-
8	05/26	10,200'	10.2	45	21	9	9/13/-	51/30	82.4/17.6	-	2	13	70/15	2.2	-	2.8	33k	6.4/6.6	253,676	746	-/51
9	05/27	10,200'	10.38	67	22	14	12/18/-	58/36	82.2/17.8	-	2	13.5	69.5/15	2.8	-	3.6	33k	7.1/6.4	264,320	765	-/11
10	05/28	10,777'	10.05	48	21	13	12/15/-	55/34	80.3/19.7	-	2	11.2	69.5/17	2.4	-	3.1	44k	6.9/4.4	264,320	613	-/214
11	05/29	Change mud from diesel invert to salt water																			
12	05/30	11,043'	8.8	26	1	1	-	3/2	-	-/97	-	-	-/97	-	11	-	53k	0.4/-'	-	-	-/-
13	05/31	11,043'	8.8	26	1	1	-	3/2	-	-/97	-	-	-/97	-	11	-	53k	0.4/-'	-	-	-/-
14	06/01	11,043'	8.8	26	1	1	-	3/2	-	-/97	-	-	-/97	-	11	-	53k	0.4/-'	-	-	-/-
15	06/02	11,374'	9.9	27	1	1	-	3/2	-	-/89.5	-	-	-/89.5	-	8	-	177k	-/0.2	-	-	-/-
16	06/03	11,500'	9.9	27	1	1	-	3/2	-	-/89.5	-	-	-/89.5	-	8	-	177k	-/0.2	-	-	-/-
17	06/04	12,311'	9.8	28	1	1	-	3/2	-	-/90	-	-	-/90	-	7.5	-	163k	-/0.1	-	-	-/-
18	06/05	12,744'	9.8	28	1	1	-	3/2	-	-/90	-	-	-/90	-	7.5	-	163k	-/0.1	-	-	-/-
19	06/06	13,322'	9.7	27	1	1	-	3/2	-	-/90	-	-	-/90	-	8.5	-	170k	0.1/0.1	-	-	-/-
20	06/07	15,044'	9.7	27	1	1	-	3/2	-	-/90	-	-	-/90	-	8.5	-	170k	0.1/0.1	-	-	-/-
21	06/08	16,071'	9.7	27	1	1	-	3/2	-	-/90	-	-	-/90	-	8.5	-	168k	0.1/0.1	-	-	-/-
22	06/09	17,660'	9.7	27	1	1	-	3/2	-	-/90	-	-	-/90	-	8.5	-	168k	0.1/0.1	-	-	-/-
23	06/10	18,923'	9.6	26	1	1	-	3/2	-	-/90	-	-	-/90	-	8	-	168k	0.1/0.1	-	-	-/-
24	06/11	20,220'	9.6	26	1	1	-	3/2	-	-/90	-	-	-/90	-	8	-	168k	0.1/0.1	-	-	-/-

BOTTOM HOLE ASSEMBLY RECORD

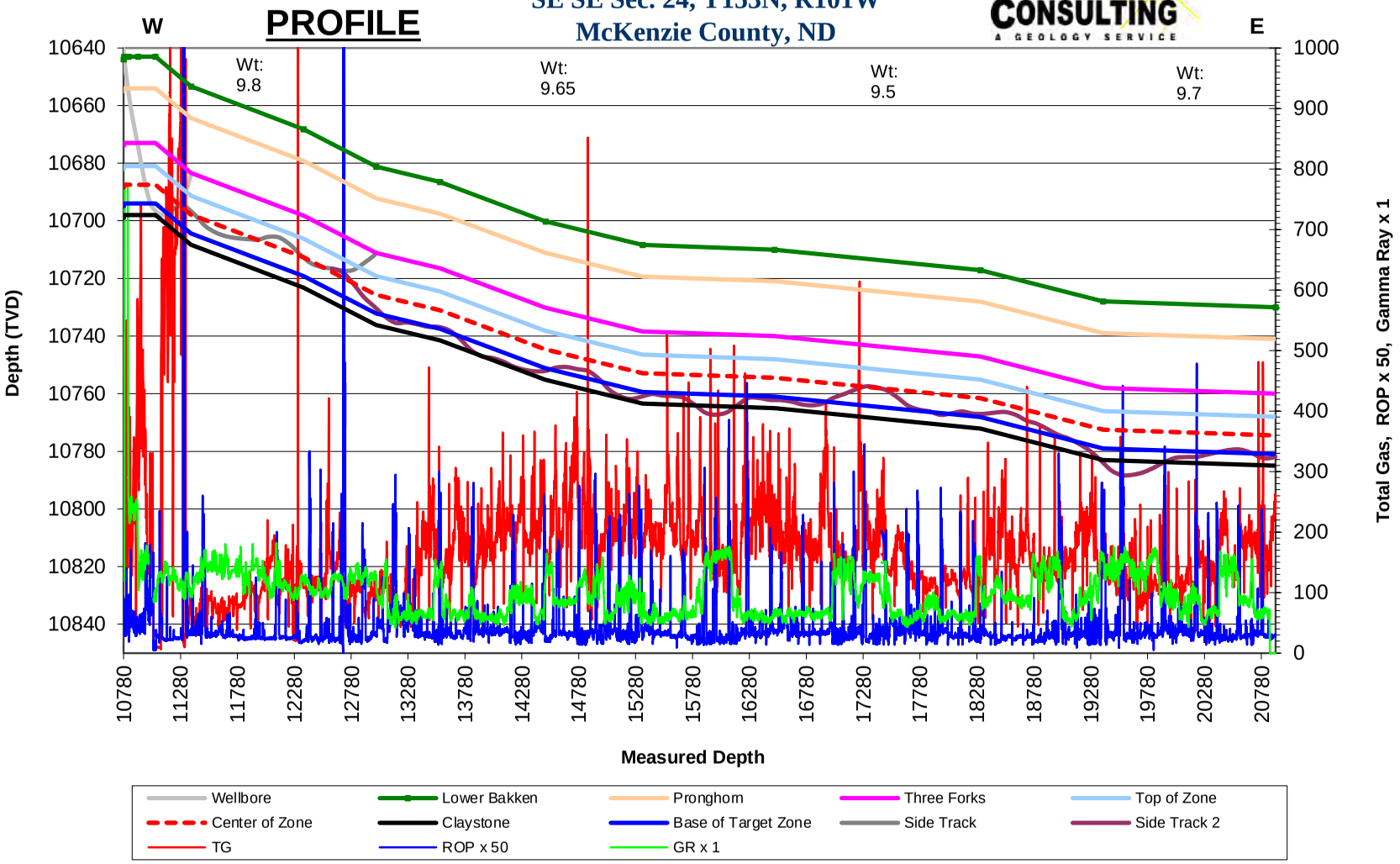
BHA Run	Depth In	Depth Out	Footage	Hours	Accum. Hours	Vert. Dev.	Bit Data								Motor Data				
							Bit #	Size (in.)	Type	Make	Model	Serial #	Jets	Hours	Motor #	Make	Bend	Hours	Rev/Gal
2	2,058'	5,993'	3,935'	35.5	35.50	Vertical	2	12 1/4	PDC	Stickman	-	200635	9x14	35.5	2	Baker	1.50°	35.5	0.49
3	5,993'	10,200'	4,207'	61.5	97.00	Vertical	3	8 3/4	PDC	Haliburton	MM55D	12394664	5x14	61.5	3	Baker	1.50°	61.5	0.49
4	10,200'	11,043'	843'	23.5	120.50	Curve	4	8 3/4	PDC	Haliburton	MMD55M	12260862	5x14	23.5	4	Baker	1.86°	23.5	0.49
5	11,043'	11,374'	331'	5	125.50	Lateral	5	6	PDC	-	-	JH5916	3x18	5	5	Baker	1.50°	5	0.29
6	11,298'	20,904'	9,606'	142.5	268.00	Lateral	6	6	PDC	Baker Hughes	T307	7151043	5x14	142.5	6	Baker	1.50°	142.5	0.29

PLAN VIEW

Oasis Petroleum North America, LLC
Chalmers 5301 44-24 2TR



Oasis Petroleum North America, LLC
Chalmers 5301 44-24 2TR
SE SE Sec. 24, T153N, R101W
McKenzie County, ND



FORMATION MARKERS & DIP ESTIMATES

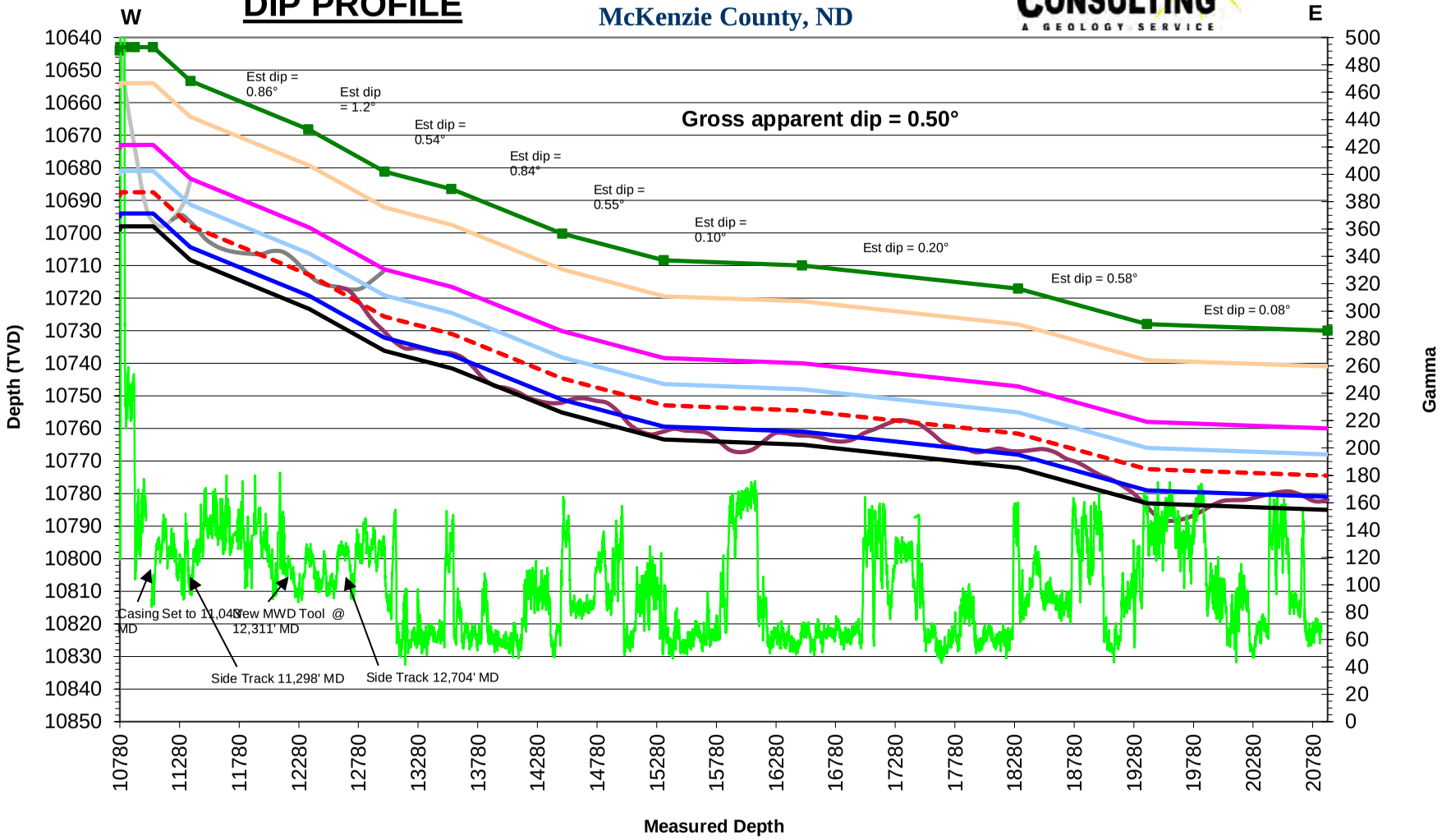
Oasis Petroleum North America, LLC - Chalmers 5301 44-24 2TR

Dip Change Points	MD	TVD	TVD diff.	MD diff.	Dip	Dipping up/down	Type of Marker
Marker							
	10,906'	10,643.00					
Base of Target	11,059'	10,643.00	0.00	153.00	***0.00***	Flat	Gamma
Center of Target	11,374'	10,653.40	10.40	315.00	***-1.89***	Down	Gamma
Center of Target	12,361'	10,668.20	14.80	987.00	***-0.86***	Down	Gamma
Side Track 1	13,000'	10,681.20	13.00	639.00	***-1.17***	Down	Gamma
Base of Target	13,560'	10,686.50	5.30	560.00	***-0.54***	Down	Gamma
Cool Gamma Marker	14,490'	10,700.20	13.70	930.00	***-0.84***	Down	Gamma
Cool Gamma Marker	15,340'	10,708.40	8.20	850.00	***-0.55***	Down	Gamma
Cool Gamma Marker	16,500'	10,710.00	1.60	1160.00	***-0.08***	Down	Gamma
Warm Gamma Marker	18,310'	10,717.10	7.10	1810.00	***-0.22***	Down	Gamma
Claystone	19,390'	10,728.00	10.90	1080.00	***-0.58***	Down	Gamma
	20,904'	10,730.00	2.00	1514.00	***-0.08***	Down	Gamma
Gross Dip							
Initial Target Contact	10,906'	10,643.00					
Projected Final Target Contact	20,904'	10,730.00	87.00	9998.00	***-0.50***	Down	Projection

Oasis Petroleum North America, LLC
Chalmers 5301 44-24 2TR
SE SE Sec. 24, T153N, R101W
McKenzie County, ND

SUNBURST CONSULTING
A GEOLOGY SERVICE

DIP PROFILE



Wellbore | Lower Bakken | Pronghorn | Three Forks | Top of Zone | Center of Zone
Claystone | Base of Target Zone | Side Track | Side Track 2 | Gamma

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	5/28/2014
Well :	Chalmers 5301 44-24 2TR			Finish:	6/1/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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	0.00	0.00	0.00	0.00	0.00
1	118.00	0.10	79.80	118.00	0.02	0.10	0.10	0.08
2	149.00	0.30	58.90	149.00	0.06	0.20	0.20	0.68
3	242.00	0.30	105.30	242.00	0.13	0.64	0.64	0.25
4	335.00	0.40	85.40	335.00	0.09	1.20	1.20	0.17
5	429.00	0.40	115.20	428.99	-0.03	1.82	1.82	0.22
6	522.00	0.40	140.40	521.99	-0.41	2.32	2.32	0.19
7	614.00	0.40	79.20	613.99	-0.60	2.84	2.84	0.44
8	706.00	0.40	30.60	705.99	-0.26	3.32	3.32	0.36
9	798.00	0.40	16.90	797.99	0.32	3.58	3.58	0.10
10	890.00	0.40	25.50	889.98	0.92	3.81	3.82	0.07
11	982.00	0.10	168.80	981.98	1.13	3.97	3.97	0.53
12	1075.00	0.40	201.90	1074.98	0.75	3.86	3.86	0.35
13	1167.00	0.60	185.90	1166.98	-0.03	3.69	3.69	0.26
14	1259.00	0.80	236.90	1258.97	-0.86	3.10	3.10	0.68
15	1351.00	0.90	271.20	1350.96	-1.20	1.84	1.83	0.55
16	1443.00	1.10	282.40	1442.95	-0.99	0.26	0.25	0.30
17	1537.00	1.20	287.20	1536.93	-0.51	-1.56	-1.57	0.15
18	1630.00	0.70	306.20	1629.92	0.12	-2.95	-2.95	0.63
19	1723.00	0.40	354.40	1722.91	0.78	-3.44	-3.44	0.57
20	1817.00	0.60	349.40	1816.91	1.59	-3.57	-3.55	0.22
21	1910.00	0.70	344.00	1909.90	2.61	-3.81	-3.79	0.13
22	1991.00	0.70	345.60	1990.90	3.57	-4.07	-4.05	0.02
23	2084.00	1.10	345.60	2083.89	4.98	-4.43	-4.40	0.43
24	2178.00	1.10	345.50	2177.87	6.73	-4.88	-4.84	0.00
25	2271.00	1.10	2.90	2270.85	8.48	-5.06	-5.00	0.36
26	2364.00	1.10	11.00	2363.84	10.25	-4.85	-4.78	0.17
27	2457.00	1.00	41.60	2456.82	11.74	-4.14	-4.06	0.60
28	2551.00	1.10	64.70	2550.80	12.73	-2.78	-2.69	0.46
29	2644.00	1.10	69.70	2643.79	13.43	-1.13	-1.04	0.10
30	2737.00	1.30	82.90	2736.77	13.87	0.75	0.85	0.37
31	2830.00	1.20	90.70	2829.75	13.98	2.77	2.87	0.21
32	2924.00	1.20	119.00	2923.73	13.49	4.62	4.71	0.62
33	3017.00	0.70	154.10	3016.71	12.51	5.72	5.80	0.80
34	3110.00	0.40	158.90	3109.71	11.70	6.08	6.16	0.33

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	5/28/2014
Well :	Chalmers 5301 44-24 2TR			Finish:	6/1/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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
35	3203.00	0.50	351.80	3202.71	11.80	6.14	6.22	0.96
36	3297.00	0.70	357.20	3296.70	12.78	6.05	6.14	0.22
37	3390.00	1.00	10.40	3389.69	14.14	6.17	6.27	0.38
38	3483.00	1.30	12.90	3482.67	15.97	6.55	6.66	0.33
39	3577.00	1.70	28.80	3576.64	18.23	7.46	7.59	0.61
40	3670.00	1.80	23.00	3669.60	20.78	8.70	8.84	0.22
41	3763.00	1.80	21.70	3762.55	23.48	9.81	9.97	0.04
42	3856.00	1.80	29.70	3855.51	26.11	11.07	11.25	0.27
43	3950.00	2.40	40.10	3949.44	28.90	13.07	13.27	0.75
44	4043.00	0.80	54.80	4042.40	30.76	14.86	15.07	1.76
45	4136.00	0.80	110.80	4135.40	30.91	16.00	16.21	0.81
46	4229.00	0.80	232.60	4228.39	30.28	16.09	16.29	1.50
47	4323.00	1.10	239.80	4322.38	29.43	14.79	14.99	0.34
48	4416.00	1.40	258.60	4415.36	28.75	12.90	13.10	0.54
49	4509.00	1.10	220.20	4508.34	27.85	11.21	11.40	0.94
50	4603.00	1.50	218.50	4602.31	26.20	9.86	10.04	0.43
51	4696.00	1.00	249.00	4695.29	24.95	8.35	8.52	0.88
52	4789.00	1.10	253.00	4788.28	24.40	6.74	6.90	0.13
53	4882.00	1.50	257.60	4881.25	23.88	4.69	4.86	0.44
54	4976.00	1.20	263.50	4975.23	23.50	2.51	2.67	0.35
55	5069.00	0.40	250.60	5068.22	23.28	1.24	1.40	0.88
56	5162.00	0.10	137.40	5161.21	23.12	0.99	1.15	0.48
57	5255.00	1.30	143.50	5254.21	22.21	1.67	1.82	1.29
58	5348.00	1.50	155.00	5347.18	20.26	2.81	2.95	0.37
59	5441.00	1.30	184.50	5440.15	18.10	3.24	3.37	0.79
60	5534.00	1.20	214.70	5533.13	16.25	2.61	2.72	0.71
61	5627.00	1.60	233.70	5626.10	14.68	1.01	1.11	0.65
62	5721.00	1.70	229.70	5720.06	13.00	-1.11	-1.03	0.16
63	5814.00	1.70	231.10	5813.02	11.24	-3.24	-3.16	0.04
64	5907.00	1.50	233.80	5905.99	9.66	-5.30	-5.23	0.23
65	5937.00	1.60	236.10	5935.98	9.19	-5.96	-5.90	0.39
66	6062.00	2.10	237.20	6060.91	6.98	-9.33	-9.29	0.40
67	6093.00	1.80	238.40	6091.89	6.42	-10.23	-10.18	0.98
68	6186.00	1.30	297.20	6184.86	6.13	-12.41	-12.37	1.70
69	6279.00	1.60	294.20	6277.83	7.15	-14.53	-14.48	0.33

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	5/28/2014
Well :	Chalmers 5301 44-24 2TR			Finish:	6/1/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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
70	6372.00	0.80	315.60	6370.81	8.14	-16.17	-16.11	0.97
71	6465.00	0.60	309.80	6463.81	8.92	-17.00	-16.94	0.23
72	6559.00	1.50	32.70	6557.79	10.27	-16.71	-16.64	1.64
73	6652.00	1.50	25.70	6650.76	12.39	-15.53	-15.44	0.20
74	6745.00	1.70	32.90	6743.72	14.65	-14.25	-14.15	0.30
75	6838.00	1.50	24.70	6836.69	16.91	-12.99	-12.88	0.33
76	6932.00	1.40	35.60	6930.66	18.96	-11.81	-11.68	0.31
77	7025.00	1.30	33.80	7023.63	20.76	-10.56	-10.42	0.12
78	7118.00	1.00	40.00	7116.61	22.26	-9.45	-9.30	0.35
79	7211.00	0.80	60.00	7209.60	23.21	-8.37	-8.21	0.40
80	7305.00	0.80	59.50	7303.59	23.87	-7.23	-7.07	0.01
81	7398.00	0.90	46.70	7396.58	24.70	-6.14	-5.97	0.23
82	7491.00	0.60	67.10	7489.58	25.39	-5.16	-4.99	0.43
83	7584.00	0.50	81.40	7582.57	25.64	-4.31	-4.14	0.18
84	7677.00	0.70	5.80	7675.57	26.27	-3.85	-3.68	0.81
85	7771.00	0.60	357.70	7769.56	27.33	-3.82	-3.63	0.14
86	7864.00	0.70	21.80	7862.56	28.34	-3.62	-3.43	0.31
87	8050.00	0.70	15.70	8048.54	30.49	-2.90	-2.69	0.04
88	8143.00	1.00	26.80	8141.53	31.76	-2.38	-2.16	0.37
89	8237.00	1.00	22.60	8235.52	33.25	-1.69	-1.46	0.08
90	8330.00	0.80	31.30	8328.51	34.56	-1.04	-0.81	0.26
91	8423.00	0.70	23.30	8421.50	35.63	-0.48	-0.24	0.16
92	8516.00	0.70	44.20	8514.49	36.56	0.14	0.39	0.27
93	8609.00	1.00	40.90	8607.48	37.58	1.07	1.32	0.33
94	8702.00	0.90	54.10	8700.47	38.62	2.19	2.45	0.26
95	8796.00	0.60	43.40	8794.46	39.41	3.13	3.40	0.35
96	8889.00	0.70	60.60	8887.45	40.05	3.96	4.23	0.23
97	8982.00	0.50	63.90	8980.45	40.50	4.82	5.09	0.22
98	9075.00	0.50	75.50	9073.45	40.78	5.57	5.85	0.11
99	9169.00	0.20	78.40	9167.44	40.92	6.13	6.41	0.32
100	9262.00	0.20	121.70	9260.44	40.87	6.43	6.71	0.16
101	9355.00	0.30	91.10	9353.44	40.78	6.81	7.09	0.18
102	9448.00	0.30	87.10	9446.44	40.78	7.30	7.57	0.02
103	9542.00	0.10	7.30	9540.44	40.88	7.55	7.83	0.32
104	9635.00	0.20	233.00	9633.44	40.86	7.43	7.71	0.30

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	5/28/2014
Well :	Chalmers 5301 44-24 2TR			Finish:	6/1/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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
105	9728.00	0.40	230.20	9726.44	40.56	7.05	7.33	0.22
106	9821.00	0.60	204.20	9819.44	39.90	6.61	6.88	0.32
107	9915.00	0.60	230.70	9913.43	39.14	6.02	6.29	0.29
108	10008.00	1.00	244.10	10006.42	38.48	4.92	5.18	0.47
109	10101.00	1.40	243.10	10099.40	37.61	3.17	3.43	0.43
110	10144.00	1.40	242.70	10142.39	37.13	2.24	2.49	0.02
111	10209.00	1.50	134.40	10207.38	36.17	2.14	2.39	3.62
112	10240.00	6.30	104.70	10238.30	35.46	4.08	4.32	16.30
113	10271.00	10.90	98.60	10268.94	34.59	8.62	8.86	15.11
114	10302.00	15.50	93.60	10299.11	33.89	15.66	15.89	15.28
115	10333.00	19.20	91.10	10328.70	33.53	24.89	25.12	12.17
116	10364.00	22.20	87.20	10357.70	33.72	35.84	36.07	10.65
117	10396.00	25.10	83.90	10387.01	34.74	48.63	48.87	9.96
118	10427.00	28.20	85.00	10414.71	36.07	62.47	62.71	10.13
119	10458.00	32.20	86.40	10441.50	37.23	78.02	78.27	13.10
120	10489.00	35.30	91.20	10467.27	37.56	95.22	95.47	13.18
121	10520.00	38.20	92.60	10492.11	36.94	113.76	114.00	9.74
122	10551.00	42.00	92.30	10515.82	36.09	133.70	133.94	12.27
123	10582.00	46.90	91.90	10537.94	35.30	155.39	155.63	15.83
124	10613.00	51.40	90.50	10558.21	34.81	178.83	179.06	14.91
125	10644.00	54.90	87.90	10576.81	35.17	203.62	203.86	13.13
126	10675.00	57.10	84.60	10594.14	36.86	229.26	229.51	11.32
127	10707.00	60.80	84.10	10610.64	39.56	256.54	256.80	11.64
128	10738.00	63.80	85.00	10625.05	42.17	283.86	284.14	10.01
129	10769.00	67.50	86.20	10637.83	44.33	312.01	312.31	12.45
130	10800.00	71.30	87.90	10648.74	45.82	340.98	341.29	13.29
131	10831.00	75.00	88.50	10657.72	46.75	370.63	370.94	12.08
132	10862.00	78.00	89.00	10664.96	47.40	400.77	401.08	9.80
133	10893.00	78.10	89.00	10671.38	47.93	431.09	431.41	0.32
134	10924.00	77.80	89.10	10677.85	48.44	461.40	461.72	1.02
135	10955.00	77.60	89.30	10684.45	48.86	491.69	492.01	0.90
136	10986.00	81.50	90.10	10690.08	49.02	522.17	522.49	12.83
137	11034.00	85.70	85.80	10695.43	50.73	569.81	570.15	12.48
138	11126.00	91.10	86.60	10698.00	56.82	661.54	661.91	5.93
139	11219.00	91.50	85.40	10695.89	63.31	754.29	754.70	1.36

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	5/28/2014
Well :	Chalmers 5301 44-24 2TR			Finish:	6/1/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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
140	11312.00	94.50	87.20	10691.02	69.30	846.95	847.41	3.76
141	11374.00	98.90	87.20	10683.79	72.31	908.44	908.91	7.10

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	6/2/2014
Well :	Chalmers 5301 44-24 2TR Sidetrack #1			Finish:	6/4/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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	11219.00	91.50	85.40	10695.89	63.30	754.30	754.71	1.36
1	11281.00	90.80	86.10	10694.64	67.89	816.12	816.56	1.60
2	11312.00	89.00	86.10	10694.69	70.00	847.04	847.50	5.81
3	11405.00	87.10	87.90	10697.86	74.87	939.85	940.34	2.81
4	11498.00	88.00	89.30	10701.84	77.14	1032.74	1033.24	1.79
5	11591.00	89.20	89.70	10704.11	77.95	1125.70	1126.21	1.36
6	11683.00	89.20	89.50	10705.39	78.59	1217.69	1218.20	0.22
7	11776.00	90.00	89.70	10706.04	79.24	1310.69	1311.20	0.89
8	11869.00	89.60	89.40	10706.37	79.97	1403.68	1404.20	0.54
9	11962.00	90.20	89.80	10706.53	80.62	1496.68	1497.20	0.78
10	12054.00	91.00	89.70	10705.56	81.02	1588.67	1589.19	0.88
11	12147.00	88.70	91.10	10705.81	80.37	1681.66	1682.17	2.90
12	12240.00	88.40	91.30	10708.16	78.42	1774.61	1775.11	0.39
13	12333.00	87.20	89.80	10711.73	77.53	1867.54	1868.02	2.06
14	12426.00	89.10	90.20	10714.73	77.53	1960.48	1960.97	2.09
15	12519.00	89.30	90.80	10716.03	76.72	2053.47	2053.94	0.68
16	12611.00	90.00	91.00	10716.59	75.27	2145.46	2145.92	0.79
17	12704.00	89.10	91.50	10717.32	73.25	2238.43	2238.88	1.11
18	12798.00	91.20	92.30	10717.08	70.13	2332.37	2332.80	2.39
19	12892.00	91.70	91.90	10714.70	66.69	2426.28	2426.68	0.68
20	12987.00	91.70	91.90	10711.88	63.54	2521.18	2521.56	0.00

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	6/5/2014
Well :	Chalmers 5301 44-24 2TR Sidetrack #2			Finish:	6/11/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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	12611.00	90.00	91.00	10716.59	75.28	2145.46	2145.92	0.00
1	12704.00	88.50	91.80	10717.81	73.01	2238.42	2238.87	1.83
2	12798.00	86.60	93.00	10721.83	69.08	2332.25	2332.66	2.39
3	12892.00	87.70	90.90	10726.50	65.88	2426.07	2426.46	2.52
4	12987.00	88.20	90.40	10729.90	64.81	2521.00	2521.38	0.74
5	13081.00	87.60	90.40	10733.34	64.15	2614.94	2615.31	0.64
6	13174.00	89.80	90.10	10735.45	63.74	2707.91	2708.28	2.39
7	13268.00	90.40	89.80	10735.29	63.83	2801.90	2802.27	0.71
8	13362.00	88.80	89.30	10735.94	64.56	2895.90	2896.27	1.78
9	13456.00	90.20	89.60	10736.76	65.47	2989.89	2990.26	1.52
10	13550.00	89.70	89.70	10736.85	66.04	3083.88	3084.26	0.54
11	13644.00	88.80	89.40	10738.08	66.78	3177.87	3178.25	1.01
12	13738.00	87.60	89.40	10741.03	67.76	3271.82	3272.20	1.28
13	13832.00	87.80	90.10	10744.80	68.17	3365.74	3366.13	0.77
14	13926.00	89.50	89.60	10747.02	68.42	3459.71	3460.10	1.89
15	14021.00	89.80	90.40	10747.60	68.42	3554.71	3555.09	0.90
16	14114.00	88.70	91.10	10748.81	67.20	3647.69	3648.06	1.40
17	14208.00	89.10	90.00	10750.62	66.30	3741.67	3742.03	1.24
18	14301.00	89.60	89.00	10751.67	67.11	3834.66	3835.02	1.20
19	14394.00	89.70	88.70	10752.24	68.98	3927.64	3928.01	0.34
20	14488.00	90.50	90.00	10752.08	70.04	4021.63	4022.01	1.62
21	14582.00	90.90	90.40	10750.93	69.72	4115.62	4116.00	0.60
22	14676.00	89.30	90.20	10750.77	69.22	4209.61	4209.99	1.72
23	14770.00	89.80	90.80	10751.50	68.40	4303.61	4303.97	0.83
24	14864.00	89.40	90.60	10752.16	67.26	4397.60	4397.95	0.48
25	14958.00	87.30	89.40	10754.87	67.25	4491.55	4491.90	2.57
26	15052.00	88.00	89.60	10758.72	68.07	4585.47	4585.83	0.77
27	15146.00	89.30	89.20	10760.94	69.06	4679.43	4679.80	1.45
28	15239.00	89.60	89.40	10761.83	70.19	4772.42	4772.79	0.39
29	15333.00	91.40	90.10	10761.01	70.60	4866.41	4866.78	2.05
30	15427.00	89.70	90.70	10760.11	69.95	4960.40	4960.76	1.92
31	15520.00	89.60	90.70	10760.67	68.81	5053.39	5053.75	0.11
32	15614.00	90.20	91.40	10760.84	67.09	5147.38	5147.72	0.98
33	15708.00	89.00	89.40	10761.49	66.43	5241.37	5241.70	2.48
34	15801.00	88.00	89.50	10763.93	67.33	5334.33	5334.66	1.08

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	6/5/2014
Well :	Chalmers 5301 44-24 2TR Sidetrack #2			Finish:	6/11/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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
35	15895.00	88.70	89.30	10766.64	68.31	5428.28	5428.62	0.77
36	15989.00	90.50	89.80	10767.29	69.05	5522.28	5522.62	1.99
37	16083.00	90.50	89.10	10766.47	69.95	5616.27	5616.61	0.74
38	16177.00	92.60	89.40	10763.93	71.18	5710.22	5710.57	2.26
39	16270.00	90.40	90.00	10761.49	71.67	5803.18	5803.53	2.45
38	16364.00	89.60	91.00	10761.49	70.85	5897.17	5897.52	1.36
40	16458.00	89.60	91.90	10762.15	68.47	5991.14	5991.47	0.96
41	16552.00	90.30	90.90	10762.23	66.17	6085.11	6085.42	1.30
42	16646.00	89.10	90.30	10762.72	65.19	6179.10	6179.40	1.43
43	16739.00	89.70	90.00	10763.70	64.94	6272.10	6272.39	0.72
44	16833.00	89.90	89.90	10764.03	65.03	6366.10	6366.39	0.24
45	16927.00	90.90	90.10	10763.37	65.03	6460.09	6460.39	1.08
46	17020.00	91.50	90.50	10761.42	64.54	6553.07	6553.36	0.78
47	17114.00	90.10	90.80	10760.11	63.47	6647.05	6647.33	1.52
48	17208.00	91.70	90.20	10758.63	62.65	6741.03	6741.30	1.82
49	17302.00	89.70	89.40	10757.49	62.98	6835.02	6835.29	2.29
50	17395.00	89.90	89.70	10757.81	63.71	6928.02	6928.29	0.39
51	17488.00	88.80	89.80	10758.87	64.12	7021.01	7021.28	1.19
52	17582.00	88.20	90.00	10761.33	64.28	7114.98	7115.25	0.67
53	17676.00	88.30	89.40	10764.20	64.77	7208.93	7209.20	0.65
54	17771.00	90.10	89.90	10765.52	65.35	7303.92	7304.19	1.97
55	17865.00	89.10	89.60	10766.18	65.76	7397.91	7398.19	1.11
56	17960.00	89.50	89.70	10767.34	66.34	7492.90	7493.18	0.43
57	18054.00	91.10	88.70	10766.85	67.66	7586.89	7587.17	2.01
58	18149.00	89.70	89.60	10766.18	69.06	7681.87	7682.16	1.75
59	18243.00	89.40	89.60	10766.92	69.72	7775.87	7776.16	0.32
60	18338.00	90.50	88.70	10767.01	71.13	7870.85	7871.15	1.50
61	18432.00	90.00	89.60	10766.60	72.52	7964.84	7965.15	1.10
62	18526.00	90.30	89.30	10766.35	73.43	8058.84	8059.15	0.45
63	18621.00	88.50	89.90	10767.34	74.09	8153.82	8154.14	2.00
64	18715.00	89.10	90.50	10769.31	73.76	8247.80	8248.11	0.90
65	18809.00	89.50	90.90	10770.46	72.61	8341.79	8342.09	0.60
66	18903.00	88.20	91.20	10772.35	70.89	8435.75	8436.04	1.42
67	18997.00	89.40	91.00	10774.32	69.09	8529.71	8529.98	1.29
68	19090.00	89.00	89.10	10775.61	69.01	8622.70	8622.97	2.09

SUNBURST CONSULTING, INC.

Operator:	Oasis Petroleum North America, LLC			Kick-off:	6/5/2014
Well :	Chalmers 5301 44-24 2TR Sidetrack #2			Finish:	6/11/2014
County:	McKenzie	State:	ND	Directional Supervision:	
QQ:	SE SE	Section:	24	RPM	
Township:	153	N/S:	N		
Range:	101	E/W:	W	Date:	6/13/2014
Footages:	959	FN/SL:	S	Time:	16:59
	245	FE/WL:	E	**F9 to re-calculate**	

Minimum Curvature Method (SPE-3362) Proposed dir: 89.61

[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
69	19184.00	88.60	90.20	10777.58	69.58	8716.67	8716.94	1.24
70	19278.00	88.50	90.80	10779.96	68.76	8810.64	8810.90	0.65
71	19372.00	87.40	90.40	10783.32	67.78	8904.57	8904.83	1.25
72	19465.00	88.40	88.00	10786.73	69.07	8997.49	8997.75	2.79
73	19559.00	89.70	89.00	10788.29	71.54	9091.44	9091.72	1.74
74	19653.00	90.50	88.60	10788.13	73.50	9185.42	9185.71	0.95
75	19746.00	90.60	88.70	10787.23	75.69	9278.39	9278.69	0.15
76	19840.00	91.40	88.70	10785.59	77.83	9372.35	9372.67	0.85
77	19934.00	91.00	89.40	10783.63	79.38	9466.32	9466.64	0.86
78	20027.00	90.70	90.10	10782.25	79.79	9559.31	9559.63	0.82
79	20121.00	89.60	89.80	10782.00	79.87	9653.30	9653.62	1.21
80	20215.00	90.50	89.00	10781.92	80.86	9747.30	9747.62	1.28
81	20309.00	90.50	89.30	10781.10	82.25	9841.28	9841.62	0.32
82	20403.00	90.50	89.90	10780.28	82.91	9935.28	9935.61	0.64
83	20497.00	90.40	90.50	10779.54	82.58	10029.27	10029.60	0.65
84	20590.00	89.80	91.40	10779.38	81.04	10122.26	10122.58	1.16
85	20684.00	88.90	93.00	10780.44	77.43	10216.18	10216.47	1.95
86	20778.00	89.00	92.90	10782.17	72.59	10310.04	10310.29	0.15
87	20841.00	90.50	92.30	10782.44	69.74	10372.97	10373.21	2.56
88	20904.00	90.50	92.30	10781.89	67.21	10435.92	10436.13	0.00

FORMATION TOPS & STRUCTURAL RELATIONSHIPS

	Subject Well:								Offset Wells:		
Operator:	**Oasis Petroleum North America, LLC**										
Well Name:	**Chalmers 5301 44-24 2TR**										
Location:	959 FSL & 245 FEL										
	SE SE Section 24, T153N, R101W										
Elevation:	GL: 1,943' Sub: 25' KB: 1,968'										
Formation/ Zone	**Prog. Top**	**Prog. Datum (MSL)**	**Driller's Depth Top (MD)**	**Driller's Depth Top (TVD)**	**Datum (MSL)**	**Interval Thickness**	**Thickness to Target**	**Dip To Prog.**	**Dip To Chalmers 5300 31-19H**	**Dip To Lynn 1**	**Dip To Kline Federal 5300 11-18H**
Mowry	4,914'	-2,946'	4,907'	4,906'	-2,938'	437'	5,791'	8'	15'	-85'	-
Dakota	5,341'	-3,373'	5,344'	5,343'	-3,375'	500'	5,354'	-2'	7'	-92'	-
Swift	5,853'	-3,885'	5,844'	5,843'	-3,875'	495'	4,854'	10'	19'	-127'	-
Kibbey Lime	8,269'	-6,301'	8,265'	8,264'	-6,296'	165'	2,433'	5'	15'	-43'	-3'
Charles	8,433'	-6,465'	8,430'	8,429'	-6,461'	553'	2,268'	4'	14'	-44'	-30'
UB	9,010'	-7,042'	8,983'	8,982'	-7,014'	80'	1,715'	28'	35'	-23'	-9'
Base Last Salt	9,091'	-7,123'	9,064'	9,062'	-7,094'	47'	1,635'	29'	36'	-22'	43'
Ratcliffe	9,141'	-7,173'	9,111'	9,109'	-7,141'	177'	1,588'	32'	38'	-19'	46'
Mission Canyon	9,311'	-7,343'	9,288'	9,286'	-7,318'	559'	1,411'	25'	31'	-22'	45'
Lodgepole	9,876'	-7,908'	9,847'	9,845'	-7,877'	108'	852'	31'	38'	-31'	40'
Lodgepole A	9,953'	-7,985'	9,955'	9,953'	-7,985'	98'	744'	0'	9'	-61'	68'
Lodgepole B	10,109'	-8,141'	10,053'	10,051'	-8,083'	40'	646'	58'	65'	-68'	14'
Lodgepole C	10,180'	-8,212'	10,093'	10,091'	-8,123'	184'	606'	89'	96'	-27'	50'
Lodgepole D	10,283'	-8,315'	10,279'	10,275'	-8,307'	146'	422'	8'	15'	-83'	-28'
Lodgepole E	10,429'	-8,461'	10,434'	10,421'	-8,453'	71'	276'	8'	15'	-49'	-97'
Lodgepole F	10,502'	-8,534'	10,520'	10,492'	-8,524'	85'	205'	10'	16'	-39'	-86'
False Bakken	10,588'	-8,620'	10,641'	10,577'	-8,609'	8'	120'	11'	18'	-47'	9'
Upper Bakken	10,599'	-8,631'	10,658'	10,585'	-8,617'	17'	112'	14'	19'	-45'	11'
Middle Bakken	10,616'	-8,648'	10,689'	10,602'	-8,634'	42'	95'	14'	20'	-47'	10'
Lower Bakken	10,648'	-8,680'	10,785'	10,644'	-8,676'	11'	53'	4'	9'	-54'	-18'
Pronghorn	10,659'	-8,691'	10,821'	10,655'	-8,687'	19'	42'	4'	8'	-47'	-15'
Threeforks	10,676'	-8,708'	10,906'	10,674'	-8,706'	8'	23'	2'	5'	-55'	-8'
Target Top	10,692'	-8,724'	10,944'	10,682'	-8,714'	13'	15'	10'	16'	-48'	1'
Landing Target	10,697'	-8,729'	11,043'	10,695'	-8,727'	-	-	2'	8'	-51'	-5'

CONTROL DATA

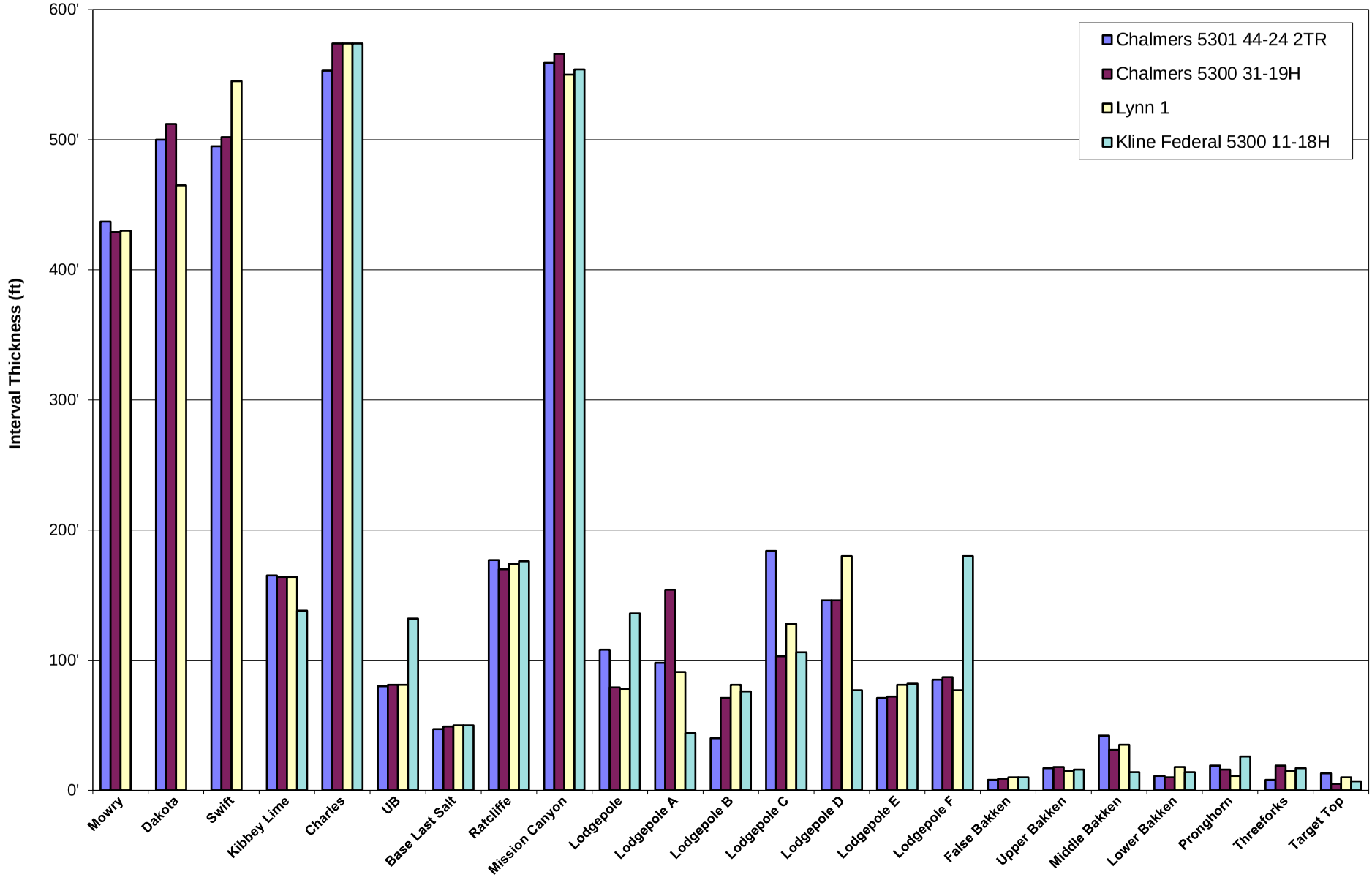
Operator:	Oasis Petroleum North America				Missouri Basin Well				Oasis Petroleum North America			
Well Name:	Chalmers 5300 31-19H				Lynn 1				Kline Federal 5300 11-18H			
Location:	NW SW Sec.19, T153N, R100W				SW NW Sec. 23, T153N, R101W				NW NW Section 18, T153N, R100W			
	McKenzie Co., ND				McKenzie Co., ND				McKenzie Co., ND			
	0.16 miles northeast of Chalmers 5301 44-24 2TR				1.83 miles northwest of Chalmers 5301 44-24 2TR				1.63 miles north of Chalmers 5301 44-24 2TR			
Elevation:	KB: 1,929'				KB: 2,142'				KB: 2,079'			
Formation/ Zone	**E-Log Top**	**Datum (MSL)**	**Interval Thickness**	**Thickness to Target**	**E-Log Top**	**Datum (MSL)**	**Interval Thickness**	**Thickness to Target**	**E-Log Top**	**Datum (MSL)**	**Interval Thickness**	**Thickness to Target**
Mowry	4,882'	-2,953'	429'	5,782'	4,995'	-2,853'	430'	5,823'	-	-	-	-
Dakota	5,311'	-3,382'	512'	5,353'	5,425'	-3,283'	465'	5,393'	-	-	-	-
Swift	5,823'	-3,894'	502'	4,841'	5,890'	-3,748'	545'	4,928'	-	-	-	-
Kibbey Lime	8,240'	-6,311'	164'	2,424'	8,395'	-6,253'	164'	2,423'	8,372'	-6,293'	138'	2,429'
Charles	8,404'	-6,475'	574'	2,260'	8,559'	-6,417'	574'	2,259'	8,510'	-6,431'	574'	2,291'
UB	8,978'	-7,049'	81'	1,686'	9,133'	-6,991'	81'	1,685'	9,084'	-7,005'	132'	1,717'
Base Last Salt	9,059'	-7,130'	49'	1,605'	9,214'	-7,072'	50'	1,604'	9,216'	-7,137'	50'	1,585'
Ratcliffe	9,108'	-7,179'	170'	1,556'	9,264'	-7,122'	174'	1,554'	9,266'	-7,187'	176'	1,535'
Mission Canyon	9,278'	-7,349'	566'	1,386'	9,438'	-7,296'	550'	1,380'	9,442'	-7,363'	554'	1,359'
Lodgepole	9,844'	-7,915'	79'	820'	9,988'	-7,846'	78'	830'	9,996'	-7,917'	136'	805'
Lodgepole A	9,923'	-7,994'	154'	741'	10,066'	-7,924'	91'	752'	10,132'	-8,053'	44'	669'
Lodgepole B	10,077'	-8,148'	71'	587'	10,157'	-8,015'	81'	661'	10,176'	-8,097'	76'	625'
Lodgepole C	10,148'	-8,219'	103'	516'	10,238'	-8,096'	128'	580'	10,252'	-8,173'	106'	549'
Lodgepole D	10,251'	-8,322'	146'	413'	10,366'	-8,224'	180'	452'	10,358'	-8,279'	77'	443'
Lodgepole E	10,397'	-8,468'	72'	267'	10,546'	-8,404'	81'	272'	10,435'	-8,356'	82'	366'
Lodgepole F	10,469'	-8,540'	87'	195'	10,627'	-8,485'	77'	191'	10,517'	-8,438'	180'	284'
False Bakken	10,556'	-8,627'	9'	108'	10,704'	-8,562'	10'	114'	10,697'	-8,618'	10'	104'
Upper Bakken	10,565'	-8,636'	18'	99'	10,714'	-8,572'	15'	104'	10,707'	-8,628'	16'	94'
Middle Bakken	10,583'	-8,654'	31'	81'	10,729'	-8,587'	35'	89'	10,723'	-8,644'	14'	78'
Lower Bakken	10,614'	-8,685'	10'	50'	10,764'	-8,622'	18'	54'	10,737'	-8,658'	14'	64'
Pronghorn	10,624'	-8,695'	16'	40'	10,782'	-8,640'	11'	36'	10,751'	-8,672'	26'	50'
Threeforks	10,640'	-8,711'	19'	24'	10,793'	-8,651'	15'	25'	10,777'	-8,698'	17'	24'
Target Top	10,659'	-8,730'	5'	5'	10,808'	-8,666'	10'	10'	10,794'	-8,715'	7'	7'
Landing Target	10,664'	-8,735'	3'	0'	10,818'	-8,676'	9'	0'	10,801'	-8,722'	7'	0'
Target Base	10,667'	-8,738'	1'	-	10,827'	-8,685'	1'	-	10,808'	-8,729'	1'	-
Claystone	10,668'	-8,739'	-	-	10,828'	-8,686'	-	-	10,809'	-8,730'	-	-

LANDING PROJECTION

Formation/ Zone:	Proposed Top of Target From:			
	Chalmers 5300 31-19H	Lynn 1	Kline Federal 5300 11-18H	Average of Offset Wells
Kibbey Lime	10,688'	10,687'	10,693'	10,689'
Charles	10,689'	10,688'	10,720'	10,699'
UB	10,668'	10,667'	10,699'	10,678'
Base Last Salt	10,667'	10,666'	10,647'	10,660'
Ratcliffe	10,665'	10,663'	10,644'	10,657'
Mission Canyon	10,672'	10,666'	10,645'	10,661'
Lodgepole	10,665'	10,675'	10,650'	10,663'
Lodgepole A	10,694'	10,705'	10,622'	10,674'
Lodgepole B	10,638'	10,712'	10,676'	10,675'
Lodgepole C	10,607'	10,671'	10,640'	10,639'
Lodgepole D	10,688'	10,727'	10,718'	10,711'
Lodgepole E	10,688'	10,693'	10,787'	10,723'
Lodgepole F	10,687'	10,683'	10,776'	10,715'
False Bakken	10,685'	10,691'	10,681'	10,686'
Upper Bakken	10,684'	10,689'	10,679'	10,684'
Middle Bakken	10,683'	10,691'	10,680'	10,685'
Lower Bakken	10,694'	10,698'	10,708'	10,700'
Pronghorn	10,695'	10,691'	10,705'	10,697'
Threeforks	10,698'	10,699'	10,698'	10,698'
Target Top	10,687'	10,692'	10,689'	10,689'
Landing Target	10,695'	10,695'	10,695'	10,695'

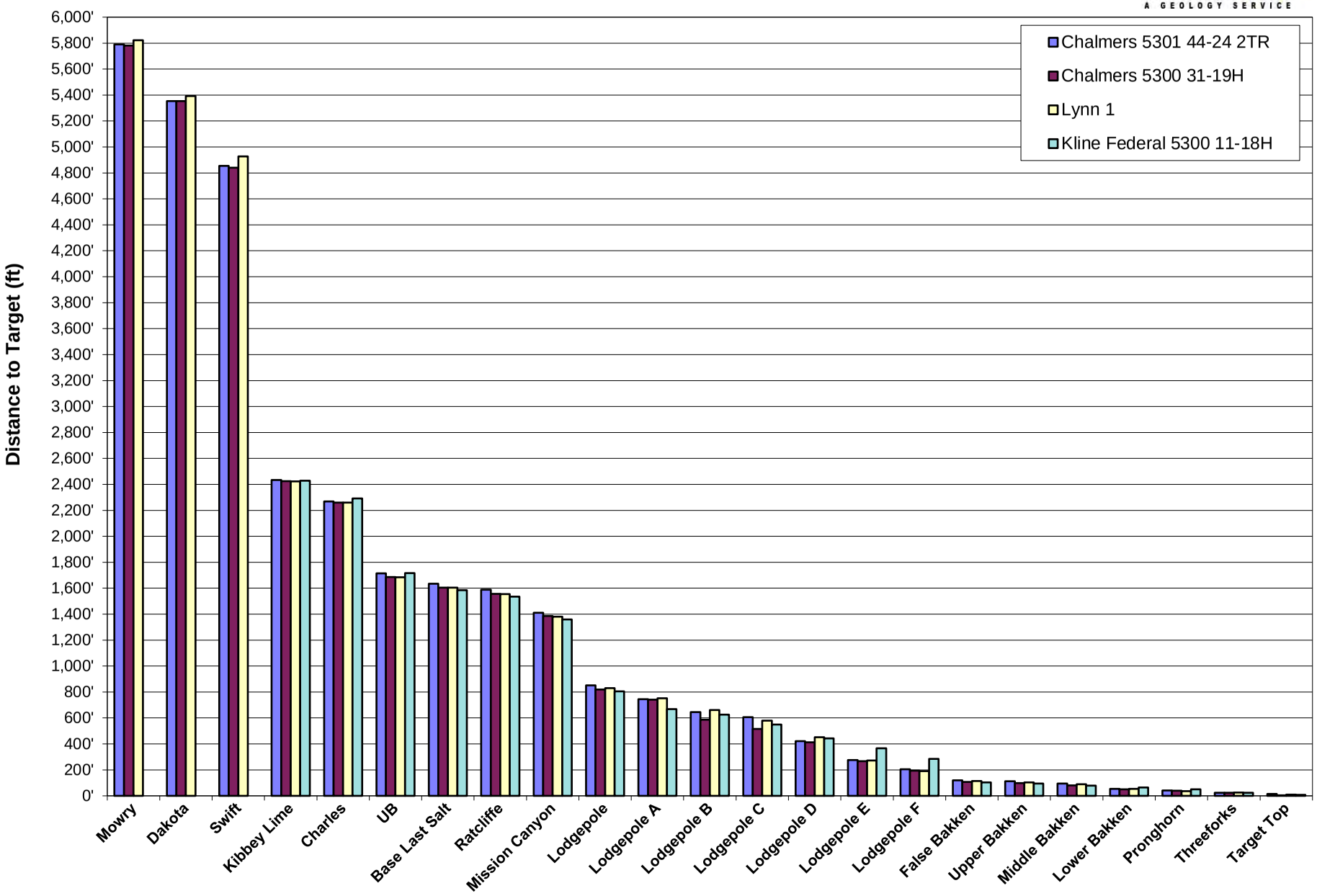
INTERVAL THICKNESS

Oasis Petroleum North America, LLC - Chalmers 5301 44-24 2TR



ISOPACH TO TARGET

Oasis Petroleum North America, LLC - Chalmers 5301 44-24 2TR



LITHOLOGY

Rig crews caught lagged samples in 30' intervals under the supervision of Sunburst geologists. A detailed list of sampling intervals is included in the well data summary page. Sample or gamma ray marker tops have been inserted in the sample descriptions below for reference. Samples were examined wet and dry under a trinocular microscope. The drilling fluid was diesel-based invert from surface casing to intermediate casing, while salt water drilling fluid was used throughout the lateral. Sample collection began at 4,960' MD.

Mowry [4,907' MD, 4,906' TVD (-2,938')]

4930-4960 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

4960-4990 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

4990-5020 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5020-5050 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5050-5080 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5080-5110 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5110-5140 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5140-5170 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; trace SILTSTONE: light gray to brown, friable to firm, sub rounded, moderately cemented, possible intergranular porosity, no visible oil stain

5170-5200 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; trace SILTSTONE: light gray to brown, friable to firm, sub rounded, moderately cemented, possible intergranular porosity, no visible oil stain

5200-5230 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain; trace SILTSTONE: light gray to brown, friable to firm, sub rounded, moderately cemented, possible intergranular porosity, no visible oil stain

5230-5260 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5260-5290 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5290-5320 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

Dakota [5,344' MD, 5,343' TVD (-3,375')]

5320-5350 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5350-5380 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5380-5410 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5410-5440 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5440-5470 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5470-5500 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5500-5530 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, trace SILTY SANDSTONE: light gray to medium brown, very fine good, friable to firm, sub round, well sorted, moderately cemented, no visible porosity, no visible oil stain

5530-5560 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5560-5590 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5590-5620 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5620-5650 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5650-5680 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5680-5710 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5710-5740 SHALE: dark to medium gray, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5740-5770 SILTY SANDSTONE: light gray to medium brown, very fine good, friable to firm, sub rounded, well sorted, moderately cemented, calcareous, no visible porosity; trace SHALE: orange, firm, blocky, earthy, calcareous, no visible porosity, no visible oil stain

5770-5800 SILTY SANDSTONE: light gray to medium brown, very fine good, friable to firm, sub rounded, well sorted, moderately cemented, calcareous, no visible porosity; trace SHALE: orange, firm, blocky, earthy, calcareous, no visible porosity, no visible oil stain

5800-5830 SILTY SANDSTONE: light to medium gray to brown, very fine good, friable to firm, sub rounded, well sorted, moderately cemented, calcareous, trace SHALE: dark gray brown, firm, blocky, earthy, calcareous, trace spry calcite, no visible porosity, no visible oil stain

<u>Swift</u> [5,844’ MD, 5,843’ TVD (-3,875’)]

5830-5860 SILTY SANDSTONE: light to medium gray to brown, very fine good, friable to firm, sub rounded, well sorted, moderately cemented, calcareous, trace SHALE: dark gray brown, firm, blocky, earthy, calcareous, trace spry calcite, no visible porosity, no visible oil stain

5860-5890 SHALE: dark to medium gray brown, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5890-5920 SHALE: dark to medium gray brown, firm, sub blocky, earthy, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

5920-5950 SHALE: light blue gray, firm, earthy, calcareous, fissile, no visible porosity, no visible oil stain

5950-5980 SHALE: light blue gray, firm, earthy, calcareous, fissile, no visible porosity, no visible oil stain

5980-5993 SHALE: medium gray to brown, firm, sub blocky, calcareous, trace disseminated pyrite, no visible porosity, no visible oil stain

Kibbey

8170-8200 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; rare ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: tan to off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

8200-8230 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; rare ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: tan to off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

8230-8260 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; rare ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: tan to off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

Kibbey "Lime" [8,265' MD, 8,264' TVD (-6,296')]

8260-8290 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; rare ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: tan to off white, very fine grained, sub rounded, moderately sorted, calcite cement, poorly cemented

8290-8320 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; occasional ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: as above

8320-8350 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; occasional ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: as above

8350-8380 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; occasional ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: as above

8380-8410 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; occasional ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: as above

The First Charles Salt [8,430' MD, 8,429' TVD (-6,461')]

8410-8440 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; occasional ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: as above

8440-8470 SILTSTONE: dark orange to light brown, tan, pink, soft, sub blocky, calcite cement, poorly cemented; occasional ANHYDRITE: off white, soft, amorphous texture; trace SILTY SANDSTONE: as above

8470-8500 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8500-8530 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8530-8560 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8560-8590 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8590-8620 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8620-8650 ANHYDRITE: off white, soft, amorphous; common SALT: clear to milky, off white, crystalline, hard, euhedral; trace LIMESTONE: as above

8650-8680 ANHYDRITE: off white, soft, amorphous; common SALT: clear to milky, off white, crystalline, hard, euhedral; trace LIMESTONE: as above

8680-8710 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture; rare ANHYDRITE: off white, soft, amorphous, no visible porosity

8710-8740 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8740-8770 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8770-8800 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8800-8830 SALT: translucent, microcrystalline, anhedral, crystalline texture, hard, frosted; occasional LIMESTONE: mudstone, light to medium gray to gray brown, microcrystalline, firm to hard, argillaceous in part, dense, chalky texture, no visible porosity

8830-8860 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: off white, soft, amorphous, no visible porosity

8860-8890 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

8890-8920 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

8920-8950 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

8950-8980 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

<u>UB</u> [8,983’ MD, 8,982’ TVD (-7,014’)]

8980-9010 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9010-9040 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

<u>Base Last Salt</u> [9,064’ MD, 9,062’ TVD (-7,094’)]

9040-9070 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9070-9100 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

<u>Ratcliffe</u> [9,111’ MD, 9,109’ TVD (-7,141’)]

9100-9130 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9130-9160 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9160-9190 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9190-9220 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9220-9250 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9250-9280 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

<u>Mission Canyon</u> [9,288’ MD, 9,286’ TVD (-7,318’)]

9280-9310 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, occasional SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9310-9340 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, trace SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9340-9370 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, trace SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9370-9400 ARGILLACEOUS LIMESTONE: mudstone, cream, tan, light gray, microcrystalline, firm, dense to banded, earthy texture, no visible porosity, trace SALT: clear to milky, off white, crystalline, hard, euhedral; trace ANHYDRITE: as above

9400-9430 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9430-9460 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9460-9490 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9490-9520 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9520-9550 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9550-9580 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9580-9610 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9610-9640 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9640-9670 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9670-9700 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9700-9730 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9730-9760 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9760-9790 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9790-9820 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9820-9850 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

<u>Lodgepole</u> [9,847’ MD, 9,845’ TVD (-7,877’)]

9850-9880 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9880-9910 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9910-9940 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9940-9970 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

9970-10000 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10000-10030 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10030-10060 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10060-10090 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10090-10120 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10120-10150 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10150-10180 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10180-10200 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10210-10240 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10240-10270 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10270-10300 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10300-10330 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10330-10360 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10360-10390 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10390-10420 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10420-10450 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10450-10480 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10480-14510 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10510-14540 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10540-10570 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10570-10600 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10600-10630 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

False Bakken [10,641' MD, 10,577' TVD (-8,609')]

Upper Bakken [10,658' MD, 10,585' TVD (-8,617')]

10630-10660 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

10660-10690 ARGILLACEOUS LIMESTONE: mudstone, light to medium gray brown, tan, microcrystalline, firm to friable, rare algal material; rare ANHYDRITE: off white, massive, soft, amorphous

Middle Bakken [10,689' MD, 10,602' TVD (-8,634')]

10690-10720 SHALE: black to dark brown, firm, blocky, earthy, disseminated pyrite, petroliferous, carbonaceous, no visible porosity, abundant brown even oil stain

10720-10750 SILTSTONE: light gray to light gray brown, sub blocky, calcite cemented, trace disseminated pyrite, possible intergranular porosity; occasional SILTY SANDSTONE: medium to light gray, fine grained, sub round, firm, moderately sorted, calcite cement, moderately cemented, trace disseminated pyrite, possible intergranular porosity; trace SHALE: as above, trace spotty light brown oil stain

10750-10780 SILTSTONE: light gray to light gray brown, sub blocky, calcite cemented, trace disseminated pyrite, possible intergranular porosity; occasional SILTY SANDSTONE: as above; trace SHALE: as above, trace spotty light brown oil stain

Lower Bakken [10,785' MD, 10,644' TVD (-8,676')]

10780-10810 SILTSTONE: light gray to light gray brown, sub blocky, calcite cemented, trace disseminated pyrite, possible intergranular porosity; occasional SILTY SANDSTONE: as above; trace SHALE: as above, trace spotty light brown oil stain

10810-10840 SHALE: black to dark brown, firm to hard, blocky, earthy texture, carbonaceous, abundant disseminated pyrite

Pronghorn [10,821' MD, 10,655' TVD (-8,687')]

10840-10870 SHALE: black to dark brown, firm to hard, blocky, earthy texture, carbonaceous, abundant disseminated pyrite

10870-10880 SILTSTONE: dark to medium brown gray, sub blocky to sub round, soft, well sorted, calcite cement, moderately cemented, visible intergranular porosity, trace spotty light brown oil stain; occasional SHALE: black to dark brown, firm to hard, blocky, earthy texture, carbonaceous, rare disseminated pyrite

10880-10890 SILTSTONE: dark to medium brown gray, sub blocky to sub round, soft, well sorted, calcite cement, moderately cemented, visible intergranular porosity, trace spotty light brown oil stain; occasional SHALE: as above

10890-10900 SILTSTONE: dark to medium brown gray, sub blocky to sub round, soft, well sorted, calcite cement, moderately cemented, visible intergranular porosity, trace spotty light brown oil stain; occasional SHALE: as above

<u>Three Forks [</u>10,906’ MD, 10,674’ TVD (-8,706’)]

10900-10910 SILTSTONE: dark to medium brown gray, sub blocky to sub round, soft, well sorted, calcite cement, moderately cemented, visible intergranular porosity, trace spotty light brown oil stain

10910-10920 SILTSTONE: dark to medium brown gray, sub blocky to sub round, soft, well sorted, calcite cement, moderately cemented, visible intergranular porosity, trace spotty light brown oil stain

10920-10930 SILTSTONE: as above; ARGILLACEOUS DOLOMITE: mudstone, medium gray to gray brown, pale grain, cream to tan, fine crystalline, sucrosic texture, firm to friable, rare disseminated pyrite, silty in part, sandy in part, possible intercrystalline porosity, trace spotty light brown oil stain

10930-10940 SILTSTONE: as above; ARGILLACEOUS DOLOMITE: mudstone, medium gray to gray brown, pale grain, cream to tan, fine crystalline, sucrosic texture, firm to friable, rare disseminated pyrite, silty in part, sandy in part, possible intercrystalline porosity, trace spotty light brown oil stain

10940-10950 ARGILLACEOUS DOLOMITE: mudstone, medium gray to gray brown, pale grain, cream to tan, fine crystalline, sucrosic texture, firm to friable, rare disseminated pyrite, silty in part, sandy in part, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain

10950-10960 ARGILLACEOUS DOLOMITE: mudstone, medium gray to gray brown, pale grain, cream to tan, fine crystalline, sucrosic texture, firm to friable, rare disseminated pyrite, silty in part, sandy in part, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, no visible porosity, trace spotty light brown oil stain

10960-10970 ARGILLACEOUS DOLOMITE: as above; common SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain

10970-10980 ARGILLACEOUS DOLOMITE: as above; common SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain

10980-10990 ARGILLACEOUS DOLOMITE: as above; common SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain

10990-11000 ARGILLACEOUS DOLOMITE: as above; common SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain

11000-11010 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain; rare ARGILLACEOUS DOLOMITE: as above

11010-11020 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain; rare ARGILLACEOUS DOLOMITE: as above

11020-11030 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain; rare ARGILLACEOUS DOLOMITE: as above

11030-11043 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain; trace ARGILLACEOUS DOLOMITE: as above

11043-11080 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain; trace ARGILLACEOUS DOLOMITE: as above

11080-11110 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11110-11140 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11140-11170 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11170-11200 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11200-11230 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11230-11260 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11260-11290 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11290-11320 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11320-11350 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; common SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11350-11380 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11380-11410 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11410-11440 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11440-11470 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11470-11500 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11500-11530 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11530-11560 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

11560-11590 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11590-11620 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11620-11650 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11650-11680 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11680-11710 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11710-11740 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11740-11770 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11770-11800 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11800-11830 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11830-11860 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11860-11890 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11890-11920 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11920-11950 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11950-11980 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

11980-12010 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12010-12040 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12040-12070 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12070-12100 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12100-12130 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12130-12160 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12160-12190 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12190-12220 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12220-12250 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12250-12280 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12280-12310 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12310-12340 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12340-12370 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12370-12400 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12400-12430 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12430-12460 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12460-12490 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12490-12520 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12520-12550 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12550-12580 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12580-12610 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12610-12640 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12640-12670 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12670-12700 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast weak diffuse pale green cut fluorescence

12700-12730 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, fast weak cloudy pale green cut fluorescence

12730-12760 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12760-12790 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12790-12820 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12820-12850 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12850-12880 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12880-12910 DOLOMITE: mudstone, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12910-12940 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12940-12970 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

12970-13000 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13000-13030 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13030-13060 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13060-13090 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13090-13120 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13120-13150 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13150-13180 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13180-13210 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

13210-13240 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

13240-13270 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

13270-13300 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

13300-13330 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

13330-13360 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13360-13390 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13390-13420 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13420-13450 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13450-13480 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13480-13510 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13510-13540 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13540-13570 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13570-13600 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13600-13630 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13630-13660 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13660-13690 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13690-13720 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13720-13750 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13750-13780 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13780-13810 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13810-13840 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13840-13870 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13870-13900 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13900-13930 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13930-13960 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13960-13990 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

13990-14020 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14020-14050 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14050-14080 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14080-14110 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14110-14140 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14140-14170 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14170-14200 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14200-14230 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14230-14260 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14260-14290 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14290-14320 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14320-14350 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14350-14380 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14380-14410 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14410-14440 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14440-14470 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14470-14500 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14500-14530 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14530-14560 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14560-14590 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14590-14620 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14620-14650 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14650-14680 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14680-14710 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14710-14740 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14740-14770 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14770-14800 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14800-14830 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14830-14860 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14860-14890 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14890-14920 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14920-14950 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14950-14980 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

14980-15010 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15010-15040 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15040-15070 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast diffuse pale green cut flour

15070-15100 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast diffuse pale green cut flour

15100-15130 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast diffuse pale green cut flour

15130-15160 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast diffuse pale green cut flour

15160-15190 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast diffuse pale green cut flour

15190-15220 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, fast diffuse pale green cut flour

15220-15250 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15250-15280 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15280-15310 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15310-15340 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15340-15370 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15370-15400 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15400-15430 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15430-15460 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15460-15490 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15490-15520 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15520-15550 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15550-15580 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15580-15610 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15610-15640 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15640-15670 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15670-15700 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15700-15730 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15730-15760 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15760-15790 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15790-15820 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15820-15850 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

15850-15880 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

15880-15910 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

15910-15940 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

15940-15970 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

15970-16000 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16000-16030 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16030-16060 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16060-16090 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, occasional CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16090-16120 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, rare CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16120-16150 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, rare CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16150-16180 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; trace SHALE: as above, occasional CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16180-16210 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16210-16240 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace CLAYSTONE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16240-16270 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

16270-16300 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

16300-16330 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

16330-16360 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

16360-16390 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, moderately contaminated with lube

16390-16420 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16420-16450 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16450-16480 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16480-16510 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16510-16540 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16540-16570 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16570-16600 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

166000-16630 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16630-16660 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16660-16690 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16690-16720 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16720-16750 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16750-16780 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16780-16810 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16810-16840 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16840-16870 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16870-16900 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16900-16930 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16930-16960 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16960-16990 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

16990-17020 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17020-17050 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17050-17080 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17080-17110 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17110-17140 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17140-17170 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17170-17200 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17200-17230 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17230-17260 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17260-17290 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17290-17320 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17320-17350 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17350-17380 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17380-17410 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17410-17440 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17440-17470 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17470-17500 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17500-17530 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17530-17560 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17560-17590 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17590-17620 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17620-17650 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17650-17680 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17680-17710 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17710-17740 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17740-17770 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17770-17800 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17800-17830 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17830-17860 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17860-17890 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17890-17920 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17920-17950 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17950-17980 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

17980-18010 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18010-18040 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18040-18070 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18070-18100 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18100-18130 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18130-18160 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18160-18190 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18190-18220 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18220-18250 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18250-18280 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18280-18310 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18310-18340 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18340-18370 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18370-18400 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18400-18430 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18430-18460 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18460-18490 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18490-18520 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18520-18550 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18550-18580 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18580-18610 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18610-18640 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18640-18670 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18670-18700 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18700-18730 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18730-18760 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18760-18790 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18790-18820 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18820-18850 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18850-18880 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18880-18910 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18910-18940 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18940-18970 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

18970-19000 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19000-19030 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19030-19060 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19060-19090 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19090-19120 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19120-19150 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19150-19180 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19180-19210 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19210-19240 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19240-19270 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19270-19300 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19300-19330 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19330-19360 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19360-19390 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19390-19420 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19420-19450 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, moderately contaminated with lube

19450-19480 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19480-19510 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19510-19540 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19540-19570 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19570-19600 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19600-19630 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19630-19660 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19660-19690 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19690-19720 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19720-19750 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19750-19780 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19780-19810 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, moderately contaminated with lube

19810-19840 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; rare CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, heavily contaminated with lube

19840-19870 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above; rare CLAYSTONE: light gray, medium gray to tan, occasional off white, massive, fine crystalline, dolomitic cement, trace disseminated pyrite, trace spotty light brown oil stain, heavily contaminated with lube

19870-19900 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

19900-19930 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

19930-19960 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

19960-19990 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

19990-20020 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20020-20050 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20050-20080 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, heavily contaminated with lube

20080-20110 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, heavily contaminated with lube

20110-20140 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, heavily contaminated with lube

20140-20170 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, heavily contaminated with lube

20170-20200 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: light green, trace gray, friable, earthy texture, trace disseminated pyrite, no visible porosity, trace spotty light brown oil stain, heavily contaminated with lube

20230-20260 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20260-20290 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20290-20320 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20320-20350 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20350-20380 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20380-20410 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20410-20440 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20440-20470 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20470-20500 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20500-20530 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20530-20560 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20560-20590 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20590-20620 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20620-20650 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20650-20680 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; occasional SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20680-20710 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20710-20740 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20740-20770 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20770-20800 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20800-20830 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20830-20860 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

20860-20904 DOLOMITE: mudstone, orange, tan, pink, friable, earthy texture, trace disseminated pyrite, possible intercrystalline porosity, trace spotty light brown oil stain; rare SHALE: as above, trace spotty light brown oil stain, heavily contaminated with lube

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 2014 RECEIVED ND OIL & GAS DIVISION

Well File No. **28342**

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

☑ Notice of Intent	Approximate Start Date **July 7, 2014**	☐ 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	**Change well status to CONFIDENTIAL**

Well Name and Number					
Chalmers 5301 44-24 2TR					
Footages	Qtr-Qtr	Section	Township	Range	
959 F S L 245 F E L	**SESE**	**24**	**153 N**	**101 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.

OFF CONFIDENTIAL 1/08/15

Company **Oasis Petroleum North America LLC**		Telephone Number **281-404-9591**
Address **1001 Fannin, Suite 1500**		
City **Houston**	State **TX**	Zip Code **77002**
Signature Chelsea Covington	Printed Name **Chelsea Covington**	
Title **Regulatory Assistant**	Date **July 7, 2014**	
Email Address **ccovington@oasispetroleum.com**		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date 7/30/14	
By Alice D. Webber	
Title Engineering Technician	

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. 28342

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

☑ Notice of Intent	Approximate Start Date **May 15, 2014**	☐ 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					
Chalmers 5301 44-24 2TR					
Footages	Qtr-Qtr	Section	Township	Range	
959 F S L 245 F E L	**SESE**	**24**	**153 N**	**101 W**	
Field	Pool	County			
	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/ Chalmers 5300 31-19H (NDIC 20407) located within one 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 GR.

Company **Oasis Petroleum North America LLC**		Telephone Number **281-404-9491**
Address **1001 Fannin, Suite 1500**		
City **Houston**	State **TX**	Zip Code **77002**
Signature BRandi Terry	Printed Name **Brandi Terry**	
Title **Regulatory Specialist**	Date **May 15, 2014**	
Email Address **bterry@oasispetroleum.com**		

FOR STATE USE ONLY

☐ Received	☒ Approved
Date 7-8-2014	
By Stephen Fried	
Title **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)

JUN 2014 RECEIVED ND OIL & GAS DIVISION

Well File No. **28342**

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

- [x] Notice of Intent — Approximate Start Date: **May 30, 2014**
- [ ] 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
- [ ] Spill Report
- [ ] Redrilling or Repair
- [ ] Shooting
- [x] Casing or Liner
- [ ] Acidizing
- [ ] Plug Well
- [ ] Fracture Treatment
- [ ] Supplemental History
- [ ] Change Production Method
- [ ] Temporarily Abandon
- [ ] Reclamation
- [ ] Other

Well Name and Number				
Chalmers 5301 44-24 2TR				
Footages	Qtr-Qtr	Section	Township	Range
959 F S L 245 F E L	SESE	24	153 N	101 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 permission to revise the APD issued for the Chalmers 5301 44-24 2TR to include the following change:

Cement entire 4.5" liner from TD to liner top at KOP.

Reasoning for the change is as follows: 7" casing string was successfully landed across the 200' setback in Section 19. Shoe is estimated at 11,014' (~550' E of SHL or 105' past hardline). Pumps were brought on in order to establish circulation and the hole packed off around the 7" casing string, making circulation impossible. The casing string was slowly worked in order to attempt to clear up obstruction and circulation was never achieved. Called Rick Dunn at NDIC and notified him of intention to perforate casing behind hardline, in Middle Bakken, and cement through perforation holes. Perfed at est 10,725' MD (272' E of SHL or 173' short of hardline). Cemented through perfs.

Oasis Petroleum will verify isolation across the hardline from cemented liner with a CBL, prior to completing the well.

Company		Telephone Number
Oasis Petroleum North America LLC		**(281) 404-9634**
Address		
1001 Fannin, Siute 1500		
City	State	Zip Code
Houston	**TX**	**77002**
Signature: Mike Brown	Printed Name: **Mike Brown**	
Title: **Drilling Engineer**	Date: **June 2, 2014**	
Email Address: **mbrown@oasispetroleum.com**		

FOR STATE USE ONLY

- [x] Received
- [ ] Approved

Date: 6/24/14

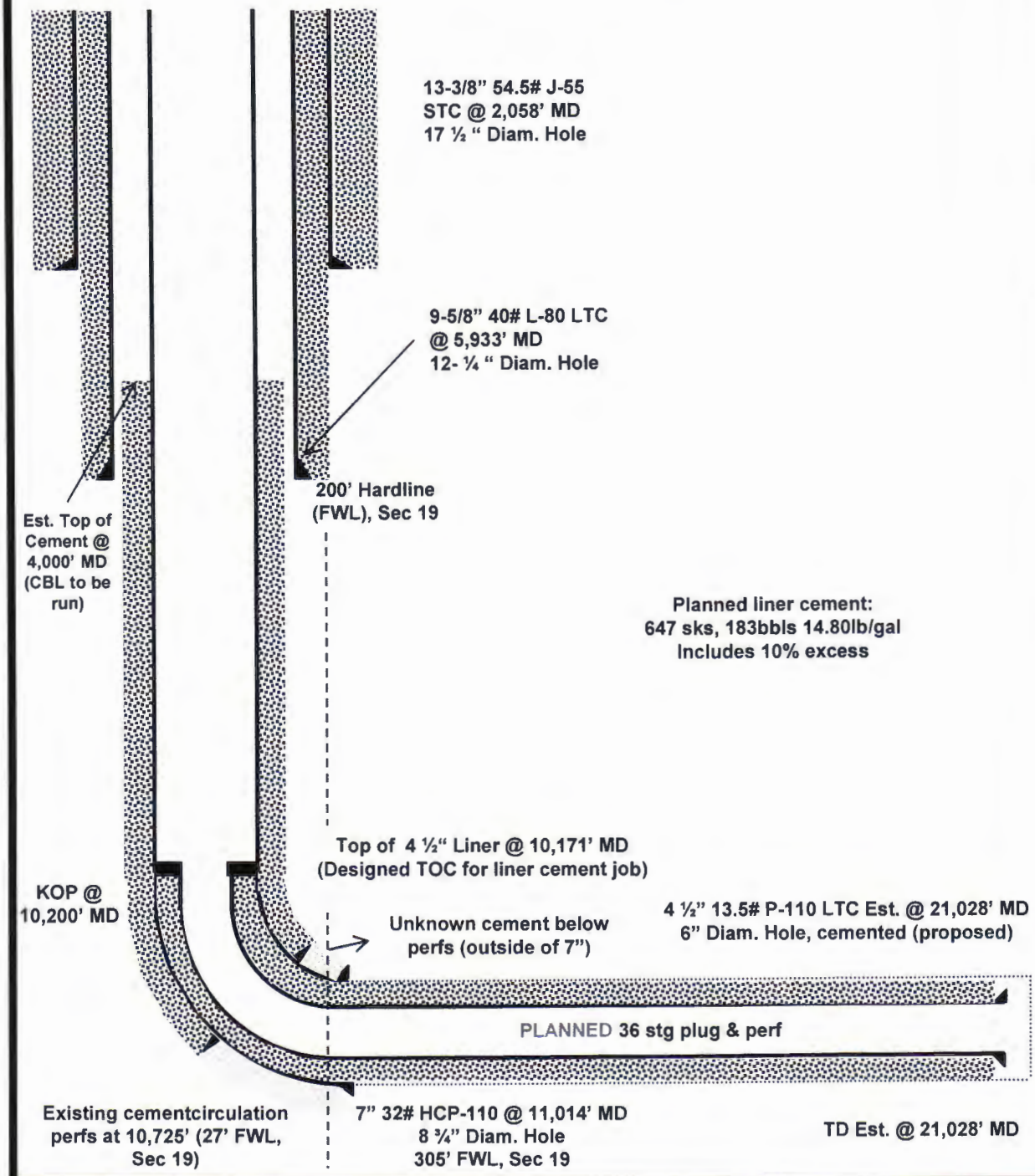
By: Nathan Erbele

Title: Petroleum Resource Specialist

RIG: Nabors B25
NDIC#: 28342

Chalmers 5301 44-24 2TR
WELLBORE SCHEMATIC

API #: 33-053-05924
FORMATION: Three Forks
FIELD: Baker



OASIS PETROLEUM NA LLC

Chalmers 5301 44-24 2TR T153N-R101W Sec. 24 (SHL) – Drilling Sec. 19 & 20 959' FSL & 245' FEL Sec. 24	Status: Drilling McKenzie County, North Dakota Updated: 6/2/2014 MGB

Oasis Petroleum
Well Summary
Chalmers 5301 44-24 2TR
Sec. 24 T153N R101W
McKenzie County, North Dakota

PRODUCTION LINER

Size	Interval	Weight	Grade	Coupling	I.D.	Drift	Torque
4-1/2"	10,171' – 21,028'	13.5	P-110	BTC	3.92"	3.795"	4,500

Interval	Length	Description	Collapse	Burst	Tension
			(psi) **a**	(psi) **b**	(1000 lbs) **c**
10,171' – 21,028'	10,086'	4-1/2", 13.5 lb, P-110, BTC, 8rd	10670 / 2.00	12410 / 1.28	443 / 1.99

API Rating & Safety Factor

a) Based on full casing evacuation with 9.5 ppg fluid on backside @ 10,769' TVD.

b) Burst pressure based on 9000 psi treating pressure with 10.2 ppg internal fluid gradient and 9 ppg external fluid gradient @ 10,769' TVD.

c) Based on string weight in 9.5 ppg fluid (Buoyed weight: 122k lbs.) plus 100k lbs overpull.

Cemented Liner – Based on 4.5" liner from TD to liner top, 10% excess

Pre-flush (Spacer): **30 bbls** MudPush

Lead Slurry: **647 sks** (183 bbls) 14.80 lb/gal Conventional cement with 61.1 lb/sk D907 Cement, 23.45lb/sk D035-BCA Cementing Additive, 0.2% D065 Dispersant, 0.2% D046 Anti Foam, 0.4% D167 Fluid Loss, 35% Silica, 0.4% D198 Retarder

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)

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)

MAY 2014
RECEIVED
ND OIL & GAS
DIVISION

Well File No.
28342

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

☑ Notice of Intent	Approximate Start Date **May 14, 2014**	☑ 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	

Well Name and Number				
Chalmers 5301 44-24 2TX				
Footages	Qtr-Qtr	Section	Township	Range
959 F S L 245 F E L	**SESE**	**24**	**153 N**	**101 W**
Field	Pool	County		
McKenzie	**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 to revise the well name for the subject well.

Well name will change to: Chalmers 5301 44-24 2TR

SHL and BHL will remain the same.

inv. 41554 25- 80 5/27/14 CC 25.00

Company **Oasis Petroleum North America LLC**		Telephone Number **281-404-9491**
Address **1001 Fannin, Suite 1500**		
City **Houston**	State **TX**	Zip Code **77002**
Signature Brandi Terry	Printed Name **Brandi Terry**	
Title **Regulatory Specialist**	Date **May 14, 2014**	
Email Address **bterry@oasispetroleum.com**		

FOR STATE USE ONLY

☐ Received	☑ Approved
Date 5-23-2014	
By	
Title David Burns Engineering Tech	

RYAN DIRECTIONAL SERVICES, INC.
A NABORS COMPANY

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

Wednesday, June 18, 2014

State of North Dakota

ND

Subject: **Surveys**

Re: **Oasis**
Chalmers 5301 44-24 2TR
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*
Unger, Henry	MWD Operator	O.H.	0'	11312'	05/15/14	06/02/14	MWD	11374'
Unger, Henry	MWD Operator	ST 1	11219'	12892'	06/02/14	06/04/14	MWD	12985'
Unger, Henry	MWD Operator	ST 2	12611'	20841'	06/04/14	06/11/14	MWD	20904'

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required please contact the undersigned at the letterhead address or phone number.

Douglas Hudson

Hudson, Douglas
Well Planner

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

Wednesday, December 11, 2013

State of North Dakota
County of McKenzie Co.

Subject: **Survey Certification Letter**

Survey Company: **Ryan Directional Services, Inc.**
Job Number: **7579**
Survey Job Type: **Ryan MWD**
Customer: **Oasis Petroleum North America LLC**
Well Name: **Chalmers 5301 44-24 2TR**
Rig Name: **Nabors B25**

Surface: **S24, 153N, 101W**
A.P.I. No: **33-053-05924**
Location: **McKenzie Co., ND**
RKB Height: **1989'**
Distance to Bit: **63'**

Surveyor Name	*Surveyor Title*	*Borehole Number*	*Start Depth*	*End Depth*	*Start Date*	*End Date*	*Type of*	*TD Straight Line Projection*
Henry Unger	MWD Supervisor	OH	118'	11374'	05/15/14	06/02/14	MWD	11376'
Henry Unger	MWD Supervisor	ST1	11300'	12892'	06/02/14	06/04/14	MWD	12987'
Henry Unger	MWD Supervisor	ST2	12704'	20841'	06/04/14	06/11/14	MWD	20904'

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.

Henry Unger

Henry Unger
MWD Supervisor
Ryan Directional Services, Inc.

Report #: 1

Date: 1-Jun-14

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 7579

SURVEY REPORT

Customer: Oasis Petroleum North America LLC

Well Name: Chalmers 5301 44-24 2TR

Rig #: Nabors B25

API #: 33-053-05924

Calculation Method: Minimum Curvature Calculation

MWD Operator: Henry Unger

Directional Drillers: RPM

Survey Corrected To: True North

Vertical Section Direction: 89.61

Total Correction: 8.14

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	118	0.10	79.80	40.00	118.00	0.10	0.02	0.10	0.08
2	149	0.30	58.90	44.00	149.00	0.20	0.06	0.20	0.68
3	242	0.30	105.30	48.00	242.00	0.64	0.13	0.64	0.25
4	335	0.40	85.40	53.00	335.00	1.20	0.09	1.20	0.17
5	**429**	**0.40**	**115.20**	**48.00**	**428.99**	**1.82**	**-0.03**	**1.82**	**0.22**
6	522	0.40	140.40	60.00	521.99	2.32	-0.41	2.32	0.19
7	614	0.40	79.20	64.00	613.99	2.84	-0.60	2.84	0.44
8	706	0.40	30.60	68.00	705.99	3.32	-0.26	3.32	0.36
9	798	0.40	16.90	71.00	797.99	3.58	0.32	3.58	0.10
10	**890**	**0.40**	**25.50**	**73.00**	**889.98**	**3.82**	**0.92**	**3.81**	**0.07**
11	982	0.10	168.80	77.00	981.98	3.97	1.13	3.97	0.53
12	1075	0.40	201.90	80.00	1074.98	3.86	0.75	3.86	0.35
13	1167	0.60	185.90	78.00	1166.98	3.69	-0.03	3.69	0.26
14	1259	0.80	236.90	82.00	1258.97	3.10	-0.86	3.10	0.68
15	**1351**	**0.90**	**271.20**	**86.00**	**1350.96**	**1.83**	**-1.20**	**1.84**	**0.55**
16	1443	1.10	282.40	87.00	1442.95	0.25	-0.99	0.26	0.30
17	1537	1.20	287.20	91.00	1536.93	-1.57	-0.51	-1.56	0.15
18	1630	0.70	306.20	95.00	1629.92	-2.95	0.12	-2.95	0.63
19	1723	0.40	354.40	96.00	1722.91	-3.44	0.78	-3.44	0.57
20	**1817**	**0.60**	**349.40**	**100.00**	**1816.91**	**-3.55**	**1.59**	**-3.57**	**0.22**
21	1910	0.70	344.00	102.00	1909.90	-3.79	2.61	-3.81	0.13
22	1991	0.70	345.60	86.00	1990.90	-4.05	3.57	-4.07	0.02
23	2084	1.10	345.60	86.00	2083.89	-4.40	4.98	-4.43	0.43
24	2178	1.10	345.50	86.00	2177.87	-4.84	6.73	-4.88	0.00
25	**2271**	**1.10**	**2.90**	**91.00**	**2270.85**	**-5.00**	**8.48**	**-5.06**	**0.36**
26	2364	1.10	11.00	100.40	2363.84	-4.78	10.25	-4.85	0.17
27	2457	1.00	41.60	104.00	2456.82	-4.06	11.74	-4.14	0.60
28	2551	1.10	64.70	107.00	2550.80	-2.69	12.73	-2.78	0.46
29	2644	1.10	69.70	111.00	2643.79	-1.04	13.43	-1.13	0.10
30	**2737**	**1.30**	**82.90**	**113.00**	**2736.77**	**0.85**	**13.87**	**0.75**	**0.37**
31	2830	1.20	90.70	114.00	2829.75	2.87	13.98	2.77	0.21
32	2924	1.20	119.00	118.00	2923.73	4.71	13.49	4.62	0.62
33	3017	0.70	154.10	120.00	3016.71	5.80	12.51	5.72	0.80
34	3110	0.40	158.90	123.00	3109.71	6.16	11.70	6.08	0.33
35	**3203**	**0.50**	**351.80**	**127.00**	**3202.71**	**6.22**	**11.80**	**6.14**	**0.96**
36	3297	0.70	357.20	129.00	3296.70	6.14	12.78	6.05	0.22
37	3390	1.00	10.40	131.00	3389.69	6.27	14.14	6.17	0.38
38	3483	1.30	12.90	132.00	3482.67	6.66	15.97	6.55	0.33
39	3577	1.70	28.80	132.00	3576.64	7.59	18.23	7.46	0.61
40	**3670**	**1.80**	**23.00**	**134.00**	**3669.60**	**8.84**	**20.78**	**8.70**	**0.22**
41	3763	1.80	21.70	136.00	3762.55	9.97	23.48	9.81	0.04
42	3856	1.80	29.70	138.00	3855.51	11.25	26.11	11.07	0.27
43	3950	2.40	40.10	140.00	3949.44	13.27	28.90	13.07	0.75
44	4043	0.80	54.80	140.00	4042.40	15.07	30.76	14.86	1.76
45	**4136**	**0.80**	**110.80**	**141.00**	**4135.40**	**16.21**	**30.91**	**16.00**	**0.81**
46	4229	0.80	232.60	143.00	4228.39	16.29	30.28	16.09	1.50
47	4323	1.10	239.80	145.00	4322.38	14.99	29.43	14.79	0.34
48	4416	1.40	258.60	147.00	4415.36	13.10	28.75	12.90	0.54
49	4509	1.10	220.20	149.00	4508.34	11.40	27.85	11.21	0.94
50	**4603**	**1.50**	**218.50**	**149.00**	**4602.31**	**10.04**	**26.20**	**9.86**	**0.43**
51	4696	1.00	249.00	151.00	4695.29	8.52	24.95	8.35	0.88
52	4789	1.10	253.00	150.00	4788.28	6.90	24.40	6.74	0.13
53	4882	1.50	257.60	154.00	4881.25	4.86	23.88	4.69	0.44
54	4976	1.20	263.50	152.00	4975.23	2.67	23.50	2.51	0.35
55	**5069**	**0.40**	**250.60**	**152.00**	**5068.22**	**1.40**	**23.28**	**1.24**	**0.88**
56	5162	0.10	137.40	156.00	5161.21	1.15	23.12	0.99	0.48
57	5255	1.30	143.50	154.00	5254.21	1.82	22.21	1.67	1.29
58	5348	1.50	155.00	152.00	5347.18	2.95	20.26	2.81	0.37
59	5441	1.30	184.50	152.00	5440.15	3.37	18.10	3.24	0.79
60	**5534**	**1.20**	**214.70**	**152.00**	**5533.13**	**2.72**	**16.25**	**2.61**	**0.71**

Report #: 1

Date: 1-Jun-14

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 7579

SURVEY REPORT

Customer: Oasis Petroleum North America LLC

Well Name: Chalmers 5301 44-24 2TR

Rig #: Nabors B25

API #: 33-053-05924

Calculation Method: Minimum Curvature Calculation

MWD Operator: Henry Unger

Directional Drillers: RPM

Survey Corrected To: True North

Vertical Section Direction: 89.61

Total Correction: 8.14

Temperature Forecasting Model (Chart Only): Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
61	5627	1.60	233.70	158.00	5626.10	1.11	14.68	1.01	0.65
62	5721	1.70	229.70	156.00	5720.06	-1.03	13.00	-1.11	0.16
63	5814	1.70	231.10	159.00	5813.02	-3.16	11.24	-3.24	0.04
64	5907	1.50	233.80	158.00	5905.99	-5.23	9.66	-5.30	0.23
65	**5937**	**1.60**	**236.10**	**159.00**	**5935.98**	**-5.90**	**9.19**	**-5.96**	**0.39**
66	6062	2.10	237.20	147.00	6060.91	-9.29	6.98	-9.33	0.40
67	6093	1.80	238.40	149.00	6091.89	-10.18	6.42	-10.23	0.98
68	6186	1.30	297.20	154.00	6184.86	-12.37	6.13	-12.41	1.70
69	6279	1.60	294.20	156.00	6277.83	-14.48	7.15	-14.53	0.33
70	**6372**	**0.80**	**315.60**	**158.00**	**6370.81**	**-16.11**	**8.14**	**-16.17**	**0.97**
71	6465	0.60	309.80	159.00	6463.81	-16.94	8.92	-17.00	0.23
72	6559	1.50	32.70	163.00	6557.79	-16.64	10.27	-16.71	1.64
73	6652	1.50	25.70	168.00	6650.76	-15.44	12.39	-15.53	0.20
74	6745	1.70	32.90	171.00	6743.72	-14.15	14.65	-14.25	0.30
75	**6838**	**1.50**	**24.70**	**172.00**	**6836.69**	**-12.88**	**16.91**	**-12.99**	**0.33**
76	6932	1.40	35.60	174.00	6930.66	-11.68	18.96	-11.81	0.31
77	7025	1.30	33.80	177.00	7023.63	-10.42	20.76	-10.56	0.12
78	7118	1.00	40.00	179.00	7116.61	-9.30	22.26	-9.45	0.35
79	7211	0.80	60.00	181.00	7209.60	-8.21	23.21	-8.37	0.40
80	**7305**	**0.80**	**59.50**	**183.00**	**7303.59**	**-7.07**	**23.87**	**-7.23**	**0.01**
81	7398	0.90	46.70	185.00	7396.58	-5.97	24.70	-6.14	0.23
82	7491	0.60	67.10	188.00	7489.58	-4.99	25.39	-5.16	0.43
83	7584	0.50	81.40	188.00	7582.57	-4.14	25.64	-4.31	0.18
84	7677	0.70	5.80	188.00	7675.57	-3.68	26.27	-3.85	0.81
85	**7771**	**0.60**	**357.70**	**190.00**	**7769.56**	**-3.63**	**27.33**	**-3.82**	**0.14**
86	7864	0.70	21.80	190.00	7862.56	-3.43	28.34	-3.62	0.31
87	7957	0.70	19.80	192.00	7955.55	-3.02	29.40	-3.22	0.03
88	8050	0.70	15.70	194.00	8048.54	-2.67	30.49	-2.88	0.05
89	8143	1.00	26.80	195.00	8141.53	-2.14	31.76	-2.36	0.37
90	**8237**	**1.00**	**22.60**	**195.00**	**8235.52**	**-1.44**	**33.25**	**-1.67**	**0.08**
91	8330	0.80	31.10	197.00	8328.51	-0.79	34.55	-1.02	0.26
92	8423	0.70	23.30	199.00	8421.50	-0.22	35.63	-0.46	0.15
93	8516	0.70	44.20	201.00	8514.49	0.41	36.56	0.16	0.27
94	8609	1.00	40.90	203.00	8607.48	1.34	37.58	1.08	0.33
95	**8702**	**0.90**	**54.10**	**204.00**	**8700.47**	**2.47**	**38.62**	**2.21**	**0.26**
96	8796	0.60	43.40	204.00	8794.46	3.41	39.41	3.14	0.35
97	8889	0.70	60.60	206.00	8887.45	4.25	40.04	3.97	0.23
98	8982	0.50	63.90	208.00	8980.45	5.11	40.50	4.83	0.22
99	9075	0.50	75.50	208.00	9073.45	5.87	40.78	5.59	0.11
100	**9169**	**0.20**	**78.40**	**208.00**	**9167.44**	**6.43**	**40.92**	**6.15**	**0.32**
101	9262	0.20	121.70	210.00	9260.44	6.72	40.86	6.45	0.16
102	9355	0.30	91.10	212.00	9353.44	7.10	40.77	6.83	0.18
103	9448	0.30	87.10	212.00	9446.44	7.59	40.78	7.31	0.02
104	9542	0.10	7.30	215.00	9540.44	7.85	40.88	7.57	0.32
105	**9635**	**0.20**	**233.00**	**215.00**	**9633.44**	**7.73**	**40.86**	**7.45**	**0.30**
106	9728	0.40	230.20	215.00	9726.44	7.35	40.55	7.07	0.22
107	9821	0.60	204.20	217.00	9819.44	6.89	39.90	6.62	0.32
108	9915	0.60	230.70	217.00	9913.43	6.31	39.14	6.04	0.29
109	10008	1.00	244.10	215.00	10006.42	5.19	38.48	4.93	0.47
110	**10101**	**1.40**	**243.10**	**217.00**	**10099.40**	**3.45**	**37.61**	**3.19**	**0.43**
111	10144	1.40	242.70	213.00	10142.39	2.51	37.13	2.25	0.02
112	10209	1.50	134.40	186.00	10207.38	2.40	36.17	2.16	3.62
113	10240	6.30	104.70	188.00	10238.30	4.33	35.45	4.09	16.30
114	10271	10.90	98.60	192.00	10268.94	8.87	34.58	8.64	15.11
115	**10302**	**15.50**	**93.60**	**194.00**	**10299.11**	**15.90**	**33.89**	**15.67**	**15.28**
116	10333	19.20	91.10	195.00	10328.70	25.14	33.53	24.91	12.17
117	10364	22.20	87.20	197.00	10357.70	36.09	33.72	35.86	10.65
118	10396	25.10	83.90	199.00	10387.01	48.88	34.73	48.65	9.96
119	10427	28.20	85.00	199.00	10414.71	62.73	36.07	62.49	10.13
120	**10458**	**32.20**	**86.40**	**201.00**	**10441.50**	**78.28**	**37.23**	**78.03**	**13.10**

Report #: 1

Date: 1-Jun-14

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 7579

SURVEY REPORT

Customer: Oasis Petroleum North America LLC

Well Name: Chalmers 5301 44-24 2TR

Rig #: Nabors B25

API #: 33-053-05924

Calculation Method: Minimum Curvature Calculation

MWD Operator: Henry Unger

Directional Drillers: RPM

Survey Corrected To: True North

Vertical Section Direction: 89.61

Total Correction: 8.14

Temperature Forecasting Model (Chart Only): Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
121	10489	35.30	91.20	201.00	10467.27	95.49	37.56	95.24	13.18
122	10520	38.20	92.60	203.00	10492.11	114.02	36.94	113.77	9.74
123	10551	42.00	92.30	203.00	10515.82	133.96	36.08	133.72	12.27
124	10582	46.90	91.90	201.00	10537.94	155.64	35.29	155.41	15.83
125	**10613**	**51.40**	**90.50**	**203.00**	**10558.21**	**179.08**	**34.81**	**178.84**	**14.91**
126	10644	54.90	87.90	204.00	10576.81	203.87	35.17	203.64	13.13
127	10675	57.10	84.60	204.00	10594.14	229.52	36.86	229.28	11.32
128	10707	60.80	84.10	206.00	10610.64	256.82	39.56	256.55	11.64
129	10738	63.80	85.00	206.00	10625.05	284.15	42.17	283.87	10.01
130	**10769**	**67.50**	**86.20**	**208.00**	**10637.83**	**312.32**	**44.33**	**312.03**	**12.45**
131	10800	71.30	87.90	206.00	10648.74	341.30	45.81	341.00	13.29
132	10831	75.00	88.50	208.00	10657.72	370.96	46.75	370.65	12.08
133	10862	78.00	89.00	208.00	10664.96	401.10	47.40	400.78	9.80
134	10893	78.10	89.00	210.00	10671.38	431.42	47.93	431.11	0.32
135	**10924**	**77.80**	**89.10**	**208.00**	**10677.85**	**461.74**	**48.43**	**461.42**	**1.02**
136	10955	77.60	89.30	208.00	10684.45	492.02	48.86	491.70	0.90
137	10986	81.50	90.10	208.00	10690.08	522.50	49.01	522.18	12.83
138	11034	85.70	85.80	224.00	10695.43	570.16	50.73	569.83	12.48
139	11126	91.10	86.60	222.00	10698.00	661.93	56.82	661.56	5.93
140	**11219**	**91.50**	**85.40**	**224.00**	**10695.89**	**754.72**	**63.30**	**754.31**	**1.36**
141	11312	94.50	87.20	228.00	10691.02	847.42	69.30	846.97	3.76
Projection	11374	94.50	87.20		10686.15	909.18	72.32	908.71	0.00

Report #: 2

Date: 4-Jun-14

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 7579

SURVEY REPORT

Customer: Oasis Petroleum North America LLC

Well Name: Chalmers 5301 44-24 2TR

Rig #: Nabors B25

API #: 33-053-05924

Calculation Method: Minimum Curvature Calculation

MWD Operator: H. Unger / D. Ogden

Directional Drillers: RPM

Survey Corrected To: True North

Vertical Section Direction: 89.61

Total Correction: 8.14

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	**11219**	**91.50**	**85.40**	**224.00**	**10695.89**	**754.72**	**63.30**	**754.31**	**1.36**
1	11281	90.80	86.10	208.00	10694.64	816.57	67.90	816.12	1.60
2	11312	89.00	86.10	208.00	10694.69	847.51	70.01	847.05	5.81
3	11405	87.10	87.90	212.00	10697.86	940.35	74.87	939.86	2.81
4	11498	88.00	89.30	210.00	10701.84	1033.24	77.14	1032.74	1.79
5	**11591**	**89.20**	**89.70**	**212.00**	**10704.11**	**1126.21**	**77.95**	**1125.71**	**1.36**
6	11683	89.20	89.50	215.00	10705.39	1218.21	78.59	1217.70	0.22
7	11776	90.00	89.70	217.00	10706.04	1311.20	79.24	1310.69	0.89
8	11869	89.60	89.40	219.00	10706.37	1404.20	79.97	1403.69	0.54
9	11962	90.20	89.80	221.00	10706.53	1497.20	80.62	1496.69	0.78
10	**12054**	**91.00**	**89.70**	**222.00**	**10705.56**	**1589.20**	**81.03**	**1588.68**	**0.88**
11	12147	88.70	91.10	221.00	10705.81	1682.18	80.38	1681.67	2.90
12	12240	88.40	91.30	224.00	10708.16	1775.11	78.43	1774.62	0.39
13	12333	87.20	89.80	231.00	10711.73	1868.03	77.54	1867.54	2.06
14	12426	89.10	90.20	226.00	10714.73	1960.97	77.54	1960.49	2.09
15	**12519**	**89.30**	**90.80**	**226.00**	**10716.03**	**2053.95**	**76.72**	**2053.48**	**0.68**
16	12611	90.00	91.00	226.00	10716.59	2145.92	75.28	2145.46	0.79
17	12704	89.10	91.50	228.00	10717.32	2238.88	73.25	2238.44	1.11
18	12798	91.20	92.30	230.00	10717.08	2332.80	70.13	2332.38	2.39
19	12892	91.70	91.90	226.00	10714.70	2426.68	66.69	2426.28	0.68
Projection	**12985**	**91.70**	**91.90**		**10711.94**	**2519.57**	**63.61**	**2519.19**	**0.00**

Report #: 3

Date: 5-Jun-14

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 7579

SURVEY REPORT

Customer: Oasis Petroleum North America LLC

Well Name: Chalmers 5301 44-24 2TR

Rig #: Nabors B25

API #: 33-053-05924

Calculation Method: Minimum Curvature Calculation

MWD Operator: Henry Unger / Daniel Ogden

Directional Drillers: RPM

Survey Corrected To: True North

Vertical Section Direction: 89.61

Total Correction: 8.14

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	**12611**	**90.00**	**91.00**	**226.00**	**10716.59**	**2145.92**	**75.28**	**2145.46**	**0.79**
1	12704	88.50	91.80	221.00	10717.81	2238.87	73.01	2238.42	1.83
2	12798	86.60	93.00	224.00	10721.83	2332.66	69.08	2332.25	2.39
3	12892	87.70	90.90	226.00	10726.50	2426.46	65.88	2426.07	2.52
4	12987	88.20	90.40	228.00	10729.90	2521.39	64.81	2521.00	0.74
5	**13081**	**87.60**	**91.40**	**228.00**	**10733.35**	**2615.30**	**63.33**	**2614.93**	**1.24**
6	13174	89.80	90.10	228.00	10735.46	2708.25	62.11	2707.89	2.75
7	13268	90.40	89.80	230.00	10735.29	2802.25	62.20	2801.89	0.71
8	13362	88.80	89.30	231.00	10735.95	2896.24	62.93	2895.88	1.78
9	13456	90.20	89.60	233.00	10736.77	2990.23	63.84	2989.87	1.52
10	**13550**	**89.70**	**89.70**	**231.00**	**10736.85**	**3084.23**	**64.41**	**3083.87**	**0.54**
11	13644	88.80	89.40	235.00	10738.08	3178.22	65.15	3177.85	1.01
12	13738	87.60	89.40	235.00	10741.03	3272.18	66.13	3271.80	1.28
13	13832	87.80	90.10	233.00	10744.81	3366.10	66.54	3365.72	0.77
14	13926	89.50	89.60	237.00	10747.02	3460.07	66.79	3459.69	1.89
15	**14021**	**89.80**	**90.40**	**237.00**	**10747.60**	**3555.06**	**66.79**	**3554.69**	**0.90**
16	14114	88.70	91.10	239.00	10748.82	3648.03	65.57	3647.67	1.40
17	14208	89.10	90.00	239.00	10750.62	3742.00	64.67	3741.65	1.24
18	14301	89.60	89.00	240.00	10751.68	3835.00	65.48	3834.64	1.20
19	14394	89.70	88.70	240.00	10752.25	3927.99	67.35	3927.62	0.34
20	**14488**	**90.50**	**90.00**	**240.00**	**10752.08**	**4021.98**	**68.41**	**4021.61**	**1.62**
21	14582	90.90	90.40	239.00	10750.93	4115.97	68.09	4115.60	0.60
22	14676	89.30	90.20	240.00	10750.77	4209.96	67.59	4209.60	1.72
23	14770	89.80	90.80	240.00	10751.51	4303.94	66.77	4303.59	0.83
24	14864	89.40	90.60	242.00	10752.16	4397.92	65.62	4397.58	0.48
25	**14958**	**87.30**	**89.40**	**242.00**	**10754.87**	**4491.88**	**65.62**	**4491.53**	**2.57**
26	15052	88.00	89.40	242.00	10758.73	4585.80	66.61	4585.45	0.74
27	15146	89.30	88.60	242.00	10760.94	4679.76	68.25	4679.41	1.62
28	15239	89.60	89.40	244.00	10761.83	4772.75	69.87	4772.39	0.92
29	15333	91.40	90.10	244.00	10761.01	4866.74	70.28	4866.38	2.05
30	**15427**	**89.70**	**90.70**	**246.00**	**10760.11**	**4960.73**	**69.63**	**4960.37**	**1.92**
31	15520	89.60	90.70	246.00	10760.68	5053.71	68.49	5053.36	0.11
32	15614	90.20	91.40	246.00	10760.84	5147.68	66.77	5147.34	0.98
33	15708	89.00	89.40	246.00	10761.50	5241.66	66.11	5241.33	2.48
34	15801	88.00	89.50	248.00	10763.93	5334.63	67.00	5334.29	1.08
35	**15895**	**88.70**	**89.30**	**248.00**	**10766.64**	**5428.59**	**67.99**	**5428.25**	**0.77**
36	15989	90.50	89.80	248.00	10767.30	5522.58	68.72	5522.24	1.99
37	16083	90.50	89.10	248.00	10766.48	5616.57	69.63	5616.23	0.74
38	16177	92.60	89.40	248.00	10763.93	5710.53	70.86	5710.18	2.26
39	16270	90.40	90.00	249.00	10761.50	5803.49	71.34	5803.14	2.45
40	**16364**	**89.60**	**91.00**	**249.00**	**10761.50**	**5897.48**	**70.52**	**5897.14**	**1.36**
41	16458	89.60	91.90	249.00	10762.16	5991.43	68.14	5991.10	0.96
42	16552	90.30	90.90	249.00	10762.24	6085.38	65.85	6085.07	1.30
43	16646	89.10	90.30	249.00	10762.73	6179.36	64.86	6179.07	1.43
44	16739	89.70	90.00	249.00	10763.70	6272.35	64.62	6272.06	0.72
45	**16833**	**89.90**	**89.90**	**251.00**	**10764.03**	**6366.35**	**64.70**	**6366.06**	**0.24**
46	16927	90.90	90.10	251.00	10763.38	6460.35	64.70	6460.06	1.08
47	17020	91.50	90.50	251.00	10761.43	6553.32	64.22	6553.03	0.78
48	17114	90.10	90.80	253.00	10760.12	6647.29	63.15	6647.02	1.52
49	17208	91.70	90.20	251.00	10758.64	6741.27	62.33	6741.00	1.82
50	**17302**	**89.70**	**89.40**	**253.00**	**10757.49**	**6835.25**	**62.66**	**6834.98**	**2.29**
51	17395	89.90	89.70	253.00	10757.82	6928.25	63.39	6927.98	0.39
52	17488	88.80	89.80	253.00	10758.87	7021.24	63.79	7020.97	1.19
53	17582	88.20	90.00	255.00	10761.33	7115.21	63.96	7114.94	0.67
54	17676	88.30	89.40	253.00	10764.20	7209.17	64.45	7208.89	0.65
55	**17771**	**90.10**	**89.90**	**255.00**	**10765.53**	**7304.15**	**65.03**	**7303.88**	**1.97**
56	17865	89.10	89.60	257.00	10766.18	7398.15	65.44	7397.87	1.11
57	17960	89.50	89.70	255.00	10767.34	7493.14	66.02	7492.87	0.43
58	18054	91.10	88.70	257.00	10766.85	7587.13	67.33	7586.85	2.01
59	18149	89.70	89.60	257.00	10766.19	7682.12	68.74	7681.83	1.75
60	**18243**	**89.40**	**89.60**	**255.00**	**10766.93**	**7776.12**	**69.40**	**7775.83**	**0.32**

Report #: 3

Date: 5-Jun-14

RYAN DIRECTIONAL SERVICES, INC.

A NABORS COMPANY

Ryan Job # 7579

SURVEY REPORT

Customer: Oasis Petroleum North America LLC

Well Name: Chalmers 5301 44-24 2TR

Rig #: Nabors B25

API #: 33-053-05924

Calculation Method: Minimum Curvature Calculation

MWD Operator: Henry Unger / Daniel Ogden

Directional Drillers: RPM

Survey Corrected To: True North

Vertical Section Direction: 89.61

Total Correction: 8.14

Temperature Forecasting Model (Chart Only): Logarithmic

Survey #	MD	Inc	Azm	Temp	TVD	VS	N/S	E/W	DLS
61	18338	90.50	88.70	257.00	10767.01	7871.12	70.81	7870.82	1.50
62	18432	90.00	89.60	258.00	10766.60	7965.11	72.20	7964.80	1.10
63	18526	90.30	89.30	258.00	10766.35	8059.11	73.10	8058.80	0.45
64	18621	88.50	89.90	258.00	10767.35	8154.10	73.77	8153.79	2.00
65	**18715**	**89.10**	**90.50**	**258.00**	**10769.32**	**8248.07**	**73.44**	**8247.76**	**0.90**
66	18809	89.50	90.90	260.00	10770.47	8342.05	72.29	8341.75	0.60
67	18903	88.20	91.20	260.00	10772.35	8436.00	70.57	8435.71	1.42
68	18997	89.40	91.00	258.00	10774.32	8529.94	68.76	8529.67	1.29
69	19090	89.00	89.10	260.00	10775.62	8622.93	68.68	8622.66	2.09
70	**19184**	**88.60**	**90.20**	**262.00**	**10777.59**	**8716.91**	**69.26**	**8716.64**	**1.24**
71	19278	88.50	90.80	262.00	10779.97	8810.86	68.44	8810.60	0.65
72	19372	87.40	90.40	258.00	10783.33	8904.79	67.45	8904.54	1.25
73	19465	88.40	88.00	260.00	10786.74	8997.72	68.75	8997.46	2.79
74	19559	89.70	89.00	258.00	10788.30	9091.68	71.21	9091.41	1.74
75	**19653**	**90.50**	**88.60**	**260.00**	**10788.13**	**9185.67**	**73.18**	**9185.39**	**0.95**
76	19746	90.60	88.70	262.00	10787.24	9278.65	75.37	9278.36	0.15
77	19840	91.40	88.70	262.00	10785.60	9372.63	77.50	9372.32	0.85
78	19934	91.00	89.40	260.00	10783.63	9466.60	79.06	9466.28	0.86
79	20027	90.70	90.10	262.00	10782.25	9559.59	79.47	9559.27	0.82
80	**20121**	**89.60**	**89.80**	**262.00**	**10782.00**	**9653.59**	**79.55**	**9653.27**	**1.21**
81	20215	90.50	89.00	260.00	10781.92	9747.58	80.53	9747.26	1.28
82	20309	90.50	89.30	262.00	10781.10	9841.58	81.93	9841.25	0.32
83	20403	90.50	89.90	262.00	10780.28	9935.57	82.58	9935.24	0.64
84	20497	90.40	90.50	262.00	10779.54	10029.56	82.26	10029.24	0.65
85	**20590**	**89.80**	**91.40**	**262.00**	**10779.38**	**10122.54**	**80.71**	**10122.22**	**1.16**
86	20684	88.90	93.00	262.00	10780.45	10216.43	77.11	10216.14	1.95
87	20778	89.00	92.90	262.00	10782.17	10310.26	72.27	10310.00	0.15
88	20841	90.50	92.30	262.00	10782.45	10373.17	69.41	10372.94	2.56
Projection	20904	90.50	92.30	262.00	10781.90	10436.10	66.88	10435.88	0.00

TH

Industrial Commission of North Dakota
Oil and Gas Division Verbal Approval Procedures
Other

Well or Facility No **28342**

Tight Hole **No**

OPERATOR

Operator	Representative	Rep Phone
OASIS PETROLEUM NORTH AMERICA LL	**Mike Brown**	**(281) 404-9634**

WELL INFORMATION

Well Name
CHALMERS 5301 44-24 2TR

Inspector
Richard Dunn

Well Location	QQ	Sec	Twp		Rng	
	SESE	**24**	**153**	**N**	**101**	**W**

County
MCKENZIE

Field
BAKER

Footages
959 Feet From the **S** Line
245 Feet From the **E** Line

Pool
BAKKEN

OTHER INFORMATION

Contractor

Rig Operator
NABORS DRILLING U.S.A., INC.

Surface Owner

Pit Water Disposal

DETAILS OF PROCEDURE

This well is the replacement well for the Chalmers Wade Federal 5301 44-24 12T which was PA due to a water flow from the Dakota Formation. All four initial wells on this pad had received a log waiver due to another Oasis well located several hundered feet away having run a full suite of logs. A waiver has been requested and submitted but has not been processed yet. Rig will finish curve sometime in the next 24 hours and will run casing. Permission for a log waiver is granted.

Start Date	**5/29/2014**
Date Approved	**5/29/2014**
Approved By	**Richard Dunn**

NORTH DAKOTA
OIL AND GAS DIVISION

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.dmr.nd.gov/oilgas

28342

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

Date: **5/12/2014**

RE: CORES AND SAMPLES

Well Name:	**CHALMERS 5301 44-24 2TX**	Well File No.: **28342**
Location:	**SESE 24-153-101**	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:
  - o 30' maximum intervals through all vertical and build sections.
  - o 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

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

May 9, 2014

Mike Brown
Drilling Engineer II
OASIS PETROLEUM NORTH AMERICA LLC
1001 Fannin Suite 1500
Houston, TX 77002

RE: HORIZONTAL WELL
CHALMERS 5301 44-24 2TX
SESE Section 24-153N-101W
McKenzie County
Well File # 28342

Dear Mike :

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 Section 19 & 20 T153N R100W.

PERMIT STIPULATIONS: DUE TO STREAM ADJACENT TO THE WELL SITE, A DIKE IS REQUIRED SURROUNDING THE ENTIRE LOCATION. OASIS PETRO NO AMER must contact NDIC Field Inspector Richard Dunn at 701-770-3554 prior to SETTING CONDUCTOR.

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. The minimum legal coordinate from the well head at casing point is: 445E. Also, based on the azimuth of the proposed lateral the maximum legal coordinate from the well head is: 459S & 10534E.

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,

Todd L. Holweger
Mineral Resources Permit Manager

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	5 / 10 / 2014	No

Operator	Telephone Number
OASIS PETROLEUM NORTH AMERICA LLC	281-404-9634

Address	City	State	Zip Code
1001 Fannin 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
CHALMERS	5301 44-24 2TX

Surface Footages	Qtr-Qtr	Section	Township	Range	County
959 F S L 245 F E L	SESE	24	153 N	101 W	McKenzie

Longstring Casing Point Footages	Qtr-Qtr	Section	Township	Range	County
1028 F S L 255 F W L	LOT4	19	153 N	100 W	McKenzie

Longstring Casing Point Coordinates From Well Head	Azimuth	Longstring Total Depth
69 N From WH 500 E From WH	87.77 º	10944 Feet MD 10699 Feet TVD

Bottom Hole Footages From Nearest Section Line	Qtr-Qtr	Section	Township	Range	County
1030 F S L 200 F E L	SESE	20	153 N	100 W	Williams

Bottom Hole Coordinates From Well Head	KOP Lateral 1	Azimuth Lateral 1	Estimated Total Depth Lateral 1
71 N From WH 10534 E From WH	10258 Feet MD	90 º	21029 Feet MD 10769 Feet TVD

Latitude of Well Head	Longitude of Well Head	NAD Reference	Description of (Subject to NDIC Approval)
48 ° 03 ' 20.82 "	-103 ° 36 ' 18.55 "	NAD83	Spacing Unit: Section 19 & 20 T153N R100W

Ground Elevation	Acres in Spacing/Drilling Unit	Spacing/Drilling Unit Setback Requirement	Industrial Commission Order
1972 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
10489 Feet	10513 Feet	5280 Feet	5263 Feet

Objective Horizons	Pierre Shale Top
Three Forks B1	1918

Proposed	Size	Weight	Depth	Cement Volume	
Surface Casing	13 - 3/8 "	54 Lb./Ft.	2018 Feet	955 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 - "	29/32 Lb./Ft.	10944 Feet MD 10699 Feet TVD	799 Sacks	3841 Feet	5341 Feet

Base Last Charles Salt (If Applicable)	
9091 Feet	NOTE: Intermediate or longstring casing string must be cemented above the top Dakota Group Sand.

Proposed Logs
Triple Combo: KOP-KibbyGR/Res to BSC GR-To Surf CND thru 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

Note that 9-5/8" Intermediate string will be set across Dakota. See supplemental wellbore diagram. Water flow from Dakota is a known issue in the area.

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	Qtr-Qtr	Section	Township	Range	County
F L F L			N	W	
Bottom Hole Footages From Nearest Section Line	**Qtr-Qtr**	**Section**	**Township**	**Range**	**County**
F L F L			N	W	

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	Qtr-Qtr	Section	Township	Range	County
F L F L			N	W	
Bottom Hole Footages From Nearest Section Line	**Qtr-Qtr**	**Section**	**Township**	**Range**	**County**
F L F L			N	W	

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	Qtr-Qtr	Section	Township	Range	County
F L F L			N	W	
Bottom Hole Footages From Nearest Section Line	**Qtr-Qtr**	**Section**	**Township**	**Range**	**County**
F L F L			N	W	

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	Qtr-Qtr	Section	Township	Range	County
F L F L			N	W	
Bottom Hole Footages From Nearest Section Line	**Qtr-Qtr**	**Section**	**Township**	**Range**	**County**
F L F L			N	W	

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

Date: **5 / 9 / 2014**

ePermit	Printed Name: **Mike Brown**	Title: **Drilling Engineer II**

FOR STATE USE ONLY

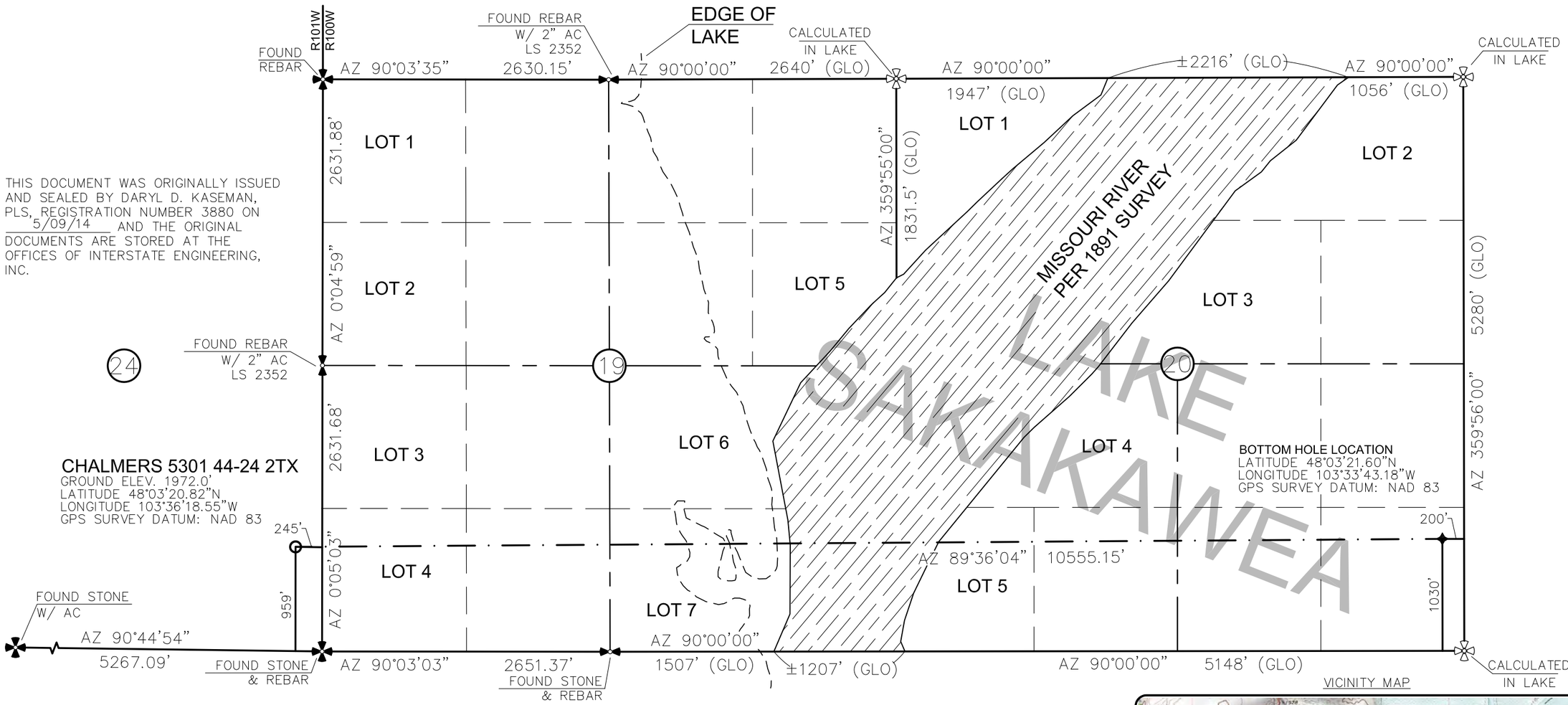
Permit and File Number	API Number
28342	**33 - 053 - 05924**
Field: **BAKER**	
Pool: **BAKKEN**	Permit Type: **DEVELOPMENT**

FOR STATE USE ONLY

Date Approved
5 / 9 / 2014
By: **Todd L. Holweger**
Title: **Mineral Resources Permit Manager**

WELL LOCATION PLAT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DARYL D. KASEMAN, PLS, REGISTRATION NUMBER 3880 ON 5/09/14 AND THE ORIGINAL DOCUMENTS ARE STORED AT THE OFFICES OF INTERSTATE ENGINEERING, INC.

0 1000
1" = 1000'

– MONUMENT – RECOVERED
– MONUMENT – NOT RECOVERED

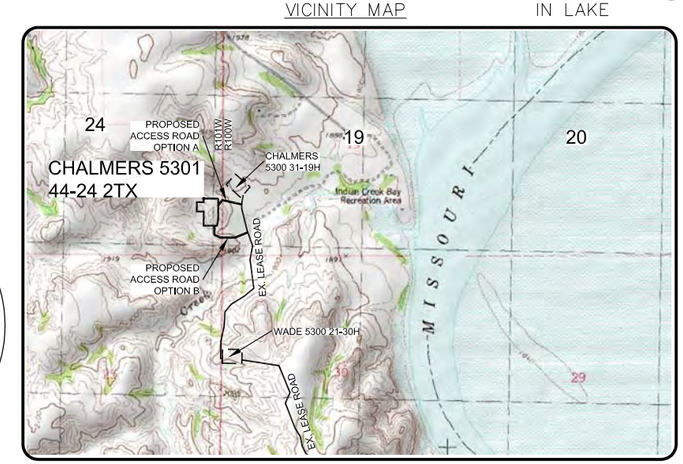
STAKED ON 9/3/13
VERTICAL CONTROL DATUM WAS BASED UPON CONTROL POINT 16 WITH AN ELEVATION OF 2014.2'

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: 5/09/14
NORTH DAKOTA

VICINITY MAP



Revision No.	Date	By	Description

G:\2013\13-136-135-05 Data Petroleum Additional Wells dgn\CALMERS 2TX.dwg
5/9/2014 10:33 AM josh schmierer

OASIS PETROLEUM NORTH AMERICA, LLC
WELL LOCATION PLAT
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. | Project No.: S13-09-235.05
Checked By: D.D.K. | Date: MAY 2014

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Other offices in Minnesota, North Dakota and South Dakota

INTERSTATE ENGINEERING
Professionals you need, people you trust

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

North Dakota Oil and Gas Division
5/9/2014

To whom it may concern:

Oasis Petroleum (with Nabors B25) had a water influx of around 600bbls on the Chalmers Wade Federal 5301 44-24 12T, early morning of 5/8/14. Permission was granted to plug the well on the morning of 5/9/14.

Pending full approval from the North Dakota Industrial Commission, Oasis Petroleum is proposing to drill a new well according to this APD request.

Due to our experience with the Gramma Federal well (~2 miles to the south) about 1.5 years ago, where we ended up having to abandon the well after getting stuck with 7" casing, we respectfully propose the course of action below:

1. Plug the Chalmers Wade Federal 5301 44-24 12T per NDIC requirements. Approval granted 5/9-14
2. Move to north end of pad and drill the Chalmers 5301 44-24 2TX. Set 13-3/8" surface casing, followed by 9-5/8" intermediate casing across the Dakota, sealing off likely flow.
3. Drill down into Mission Canyon and <u>attempt</u> to seal up Mission Canyon, so that it is able to hold ~11.4 ppg mud and drill ahead. If unsuccessful, reduce mud weight and proceed ahead.
4. Drill curve, set 7" casing, and lateral through Bakken pool. Run 4.5" liner

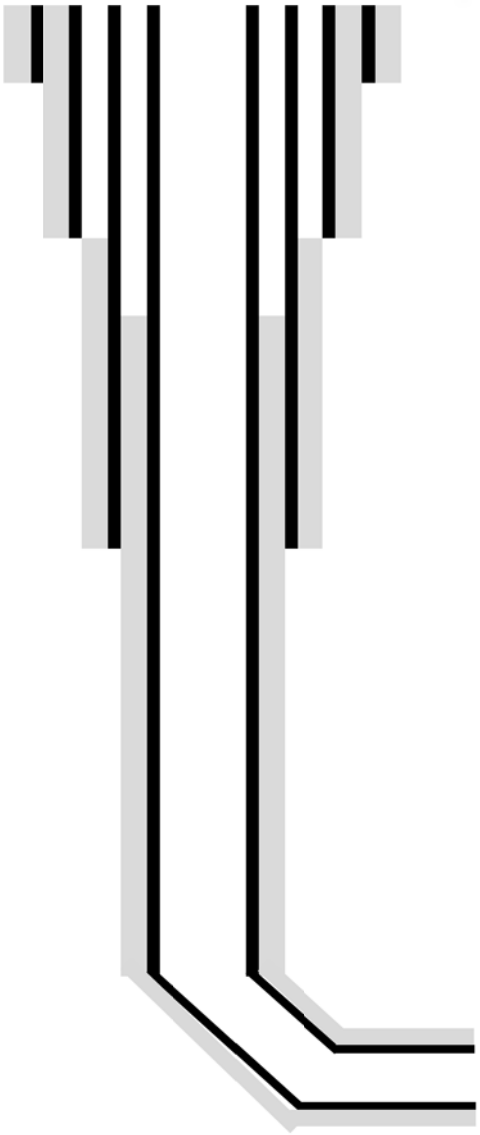
With the above plan, we hope to test whether or not the Mission Canyon can be sealed up enough to hold back the approximately 11.4 ppg mud that would be required to prevent flow from the Dakota. If this test is successful, we would plan to make use of the existing 3 surface holes on the pad.

If we are unable to seal the Mission Canyon, we would proceed to drop mud weight and continue on to drill the curve and lateral as outlined above. We would then seek permission to plug the 3 existing surface holes per NDIC guidelines and set 3 more 13-3/8" surface casing strings, with previously described 9-5/8" across the Dakota and then 7" casing through the curve.

Regards,

Mike Brown
Drilling Engineer II
Oasis Petroleum

Chalmers Infill 9-5/8" Dakota String Design



Hole Section	Hole Size	Casing Size	Weight	Drift	TD	TOC
Conductor	24	20	52.8	19.5	70	SFC
Surface	17.5	13.375	54.5	12.459	2018	SFC
INT - Dakota	12.25	9.625	40	8.75	6400	SFC Shoe
Prod Casing	8.75	7	29/32	6.0	Varied	3841

DRILLING PLAN

OPERATOR	Oasis Petroleum	**COUNTY/STATE**	McKenzie Co., ND
WELL NAME	Chalmers 5301 44-24 2TX	**RIG**	Nabors B25
WELL TYPE	Horizontal Three Forks		
LOCATION	SESE 24-153N-101W	Surface Location (survey plat): 959' FSL	245' FEL
EST. T.D.	21,028'	**GROUND ELEV:**	1943 Finished Pad Elev. **Sub Height:** 25
	TOTAL LATERAL: 10,034' (est)	**KB ELEV:**	1968

PROGNOSIS: Based on 1,968' KB(est)

MARKER		DEPTH (Surf Loc)	DATUM (Surf Loc)
Pierre	NDIC MAP	1,918	50'
Greenhorn		4,510	-2,542'
Mowry		4,914	-2,946'
Dakota		5,341	-3,373'
Rierdon		6,356	-4,388'
Dunham Salt		6,683	-4,715'
Dunham Salt Base		6,800	-4,832'
Spearfish		6,887	-4,919'
Pine Salt		7,135	-5,167'
Pine Salt Base		7,168	-5,200'
Opeche Salt		7,235	-5,267'
Opeche Salt Base		7,269	-5,301'
Broom Creek (Top of Minnelusa Gp.)		7,469	-5,501'
Amsden		7,553	-5,585'
Tyler		7,720	-5,752'
Otter (Base of Minnelusa Gp.)		7,920	-5,952'
Kibbey		8,269	-6,301'
Charles Salt		8,433	-6,465'
UB		9,010	-7,042'
Base Last Salt		9,091	-7,123'
Ratcliffe		9,141	-7,173'
Mission Canyon		9,311	-7,343'
Lodgepole		9,876	-7,908'
Lodgepole Fracture Zone		10,109	-8,141'
False Bakken		10,588	-8,620'
Upper Bakken		10,599	-8,631'
Middle Bakken		10,616	-8,648'
Lower Bakken		10,648	-8,680'
Pronghorn		10,659	-8,691'
Three Forks		10,676	-8,708'
Three Forks Target Top		10,692	-8,724'
Three Forks Target Base		10,699	-8,731'
Claystone		10,702	-8,734'

Dip Rate: **overall -0.4° or .7' /100' down**

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	
Logging Waiver	**Oasis Chalmers 5300 31-19H 894' to NE sec 19 153N 100W**	

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: 8,233'
~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

Max. Anticipated BHP: 4633

Surface Formation: *Glacial till*

MUD:	Interval		Type	WT	Vis	WL	Remarks
Surface:	0' -	2,018'	FW/Gel - Lime Sweeps	8.4-9.0	28-32	NC	Circ Mud Tanks
Intermediate:	2,018' -	10,994'	Invert	9.5-10.4	40-50	30+HtHp	Circ Mud Tanks
Lateral:	10,994' -	21,028'	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 1/2	17-1/2"	2,018'		To Surface	12	100' into Pierre
Intermediate (Dakota):	9-5/8"	40#	12-1/4"	6,400'		2018	24	Set Casing across Dakota
Intermediate:	7"	29/32#	8-3/4"	10,994'		3,841'	24	1500' above Dakota
Production Liner:	4.5"	13.5#	6"	21,028'	**TOL @ 10,171'**			50' above KOP

PROBABLE PLUGS, IF REQ'D:

OTHER:

	MD	TVD	FNL/FSL	FEL/FWL	S-T-R	AZI		
Surface:	2,018	2,018	959' FSL	245' FEL	**Sec. 24 153N 101W**		Survey Company:	
KOP:	10,221'	10,221'	1009' FSL	245' FEL	**Sec. 24 153N 101W**		Build Rate:	12 deg /100'
EOC:	10,968'	10,699'	1027' FSL	228' FWL	**Sec. 19 153N 100W**	87.8	Turn Rate:	3 deg /100'
Casing Point:	10,994'	10,699'	1028' FSL	255' FWL	**Sec. 19 153N 100W**	87.8		
Middle Bakken Lateral TD:	21,028'	10,769'	1030' FSL	200' FEL	**Sec. 20 153N 100W**	90.0		

Comments:

36 pkrs 36 slvs
**Note Hardlines
No frac string planned

Geology: 1/0/1900 **Engineering:** **M. Brown 5-8-14**

Holweger, Todd L.

From: Mike Brown <mbrown@oasispetroleum.com>
Sent: Friday, May 09, 2014 3:16 PM
To: Holweger, Todd L.
Cc: Brandi Terry
Subject: RE: Chalmers 5301 44-24 2TX APD Request

Todd,

I just confirmed with Brandi that we have requested a legal street address. I do not have the affidavit though, as the regulatory group is out of the office today. We can get it to you on Monday if needed.

Thanks,
Mike

From: Holweger, Todd L. [mailto:tholweger@nd.gov]
Sent: Friday, May 09, 2014 2:52 PM
To: Mike Brown
Subject: RE: Chalmers 5301 44-24 2TX APD Request

Ok. Got it.
Also, I need a confirmation that a legal street address was requested (for this pad). Give me a call if you have questions.
Thanks,
Todd

The information contained in this electronic mail transmission is confidential and intended to be sent only to the intended recipient of the transmission. If you are not the intended recipient or the intended recipient's agent, you are hereby notified that any review, use, dissemination, distribution or copying of this communication is strictly prohibited. You are also asked to notify the sender immediately by telephone and to delete this transmission with any attachments and destroy all copies in any form. Thank you in advance for your cooperation.

Azimuths to True North
Magnetic North: 8.14°

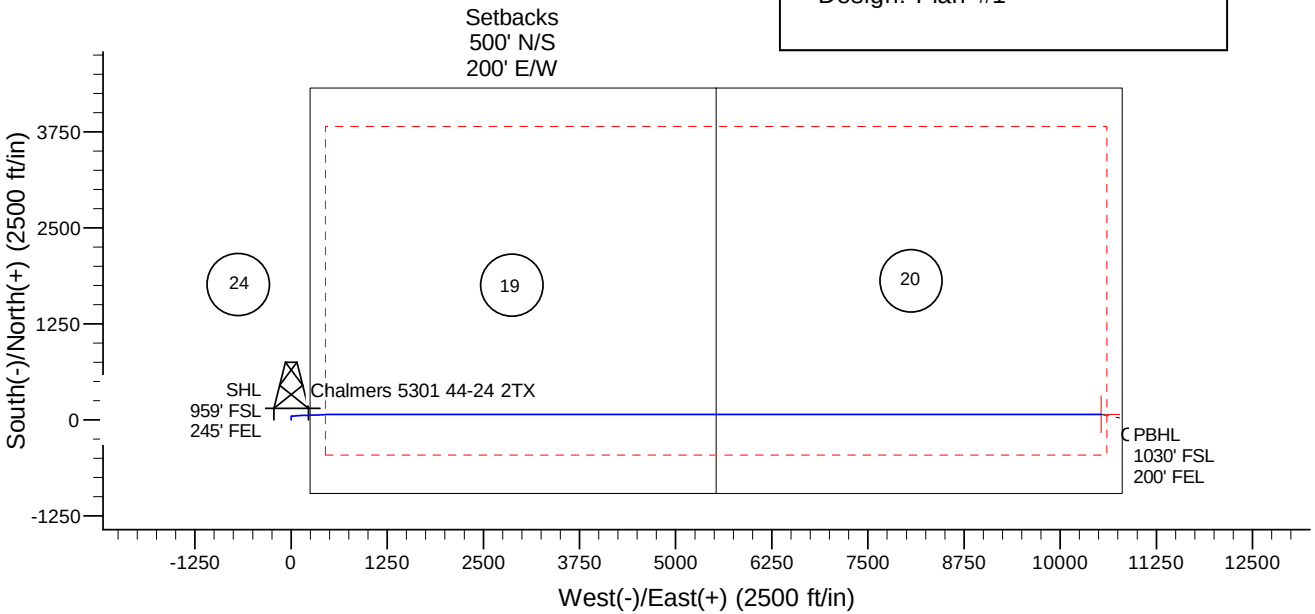
Magnetic Field
Strength: 56466.5snT
Dip Angle: 72.95°
Date: 5/8/2014
Model: IGRF200510

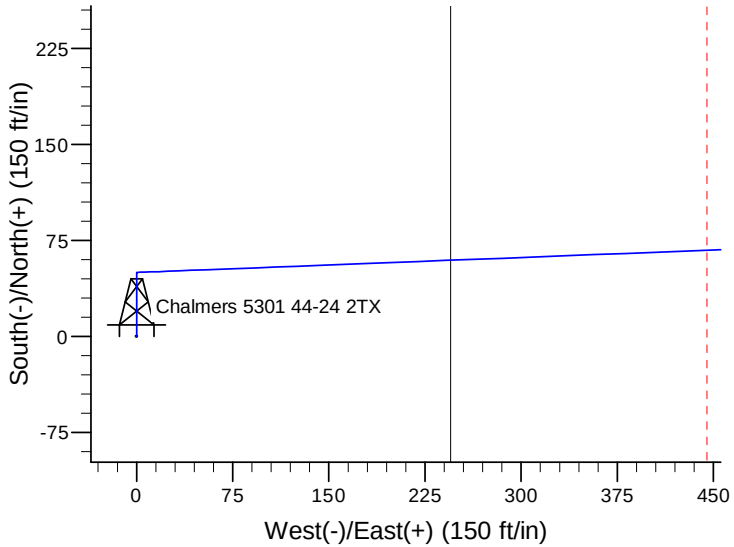
Project: Indian Hills
Site: 153N-100W-19/20_Altered
Well: Chalmers 5301 44-24 2TX
Wellbore: Chalmers #2T
Design: Plan #1

SITE DETAILS: 153N-100W-19/20_Altered

Site Centre Latitude: 48° 3' 20.170 N
Longitude: 103° 36' 18.550 W

Positional Uncertainity: 0.0
Convergence: -2.31
Local North: True



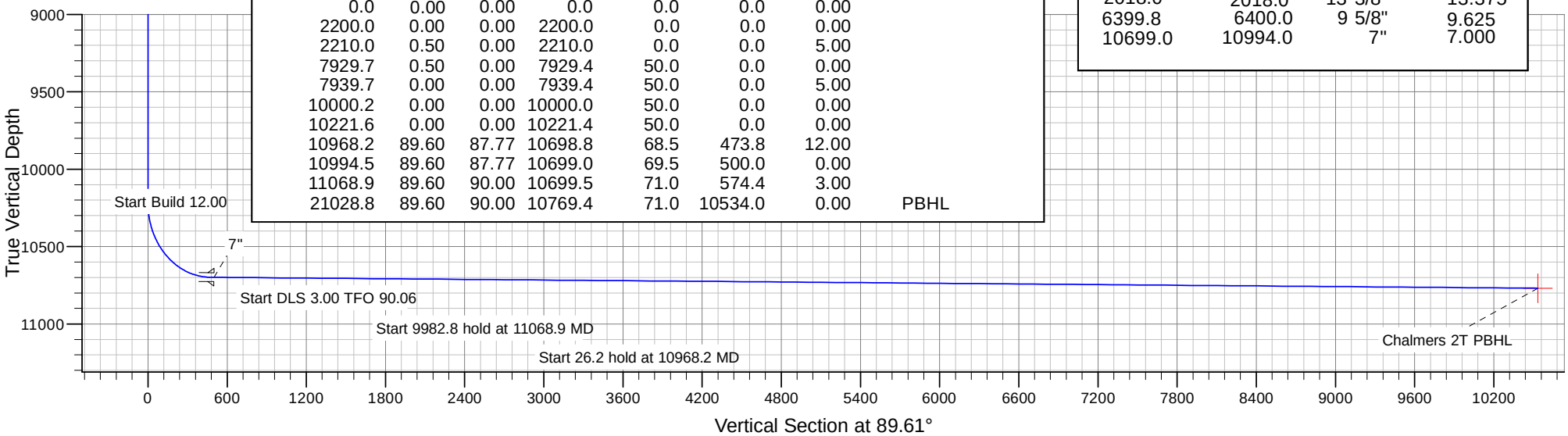


SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	
2200.0	0.00	0.00	2200.0	0.0	0.0	0.00	
2210.0	0.50	0.00	2210.0	0.0	0.0	5.00	
7929.7	0.50	0.00	7929.4	50.0	0.0	0.00	
7939.7	0.00	0.00	7939.4	50.0	0.0	5.00	
10000.2	0.00	0.00	10000.0	50.0	0.0	0.00	
10221.6	0.00	0.00	10221.4	50.0	0.0	0.00	
10968.2	89.60	87.77	10698.8	68.5	473.8	12.00	
10994.5	89.60	87.77	10699.0	69.5	500.0	0.00	
11068.9	89.60	90.00	10699.5	71.0	574.4	3.00	
21028.8	89.60	90.00	10769.4	71.0	10534.0	0.00	PBHL

CASING DETAILS

TVD	MD	Name	Size
2018.0	2018.0	13 3/8"	13.375
6399.8	6400.0	9 5/8"	9.625
10699.0	10994.0	7"	7.000



Oasis

Indian Hills
153N-100W-19/20_Altered
Chalmers 5301 44-24 2TX

Chalmers #2T

Plan: Plan #1

Standard Planning Report

09 May, 2014

Oasis Petroleum

Planning Report

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
Company:	Oasis	**TVD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #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-19/20_Altered

Site Position:		**Northing:**	400,359.23 ft	**Latitude:**	48° 3' 20.170 N
From:	Lat/Long	**Easting:**	1,209,331.30 ft	**Longitude:**	103° 36' 18.550 W
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-2.31 °

Well Chalmers 5301 44-24 2TX

Well Position	**+N/-S**	66.0 ft	**Northing:**	400,425.17 ft	**Latitude:**	48° 3' 20.821 N
	+E/-W	0.0 ft	**Easting:**	1,209,333.96 ft	**Longitude:**	103° 36' 18.550 W
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	0.0 ft	**Ground Level:**	1,942.0 ft

Wellbore Chalmers #2T

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF200510	5/8/2014	8.14	72.95	56,466

Design Plan #1

Audit Notes:

Version:	**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**
	0.0	0.0	0.0	89.61

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	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	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,210.0	0.50	0.00	2,210.0	0.0	0.0	5.00	5.00	0.00	0.00	
7,929.7	0.50	0.00	7,929.4	50.0	0.0	0.00	0.00	0.00	0.00	
7,939.7	0.00	0.00	7,939.4	50.0	0.0	5.00	-5.00	0.00	180.00	
10,000.2	0.00	0.00	10,000.0	50.0	0.0	0.00	0.00	0.00	0.00	
10,221.6	0.00	0.00	10,221.4	50.0	0.0	0.00	0.00	0.00	0.00	
10,968.2	89.60	87.77	10,698.8	68.5	473.8	12.00	12.00	0.00	87.77	
10,994.5	89.60	87.77	10,699.0	69.5	500.0	0.00	0.00	0.00	0.00	
11,068.9	89.60	90.00	10,699.5	71.0	574.4	3.00	0.00	3.00	90.06	
21,028.8	89.60	90.00	10,769.4	71.0	10,534.0	0.00	0.00	0.00	0.00	Chalmers 2TX PBHL

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
Company:	Oasis	**TVD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,918.0	0.00	0.00	1,918.0	0.0	0.0	0.0	0.00	0.00	0.00
Pierre									
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,018.0	0.00	0.00	2,018.0	0.0	0.0	0.0	0.00	0.00	0.00
13 3/8"									
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 5.00									
2,210.0	0.50	0.00	2,210.0	0.0	0.0	0.0	5.00	5.00	0.00
Start 5719.7 hold at 2210.0 MD									
2,300.0	0.50	0.00	2,300.0	0.8	0.0	0.0	0.00	0.00	0.00
2,400.0	0.50	0.00	2,400.0	1.7	0.0	0.0	0.00	0.00	0.00
2,500.0	0.50	0.00	2,500.0	2.6	0.0	0.0	0.00	0.00	0.00
2,600.0	0.50	0.00	2,600.0	3.4	0.0	0.0	0.00	0.00	0.00
2,700.0	0.50	0.00	2,700.0	4.3	0.0	0.0	0.00	0.00	0.00
2,800.0	0.50	0.00	2,800.0	5.2	0.0	0.0	0.00	0.00	0.00
2,900.0	0.50	0.00	2,900.0	6.1	0.0	0.0	0.00	0.00	0.00
3,000.0	0.50	0.00	3,000.0	6.9	0.0	0.0	0.00	0.00	0.00
3,100.0	0.50	0.00	3,100.0	7.8	0.0	0.1	0.00	0.00	0.00
3,200.0	0.50	0.00	3,200.0	8.7	0.0	0.1	0.00	0.00	0.00
3,300.0	0.50	0.00	3,300.0	9.6	0.0	0.1	0.00	0.00	0.00
3,400.0	0.50	0.00	3,400.0	10.4	0.0	0.1	0.00	0.00	0.00
3,500.0	0.50	0.00	3,500.0	11.3	0.0	0.1	0.00	0.00	0.00
3,600.0	0.50	0.00	3,599.9	12.2	0.0	0.1	0.00	0.00	0.00
3,700.0	0.50	0.00	3,699.9	13.0	0.0	0.1	0.00	0.00	0.00
3,800.0	0.50	0.00	3,799.9	13.9	0.0	0.1	0.00	0.00	0.00
3,900.0	0.50	0.00	3,899.9	14.8	0.0	0.1	0.00	0.00	0.00
4,000.0	0.50	0.00	3,999.9	15.7	0.0	0.1	0.00	0.00	0.00
4,100.0	0.50	0.00	4,099.9	16.5	0.0	0.1	0.00	0.00	0.00
4,200.0	0.50	0.00	4,199.9	17.4	0.0	0.1	0.00	0.00	0.00
4,300.0	0.50	0.00	4,299.9	18.3	0.0	0.1	0.00	0.00	0.00
4,400.0	0.50	0.00	4,399.9	19.2	0.0	0.1	0.00	0.00	0.00
4,500.0	0.50	0.00	4,499.9	20.0	0.0	0.1	0.00	0.00	0.00
4,510.1	0.50	0.00	4,510.0	20.1	0.0	0.1	0.00	0.00	0.00
Greenhorn									

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
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Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,600.0	0.50	0.00	4,599.9	20.9	0.0	0.1	0.00	0.00	0.00
4,700.0	0.50	0.00	4,699.9	21.8	0.0	0.1	0.00	0.00	0.00
4,800.0	0.50	0.00	4,799.9	22.6	0.0	0.2	0.00	0.00	0.00
4,900.0	0.50	0.00	4,899.9	23.5	0.0	0.2	0.00	0.00	0.00
4,914.1	0.50	0.00	4,914.0	23.6	0.0	0.2	0.00	0.00	0.00
Mowry									
5,000.0	0.50	0.00	4,999.9	24.4	0.0	0.2	0.00	0.00	0.00
5,100.0	0.50	0.00	5,099.9	25.3	0.0	0.2	0.00	0.00	0.00
5,200.0	0.50	0.00	5,199.9	26.1	0.0	0.2	0.00	0.00	0.00
5,300.0	0.50	0.00	5,299.9	27.0	0.0	0.2	0.00	0.00	0.00
5,341.1	0.50	0.00	5,341.0	27.4	0.0	0.2	0.00	0.00	0.00
Dakota									
5,400.0	0.50	0.00	5,399.9	27.9	0.0	0.2	0.00	0.00	0.00
5,500.0	0.50	0.00	5,499.9	28.8	0.0	0.2	0.00	0.00	0.00
5,600.0	0.50	0.00	5,599.9	29.6	0.0	0.2	0.00	0.00	0.00
5,700.0	0.50	0.00	5,699.9	30.5	0.0	0.2	0.00	0.00	0.00
5,800.0	0.50	0.00	5,799.9	31.4	0.0	0.2	0.00	0.00	0.00
5,900.0	0.50	0.00	5,899.9	32.2	0.0	0.2	0.00	0.00	0.00
6,000.0	0.50	0.00	5,999.9	33.1	0.0	0.2	0.00	0.00	0.00
6,100.0	0.50	0.00	6,099.9	34.0	0.0	0.2	0.00	0.00	0.00
6,200.0	0.50	0.00	6,199.8	34.9	0.0	0.2	0.00	0.00	0.00
6,300.0	0.50	0.00	6,299.8	35.7	0.0	0.2	0.00	0.00	0.00
6,356.2	0.50	0.00	6,356.0	36.2	0.0	0.2	0.00	0.00	0.00
Rierdon									
6,400.0	0.50	0.00	6,399.8	36.6	0.0	0.2	0.00	0.00	0.00
9 5/8"									
6,500.0	0.50	0.00	6,499.8	37.5	0.0	0.3	0.00	0.00	0.00
6,600.0	0.50	0.00	6,599.8	38.4	0.0	0.3	0.00	0.00	0.00
6,683.2	0.50	0.00	6,683.0	39.1	0.0	0.3	0.00	0.00	0.00
Dunham Salt									
6,700.0	0.50	0.00	6,699.8	39.2	0.0	0.3	0.00	0.00	0.00
6,800.0	0.50	0.00	6,799.8	40.1	0.0	0.3	0.00	0.00	0.00
6,800.2	0.50	0.00	6,800.0	40.1	0.0	0.3	0.00	0.00	0.00
Dunham Salt Base									
6,887.2	0.50	0.00	6,887.0	40.9	0.0	0.3	0.00	0.00	0.00
Spearfish									
6,900.0	0.50	0.00	6,899.8	41.0	0.0	0.3	0.00	0.00	0.00
7,000.0	0.50	0.00	6,999.8	41.8	0.0	0.3	0.00	0.00	0.00
7,100.0	0.50	0.00	7,099.8	42.7	0.0	0.3	0.00	0.00	0.00
7,135.2	0.50	0.00	7,135.0	43.0	0.0	0.3	0.00	0.00	0.00
Pine Salt									
7,168.2	0.50	0.00	7,168.0	43.3	0.0	0.3	0.00	0.00	0.00
Pine Salt Base									
7,200.0	0.50	0.00	7,199.8	43.6	0.0	0.3	0.00	0.00	0.00
7,235.2	0.50	0.00	7,235.0	43.9	0.0	0.3	0.00	0.00	0.00
Opeche Salt									
7,269.2	0.50	0.00	7,269.0	44.2	0.0	0.3	0.00	0.00	0.00
Opeche Salt Base									
7,300.0	0.50	0.00	7,299.8	44.5	0.0	0.3	0.00	0.00	0.00
7,400.0	0.50	0.00	7,399.8	45.3	0.0	0.3	0.00	0.00	0.00
7,469.2	0.50	0.00	7,469.0	45.9	0.0	0.3	0.00	0.00	0.00
Broom Creek (Top of Minnelusa Gp.)									
7,500.0	0.50	0.00	7,499.8	46.2	0.0	0.3	0.00	0.00	0.00

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
Company:	Oasis	**TVD Reference:**	WELL @ 1967.0ft (Original Well Elev)
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Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,553.2	0.50	0.00	7,553.0	46.7	0.0	0.3	0.00	0.00	0.00
Amsden									
7,600.0	0.50	0.00	7,599.8	47.1	0.0	0.3	0.00	0.00	0.00
7,700.0	0.50	0.00	7,699.8	48.0	0.0	0.3	0.00	0.00	0.00
7,720.2	0.50	0.00	7,720.0	48.1	0.0	0.3	0.00	0.00	0.00
Tyler									
7,800.0	0.50	0.00	7,799.8	48.8	0.0	0.3	0.00	0.00	0.00
7,900.0	0.50	0.00	7,899.8	49.7	0.0	0.3	0.00	0.00	0.00
7,920.2	0.50	0.00	7,920.0	49.9	0.0	0.3	0.00	0.00	0.00
Otter (Base of Minnelusa Gp.)									
7,929.7	0.50	0.00	7,929.4	50.0	0.0	0.3	0.00	0.00	0.00
Start Drop -5.00									
7,939.7	0.00	0.00	7,939.4	50.0	0.0	0.3	5.00	-5.00	0.00
Start 2060.6 hold at 7939.7 MD									
8,000.0	0.00	0.00	7,999.8	50.0	0.0	0.3	0.00	0.00	0.00
8,100.0	0.00	0.00	8,099.8	50.0	0.0	0.3	0.00	0.00	0.00
8,200.0	0.00	0.00	8,199.8	50.0	0.0	0.3	0.00	0.00	0.00
8,269.2	0.00	0.00	8,269.0	50.0	0.0	0.3	0.00	0.00	0.00
Kibbey									
8,300.0	0.00	0.00	8,299.8	50.0	0.0	0.3	0.00	0.00	0.00
8,400.0	0.00	0.00	8,399.8	50.0	0.0	0.3	0.00	0.00	0.00
8,433.2	0.00	0.00	8,433.0	50.0	0.0	0.3	0.00	0.00	0.00
Charles Salt									
8,500.0	0.00	0.00	8,499.8	50.0	0.0	0.3	0.00	0.00	0.00
8,600.0	0.00	0.00	8,599.8	50.0	0.0	0.3	0.00	0.00	0.00
8,700.0	0.00	0.00	8,699.8	50.0	0.0	0.3	0.00	0.00	0.00
8,800.0	0.00	0.00	8,799.8	50.0	0.0	0.3	0.00	0.00	0.00
8,900.0	0.00	0.00	8,899.8	50.0	0.0	0.3	0.00	0.00	0.00
9,000.0	0.00	0.00	8,999.8	50.0	0.0	0.3	0.00	0.00	0.00
9,010.2	0.00	0.00	9,010.0	50.0	0.0	0.3	0.00	0.00	0.00
UB									
9,091.2	0.00	0.00	9,091.0	50.0	0.0	0.3	0.00	0.00	0.00
Base Last Salt									
9,100.0	0.00	0.00	9,099.8	50.0	0.0	0.3	0.00	0.00	0.00
9,141.2	0.00	0.00	9,141.0	50.0	0.0	0.3	0.00	0.00	0.00
Ratcliffe									
9,200.0	0.00	0.00	9,199.8	50.0	0.0	0.3	0.00	0.00	0.00
9,300.0	0.00	0.00	9,299.8	50.0	0.0	0.3	0.00	0.00	0.00
9,311.2	0.00	0.00	9,311.0	50.0	0.0	0.3	0.00	0.00	0.00
Mission Canyon									
9,400.0	0.00	0.00	9,399.8	50.0	0.0	0.3	0.00	0.00	0.00
9,500.0	0.00	0.00	9,499.8	50.0	0.0	0.3	0.00	0.00	0.00
9,600.0	0.00	0.00	9,599.8	50.0	0.0	0.3	0.00	0.00	0.00
9,700.0	0.00	0.00	9,699.8	50.0	0.0	0.3	0.00	0.00	0.00
9,800.0	0.00	0.00	9,799.8	50.0	0.0	0.3	0.00	0.00	0.00
9,876.2	0.00	0.00	9,876.0	50.0	0.0	0.3	0.00	0.00	0.00
Lodgepole									
9,900.0	0.00	0.00	9,899.8	50.0	0.0	0.3	0.00	0.00	0.00
10,000.2	0.00	0.00	10,000.0	50.0	0.0	0.3	0.00	0.00	0.00
Start 221.4 hold at 10000.2 MD									
10,100.0	0.00	0.00	10,099.8	50.0	0.0	0.3	0.00	0.00	0.00
10,109.2	0.00	0.00	10,109.0	50.0	0.0	0.3	0.00	0.00	0.00
Lodgepole Fracture Zone									

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
Company:	Oasis	**TVD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,200.0	0.00	0.00	10,199.8	50.0	0.0	0.3	0.00	0.00	0.00
10,221.6	0.00	0.00	10,221.4	50.0	0.0	0.3	0.00	0.00	0.00
Start Build 12.00									
10,225.0	0.41	87.77	10,224.8	50.0	0.0	0.3	12.00	12.00	0.00
10,250.0	3.41	87.77	10,249.8	50.0	0.8	1.2	12.00	12.00	0.00
10,275.0	6.41	87.77	10,274.7	50.1	3.0	3.3	12.00	12.00	0.00
10,300.0	9.41	87.77	10,299.4	50.3	6.4	6.8	12.00	12.00	0.00
10,325.0	12.41	87.77	10,324.0	50.4	11.1	11.5	12.00	12.00	0.00
10,350.0	15.41	87.77	10,348.2	50.7	17.2	17.5	12.00	12.00	0.00
10,375.0	18.41	87.77	10,372.2	51.0	24.4	24.8	12.00	12.00	0.00
10,400.0	21.41	87.77	10,395.7	51.3	32.9	33.3	12.00	12.00	0.00
10,425.0	24.41	87.77	10,418.7	51.7	42.6	43.0	12.00	12.00	0.00
10,450.0	27.41	87.77	10,441.2	52.1	53.6	53.9	12.00	12.00	0.00
10,475.0	30.41	87.77	10,463.1	52.6	65.6	66.0	12.00	12.00	0.00
10,500.0	33.41	87.77	10,484.3	53.1	78.8	79.2	12.00	12.00	0.00
10,525.0	36.41	87.77	10,504.8	53.6	93.1	93.5	12.00	12.00	0.00
10,550.0	39.41	87.77	10,524.5	54.2	108.5	108.8	12.00	12.00	0.00
10,575.0	42.41	87.77	10,543.4	54.9	124.8	125.2	12.00	12.00	0.00
10,600.0	45.41	87.77	10,561.4	55.5	142.2	142.5	12.00	12.00	0.00
10,625.0	48.41	87.77	10,578.5	56.3	160.4	160.8	12.00	12.00	0.00
10,639.6	50.16	87.77	10,588.0	56.7	171.5	171.9	12.00	12.00	0.00
False Bakken									
10,650.0	51.41	87.77	10,594.6	57.0	179.5	179.9	12.00	12.00	0.00
10,657.2	52.27	87.77	10,599.0	57.2	185.2	185.5	12.00	12.00	0.00
Upper Bakken									
10,675.0	54.41	87.77	10,609.6	57.8	199.4	199.8	12.00	12.00	0.00
10,686.1	55.74	87.77	10,616.0	58.1	208.5	208.9	12.00	12.00	0.00
Middle Bakken									
10,700.0	57.41	87.77	10,623.7	58.6	220.1	220.5	12.00	12.00	0.00
10,725.0	60.41	87.77	10,636.6	59.4	241.5	241.9	12.00	12.00	0.00
10,749.3	63.32	87.77	10,648.0	60.3	262.9	263.3	12.00	12.00	0.00
Lower Bakken									
10,750.0	63.41	87.77	10,648.3	60.3	263.6	264.0	12.00	12.00	0.00
10,775.0	66.41	87.77	10,658.9	61.2	286.2	286.6	12.00	12.00	0.00
10,775.2	66.41	87.77	10,659.0	61.2	286.3	286.7	0.00	0.00	0.00
Pronghorn									
10,800.0	69.41	87.77	10,668.3	62.1	309.3	309.7	12.09	12.09	0.00
10,823.3	72.21	87.77	10,676.0	62.9	331.3	331.8	12.00	12.00	0.00
Three Forks									
10,825.0	72.41	87.77	10,676.5	63.0	332.9	333.3	12.00	12.00	0.00
10,850.0	75.41	87.77	10,683.4	63.9	356.9	357.3	12.00	12.00	0.00
10,875.0	78.41	87.77	10,689.1	64.9	381.3	381.7	12.00	12.00	0.00
10,890.7	80.30	87.77	10,692.0	65.5	396.7	397.1	12.00	12.00	0.00
Three Forks Target Top									
10,900.0	81.41	87.77	10,693.5	65.8	405.8	406.3	12.00	12.00	0.00
10,925.0	84.41	87.77	10,696.6	66.8	430.6	431.1	12.00	12.00	0.00
10,950.0	87.41	87.77	10,698.3	67.8	455.5	456.0	12.00	12.00	0.00
10,968.2	89.60	87.77	10,698.8	68.5	473.8	474.2	12.00	12.00	0.00
Start 26.2 hold at 10968.2 MD									
10,994.0	89.60	87.77	10,699.0	69.5	499.5	500.0	0.00	0.00	0.00
7"									
10,994.5	89.60	87.77	10,699.0	69.5	500.0	500.5	0.00	0.00	0.00
Start DLS 3.00 TFO 90.06									
11,000.0	89.60	87.93	10,699.0	69.7	505.5	506.0	3.00	0.00	3.00

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
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Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
11,068.9	89.60	90.00	10,699.5	71.0	574.4	574.9	3.00	0.00	3.00
Start 9982.8 hold at 11068.9 MD									
11,100.0	89.60	90.00	10,699.7	71.0	605.5	605.9	0.00	0.00	0.00
11,200.0	89.60	90.00	10,700.4	71.0	705.5	705.9	0.00	0.00	0.00
11,300.0	89.60	90.00	10,701.1	71.0	805.5	805.9	0.00	0.00	0.00
11,400.0	89.60	90.00	10,701.8	71.0	905.5	905.9	0.00	0.00	0.00
11,500.0	89.60	90.00	10,702.5	71.0	1,005.5	1,005.9	0.00	0.00	0.00
11,600.0	89.60	90.00	10,703.2	71.0	1,105.5	1,105.9	0.00	0.00	0.00
11,700.0	89.60	90.00	10,703.9	71.0	1,205.5	1,205.9	0.00	0.00	0.00
11,800.0	89.60	90.00	10,704.7	71.0	1,305.5	1,305.9	0.00	0.00	0.00
11,900.0	89.60	90.00	10,705.4	71.0	1,405.5	1,405.9	0.00	0.00	0.00
12,000.0	89.60	90.00	10,706.1	71.0	1,505.5	1,505.9	0.00	0.00	0.00
12,100.0	89.60	90.00	10,706.8	71.0	1,605.5	1,605.9	0.00	0.00	0.00
12,200.0	89.60	90.00	10,707.5	71.0	1,705.5	1,705.9	0.00	0.00	0.00
12,300.0	89.60	90.00	10,708.2	71.0	1,805.5	1,805.9	0.00	0.00	0.00
12,400.0	89.60	90.00	10,708.9	71.0	1,905.4	1,905.9	0.00	0.00	0.00
12,500.0	89.60	90.00	10,709.6	71.0	2,005.4	2,005.9	0.00	0.00	0.00
12,600.0	89.60	90.00	10,710.3	71.0	2,105.4	2,105.9	0.00	0.00	0.00
12,700.0	89.60	90.00	10,711.0	71.0	2,205.4	2,205.9	0.00	0.00	0.00
12,800.0	89.60	90.00	10,711.7	71.0	2,305.4	2,305.9	0.00	0.00	0.00
12,900.0	89.60	90.00	10,712.4	71.0	2,405.4	2,405.9	0.00	0.00	0.00
13,000.0	89.60	90.00	10,713.1	71.0	2,505.4	2,505.9	0.00	0.00	0.00
13,100.0	89.60	90.00	10,713.8	71.0	2,605.4	2,605.9	0.00	0.00	0.00
13,200.0	89.60	90.00	10,714.5	71.0	2,705.4	2,705.8	0.00	0.00	0.00
13,300.0	89.60	90.00	10,715.2	71.0	2,805.4	2,805.8	0.00	0.00	0.00
13,400.0	89.60	90.00	10,715.9	71.0	2,905.4	2,905.8	0.00	0.00	0.00
13,500.0	89.60	90.00	10,716.6	71.0	3,005.4	3,005.8	0.00	0.00	0.00
13,600.0	89.60	90.00	10,717.3	71.0	3,105.4	3,105.8	0.00	0.00	0.00
13,700.0	89.60	90.00	10,718.0	71.0	3,205.4	3,205.8	0.00	0.00	0.00
13,800.0	89.60	90.00	10,718.7	71.0	3,305.4	3,305.8	0.00	0.00	0.00
13,900.0	89.60	90.00	10,719.4	71.0	3,405.4	3,405.8	0.00	0.00	0.00
14,000.0	89.60	90.00	10,720.1	71.0	3,505.4	3,505.8	0.00	0.00	0.00
14,100.0	89.60	90.00	10,720.8	71.0	3,605.4	3,605.8	0.00	0.00	0.00
14,200.0	89.60	90.00	10,721.5	71.0	3,705.4	3,705.8	0.00	0.00	0.00
14,300.0	89.60	90.00	10,722.2	71.0	3,805.4	3,805.8	0.00	0.00	0.00
14,400.0	89.60	90.00	10,722.9	71.0	3,905.4	3,905.8	0.00	0.00	0.00
14,500.0	89.60	90.00	10,723.6	71.0	4,005.4	4,005.8	0.00	0.00	0.00
14,600.0	89.60	90.00	10,724.3	71.0	4,105.4	4,105.8	0.00	0.00	0.00
14,700.0	89.60	90.00	10,725.0	71.0	4,205.4	4,205.8	0.00	0.00	0.00
14,800.0	89.60	90.00	10,725.7	71.0	4,305.4	4,305.8	0.00	0.00	0.00
14,900.0	89.60	90.00	10,726.4	71.0	4,405.4	4,405.8	0.00	0.00	0.00
15,000.0	89.60	90.00	10,727.1	71.0	4,505.4	4,505.8	0.00	0.00	0.00
15,100.0	89.60	90.00	10,727.8	71.0	4,605.4	4,605.8	0.00	0.00	0.00
15,200.0	89.60	90.00	10,728.5	71.0	4,705.4	4,705.8	0.00	0.00	0.00
15,300.0	89.60	90.00	10,729.2	71.0	4,805.4	4,805.7	0.00	0.00	0.00
15,400.0	89.60	90.00	10,729.9	71.0	4,905.4	4,905.7	0.00	0.00	0.00
15,500.0	89.60	90.00	10,730.6	71.0	5,005.4	5,005.7	0.00	0.00	0.00
15,600.0	89.60	90.00	10,731.3	71.0	5,105.4	5,105.7	0.00	0.00	0.00
15,700.0	89.60	90.00	10,732.0	71.0	5,205.4	5,205.7	0.00	0.00	0.00
15,800.0	89.60	90.00	10,732.7	71.0	5,305.4	5,305.7	0.00	0.00	0.00
15,900.0	89.60	90.00	10,733.4	71.0	5,405.4	5,405.7	0.00	0.00	0.00
16,000.0	89.60	90.00	10,734.1	71.0	5,505.4	5,505.7	0.00	0.00	0.00
16,100.0	89.60	90.00	10,734.8	71.0	5,605.4	5,605.7	0.00	0.00	0.00
16,200.0	89.60	90.00	10,735.5	71.0	5,705.4	5,705.7	0.00	0.00	0.00
16,300.0	89.60	90.00	10,736.2	71.0	5,805.4	5,805.7	0.00	0.00	0.00

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
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Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
16,400.0	89.60	90.00	10,736.9	71.0	5,905.4	5,905.7	0.00	0.00	0.00
16,500.0	89.60	90.00	10,737.6	71.0	6,005.3	6,005.7	0.00	0.00	0.00
16,600.0	89.60	90.00	10,738.3	71.0	6,105.3	6,105.7	0.00	0.00	0.00
16,700.0	89.60	90.00	10,739.0	71.0	6,205.3	6,205.7	0.00	0.00	0.00
16,800.0	89.60	90.00	10,739.7	71.0	6,305.3	6,305.7	0.00	0.00	0.00
16,900.0	89.60	90.00	10,740.4	71.0	6,405.3	6,405.7	0.00	0.00	0.00
17,000.0	89.60	90.00	10,741.1	71.0	6,505.3	6,505.7	0.00	0.00	0.00
17,100.0	89.60	90.00	10,741.8	71.0	6,605.3	6,605.7	0.00	0.00	0.00
17,200.0	89.60	90.00	10,742.5	71.0	6,705.3	6,705.7	0.00	0.00	0.00
17,300.0	89.60	90.00	10,743.2	71.0	6,805.3	6,805.7	0.00	0.00	0.00
17,400.0	89.60	90.00	10,743.9	71.0	6,905.3	6,905.6	0.00	0.00	0.00
17,500.0	89.60	90.00	10,744.6	71.0	7,005.3	7,005.6	0.00	0.00	0.00
17,600.0	89.60	90.00	10,745.3	71.0	7,105.3	7,105.6	0.00	0.00	0.00
17,700.0	89.60	90.00	10,746.0	71.0	7,205.3	7,205.6	0.00	0.00	0.00
17,800.0	89.60	90.00	10,746.8	71.0	7,305.3	7,305.6	0.00	0.00	0.00
17,900.0	89.60	90.00	10,747.5	71.0	7,405.3	7,405.6	0.00	0.00	0.00
18,000.0	89.60	90.00	10,748.2	71.0	7,505.3	7,505.6	0.00	0.00	0.00
18,100.0	89.60	90.00	10,748.9	71.0	7,605.3	7,605.6	0.00	0.00	0.00
18,200.0	89.60	90.00	10,749.6	71.0	7,705.3	7,705.6	0.00	0.00	0.00
18,300.0	89.60	90.00	10,750.3	71.0	7,805.3	7,805.6	0.00	0.00	0.00
18,400.0	89.60	90.00	10,751.0	71.0	7,905.3	7,905.6	0.00	0.00	0.00
18,500.0	89.60	90.00	10,751.7	71.0	8,005.3	8,005.6	0.00	0.00	0.00
18,600.0	89.60	90.00	10,752.4	71.0	8,105.3	8,105.6	0.00	0.00	0.00
18,700.0	89.60	90.00	10,753.1	71.0	8,205.3	8,205.6	0.00	0.00	0.00
18,800.0	89.60	90.00	10,753.8	71.0	8,305.3	8,305.6	0.00	0.00	0.00
18,900.0	89.60	90.00	10,754.5	71.0	8,405.3	8,405.6	0.00	0.00	0.00
19,000.0	89.60	90.00	10,755.2	71.0	8,505.3	8,505.6	0.00	0.00	0.00
19,100.0	89.60	90.00	10,755.9	71.0	8,605.3	8,605.6	0.00	0.00	0.00
19,200.0	89.60	90.00	10,756.6	71.0	8,705.3	8,705.6	0.00	0.00	0.00
19,300.0	89.60	90.00	10,757.3	71.0	8,805.3	8,805.6	0.00	0.00	0.00
19,400.0	89.60	90.00	10,758.0	71.0	8,905.3	8,905.6	0.00	0.00	0.00
19,500.0	89.60	90.00	10,758.7	71.0	9,005.3	9,005.5	0.00	0.00	0.00
19,600.0	89.60	90.00	10,759.4	71.0	9,105.3	9,105.5	0.00	0.00	0.00
19,700.0	89.60	90.00	10,760.1	71.0	9,205.3	9,205.5	0.00	0.00	0.00
19,800.0	89.60	90.00	10,760.8	71.0	9,305.3	9,305.5	0.00	0.00	0.00
19,900.0	89.60	90.00	10,761.5	71.0	9,405.3	9,405.5	0.00	0.00	0.00
20,000.0	89.60	90.00	10,762.2	71.0	9,505.3	9,505.5	0.00	0.00	0.00
20,100.0	89.60	90.00	10,762.9	71.0	9,605.3	9,605.5	0.00	0.00	0.00
20,200.0	89.60	90.00	10,763.6	71.0	9,705.3	9,705.5	0.00	0.00	0.00
20,300.0	89.60	90.00	10,764.3	71.0	9,805.3	9,805.5	0.00	0.00	0.00
20,400.0	89.60	90.00	10,765.0	71.0	9,905.3	9,905.5	0.00	0.00	0.00
20,500.0	89.60	90.00	10,765.7	71.0	10,005.2	10,005.5	0.00	0.00	0.00
20,600.0	89.60	90.00	10,766.4	71.0	10,105.2	10,105.5	0.00	0.00	0.00
20,700.0	89.60	90.00	10,767.1	71.0	10,205.2	10,205.5	0.00	0.00	0.00
20,800.0	89.60	90.00	10,767.8	71.0	10,305.2	10,305.5	0.00	0.00	0.00
20,900.0	89.60	90.00	10,768.5	71.0	10,405.2	10,405.5	0.00	0.00	0.00
21,000.0	89.60	90.00	10,769.2	71.0	10,505.2	10,505.5	0.00	0.00	0.00
21,028.8	89.60	90.00	10,769.4	71.0	10,534.0	10,534.2	0.00	0.00	0.00

TD at 21051.8 - Chalmers 2TX PBHL

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
Company:	Oasis	**TVD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Chalmers 2TX PBHL - plan hits target center - Point	0.00	0.00	10,769.4	71.0	10,534.0	400,071.41	1,219,862.27	48° 3' 21.493 N	103° 33' 43.482 W

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
2,018.0	2,018.0	13 3/8"	13.375	17.500
6,400.0	6,399.8	9 5/8"	9.625	12.250
10,994.0	10,699.0	7"	7.000	8.750

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,918.0	1,918.0	Pierre			
4,510.1	4,510.0	Greenhorn			
4,914.1	4,914.0	Mowry			
5,341.1	5,341.0	Dakota			
6,356.2	6,356.0	Rierdon			
6,683.2	6,683.0	Dunham Salt			
6,800.2	6,800.0	Dunham Salt Base			
6,887.2	6,887.0	Spearfish			
7,135.2	7,135.0	Pine Salt			
7,168.2	7,168.0	Pine Salt Base			
7,235.2	7,235.0	Opeche Salt			
7,269.2	7,269.0	Opeche Salt Base			
7,469.2	7,469.0	Broom Creek (Top of Minnelusa Gp.)			
7,553.2	7,553.0	Amsden			
7,720.2	7,720.0	Tyler			
7,920.2	7,920.0	Otter (Base of Minnelusa Gp.)			
8,269.2	8,269.0	Kibbey			
8,433.2	8,433.0	Charles Salt			
9,010.2	9,010.0	UB			
9,091.2	9,091.0	Base Last Salt			
9,141.2	9,141.0	Ratcliffe			
9,311.2	9,311.0	Mission Canyon			
9,876.2	9,876.0	Lodgepole			
10,109.2	10,109.0	Lodgepole Fracture Zone			
10,639.6	10,588.0	False Bakken			
10,657.2	10,599.0	Upper Bakken			
10,686.1	10,616.0	Middle Bakken			
10,749.3	10,648.0	Lower Bakken			
10,775.2	10,659.0	Pronghorn			
10,823.3	10,676.0	Three Forks			
10,890.7	10,692.0	Three Forks Target Top			

Database:	OpenWellsCompass - EDM Prod	**Local Co-ordinate Reference:**	Well Chalmers 5301 44-24 2TX
Company:	Oasis	**TVD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Project:	Indian Hills	**MD Reference:**	WELL @ 1967.0ft (Original Well Elev)
Site:	153N-100W-19/20_Altered	**North Reference:**	True
Well:	Chalmers 5301 44-24 2TX	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Chalmers #2T		
Design:	Plan #1		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
2,200.0	2,200.0	0.0	0.0	Start Build 5.00
2,210.0	2,210.0	0.0	0.0	Start 5719.7 hold at 2210.0 MD
7,929.7	7,929.4	50.0	0.0	Start Drop -5.00
7,939.7	7,939.4	50.0	0.0	Start 2060.6 hold at 7939.7 MD
10,000.2	10,000.0	50.0	0.0	Start 221.4 hold at 10000.2 MD
10,221.6	10,221.4	50.0	0.0	Start Build 12.00
10,968.2	10,698.8	68.5	473.8	Start 26.2 hold at 10968.2 MD
10,994.5	10,699.0	69.5	500.0	Start DLS 3.00 TFO 90.06
11,068.9	10,699.5	71.0	574.4	Start 9982.8 hold at 11068.9 MD
21,028.8	10,769.4	71.0	10,534.0	TD at 21051.8

Oasis Petroleum
Well Summary
Chalmers 5301 44-24 2TX
Sec. 24 T153N R101W
McKenzie County, North Dakota

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’ to 2,018’	54.5	J-55	STC	12.615"	12.459"	4,100	5,470	6,840

Interval	Description	Collapse	Burst	Tension	Cost per ft
		(psi) a	(psi) b	(1000 lbs) c	
0’ to 2,018’	13-3/8", 54.5#, J-55, STC, 8rd	1130 / 2.13	2730 / 2.89	514 / 2.63	

API Rating & Safety Factor

a) Based on full casing evacuation with 9 ppg fluid on backside (2018' setting depth).

b) Burst pressure based on 9 ppg fluid with no fluid on backside (2018' setting depth).

c) Based on string weight in 9 ppg fluid at 2018' 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: **689 sks** (355 bbls) 2.9 yield conventional system with 94 lb/sk cement, .25 lb/sk D130 Lost Circulation Control Agent, 2% CaCL2, 4% D079 Extender, and 2% D053 Expanding Agent.

Tail Slurry: **266 sks** (55 bbls) 1.16 yield conventional system with 94 lb/sk cement, .25 lb/sk Lost Circulation Control Agent, and .25% CaCL2.

Oasis Petroleum
Well Summary
Chalmers 5301 44-24 2TX
Sec. 24 T153N R101W
McKenzie County, North Dakota

INTERMEDIATE CASING AND CEMENT DESIGN

Intermediate Casing Design

							Make-up Torque (ft-lbs)		
Size	**Interval**	**Weight**	**Grade**	**Coupling**	**I.D.**	**Drift**	**Minimum**	**Optimum**	**Max**
9-5/8”	0' - 6400'	40	L-80	LTC	8.835”	8.75”**	5,450	7,270	9,090

**Special Drift

Interval	Description	Collapse	Burst	Tension
		(psi) a	(psi) b	(1000 lbs) c
0' - 6400'	9-5/8”, 40#, HCP-110, LTC, 8rd	3090 / 3.71*	5750 / 1.24	837 / 3.86

API Rating & Safety Factor

a) 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 13.5#/ft fracture gradient. Backup of 9 ppg fluid.

b) Collapse pressure based on 11.5ppg fluid on backside and 9ppg fluid inside of casing.

c) Yield based on string weight in 10 ppg fluid, (217k lbs buoyed weight) plus 100k lbs overpull.

Cement volumes are estimates based on 9-5/8" casing set in an 12-1/4" hole with 30% excess. TOC at SFC shoe.

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

Lead Slurry: **592 sks** (210 bbls) Conventional system with 75 lb/sk cement, 0.5lb/sk lost circulation, 10% expanding agent, 2% extender, 2% CaCl2, 0.2% anti foam, and 0.4% fluid loss

Tail Slurry: **521 sks** (108 bbls) Conventional system with 94 lb/sk cement, 0.3% anti-settling agent, 0.3% fluid loss agent, 0.3 lb/sk lost circulation control agent, 0.2% anti foam, and 0.1% retarder

Oasis Petroleum
Well Summary
Chalmers 5301 44-24 2TX
Sec. 24 T153N R101W
McKenzie County, North Dakota

INTERMEDIATE CASING AND CEMENT DESIGN

Intermediate Casing Design

							Make-up Torque (ft-lbs)		
Size	**Interval**	**Weight**	**Grade**	**Coupling**	**I.D.**	**Drift**	**Minimum**	**Optimum**	**Max**
7”	0' - 6683'	29	P-110	LTC	6.184”	6.059”	5,980	7,970	8,770
7”	6683' - 10221'	32	HCP-110	LTC	6.094”	6.000”**	6,730	8,970	9,870
7”	10221' - 10994'	29	P-110	LTC	6.184”	6.059”	5,980	7,970	8,770

**Special Drift

Interval	Length	Description	Collapse	Burst	Tension
			(psi) a	(psi) b	(1000 lbs) c
0' - 6683'	6683’	7”, 29#, P-110, LTC, 8rd	8530 / 2.45*	11220 / 1.19	797 / 2.10
6683' - 10221'	3538’	7”, 32#, HCP-110, LTC, 8rd	11890 / 2.23*	12450 / 1.29	
6683' - 10221'	3538’	7”, 32#, HCP-110, LTC, 8rd	11890 / 1.86**	12450 / 1.29	
10221' - 10994'	773’	7”, 29#, P-110, LTC, 8rd	8530 / 1.53*	11220 / 1.16	

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 10699' TVD.

c. Based on string weight in 10 ppg fluid, (298k 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.

Pre-flush (Spacer): **50 bbls** Saltwater
40 bbls Weighted MudPush Express

Lead Slurry: **177 sks** (82 bbls) 2.59 yield conventional system with 61 lb/sk cement, 23 lb/sk D035 Extender, .250 lb/sk D130 Lost Circulation Control Agent, 10% NaCl, .15% D208 Viscosifier, .20% D046 Anti Foamer, .8% D112 Fluid Loss Agent, and 6% D154 Extender.

Tail Slurry: **622 sks** (172 bbls) 1.55 yield conventional system with 94 lb/sk cement, .250 lb/sk D130 Lost Circulation Control Agent, 3% KCL, 35% Silica, .2% D167 Fluid Loss Agent, .5% D065 Dispersant, .2%D198 Retarder, .2% D046 Anti Foamer, and .25% D153 Anti-Settling Agent.

Oasis Petroleum
Well Summary
Chalmers 5301 44-24 2TX
Sec. 24 T153N R101W
McKenzie County, North Dakota

PRODUCTION LINER

Size	Interval	Weight	Grade	Coupling	I.D.	Drift	Torque
4-1/2”	10,171' – 21,051'	13.5	P-110	BTC	3.92"	3.795"	4,500

Interval	Length	Description	Collapse	Burst	Tension	Condition
			(psi) **a**	(psi) **b**	(1000 lbs) **c**	
10,171' – 21,028'	10,857’	4-1/2”, 13.5 lb, P-110, BTC, 8rd	10670 / 2.00	12410 / 1.28	443 / 1.96	New

API Rating & Safety Factor

a) Based on full casing evacuation with 9.5 ppg fluid on backside @ 10769' TVD.

b) Burst pressure based on 9000 psi treating pressure with 10.2 ppg internal fluid gradient and 9 ppg external fluid gradient @ 10769' TVD.

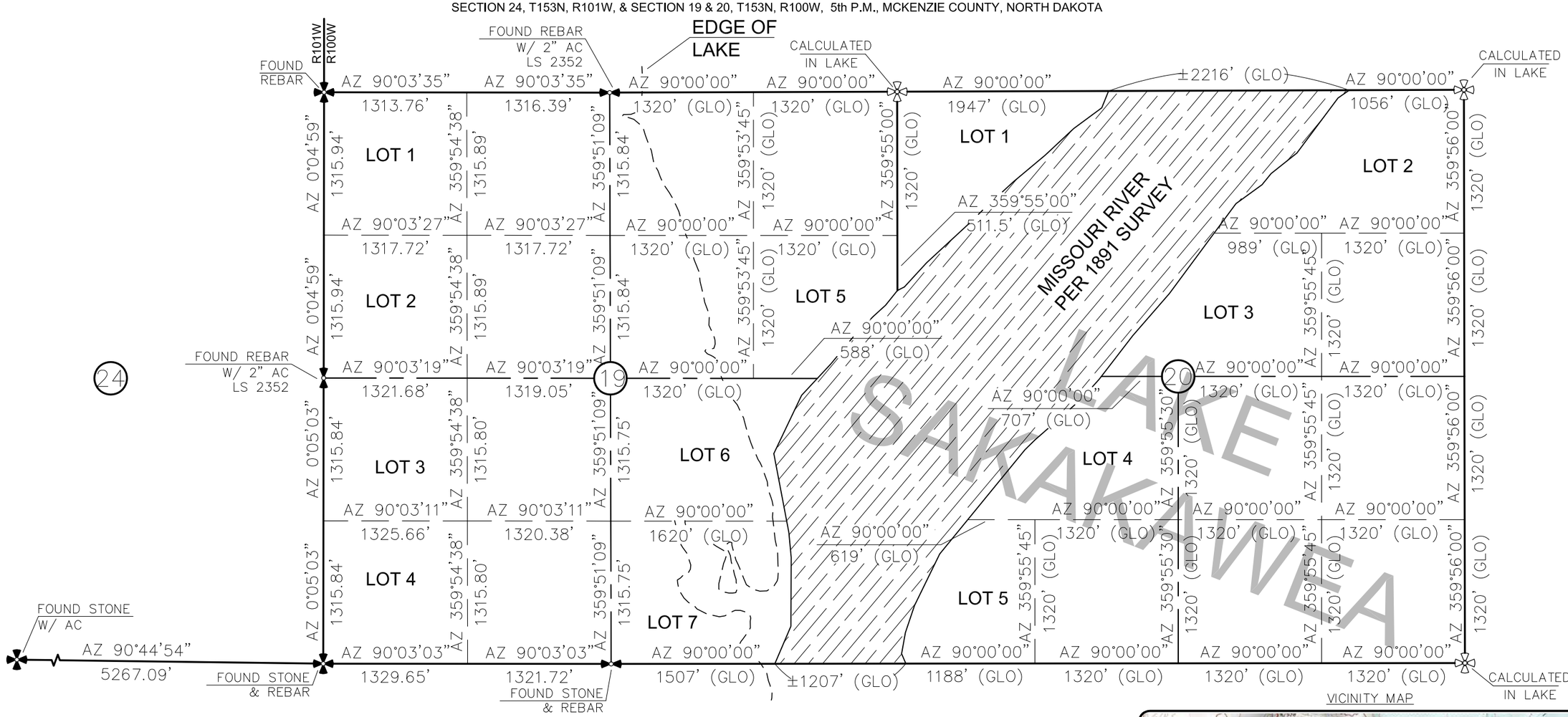
c) Based on string weight in 9.5 ppg fluid (Buoyed weight: 125k lbs.) plus 100k lbs overpull.

Oasis Petroleum does not use Diesel Fuel, as defined by the US EPA in the list below, in our hydraulic fracture operations.

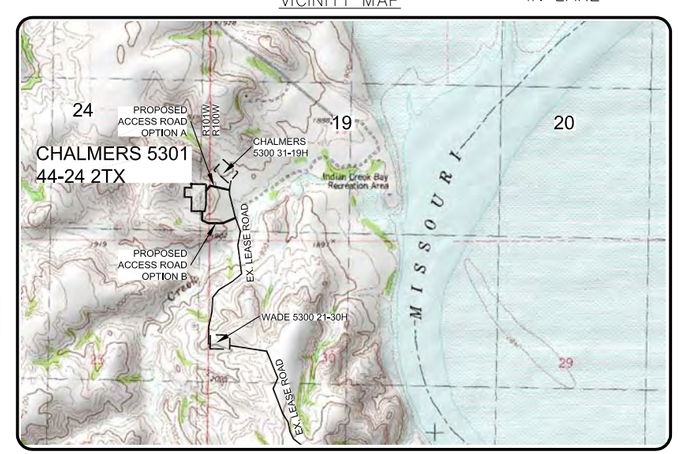
68334-30-5 (Primary Name: Fuels, diesel)
68476-34-6 (Primary Name: Fuels, diesel, No. 2)
68476-30-2 (Primary Name: Fuel oil No. 2)
68476-31-3 (Primary Name: Fuel oil, No. 4)
8008-20-6 (Primary Name: Kerosene)

SECTION BREAKDOWN

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, & SECTION 19 & 20, T153N, R100W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



VICINITY MAP



N

0 1000
1" = 1000'

– MONUMENT – RECOVERED
– MONUMENT – NOT RECOVERED

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REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 5/09/14
NORTH DAKOTA

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Revision No.	Date	By	Description

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OASIS PETROLEUM NORTH AMERICA, LLC
SECTION BREAKDOWN
SECTION 24, T153N, R101W, & SECTIONS 19 & 20, T153N, R100W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. Project No.: S13-09-235.05
Checked By: D.D.K. Date: MAY 2014

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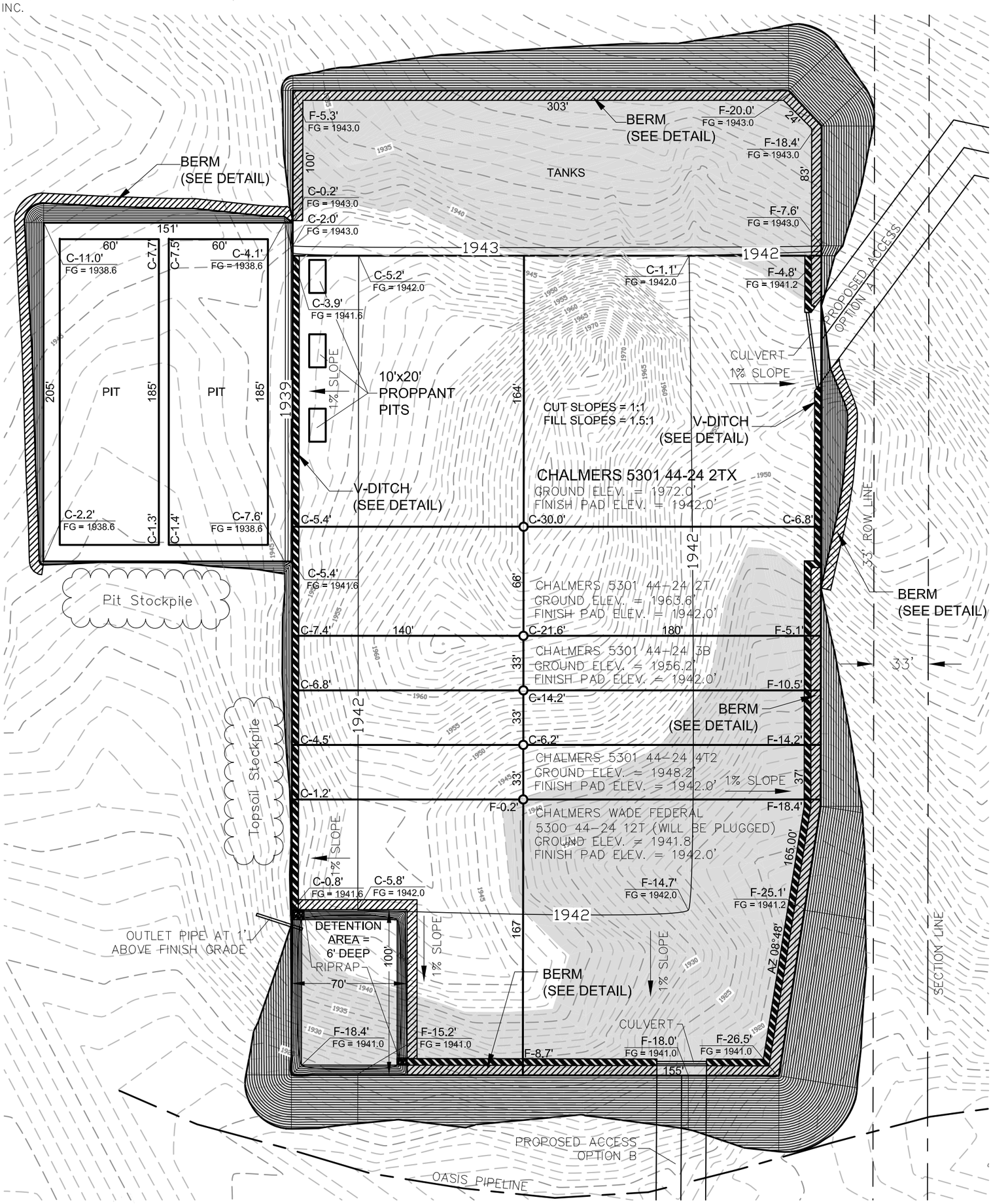
PAD LAYOUT

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



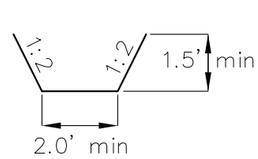
— BERM

— DITCH

Proposed Contours

Original Contours

V-DITCH DETAIL



0 60
1" = 60'

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

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OASIS PETROLEUM NORTH AMERICA, LLC
PAD LAYOUT
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. | Project No.: S13-09-235.05
Checked By: D.D.K. | Date: MAY 2014

Revision No.	Date	By	Description

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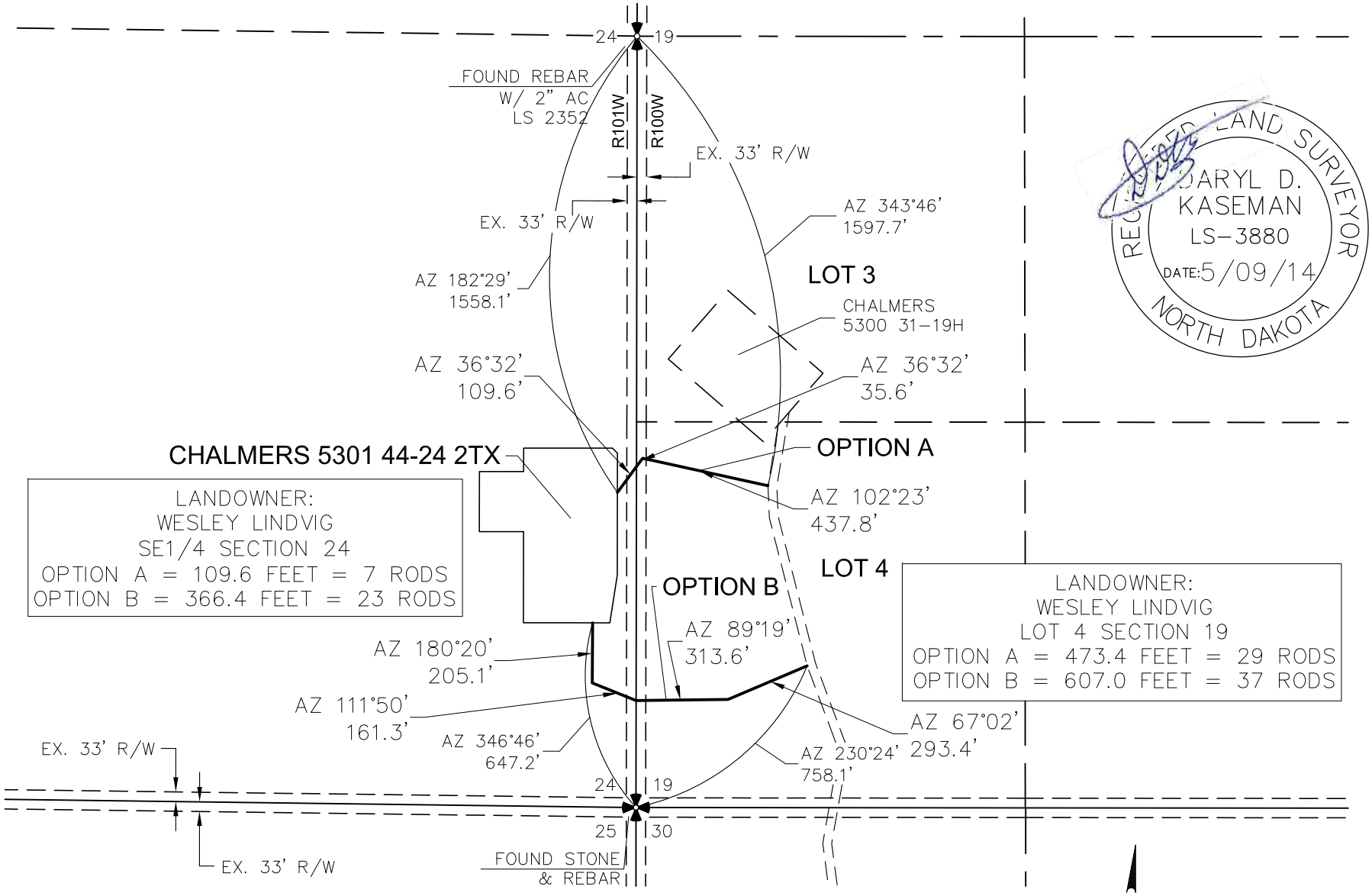
ACCESS APPROACH

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 5/09/14
NORTH DAKOTA

Revision No.	Date	By	Description

OASIS PETROLEUM NORTH AMERICA, LLC
ACCESS APPROACH
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.L.S. Project No.: S13-09-235.05
Checked By: D.D.K. Date: MAY 2014

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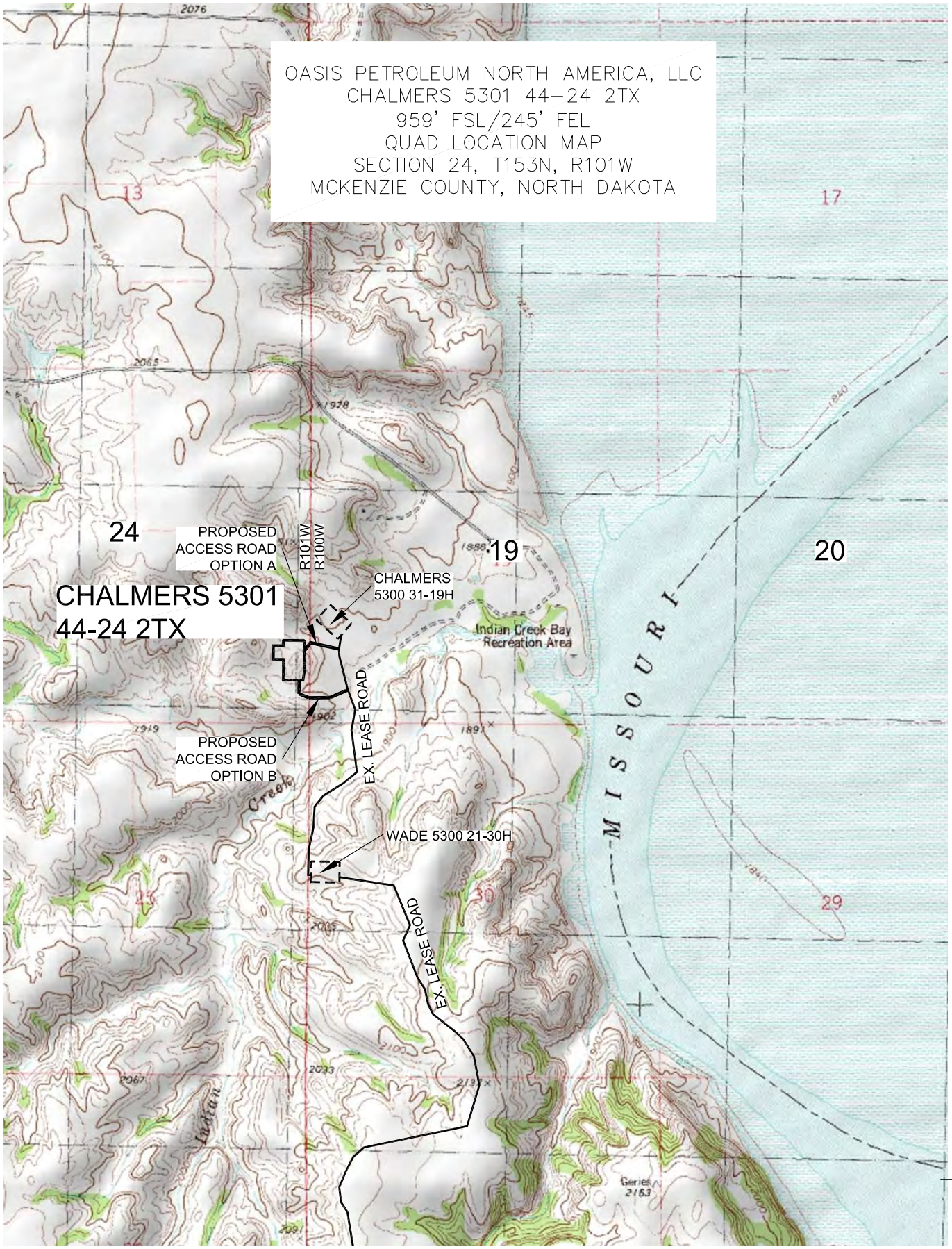

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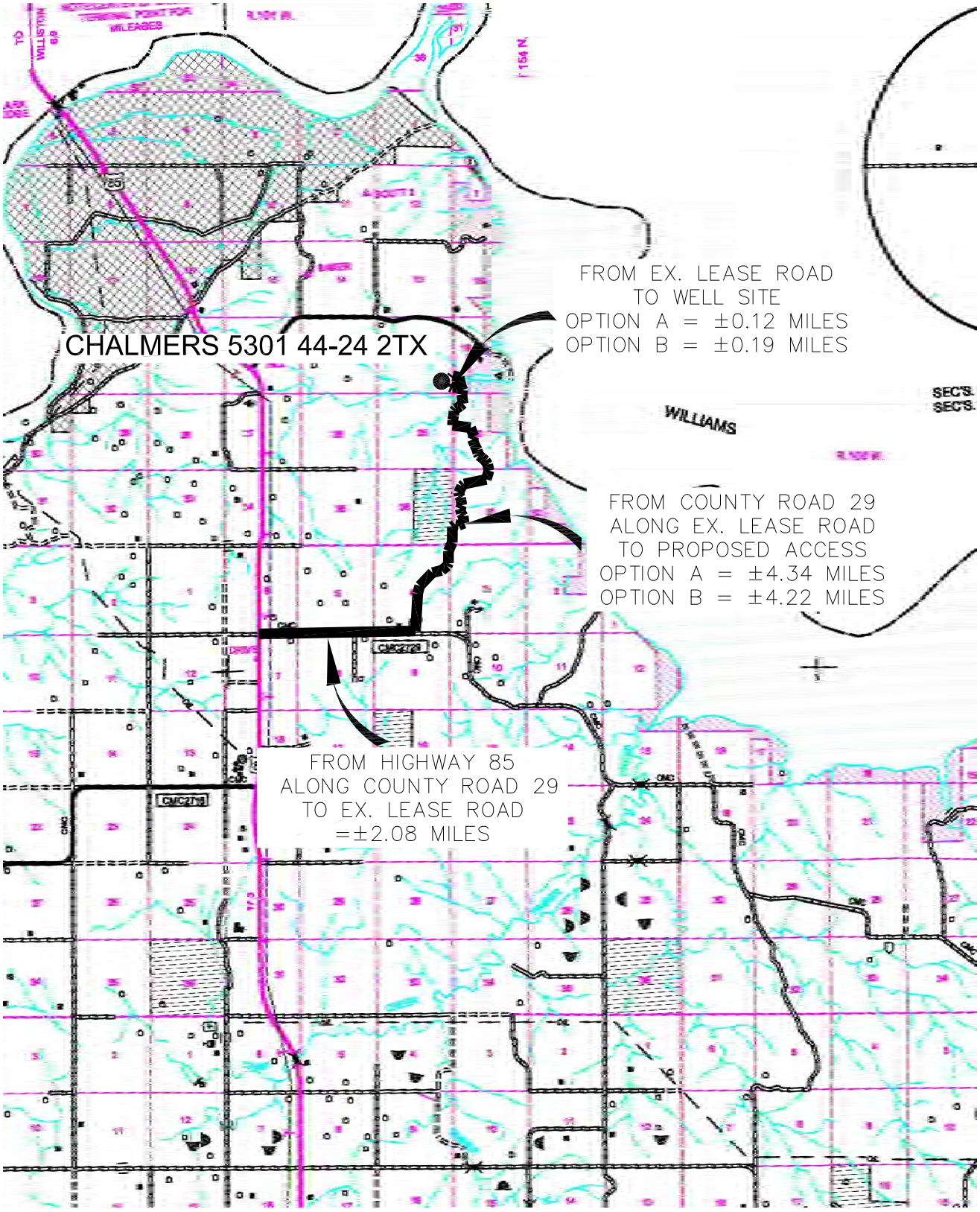
OASIS PETROLEUM NORTH AMERICA, LLC
QUAD LOCATION MAP
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By:	J.J.S.	Project No.:	S13-09-235.05
Checked By:	D.D.K.	Date:	MAY 2014

Revision No.	Date	By	Description

COUNTY ROAD MAP

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



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SCALE: 1" = 2 MILE

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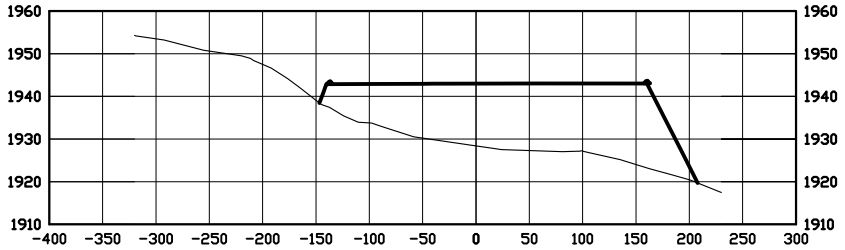
OASIS PETROLEUM NORTH AMERICA, LLC
COUNTY ROAD MAP
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By:	J.J.S.	Project No.:	S13-09-235.05
Checked By:	D.D.K.	Date:	MAY 2014

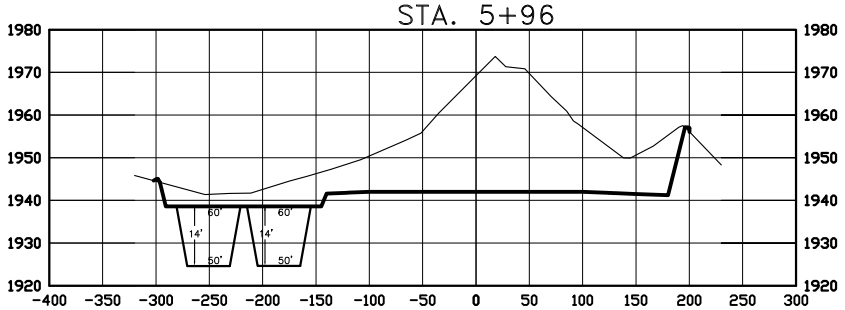
Revision No.	Date	By	Description

CROSS SECTIONS

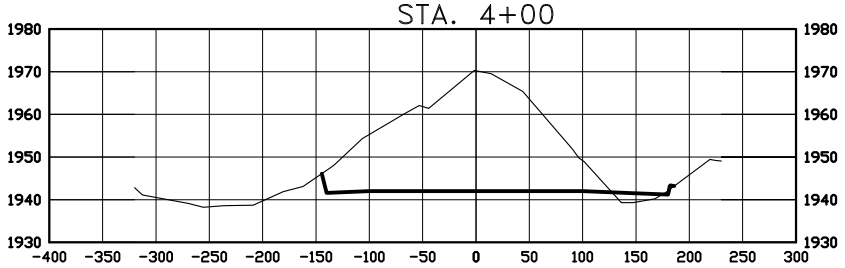
OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA



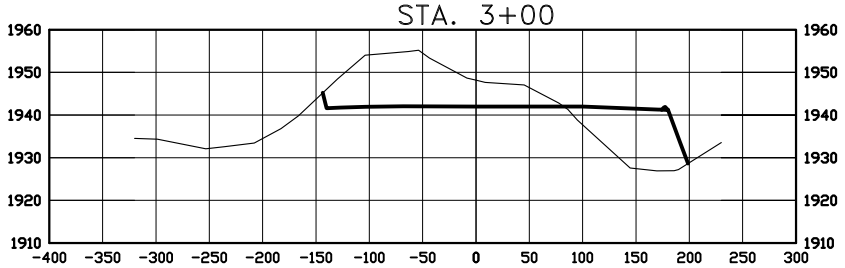
STA. 5+96



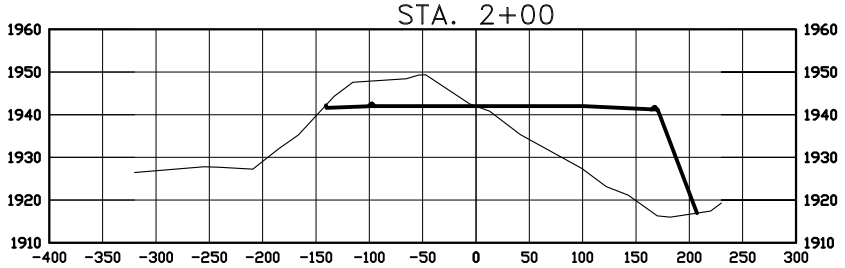
STA. 4+00



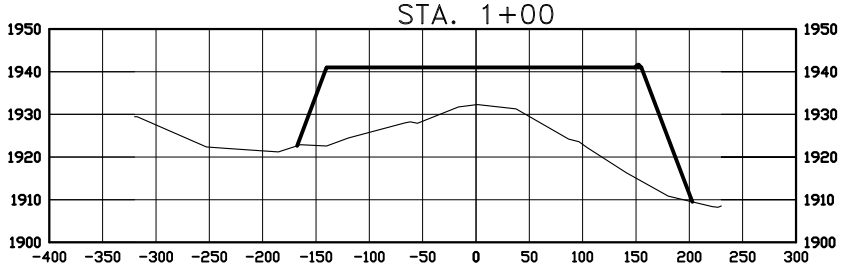
STA. 3+00



STA. 2+00



STA. 1+00



STA. 0+00

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REGISTERED LAND SURVEYOR
DARYL D. KASEMAN
LS-3880
DATE: 5/09/14
NORTH DAKOTA

SCALE
HORIZ 1"=180'
VERT 1"=45'

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OASIS PETROLEUM NORTH AMERICA, LLC
PAD CROSS SECTIONS
SECTION 24, T153N, R101W
MCKENZIE COUNTY, NORTH DAKOTA

Drawn By: J.J.S. | Project No.: S13-09-235.05
Checked By: D.D.K. | Date: MAY 2014

Revision No.	Date	By	Description

WELL LOCATION SITE QUANTITIES

OASIS PETROLEUM NORTH AMERICA, LLC
1001 FANNIN, SUITE 1500, HOUSTON, TX 77002
"CHALMERS 5301 44-24 2TX"
959 FEET FROM SOUTH LINE AND 245 FEET FROM EAST LINE
SECTION 24, T153N, R101W, 5th P.M., MCKENZIE COUNTY, NORTH DAKOTA

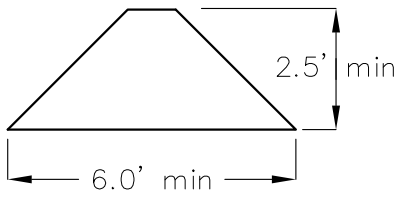
WELL SITE ELEVATION	1972.0
WELL PAD ELEVATION	1942.0

EXCAVATION	55,136
PLUS PIT	9,450
	64,586
EMBANKMENT	37,558
PLUS SHRINKAGE (30%)	11,267
	48,825
STOCKPILE PIT	9,450
STOCKPILE TOP SOIL (6")	4,770
BERMS	1,711 LF = 554 CY
DITCHES	1,029 LF = 157 CY
DETENTION AREA	1,428 CY
STOCKPILE MATERIAL	2,572
DISTURBED AREA FROM PAD	5.91 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
959' FSL
245' FEL

BERM DETAIL



DITCH DETAIL

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MCKENZIE COUNTY, NORTH DAKOTA

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