

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

5. Lease Serial No.
COC70049

6. If Indian, Allottee or Tribe Name

1a. Type of work: DRILL REENTER

7. If Unit or CA Agreement, Name and No.
RABBIT EARS / COC78026X

1b. Type of Well: Oil Well Gas Well Other Single Zone Multiple Zone

8. Lease Name and Well No.
RABBIT EARS 0681 2-23H

2. Name of Operator
SANDRIDGE ENERGY INC

9. API Well No.

3a. Address
123 Robert S Kerr Oklahoma City OK 73102

3b. Phone No. (include area code)
(405)429-6518

10. Field and Pool, or Exploratory
WILDCAT / NIOBRARA

4. Location of Well (Report location clearly and in accordance with any State requirements.)*
At surface SWNE / 1707 FNL / 2239 FEL / LAT 40.477017 / LONG -106.453979
At proposed prod. zone SENE / 1674 FNL / 1297 FEL / LAT 40.447554 / LONG -106.469504

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 23 / T6N / R81W / 6PM

14. Distance in miles and direction from nearest town or post office*
25 miles

12. County or Parish
JACKSON

13. State
CO

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)
1389 feet

16. No. of acres in lease
1624.36

17. Spacing Unit dedicated to this well
24955

18. Distance from proposed location* to nearest well, drilling, completed, 15 feet applied for, on this lease, ft.

19. Proposed Depth
5585 feet / 16865 feet

20. BLM/BIA Bond No. on file
FED: NMB000548

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
8308 feet

22. Approximate date work will start*
05/01/2017

23. Estimated duration
60 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Well plat certified by a registered surveyor. 2. A Drilling Plan. 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office). | <ul style="list-style-type: none"> 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). 5. Operator certification 6. Such other site specific information and/or plans as may be required by the BLM. |
|---|---|

25. Signature
(Electronic Submission)

Name (Printed/Typed)
Kim Rodell / Ph: (303)942-0506

Date
10/11/2016

Title
President

Approved by (Signature)
(Electronic Submission)

Name (Printed/Typed)
Reneta Kawcak / Ph: (970)878-3867

Date
01/25/2017

Title
Land Law Examiner

Office
CRAIG

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)



INSTRUCTIONS

GENERAL: This form is designed for submitting proposals to perform certain well operations, as indicated on Federal and Indian lands and leases for action by appropriate Federal agencies, pursuant to applicable Federal laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from local Federal offices.

ITEM 1: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the well, and any other required information, should be furnished when required by Federal agency offices.

ITEMS 15 AND 18: If well is to be, or has been directionally drilled, give distances for subsurface location of hole in any present or objective productive zone.

ITEM 22: Consult applicable Federal regulations, or appropriate officials, concerning approval of the proposal before operations are started.

NOTICES

The Privacy Act of 1974 and regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 25 U.S.C. 396; 43 CFR 3160

PRINCIPAL PURPOSES: The information will be used to: (1) process and evaluate your application for a permit to drill a new oil, gas, or service well or to reenter a plugged and abandoned well; and (2) document, for administrative use, information for the management, disposal and use of National Resource Lands and resources including (a) analyzing your proposal to discover and extract the Federal or Indian resources encountered; (b) reviewing procedures and equipment and the projected impact on the land involved; and (c) evaluating the effects of the proposed operation on the surface and subsurface water and other environmental impacts.

ROUTINE USE: Information from the record and/or the record will be transferred to appropriate Federal, State, and local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecution, in connection with congressional inquiries and for regulatory responsibilities.

EFFECT OF NOT PROVIDING INFORMATION: Filing of this application and disclosure of the information is mandatory only if you elect to initiate a drilling or reentry operation on an oil and gas lease.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM collects this information to allow evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications.

Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease.

The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

Additional Operator Remarks

Location of Well

1. SHL: 1707 FNL / 2239 FEL / TWSP: 6N / RANGE: 81W / SECTION: 23 / LAT: 40.477017 / LONG: -106.453979 (TVD: 5585 feet, MD: 16865 feet)
PPP: 2648 FSL / 0 FWL / TWSP: 6N / RANGE: 81W / SECTION: 27 / LAT: 40.459381 / LONG: -106.464659 (TVD: 5585 feet, MD: 12267 feet)
PPP: 1787 FNL / 2009 FWL / TWSP: 6N / RANGE: 81W / SECTION: 23 / LAT: 40.476847 / LONG: -106.456052 (TVD: 5240 feet, MD: 5333 feet)
BHL: 1674 FNL / 1297 FEL / TWSP: 6N / RANGE: 81W / SECTION: 34 / LAT: 40.447554 / LONG: -106.469504 (TVD: 5585 feet, MD: 16865 feet)

BLM Point of Contact

Name: Lauren P Brown
Title: Assistant Field Manager
Phone: 9708783800
Email: lpbrown@blm.gov

CONFIDENTIAL

Review and Appeal Rights

A person contesting a decision shall request a State Director review. This request must be filed within 20 working days of receipt of the Notice with the appropriate State Director (see 43 CFR 3165.3). The State Director review decision may be appealed to the Interior Board of Land Appeals, 801 North Quincy Street, Suite 300, Arlington, VA 22203 (see 43 CFR 3165.4). Contact the above listed Bureau of Land Management office for further information.

CONFIDENTIAL

SURFACE CONDITIONS OF APPROVAL

BLM Required Conditions of Approval to Mitigate Impacts to Cultural and Paleontological Resources: Applicable to all new surface disturbance activities

1. The applicant is responsible for informing all persons who are associated with the project that they will be subject to prosecution for knowingly disturbing archaeological sites or for collecting artifacts.
2. If any archaeological materials are discovered as a result of operations under this authorization, activity in the vicinity of the discovery will cease, and the BLM WRFO and KFO Archaeologist will be notified immediately. Work may not resume at that location until approved by the Authorized Officer (AO). The applicant will make every effort to protect the site from further impacts including looting, erosion, or other human or natural damage until BLM determines a treatment approach, and the treatment is completed. Unless previously determined in treatment plans or agreements, BLM will evaluate the cultural resources and, in consultation with the State Historic Preservation Office (SHPO), select the appropriate mitigation option within 48 hours of the discovery. The applicant, under guidance of the BLM, will implement the mitigation in a timely manner. The process will be fully documented in reports, site forms, maps, drawings, and photographs. The BLM will forward documentation to the SHPO for review and concurrence.
3. Pursuant to 43 CFR 10.4(g), the applicant must notify the AO, by telephone and written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the operator must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the AO.
4. The applicant is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for disturbing or collecting vertebrate or other scientifically-important fossils, collecting large amounts of petrified wood (over 25lbs./day, up to 250lbs./year), or collecting fossils for commercial purposes on public lands.
5. If any paleontological resources are discovered as a result of operations under this authorization, the applicant or any of his agents must stop work immediately at that site, immediately contact the BLM WRFO Paleontology Coordinator, and make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. Work may not resume at that location until approved by the AO. The BLM or designated paleontologist will evaluate the discovery and take action to protect or remove the resource within 10 working days. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (a) following the Paleontology Coordinator's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (b) following the Paleontology Coordinator's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

WILDLIFE

6. Construction, drilling, and completion activities would be prohibited from March 1 through July 15 (i.e., lekking, nesting, and early brood-rearing periods for sage-grouse).
7. Establish company guidelines to minimize wildlife losses from vehicle collisions (slow speeds, awareness, etc.).
8. Use electric pumps or otherwise muffle motors on pumps and equipment to minimize noise levels to no more than 10 dBA above ambient levels at this location during the production phase.
9. Net, fence, and/or otherwise prevent/exclude wildlife from facilities and infrastructure that may pose a risk to them (toxicity, drowning, burning, etc).
10. Reclaim the site to BLM's reclamation requirements and use seed mix recommendations pending final NEPA approval and surface owner authorization.

AIR QUALITY:

11. The operator/holder will limit unnecessary emissions from point or nonpoint pollution sources and prevent air quality deterioration from necessary pollution sources in accordance with all applicable Federal, State, and local air quality laws and regulations.
12. All access roads and the pipeline ROW will be treated with water and/or a BLM-approved chemical dust suppressant during construction and drilling activities so that there is not a visible dust plume behind vehicles. All vehicles will abide by company or public speed restrictions during all activities. If water is used as a dust suppressant, there should be no traces of oil or solvents in the water and it should be properly permitted for this use by the State of Colorado. Only water needed for abating dust should be applied; dust abatement should not be used as a water disposal option under any circumstances.

WASTE AND PITS:

13. The operator will prevent migratory bird access to facilities that store or are expected to store fluids which may pose a risk to such birds (e.g., toxicity, compromised insulation, drowning). Features that prevent access to such fluids must be in place and functional within 24 hours of the drilling rig moving off the location and will remain effective until such pits are removed or incapable of storing fluids. Deterrence methods may include netting or other alternative methods that effectively prevent use and that meet the BLMs approval. It will be the responsibility of the operator to notify the BLM of the method that will be used to prevent use two weeks prior to when completion activities are expected to begin. All lethal and non-lethal events that involve migratory birds will be reported to the BLM Natural Resource Specialist immediately
BLM_CO_WR_NRS@blm.gov.

14. No hazardous materials, hazardous wastes, or trash will be disposed of on public lands or on private surface overlying the oil and gas lease. If a release does occur, it will be reported to the White River Field Office Hazmat Coordinator immediately at **(970) 878-3873 or via email BLM_CO_WR_NRS@blm.gov.**

The operator(s) must comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) must comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 must be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances must be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.

15. All pits, cellars, rat holes and other bore holes unnecessary for further lease operations, will be backfilled immediately after the drilling rig is released.
16. All production facilities installed on location that have the potential to leak or spill oil, glycol, produced water, or other fluid, which may constitute a hazard to public health or safety, shall be placed within an appropriate secondary containment or diversionary structure. The containment structure must have sufficient volume to contain, at a minimum, the content of the largest storage tank containing liquid hydrocarbons within the facility/battery and sufficient freeboard to contain precipitation for a minimum of 72 hours. It shall be installed so that any spill or leakage would not drain, infiltrate, or otherwise escape to ground water, surface water, or navigable waters before cleanup is completed.
17. In the event a producing well is established, all new production equipment which has open-vent exhaust systems, such as heater treaters, separators, dehydration units, and flare stacks, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching on the exhaust stacks.

RECLAMATION

18. Seed mix and rate will be that recommended by the Private Surface Owner, Sandridge's proposed seed mixture or one provided by the BLM. BLM recommends the following: That all disturbed areas will be promptly seeded. No seeding will occur from May 15 to September 15. Fall seeding is preferred and will be conducted after September 15 and prior to ground freezing. Spring seeding will be conducted after the frost leaves the ground and no later than May 15. If an alternate date of seeding is requested, contact the designated Natural Resource Specialist prior to seeding for approval. Drill seeding is the

preferred method of application and drill seeding depth should be no greater than 1/4 inch. If drill seeding cannot be accomplished, seed should be broadcast at double the rate used for drill seeding, and harrowed into the soil or will be broadcast seeded into imprints, such as fresh cleat marks. Sandridge's proposed seed mixture is provided below.

Species Common Name	Scientific name	Seeding Rate Lbs. PLS/acre
Thickspike wheatgrass	<i>Elymus lanceolatus var. Critana</i>	2
Western wheatgrass	<i>Pascopyrum smithii</i>	2
Indian ricegrass	<i>Achnatherum hymenoides</i>	2
Gardner saltbrush	<i>Atriplex garneri</i>	1/2
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	1/2
Sandberg bluegrass	<i>Poa secunda</i>	1
Annual ryegrass	<i>Lolium multiflorum</i>	1

19. It is recommended the seed is certified and free of noxious weeds. All seed tags will be submitted via Sundry Notice to the designated Natural Resource Specialist within 14 calendar days from the time the seeding activities have ended. The SN will include the purpose of the seeding activity (i.e., seeding well pad cut and fill slopes, seeding pipeline corridor, etc.). In addition, the SN will include the well or well pad number associated with the seeding activity, if applicable, the name of the contractor that performed the work, his or her phone number, the method used to apply the seed (e.g., broadcast, hydro-seeded, drilled), whether the seeding activity represents interim or final reclamation, an estimate of the total acres seeded, an attached map that clearly identifies all disturbed areas that were seeded, and the date the seed was applied.

SandRidge Rabbit Ears 0681 2-23H Drilling Conditions of Approval
January, 2017

A. DRILLING COAs

1. All operations, unless a variance has been granted in writing by the Authorized Officer, must be conducted in accordance with 43 CFR PART 3160 - Onshore Oil and Gas Operations, Onshore Oil and Gas Order No.1; Approval of Operations on Onshore Federal and Indian Oil and Gas Leases; and Onshore Oil and Gas Order No. 2; Drilling Operations. If air or mist drilling is used, operations must be in accordance with Onshore Oil and Gas Order No. 2; Drilling Operations, Part E; Special Drilling Operations.
2. The operator is responsible for the actions of his subcontractors. A copy of the approved APD must be on location during construction, drilling, and completion operations.
3. Major deviations from the drilling plan require prior approval from the Authorized Officer. The operator shall verbally notify either the petroleum engineer or petroleum engineering technician 24 hours prior to the following operations to provide notice of:
 - a) Well spud (Breaking ground for drilling surface casing)
 - b) Running and cementing of all casing strings
 - c) Pressure testing of BOPE or any casing string
 - d) Commencing completion operations

A written sundry notice of the well spud must be submitted within five (5) working days.

4. All BOPE tests will be done by a tester and not by the rig pumps. The tests will include a low pressure test of 250 psi for five minutes prior to initiating the high pressure tests discussed in Onshore Order No. 2
5. No "new" hardband drill pipe abrasive to casing will be rotated inside the surface casing unless it can be shown to be casing friendly in the manufacturer's specifications. Hardband drill pipe will be considered new until it has been run at least once.
6. Drilling muds with chlorides testing in excess of 3,000 ppm or those containing hydrocarbons shall not be used in drilling operations until after the surface casing has been set. When drilling to set the surface casing, drilling fluid will be composed only of fresh water, bentonite and/or a benign lost circulation material – that is a lost circulation material that does not pose a threat to human health or the environment, e.g. cedar bark, shredded cane stalks, mineral fiber and hair, mica flakes, ground and sized limestone or marble, wood, nut hulls, corncobs, or cotton hulls.

SandRidge Rabbit Ears 0681 2-23H Drilling Conditions of Approval
January, 2017

7. Due to possible lost circulation during drilling operations and given that all usable water zones, potential productive zones, and lost circulation zones shall be protected and/or isolated per Onshore Order #2, the WRFO requires sufficient volumes of cement be pumped to meet these requirements. Cement tops behind production casing will be verified by an acceptable log to ensure compliance with this Order. **We require cement to be run a minimum of 200' above the shoe of the previous casing string.**
8. **Chronologic drilling progress reports must be sent directly to the BLM White River Field Office on a daily basis**, either electronically or by fax (970-878-3805) to the Petroleum Engineer, Supervisor Petroleum Engineering Technician, and/or other designated petroleum engineering technicians until the well is drilled to total depth.
9. All drill cuttings shall be contained in a pit on the pad of the well being drilled, or hauled to an approved disposal site. All pits shall maintain a minimum of two feet of free board at all times.
10. For foam and ultralight cement jobs that are performed in cementing the intermediate or production strings, the operator will wait at least 36 hours for cement to harden before running a specialized log capable of reading pipe cement bond and verifying tops of cement. The WRFO shall be verbally notified prior to running such specialized log with enough advance notice to allow a representative from this office to witness. Logs showing pipe cement bond and tops of cement for intermediate and production cement jobs will be forwarded to the BLM.
11. One copy of all charted BOPE tests, logs, core descriptions, core analyses, well-test data, geologic summaries, sample descriptions, and all other surveys or data obtained and compiled during the drilling, workover, and/or completion operations, shall be filed with the completion report, Form 3160-4. The logs should be submitted in a digital format, on a CD. This completion report shall be filed within 30 days of completion of operations and submitted prior to, or along with the first production notice.
12. The WRFO requires the measurement of individual gas, oil (condensate) and water production streams at the wellhead, unless otherwise approved in advance by the BLM. The sales point for natural gas will be at the wellhead. All meters will be calibrated in place prior to any deliveries. The WRFO will be provided with a date and time for the initial meter calibration and all future meter proving and calibration schedules with enough advance notice (24 hour minimum) to allow a representative from this office to witness. A copy of the meter proving and calibration reports will be submitted to the WRFO. Oil (condensate) will be sold from secured tanks on location, unless otherwise approved in advance by the BLM.

SandRidge Rabbit Ears 0681 2-23H Drilling Conditions of Approval
January, 2017

13. A Communitizaton Agreement will be required, unless the well receives a unit-paying determination or becomes part of a participating area.
14. This APD is approved for a period not to exceed 2 years unless an extension is granted.
15. Approval to flare is granted while drilling and testing.

The Bureau of Land Management, White River Field Office address is:

220 E. Market St.
Meeker, CO 81641
(970) 878-3800

WRFO CONTACTS:

Petroleum Engineers

Sean Simpson	Work Phone	(970) 878-3846	smsimpson@blm.gov
	Cell Phone	(303) 956-8091	

Craig Williamson	Work Phone	(970) 878-3814	cwilliamson@blm.gov
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Supervisory Petroleum Engineering Technician:

Bud Thompson	Work Phone	(970) 878-3828	blthomps@blm.gov
	Cell Phone	(970) 942-7040	

Petroleum Engineering Technicians

Roy Wallis	Work Phone	(970) 826-5093	rwallis@blm.gov
	Cell Phone	(970) 326-8331	

Justin Wilson	Work Phone	(970) 878-3825	jrwilson@blm.gov
	Cell Phone	(970) 942-7042	

Erika Miller	Work Phone	(970) 878-3808	emiller@blm.gov
	Cell Phone	(970) 942-8279	

Joe Beck	Work Phone	(970) 878-3826	jabeck@blm.gov
	Cell Phone	(970) 942-7042	

APD ID: 10400005194

Submission Date: 10/11/2016

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - General

APD ID: 10400005194

Tie to previous NOS?

Submission Date: 10/11/2016

BLM Office: CRAIG

User: Kim Rodell

Title: President

Federal/Indian APD: FED

Is the first lease penetrated for production Federal or Indian? FED

Lease number: COC70049

Lease Acres: 1624.36

Surface access agreement in place?

Allotted?

Reservation:

Agreement in place? YES

Federal or Indian agreement: FEDERAL

Agreement number: COC78026X

Agreement name: RABBIT EARS

Keep application confidential? YES

Permitting Agent? YES

APD Operator: SANDRIDGE ENERGY INC

Operator letter of designation:

Rabbit Ears 0681 S23 Pad BLM Designation of Agent_08-16-2016.pdf

Keep application confidential? YES

Operator Info

Operator Organization Name: SANDRIDGE ENERGY INC

Operator Address: 123 Robert S Kerr

Zip: 73102

Operator PO Box:

Operator City: Oklahoma City

State: OK

Operator Phone: (405)429-6518

Operator Internet Address:

Section 2 - Well Information

Well in Master Development Plan? NO

Mater Development Plan name:

Well in Master SUPO? NO

Master SUPO name:

Well in Master Drilling Plan? NO

Master Drilling Plan name:

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Well API Number:

Field/Pool or Exploratory? Field and Pool

Field Name: WILDCAT

Pool Name: NIOBRARA

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Is the proposed well in an area containing other mineral resources? NATURAL GAS,OIL

Describe other minerals:

Is the proposed well in a Helium production area? N **Use Existing Well Pad?** NO **New surface disturbance?**

Type of Well Pad: MULTIPLE WELL

Multiple Well Pad Name:

Number: 0681 S23

Well Class: HORIZONTAL

RABBIT EARS

Number of Legs:

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 25 Miles

Distance to nearest well: 15 FT

Distance to lease line: 1389 FT

Reservoir well spacing assigned acres Measurement: 24955 Acres

Well plat: Rabbit Ears 0681 2-23H BLM APD Survey Plat_10-07-2016.pdf

Well work start Date: 05/01/2017

Duration: 60 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83

Vertical Datum: NAVD88

Survey number: 38084

SHL

Leg #: 1

STATE: COLORADO	Meridian: SIXTH PRINCIPAL	County: JACKSON
Latitude: 40.477017	Longitude: -106.453979	
Elevation: 8308	MD: 16865	TVD: 5585
Lease Type: FEE	Lease #: FEE	
NS-Foot: 1707	NS Indicator: FNL	
EW-Foot: 2239	EW Indicator: FEL	
Twsp: 6N	Range: 81W	Section: 23
Aliquot: SWNE	Lot:	Tract:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

KOP

Leg #: 1

STATE: COLORADO	Meridian: SIXTH PRINCIPAL	County: JACKSON
Latitude: 40.477017	Longitude: -106.453979	
Elevation: 5508	MD: 2800	TVD: 2800
Lease Type: FEE	Lease #: FEE	
NS-Foot: 1707	NS Indicator: FNL	
EW-Foot: 2239	EW Indicator: FEL	
Twsp: 6N	Range: 81W	Section: 23
Aliquot: SWNE	Lot:	Tract:

PPP

Leg #: 1

STATE: COLORADO	Meridian: SIXTH PRINCIPAL	County: JACKSON
Latitude: 40.459381	Longitude: -106.464659	
Elevation: 2723	MD: 12267	TVD: 5585
Lease Type: FEDERAL	Lease #: COC70049	
NS-Foot: 2648	NS Indicator: FSL	
EW-Foot: 0	EW Indicator: FWL	
Twsp: 6N	Range: 81W	Section: 27
Aliquot: NESW	Lot:	Tract:

PPP

Leg #: 1

STATE: COLORADO	Meridian: SIXTH PRINCIPAL	County: JACKSON
Latitude: 40.476847	Longitude: -106.456052	
Elevation: 3068	MD: 5333	TVD: 5240
Lease Type: FEE	Lease #: FEE	
NS-Foot: 1787	NS Indicator: FNL	
EW-Foot: 2009	EW Indicator: FWL	
Twsp: 6N	Range: 81W	Section: 23
Aliquot: SENW	Lot:	Tract:

EXIT

Leg #: 1

STATE: COLORADO	Meridian: SIXTH PRINCIPAL	County: JACKSON
Latitude: 40.447554	Longitude: -106.469504	
Elevation: 2723	MD: 16865	TVD: 5585
Lease Type: FEDERAL	Lease #: COC70050	
NS-Foot: 1674	NS Indicator: FNL	
EW-Foot: 1297	EW Indicator: FEL	

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Twsp: 6N **Range:** 81W **Section:** 34

Aliquot: SENE **Lot:** **Tract:**

STATE: COLORADO **Meridian:** SIXTH PRINCIPAL **County:** JACKSON

Latitude: 40.447554 **Longitude:** -106.469504

BHL **Elevation:** 2723 **MD:** 16865 **TVD:** 5585

Leg #: 1 **Lease Type:** FEDERAL **Lease #:** COC70050

NS-Foot: 1674 **NS Indicator:** FNL

EW-Foot: 1297 **EW Indicator:** FEL

Twsp: 6N **Range:** 81W **Section:** 34

Aliquot: SENE **Lot:** **Tract:**



Mr. Hunter Seim
Bureau of Land Management
Little Snake Field Office
455 Emerson Street
Craig, CO 81625-1129

April 11, 2016

RE: Rabbit Ears 0681 1, 2 & 3-23H Applications for Permit to Drill

Dear Mr. Seim:

SandRidge Exploration and Production, LLC ("SandRidge") hereby designates Upstream Petroleum Management, Inc. as an authorized agent for the limited purpose of filing the Applications for Permits to Drill associated with the Rabbit Ears 0681 1, 2 & 3-23H in Jackson County, State of Colorado.

All other matters regarding drilling, completion, production and regulatory compliance will be handled through the SandRidge office.

Should you have any questions relative to this authorization, please feel free to contact me by phone at 405-429-6518 or by email slaird@sandridgeenergy.com, at your convenience.

Sincerely,

Spence Laird
Regulatory Supervisor

cc: Upstream Petroleum Management, Inc.

T6N, R81W, 6th P.M.

SandRidge Exploration & Production, LLC

Well location, RABBIT EARS 0681 2-23H located as shown in the SW1/4NE1/4 of Section 23, T6N, R81W, 6th P.M., Jackson County, Colorado.

BASIS OF BEARINGS:
US STATE PLANE 1983
CO NORTH 0501 GRID

BASIS OF ELEVATION
SPOT ELEVATION AT THE NW CORNER OF SECTION 23, T6N, R81W, 6TH PM, TAKEN FROM THE SPICER PEAK QUADRANGLE, USGS 7.5 MIN QUAD (TOPOGRAPHIC MAP) WITH SAID ELEVATION MARKED AS BEING 8313 FEET.

LEGEND

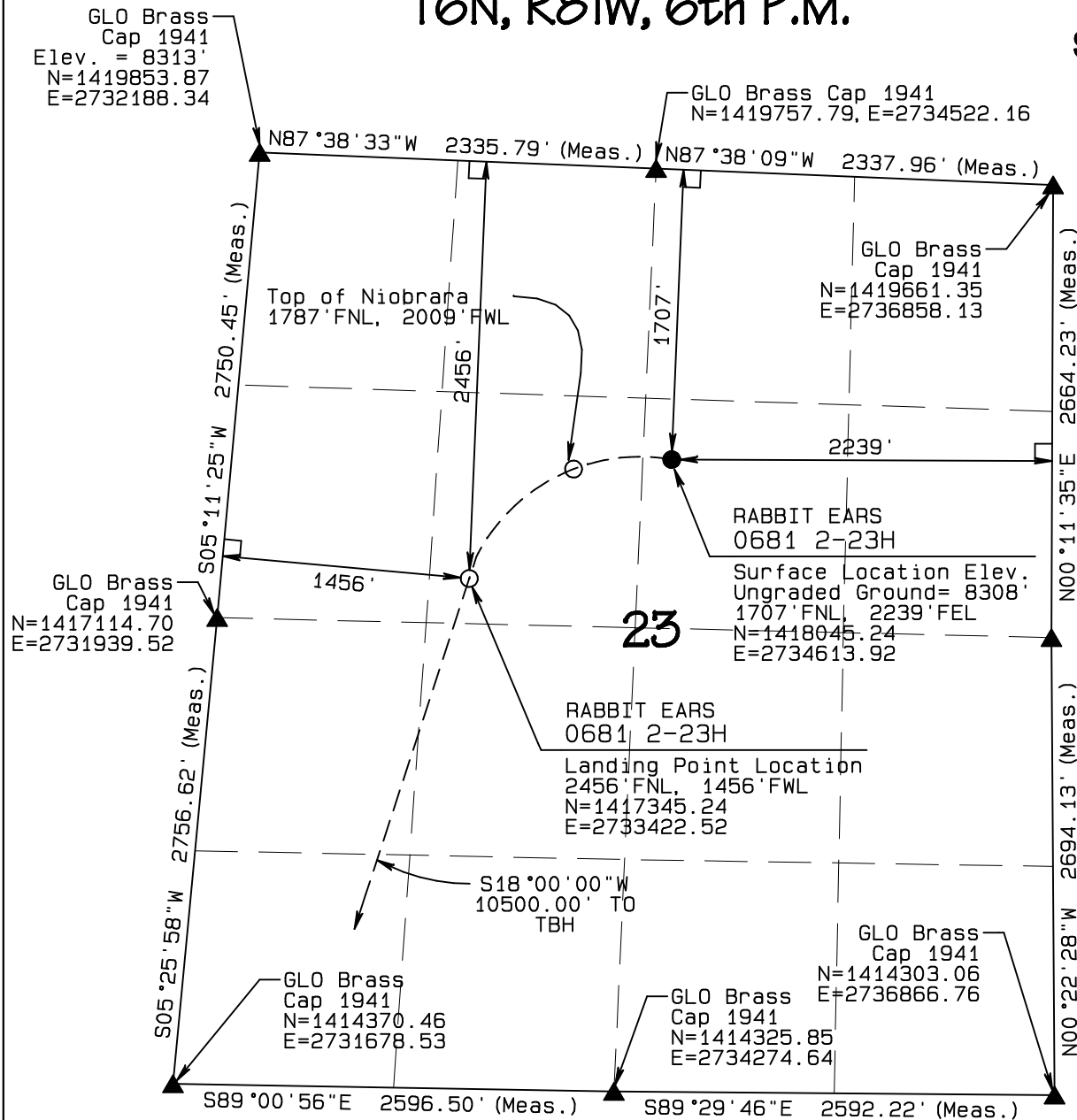
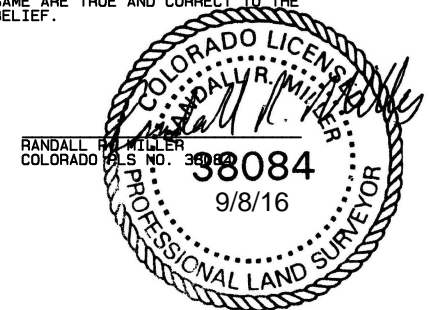
- 90° SYMBOL
- FOUND CORNER
- PROPOSED WELL
- PROPOSED BHL/LPL

GRAPHIC SCALE 1"=1000'



1000 0 1000

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



	NAD 83 (TOP OF NIOBRARA)	NAD 83 (SURFACE LOCATION)
	LATITUDE=40.476847°N LONGITUDE=106.456052°W	LATITUDE=40.477017°N LONGITUDE=106.453979°W
		PDOP = 1.981
NAD 83 (LEASE ENTRY)	NAD 83 (TARGET BOTTOM HOLE)	NAD 83 (LANDING POINT LOCATION)
LATITUDE=40.459381°N LONGITUDE=106.464659°W	LATITUDE=40.447554°N LONGITUDE=106.469504°W	LATITUDE=40.475444°N LONGITUDE=106.458097°W

NORTH PARK ENGINEERING & CONSULTING, INC.

P.O. BOX 395
WALDEN, CO 80480
(970) 723-3725

DATE OF FIELD WORK: MAR 20, 2016 DRAWING COMPLETION: JUN 8, 2016
SURVEYED BY: ADL DRAWN BY: TKH CHECKED BY: FRM
REVISED: 9/7/2016

T6N, R81W, 6th P.M.

GLO Brass
Cap 1941
N=1414370.46
E=2731678.53

SandRidge Exploration & Production, LLC

Intermediate Section, RABBIT EARS 0681 2-23H
located as shown in the W1/2 of Section 26,
T6N, R81W, 6th P.M., Jackson County, Colorado.





BASIS OF BEARINGS:

US STATE PLANE 1983
CO NORTH 0501 GRID

BASIS OF ELEVATION

SPOT ELEVATION AT THE NW CORNER OF SECTION 23,
T6N, R81W, 6TH PM, TAKEN FROM THE SPICER PEAK
QUADRANGLE, USGS 7.5 MIN QUAD (TOPOGRAPHIC MAP)
WITH SAID ELEVATION MARKED AS BEING 8313 FEET.

LEGEND

- 90° SYMBOL 
- FOUND CORNER 
- PROPOSED WELL 
- PROPOSED BHL/LPL 

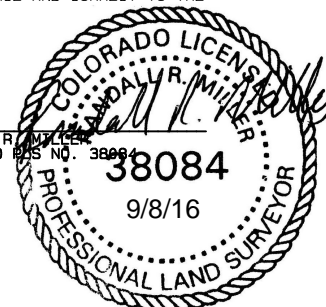
GRAPHIC SCALE 1"=1000'



1000 0 1000

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FIELD NOTES OF ACTUAL SURVEYS MADE BY ME OR UNDER MY
SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE
BEST OF MY KNOWLEDGE AND BELIEF.

RANDALL R. MILLER
COLORADO REG. NO. 38084



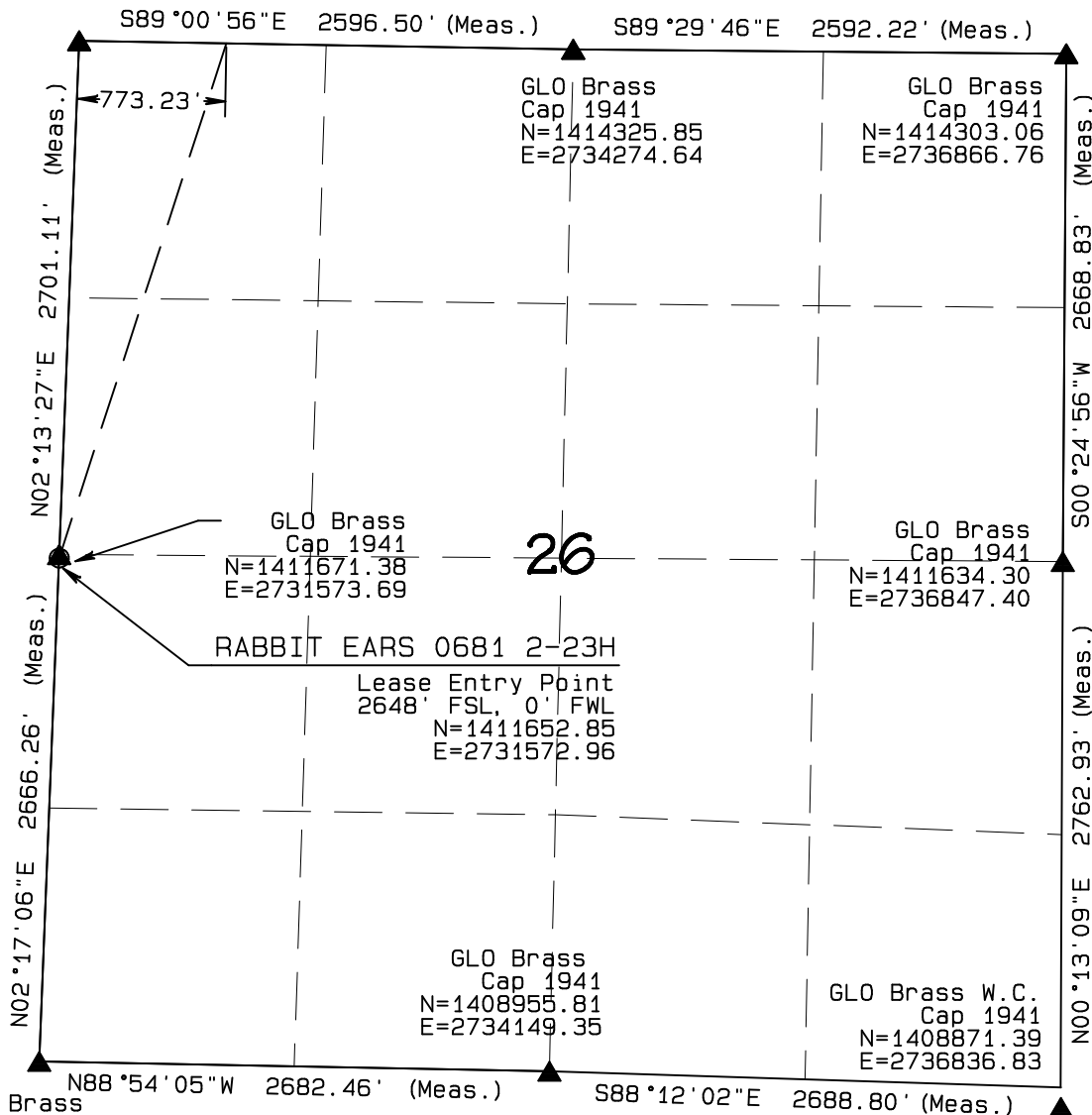
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P.O. BOX 395
WALDEN, CO 80480
(970) 723-3725

DATE OF FIELD WORK: MAR 20, 2016 DRAWING COMPLETION: JUN 8, 2016

SURVEYED BY: ADL DRAWN BY: TKH CHECKED BY: FRM

REVISED: 9/7/2016



GLO Brass
Cap 1941
N=1409007.25
E=2731467.39

NAD 83 (TOP OF NIOBRARA)	NAD 83 (SURFACE LOCATION)
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NAD 83 (LEASE ENTRY)	NAD 83 (TARGET BOTTOM HOLE)
LATITUDE=40.459381°N LONGITUDE=106.464659°W	LATITUDE=40.447554°N LONGITUDE=106.469504°W
NAD 83 (LANDING POINT LOCATION)	NAD 83 (LANDING POINT LOCATION)
LATITUDE=40.475060°N LONGITUDE=106.458234°W	LATITUDE=40.475060°N LONGITUDE=106.458234°W

T6N, R81W, 6th P.M.

SandRidge Exploration & Production, LLC

Intermediate Section, RABBIT EARS 0681 2-23H located as shown in the E1/2SE1/4 of Section 27, T6N, R81W, 6th P.M., Jackson County, Colorado.

BASIS OF BEARINGS:

US STATE PLANE 1983
CO NORTH 0501 GRID

BASIS OF ELEVATION

SPOT ELEVATION AT THE NW CORNER OF SECTION 23, T6N, R81W, 6TH PM, TAKEN FROM THE SPICER PEAK QUADRANGLE, USGS 7.5 MIN QUAD (TOPOGRAPHIC MAP) WITH SAID ELEVATION MARKED AS BEING 8313 FEET.

LEGEND

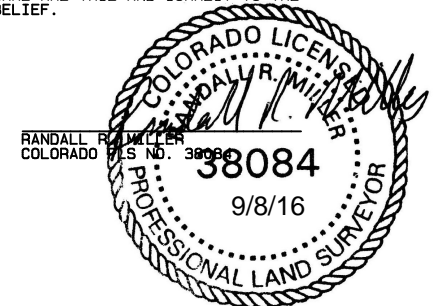
- 90° SYMBOL
- FOUND CORNER
- PROPOSED WELL
- PROPOSED BHL/LPL

GRAPHIC SCALE 1"=1000'



1000 0 1000

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GLO Brass
Cap 1941
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E=2731467.39

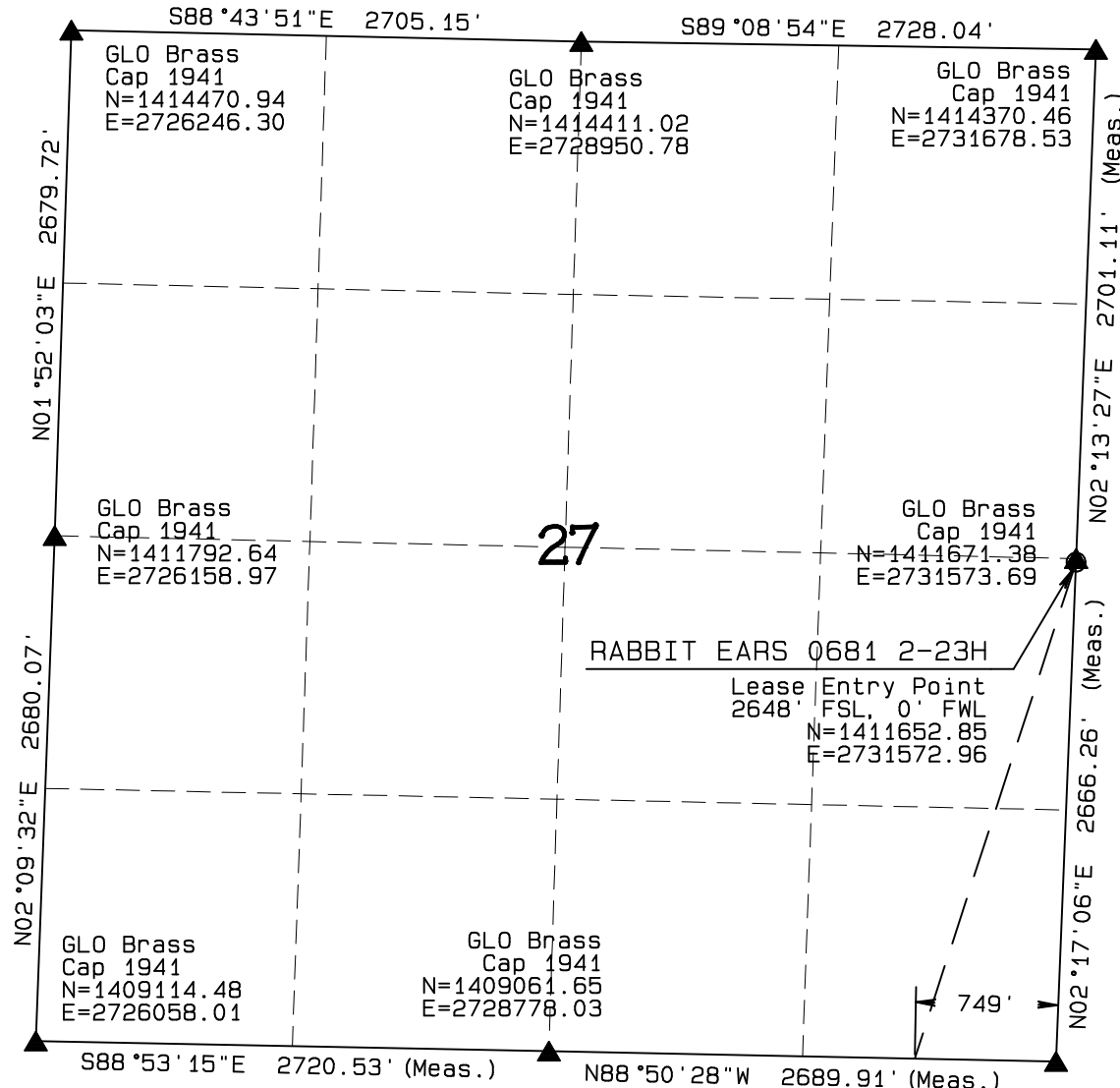
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P.O. BOX 395
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(970) 723-3725

DATE OF FIELD WORK: MAR 20, 2016 DRAWING COMPLETION: JUN 8, 2016

SURVEYED BY: ADL DRAWN BY: TKH CHECKED BY: FRM

REVISED: 9/7/2016



	NAD 83 (TOP OF NIOBRARA)	NAD 83 (SURFACE LOCATION)
	LATITUDE=40.476847°N LONGITUDE=106.456052°W	LATITUDE=40.477017°N LONGITUDE=106.453979°W PDOP = 1.981
NAD 83 (LEASE ENTRY)	NAD 83 (TARGET BOTTOM HOLE)	NAD 83 (LANDING POINT LOCATION)
LATITUDE=40.459381°N LONGITUDE=106.464659°W	LATITUDE=40.447554°N LONGITUDE=106.469504°W	LATITUDE=40.475060°N LONGITUDE=106.458234°W

T6N, R81W, 6th P.M.

SandRidge Exploration & Production, LLC

Target Bottom Hole, RABBIT EARS 0681 2-23H
located as shown in the SE1/4NE1/4 of Section 34,
T6N, R81W, 6th P.M., Jackson County, Colorado.

BASIS OF BEARINGS:

US STATE PLANE 1983
CO NORTH 0501 GRID

BASIS OF ELEVATION

SPOT ELEVATION AT THE NW CORNER OF SECTION 23,
T6N, R81W, 6TH PM, TAKEN FROM THE SPICER PEAK
QUADRANGLE, USGS 7.5 MIN QUAD (TOPOGRAPHIC MAP)
WITH SAID ELEVATION MARKED AS BEING 8313 FEET.

LEGEND

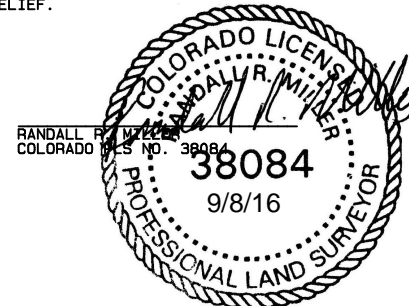
- 90° SYMBOL
- FOUND CORNER
- PROPOSED WELL
- PROPOSED BHL/LPL

GRAPHIC SCALE 1"=1000'



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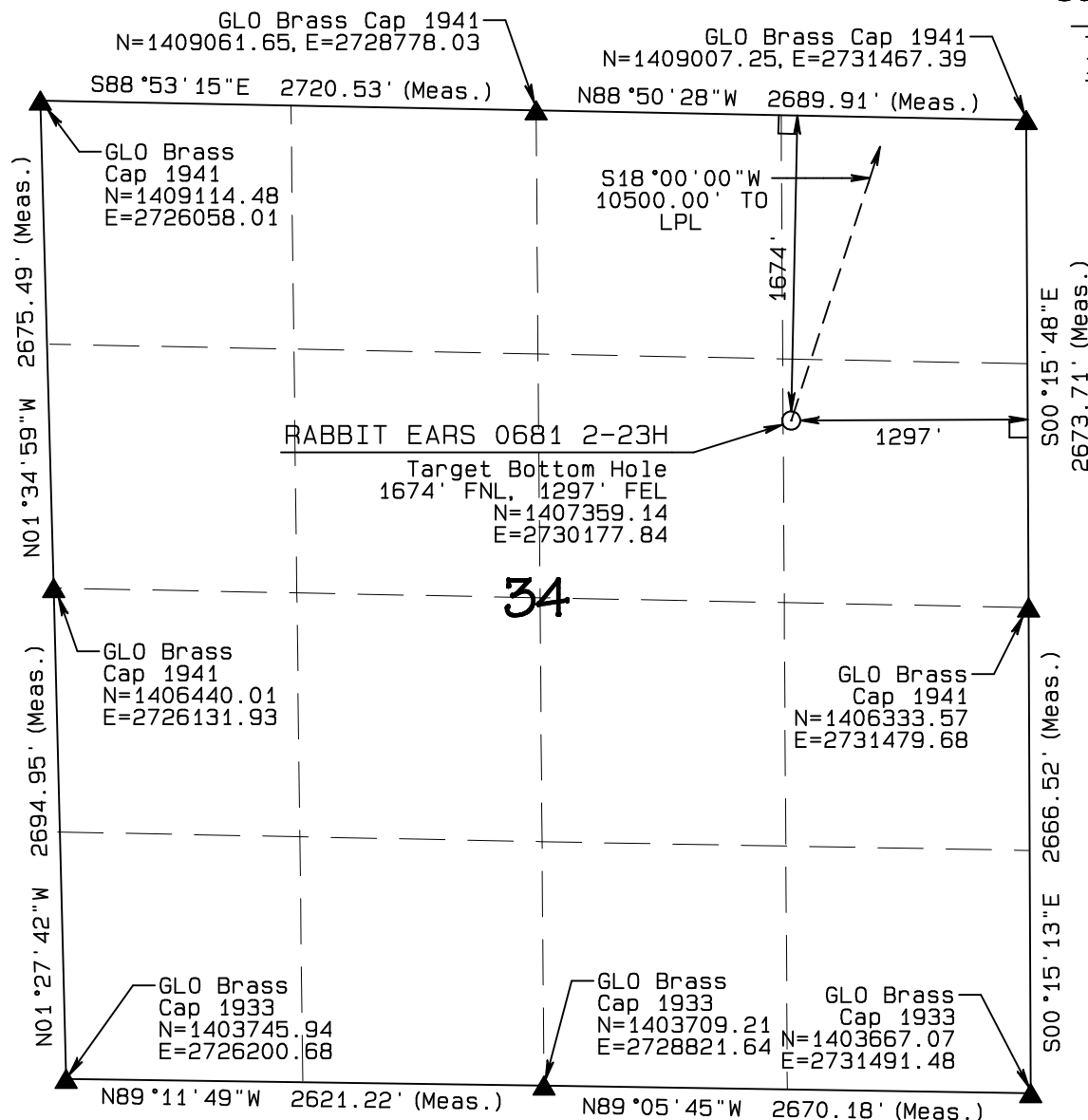
NORTH PARK ENGINEERING & CONSULTING, INC.

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WALDEN, CO 80480
(970) 723-3725

DATE OF FIELD WORK: MAR 20, 2016 DRAWING COMPLETION: JUN 8, 2016

SURVEYED BY: ADL DRAWN BY: TKH CHECKED BY: FRM

REVISED: 9/7/2016



	NAD 83 (TOP OF NIOBRARA)	NAD 83 (SURFACE LOCATION)
	LATITUDE=40.476847°N LONGITUDE=106.456052°W	LATITUDE=40.477017°N LONGITUDE=106.453979°W PDOP = 1.981
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LATITUDE=40.459381°N LONGITUDE=106.464659°W	LATITUDE=40.447554°N LONGITUDE=106.469504°W	LATITUDE=40.475060°N LONGITUDE=106.458234°W

APD ID: 10400005194

Submission Date:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - Geologic Formations

ID: Surface formation

Name: UNKNOWN

Lithology(ies):

SHALE

SANDSTONE

SILTSTONE

Elevation: 8308

True Vertical Depth: 0

Measured Depth: 0

Mineral Resource(s):

USEABLE WATER

Is this a producing formation? N

ID: Formation 1

Name: LANCE

Lithology(ies):

SANDSTONE

Elevation: 6323

True Vertical Depth: 1985

Measured Depth: 1985

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 2

Name: FOX HILLS

Lithology(ies):

SANDSTONE

Elevation: 5408

True Vertical Depth: 2900

Measured Depth: 2900

Mineral Resource(s):

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

USEABLE WATER

Is this a producing formation? N

ID: Formation 3

Name: UNKNOWN

Lithology(ies):

SANDSTONE

Elevation: 4828

True Vertical Depth: 3480

Measured Depth: 3480

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 4

Name: UNKNOWN

Lithology(ies):

SANDSTONE

Elevation: 4308

True Vertical Depth: 4000

Measured Depth: 4000

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

ID: Formation 5

Name: MANCOS A

Lithology(ies):

SHALE

Elevation: 3363

True Vertical Depth: 4945

Measured Depth: 4945

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? N

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

ID: Formation 6

Name: NIOBRARA

Lithology(ies):

SHALE

SILTSTONE

MARL

Elevation: 3068

True Vertical Depth: 5240

Measured Depth: 5333

Mineral Resource(s):

NATURAL GAS

OIL

Is this a producing formation? Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 5M

Rating Depth: 2400

Equipment: All well control equipment shall be in accordance with Onshore Order #2 for 5M systems. The minimum specifications for pressure control equipment that will be provided are included on the attached schematic diagram showing size and pressure ratings. The choke manifold will include appropriate valves and adjustable chokes. One choke will be remotely controlled. 5,000# BOP with 5" Pipe Rams, 5,000# BOP with Blind Rams, 5,000# Annular, and Rotating Head. Auxiliary equipment to be used: Upper kelly cock with the handle available and Stabbing Valve. The kill line will have one check valve.

Requesting Variance? NO

Variance request:

Testing Procedure: Ram type preventers will be pressure tested to full working pressure (utilizing a tester and a test plug) at: initial installation, whenever any seal subject to test pressure is broken, following related repairs and 30 day intervals. The annular preventer will be pressure tested to 50 percent of the rated working pressure. All pressure tests shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer. Annular preventers shall be functionally operated at least weekly. Pipe and blind rams shall be activated each trip. A BOPE pit level drill will be conducted weekly for each drilling crew. All test and drills will be recorded in the drilling log. The accumulator will have sufficient capacity to open the HCR valve, close all rams plus the annular preventer, and retain 200 psi above pre-charged pressure without the use of closing unit pumps. The system will have two independent power sources to close the preventers in accordance with 5M system requirements outlined in Onshore Order #2. Remote controls shall be readily accessible to the driller Master controls shall be at the accumulator.

Choke Diagram Attachment:

Rabbit Ears 0681 S23 Pad BOP Choke-Rig 20_08-16-2016.pdf

BOP Diagram Attachment:

Rabbit Ears 0681 S23 Pad BOP Diagram_08-16-2016.pdf

Section 3 - Casing

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

String Type: SURFACE

Other String Type:

Hole Size: 12.25

Top setting depth MD: 0

Top setting depth TVD: 0

Top setting depth MSL: 2723

Bottom setting depth MD: 2400

Bottom setting depth TVD: 2400

Bottom setting depth MSL: 323

Calculated casing length MD: 2400

Casing Size: 9.625

Other Size

Grade: J-55

Other Grade:

Weight: 36

Joint Type: LTC

Other Joint Type:

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 1.83

Burst Design Safety Factor: 2.21

Joint Tensile Design Safety Factor type: DRY

Joint Tensile Design Safety Factor: 3.39

Body Tensile Design Safety Factor type: DRY

Body Tensile Design Safety Factor: 3.39

Casing Design Assumptions and Worksheet(s):

Rabbit Ears 0681 2-23H BLM APD Casing Design_10-07-2016.pdf

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

String Type: PRODUCTION

Other String Type:

Hole Size: 8.75

Top setting depth MD: 0

Top setting depth TVD: 0

Top setting depth MSL: 2723

Bottom setting depth MD: 16865

Bottom setting depth TVD: 5585

Bottom setting depth MSL: -2862

Calculated casing length MD: 16865

Casing Size: 5.5

Other Size

Grade: P-110

Other Grade:

Weight: 20

Joint Type: OTHER

Other Joint Type: DQX

Condition: NEW

Inspection Document:

Standard: API

Spec Document:

Tapered String?: N

Tapered String Spec:

Safety Factors

Collapse Design Safety Factor: 3.66

Burst Design Safety Factor: 1.53

Joint Tensile Design Safety Factor type: DRY

Joint Tensile Design Safety Factor: 2.59

Body Tensile Design Safety Factor type: DRY

Body Tensile Design Safety Factor: 2.59

Casing Design Assumptions and Worksheet(s):

Rabbit Ears 0681 2-23H BLM APD Casing Design_10-07-2016.pdf

Section 4 - Cement

Casing String Type: SURFACE

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Stage Tool Depth:

Lead

Top MD of Segment: 0	Bottom MD Segment: 1900	Cement Type: Class G
Additives: Mix Water: 12.17 gal/sk .25 lbm/sk Poly-E-Flake	Quantity (sks): 435	Yield (cu.ff./sk): 2.19
Density: 12.5	Volume (cu.ft.): 953	Percent Excess: 60

Tail

Top MD of Segment: 1900	Bottom MD Segment: 2400	Cement Type: Class G
Additives: Mix Water: 9.01 gal/sk	Quantity (sks): 142	Yield (cu.ff./sk): 1.76
Density: 13.5	Volume (cu.ft.): 250	Percent Excess: 60

Casing String Type: PRODUCTION

Stage Tool Depth:

Lead

Top MD of Segment: 0	Bottom MD Segment: 4930	Cement Type: Class G
Additives: Mix Water: 12.57 gal/sk	Quantity (sks): 676	Yield (cu.ff./sk): 2.3
Density: 12	Volume (cu.ft.): 1555	Percent Excess: 25

Tail

Top MD of Segment: 4930	Bottom MD Segment: 16865	Cement Type: Class G
Additives: Mix Water: 7.87 gal/sk	Quantity (sks): 2279	Yield (cu.ff./sk): 1.65
Density: 13.5	Volume (cu.ft.): 3760	Percent Excess: 25

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

Description of the equipment for the circulating system in accordance with Onshore Order #2:

Diagram of the equipment for the circulating system in accordance with Onshore Order #2:

Describe what will be on location to control well or mitigate other conditions: Sufficient quantities of mud material will be maintained on site or be readily accessible for the purpose of assuring well control SPR will be recorded on daily drilling report after mudding up.

Describe the mud monitoring system utilized: Electronic/mechanical mud monitoring equipment will be utilized and will include a pit volume totalizer (PVT), stroke counter, and flow sensor as a minimum.

Circulating Medium Table

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Top Depth: 0

Bottom Depth: 2400

Mud Type: SPUD MUD

Min Weight (lbs./gal.): 8.4

Max Weight (lbs./gal.): 9

Density (lbs/cu.ft.):

Gel Strength (lbs/100 sq.ft.):

PH: 8

Viscosity (CP):

Filtration (cc):

Salinity (ppm):

Additional Characteristics: Water Based Mud - gel and lime PH: 8-10 Viscosity: 40-60 Water Loss: NC

Top Depth: 2400

Bottom Depth: 5585

Mud Type: OIL-BASED MUD

Min Weight (lbs./gal.): 10.3

Max Weight (lbs./gal.): 10.3

Density (lbs/cu.ft.):

Gel Strength (lbs/100 sq.ft.):

PH: 8

Viscosity (CP):

Filtration (cc):

Salinity (ppm):

Additional Characteristics: Oil Based Mud: Viscosity: 40-50 PH: 8-9 Water Loss: less than 9 (HTHP)

Section 6 - Test, Logging, Coring

List of production tests including testing procedures, equipment and safety measures:

None

List of open and cased hole logs run in the well:

OTH

Other log type(s):

MWD-GR: Kick Off point to TD; Triple Combo: TD to Surface Casing

Coring operation description for the well:

No cores are anticipated.

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 2971

Anticipated Surface Pressure: 1742.3

Anticipated Bottom Hole Temperature(F): 180

Anticipated abnormal pressures, temperatures, or potential geologic hazards? NO

Describe:

Contingency Plans geohazards description:

Contingency Plans geohazards attachment:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Hydrogen Sulfide drilling operations plan required? NO

Hydrogen sulfide drilling operations plan:

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Rabbit Ears 0681 2-23H BLM APD Directional Survey_09-07-2016.pdf

Other proposed operations facets description:

Conductor Casing: 0' - 90' 20" Hole 16" Casing Grade H-40 Weight 65# STC New
Formations not available on the BLM dropdown menu; Formation1: Coalmont; Formation 3: Sussex; Formation 4: Shannon; Formation 5: Mancos. There is potential for a shallow water table. A Sundry Notice will be submitted to BLM when the APD is approved and contractors have been selected. Specific contractors will maintain their own SPCC plans. Once the well is put into production and production facilities are engineered, SandRidge will maintain a SPCC Plan to include those facilities. BLM can request the plan at time.

Other proposed operations facets attachment:

Other Variance attachment:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Twsp: 6N

Range: 81W

Section: 34

Aliquot: SENE

Lot:

Tract:

STATE: COLORADO

Meridian: SIXTH PRINCIPAL

County: JACKSON

Latitude: 40.447554

Longitude: -106.469504

BHL

Elevation: 2723

MD: 16865

TVD: 5585

Leg #: 1

Lease Type: FEDERAL

Lease #: COC70050

NS-Foot: 1674

NS Indicator: FNL

EW-Foot: 1297

EW Indicator: FEL

Twsp: 6N

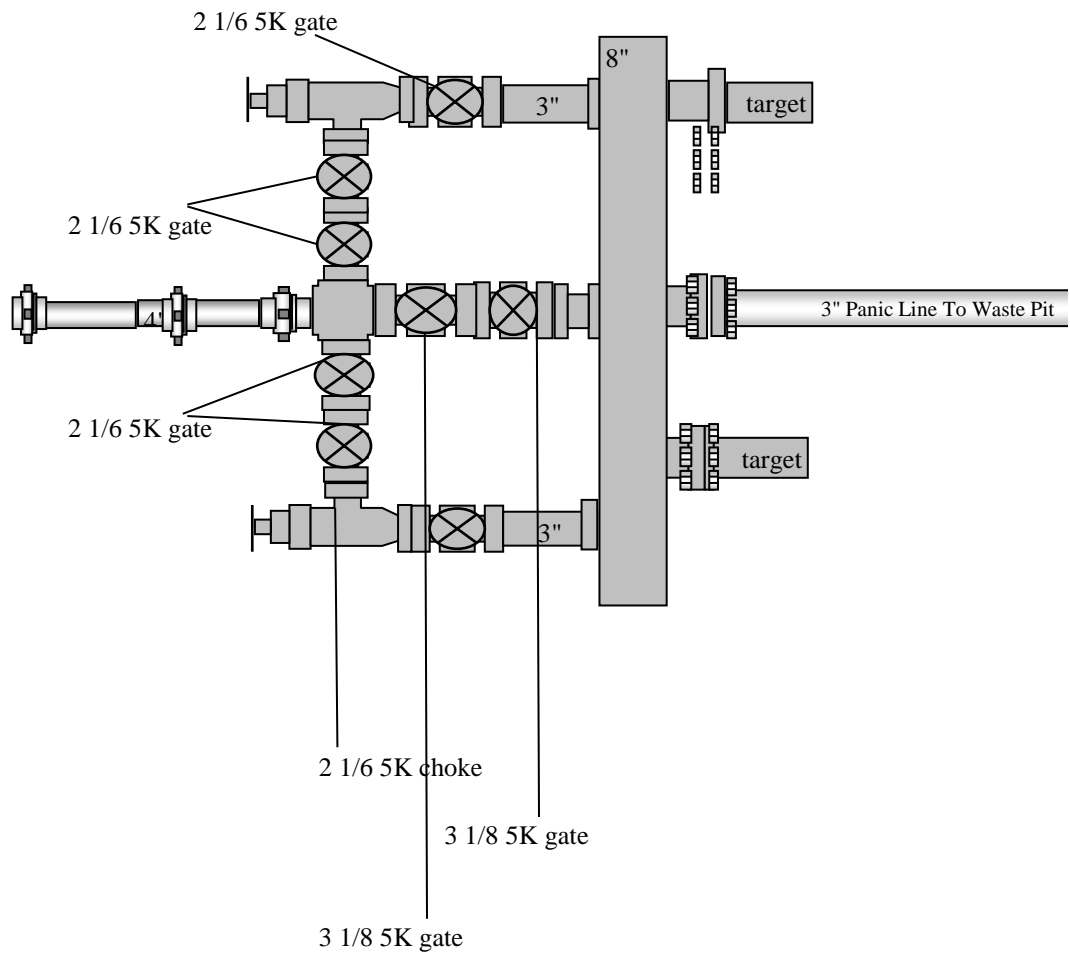
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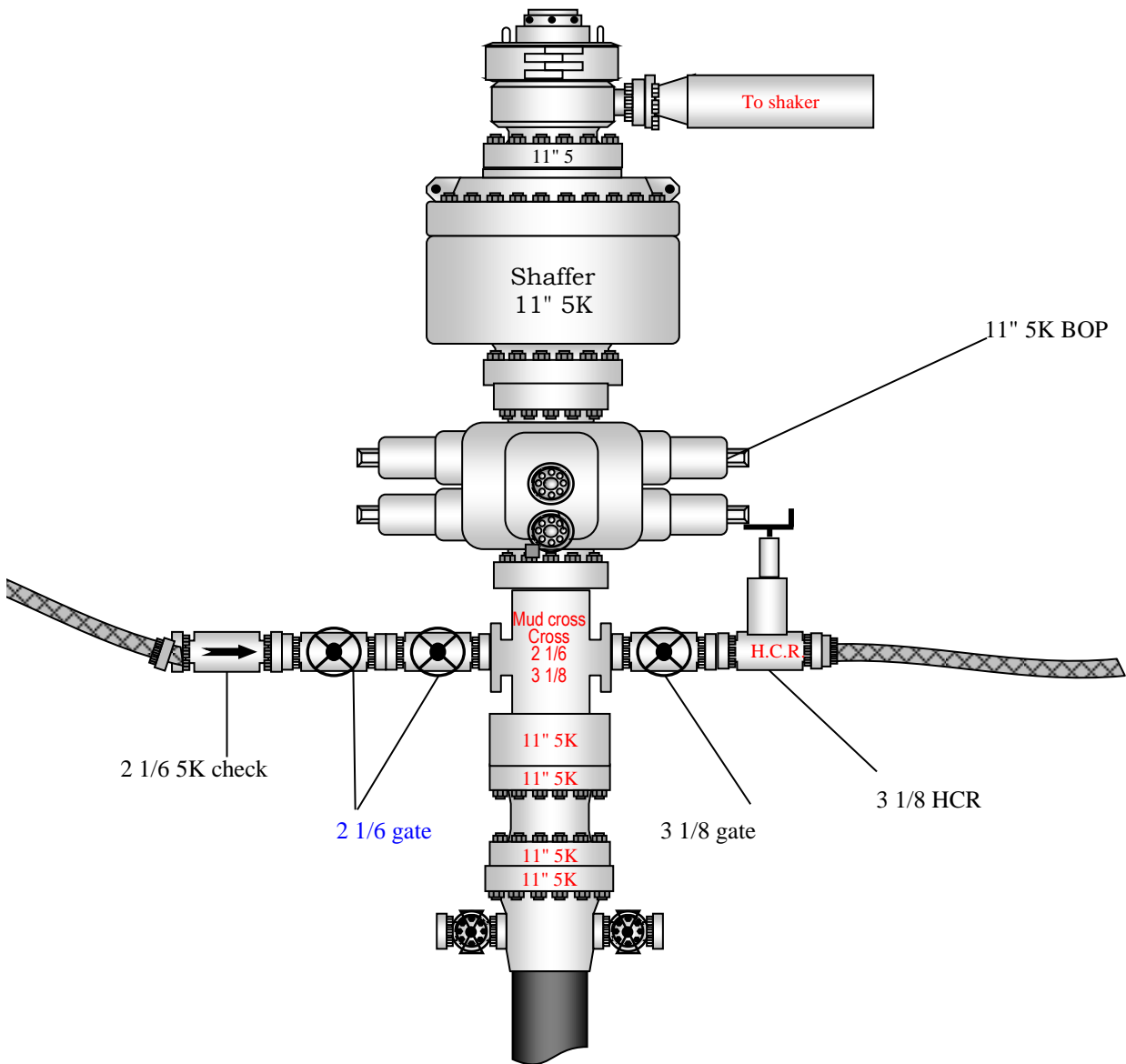
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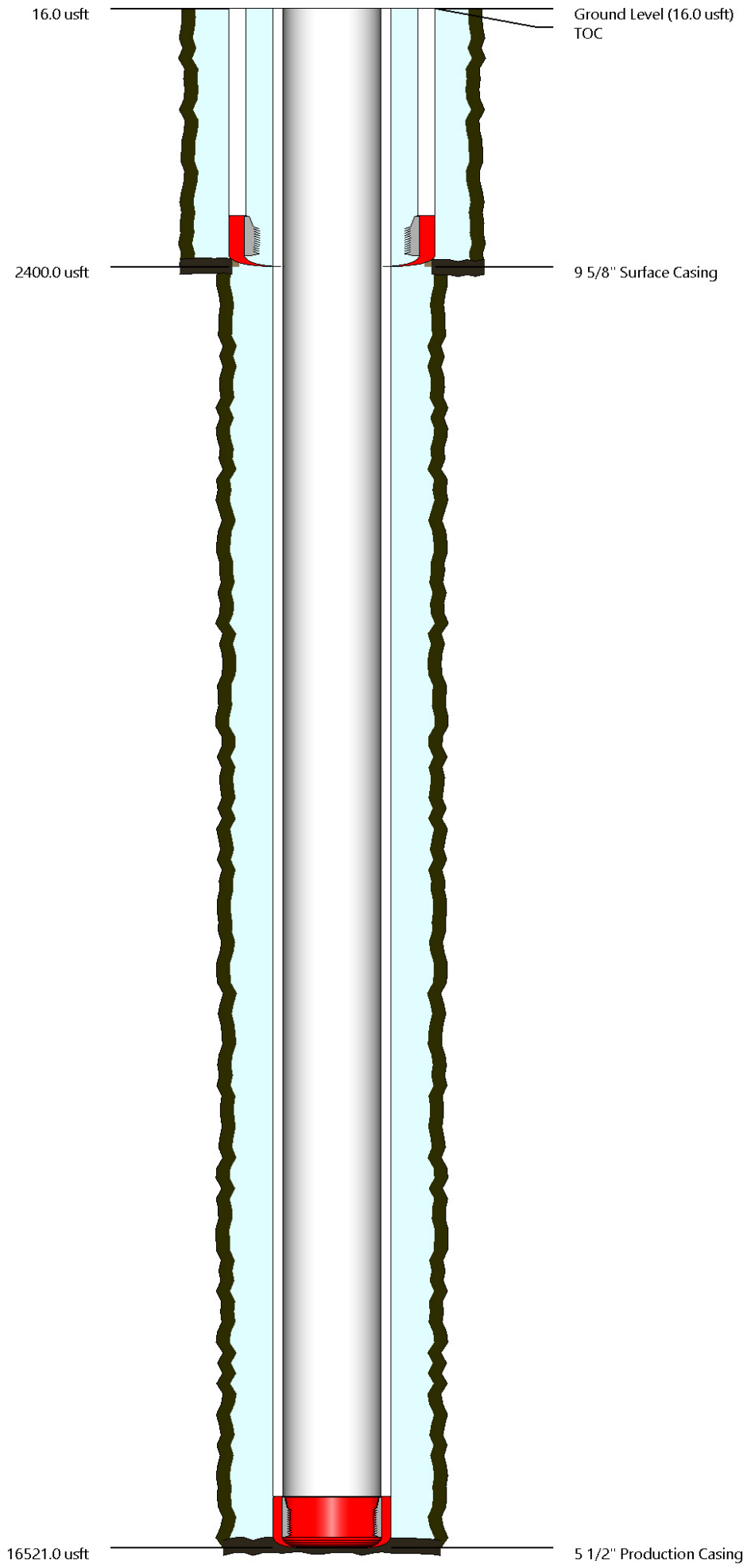
Lot:

Tract:





WELL SCHEMATIC (DEPTH - MD)



WELL SUMMARY

	String	OD/Weight/Grade	Connection	MD Interval (usft)	Drift Dia. (")	Minimum Safety Factor (Abs)				Design Cost (\$)
						Burst	Collapse	Axial	Triaxial	
1	Surface Casing	9 5/8", 36.000 ppf, J-55	LTC, J-55	16.0-2400.0	8.765	2.21	1.83	3.39	2.60	48,729
2										Total = 48,729
3										
4	Production Casing	5 1/2", 20.000 ppf, P-110	DQX	16.0-16521.0	4.653	1.53	3.66	2.59	1.79	175,358
5										Total = 175,358
6										
7										Total = 224,087
8	J Conn Jump Out									

GENERAL DATA

Description:	Wellbore #1
Well Options, Deviated:	Yes
Well Options, Offshore:	No
Well TD (MD):	16521.3 usft
Reference Point:	OTR
Air Gap:	16.0 usft
Origin N:	0.0 usft
Origin E:	0.0 usft
Azimuth:	180.00 °

CASING AND TUBING SCHEME

	OD (")	Name	Type	Hole Size (")	Measured Depths (usft)			Mud at Shoe (ppg)
					Hanger	Shoe	TOC	
1	9 5/8"	Surface	Casing	12.250	16.0	2400.0	16.0	8.80
2	5 1/2"	Production	Casing	8.750	16.0	16521.0	16.0	10.30

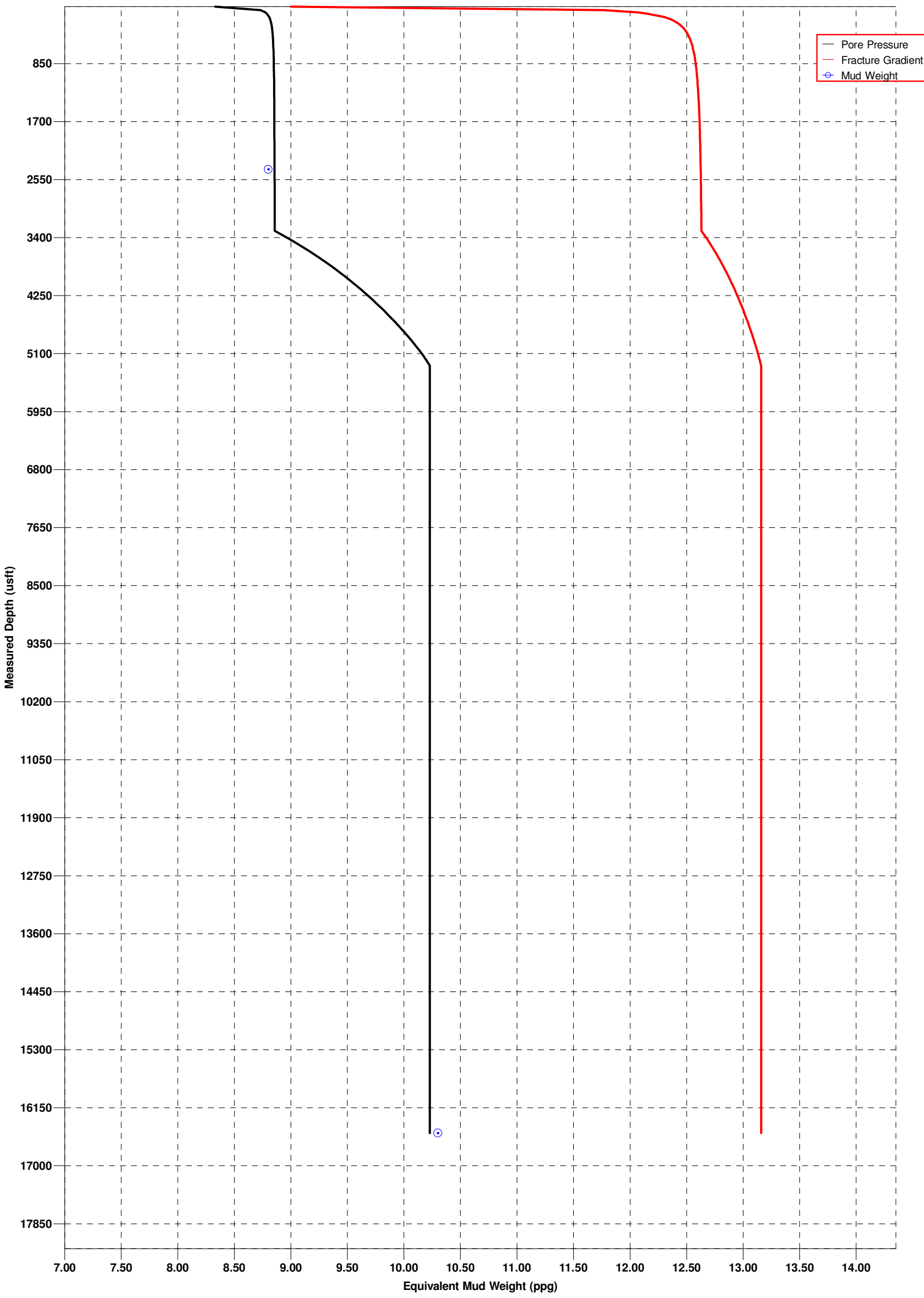
WELLPATH EDITOR

	Data-Entry Mode	MD (usft)	INC (°)	AZ (°)	TVD (usft)	DLS (%100usft)	Max DLS (%100usft)	Vsection (usft)	Departure (usft)
1	MD-INC-AZ	0.0	0.00	360.00	0.0			0.0	0.0
2	MD-INC-AZ	100.0	0.00	360.00	100.0	0.00	0.00	0.0	0.0
3	MD-INC-AZ	200.0	0.00	360.00	200.0	0.00	0.00	0.0	0.0
4	MD-INC-AZ	300.0	0.00	360.00	300.0	0.00	0.00	0.0	0.0
5	MD-INC-AZ	400.0	0.00	360.00	400.0	0.00	0.00	0.0	0.0
6	MD-INC-AZ	500.0	0.00	360.00	500.0	0.00	0.00	0.0	0.0
7	MD-INC-AZ	600.0	0.00	360.00	600.0	0.00	0.00	0.0	0.0
8	MD-INC-AZ	700.0	0.00	360.00	700.0	0.00	0.00	0.0	0.0
9	MD-INC-AZ	800.0	0.00	360.00	800.0	0.00	0.00	0.0	0.0
10	MD-INC-AZ	900.0	0.00	360.00	900.0	0.00	0.00	0.0	0.0
11	MD-INC-AZ	1000.0	0.00	360.00	1000.0	0.00	0.00	0.0	0.0
12	MD-INC-AZ	1100.0	0.00	360.00	1100.0	0.00	0.00	0.0	0.0
13	MD-INC-AZ	1200.0	0.00	360.00	1200.0	0.00	0.00	0.0	0.0
14	MD-INC-AZ	1300.0	0.00	360.00	1300.0	0.00	0.00	0.0	0.0
15	MD-INC-AZ	1400.0	0.00	360.00	1400.0	0.00	0.00	0.0	0.0
16	MD-INC-AZ	1500.0	0.00	360.00	1500.0	0.00	0.00	0.0	0.0
17	MD-INC-AZ	1600.0	0.00	360.00	1600.0	0.00	0.00	0.0	0.0
18	MD-INC-AZ	1700.0	0.00	360.00	1700.0	0.00	0.00	0.0	0.0
19	MD-INC-AZ	1800.0	0.00	360.00	1800.0	0.00	0.00	0.0	0.0
20	MD-INC-AZ	1900.0	0.00	360.00	1900.0	0.00	0.00	0.0	0.0
21	MD-INC-AZ	2000.0	0.00	360.00	2000.0	0.00	0.00	0.0	0.0
22	MD-INC-AZ	2100.0	0.00	360.00	2100.0	0.00	0.00	0.0	0.0
23	MD-INC-AZ	2200.0	0.00	360.00	2200.0	0.00	0.00	0.0	0.0
24	MD-INC-AZ	2300.0	0.00	360.00	2300.0	0.00	0.00	0.0	0.0
25	MD-INC-AZ	2400.0	0.00	360.00	2400.0	0.00	0.00	0.0	0.0
26	MD-INC-AZ	2500.0	0.00	360.00	2500.0	0.00	0.00	0.0	0.0
27	MD-INC-AZ	2600.0	0.00	360.00	2600.0	0.00	0.00	0.0	0.0
28	MD-INC-AZ	2700.0	0.00	360.00	2700.0	0.00	0.00	0.0	0.0
29	MD-INC-AZ	2800.0	0.00	360.00	2800.0	0.00	0.00	0.0	0.0
30	MD-INC-AZ	2900.0	0.00	360.00	2900.0	0.00	0.00	0.0	0.0
31	MD-INC-AZ	3000.0	0.00	360.00	3000.0	0.00	0.00	0.0	0.0
32	MD-INC-AZ	3100.0	2.00	270.00	3100.0	2.00	2.00	0.0	1.7
33	MD-INC-AZ	3200.0	4.00	270.00	3199.8	2.00	2.00	0.0	7.0
34	MD-INC-AZ	3268.1	5.36	270.00	3267.7	2.00	2.00	0.0	12.5
35	MD-INC-AZ	3300.0	5.36	270.00	3299.5	0.00	0.00	0.0	15.5
36	MD-INC-AZ	3400.0	5.36	270.00	3399.0	0.00	0.00	0.0	24.9
37	MD-INC-AZ	3500.0	5.36	270.00	3498.6	0.00	0.00	0.0	34.2
38	MD-INC-AZ	3600.0	5.36	270.00	3598.2	0.00	0.00	0.0	43.6
39	MD-INC-AZ	3700.0	5.36	270.00	3697.7	0.00	0.00	0.0	52.9
40	MD-INC-AZ	3800.0	5.36	270.00	3797.3	0.00	0.00	0.0	62.2
41	MD-INC-AZ	3900.0	5.36	270.00	3896.8	0.00	0.00	0.0	71.6
42	MD-INC-AZ	4000.0	5.36	270.00	3996.4	0.00	0.00	0.0	80.9
43	MD-INC-AZ	4100.0	5.36	270.00	4096.0	0.00	0.00	0.0	90.3
44	MD-INC-AZ	4200.0	5.36	270.00	4195.5	0.00	0.00	0.0	99.6
45	MD-INC-AZ	4300.0	5.36	270.00	4295.1	0.00	0.00	0.0	109.0
46	MD-INC-AZ	4400.0	5.36	270.00	4394.7	0.00	0.00	0.0	118.3
47	MD-INC-AZ	4500.0	5.36	270.00	4494.2	0.00	0.00	0.0	127.7
48	MD-INC-AZ	4600.0	5.36	270.00	4593.8	0.00	0.00	0.0	137.0
49	MD-INC-AZ	4700.0	5.36	270.00	4693.3	0.00	0.00	0.0	146.4
50	MD-INC-AZ	4800.0	5.36	270.00	4792.9	0.00	0.00	0.0	155.7
51	MD-INC-AZ	4846.0	5.36	270.00	4838.7	0.00	0.00	0.0	160.0
52	MD-INC-AZ	4850.0	5.49	266.87	4842.7	8.00	8.00	0.0	160.4
53	MD-INC-AZ	4900.0	8.00	239.65	4892.3	8.00	8.00	1.9	165.8
54	MD-INC-AZ	4950.0	11.39	226.86	4941.6	8.00	8.00	7.0	172.5
55	MD-INC-AZ	5000.0	15.08	220.06	4990.3	8.00	8.00	15.4	180.8
56	MD-INC-AZ	5050.0	18.90	215.92	5038.1	8.00	8.00	26.9	191.0
57	MD-INC-AZ	5100.0	22.78	213.14	5084.8	8.00	8.00	41.6	203.5
58	MD-INC-AZ	5150.0	26.69	211.13	5130.2	8.00	8.00	59.3	218.5
59	MD-INC-AZ	5200.0	30.62	209.61	5174.1	8.00	8.00	80.0	236.3
60	MD-INC-AZ	5250.0	34.57	208.40	5216.2	8.00	8.00	103.6	257.2
61	MD-INC-AZ	5300.0	38.52	207.42	5256.4	8.00	8.00	129.9	281.1
62	MD-INC-AZ	5350.0	42.49	206.59	5294.4	8.00	8.00	158.8	308.1
63	MD-INC-AZ	5400.0	46.46	205.88	5330.1	8.00	8.00	190.2	338.1
64	MD-INC-AZ	5450.0	50.43	205.25	5363.2	8.00	8.00	224.0	370.9
65	MD-INC-AZ	5500.0	54.41	204.70	5393.7	8.00	8.00	259.9	406.4
66	MD-INC-AZ	5550.0	58.38	204.19	5421.4	8.00	8.00	297.8	444.2
67	MD-INC-AZ	5570.3	60.00	204.00	5431.8	8.00	8.00	313.7	460.2
68	MD-INC-AZ	5600.0	60.00	204.00	5446.6	0.00	0.00	337.2	484.0
69	MD-INC-AZ	5700.0	60.00	204.00	5496.6	0.00	0.00	416.3	565.3
70	MD-INC-AZ	5720.3	60.00	204.00	5506.8	0.00	0.00	432.4	582.0
71	MD-INC-AZ	5750.0	62.91	203.32	5521.0	10.00	10.00	456.3	606.8
72	MD-INC-AZ	5800.0	67.81	202.24	5541.8	10.00	10.00	498.2	650.1
73	MD-INC-AZ	5850.0	72.72	201.23	5558.7	10.00	10.00	541.9	694.9
74	MD-INC-AZ	5900.0	77.64	200.28	5571.5	10.00	10.00	587.1	741.0
75	MD-INC-AZ	5950.0	82.55	199.37	5580.1	10.00	10.00	633.4	788.0
76	MD-INC-AZ	6000.0	87.47	198.47	5584.4	10.00	10.00	680.5	835.6
77	MD-INC-AZ	6025.7	90.00	198.01	5585.0	10.00	10.00	704.9	860.2
78	MD-INC-AZ	6100.0	90.00	198.01	5585.0	0.00	0.00	775.6	931.5
79	MD-INC-AZ	6200.0	90.00	198.01	5585.0	0.00	0.00	870.7	1028.2
80	MD-INC-AZ	6300.0	90.00	198.01	5585.0	0.00	0.00	965.8	1125.4
81	MD-INC-AZ	6400.0	90.00	198.01	5585.0	0.00	0.00	1060.9	1223.1
82	MD-INC-AZ	6500.0	90.00	198.01	5585.0	0.00	0.00	1156.0	1321.2
83	MD-INC-AZ	6600.0	90.00	198.01	5585.0	0.00	0.00	1251.1	1419.5
84	MD-INC-AZ	6700.0	90.00	198.01	5585.0	0.00	0.00	1346.2	1518.0
85	MD-INC-AZ	6800.0	90.00	198.01	5585.0	0.00	0.00	1441.3	1616.7
86	MD-INC-AZ	6900.0	90.00	198.01	5585.0	0.00	0.00	1536.3	1715.6
87	MD-INC-AZ	7000.0	90.00	198.01	5585.0	0.00	0.00	1631.4	1814.5
88	MD-INC-AZ	7100.0	90.00	198.01	5585.0	0.00	0.00	1726.5	1913.6
89	MD-INC-AZ	7200.0	90.00	198.01	5585.0	0.00	0.00	1821.6	2012.8
90	MD-INC-AZ	7300.0	90.00	198.01	5585.0	0.00	0.00	1916.7	2112.1

WELLPATH EDITOR

	Data-Entry Mode	MD (usft)	INC (°)	AZ (°)	TVD (usft)	DLS (%100usft)	Max DLS (%100usft)	Vsection (usft)	Departure (usft)
91	MD-INC-AZ	7400.0	90.00	198.01	5585.0	0.00	0.00	2011.8	2211.4
92	MD-INC-AZ	7500.0	90.00	198.01	5585.0	0.00	0.00	2106.9	2310.8
93	MD-INC-AZ	7600.0	90.00	198.01	5585.0	0.00	0.00	2202.0	2410.2
94	MD-INC-AZ	7700.0	90.00	198.01	5585.0	0.00	0.00	2297.1	2509.7
95	MD-INC-AZ	7800.0	90.00	198.01	5585.0	0.00	0.00	2392.2	2609.2
96	MD-INC-AZ	7900.0	90.00	198.01	5585.0	0.00	0.00	2487.3	2708.8
97	MD-INC-AZ	8000.0	90.00	198.01	5585.0	0.00	0.00	2582.4	2808.3
98	MD-INC-AZ	8100.0	90.00	198.01	5585.0	0.00	0.00	2677.5	2908.0
99	MD-INC-AZ	8200.0	90.00	198.01	5585.0	0.00	0.00	2772.6	3007.6
100	MD-INC-AZ	8300.0	90.00	198.01	5585.0	0.00	0.00	2867.7	3107.3
101	MD-INC-AZ	8400.0	90.00	198.01	5585.0	0.00	0.00	2962.8	3206.9
102	MD-INC-AZ	8500.0	90.00	198.01	5585.0	0.00	0.00	3057.9	3306.6
103	MD-INC-AZ	8600.0	90.00	198.01	5585.0	0.00	0.00	3153.0	3406.4
104	MD-INC-AZ	8700.0	90.00	198.01	5585.0	0.00	0.00	3248.1	3506.1
105	MD-INC-AZ	8800.0	90.00	198.01	5585.0	0.00	0.00	3343.2	3605.9
106	MD-INC-AZ	8900.0	90.00	198.01	5585.0	0.00	0.00	3438.3	3705.6
107	MD-INC-AZ	9000.0	90.00	198.01	5585.0	0.00	0.00	3533.4	3805.4
108	MD-INC-AZ	9100.0	90.00	198.01	5585.0	0.00	0.00	3628.5	3905.2
109	MD-INC-AZ	9200.0	90.00	198.01	5585.0	0.00	0.00	3723.6	4005.0
110	MD-INC-AZ	9300.0	90.00	198.01	5585.0	0.00	0.00	3818.7	4104.8
111	MD-INC-AZ	9400.0	90.00	198.01	5585.0	0.00	0.00	3913.8	4204.6
112	MD-INC-AZ	9500.0	90.00	198.01	5585.0	0.00	0.00	4008.9	4304.4
113	MD-INC-AZ	9600.0	90.00	198.01	5585.0	0.00	0.00	4104.0	4404.3
114	MD-INC-AZ	9700.0	90.00	198.01	5585.0	0.00	0.00	4199.1	4504.1
115	MD-INC-AZ	9800.0	90.00	198.01	5585.0	0.00	0.00	4294.2	4604.0
116	MD-INC-AZ	9900.0	90.00	198.01	5585.0	0.00	0.00	4389.3	4703.8
117	MD-INC-AZ	10000.0	90.00	198.01	5585.0	0.00	0.00	4484.4	4803.7
118	MD-INC-AZ	10100.0	90.00	198.01	5585.0	0.00	0.00	4579.5	4903.5
119	MD-INC-AZ	10200.0	90.00	198.01	5585.0	0.00	0.00	4674.6	5003.4
120	MD-INC-AZ	10300.0	90.00	198.01	5585.0	0.00	0.00	4769.7	5103.3
121	MD-INC-AZ	10400.0	90.00	198.01	5585.0	0.00	0.00	4864.8	5203.2
122	MD-INC-AZ	10500.0	90.00	198.01	5585.0	0.00	0.00	4959.9	5303.1
123	MD-INC-AZ	10600.0	90.00	198.01	5585.0	0.00	0.00	5055.0	5402.9
124	MD-INC-AZ	10700.0	90.00	198.01	5585.0	0.00	0.00	5150.1	5502.8
125	MD-INC-AZ	10800.0	90.00	198.01	5585.0	0.00	0.00	5245.2	5602.7
126	MD-INC-AZ	10900.0	90.00	198.01	5585.0	0.00	0.00	5340.3	5702.6
127	MD-INC-AZ	11000.0	90.00	198.01	5585.0	0.00	0.00	5435.4	5802.5
128	MD-INC-AZ	11100.0	90.00	198.01	5585.0	0.00	0.00	5530.5	5902.4
129	MD-INC-AZ	11200.0	90.00	198.01	5585.0	0.00	0.00	5625.6	6002.4
130	MD-INC-AZ	11300.0	90.00	198.01	5585.0	0.00	0.00	5720.7	6102.3
131	MD-INC-AZ	11400.0	90.00	198.01	5585.0	0.00	0.00	5815.8	6202.2
132	MD-INC-AZ	11500.0	90.00	198.01	5585.0	0.00	0.00	5910.9	6302.1
133	MD-INC-AZ	11600.0	90.00	198.01	5585.0	0.00	0.00	6006.0	6402.0
134	MD-INC-AZ	11700.0	90.00	198.01	5585.0	0.00	0.00	6101.1	6502.0
135	MD-INC-AZ	11800.0	90.00	198.01	5585.0	0.00	0.00	6196.2	6601.9
136	MD-INC-AZ	11900.0	90.00	198.01	5585.0	0.00	0.00	6291.3	6701.8
137	MD-INC-AZ	12000.0	90.00	198.01	5585.0	0.00	0.00	6386.4	6801.7
138	MD-INC-AZ	12100.0	90.00	198.01	5585.0	0.00	0.00	6481.5	6901.7
139	MD-INC-AZ	12200.0	90.00	198.01	5585.0	0.00	0.00	6576.6	7001.6
140	MD-INC-AZ	12300.0	90.00	198.01	5585.0	0.00	0.00	6671.7	7101.5
141	MD-INC-AZ	12400.0	90.00	198.01	5585.0	0.00	0.00	6766.8	7201.5
142	MD-INC-AZ	12500.0	90.00	198.01	5585.0	0.00	0.00	6861.9	7301.4
143	MD-INC-AZ	12600.0	90.00	198.01	5585.0	0.00	0.00	6957.0	7401.4
144	MD-INC-AZ	12700.0	90.00	198.01	5585.0	0.00	0.00	7052.1	7501.3
145	MD-INC-AZ	12800.0	90.00	198.01	5585.0	0.00	0.00	7147.2	7601.3
146	MD-INC-AZ	12900.0	90.00	198.01	5585.0	0.00	0.00	7242.3	7701.2
147	MD-INC-AZ	13000.0	90.00	198.01	5585.0	0.00	0.00	7337.4	7801.1
148	MD-INC-AZ	13100.0	90.00	198.01	5585.0	0.00	0.00	7432.5	7901.1
149	MD-INC-AZ	13200.0	90.00	198.01	5585.0	0.00	0.00	7527.6	8001.0
150	MD-INC-AZ	13300.0	90.00	198.01	5585.0	0.00	0.00	7622.7	8101.0
151	MD-INC-AZ	13400.0	90.00	198.01	5585.0	0.00	0.00	7717.8	8201.0
152	MD-INC-AZ	13500.0	90.00	198.01	5585.0	0.00	0.00	7812.9	8300.9
153	MD-INC-AZ	13600.0	90.00	198.01	5585.0	0.00	0.00	7908.0	8400.9
154	MD-INC-AZ	13700.0	90.00	198.01	5585.0	0.00	0.00	8003.1	8500.8
155	MD-INC-AZ	13800.0	90.00	198.01	5585.0	0.00	0.00	8098.2	8600.8
156	MD-INC-AZ	13900.0	90.00	198.01	5585.0	0.00	0.00	8193.3	8700.7
157	MD-INC-AZ	14000.0	90.00	198.01	5585.0	0.00	0.00	8288.4	8800.7
158	MD-INC-AZ	14100.0	90.00	198.01	5585.0	0.00	0.00	8383.5	8900.6
159	MD-INC-AZ	14200.0	90.00	198.01	5585.0	0.00	0.00	8478.6	9000.6
160	MD-INC-AZ	14300.0	90.00	198.01	5585.0	0.00	0.00	8573.7	9100.6
161	MD-INC-AZ	14400.0	90.00	198.01	5585.0	0.00	0.00	8668.8	9200.5
162	MD-INC-AZ	14500.0	90.00	198.01	5585.0	0.00	0.00	8763.9	9300.5
163	MD-INC-AZ	14600.0	90.00	198.01	5585.0	0.00	0.00	8859.0	9400.5
164	MD-INC-AZ	14700.0	90.00	198.01	5585.0	0.00	0.00	8954.1	9500.4
165	MD-INC-AZ	14800.0	90.00	198.01	5585.0	0.00	0.00	9049.2	9600.4
166	MD-INC-AZ	14900.0	90.00	198.01	5585.0	0.00	0.00	9144.3	9700.4
167	MD-INC-AZ	15000.0	90.00	198.01	5585.0	0.00	0.00	9239.4	9800.3
168	MD-INC-AZ	15100.0	90.00	198.01	5585.0	0.00	0.00	9334.5	9900.3
169	MD-INC-AZ	15200.0	90.00	198.01	5585.0	0.00	0.00	9429.6	10000.3
170	MD-INC-AZ	15300.0	90.00	198.01	5585.0	0.00	0.00	9524.7	10100.2
171	MD-INC-AZ	15400.0	90.00	198.01	5585.0	0.00	0.00	9619.8	10200.2
172	MD-INC-AZ	15500.0	90.00	198.01	5585.0	0.00	0.00	9714.8	10300.2
173	MD-INC-AZ	15600.0	90.00	198.01	5585.0	0.00	0.00	9809.9	10400.1
174	MD-INC-AZ	15700.0	90.00	198.01	5585.0	0.00	0.00	9905.0	10500.1
175	MD-INC-AZ	15800.0	90.00	198.01	5585.0	0.00	0.00	10000.1	10600.1
176	MD-INC-AZ	15900.0	90.00	198.01	5585.0	0.00	0.00	10095.2	10700.1
177	MD-INC-AZ	16000.0	90.00	198.01	5585.0	0.00	0.00	10190.3	10800.0
178	MD-INC-AZ	16100.0	90.00	198.01	5585.0	0.00	0.00	10285.4	10900.0
179	MD-INC-AZ	16200.0	90.00	198.01	5585.0	0.00	0.00	10380.5	11000.0
180	MD-INC-AZ	16300.0	90.00	198.01	5585.0	0.00	0.00	10475.6	11099.9

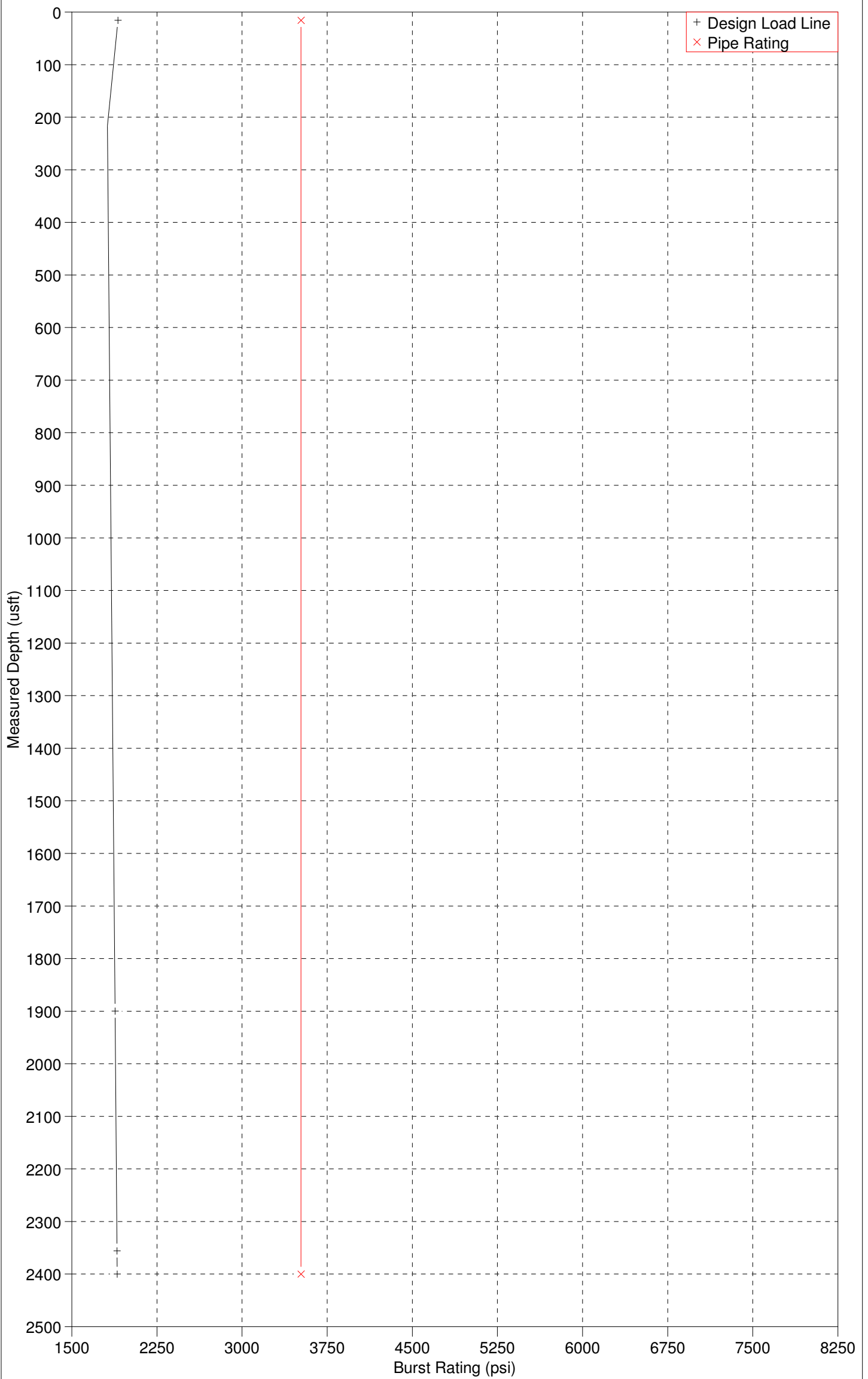
Pore, Fracture & MW



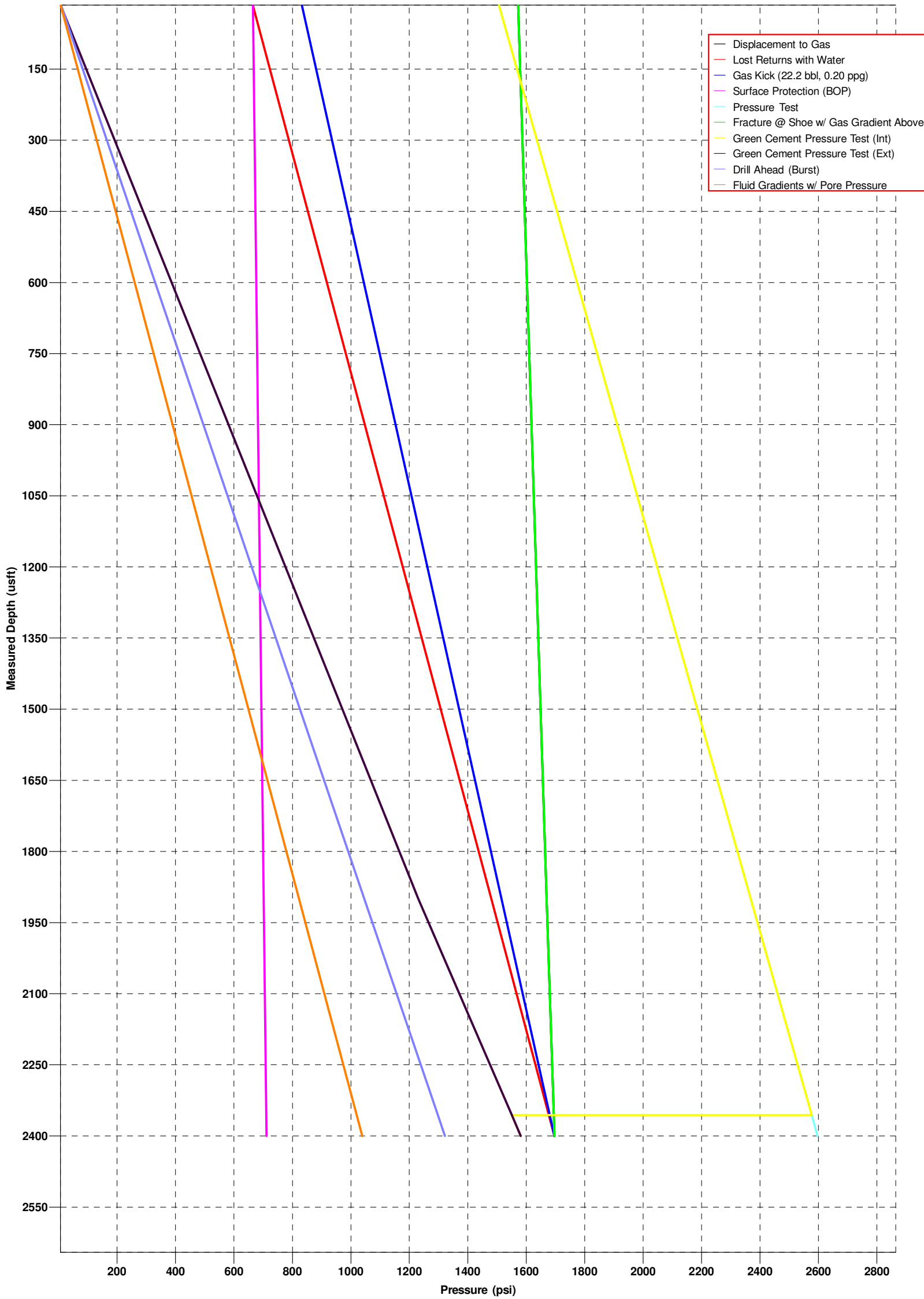
GEOTHERMAL GRADIENT DATA

Surface Ambient:	80.00 °F
Bottomhole Temperature - 5585.0 usft TVD:	180.24 °F
Bottomhole Gradient - 5585.0 usft TVD:	1.80 °F/100ft

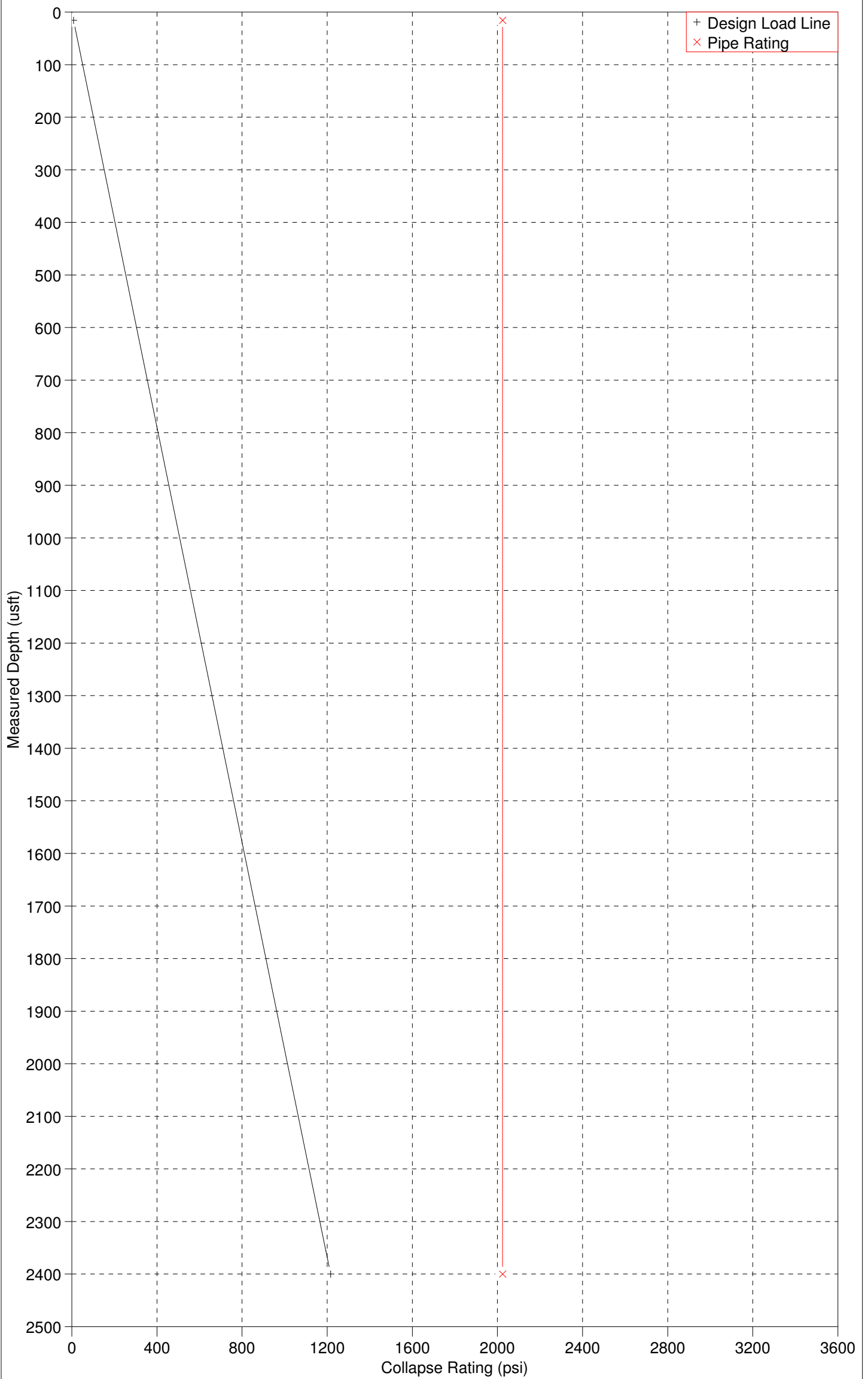
BURST DESIGN (9 5/8" Surface Casing)



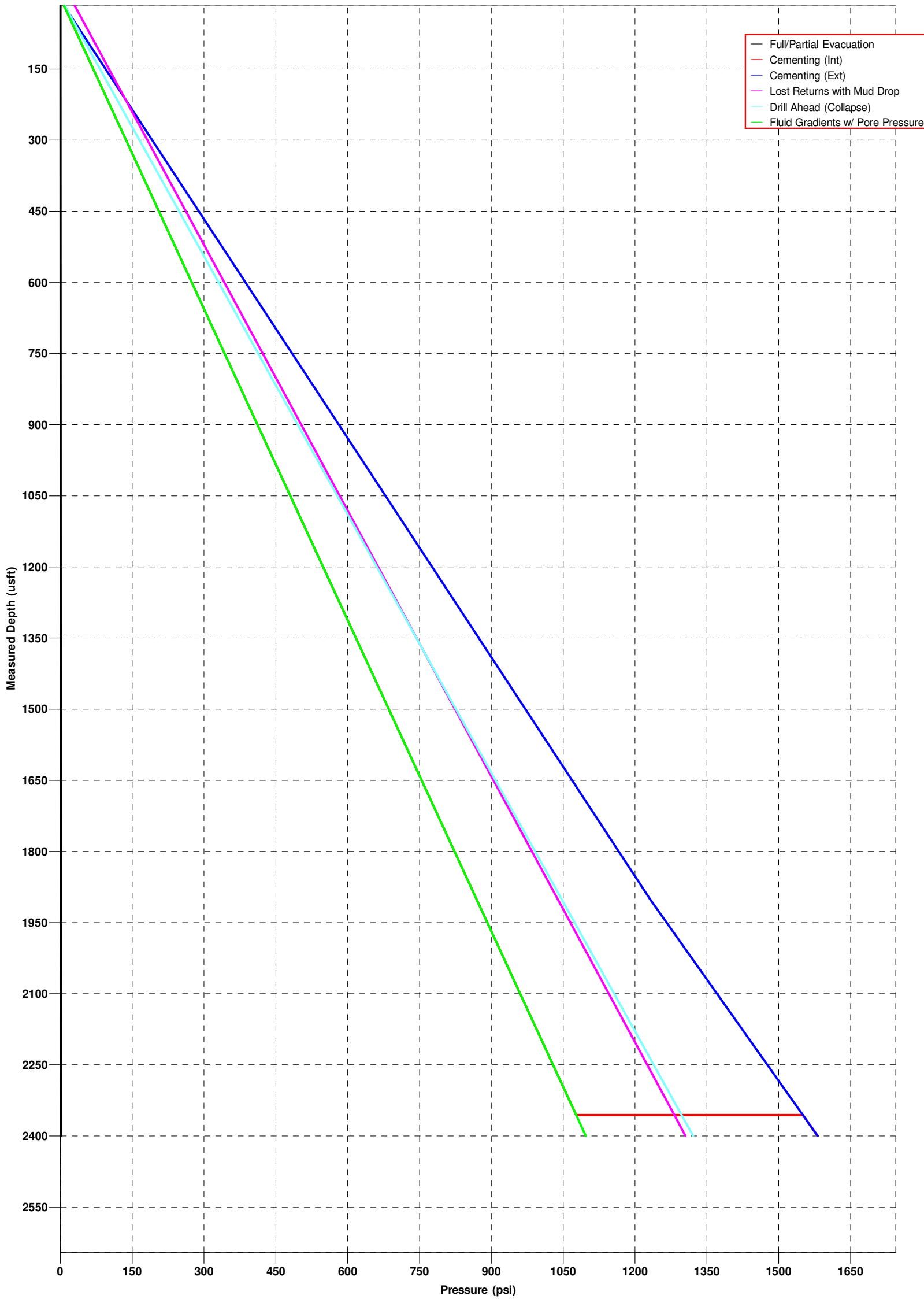
Burst Pressure Profiles (9 5/8" Surface Casing)



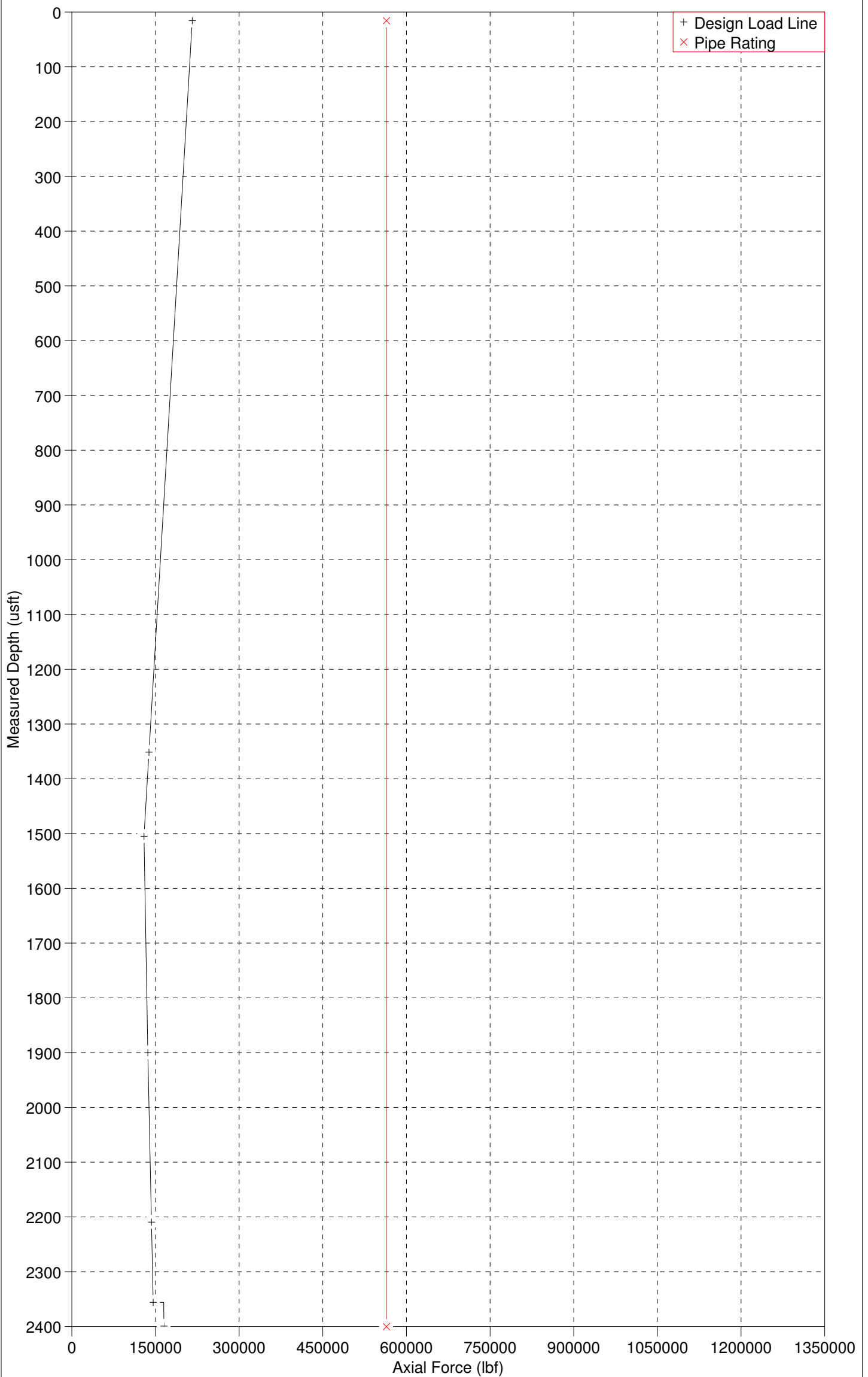
COLLAPSE DESIGN (9 5/8" Surface Casing)



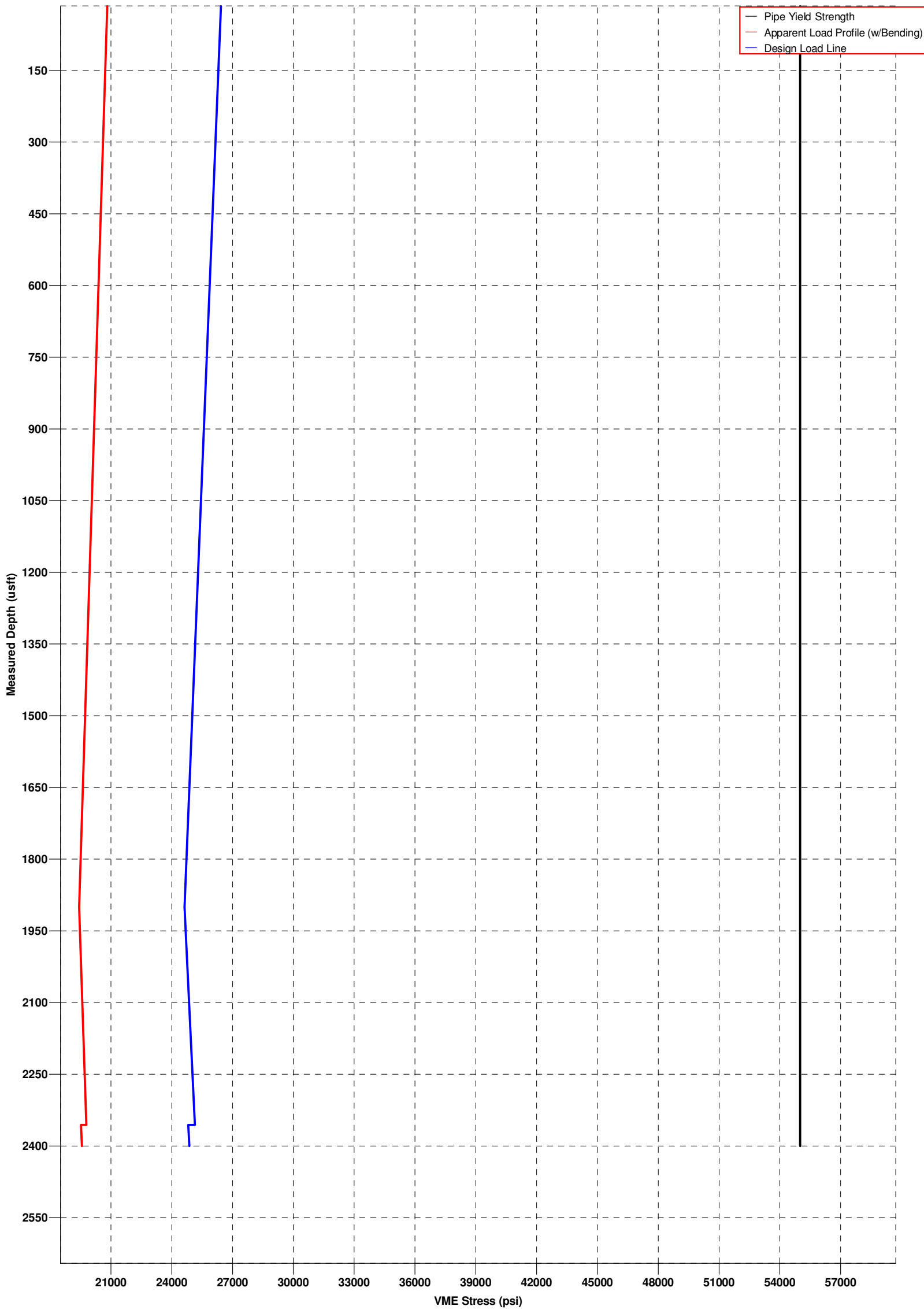
Collapse Pressure Profiles (9 5/8" Surface Casing)

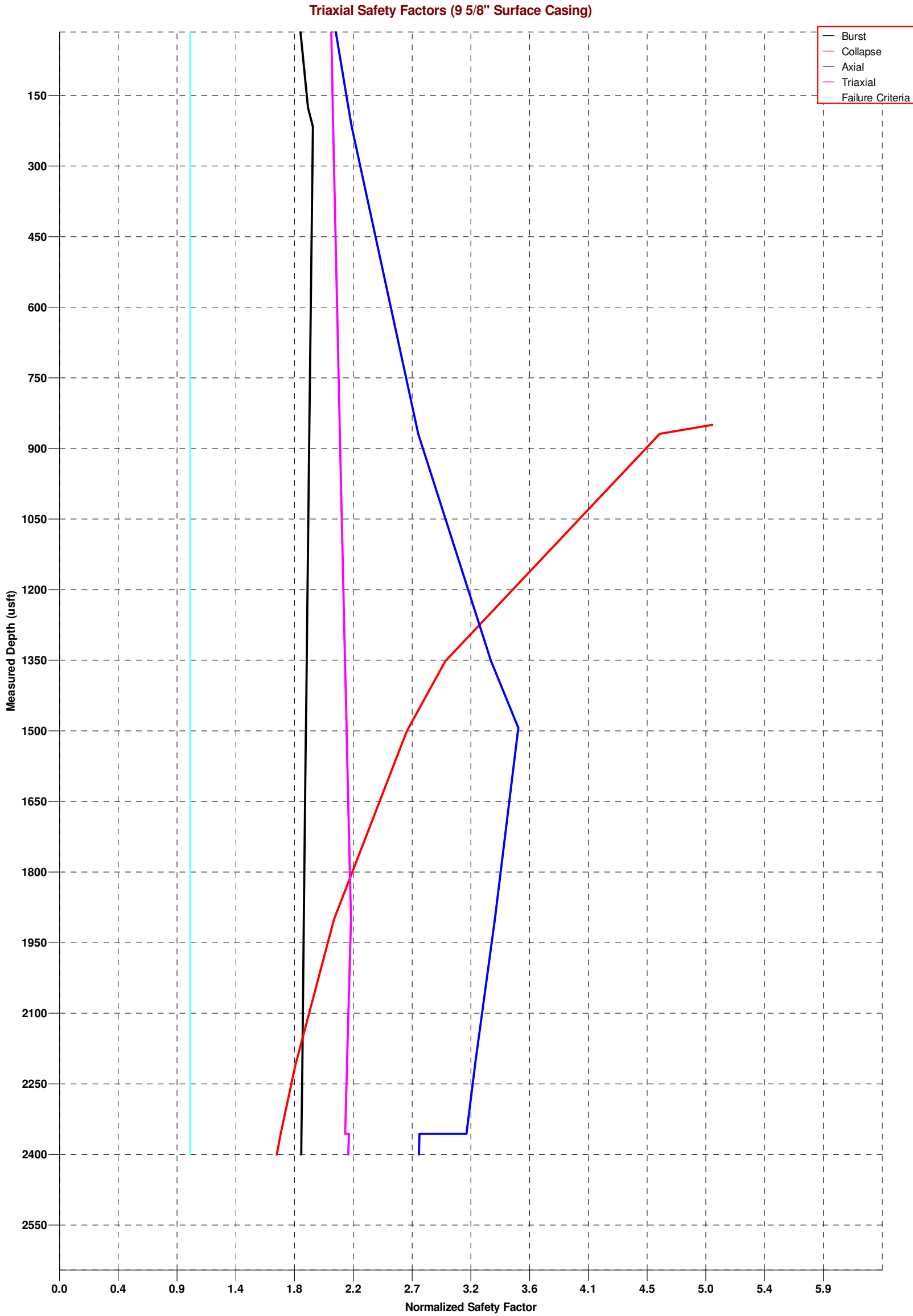


AXIAL DESIGN (9 5/8" Surface Casing)

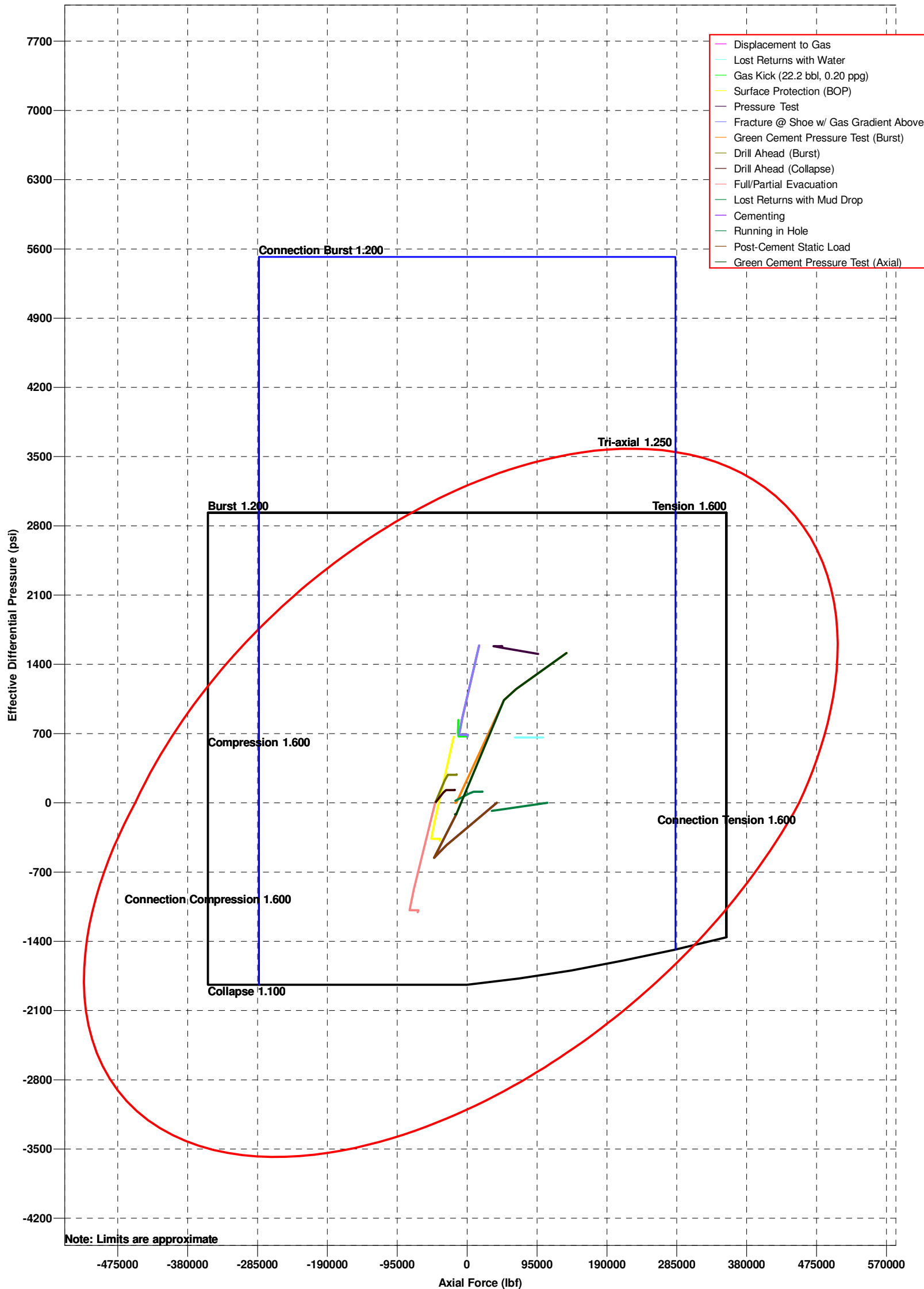


Triaxial Load Line (9 5/8" Surface Casing)



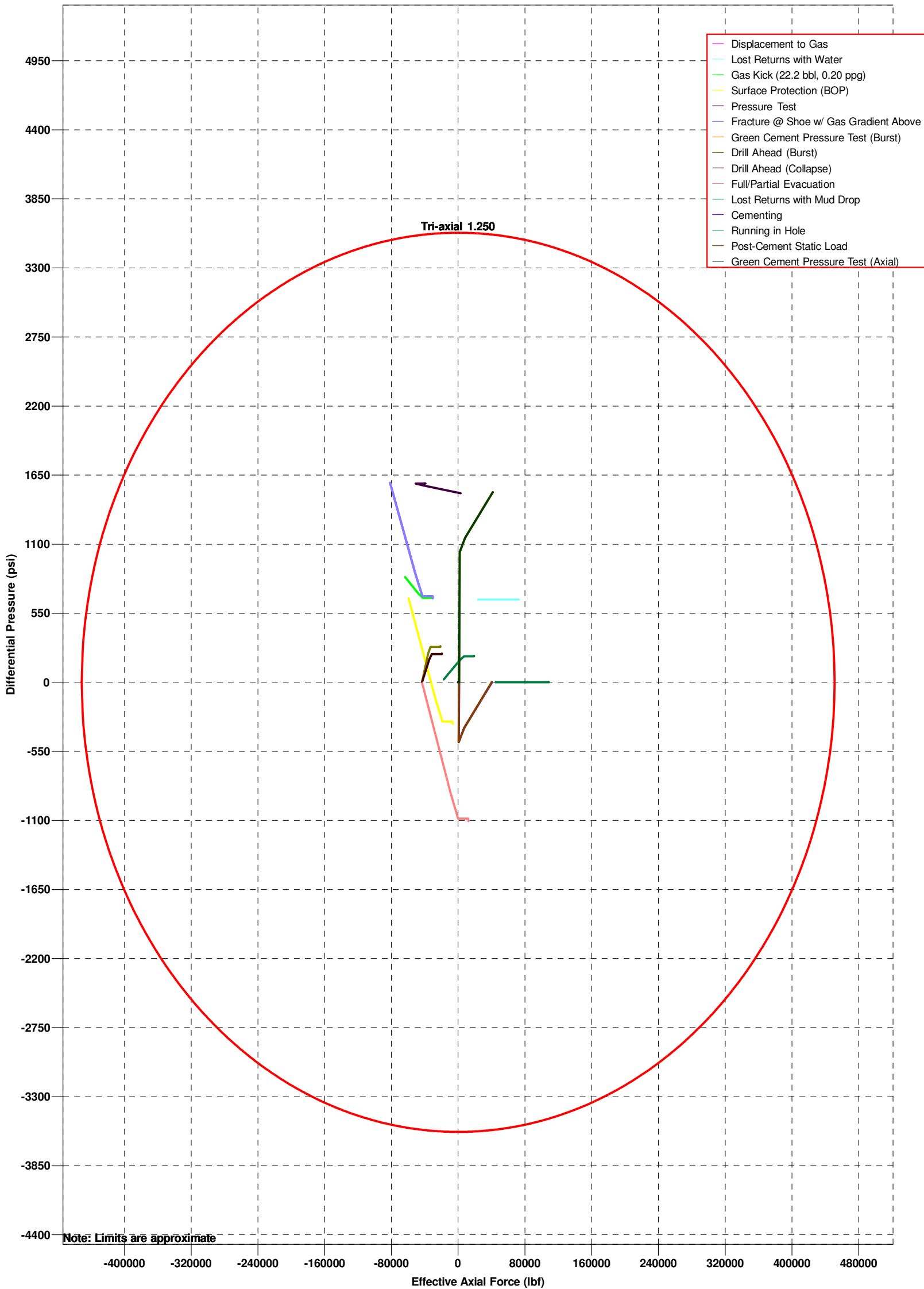


Design Limits (9 5/8" Surface Casing - Section 1)



Note: Limits are approximate

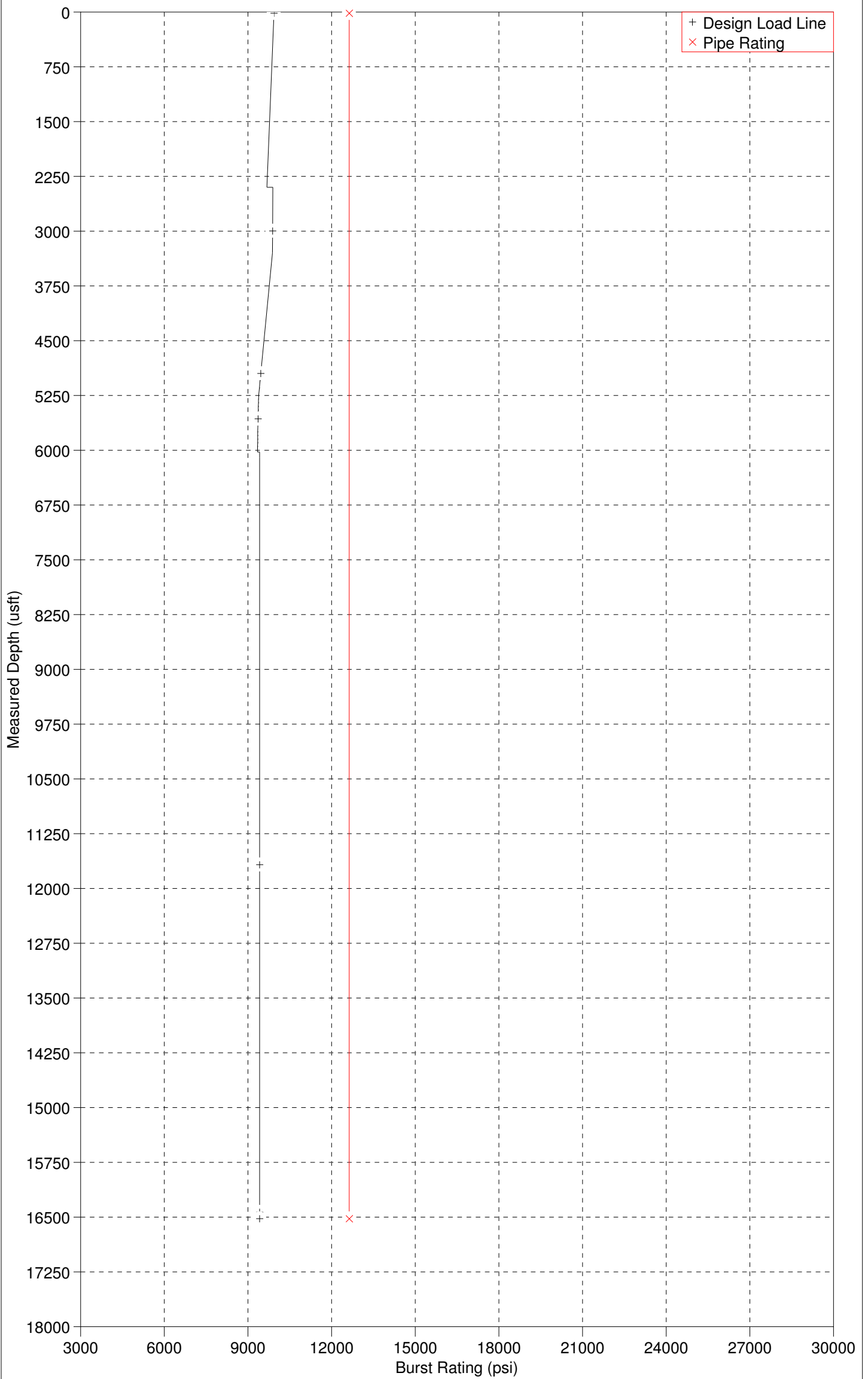
Von Mises Equivalent Stress (9 5/8" Surface Casing - Section 1)



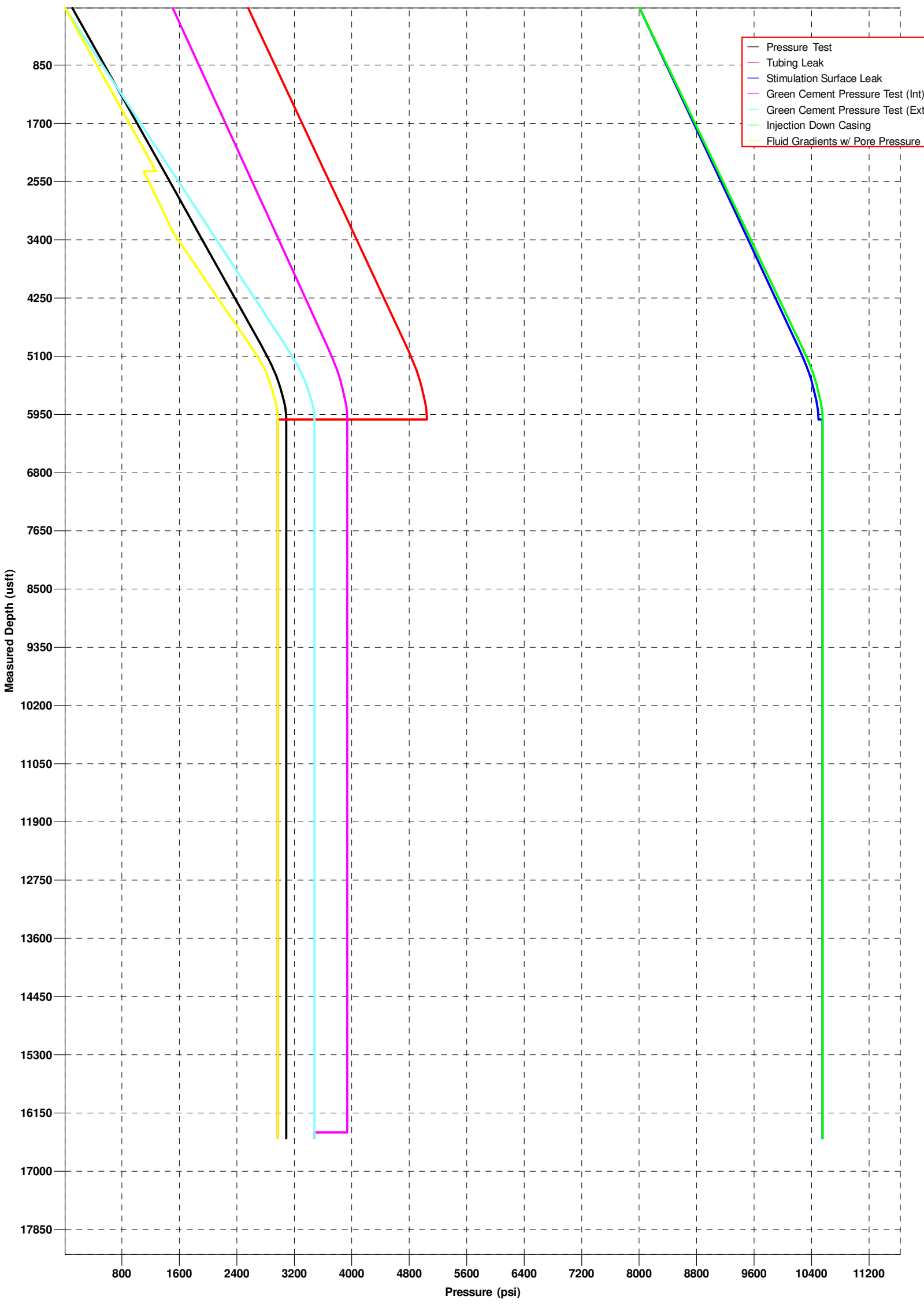
MINIMUM SAFETY FACTORS (9 5/8" Surface Casing)

	Depth (MD) (usft)	OD/Weight/Grade	Connection	Minimum Safety Factor (Abs)			
				Burst	Collapse	Axial	Triaxial
1	16	9 5/8", 36.000 ppf, J-55	LTC, J-55	2.21 B10	+ 100.00 C1	3.39 B12 J	2.60 B10
2	176			2.28 B10	24.91 C1	3.54 B12 J	2.62 B10
3	216			2.33 B5	20.30 C1	3.58 B12 J	2.62 B10
4	869			2.30 B5	5.06 C1	4.40 B12 J	2.68 B10
5	1352			2.27 B5	3.25 C1	5.29 B12 J	2.73 B5
6	1494			2.26 B5	2.94 C1	5.62 B12 J	2.75 B5
7	1505			2.26 B5	2.92 C1	5.61 B12 J	2.75 B5
8	1900			2.25 B5	2.31 C1	5.33 B2 J	2.79 B5
9	2210			2.23 B5	1.99 C1	5.09 B2 J	2.75 B5
10	2213			2.23 B5	1.98 C1	5.09 B2 J	2.75 B5
11	2356			2.22 B5	1.86 C1	4.99 B2 J	2.73 B5
12	2356			2.22 B5	1.86 C1	4.41 B2 J	2.77 B5
13	2399			2.22 B5	1.83 C1	4.40 B2 J	2.76 B5
14	2400			2.22 B5	1.83 C1	4.40 B2 J	2.76 B5
15							
16	J	Connection Jump Out					
17	B2	Lost Returns with Water					
18	B5	Pressure Test					
19	B10	Fracture @ Shoe w/ Gas Gradient Above					
20	B12	Green Cement Pressure Test(Burst)					
21	C1	Full/Partial Evacuation					

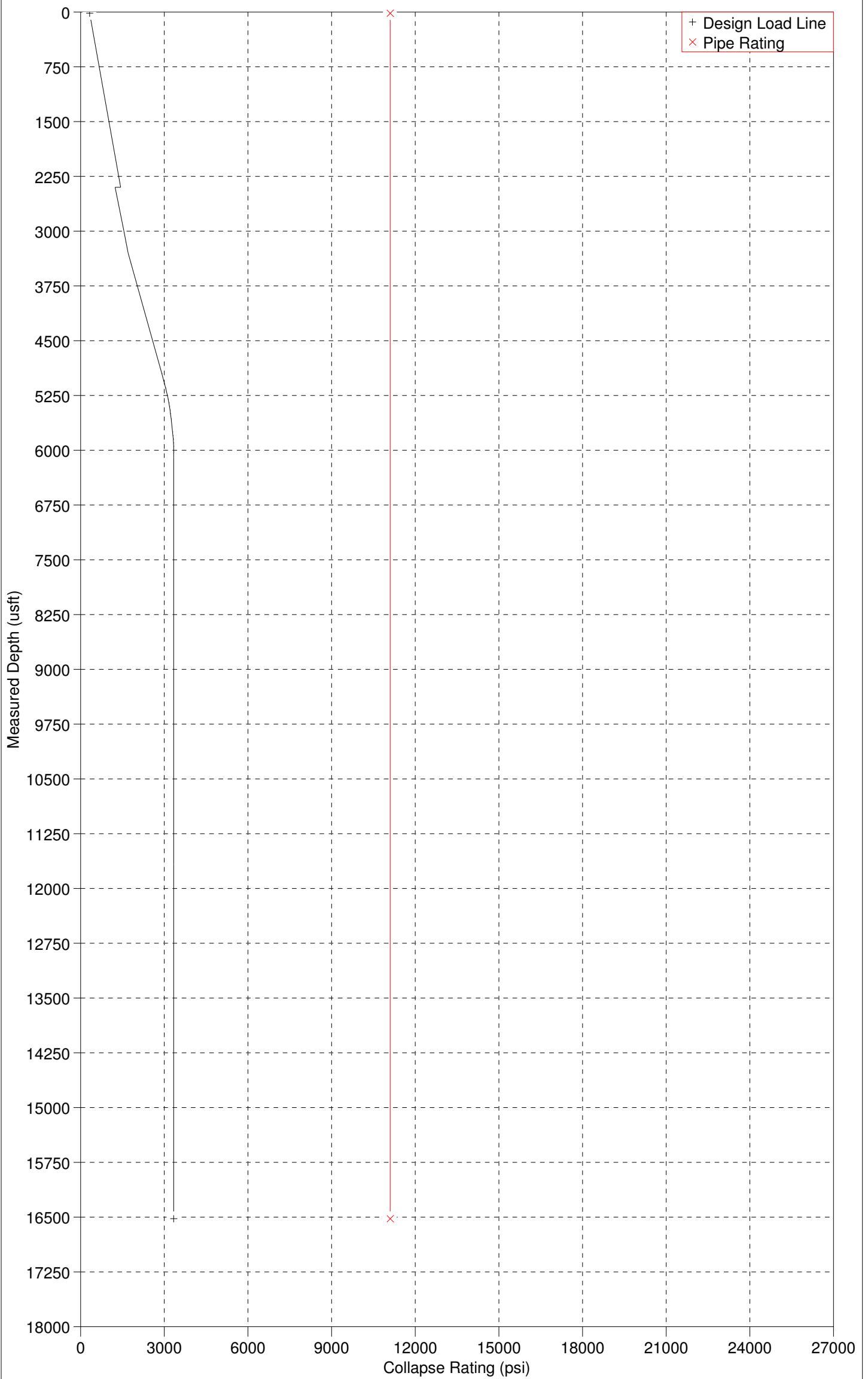
BURST DESIGN (5 1/2" Production Casing)



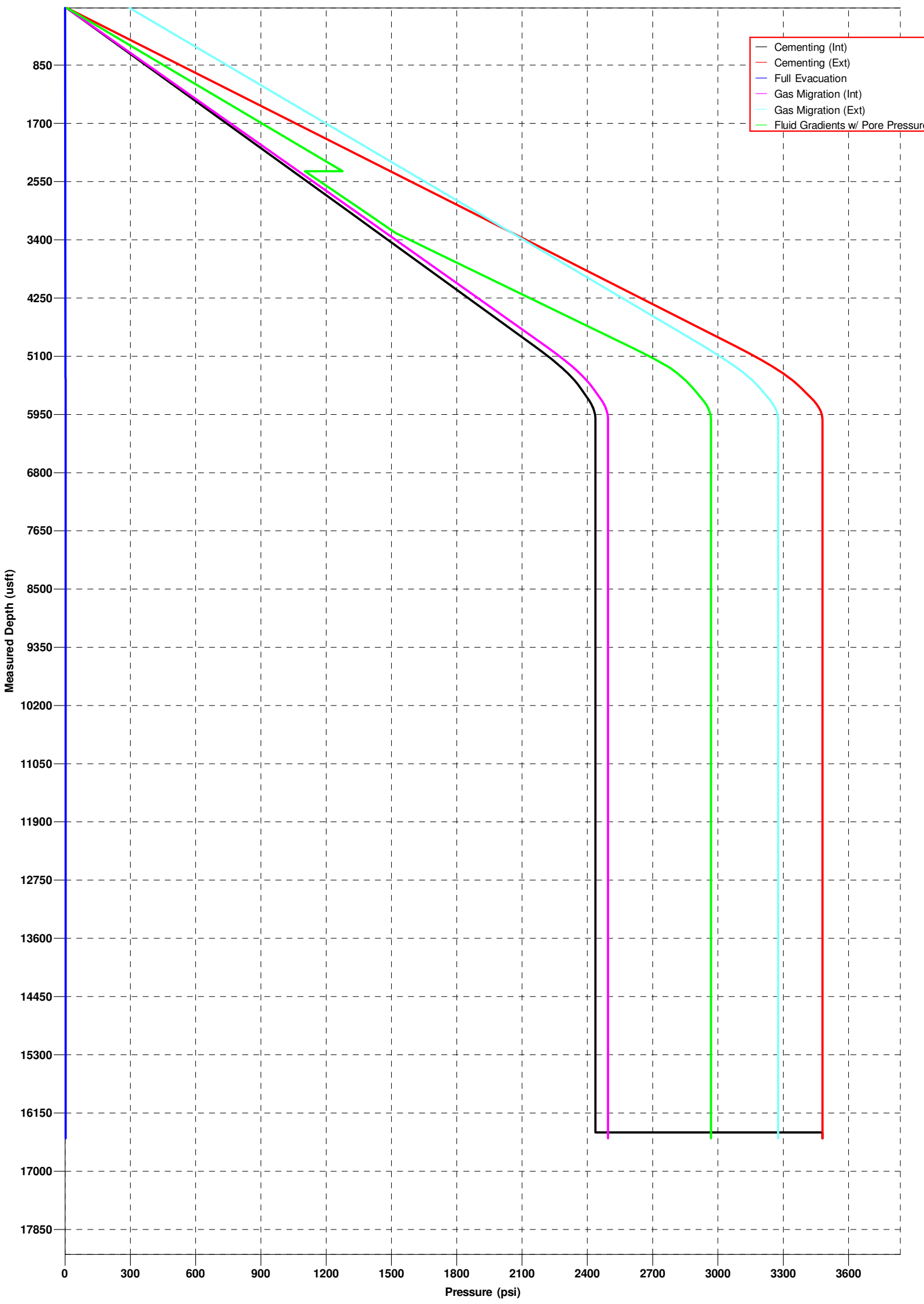
Burst Pressure Profiles (5 1/2" Production Casing)



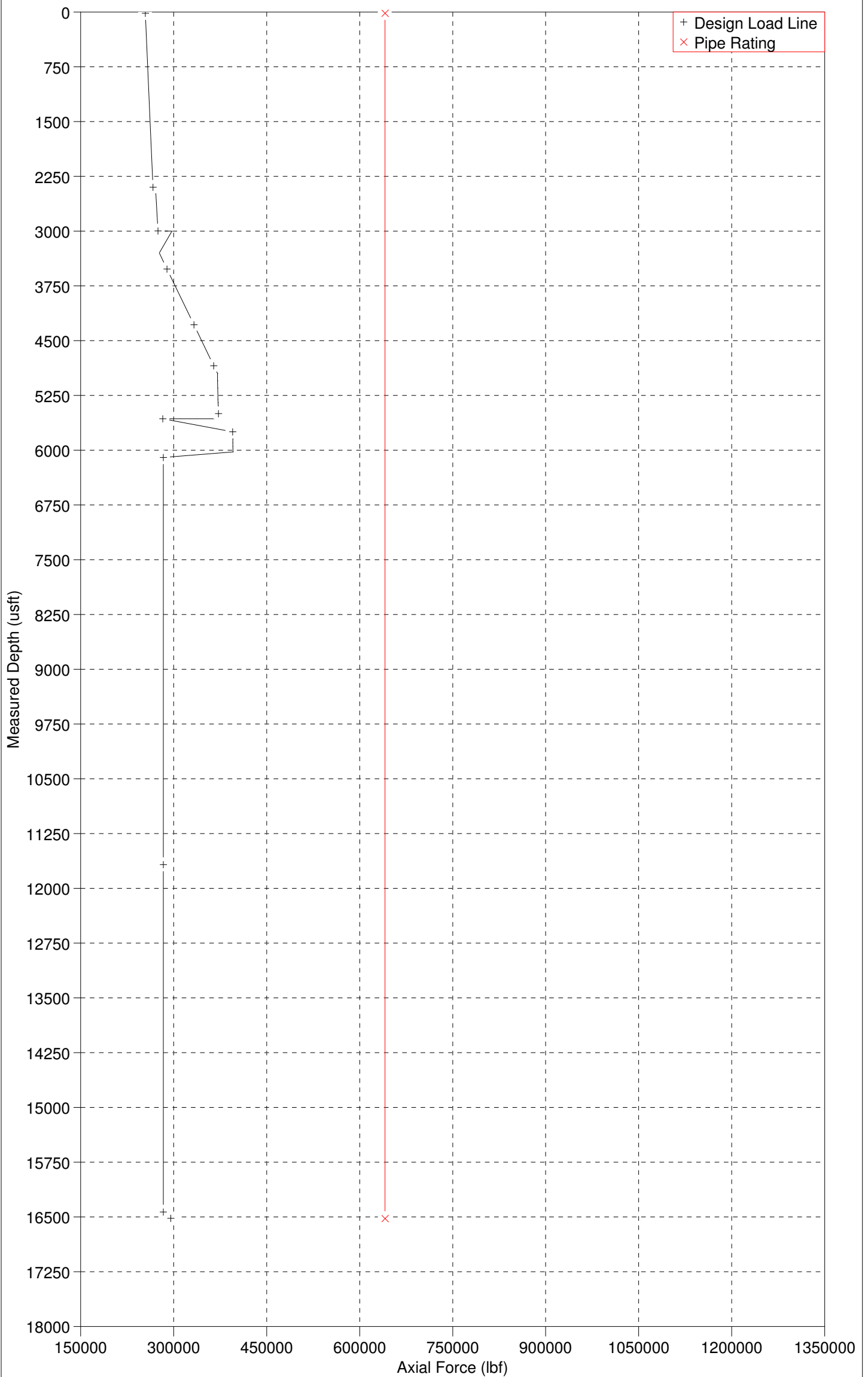
COLLAPSE DESIGN (5 1/2" Production Casing)



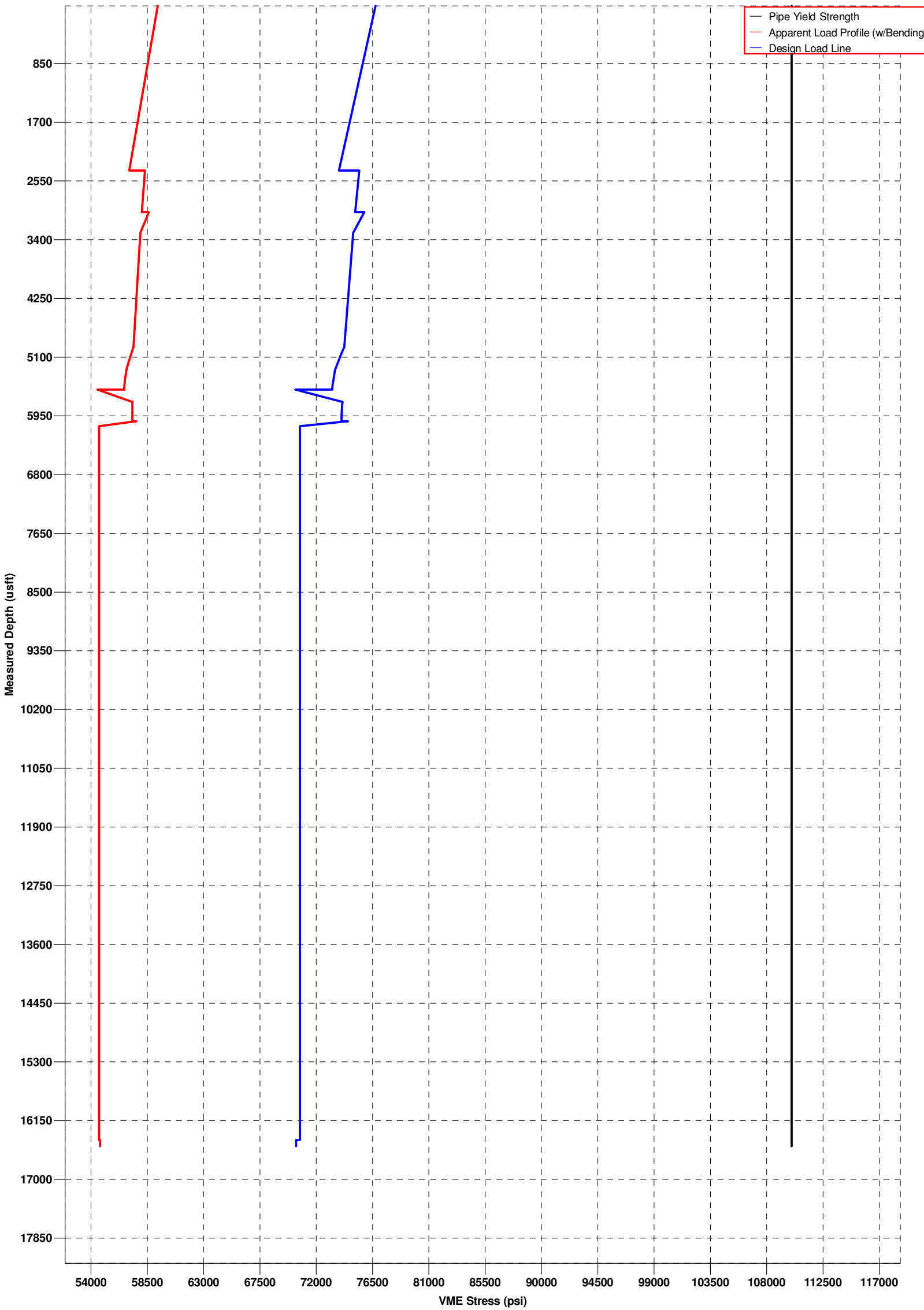
Collapse Pressure Profiles (5 1/2" Production Casing)



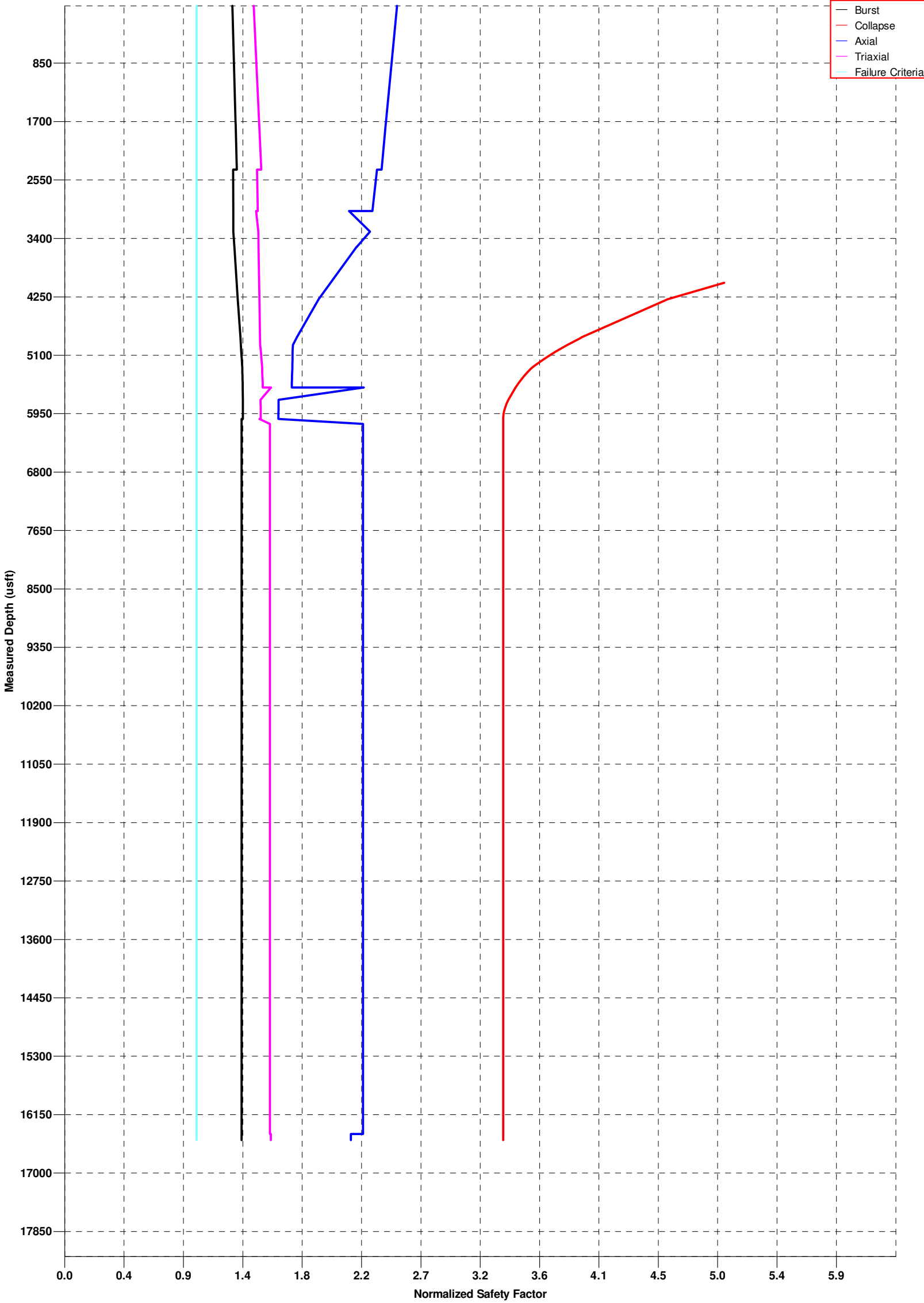
AXIAL DESIGN (5 1/2" Production Casing)



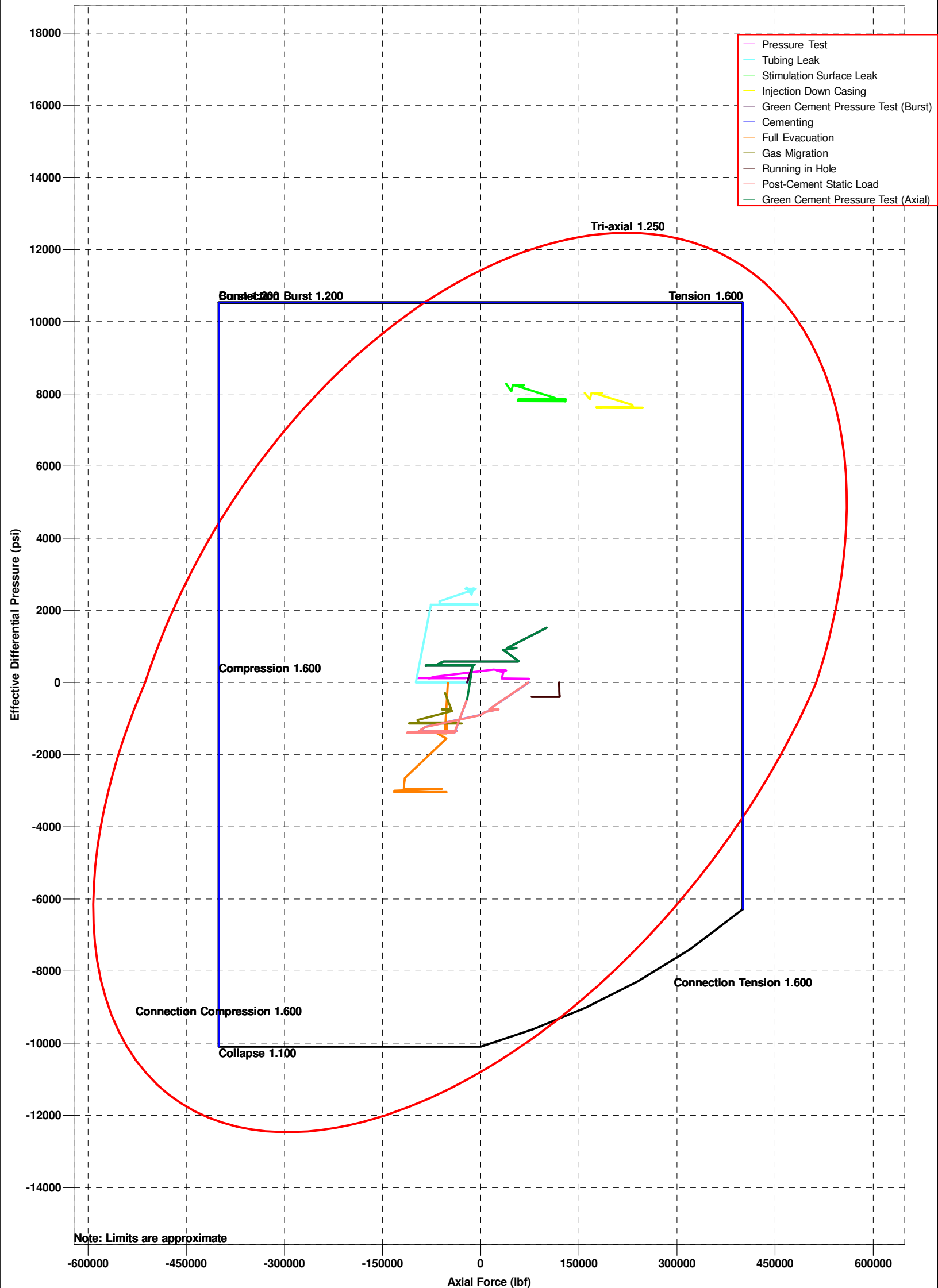
Triaxial Load Line (5 1/2" Production Casing)



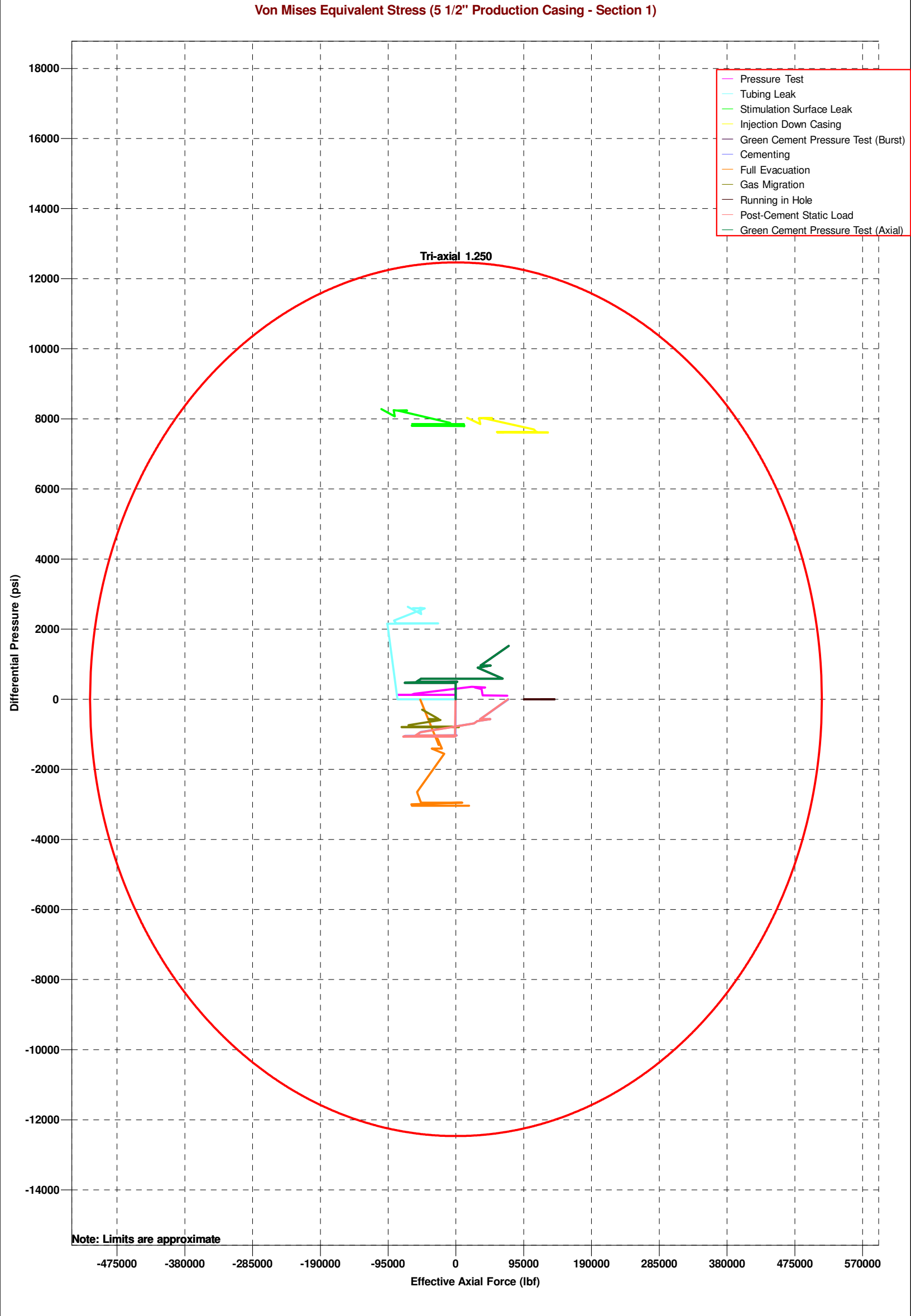
Triaxial Safety Factors (5 1/2" Production Casing)



Design Limits (5 1/2" Production Casing - Section 1)



Von Mises Equivalent Stress (5 1/2" Production Casing - Section 1)



MINIMUM SAFETY FACTORS (5 1/2" Production Casing)

	Depth (MD) (usft)	OD/Weight/Grade	Connection	Minimum Safety Factor (Abs)			
				Burst	Collapse	Axial	Triaxial
1	16	5 1/2", 20.000 ppf, P-110	DQX	1.53 B7	37.38 C7	4.03 B8	1.79 B7
2	1697			1.55 B7	11.02 C5	3.90 B8	1.84 B7
3	1748			1.55 B7	10.79 C5	3.89 B8	1.84 B7
4	2400			1.57 B7	8.51 C5	3.84 B8	1.86 B7
5	2400			1.53 B7	9.85 C5	3.79 B8	1.82 B7
6	3000			1.53 B7	7.87 C5	3.73 B8	1.83 B7
7	3000			1.53 B7	7.87 C5	3.45 B8	1.81 B7
8	3301			1.53 B7	7.15 C5	3.70 B8	1.83 B7
9	3519			1.54 B7	6.54 C5	3.54 B8	1.84 B7
10	3523			1.54 B7	6.53 C5	3.54 B8	1.84 B7
11	4285			1.57 B7	5.03 C5	3.08 B8	1.84 B7
12	4841			1.60 B7	4.31 C5	2.81 B8	1.85 B7
13	4844			1.60 B7	4.30 C5	2.81 B8	1.85 B7
14	4950			1.60 B7	4.19 C5	2.77 B8	1.85 B7
15	5050			1.61 B7	4.09 C5	2.76 B8	1.86 B7
16	5150			1.61 B7	4.00 C5	2.76 B8	1.86 B7
17	5250			1.61 B7	3.92 C5	2.76 B8	1.87 B7
18	5279			1.62 B7	3.90 C5	2.76 B8	1.87 B7
19	5300			1.62 B7	3.89 C5	2.76 B8	1.87 B7
20	5350			1.62 B7	3.86 C5	2.76 B8	1.87 B7
21	5400			1.62 B7	3.83 C5	2.76 B8	1.87 B7
22	5450			1.62 B7	3.81 C5	2.76 B8	1.87 B7
23	5500			1.62 B7	3.79 C5	2.76 B8	1.88 B7
24	5570			1.62 B7	3.76 C5	2.75 B8	1.88 B7
25	5570			1.62 B7	3.76 C5	3.63 B8	1.96 B7
26	5750			1.62 B7	3.70 C5	2.59 B8	1.86 B7
27	5800			1.62 B7	3.69 C5	2.59 B8	1.86 B7
28	5850			1.62 B7	3.67 C5	2.59 B8	1.86 B7
29	5900			1.62 B7	3.67 C5	2.59 B8	1.86 B7
30	5950			1.62 B7	3.66 C5	2.59 B8	1.86 B7
31	6000			1.62 B7	3.66 C5	2.59 B8	1.86 B7
32	6025			1.62 B7	3.66 C5	2.59 B8	1.86 B7
33	6025			1.61 B7	3.66 C5	2.59 B8	1.84 B7
34	6100			1.61 B7	3.66 C5	3.62 B8	1.95 B7
35	11675			1.61 B7	3.66 C5	3.62 B8	1.95 B7
36	16433			1.61 B7	3.66 C5	3.62 B8	1.95 B7
37	16433			1.61 B7	3.66 C5	3.47 B8	1.95 B7
38	16500			1.61 B7	3.66 C5	3.47 B8	1.95 B7
39	16520			1.61 B7	3.66 C5	3.47 B8	1.95 B7
40	16521			1.61 B7	3.66 C5	3.47 B8	1.95 B7
41							
42	B7	Stimulation Surface Leak					
43	B8	Injection Casing					
44	C5	Full Evacuation Production					
45	C7	Gas Migration(Collapse)					

PROJECT DETAILS: North Park Basin

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Northern Zone
 System Datum: Mean Sea Level



Azimuths to Grid North
 True North: 0.62°
 Magnetic North: 10.52°
 Magnetic Field
 Strength: 53125.3snT
 Dip Angle: 66.88°
 Date: 12/31/2009
 Model: IGRF200510

FORMATION TOP DETAILS

TVDPATH	MDPATH	FORMATION	DIPANGLE	DIPDIR
5240.0	5333.4	Niobrara	0.00	

CASING DETAILS

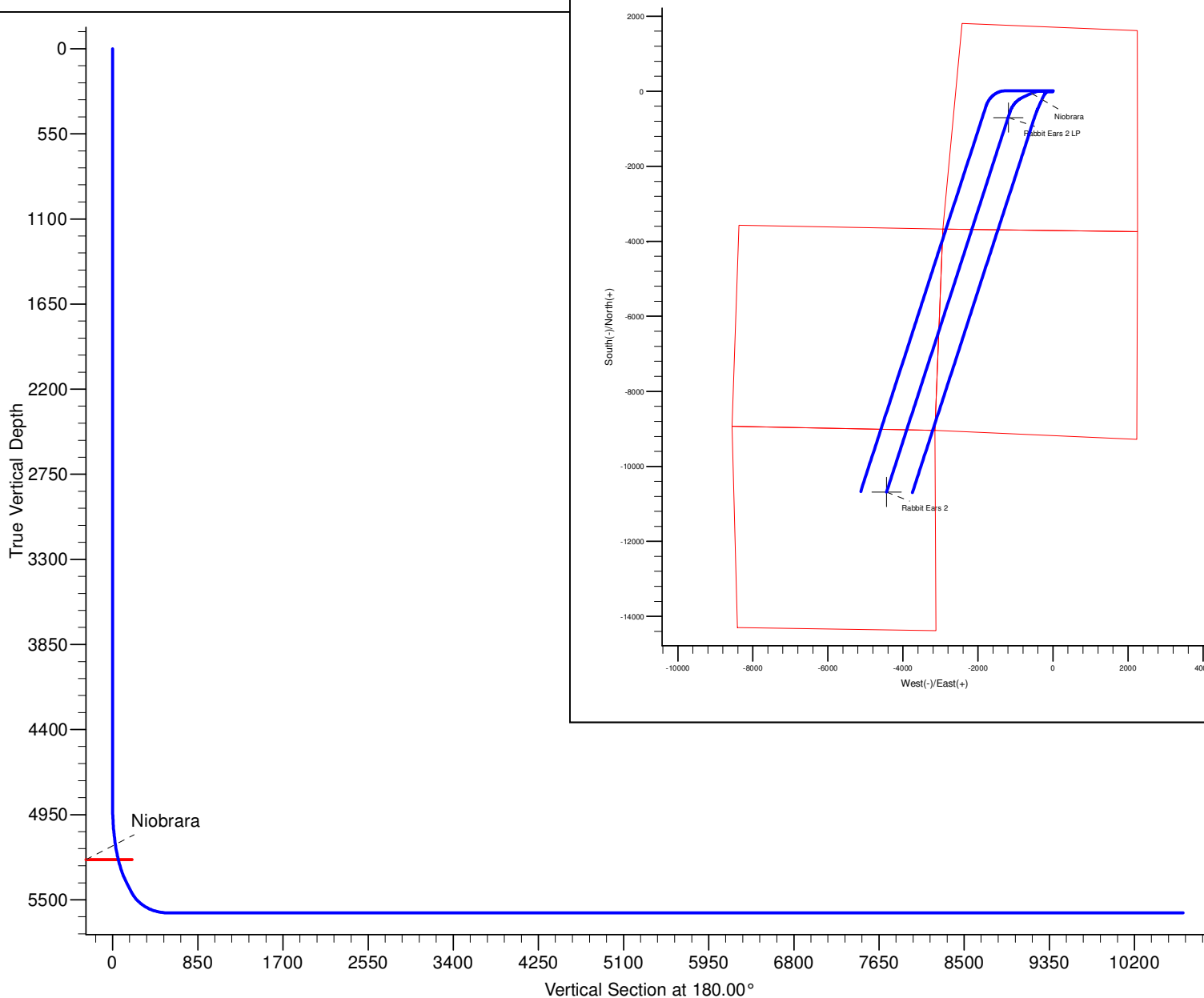
No casing data is available

DESIGN DETAILS: Design #1

0' Vertical Section coordinates

Type	Target	Azimuth	Origin	Type	N/S	E/W	From TVD
User		180.00	Slot		0.0	0.0	0.0

Project: North Park Basin
 Site: T6N-R81W-S23
 Well: Rabbit Ears 0681 2-23H
 Wellbore: Wellbore #1
 Design: Design #1



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	2800.0	0.00	0.00	2800.0	0.0	0.0	0.00	0.00	0.0	
3	3437.3	12.75	270.00	3432.1	0.0	-70.6	2.00	270.00	0.0	
4	4930.3	12.75	270.00	4888.3	0.0	-400.0	0.00	0.00	0.0	
5	5539.6	60.00	244.00	5367.0	-123.2	-724.1	8.00	-30.33	123.2	
6	5689.6	60.00	244.00	5442.0	-180.1	-840.9	0.00	0.00	180.1	
7	6220.0	90.00	197.97	5585.0	-560.6	-1151.7	10.00	-64.25	560.6	Rabbit Ears 2
8	16864.9	90.00	197.97	5585.0	-10686.1	-4436.1	0.00	0.00	10686.1	Rabbit Ears 2

SandRidge Energy

North Park Basin

T6N-R81W-S23

Rabbit Ears 0681 2-23H

Wellbore #1

Plan: Design #1

Standard Survey Report

03 August, 2016

SandRidge Energy

Survey Report

Company: SandRidge Energy	Local Co-ordinate Reference: Well Rabbit Ears 0681 2-23H
Project: North Park Basin	TVD Reference: KB @ 8324.0usft
Site: T6N-R81W-S23	MD Reference: KB @ 8324.0usft
Well: Rabbit Ears 0681 2-23H	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Design #1	Database: EDMProd

Project North Park Basin		
Map System: US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum: North American Datum 1983		
Map Zone: Colorado Northern Zone		

Site T6N-R81W-S23			
Site Position:	Northing: 1,418,032.39 usft	Latitude:	40° 28' 37.133 N
From: Map	Easting: 2,734,606.19 usft	Longitude:	106° 27' 14.423 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence:	-0.62 °

Well Rabbit Ears 0681 2-23H			
Well Position	+N/-S 0.0 usft	Northing: 1,418,045.24 usft	Latitude: 40° 28' 37.261 N
	+E/-W 0.0 usft	Easting: 2,734,613.92 usft	Longitude: 106° 27' 14.325 W
Position Uncertainty	0.0 usft	Wellhead Elevation: 0.0 usft	Ground Level: 8,308.0 usft

Wellbore Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	9.91	66.88	53,125

Design Design #1				
Audit Notes:				
Version:	Phase: PROTOTYPE	Tie On Depth:	0.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	180.00

Survey Tool Program		Date 8/2/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	16,864.9	Design #1 (Wellbore #1)	Sperry MWD	Fixed:v2:standard declination

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
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	

SandRidge Energy

Survey Report

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
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
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 2.00									
2,900.0	2.00	270.00	2,900.0	0.0	-1.7	0.0	2.00	2.00	0.00
3,000.0	4.00	270.00	2,999.8	0.0	-7.0	0.0	2.00	2.00	0.00
3,100.0	6.00	270.00	3,099.5	0.0	-15.7	0.0	2.00	2.00	0.00
3,200.0	8.00	270.00	3,198.7	0.0	-27.9	0.0	2.00	2.00	0.00
3,300.0	10.00	270.00	3,297.5	0.0	-43.5	0.0	2.00	2.00	0.00
3,400.0	12.00	270.00	3,395.6	0.0	-62.6	0.0	2.00	2.00	0.00
3,437.3	12.75	270.00	3,432.1	0.0	-70.6	0.0	2.00	2.00	0.00
Start 1493.0 hold at 3437.3 MD									
3,500.0	12.75	270.00	3,493.2	0.0	-84.4	0.0	0.00	0.00	0.00
3,600.0	12.75	270.00	3,590.7	0.0	-106.5	0.0	0.00	0.00	0.00
3,700.0	12.75	270.00	3,688.3	0.0	-128.6	0.0	0.00	0.00	0.00
3,800.0	12.75	270.00	3,785.8	0.0	-150.6	0.0	0.00	0.00	0.00
3,900.0	12.75	270.00	3,883.4	0.0	-172.7	0.0	0.00	0.00	0.00
4,000.0	12.75	270.00	3,980.9	0.0	-194.7	0.0	0.00	0.00	0.00
4,100.0	12.75	270.00	4,078.4	0.0	-216.8	0.0	0.00	0.00	0.00
4,200.0	12.75	270.00	4,176.0	0.0	-238.9	0.0	0.00	0.00	0.00
4,300.0	12.75	270.00	4,273.5	0.0	-260.9	0.0	0.00	0.00	0.00
4,400.0	12.75	270.00	4,371.0	0.0	-283.0	0.0	0.00	0.00	0.00
4,500.0	12.75	270.00	4,468.6	0.0	-305.1	0.0	0.00	0.00	0.00
4,600.0	12.75	270.00	4,566.1	0.0	-327.1	0.0	0.00	0.00	0.00
4,700.0	12.75	270.00	4,663.6	0.0	-349.2	0.0	0.00	0.00	0.00
4,800.0	12.75	270.00	4,761.2	0.0	-371.2	0.0	0.00	0.00	0.00
4,900.0	12.75	270.00	4,858.7	0.0	-393.3	0.0	0.00	0.00	0.00
4,930.3	12.75	270.00	4,888.3	0.0	-400.0	0.0	0.00	0.00	0.00

SandRidge Energy

Survey Report

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Start DLS 8.00 TFO -30.33									
4,950.0	14.13	266.74	4,907.4	-0.1	-404.6	0.1	8.00	7.02	-16.56
5,000.0	17.78	260.76	4,955.5	-1.7	-418.2	1.7	8.00	7.30	-11.97
5,050.0	21.55	256.78	5,002.6	-5.0	-434.7	5.0	8.00	7.54	-7.95
5,100.0	25.39	253.95	5,048.4	-10.1	-453.9	10.1	8.00	7.68	-5.66
5,150.0	29.27	251.83	5,092.8	-16.9	-475.8	16.9	8.00	7.76	-4.25
5,200.0	33.17	250.16	5,135.6	-25.3	-500.3	25.3	8.00	7.81	-3.33
5,250.0	37.10	248.81	5,176.5	-35.4	-527.3	35.4	8.00	7.85	-2.70
5,300.0	41.03	247.69	5,215.3	-47.1	-556.5	47.1	8.00	7.87	-2.25
5,333.4	43.67	247.03	5,240.0	-55.8	-577.3	55.8	8.00	7.89	-1.97
Niobrara									
5,350.0	44.98	246.73	5,251.8	-60.3	-588.0	60.3	8.00	7.90	-1.83
5,400.0	48.93	245.89	5,286.0	-75.0	-621.4	75.0	8.00	7.91	-1.67
5,450.0	52.89	245.15	5,317.5	-91.1	-656.7	91.1	8.00	7.92	-1.48
5,500.0	56.86	244.49	5,346.2	-108.5	-693.7	108.5	8.00	7.93	-1.33
5,539.6	60.00	244.00	5,367.0	-123.2	-724.1	123.2	8.00	7.93	-1.23
Start 150.0 hold at 5539.6 MD									
5,600.0	60.00	244.00	5,397.2	-146.1	-771.1	146.1	0.00	0.00	0.00
5,689.6	60.00	244.00	5,442.0	-180.1	-840.9	180.1	0.00	0.00	0.00
Start DLS 10.00 TFO -64.25									
5,700.0	60.45	242.93	5,447.1	-184.1	-848.9	184.1	10.00	4.39	-10.35
5,750.0	62.76	237.89	5,470.9	-205.9	-887.2	205.9	10.00	4.62	-10.08
5,800.0	65.25	233.06	5,492.9	-231.3	-924.2	231.3	10.00	4.96	-9.66
5,850.0	67.88	228.42	5,512.8	-260.4	-959.6	260.4	10.00	5.26	-9.27
5,900.0	70.63	223.96	5,530.5	-292.7	-993.4	292.7	10.00	5.51	-8.92
5,950.0	73.49	219.65	5,545.9	-328.2	-1,025.0	328.2	10.00	5.72	-8.62
6,000.0	76.44	215.47	5,558.8	-366.5	-1,054.5	366.5	10.00	5.89	-8.37
6,050.0	79.46	211.39	5,569.3	-407.3	-1,081.4	407.3	10.00	6.03	-8.16
6,100.0	82.52	207.39	5,577.1	-450.3	-1,105.6	450.3	10.00	6.13	-8.00
6,150.0	85.62	203.44	5,582.3	-495.2	-1,126.9	495.2	10.00	6.20	-7.89
6,200.0	88.75	199.53	5,584.7	-541.7	-1,145.2	541.7	10.00	6.24	-7.82
6,220.0	90.00	197.97	5,585.0	-560.6	-1,151.7	560.6	10.00	6.26	-7.80
Start 10644.8 hold at 6220.0 MD									
6,300.0	90.00	197.97	5,585.0	-636.7	-1,176.3	636.7	0.00	0.00	0.00
6,400.0	90.00	197.97	5,585.0	-731.8	-1,207.2	731.8	0.00	0.00	0.00
6,500.0	90.00	197.97	5,585.0	-826.9	-1,238.0	826.9	0.00	0.00	0.00
6,600.0	90.00	197.97	5,585.0	-922.1	-1,268.9	922.1	0.00	0.00	0.00
6,700.0	90.00	197.97	5,585.0	-1,017.2	-1,299.8	1,017.2	0.00	0.00	0.00
6,800.0	90.00	197.97	5,585.0	-1,112.3	-1,330.6	1,112.3	0.00	0.00	0.00
6,900.0	90.00	197.97	5,585.0	-1,207.4	-1,361.5	1,207.4	0.00	0.00	0.00
7,000.0	90.00	197.97	5,585.0	-1,302.5	-1,392.3	1,302.5	0.00	0.00	0.00
7,100.0	90.00	197.97	5,585.0	-1,397.7	-1,423.2	1,397.7	0.00	0.00	0.00
7,200.0	90.00	197.97	5,585.0	-1,492.8	-1,454.0	1,492.8	0.00	0.00	0.00
7,300.0	90.00	197.97	5,585.0	-1,587.9	-1,484.9	1,587.9	0.00	0.00	0.00

SandRidge Energy

Survey Report

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,400.0	90.00	197.97	5,585.0	-1,683.0	-1,515.7	1,683.0	0.00	0.00	0.00
7,500.0	90.00	197.97	5,585.0	-1,778.1	-1,546.6	1,778.1	0.00	0.00	0.00
7,600.0	90.00	197.97	5,585.0	-1,873.3	-1,577.4	1,873.3	0.00	0.00	0.00
7,700.0	90.00	197.97	5,585.0	-1,968.4	-1,608.3	1,968.4	0.00	0.00	0.00
7,800.0	90.00	197.97	5,585.0	-2,063.5	-1,639.2	2,063.5	0.00	0.00	0.00
7,900.0	90.00	197.97	5,585.0	-2,158.6	-1,670.0	2,158.6	0.00	0.00	0.00
8,000.0	90.00	197.97	5,585.0	-2,253.7	-1,700.9	2,253.7	0.00	0.00	0.00
8,100.0	90.00	197.97	5,585.0	-2,348.9	-1,731.7	2,348.9	0.00	0.00	0.00
8,200.0	90.00	197.97	5,585.0	-2,444.0	-1,762.6	2,444.0	0.00	0.00	0.00
8,300.0	90.00	197.97	5,585.0	-2,539.1	-1,793.4	2,539.1	0.00	0.00	0.00
8,400.0	90.00	197.97	5,585.0	-2,634.2	-1,824.3	2,634.2	0.00	0.00	0.00
8,500.0	90.00	197.97	5,585.0	-2,729.4	-1,855.1	2,729.4	0.00	0.00	0.00
8,600.0	90.00	197.97	5,585.0	-2,824.5	-1,886.0	2,824.5	0.00	0.00	0.00
8,700.0	90.00	197.97	5,585.0	-2,919.6	-1,916.8	2,919.6	0.00	0.00	0.00
8,800.0	90.00	197.97	5,585.0	-3,014.7	-1,947.7	3,014.7	0.00	0.00	0.00
8,900.0	90.00	197.97	5,585.0	-3,109.8	-1,978.6	3,109.8	0.00	0.00	0.00
9,000.0	90.00	197.97	5,585.0	-3,205.0	-2,009.4	3,205.0	0.00	0.00	0.00
9,100.0	90.00	197.97	5,585.0	-3,300.1	-2,040.3	3,300.1	0.00	0.00	0.00
9,200.0	90.00	197.97	5,585.0	-3,395.2	-2,071.1	3,395.2	0.00	0.00	0.00
9,300.0	90.00	197.97	5,585.0	-3,490.3	-2,102.0	3,490.3	0.00	0.00	0.00
9,400.0	90.00	197.97	5,585.0	-3,585.4	-2,132.8	3,585.4	0.00	0.00	0.00
9,500.0	90.00	197.97	5,585.0	-3,680.6	-2,163.7	3,680.6	0.00	0.00	0.00
9,600.0	90.00	197.97	5,585.0	-3,775.7	-2,194.5	3,775.7	0.00	0.00	0.00
9,700.0	90.00	197.97	5,585.0	-3,870.8	-2,225.4	3,870.8	0.00	0.00	0.00
9,800.0	90.00	197.97	5,585.0	-3,965.9	-2,256.2	3,965.9	0.00	0.00	0.00
9,900.0	90.00	197.97	5,585.0	-4,061.0	-2,287.1	4,061.0	0.00	0.00	0.00
10,000.0	90.00	197.97	5,585.0	-4,156.2	-2,318.0	4,156.2	0.00	0.00	0.00
10,100.0	90.00	197.97	5,585.0	-4,251.3	-2,348.8	4,251.3	0.00	0.00	0.00
10,200.0	90.00	197.97	5,585.0	-4,346.4	-2,379.7	4,346.4	0.00	0.00	0.00
10,300.0	90.00	197.97	5,585.0	-4,441.5	-2,410.5	4,441.5	0.00	0.00	0.00
10,400.0	90.00	197.97	5,585.0	-4,536.7	-2,441.4	4,536.7	0.00	0.00	0.00
10,500.0	90.00	197.97	5,585.0	-4,631.8	-2,472.2	4,631.8	0.00	0.00	0.00
10,600.0	90.00	197.97	5,585.0	-4,726.9	-2,503.1	4,726.9	0.00	0.00	0.00
10,700.0	90.00	197.97	5,585.0	-4,822.0	-2,533.9	4,822.0	0.00	0.00	0.00
10,800.0	90.00	197.97	5,585.0	-4,917.1	-2,564.8	4,917.1	0.00	0.00	0.00
10,900.0	90.00	197.97	5,585.0	-5,012.3	-2,595.6	5,012.3	0.00	0.00	0.00
11,000.0	90.00	197.97	5,585.0	-5,107.4	-2,626.5	5,107.4	0.00	0.00	0.00
11,100.0	90.00	197.97	5,585.0	-5,202.5	-2,657.4	5,202.5	0.00	0.00	0.00
11,200.0	90.00	197.97	5,585.0	-5,297.6	-2,688.2	5,297.6	0.00	0.00	0.00
11,300.0	90.00	197.97	5,585.0	-5,392.7	-2,719.1	5,392.7	0.00	0.00	0.00
11,400.0	90.00	197.97	5,585.0	-5,487.9	-2,749.9	5,487.9	0.00	0.00	0.00
11,500.0	90.00	197.97	5,585.0	-5,583.0	-2,780.8	5,583.0	0.00	0.00	0.00
11,600.0	90.00	197.97	5,585.0	-5,678.1	-2,811.6	5,678.1	0.00	0.00	0.00
11,700.0	90.00	197.97	5,585.0	-5,773.2	-2,842.5	5,773.2	0.00	0.00	0.00

SandRidge Energy

Survey Report

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,800.0	90.00	197.97	5,585.0	-5,868.3	-2,873.3	5,868.3	0.00	0.00	0.00
11,900.0	90.00	197.97	5,585.0	-5,963.5	-2,904.2	5,963.5	0.00	0.00	0.00
12,000.0	90.00	197.97	5,585.0	-6,058.6	-2,935.0	6,058.6	0.00	0.00	0.00
12,100.0	90.00	197.97	5,585.0	-6,153.7	-2,965.9	6,153.7	0.00	0.00	0.00
12,200.0	90.00	197.97	5,585.0	-6,248.8	-2,996.8	6,248.8	0.00	0.00	0.00
12,300.0	90.00	197.97	5,585.0	-6,343.9	-3,027.6	6,343.9	0.00	0.00	0.00
12,400.0	90.00	197.97	5,585.0	-6,439.1	-3,058.5	6,439.1	0.00	0.00	0.00
12,500.0	90.00	197.97	5,585.0	-6,534.2	-3,089.3	6,534.2	0.00	0.00	0.00
12,600.0	90.00	197.97	5,585.0	-6,629.3	-3,120.2	6,629.3	0.00	0.00	0.00
12,700.0	90.00	197.97	5,585.0	-6,724.4	-3,151.0	6,724.4	0.00	0.00	0.00
12,800.0	90.00	197.97	5,585.0	-6,819.6	-3,181.9	6,819.6	0.00	0.00	0.00
12,900.0	90.00	197.97	5,585.0	-6,914.7	-3,212.7	6,914.7	0.00	0.00	0.00
13,000.0	90.00	197.97	5,585.0	-7,009.8	-3,243.6	7,009.8	0.00	0.00	0.00
13,100.0	90.00	197.97	5,585.0	-7,104.9	-3,274.4	7,104.9	0.00	0.00	0.00
13,200.0	90.00	197.97	5,585.0	-7,200.0	-3,305.3	7,200.0	0.00	0.00	0.00
13,300.0	90.00	197.97	5,585.0	-7,295.2	-3,336.2	7,295.2	0.00	0.00	0.00
13,400.0	90.00	197.97	5,585.0	-7,390.3	-3,367.0	7,390.3	0.00	0.00	0.00
13,500.0	90.00	197.97	5,585.0	-7,485.4	-3,397.9	7,485.4	0.00	0.00	0.00
13,600.0	90.00	197.97	5,585.0	-7,580.5	-3,428.7	7,580.5	0.00	0.00	0.00
13,700.0	90.00	197.97	5,585.0	-7,675.6	-3,459.6	7,675.6	0.00	0.00	0.00
13,800.0	90.00	197.97	5,585.0	-7,770.8	-3,490.4	7,770.8	0.00	0.00	0.00
13,900.0	90.00	197.97	5,585.0	-7,865.9	-3,521.3	7,865.9	0.00	0.00	0.00
14,000.0	90.00	197.97	5,585.0	-7,961.0	-3,552.1	7,961.0	0.00	0.00	0.00
14,100.0	90.00	197.97	5,585.0	-8,056.1	-3,583.0	8,056.1	0.00	0.00	0.00
14,200.0	90.00	197.97	5,585.0	-8,151.2	-3,613.8	8,151.2	0.00	0.00	0.00
14,300.0	90.00	197.97	5,585.0	-8,246.4	-3,644.7	8,246.4	0.00	0.00	0.00
14,400.0	90.00	197.97	5,585.0	-8,341.5	-3,675.6	8,341.5	0.00	0.00	0.00
14,500.0	90.00	197.97	5,585.0	-8,436.6	-3,706.4	8,436.6	0.00	0.00	0.00
14,600.0	90.00	197.97	5,585.0	-8,531.7	-3,737.3	8,531.7	0.00	0.00	0.00
14,700.0	90.00	197.97	5,585.0	-8,626.9	-3,768.1	8,626.9	0.00	0.00	0.00
14,800.0	90.00	197.97	5,585.0	-8,722.0	-3,799.0	8,722.0	0.00	0.00	0.00
14,900.0	90.00	197.97	5,585.0	-8,817.1	-3,829.8	8,817.1	0.00	0.00	0.00
15,000.0	90.00	197.97	5,585.0	-8,912.2	-3,860.7	8,912.2	0.00	0.00	0.00
15,100.0	90.00	197.97	5,585.0	-9,007.3	-3,891.5	9,007.3	0.00	0.00	0.00
15,200.0	90.00	197.97	5,585.0	-9,102.5	-3,922.4	9,102.5	0.00	0.00	0.00
15,300.0	90.00	197.97	5,585.0	-9,197.6	-3,953.2	9,197.6	0.00	0.00	0.00
15,400.0	90.00	197.97	5,585.0	-9,292.7	-3,984.1	9,292.7	0.00	0.00	0.00
15,500.0	90.00	197.97	5,585.0	-9,387.8	-4,015.0	9,387.8	0.00	0.00	0.00
15,600.0	90.00	197.97	5,585.0	-9,482.9	-4,045.8	9,482.9	0.00	0.00	0.00
15,700.0	90.00	197.97	5,585.0	-9,578.1	-4,076.7	9,578.1	0.00	0.00	0.00
15,800.0	90.00	197.97	5,585.0	-9,673.2	-4,107.5	9,673.2	0.00	0.00	0.00
15,900.0	90.00	197.97	5,585.0	-9,768.3	-4,138.4	9,768.3	0.00	0.00	0.00
16,000.0	90.00	197.97	5,585.0	-9,863.4	-4,169.2	9,863.4	0.00	0.00	0.00

SandRidge Energy

Survey Report

Company: SandRidge Energy	Local Co-ordinate Reference: Well Rabbit Ears 0681 2-23H
Project: North Park Basin	TVD Reference: KB @ 8324.0usft
Site: T6N-R81W-S23	MD Reference: KB @ 8324.0usft
Well: Rabbit Ears 0681 2-23H	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Design #1	Database: EDMProd

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
16,100.0	90.00	197.97	5,585.0	-9,958.5	-4,200.1	9,958.5	0.00	0.00	0.00	
16,200.0	90.00	197.97	5,585.0	-10,053.7	-4,230.9	10,053.7	0.00	0.00	0.00	
16,300.0	90.00	197.97	5,585.0	-10,148.8	-4,261.8	10,148.8	0.00	0.00	0.00	
16,400.0	90.00	197.97	5,585.0	-10,243.9	-4,292.6	10,243.9	0.00	0.00	0.00	
16,500.0	90.00	197.97	5,585.0	-10,339.0	-4,323.5	10,339.0	0.00	0.00	0.00	
16,600.0	90.00	197.97	5,585.0	-10,434.1	-4,354.4	10,434.1	0.00	0.00	0.00	
16,700.0	90.00	197.97	5,585.0	-10,529.3	-4,385.2	10,529.3	0.00	0.00	0.00	
16,800.0	90.00	197.97	5,585.0	-10,624.4	-4,416.1	10,624.4	0.00	0.00	0.00	
16,864.9	90.00	197.97	5,585.0	-10,686.1	-4,436.1	10,686.1	0.00	0.00	0.00	
TD at 16864.9										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Rabbit Ears 2 - hit/miss target - Shape - plan hits target center - Point	0.00	360.00	5,585.0	-10,686.1	-4,436.1	1,407,359.14	2,730,177.84	40° 26' 51.193 N	106° 28' 10.215 W	
Rabbit Ears 2 LP - plan misses target center by 5.2usft at 6364.9usft MD (5585.0 TVD, -698.4 N, -1196.3 E) - Point	0.00	360.00	5,585.0	-700.0	-1,191.4	1,417,345.24	2,733,422.52	40° 28' 30.217 N	106° 27' 29.643 W	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
5,333.4	5,240.0	Niobrara		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
2800	2800	0	0	Start Build 2.00	
3437	3432	0	-71	Start 1493.0 hold at 3437.3 MD	
4930	4888	0	-400	Start DLS 8.00 TFO -30.33	
5540	5367	-123	-724	Start 150.0 hold at 5539.6 MD	
5690	5442	-180	-841	Start DLS 10.00 TFO -64.25	
6220	5585	-561	-1152	Start 10644.8 hold at 6220.0 MD	
16,865	5585	-10,686	-4436	TD at 16864.9	

Checked By: _____ Approved By: _____ Date: _____

SandRidge Energy

North Park Basin

T6N-R81W-S23

Rabbit Ears 0681 2-23H

Wellbore #1

Plan: Design #1

Survey Report - Geographic

03 August, 2016

SandRidge Energy
Survey Report - Geographic

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Project	North Park Basin		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	T6N-R81W-S23				
Site Position:		Northing:	1,418,032.39 usft	Latitude:	40° 28' 37.133 N
From:	Map	Easting:	2,734,606.19 usft	Longitude:	106° 27' 14.423 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.62 °

Well	Rabbit Ears 0681 2-23H					
Well Position	+N/-S	0.0 usft	Northing:	1,418,045.24 usft	Latitude:	40° 28' 37.261 N
	+E/-W	0.0 usft	Easting:	2,734,613.92 usft	Longitude:	106° 27' 14.325 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	8,308.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	9.91	66.88	53,125

Design	Design #1				
Audit Notes:					
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	180.00	

Survey Tool Program	Date	8/2/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	16,864.9	Design #1 (Wellbore #1)	Sperry MWD	Fixed:v2:standard declination	

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.0	0.00	0.00	0.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
100.0	0.00	0.00	100.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
200.0	0.00	0.00	200.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
300.0	0.00	0.00	300.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
400.0	0.00	0.00	400.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
500.0	0.00	0.00	500.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
600.0	0.00	0.00	600.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
700.0	0.00	0.00	700.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
800.0	0.00	0.00	800.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
900.0	0.00	0.00	900.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	

SandRidge Energy
Survey Report - Geographic

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,400.0	0.00	0.00	2,400.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,600.0	0.00	0.00	2,600.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	1,418,045.24	2,734,613.92	40° 28' 37.261 N	106° 27' 14.325 W	
Start Build 2.00										
2,900.0	2.00	270.00	2,900.0	0.0	-1.7	1,418,045.24	2,734,612.18	40° 28' 37.261 N	106° 27' 14.347 W	
3,000.0	4.00	270.00	2,999.8	0.0	-7.0	1,418,045.24	2,734,606.94	40° 28' 37.260 N	106° 27' 14.415 W	
3,100.0	6.00	270.00	3,099.5	0.0	-15.7	1,418,045.24	2,734,598.23	40° 28' 37.260 N	106° 27' 14.528 W	
3,200.0	8.00	270.00	3,198.7	0.0	-27.9	1,418,045.24	2,734,586.04	40° 28' 37.258 N	106° 27' 14.685 W	
3,300.0	10.00	270.00	3,297.5	0.0	-43.5	1,418,045.24	2,734,570.40	40° 28' 37.257 N	106° 27' 14.888 W	
3,400.0	12.00	270.00	3,395.6	0.0	-62.6	1,418,045.24	2,734,551.32	40° 28' 37.255 N	106° 27' 15.135 W	
3,437.3	12.75	270.00	3,432.1	0.0	-70.6	1,418,045.24	2,734,543.33	40° 28' 37.254 N	106° 27' 15.238 W	
Start 1493.0 hold at 3437.3 MD										
3,500.0	12.75	270.00	3,493.2	0.0	-84.4	1,418,045.24	2,734,529.49	40° 28' 37.252 N	106° 27' 15.417 W	
3,600.0	12.75	270.00	3,590.7	0.0	-106.5	1,418,045.24	2,734,507.43	40° 28' 37.250 N	106° 27' 15.703 W	
3,700.0	12.75	270.00	3,688.3	0.0	-128.6	1,418,045.24	2,734,485.37	40° 28' 37.248 N	106° 27' 15.988 W	
3,800.0	12.75	270.00	3,785.8	0.0	-150.6	1,418,045.24	2,734,463.30	40° 28' 37.245 N	106° 27' 16.274 W	
3,900.0	12.75	270.00	3,883.4	0.0	-172.7	1,418,045.24	2,734,441.24	40° 28' 37.243 N	106° 27' 16.559 W	
4,000.0	12.75	270.00	3,980.9	0.0	-194.7	1,418,045.24	2,734,419.18	40° 28' 37.240 N	106° 27' 16.845 W	
4,100.0	12.75	270.00	4,078.4	0.0	-216.8	1,418,045.24	2,734,397.12	40° 28' 37.238 N	106° 27' 17.130 W	
4,200.0	12.75	270.00	4,176.0	0.0	-238.9	1,418,045.24	2,734,375.05	40° 28' 37.236 N	106° 27' 17.416 W	
4,300.0	12.75	270.00	4,273.5	0.0	-260.9	1,418,045.24	2,734,352.99	40° 28' 37.233 N	106° 27' 17.701 W	
4,400.0	12.75	270.00	4,371.0	0.0	-283.0	1,418,045.24	2,734,330.93	40° 28' 37.231 N	106° 27' 17.986 W	
4,500.0	12.75	270.00	4,468.6	0.0	-305.1	1,418,045.24	2,734,308.86	40° 28' 37.229 N	106° 27' 18.272 W	
4,600.0	12.75	270.00	4,566.1	0.0	-327.1	1,418,045.24	2,734,286.80	40° 28' 37.226 N	106° 27' 18.557 W	
4,700.0	12.75	270.00	4,663.6	0.0	-349.2	1,418,045.24	2,734,264.74	40° 28' 37.224 N	106° 27' 18.843 W	
4,800.0	12.75	270.00	4,761.2	0.0	-371.2	1,418,045.24	2,734,242.68	40° 28' 37.222 N	106° 27' 19.128 W	
4,900.0	12.75	270.00	4,858.7	0.0	-393.3	1,418,045.24	2,734,220.61	40° 28' 37.219 N	106° 27' 19.414 W	
4,930.3	12.75	270.00	4,888.3	0.0	-400.0	1,418,045.24	2,734,213.92	40° 28' 37.219 N	106° 27' 19.501 W	
Start DLS 8.00 TFO -30.33										
4,950.0	14.13	266.74	4,907.4	-0.1	-404.6	1,418,045.11	2,734,209.36	40° 28' 37.217 N	106° 27' 19.560 W	
5,000.0	17.78	260.76	4,955.5	-1.7	-418.2	1,418,043.53	2,734,195.73	40° 28' 37.200 N	106° 27' 19.736 W	
5,050.0	21.55	256.78	5,002.6	-5.0	-434.7	1,418,040.21	2,734,179.25	40° 28' 37.165 N	106° 27' 19.949 W	
5,100.0	25.39	253.95	5,048.4	-10.1	-453.9	1,418,035.14	2,734,160.00	40° 28' 37.113 N	106° 27' 20.197 W	
5,150.0	29.27	251.83	5,092.8	-16.9	-475.8	1,418,028.36	2,734,138.08	40° 28' 37.044 N	106° 27' 20.480 W	
5,200.0	33.17	250.16	5,135.6	-25.3	-500.3	1,418,019.91	2,734,113.58	40° 28' 36.958 N	106° 27' 20.795 W	
5,250.0	37.10	248.81	5,176.5	-35.4	-527.3	1,418,009.81	2,734,086.65	40° 28' 36.855 N	106° 27' 21.143 W	
5,300.0	41.03	247.69	5,215.3	-47.1	-556.5	1,417,998.13	2,734,057.39	40° 28' 36.736 N	106° 27' 21.519 W	
5,333.4	43.67	247.03	5,240.0	-55.8	-577.3	1,417,989.45	2,734,036.60	40° 28' 36.648 N	106° 27' 21.787 W	
Niobrara										
5,350.0	44.98	246.73	5,251.8	-60.3	-588.0	1,417,984.91	2,734,025.96	40° 28' 36.602 N	106° 27' 21.924 W	

SandRidge Energy

Survey Report - Geographic

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,400.0	48.93	245.89	5,286.0	-75.0	-621.4	1,417,970.22	2,733,992.50	40° 28' 36.454 N	106° 27' 22.355 W
5,450.0	52.89	245.15	5,317.5	-91.1	-656.7	1,417,954.14	2,733,957.19	40° 28' 36.291 N	106° 27' 22.810 W
5,500.0	56.86	244.49	5,346.2	-108.5	-693.7	1,417,936.74	2,733,920.19	40° 28' 36.115 N	106° 27' 23.286 W
5,539.6	60.00	244.00	5,367.0	-123.2	-724.1	1,417,922.06	2,733,889.78	40° 28' 35.967 N	106° 27' 23.678 W
Start 150.0 hold at 5539.6 MD									
5,600.0	60.00	244.00	5,397.2	-146.1	-771.1	1,417,899.15	2,733,842.80	40° 28' 35.735 N	106° 27' 24.282 W
5,689.6	60.00	244.00	5,442.0	-180.1	-840.9	1,417,865.11	2,733,773.02	40° 28' 35.392 N	106° 27' 25.181 W
Start DLS 10.00 TFO -64.25									
5,700.0	60.45	242.93	5,447.1	-184.1	-848.9	1,417,861.10	2,733,764.98	40° 28' 35.351 N	106° 27' 25.284 W
5,750.0	62.76	237.89	5,470.9	-205.9	-887.2	1,417,839.37	2,733,726.76	40° 28' 35.132 N	106° 27' 25.776 W
5,800.0	65.25	233.06	5,492.9	-231.3	-924.2	1,417,813.89	2,733,689.77	40° 28' 34.877 N	106° 27' 26.251 W
5,850.0	67.88	228.42	5,512.8	-260.4	-959.6	1,417,784.86	2,733,654.28	40° 28' 34.586 N	106° 27' 26.706 W
5,900.0	70.63	223.96	5,530.5	-292.7	-993.4	1,417,752.49	2,733,620.56	40° 28' 34.263 N	106° 27' 27.138 W
5,950.0	73.49	219.65	5,545.9	-328.2	-1,025.0	1,417,717.04	2,733,588.87	40° 28' 33.909 N	106° 27' 27.543 W
6,000.0	76.44	215.47	5,558.8	-366.5	-1,054.5	1,417,678.76	2,733,559.46	40° 28' 33.528 N	106° 27' 27.918 W
6,050.0	79.46	211.39	5,569.3	-407.3	-1,081.4	1,417,637.96	2,733,532.54	40° 28' 33.122 N	106° 27' 28.261 W
6,100.0	82.52	207.39	5,577.1	-450.3	-1,105.6	1,417,594.94	2,733,508.32	40° 28' 32.694 N	106° 27' 28.568 W
6,150.0	85.62	203.44	5,582.3	-495.2	-1,126.9	1,417,550.04	2,733,486.99	40° 28' 32.248 N	106° 27' 28.838 W
6,200.0	88.75	199.53	5,584.7	-541.7	-1,145.2	1,417,503.58	2,733,468.70	40° 28' 31.787 N	106° 27' 29.068 W
6,220.0	90.00	197.97	5,585.0	-560.6	-1,151.7	1,417,484.62	2,733,462.26	40° 28' 31.599 N	106° 27' 29.148 W
Start 10644.8 hold at 6220.0 MD									
6,300.0	90.00	197.97	5,585.0	-636.7	-1,176.3	1,417,408.55	2,733,437.59	40° 28' 30.845 N	106° 27' 29.457 W
6,400.0	90.00	197.97	5,585.0	-731.8	-1,207.2	1,417,313.43	2,733,406.73	40° 28' 29.901 N	106° 27' 29.843 W
6,500.0	90.00	197.97	5,585.0	-826.9	-1,238.0	1,417,218.31	2,733,375.88	40° 28' 28.958 N	106° 27' 30.229 W
6,600.0	90.00	197.97	5,585.0	-922.1	-1,268.9	1,417,123.19	2,733,345.02	40° 28' 28.015 N	106° 27' 30.615 W
6,700.0	90.00	197.97	5,585.0	-1,017.2	-1,299.8	1,417,028.07	2,733,314.17	40° 28' 27.072 N	106° 27' 31.001 W
6,800.0	90.00	197.97	5,585.0	-1,112.3	-1,330.6	1,416,932.94	2,733,283.32	40° 28' 26.128 N	106° 27' 31.387 W
6,900.0	90.00	197.97	5,585.0	-1,207.4	-1,361.5	1,416,837.82	2,733,252.46	40° 28' 25.185 N	106° 27' 31.773 W
7,000.0	90.00	197.97	5,585.0	-1,302.5	-1,392.3	1,416,742.70	2,733,221.61	40° 28' 24.242 N	106° 27' 32.159 W
7,100.0	90.00	197.97	5,585.0	-1,397.7	-1,423.2	1,416,647.58	2,733,190.75	40° 28' 23.299 N	106° 27' 32.545 W
7,200.0	90.00	197.97	5,585.0	-1,492.8	-1,454.0	1,416,552.46	2,733,159.90	40° 28' 22.356 N	106° 27' 32.931 W
7,300.0	90.00	197.97	5,585.0	-1,587.9	-1,484.9	1,416,457.34	2,733,129.04	40° 28' 21.412 N	106° 27' 33.316 W
7,400.0	90.00	197.97	5,585.0	-1,683.0	-1,515.7	1,416,362.22	2,733,098.19	40° 28' 20.469 N	106° 27' 33.702 W
7,500.0	90.00	197.97	5,585.0	-1,778.1	-1,546.6	1,416,267.10	2,733,067.33	40° 28' 19.526 N	106° 27' 34.088 W
7,600.0	90.00	197.97	5,585.0	-1,873.3	-1,577.4	1,416,171.98	2,733,036.48	40° 28' 18.583 N	106° 27' 34.474 W
7,700.0	90.00	197.97	5,585.0	-1,968.4	-1,608.3	1,416,076.86	2,733,005.62	40° 28' 17.639 N	106° 27' 34.860 W
7,800.0	90.00	197.97	5,585.0	-2,063.5	-1,639.2	1,415,981.74	2,732,974.77	40° 28' 16.696 N	106° 27' 35.246 W
7,900.0	90.00	197.97	5,585.0	-2,158.6	-1,670.0	1,415,886.61	2,732,943.92	40° 28' 15.753 N	106° 27' 35.632 W
8,000.0	90.00	197.97	5,585.0	-2,253.7	-1,700.9	1,415,791.49	2,732,913.06	40° 28' 14.810 N	106° 27' 36.018 W
8,100.0	90.00	197.97	5,585.0	-2,348.9	-1,731.7	1,415,696.37	2,732,882.21	40° 28' 13.867 N	106° 27' 36.404 W
8,200.0	90.00	197.97	5,585.0	-2,444.0	-1,762.6	1,415,601.25	2,732,851.35	40° 28' 12.923 N	106° 27' 36.790 W
8,300.0	90.00	197.97	5,585.0	-2,539.1	-1,793.4	1,415,506.13	2,732,820.50	40° 28' 11.980 N	106° 27' 37.175 W
8,400.0	90.00	197.97	5,585.0	-2,634.2	-1,824.3	1,415,411.01	2,732,789.64	40° 28' 11.037 N	106° 27' 37.561 W
8,500.0	90.00	197.97	5,585.0	-2,729.4	-1,855.1	1,415,315.89	2,732,758.79	40° 28' 10.094 N	106° 27' 37.947 W
8,600.0	90.00	197.97	5,585.0	-2,824.5	-1,886.0	1,415,220.77	2,732,727.93	40° 28' 9.150 N	106° 27' 38.333 W
8,700.0	90.00	197.97	5,585.0	-2,919.6	-1,916.8	1,415,125.65	2,732,697.08	40° 28' 8.207 N	106° 27' 38.719 W
8,800.0	90.00	197.97	5,585.0	-3,014.7	-1,947.7	1,415,030.53	2,732,666.22	40° 28' 7.264 N	106° 27' 39.105 W
8,900.0	90.00	197.97	5,585.0	-3,109.8	-1,978.6	1,414,935.40	2,732,635.37	40° 28' 6.321 N	106° 27' 39.491 W
9,000.0	90.00	197.97	5,585.0	-3,205.0	-2,009.4	1,414,840.28	2,732,604.51	40° 28' 5.378 N	106° 27' 39.877 W
9,100.0	90.00	197.97	5,585.0	-3,300.1	-2,040.3	1,414,745.16	2,732,573.66	40° 28' 4.434 N	106° 27' 40.262 W
9,200.0	90.00	197.97	5,585.0	-3,395.2	-2,071.1	1,414,650.04	2,732,542.81	40° 28' 3.491 N	106° 27' 40.648 W
9,300.0	90.00	197.97	5,585.0	-3,490.3	-2,102.0	1,414,554.92	2,732,511.95	40° 28' 2.548 N	106° 27' 41.034 W
9,400.0	90.00	197.97	5,585.0	-3,585.4	-2,132.8	1,414,459.80	2,732,481.10	40° 28' 1.605 N	106° 27' 41.420 W
9,500.0	90.00	197.97	5,585.0	-3,680.6	-2,163.7	1,414,364.68	2,732,450.24	40° 28' 0.661 N	106° 27' 41.806 W
9,600.0	90.00	197.97	5,585.0	-3,775.7	-2,194.5	1,414,269.56	2,732,419.39	40° 27' 59.718 N	106° 27' 42.192 W

SandRidge Energy
Survey Report - Geographic

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,700.0	90.00	197.97	5,585.0	-3,870.8	-2,225.4	1,414,174.44	2,732,388.53	40° 27' 58.775 N	106° 27' 42.577 W
9,800.0	90.00	197.97	5,585.0	-3,965.9	-2,256.2	1,414,079.32	2,732,357.68	40° 27' 57.832 N	106° 27' 42.963 W
9,900.0	90.00	197.97	5,585.0	-4,061.0	-2,287.1	1,413,984.20	2,732,326.82	40° 27' 56.889 N	106° 27' 43.349 W
10,000.0	90.00	197.97	5,585.0	-4,156.2	-2,318.0	1,413,889.07	2,732,295.97	40° 27' 55.945 N	106° 27' 43.735 W
10,100.0	90.00	197.97	5,585.0	-4,251.3	-2,348.8	1,413,793.95	2,732,265.11	40° 27' 55.002 N	106° 27' 44.121 W
10,200.0	90.00	197.97	5,585.0	-4,346.4	-2,379.7	1,413,698.83	2,732,234.26	40° 27' 54.059 N	106° 27' 44.507 W
10,300.0	90.00	197.97	5,585.0	-4,441.5	-2,410.5	1,413,603.71	2,732,203.41	40° 27' 53.116 N	106° 27' 44.892 W
10,400.0	90.00	197.97	5,585.0	-4,536.7	-2,441.4	1,413,508.59	2,732,172.55	40° 27' 52.172 N	106° 27' 45.278 W
10,500.0	90.00	197.97	5,585.0	-4,631.8	-2,472.2	1,413,413.47	2,732,141.70	40° 27' 51.229 N	106° 27' 45.664 W
10,600.0	90.00	197.97	5,585.0	-4,726.9	-2,503.1	1,413,318.35	2,732,110.84	40° 27' 50.286 N	106° 27' 46.050 W
10,700.0	90.00	197.97	5,585.0	-4,822.0	-2,533.9	1,413,223.23	2,732,079.99	40° 27' 49.343 N	106° 27' 46.436 W
10,800.0	90.00	197.97	5,585.0	-4,917.1	-2,564.8	1,413,128.11	2,732,049.13	40° 27' 48.399 N	106° 27' 46.822 W
10,900.0	90.00	197.97	5,585.0	-5,012.3	-2,595.6	1,413,032.99	2,732,018.28	40° 27' 47.456 N	106° 27' 47.207 W
11,000.0	90.00	197.97	5,585.0	-5,107.4	-2,626.5	1,412,937.86	2,731,987.42	40° 27' 46.513 N	106° 27' 47.593 W
11,100.0	90.00	197.97	5,585.0	-5,202.5	-2,657.4	1,412,842.74	2,731,956.57	40° 27' 45.570 N	106° 27' 47.979 W
11,200.0	90.00	197.97	5,585.0	-5,297.6	-2,688.2	1,412,747.62	2,731,925.71	40° 27' 44.627 N	106° 27' 48.365 W
11,300.0	90.00	197.97	5,585.0	-5,392.7	-2,719.1	1,412,652.50	2,731,894.86	40° 27' 43.683 N	106° 27' 48.751 W
11,400.0	90.00	197.97	5,585.0	-5,487.9	-2,749.9	1,412,557.38	2,731,864.00	40° 27' 42.740 N	106° 27' 49.136 W
11,500.0	90.00	197.97	5,585.0	-5,583.0	-2,780.8	1,412,462.26	2,731,833.15	40° 27' 41.797 N	106° 27' 49.522 W
11,600.0	90.00	197.97	5,585.0	-5,678.1	-2,811.6	1,412,367.14	2,731,802.30	40° 27' 40.854 N	106° 27' 49.908 W
11,700.0	90.00	197.97	5,585.0	-5,773.2	-2,842.5	1,412,272.02	2,731,771.44	40° 27' 39.910 N	106° 27' 50.294 W
11,800.0	90.00	197.97	5,585.0	-5,868.3	-2,873.3	1,412,176.90	2,731,740.59	40° 27' 38.967 N	106° 27' 50.679 W
11,900.0	90.00	197.97	5,585.0	-5,963.5	-2,904.2	1,412,081.78	2,731,709.73	40° 27' 38.024 N	106° 27' 51.065 W
12,000.0	90.00	197.97	5,585.0	-6,058.6	-2,935.0	1,411,986.66	2,731,678.88	40° 27' 37.081 N	106° 27' 51.451 W
12,100.0	90.00	197.97	5,585.0	-6,153.7	-2,965.9	1,411,891.53	2,731,648.02	40° 27' 36.137 N	106° 27' 51.837 W
12,200.0	90.00	197.97	5,585.0	-6,248.8	-2,996.8	1,411,796.41	2,731,617.17	40° 27' 35.194 N	106° 27' 52.223 W
12,300.0	90.00	197.97	5,585.0	-6,343.9	-3,027.6	1,411,701.29	2,731,586.31	40° 27' 34.251 N	106° 27' 52.608 W
12,400.0	90.00	197.97	5,585.0	-6,439.1	-3,058.5	1,411,606.17	2,731,555.46	40° 27' 33.308 N	106° 27' 52.994 W
12,500.0	90.00	197.97	5,585.0	-6,534.2	-3,089.3	1,411,511.05	2,731,524.60	40° 27' 32.364 N	106° 27' 53.380 W
12,600.0	90.00	197.97	5,585.0	-6,629.3	-3,120.2	1,411,415.93	2,731,493.75	40° 27' 31.421 N	106° 27' 53.766 W
12,700.0	90.00	197.97	5,585.0	-6,724.4	-3,151.0	1,411,320.81	2,731,462.90	40° 27' 30.478 N	106° 27' 54.151 W
12,800.0	90.00	197.97	5,585.0	-6,819.6	-3,181.9	1,411,225.69	2,731,432.04	40° 27' 29.535 N	106° 27' 54.537 W
12,900.0	90.00	197.97	5,585.0	-6,914.7	-3,212.7	1,411,130.57	2,731,401.19	40° 27' 28.592 N	106° 27' 54.923 W
13,000.0	90.00	197.97	5,585.0	-7,009.8	-3,243.6	1,411,035.45	2,731,370.33	40° 27' 27.648 N	106° 27' 55.309 W
13,100.0	90.00	197.97	5,585.0	-7,104.9	-3,274.4	1,410,940.33	2,731,339.48	40° 27' 26.705 N	106° 27' 55.694 W
13,200.0	90.00	197.97	5,585.0	-7,200.0	-3,305.3	1,410,845.20	2,731,308.62	40° 27' 25.762 N	106° 27' 56.080 W
13,300.0	90.00	197.97	5,585.0	-7,295.2	-3,336.2	1,410,750.08	2,731,277.77	40° 27' 24.819 N	106° 27' 56.466 W
13,400.0	90.00	197.97	5,585.0	-7,390.3	-3,367.0	1,410,654.96	2,731,246.91	40° 27' 23.875 N	106° 27' 56.852 W
13,500.0	90.00	197.97	5,585.0	-7,485.4	-3,397.9	1,410,559.84	2,731,216.06	40° 27' 22.932 N	106° 27' 57.237 W
13,600.0	90.00	197.97	5,585.0	-7,580.5	-3,428.7	1,410,464.72	2,731,185.20	40° 27' 21.989 N	106° 27' 57.623 W
13,700.0	90.00	197.97	5,585.0	-7,675.6	-3,459.6	1,410,369.60	2,731,154.35	40° 27' 21.046 N	106° 27' 58.009 W
13,800.0	90.00	197.97	5,585.0	-7,770.8	-3,490.4	1,410,274.48	2,731,123.49	40° 27' 20.102 N	106° 27' 58.394 W
13,900.0	90.00	197.97	5,585.0	-7,865.9	-3,521.3	1,410,179.36	2,731,092.64	40° 27' 19.159 N	106° 27' 58.780 W
14,000.0	90.00	197.97	5,585.0	-7,961.0	-3,552.1	1,410,084.24	2,731,061.79	40° 27' 18.216 N	106° 27' 59.166 W
14,100.0	90.00	197.97	5,585.0	-8,056.1	-3,583.0	1,409,989.12	2,731,030.93	40° 27' 17.273 N	106° 27' 59.552 W
14,200.0	90.00	197.97	5,585.0	-8,151.2	-3,613.8	1,409,893.99	2,731,000.08	40° 27' 16.329 N	106° 27' 59.937 W
14,300.0	90.00	197.97	5,585.0	-8,246.4	-3,644.7	1,409,798.87	2,730,969.22	40° 27' 15.386 N	106° 28' 0.323 W
14,400.0	90.00	197.97	5,585.0	-8,341.5	-3,675.6	1,409,703.75	2,730,938.37	40° 27' 14.443 N	106° 28' 0.709 W
14,500.0	90.00	197.97	5,585.0	-8,436.6	-3,706.4	1,409,608.63	2,730,907.51	40° 27' 13.500 N	106° 28' 1.094 W
14,600.0	90.00	197.97	5,585.0	-8,531.7	-3,737.3	1,409,513.51	2,730,876.66	40° 27' 12.556 N	106° 28' 1.480 W
14,700.0	90.00	197.97	5,585.0	-8,626.9	-3,768.1	1,409,418.39	2,730,845.80	40° 27' 11.613 N	106° 28' 1.866 W
14,800.0	90.00	197.97	5,585.0	-8,722.0	-3,799.0	1,409,323.27	2,730,814.95	40° 27' 10.670 N	106° 28' 2.252 W
14,900.0	90.00	197.97	5,585.0	-8,817.1	-3,829.8	1,409,228.15	2,730,784.09	40° 27' 9.727 N	106° 28' 2.637 W
15,000.0	90.00	197.97	5,585.0	-8,912.2	-3,860.7	1,409,133.03	2,730,753.24	40° 27' 8.783 N	106° 28' 3.023 W
15,100.0	90.00	197.97	5,585.0	-9,007.3	-3,891.5	1,409,037.91	2,730,722.39	40° 27' 7.840 N	106° 28' 3.409 W

SandRidge Energy
Survey Report - Geographic

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,200.0	90.00	197.97	5,585.0	-9,102.5	-3,922.4	1,408,942.79	2,730,691.53	40° 27' 6.897 N	106° 28' 3.794 W
15,300.0	90.00	197.97	5,585.0	-9,197.6	-3,953.2	1,408,847.66	2,730,660.68	40° 27' 5.954 N	106° 28' 4.180 W
15,400.0	90.00	197.97	5,585.0	-9,292.7	-3,984.1	1,408,752.54	2,730,629.82	40° 27' 5.010 N	106° 28' 4.566 W
15,500.0	90.00	197.97	5,585.0	-9,387.8	-4,015.0	1,408,657.42	2,730,598.97	40° 27' 4.067 N	106° 28' 4.951 W
15,600.0	90.00	197.97	5,585.0	-9,482.9	-4,045.8	1,408,562.30	2,730,568.11	40° 27' 3.124 N	106° 28' 5.337 W
15,700.0	90.00	197.97	5,585.0	-9,578.1	-4,076.7	1,408,467.18	2,730,537.26	40° 27' 2.181 N	106° 28' 5.723 W
15,800.0	90.00	197.97	5,585.0	-9,673.2	-4,107.5	1,408,372.06	2,730,506.40	40° 27' 1.237 N	106° 28' 6.108 W
15,900.0	90.00	197.97	5,585.0	-9,768.3	-4,138.4	1,408,276.94	2,730,475.55	40° 27' 0.294 N	106° 28' 6.494 W
16,000.0	90.00	197.97	5,585.0	-9,863.4	-4,169.2	1,408,181.82	2,730,444.69	40° 26' 59.351 N	106° 28' 6.880 W
16,100.0	90.00	197.97	5,585.0	-9,958.5	-4,200.1	1,408,086.70	2,730,413.84	40° 26' 58.408 N	106° 28' 7.265 W
16,200.0	90.00	197.97	5,585.0	-10,053.7	-4,230.9	1,407,991.58	2,730,382.98	40° 26' 57.464 N	106° 28' 7.651 W
16,300.0	90.00	197.97	5,585.0	-10,148.8	-4,261.8	1,407,896.45	2,730,352.13	40° 26' 56.521 N	106° 28' 8.037 W
16,400.0	90.00	197.97	5,585.0	-10,243.9	-4,292.6	1,407,801.33	2,730,321.28	40° 26' 55.578 N	106° 28' 8.422 W
16,500.0	90.00	197.97	5,585.0	-10,339.0	-4,323.5	1,407,706.21	2,730,290.42	40° 26' 54.635 N	106° 28' 8.808 W
16,600.0	90.00	197.97	5,585.0	-10,434.1	-4,354.4	1,407,611.09	2,730,259.57	40° 26' 53.691 N	106° 28' 9.193 W
16,700.0	90.00	197.97	5,585.0	-10,529.3	-4,385.2	1,407,515.97	2,730,228.71	40° 26' 52.748 N	106° 28' 9.579 W
16,800.0	90.00	197.97	5,585.0	-10,624.4	-4,416.1	1,407,420.85	2,730,197.86	40° 26' 51.805 N	106° 28' 9.965 W
16,864.9	90.00	197.97	5,585.0	-10,686.1	-4,436.1	1,407,359.14	2,730,177.84	40° 26' 51.193 N	106° 28' 10.215 W

TD at 16864.9

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Rabbit Ears 2 - hit/miss target - Shape - Point	0.00	360.00	5,585.0	-10,686.1	-4,436.1	1,407,359.14	2,730,177.84	40° 26' 51.193 N	106° 28' 10.215 W
Rabbit Ears 2 LP - plan misses target center by 5.2usft at 6364.9usft MD (5585.0 TVD, -698.4 N, -1196.3 E) - Point	0.00	360.00	5,585.0	-700.0	-1,191.4	1,417,345.24	2,733,422.52	40° 28' 30.217 N	106° 27' 29.643 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,333.4	5,240.0	Niobrara		0.00	

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
2800	2800	0	0	Start Build 2.00
3437	3432	0	-71	Start 1493.0 hold at 3437.3 MD
4930	4888	0	-400	Start DLS 8.00 TFO -30.33
5540	5367	-123	-724	Start 150.0 hold at 5539.6 MD
5690	5442	-180	-841	Start DLS 10.00 TFO -64.25
6220	5585	-561	-1152	Start 10644.8 hold at 6220.0 MD
16,865	5585	-10,686	-4436	TD at 16864.9

SandRidge Energy
Survey Report - Geographic

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 2-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Well:	Rabbit Ears 0681 2-23H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Design #1	Database:	EDMProd

Checked By: _____ Approved By: _____ Date: _____

SandRidge Energy

North Park Basin

T6N-R81W-S23

Rabbit Ears 0681 1-23H

Wellbore #1

Design #1

Anticollision Summary Report

02 August, 2016

SandRidge Energy

Anticollision Summary Report

Company:	SandRidge Energy	Local Co-ordinate Reference:	Well Rabbit Ears 0681 1-23H
Project:	North Park Basin	TVD Reference:	KB @ 8324.0usft
Reference Site:	T6N-R81W-S23	MD Reference:	KB @ 8324.0usft
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Rabbit Ears 0681 1-23H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDMProd
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Reference	Design #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria	WARNING: There is hidden tight data in this project	
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	8/2/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	16,521.3	Design #1 (Wellbore #1)	Sperry MWD	Fixed:v2:standard declination

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
T6N-R81W-S23						
Rabbit Ears Unit 0681 2-23H - Wellbore #1 - Design #1	3,010.6	3,010.8	12.8	-0.4	0.971	Level 1, CC, ES, SF
Rabbit Ears Unit 0681 3-23H - Wellbore #1 - Design #1	2,797.3	2,797.9	25.7	13.4	2.098	CC
Rabbit Ears Unit 0681 3-23H - Wellbore #1 - Design #1	2,800.0	2,800.5	25.7	13.4	2.096	ES, SF

SandRidge Energy

Anticollision Summary Report

Company: SandRidge Energy	Local Co-ordinate Reference: Well Rabbit Ears 0681 1-23H
Project: North Park Basin	TVD Reference: KB @ 8324.0usft
Reference Site: T6N-R81W-S23	MD Reference: KB @ 8324.0usft
Site Error: 0.0 usft	North Reference: Grid
Reference Well: Rabbit Ears 0681 1-23H	Survey Calculation Method: Minimum Curvature
Well Error: 0.0 usft	Output errors are at: 2.00 sigma
Reference Wellbore: Wellbore #1	Database: EDMProd
Reference Design: Design #1	Offset TVD Reference: Offset Datum

Reference Depths are relative to KB @ 8324.0usft

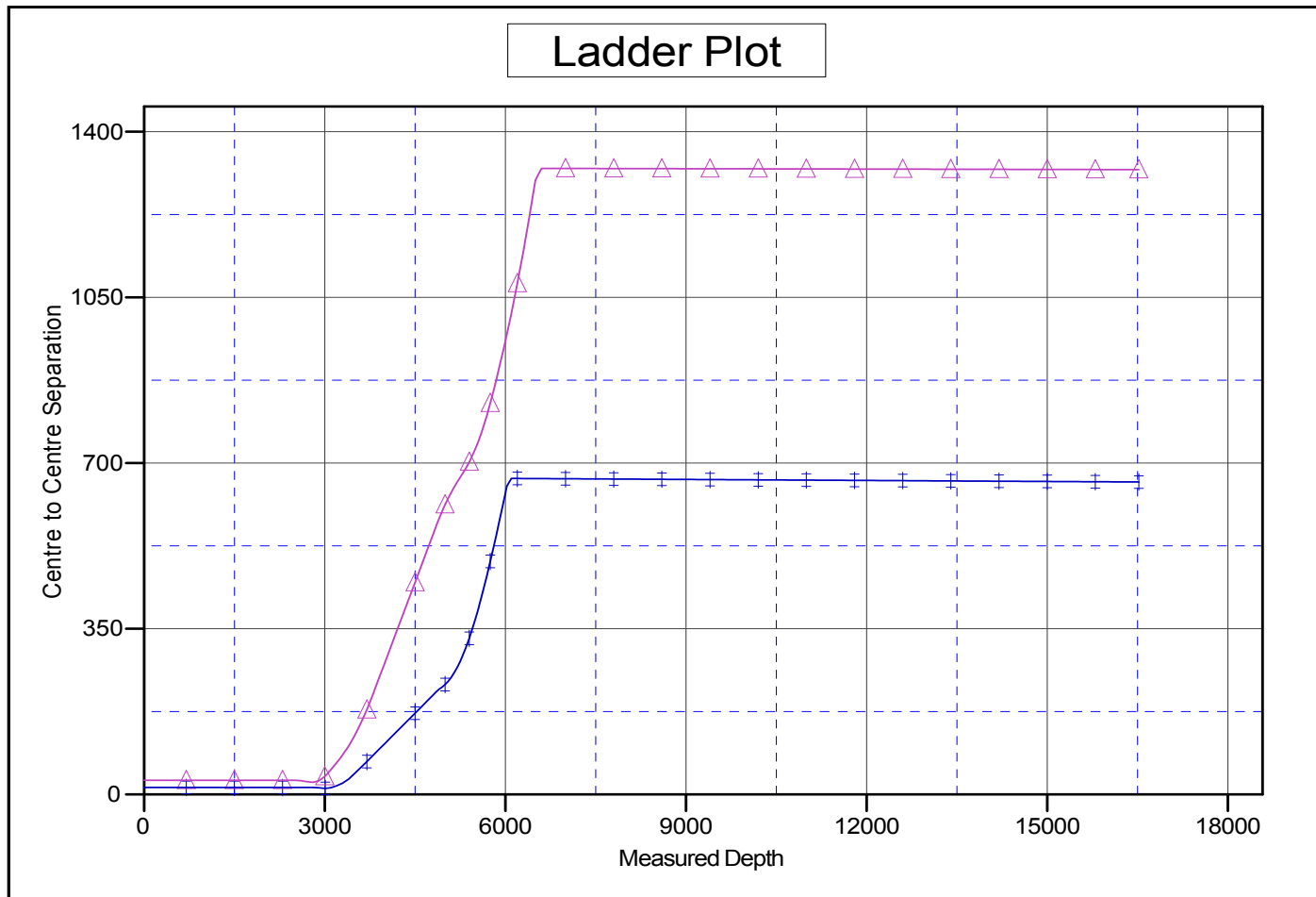
Offset Depths are relative to Offset Datum

Central Meridian is 105° 30' 0.000 W

Coordinates are relative to: Rabbit Ears 0681 1-23H

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: -0.62°



LEGEND

ars Unit0681 2-23H, Wellbore #1, Design #1 V0 ▲ Rabbit Ears Unit0681 3-23H, Wellbore #1, Design #1 V0

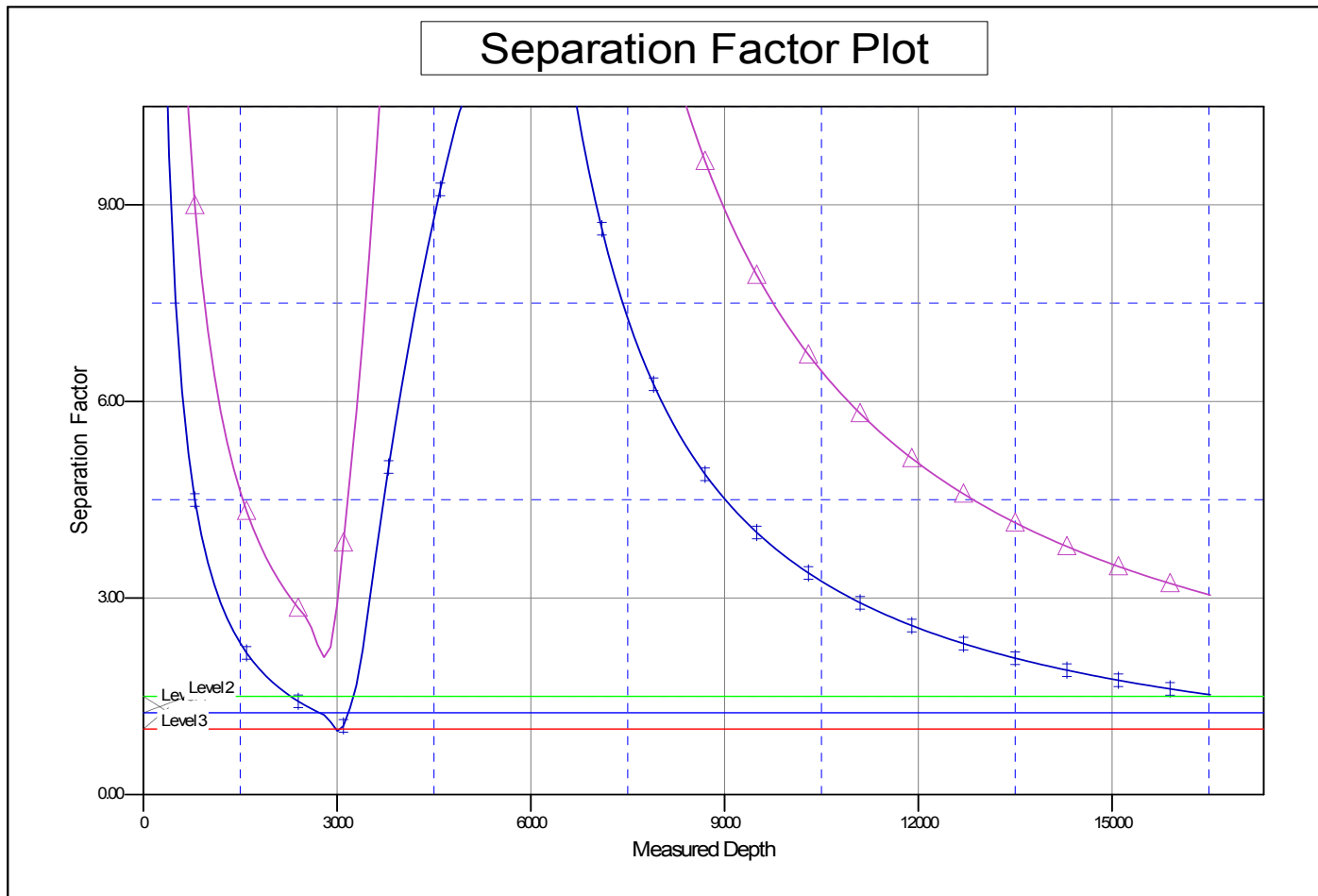
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LEGEND

ars Unit0681 2-23H, Wellbore #1, Design #1 V0 ▲ Rabbit Ears Unit0681 3-23H, Wellbore #1, Design #1 V0

APD ID: 10400005194

Submission Date: 10/11/2016

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

Rabbit Ears 0681 S23 Pad Access-Area-Pipeline Maps_10-07-2016.pdf

Existing Road Purpose: ACCESS,FLUID TRANSPORT

Row(s) Exist? NO

ROW ID(s)

ID:

Do the existing roads need to be improved? YES

Existing Road Improvement Description: Existing Access Road which is currently 12' wide will be widened to 22'. Existing roads within 1.00 mile consists of a County Road which will provide access to the proposed location. Plans for improvement and/or maintenance of existing roads are to maintain in as good or better conditions than at present. A regular maintenance plan will include, but not be limited to blading, ditching, and surfacing. Due to the constraints of the BLM system, we not able to enter the length of the existing road to be upgraded. The length of the existing road to be upgraded is 3,036' - road to be widened to 22' as was indicated initially. Total disturbance width is 35'

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

Rabbit Ears 0681 S23 Pad Access-Area-Pipeline Maps_10-07-2016.pdf

New road type: LOCAL

Length: 1036 Feet

Width (ft.): 35

Max slope (%): 2

Max grade (%): 7

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 22

New road access erosion control: If identified during/after construction of the wellpad and access road, erosion control methods such as wattles, straw bales and ditches will be used and placed to control drainage where needed.

New road access plan or profile prepared? NO

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Access surfacing type: GRAVEL

Access topsoil source: ONSITE

Access surfacing type description:

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: A minimum of six inches (6") of topsoil will be removed prior to location construction from any disturbed areas. Topsoil will be stockpiled adjacent to the wellsite within the maximum disturbed area. Topsoil will be segregated from other material, marked as topsoil, stockpiled in a safe location and if kept for six (6) months or longer, stockpiles will be reseeded to help retain soil vigor and diminish potential for soil erosion and loss.

Access other construction information: This is an existing 12 foot access road which will be upgraded to 22 feet, all on fee surface. Total disturbance width is 35'.

Access miscellaneous information:

Number of access turnouts:

Access turnout map:

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: Culverts are not anticipated. If necessary, culverts will be installed prior to commencement of drilling operations. Riprap will be placed at the inlet and outlet of any installed culverts. Drainage may consist of wing ditches between the existing road and the wellsite if necessary, and will be installed prior to commencing drilling operations. The borrow ditches along the proposed access road will be re-seeded whether the well is a producer or dry hole. The reseeded of the borrow ditches will reduce the area utilized by this location.

Road Drainage Control Structures (DCS) description: Drainage may consist of wing ditches between the existing road and the wellsite if necessary, and will be installed prior to commencing drilling operations. The borrow ditches along the proposed access road will be re-seeded whether the well is a producer or dry hole. The reseeded of the borrow ditches will reduce the area utilized by this location.

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

Rabbit Ears 0681 S23 Pad Nearby Wells Map_08-16-2016.pdf

Existing Wells description:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Section 4 - Location of Existing and/or Proposed Production Facilities

Submit or defer a Proposed Production Facilities plan? SUBMIT

Estimated Production Facilities description:

Production Facilities description:

Production Facilities map:

Rabbit Ears 0681 S23 Pad Production Facility Layout Revised 120816_12-28-2016.pdf

Section 5 - Location and Types of Water Supply

Water Source Table

Water source use type: DUST CONTROL, INTERMEDIATE/PRODUCTION CASING, STIMULATION, SURFACE CASING

Water source type: FRESH WATER LAKE

Describe type:

Source longitude:

Source latitude:

Source datum: NAD83

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: TRUCKING

Source transportation land ownership: PRIVATE

Water source volume (barrels): 210000

Source volume (acre-feet): 27.06755

Source volume (gal): 8820000

Water source and transportation map:

Rabbit Ears 0681 S23 Pad Water Source Location_10-07-2016.pdf

Water source comments: The anticipated amount of water to be used for drilling is 9500 bbls. The anticipated amount of water to be used for completion etc. is 200,500 bbls. We have added an additional map which shows the location of the water source: T7N R80W Sec. 6

New water well? NO

New Water Well Info

Well latitude:

Well Longitude:

Well datum:

Well target aquifer:

Est. depth to top of aquifer(ft):

Est thickness of aquifer:

Aquifer comments:

Aquifer documentation:

Well depth (ft):

Well casing type:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Well casing outside diameter (in.):

Well casing inside diameter (in.):

New water well casing?

Used casing source:

Drilling method:

Drill material:

Grout material:

Grout depth:

Casing length (ft.):

Casing top depth (ft.):

Well Production type:

Completion Method:

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Construction materials will consist of native materials from borrow ditches and location areas. Surfacing materials will be obtained from available permitted sources, if needed, and consist of pit gravel. SandRidge will use the following: Sessions & Sons – 33492 Highway 125, Walden, CO Pit located at: T6N R80W Sec. 7 (SW/4 SW/4)

Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: DRILLING

Waste content description: Drill Cuttings and Fluids

Amount of waste: 2500 barrels

Waste disposal frequency : Weekly

Safe containment description: Drill cuttings will be treated per SandRidge's North Park Basin Project Area Exploration and Production Waste Management Plan which was approved by the Colorado Oil and Gas Conservation Commission. A closed loop system will be used, no reserve pit required. Produced fluid will be contained in test tanks during completion and testing. There is potential for a shallow water table. A Sundry Notice will be submitted to BLM when the APD is approved and contractors have been selected. Specific contractors will maintain their own SPCC plans. Once the well is put into production and production facilities are engineered, SandRidge will maintain a SPCC Plan to include those facilities. BLM can request the plan at any time.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** PRIVATE

Disposal type description:

Disposal location description: Sent to Polar Bear; Cuttings hauled to Twin Enviro.

Waste type: SEWAGE

Waste content description: Waste from Portable Toilets

Amount of waste: 0 gallons

Waste disposal frequency : Weekly

Safe containment description: Sewage disposal facilities will be in accordance with State and Local Regulations. Sewage may not be buried on location or put in a borehole. Colorado Department of Public Health and Environment (CDPHE) regulations prevent this unless a CDPHE Permit is obtained. The amount was marked as zero. SandRidge will not hire a

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

contractor for this service until the APD is approved and they are ready to drill. The contractor will haul weekly or as needed and portable toilets will be sufficient to contain the waste generated.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL FACILITY

Disposal type description:

Disposal location description: Trucked to commercial disposal facility

Waste type: GARBAGE

Waste content description: Garbage and other waste

Amount of waste: 0 pounds

Waste disposal frequency : Weekly

Safe containment description: Garbage and other waste burnable waste will be contained in a portable trash cage which will be totally enclosed with small mesh wire. The amount was marked as zero. Depending on the type of trash, this amount can vary. SandRidge will remove the trash on a weekly or as needed basis as these garbage cans fill up.

Safe containmant attachment:

Waste disposal type: HAUL TO COMMERCIAL FACILITY **Disposal location ownership:** COMMERCIAL FACILITY

Disposal type description:

Disposal location description: SandRidge is hiring a contractor to remove all garbage. The location will be determined by the contractor. SandRidge will not hire a contractor until the APD is approved and SandRidge is ready to drill. Cage and contents will be transported to and trash dumped at a CDPHE approved Sanitary Landfill upon completion of operations. Trash will be picked up if scattered and contained in trash cage as soon as practical after rig is moved off.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

Reserve pit length (ft.) **Reserve pit width (ft.)**

Reserve pit depth (ft.) **Reserve pit volume (cu. yd.)**

Is at least 50% of the reserve pit in cut?

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Cuttings are stored in 3 sided bins.

Cuttings area length (ft.) **Cuttings area width (ft.)**

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Cuttings area depth (ft.)

Cuttings area volume (cu. yd.)

Is at least 50% of the cuttings area in cut?

WCuttings area liner

Cuttings area liner specifications and installation description

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

Rabbit Ears 0681 0681 S23 Pad Well Location Layout Revised 120816_12-28-2016.pdf

Comments:

Section 10 - Plans for Surface Reclamation

Type of disturbance: NEW

Recontouring attachment:

Drainage/Erosion control construction: Any combination of the following Best Management Practices may be installed for erosion control methods; Diversion Ditches/Water Bars, Road Surface Slope, Drainage Dips, Roadside Ditches, Turnouts/Wing Ditches, Road Crowning, Culverts, Berms, Silt Fence, Straw Bales, Straw Crimping, Surface Roughening, Catch Basins / Sediment Traps, Permanent Vegetation, Existing Vegetation and Mulching. The BMP selection will be determined on an individual basis and as site conditions dictate.

Drainage/Erosion control reclamation: Any combination of the following Best Management Practices may be installed for erosion control methods; Diversion Ditches/Water Bars, Road Surface Slope, Drainage Dips, Roadside Ditches, Turnouts/Wing Ditches, Road Crowning, Culverts, Berms, Silt Fence, Straw Bales, Straw Crimping, Surface Roughening, Catch Basins / Sediment Traps, Permanent Vegetation, Existing Vegetation and Mulching. The BMP selection will be determined on an individual basis and as site conditions dictate.

Wellpad long term disturbance (acres): 4.63

Wellpad short term disturbance (acres): 4.63

Access road long term disturbance (acres): 2.06

Access road short term disturbance (acres): 2.06

Pipeline long term disturbance (acres): 1.5936639

Pipeline short term disturbance (acres): 2.3904958

Other long term disturbance (acres): 0

Other short term disturbance (acres): 0

Total long term disturbance: 8.283664

Total short term disturbance: 9.080496

Reconstruction method: None.

Topsoil redistribution: Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment. If such equipment creates ruts in excess of four (4) inches deep, the soil will be deemed too wet. Distribute topsoil, if any remains, evenly over the location, and seed according to the above seed mixture. If needed the access road and location shall be ripped or disked prior to seeding. Perennial vegetation must be

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

established. Additional work shall be required in case of seeding failures, etc.

Soil treatment: Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment. If such equipment creates ruts in excess of four (4) inches deep, the soil will be deemed too wet. Earthwork for interim and final reclamation must be completed within six (6) months of well completion or plugging (weather permitting).

Existing Vegetation at the well pad:

Existing Vegetation at the well pad attachment:

Rabbit Ears 0681 S23 Pad NRCS Map Unit Description and Plants_08-16-2016.pdf

Existing Vegetation Community at the road:

Existing Vegetation Community at the road attachment:

Rabbit Ears 0681 S23 Pad NRCS Map Unit Description and Plants_08-16-2016.pdf

Existing Vegetation Community at the pipeline:

Existing Vegetation Community at the pipeline attachment:

Rabbit Ears 0681 S23 Pad NRCS Map Unit Description and Plants_08-16-2016.pdf

Existing Vegetation Community at other disturbances:

Existing Vegetation Community at other disturbances attachment:

Rabbit Ears 0681 S23 Pad NRCS Map Unit Description and Plants_08-16-2016.pdf

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre
-----------	-------------

Seed reclamation attachment:

Rabbit Ears 0681 S23 Pad Seed Mix Table_08-16-2016.pdf

Operator Contact/Responsible Official Contact Info

First Name: Spence

Last Name: Laird

Phone: (405)420-8415

Email: slaird@sandridgeenergy.com

Seedbed prep: Initial seedbed preparation will consist of backfilling, leveling, and ripping all compacted areas. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding. Seeding will be conducted no more than 24 hours following completion of final seedbed preparation. A certified weed-free seed mix approved by BLM to meet reclamation standards will be used. The seed mix will be used on all disturbed surfaces including pipelines and road cut/fill slopes.

Seed BMP: All disturbed areas, including roads, pipelines, pads, production facilities, and interim reclaimed areas will be recontoured to the contour existing prior to initial construction or a contour that blends indistinguishably with the surrounding landscape. Resalvaged topsoil will be spread evenly over the entire disturbed site to ensure successful revegetation. To help mitigate the contrast of recontoured slopes, reclamation will include measures to feather cleared lines of vegetation and to save and redistribute cleared trees, woody debris, and large rocks over recontoured cut/fill slopes.

Seed method: Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding. Seeding will be conducted no more than 24 hours following completion of final seedbed preparation. A certified weed-free seed mix approved by the BLM to meet reclamation standards will be used. The seed mix will be used on all disturbed surfaces including pipelines and road cut/fill slopes.

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: Annual or noxious weeds shall be controlled on all disturbed areas as directed by the BLM Weed Coordinator. An intensive weed monitoring and control program will be implemented beginning the first growing season after interim and final reclamation. Noxious weeds that have been identified during monitoring will be promptly treated and controlled. A Pesticide Use Proposal (PUP) will be coordinated with the BLM Weed Coordinator for approval prior to the use of herbicides. All reclamation equipment will be cleaned prior to use to reduce the potential for introduction of noxious weeds or other undesirable non-native species. The operator will coordinate all weed and insect control measures with the BLM Weed Coordinator as well as any state and/or local management agencies. Reclamation equipment will be cleaned before moving the equipment onto the location and will be cleaned again before leaving the location.

Weed treatment plan attachment:

Monitoring plan description: Reclaimed areas will be monitored annually. Actions will be taken to ensure that reclamation standards are met as quickly as reasonably practical. Reclamation monitoring will be documented in a reclamation report and submitted to the Authorized Officer. The report will document compliance with all aspects of the reclamation objectives and standards, identify whether the reclamation objectives and standards are likely to be achieved in the near future without additional actions, and identify actions that have been or will be taken to meet the objectives and standards. The report will also include acreage figures for: Initial Disturbed Acres; Successful Interim Reclaimed Acres; Successful Final Reclaimed Acres. Reports will not be submitted for sites approved by the Authorized Officer in writing as having met interim or final reclamation standards. Any time 30% or more of a reclaimed area is redisturbed, monitoring will be reinitiated.

Monitoring plan attachment:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Success standards: Reclamation will be considered successful if the following criteria are met: 70 percent of predisturbance cover; 90 percent dominate species (the vegetation will consist of species included in the seed mix and/or occurring in the surrounding natural vegetation); and erosion features are equal to or less than surrounding area.

Pit closure description: Not applicable

Pit closure attachment:

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: PRIVATE OWNERSHIP

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office:

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland:

USFS Ranger District:

Fee Owner: Van Valkenberg Cattle Company

Phone: (970)723-4346

Surface use plan certification: NO

Surface use plan certification document:

Surface access agreement or bond: Agreement

Surface Access Agreement Need description: The SUPO will be supplied to the private surface owner once agreed upon and finalized by SandRidge and BLM.

Surface Access Bond BLM or Forest Service:

BLM Surface Access Bond number:

USFS Surface access bond number:

Fee Owner Address: 12353 Highway 14 Walden, Colorado
80480

Email:

Operator Name: SANDRIDGE ENERGY INC

Well Name: RABBIT EARS 0681

Well Number: 2-23H

Section 12 - Other Information

Right of Way needed? NO

Use APD as ROW?

ROW Type(s):

ROW Applications

SUPO Additional Information: SandRidge has a pending Participation Area, identified by Serial Register Number COC78026X, in process with BLM. The unit application is in process and will cover the spacing for this location. SandRidge understands that the APD approval may be delayed until unit approval. If needed, a Communitization Agreement will be submitted after the drilling of the first well. The reservoir acreage was marked as zero. Once the unit designation is approved, the reservoir acreage will be the total unit acreage. A Class III Cultural Resources Inventory has been completed by Metcalf Archaeological Consultants, Inc. for the Rabbit Ears 0681 Wellpad and Access Road and has been sent to the BLM as requested. The Air Emissions Inventory is in process and should be completed shortly. Due to the constraints of the BLM system, we are not able to enter detailed information concerning the pipeline; Six of the pipeline will be less than 6". Pipeline will be buried and will run along the access road to a connection located at Highway 14. Pipeline will carry produced water and crude oil. Gas will be flared due to lack of pipelines out of Jackson County. Length of pipeline is 3,471' with a width of disturbance of 30'.

Use a previously conducted onsite? YES

Previous Onsite information: Rabbit Ears 0681 S23 Pad Onsite conducted on 6/23/16

Other SUPO Attachment

Rabbit Ears 0681 S23 Pad BLM Authorization to Enter-Van Valkenburg_08-16-2016.pdf

Rabbit Ears 0681 S23 Pad Lease Map_08-29-2016.pdf

Rabbit Ears 0681 S23 Pad North Park Basin Project Area Exploration and Production Waste Managemen..._08-29-2016.pdf

Rabbit Ears 0681 S23 Payment Receipt_08-31-2016.pdf

Rabbit Ears 0681 2-23H BLM APD BLM Letter_10-11-2016.pdf





Rabbit Ears 0681 2-23H BLM Letter_12-29-2016.pdf

RABBIT EARS 0681 S23 PAD PIPELINE & ACCESS ROAD

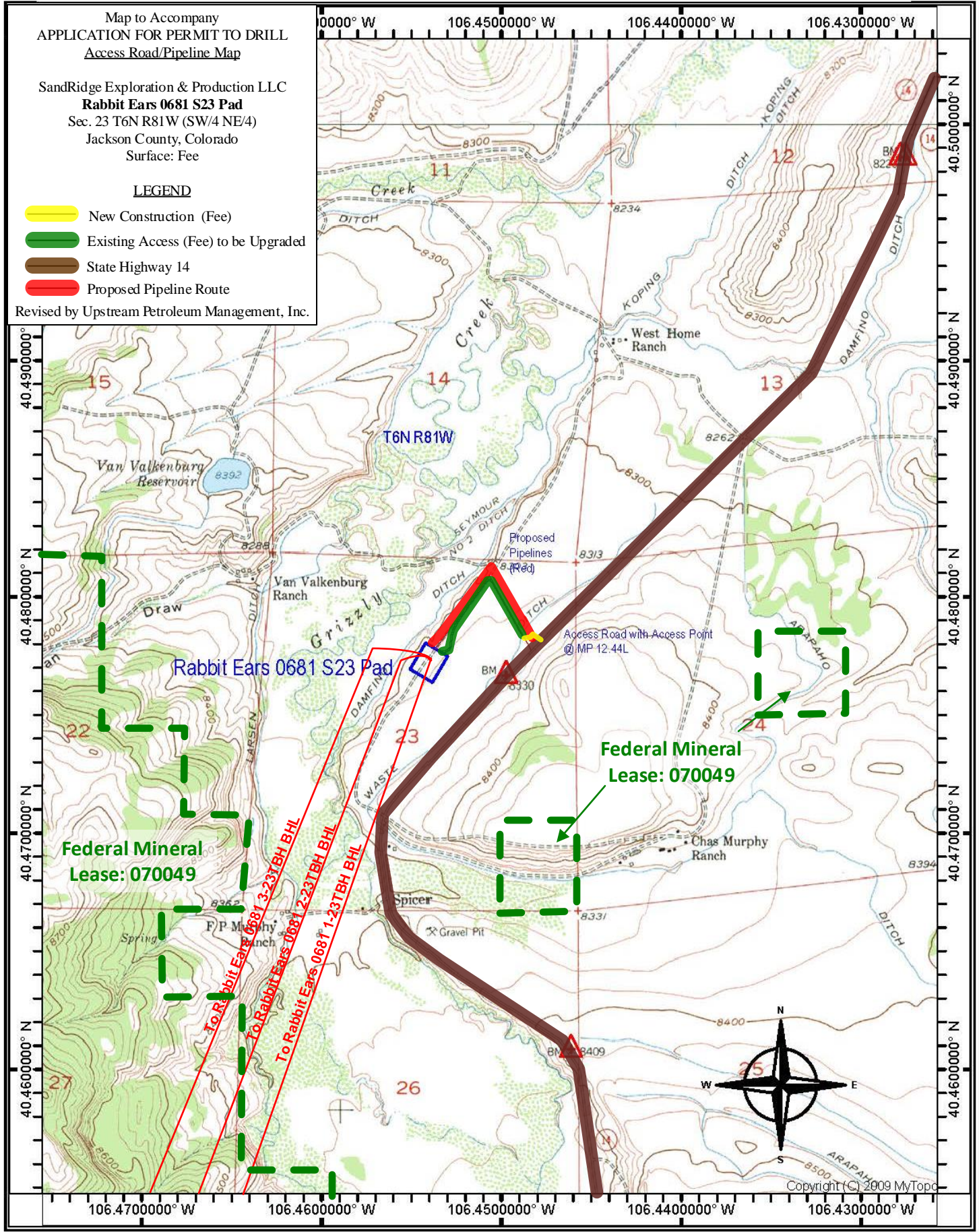
Map to Accompany
APPLICATION FOR PERMIT TO DRILL
Access Road/Pipeline Map

SandRidge Exploration & Production LLC
Rabbit Ears 0681 S23 Pad
Sec. 23 T6N R81W (SW/4 NE/4)
Jackson County, Colorado
Surface: Fee

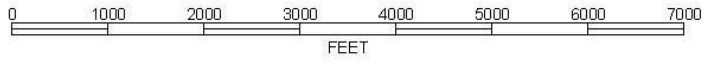
LEGEND

-  New Construction (Fee)
-  Existing Access (Fee) to be Upgraded
-  State Highway 14
-  Proposed Pipeline Route

Revised by Upstream Petroleum Management, Inc.



SCALE 1:24000






Sandridge Exploration & Production, LLC

Rabbit Ears 0681 Sec 23 100K Map

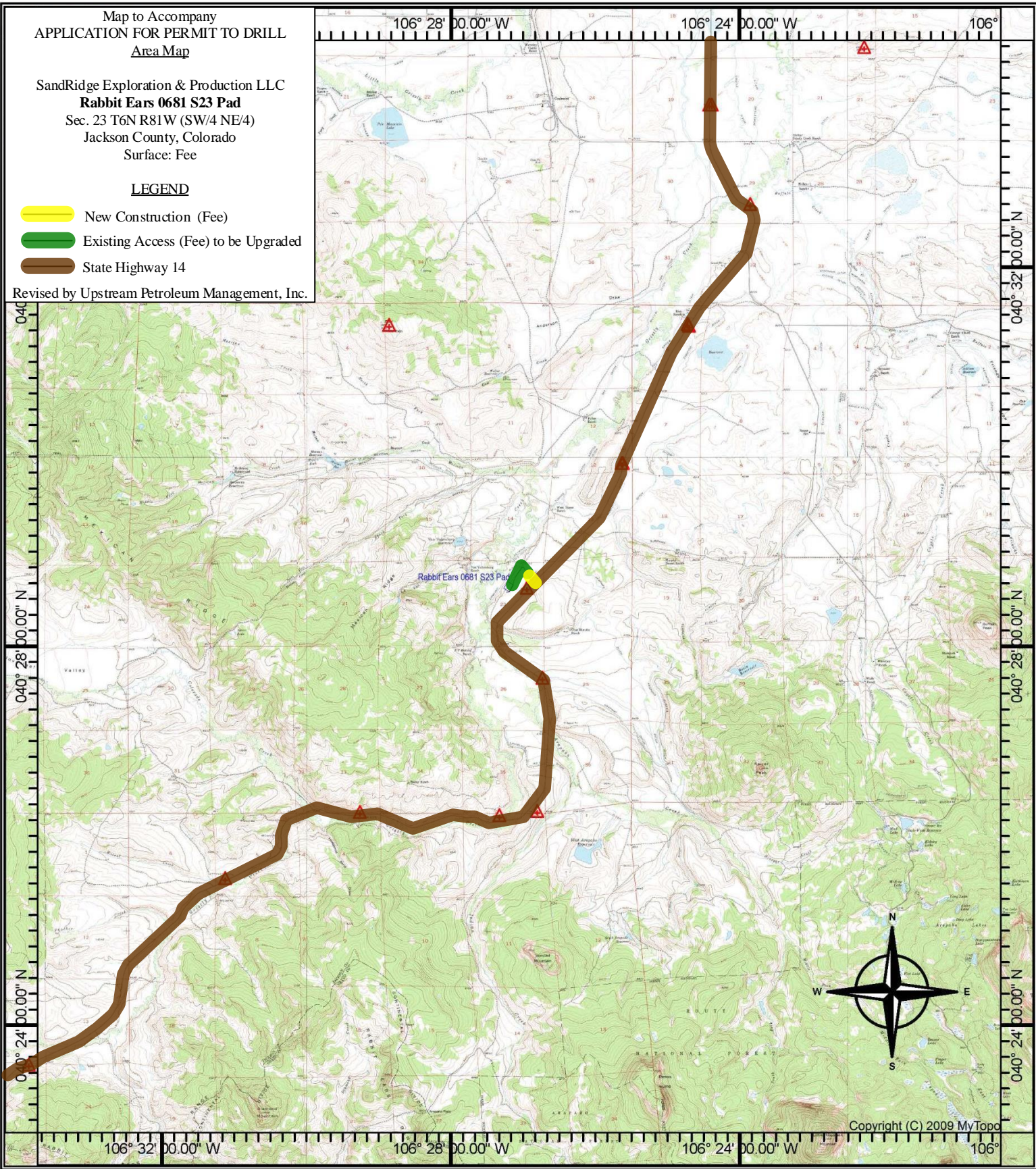
Map to Accompany
APPLICATION FOR PERMIT TO DRILL
Area Map

SandRidge Exploration & Production LLC
Rabbit Ears 0681 S23 Pad
Sec. 23 T6N R81W (SW/4 NE/4)
Jackson County, Colorado
Surface: Fee

LEGEND

-  New Construction (Fee)
-  Existing Access (Fee) to be Upgraded
-  State Highway 14

Revised by Upstream Petroleum Management, Inc.

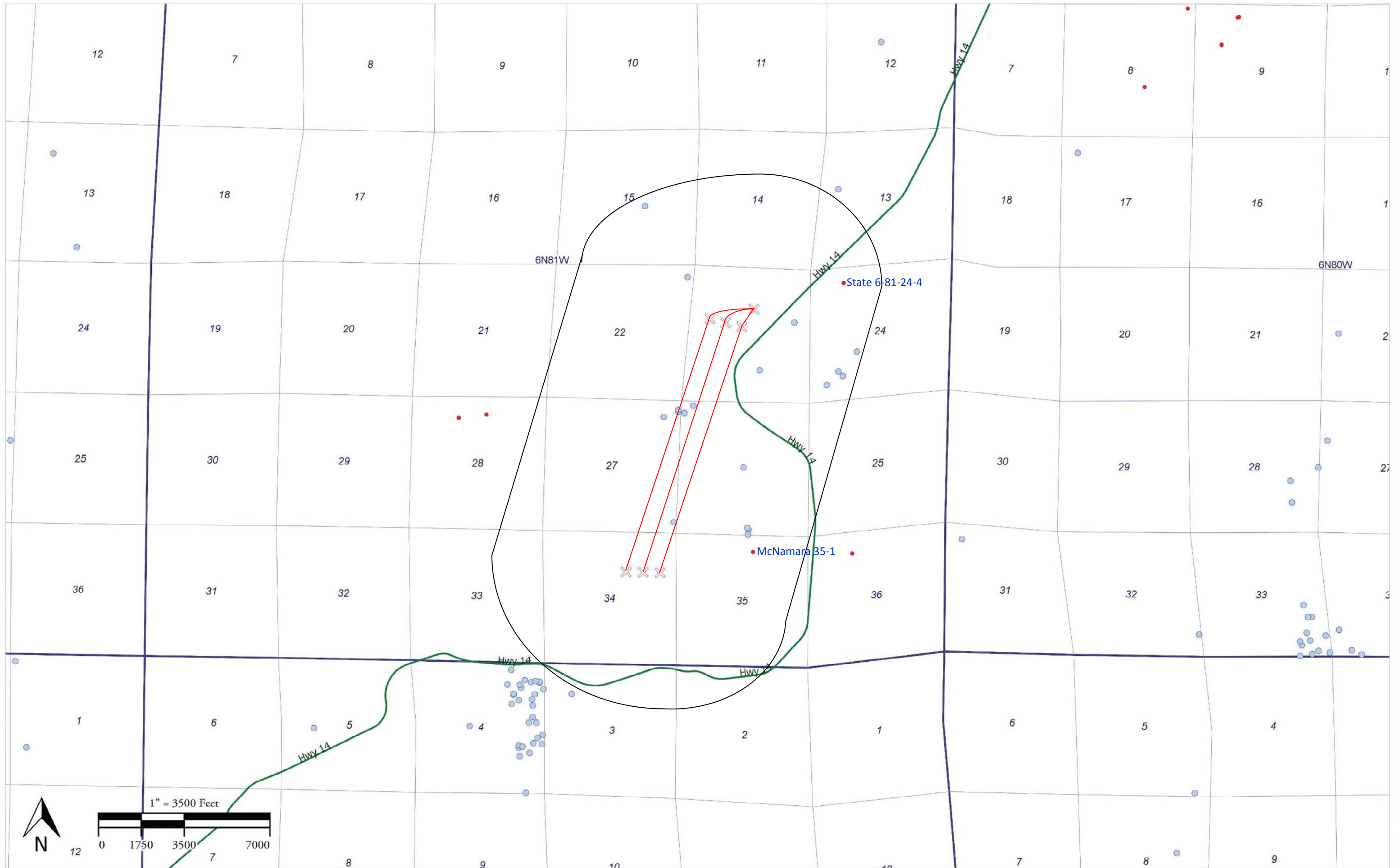


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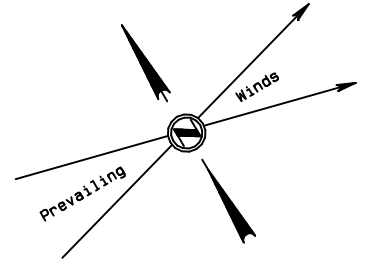
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Rabbit Ears 0681 S23 Pad Nearby Oil, Gas and Water Wells

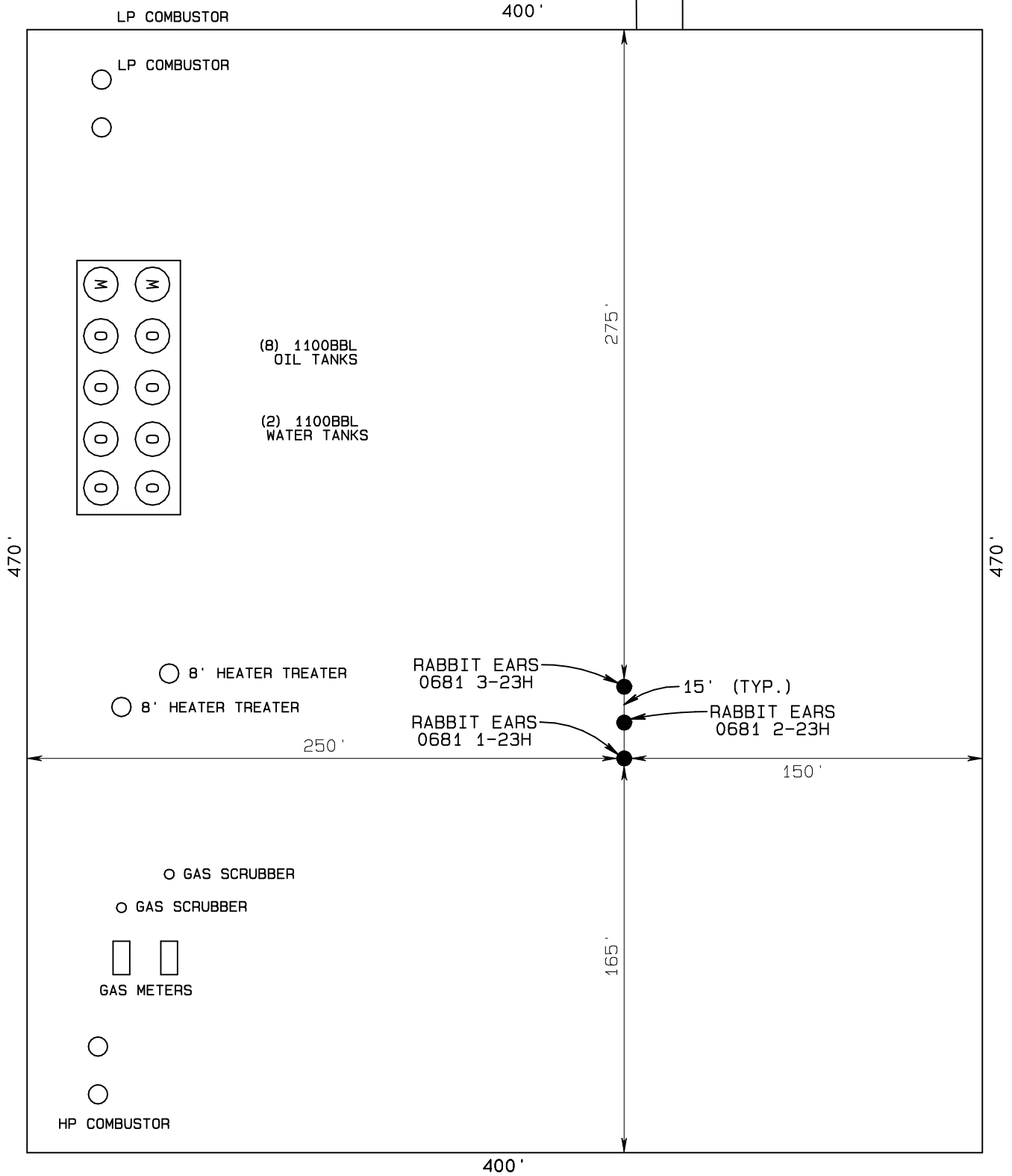


SandRidge Exploration & Production, LLC

PRODUCTION FACILITY LAYOUT
 RABBIT EARS 0681 S23 PAD
 SW1/4NE1/4 of SECTION 23,
 T6N, R81W, 6th P.M.

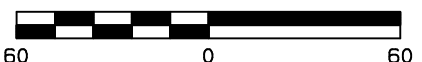


Existing
 Access Road
 (12' Wide)
 (to be widened
 to 22')

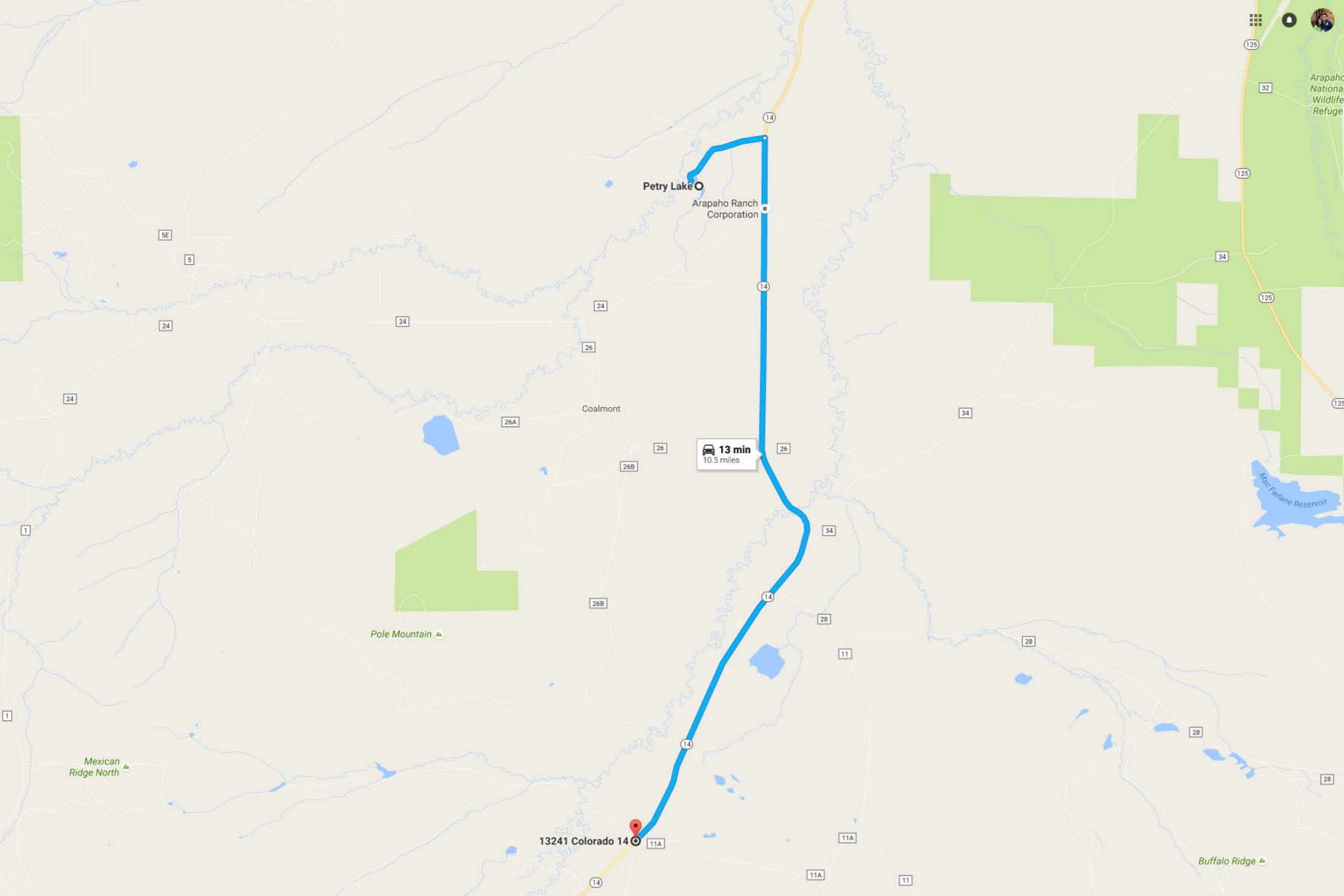


DRAWING REVISED: 12/8/2016

GRAPHIC SCALE 1"=60'



Final Pad Elevation = 8307.5'



Petry Lake

Arapaho Ranch Corporation

13 min
10.5 miles

13241 Colorado 14

Pole Mountain

Coalmont

Mexican Ridge North

Buffalo Ridge

MacFarlane Reservoir

Arapaho National Wildlife Refuge



Marr Ditch

Marr Ditch Number 1

Petty Lake

Mutual Ditch

Arapaho Ranch Corporation

Mutual Ditch



14

14

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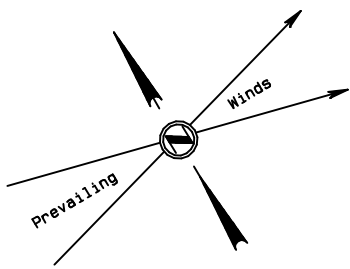
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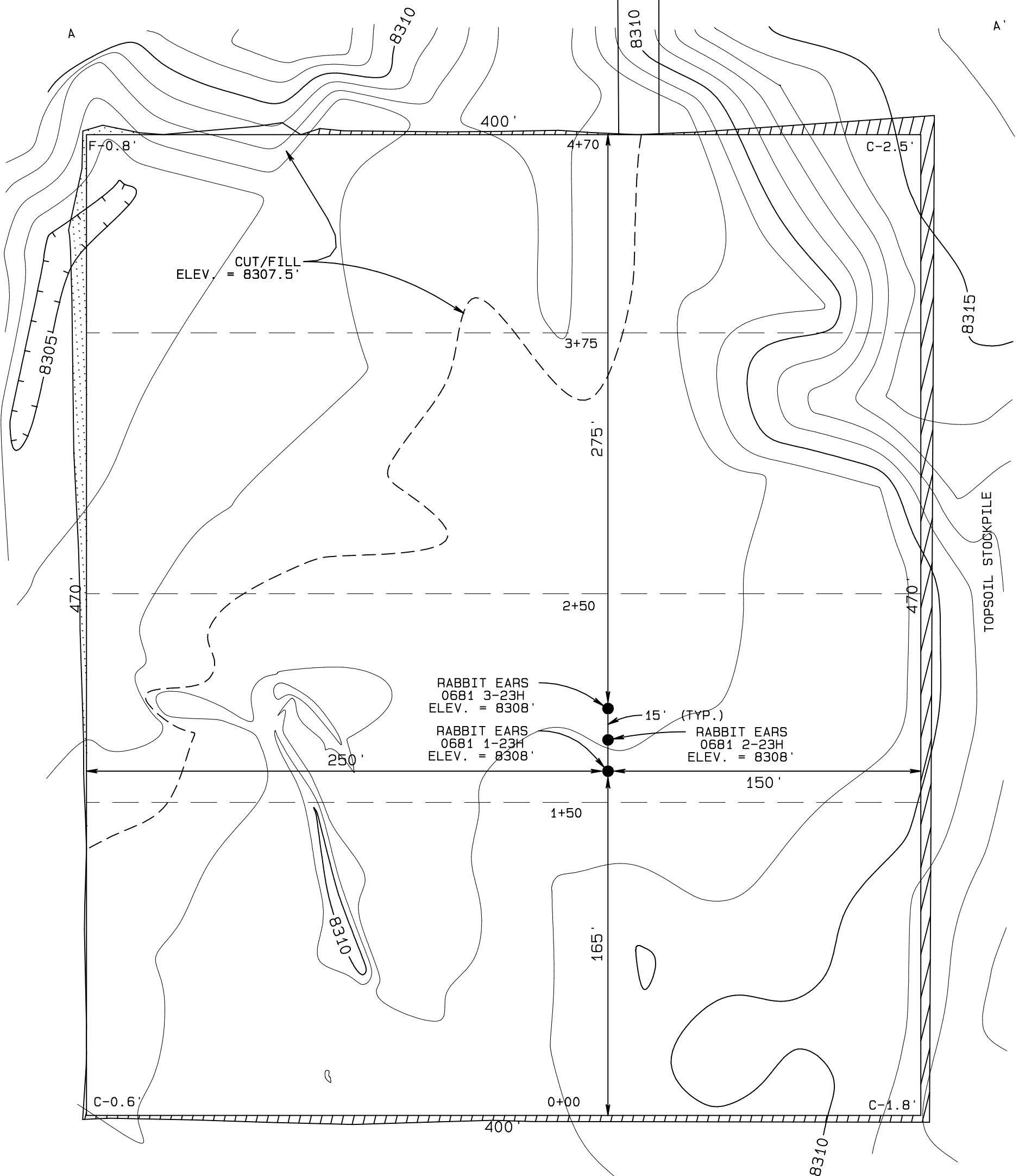
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Petry Lake Location
T7N R80W Sec. 6 Lots 6, 7





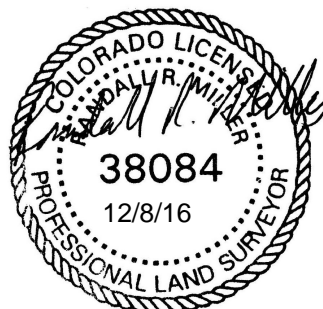
Existing
 Access Road
 (12' Wide)
 (to be widened
 to 22')



Final Pad Elevation = 8307.5'
 Elev. for Surface Locations
 are at Ungraded Ground

Earthwork:

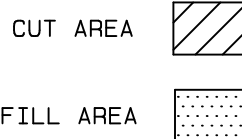
Total Excavation - 1460 Cu. Yd.
 Pad Fill/Borrow - 1460 Cu. Yd.
 Topsoil Stockpile - None (due to location in gravel pit)
 Total Pad (Disturbed) = 4.63 acres



DRAWING REVISED: 12/8/2016

BASIS OF ELEVATION

SPOT ELEVATION AT THE NW CORNER OF SECTION 23,
 T6N, R81W, 6TH PM, TAKEN FROM THE SPICER PEAK
 QUADRANGLE, USGS 7.5 MIN QUAD (TOPOGRAPHIC MAP)
 WITH SAID ELEVATION MARKED AS BEING 8313 FEET.

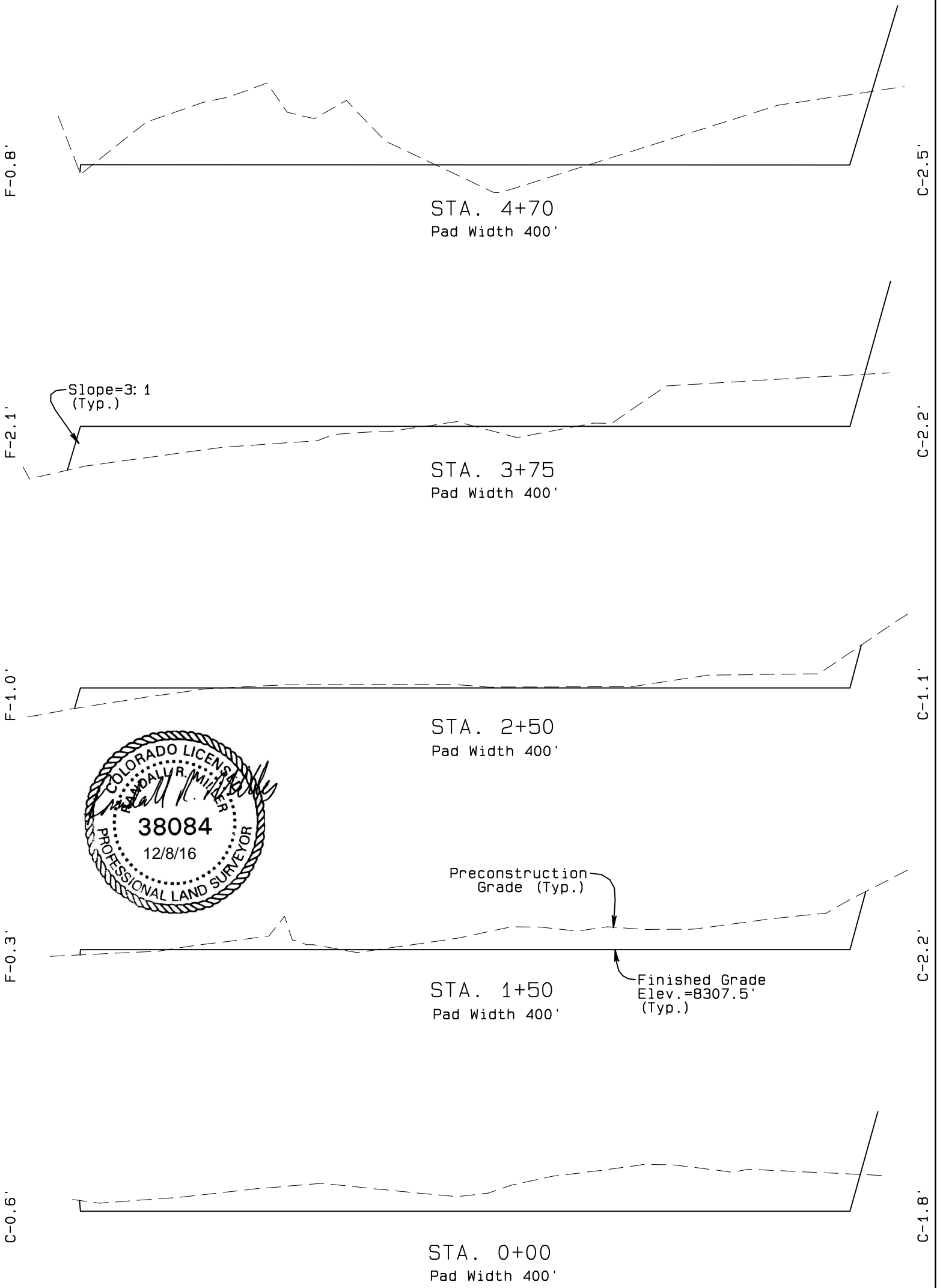


GRAPHIC SCALE 1"=50'



SandRidge Exploration & Production, LLC

CONSTRUCTION LAYOUT CROSS SECTION
 RABBIT EARS 0681 S23 PAD
 SW1/4NE1/4 of SECTION 23,
 T6N, R81W, 6th P.M.



DRAWING REVISED: 12/8/2016

Vertical Exageration = 10 Times

GRAPHIC SCALE 1"=60'

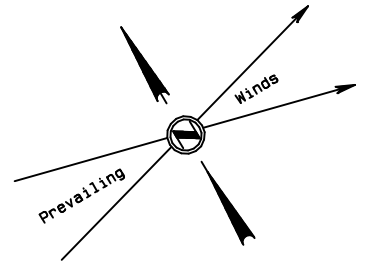


BASIS OF ELEVATION

SPOT ELEVATION AT THE NW CORNER OF SECTION 23,
 T6N, R81W, 6TH PM, TAKEN FROM THE SPICER PEAK
 QUADRANGLE, USGS 7.5 MIN QUAD (TOPOGRAPHIC MAP)
 WITH SAID ELEVATION MARKED AS BEING 8313 FEET.

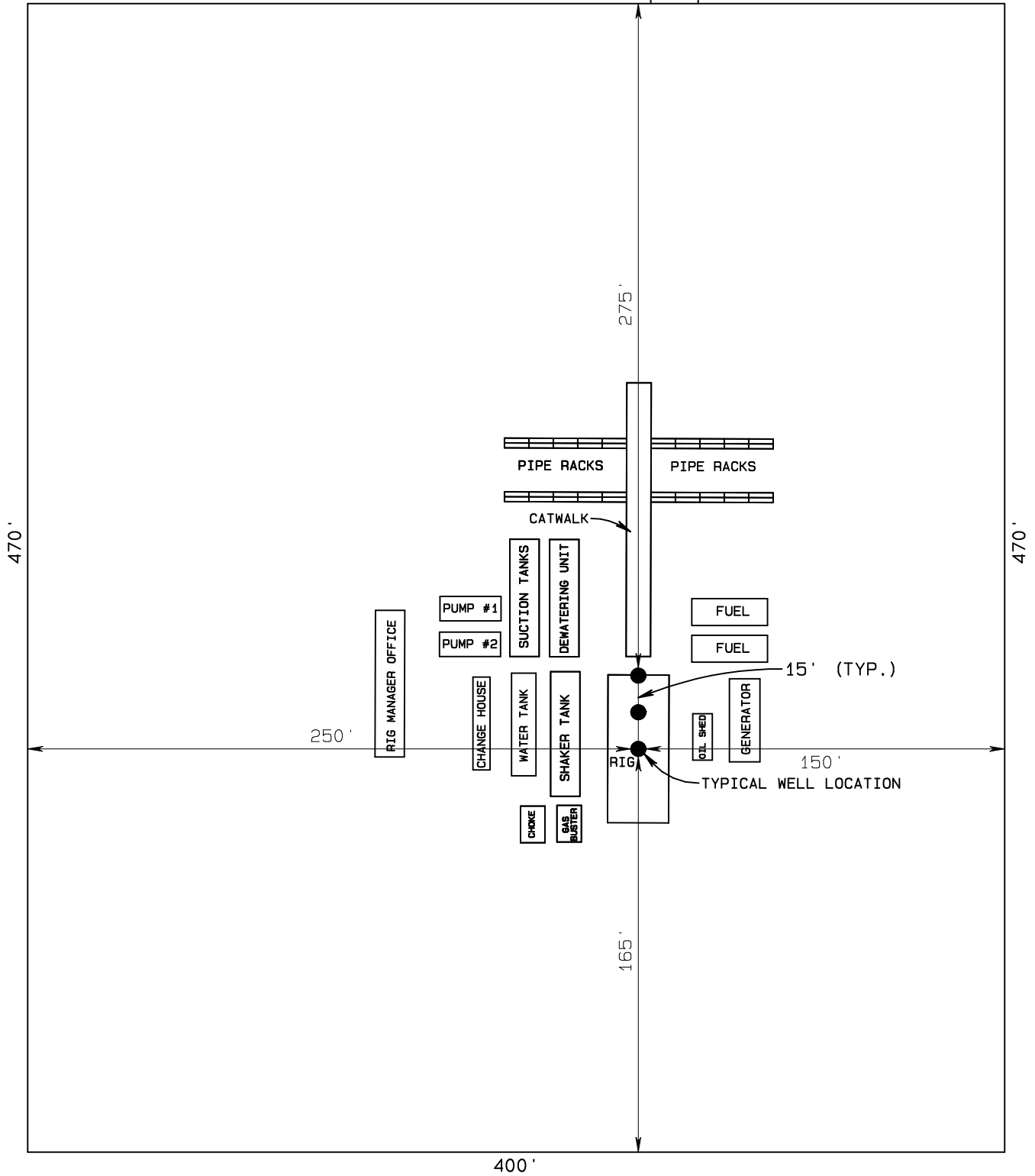
SandRidge Exploration & Production, LLC

TYPICAL RIG LAYOUT
RABBIT EARS 0681 S23 PAD
SW1/4NE1/4 of SECTION 23,
T6N, R81W, 6th P.M.



Existing Access Road (12' Wide) (to be widened to 22')

400'



DRAWING REVISED: 12/8/2016

GRAPHIC SCALE 1"=60'



Final Pad Elevation = 8307.5'

NORTH PARK ENGINEERING & CONSULTING, INC.
PO Box 395 Walden, CO 80480 970-723-3725

Jackson County Area, Colorado

Ra—Randman sandy loam

Map Unit Setting

National map unit symbol: jq0j

Elevation: 7,820 to 9,000 feet

Mean annual precipitation: 10 to 15 inches

Mean annual air temperature: 36 to 38 degrees F

Frost-free period: 35 to 45 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Randman and similar soils: 90 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Randman

Setting

Landform: Terraces, benches, terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium and/or noncalcareous outwash

Typical profile

H1 - 0 to 6 inches: sandy loam

H2 - 6 to 30 inches: gravelly sandy clay loam

H3 - 30 to 60 inches: very gravelly sand

Properties and qualities

Slope: 1 to 4 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.20 to 2.00 in/hr)

Depth to water table: About 0 to 6 inches

Frequency of flooding: Rare

Frequency of ponding: None

Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 6w

Land capability classification (nonirrigated): 6w

Hydrologic Soil Group: B/D

Data Source Information

Soil Survey Area: Jackson County Area, Colorado
Survey Area Data: Version 7, Sep 22, 2014

Ra—Randman sandy loam						
Randman	—	—	—	—	—	—

Rabbit Ears 0681S 23 Pad Seed Mix Table

Interim Restoration Seed Mix

2#/acre PLS	-	Thickspike wheatgrass
2#/acre PLS	-	Western wheatgrass
2#/acre PLS	-	Indian ricegrass
1#/acre PLS	-	Sandberg bluegrass
1#/acre PLS	-	Annual ryegrass
8#/acre PLS	-	Total

Final Reclamation Seed Mix

2#/acre PLS	-	Thickspike wheatgrass
2#/acre PLS	-	Western wheatgrass
2#/acre PLS	-	Indian ricegrass
½#/acre PLS		Gardner Saltbrush
½#/acre PLS		Scarlet globemallow
1#/acre PLS	-	Sandberg bluegrass
1#/acre PLS	-	Annual ryegrass
9#/acre PLS	-	Total



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
White River Field Office
220 East Market Street
Meeker, CO 81641

In Reply Refer To:

Rabbit Ears Unit 0681 1-23H
Rabbit Ears Unit 0681 2-23H
Rabbit Ears Unit 0681 3-23H

Landowner Access Agreement (providing access to BLM personnel)

In accordance with Instruction Memorandum No. 2009-078, which covers wells located on non federal surface and mineral locations drilled into federal minerals, this document serves as a guarantee from the owner of the surface land for SandRidge E&P's Rabbit Ears Unit 0681 1-23H, Rabbit Ears Unit 0681 2-23H, Rabbit Ears Unit 0681 3-23H wells located in the NE/4 of Township 6 North, Range 81 West, Section 23, that the Department of the Interior, including the Bureau of Land Management (BLM) has permission to access the non-Federal lands at the Rabbit Ears Unit 0681 1-23H, Rabbit Ears Unit 0681 2-23H, Rabbit Ears Unit 0681 3-23H location for the sole purpose of performing all necessary inspections. If I have a locked gate restricting access I will either provide BLM with the combination or key to the lock, or allow a BLM lock to be placed alongside mine, allowing access. The access to BLM will be limited to the use of the access road, pipeline ROW (if applicable), and well pad. In the event of a spill or leak, BLM personnel may access along the extent of the spill or leak.

This agreement is in no way intended to give permission for use of this privilege for accessing any other BLM lands from this location.

Landowner Name (print): Van Valkenburg Cattle Company, LLC, by William Van Valkenburg

Landowner Signature: William Van Valkenburg

Date: 6-23-06

**FIELD-WIDE EXPLORATION AND PRODUCTION
WASTE MANAGEMENT PLAN**

**NORTH PARK BASIN PROJECT AREA
JACKSON COUNTY, COLORADO**

JANUARY 2016

Prepared for:

**SANDRIDGE EXPLORATION AND PRODUCTION, LLC
Oklahoma City, Oklahoma**

**FIELD-WIDE EXPLORATION AND PRODUCTION
WASTE MANAGEMENT PLAN**

**NORTH PARK BASIN PROJECT AREA
JACKSON COUNTY, COLORADO**

JANUARY 2016

Prepared for:

**SANDRIDGE EXPLORATION AND PRODUCTION, LLC
123 Robert S. Kerr Avenue
Oklahoma City, Oklahoma 73102**

Prepared by:

**LT ENVIRONMENTAL, INC.
4600 West 60th Avenue
Arvada, Colorado 80003**



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FIGURES

FIGURE 1 DRILL PAD LOCATIONS

TABLES

TABLE 1 DRILLING PAD LOCATION TRACKING SHEET

APPENDIX

APPENDIX A COGCC 900 SERIES RULES



EXECUTIVE SUMMARY

SandRidge Exploration and Production, LLC (SandRidge) is an oil and gas exploration and production company operating in the North Park Basin in Jackson County, Colorado. SandRidge is registered with the Colorado Oil and Gas Conservation Commission (COGCC) and was assigned Operator No. 10598.

In an effort to promote the minimization of wastes that would otherwise be disposed off-site, SandRidge is proposing to manage water-based bentonitic E&P wastes generated during well drilling activities via bioremediation land treatment techniques, allowing SandRidge to beneficially use the wastes after achieving compliance with applicable COGCC rules.

This document outlines the operational requirements to be implemented when land treating residual water-based bentonitic drilling fluids and associated drill cuttings on the drill pad locations where they were generated to comply with COGCC Rule 907.e.(2). These materials will be treated on-site via solidification and bioremediation techniques. Once compliant with the COGCC Table 910-1 concentration levels, the materials will be utilized on-site or at other COGCC-permitted facilities in the North Park Basin operated by SandRidge, as defined in this Field-Wide Exploration and Production (E&P) Waste Management Plan. Facility locations are illustrated on Figure 1.

1.0 REGULATORY FRAMEWORK

SandRidge has developed practices and procedures to ensure that on-site land treatment of water-based bentonitic drilling fluids and associated drill cuttings are managed in a way to achieve compliance with the COGCC 900 Series Rules (Appendix A). The practices and procedures for this plan are identified in the following sections.



2.0 PRACTICES AND PROCEDURES

2.1 GENERAL

Water-based bentonitic drill cuttings will be solidified and bioremediated utilizing commercially available solidification and bioremediation products (e.g. EcoSponge, Geozorb, etc.) on SandRidge operated oil and gas production well pads located in Jackson County, Colorado. Only residual water-based bentonitic drilling fluids and associated drill cuttings generated by SandRidge will be land treated at these locations. No other E&P wastes will be deposited at these sites. If land treatment occurs on an adjacent area not being utilized for oil and gas operations, SandRidge will obtain prior written surface owner approval per COGCC Rule 907.e.(2)G.

2.2 MATERIAL HANDLING

2.2.1 Drilling Fluids

SandRidge will employ closed-loop drilling techniques at the production well pad locations. The drill cuttings will be mechanically separated from water-based bentonitic drilling fluids and stored on-site in temporary aboveground storage tanks. Drilling fluids will be disposed of accordingly per COGCC Rule 907.d.

2.2.2 Drill Cuttings

After the drill cuttings are mechanically separated from the drilling fluids, they will be conveyed into a temporary cuttings cell. SandRidge will use suitable solidification and bioremediation materials to further dry the cuttings and prevent free liquids from leaching from the cuttings themselves. Potential solidification and bioremediation materials that will be used include one of the commercially available products identified above, although native soil may also be used as well. Once removed from the temporary cuttings cell, the drill cuttings will be temporarily stockpiled followed by spreading in evenly sized windrows on a designated area of the drilling pad to prevent pooling, ponding, or run-off of fluids. The solidified drill cuttings will be stockpiled in windrows in the designated treatment area to a maximum width of twelve feet and a maximum lift of four feet. Biodegradation of the cuttings will be enhanced by disking, tilling, aerating, or the addition of nutrients, water, and/or biological amendments to promote microbial hydrocarbon degradation, as needed.

2.3 STORMWATER CONTROLS

The drill cuttings windrows will be surrounded by perimeter structural controls, such as an earthen berm, to prevent potential stormwater run-on and run-off. Bi-weekly (14-day) inspections of these controls will be conducted to ensure that they are properly maintained. Following any precipitation event significant enough to cause erosion, the liquid level within the controls will be inspected and removed for proper disposal, as needed. These structural controls will be maintained at all times while soil treatment activities are being conducted.



2.4 WEED CONTROL

Invasive weed control will be conducted in the disturbed areas associated with the land treatment areas.

2.5 GREATER SAGE GROUSE HABITAT STIPULATIONS

If the treatment area is located within an identified greater sage grouse leks habitat, material turning activities will occur outside of seasonal stipulations for the greater sage-grouse (i.e. March 1 to June 30).



3.0 SAMPLING PLAN

The following describes the procedures that will be used to sample and analyze drill cuttings that have been bioremediated to ensure that they are compliant with the COGCC Table 910-1 concentration levels prior to their beneficial use.

3.1 CONFIRMATION SAMPLING

One composite soil sample consisting of four to five discrete grab samples will be periodically collected for every 100 cubic yards of cuttings being treated to gauge bioremediation progress. The number of composite samples to be collected will be based on measuring the dimensions of each drill cuttings windrow from which their volumes, expressed in cubic yards, will be determined. The samples will be collected using a hand auger or similar sampling device, then containerized and preserved pursuant to well-established sample collection protocols, after which they will be delivered to an independent third-party laboratory for analysis under strict chain-of-custody (COC) procedures. The samples will be analyzed for total petroleum hydrocarbons (TPH)-gasoline range organics (GRO), TPH-diesel range organics (DRO), benzene, toluene, ethylbenzene, and total xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), electrical conductivity (EC), pH, sodium adsorption ratio (SAR), and COGCC Table 910-1 metals, except boron using the analytical methods prescribed in the EPA publication SW-846 *Methods for Evaluating Solid Waste, Physical/Chemical Methods*.

3.2 NON-COMPLIANT SAMPLES

Additional samples of the cuttings will be periodically collected until compliance with Table 910-1 concentration levels is achieved for the confirmation analysis addressed in Section 3.1 above.

If any of the above analytes exceed Table 910-1 concentration levels following a three-year treatment period, then SandRidge will either:

- 1.) Dispose of the cuttings at a permitted commercial disposal facility;
- 2.) Prepare and submit a plan to the COGCC to bury the cuttings and cover it with at least three feet of clean soil, if the cuttings only exceed inorganics (EC, pH, or SAR); or
- 3.) Use it at another location outside of active agricultural areas if the cuttings only exceed inorganics.

If buried off site, then written land owner permission will be obtained.



4.0 BENEFICIAL USE

Upon receipt of analytical results demonstrating that the treated cuttings are compliant with the COGCC Table 910-1 concentration levels, they will be beneficially used on-site or at other COGCC-permitted facilities in the North Park Basin operated by SandRidge.

4.1 TYPES OF BENEFICIAL USE

The treated cuttings will be beneficially used as construction material at SandRidge operated oil and gas locations. Specifically, the treated cuttings will be used in the construction and maintenance of well pads, access roads, containment berms or other similar applications.

4.2 SURFACE OWNER AGREEMENT

Written authorization from the surface owner will be obtained by SandRidge if land treatment occurs in an adjacent area not being utilized for oil and gas operations.



5.0 DOCUMENTATION

5.1 RECORDKEEPING

SandRidge will maintain the following records:

- Name of the on-site production well(s) and pad where cuttings were generated;
- Volumes of drill cuttings treated and solidification and/or bioremediation materials used;
- Treatment type and date;
- Date of transfer of the treated material from the treatment area to the area of beneficial use;
- Name of transporter;
- Location where the treated cuttings were used, recorded using GPS coordinates; and
- The manner in which the treated cuttings were beneficially used.

Upon written request by the COGCC, this information will be provided within five business days, in a format readily reviewable. The recordkeeping format is included as Table 1.

5.2 CLOSURE

Once the treated cuttings meet the Table 910-1 concentration levels and have been removed from the treatment area for on-site or off-site beneficial use, SandRidge will request closure of the treatment area by submitting a Sundry Notice Form 4 that includes a report summarizing the sampling activities and the corresponding analytical results.



FIGURES

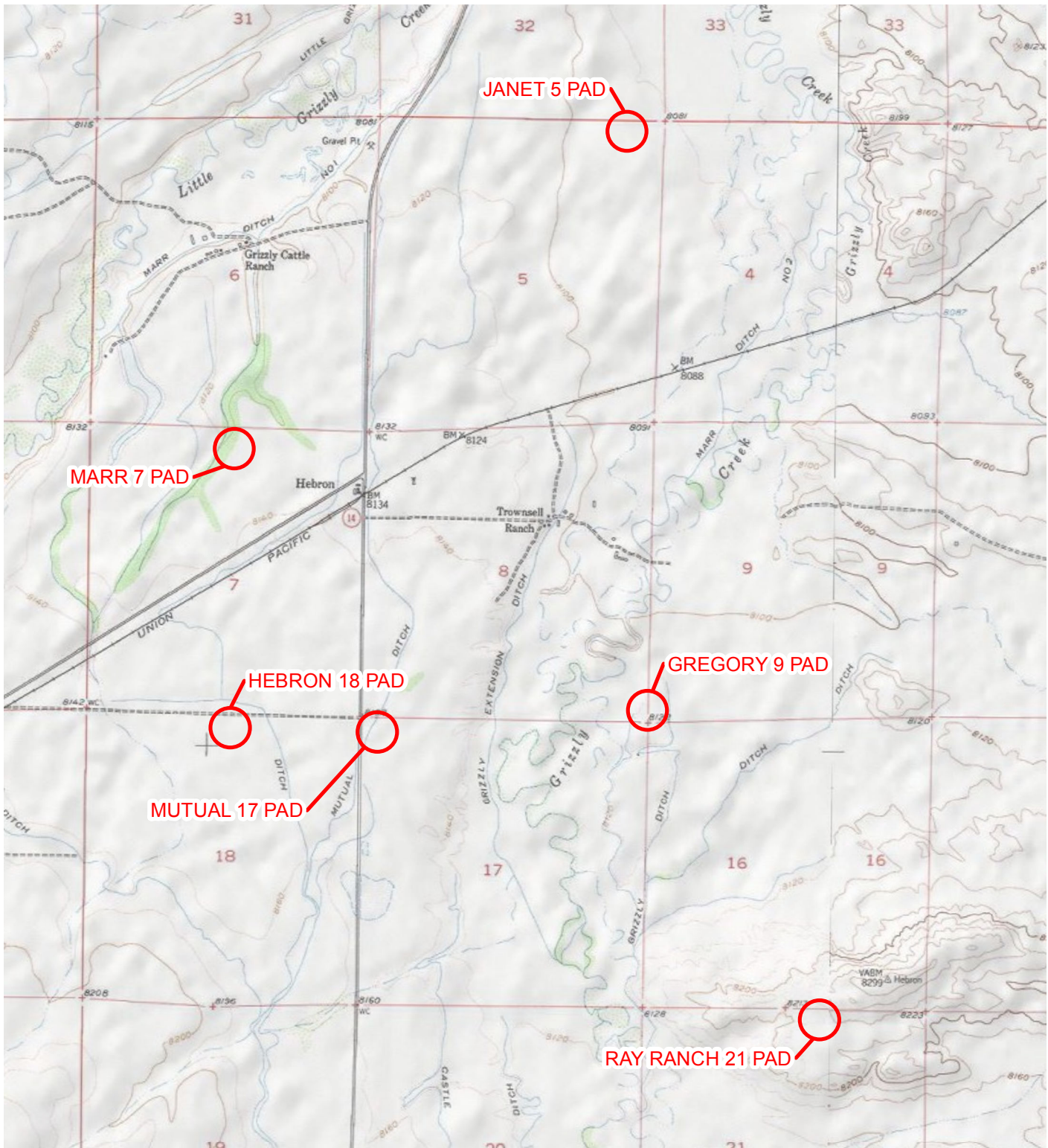


IMAGE COURTESY OF ESRI/USGS

LEGEND

 SITE LOCATION



FIGURE 1
SITE LOCATION MAP
NORTH PARK BASIN E&P WASTE MANAGEMENT PLAN
JACKSON COUNTY, COLORADO



SANDRIDGE EXPLORATION AND PRODUCTION, LLC

TABLES



**TABLE 1
DRILLING PAD LOCATION TRACKING SHEET**

**NORTH PARK BASIN PROJECT AREA EXPLORATION & PRODUCTION WASTE MANAGEMENT PLAN
SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

Pad Name	Facility ID	Production Well Name	API No.	Spud Date	Completion Date	Material Volume Generated	Treatment Type	Treatment Date	Sample Date(s)	Date of Transfer	Reuse Location	Name of Transporter	Comments
Gregory 9 Pad	439603	Gregory #5-09H	05-057-06535										
Hebron 18 Pad	414127	Hebron 01-18HR	05-057-06536										
Mutual 17 Pad	324757	Mutual 01-17H	05-057-06534										
Marr 7 Pad	413754	Marr 06-07H	05-057-06497										
Janet 5 Pad	434832	Janet 1-05H	05-057-06522										
Ray Ranch 21 Pad	438250	Ray Ranch #7-21H	05-057-06531										



APPENDIX A



E&P WASTE MANAGEMENT

901. INTRODUCTION

- a. **General.** The rules and regulations of this series establish the permitting, construction, operating and closure requirements for pits, methods of E&P waste management, procedures for spill/release response and reporting, and sampling and analysis for remediation activities. The 900 Series rules are applicable only to E&P waste, as defined in § 34-60-103(4.5), C.R.S., or other solid waste where the Colorado Department Of Public Health And Environment has allowed remediation and oversight by the Commission.
- b. **COGCC reporting forms.** The reporting required by the rules and regulations of this series shall be made on forms provided by the Director. Alternate forms may be used where equivalent information is supplied and the format has been approved by the Director.
- c. **Additional requirements.** Whenever the Director has reasonable cause to believe that an operator, in the conduct of any oil or gas operation, is performing any act or practice which threatens to cause or causes a violation of Table 910-1 and with consideration of water quality standards or classifications established by the Water Quality Control Commission ("WQCC") for waters of the state, the Director may impose additional requirements, including but not limited to, sensitive area determination, sampling and analysis, remediation, monitoring, permitting and the establishment of points of compliance. Any action taken pursuant to this Rule shall comply with the provisions of Rules 324A. through D. and the 500 Series rules.
- d. **Alternative compliance methods.** Operators may propose for prior approval by the Director alternative methods for determining the extent of contamination, sampling and analysis, or alternative cleanup goals using points of compliance.
- e. **Sensitive area determination.** When the operator or Director has data that indicate an impact or threat of impact to ground water or surface water, the Director may require the operator to make a sensitive area determination and that determination shall be subject to the Director's approval. The sensitive area determination shall be made using appropriate geologic and hydrogeologic data to evaluate the potential for impact to ground water and surface water, such as soil borings, monitoring wells, or percolation tests that demonstrate that seepage will not reach underlying ground water or waters of the State and impact current or future uses of these waters. Operators shall submit data evaluated and analysis used in the determination to the Director.
- f. **Sensitive area operations.** Operations in sensitive areas shall incorporate adequate measures and controls to prevent significant adverse environmental impacts and ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC standards and classifications.

902. PITS - GENERAL AND SPECIAL RULES

- a. Pits used for exploration and production of oil and gas shall be constructed and operated to protect public health, safety, and welfare and the environment, including soil, waters of the state, and wildlife, from significant adverse environmental, public health, or welfare impacts from E&P waste, except as permitted by applicable laws and regulations.
- b. Pits shall be constructed, monitored, and operated to provide for a minimum of two (2) feet of freeboard at all times between the top of the pit wall at its point of lowest elevation and

the fluid level of the pit. A method of monitoring and maintaining freeboard shall be employed. Any unauthorized release of fluids from a pit shall be subject to the reporting requirements of Rule 906.

- c. Any accumulation of oil or condensate in a pit shall be removed within twenty-four (24) hours of discovery. Operators shall use skimming, steam cleaning of exposed liners, or other safe and legal methods as necessary to maintain pits in clean condition and to control hydrocarbon odors. Only de minimis amounts of hydrocarbons may be present unless the pit is specifically permitted for oil or condensate recovery or disposal use. A Form 15, Earthen Pit Report/Permit, may be revoked by the Director and the Director may require that the pit be closed if an operator repeatedly allows more than de minimis amounts of oil or condensate to accumulate in a pit. This requirement is not applicable to properly permitted and properly fenced, lined, and netted skim pits that are designed, constructed, and operated to prevent impacts to wildlife, including migratory birds.
- d. Where necessary to protect public health, safety and welfare or to prevent significant adverse environmental impacts resulting from access to a pit by wildlife, migratory birds, domestic animals, or members of the general public, operators shall install appropriate netting or fencing.
- e. Pits used for a period of no more than three (3) years, or more than three (3) years if the Director has issued a variance, for storage, recycling, reuse, treatment, or disposal of E&P waste or fresh water, as applicable, may be permitted in accordance with Rule 903 to service multiple wells, subject to Director approval.
- f. Unlined pits shall not be constructed on fill material.
- g. Except as allowed under Rule 904.a, unlined pits shall not be constructed in areas where pathways for communication with ground water or surface water are likely to exist.
- h. Produced water shall be treated in accordance with Rule 907 before being placed in a production pit.
- i. Operators shall utilize appropriate biocide treatments to control bacterial growth and related odors as needed.

903. PIT PERMITTING/REPORTING REQUIREMENTS

- a. An Earthen Pit Report/Permit, Form 15, shall be submitted to the Director for prior approval for the following pits:
 - (1) All production pits.
 - (2) Special purpose pits except those reported under Rule 903.b.(1) or Rule 903.b.(2).
 - (3) Drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 10,000 ppm TPH or chloride concentrations at total well depth exceeding 15,000 ppm.
 - (4) Multi-well pits containing produced water, drilling fluids, or completion fluids that will be recycled or reused, except where reuse consists only of moving drilling fluids from one (1) oil and gas location to another such location for reuse there.
- b. An Earthen Pit Report/Permit, Form 15, shall be submitted within thirty (30) calendar days after construction for the following:

- (1) Special purpose pits used in the initial phase of emergency response.
 - (2) Flare pits where there is no risk of condensate accumulation.
- c. An Earthen Pit Report/Permit, Form 15, shall not be required for drilling pits using water-based bentonitic drilling fluids with concentrations of TPH and chloride below those referenced in Rule 903.a.(3).
 - d. An Earthen Pit Report/Permit, Form 15, shall be completed in accordance with the instructions in Appendix I. Failure to complete the form in full may result in delay of approval or return of form.
 - e. The Director shall endeavor to review any properly completed Earthen Pit Report/Permit, Form 15, within thirty (30) calendar days after receipt. In order to allow adequate time for pit permit review and approval, operators shall submit an Earthen Pit Report/Permit, Form 15, at the same time as the Application for Permit-to-Drill, Form 2, is submitted. The Director may condition permit approval upon compliance with additional terms, provisions, or requirements necessary to protect the waters of the state, public health, or the environment.

904. PIT LINING REQUIREMENTS AND SPECIFICATIONS

- a. Pits that were constructed before May 1, 2009 on federal land, or before April 1, 2009 on other land, shall comply with their permit conditions and the rules in effect at the time of their construction. The following pits shall be lined if they are constructed on or after May 1, 2009 on federal land, or on or after April 1, 2009 on other land:
 - (1) Drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 10,000 ppm TPH or chloride concentrations at total well depth exceeding 15,000 ppm.
 - (2) Production pits, other than skim pits, unless the operator demonstrates to the Director's satisfaction that the quality of the produced water is equivalent to or better than that of the underlying groundwater or the operator can clearly demonstrate by substantial evidence, such as by appropriate percolation tests, that seepage will not reach the underlying aquifer or waters of the state at contamination levels in excess of applicable standards. Subject to Rule 901.c, this requirement shall not apply to such pits in Huerfano or Las Animas Counties constructed before May 1, 2011, or to such pits in Washington, Yuma, Logan, or Morgan counties constructed before May 1, 2013.
 - (3) Special purpose pits, except emergency pits constructed during initial emergency response to spills/releases, or flare pits where there is no risk of condensate accumulation.
 - (4) Skim pits.
 - (5) Multi-well pits used to contain produced water, drilling fluids, or completion fluids that will be recycled or reused, except where reuse consists only of moving drilling fluids from one oil and gas location to another such location for reuse there. Subject to Rule 901.c, this requirement shall not apply to multi-well pits used to contain produced water in Huerfano or Las Animas Counties constructed before May 1, 2011, or to multi-well

pits used to contain produced water in Washington, Yuma, Logan, or Morgan counties constructed before May 1, 2013.

- (6) Pits at centralized E&P waste management facilities and UIC facilities.
- b. The following specifications shall apply to all pits that are required to be lined by rule or by permit condition:
- (1) Materials used in lining pits shall be of a synthetic material that is impervious, has high puncture and tear strength, has adequate elongation, and is resistant to deterioration by ultraviolet light, weathering, hydrocarbons, aqueous acids, alkali, fungi or other substances in the produced water.
 - (2) All pit lining systems shall be designed, constructed, installed, and maintained in accordance with the manufacturers' specifications and good engineering practices.
 - (3) Field seams must be installed and tested in accordance with manufacturer specifications and good engineering practices. Testing results must be maintained by the operator and provided to the Director upon request.
- c. The following specifications shall also apply to pits that are required to be lined, except those at centralized E&P waste management facilities, unless an oil and gas operator demonstrates to the satisfaction of the Director that a liner system offering equivalent protection to public health, safety, and welfare, including the environment and wildlife resources, will be used:
- (1) Liners shall have a minimum thickness of twenty-four (24) mils. The synthetic or fabricated liner shall cover the bottom and interior sides of the pit with the edges secured with at least a twelve (12) inch deep anchor trench around the pit perimeter. The anchor trench shall be designed to secure, and prevent slippage or destruction of, the liner materials.
 - (2) The foundation for the liner shall be constructed with soil having a minimum thickness of twelve (12) inches after compaction covering the entire bottom and interior sides of the pit, and shall be constructed so that the hydraulic conductivity shall not exceed 1.0×10^{-7} cm/sec after testing and compaction. Compaction and permeability test results measured in the laboratory and field must be maintained by the operator and provided to the Director upon request.
 - (3) As an alternative to the soil foundation described in Rule 904.c.(2), the foundation may be constructed with bedding material that exceeds a hydraulic conductivity of 1.0×10^{-7} cm/sec, if a double synthetic liner system is used; however, the bottom and sides of the pit shall be padded with soil or synthetic matting type material and shall be free of sharp rocks or other material that are capable of puncturing the liner. Each synthetic liner shall have a minimum thickness of twenty-four (24) mils.
- d. The following specifications shall also apply to pits used at centralized E&P waste management facilities, unless an oil and gas operator demonstrates to the satisfaction of the Director that a liner system offering equivalent protection to public health, safety, and welfare, including the environment and wildlife resources, will be used:
- (1) Liners shall have a minimum thickness of sixty (60) mils. The synthetic or fabricated liner shall cover the bottom and interior sides of the pit with the edges secured

with at least a twelve (12) inch deep anchor trench around the pit perimeter. The anchor trench shall be designed to secure, and prevent slippage or destruction of, the liner materials.

- (2) The foundation for the liner shall be constructed with soil having a minimum thickness of twenty-four (24) inches after compaction covering the entire bottom and interior sides of the pit, and shall be constructed so that the hydraulic conductivity shall not exceed 1.0×10^{-7} cm/sec after testing and compaction. Compaction and permeability test results measured in the laboratory and field must be maintained by the operator and provided to the Director upon request.
 - (3) As an alternative to the soil foundation described in Rule 904.d.(2), a secondary liner consisting of a geosynthetic clay liner, which is a manufactured hydraulic barrier typically consisting of bentonite clay or other very low permeability material, supported by geotextiles or geomembranes, which are held together by needling, stitching, or chemical adhesives, may be used.
- e. In Sensitive Areas, the Director may require a leak detection system for the pit or other equivalent protective measures, including but not limited to, increased record-keeping requirements, monitoring systems, and underlying gravel fill sumps and lateral systems. In making such determination, the Director shall consider the surface and subsurface geology, the use and quality of potentially-affected ground water, the quality of the produced water, the hydraulic conductivity of the surrounding soils, the depth to ground water, the distance to surface water and water wells, and the type of liner.

905. CLOSURE OF PITS, AND BURIED OR PARTIALLY BURIED PRODUCED WATER VESSELS.

- a. Drilling pits shall be closed in accordance with the 1000-Series Rules.
- b. Pits not used exclusively for drilling operations, buried or partially buried produced water vessels, and emergency pits shall be closed in accordance with an approved Site Investigation and Remediation Workplan, Form 27. The workplan shall be submitted for prior Director approval and shall include a description of the proposed investigation and remediation activities in accordance with Rule 909. Emergency pits shall be closed and remediated as soon as the initial phase of emergency response operations are complete or process upset conditions are controlled.
 - (1) Operators shall ensure that soils and ground water meet the concentration levels of Table 910-1.
 - (2) **Pit evacuation.** Prior to backfilling and site reclamation, E&P waste shall be treated or disposed in accordance with Rule 907.
 - (3) Liners shall be disposed as follows:
 - A. **Synthetic liner disposal.** Liner material shall be removed and disposed in accordance with applicable legal requirements for solid waste disposal.
 - B. **Constructed soil liners.** Constructed soil liner material may be removed for treatment or disposal, or, where left in place, the material shall be ripped and mixed with native soils in a manner to alleviate compaction and prevent an impermeable barrier to infiltration and ground water flow and shall meet soil standards listed in Table 910-1.

- (4) Soil beneath the low point of the pit must be sampled to verify no leakage of the managed fluids. Soil left in place shall meet the standards listed in Table 910-1.
- c. **Discovery of a spill/release during closure.** When a spill/release is discovered during closure operations, operators shall report the spill/release on the Spill/Release Report, Form 19, in accordance with Rule 906. Leaking pits and buried or partially buried produced water vessels shall be closed and remediated in accordance with Rules 909. and 910.
- d. **Unlined drilling pits.** Unlined drilling pits shall be closed and reclaimed in accordance with the 1000 Series rules and operators shall ensure that soils and ground water meet the concentration levels in Table 910-1.

906. SPILLS AND RELEASES

- a. **General.** Operators shall, immediately upon discovery, control and contain all spills/releases of E&P waste or produced fluids to protect the environment, public health, safety, and welfare, and wildlife resources. Operators shall investigate, clean up, and document impacts resulting from spills/releases as soon as practicable. The Director may require additional activities to prevent or mitigate threatened or actual significant adverse environmental impacts on any air, water, soil or biological resource, or to the extent necessary to ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC ground water standards and classifications.
- b. **Reporting spills or releases of E&P Waste or produced fluids.**
 - (1) Report to the Director. Operators shall report a spill or release of E&P Waste or produced fluids that meet any of the following criteria to the Director verbally or in writing as soon as practicable, but no more than twenty-four (24) hours after discovery (the "Initial Report").
 - A. A spills/release of any size that impacts or threatens to impact any waters of the state, a residence or occupied structure, livestock, or public byway;
 - B. A spill/release in which one (1) barrel or more of E&P Waste or produced fluids is spilled or released outside of berms or other secondary containment;
 - C. A spill/release of five (5) barrels or more regardless of whether the spill/release is completely contained within berms or other secondary containment.

The Initial Report to the Director shall include, at a minimum, the location of the spill/release and any information available to the Operator about the type and volume of waste involved.

If the Initial Report was not made by submitting a COGCC Spill/Release Report, Form 19 the Operator must submit a Form 19 with the Initial Report information as soon as practicable but not later than 72 hours after discovery of the spill/release unless extended by the Director.

In addition to the Initial Report to the Director, the Operator shall make a supplemental report on Form 19 not more than 10 calendar days after the spill/release is discovered that includes an 8 1/2 x 11 inch topographic map showing the governmental section and location of the spill or an aerial photograph showing the location of the spill; all pertinent

information about the spill/release known to the Operator that has not been reported previously; and information relating to the initial mitigation, site investigation, and remediation measures conducted by the Operator.

The Director may require further supplemental reports or additional information.

- (2) Notification to the local government. In addition to the Initial Report to the Director, as soon as practicable, but not more than 24 hours after discovery of a spill/release of E & P Waste or produced fluids reportable under Rule 906.b.(1)A or B, above, an Operator shall provide verbal or written notification to the entity with jurisdiction over emergency response within the local municipality if the spill/release occurred within a municipality or the local county if the spill/release did not occur within a municipality. The notification shall include, at a minimum, the information provided in the Initial Report to the Director.
 - (3) Notification to the Surface Owner. In addition to the Initial Report to the Director, within 24 hours after discovery of a spill/release of E & P Waste or produced fluids reportable under Rule 906.b.(1)A or B, an Operator shall provide verbal notification to the affected Surface Owner or the Surface Owner's appointed tenant. If the Surface Owner cannot be reached within 24 hours, the Operator shall continue good faith efforts to notify the Surface Owner until notice has been provided. The verbal notification shall include, at a minimum, the information provided in the Initial Report to the Director.
 - (4) Report to Environmental Release/Incident Report Hotline. A spill/release of any size which impact or threaten to impact any surface water supply area shall be reported to the Director and to the Environmental Release/Incident Report Hotline (1-877-518-5608). Spills and releases that impact or threaten a surface water intake shall be verbally reported to the emergency contact for that facility immediately after discovery.
 - (5) Reporting chemical spills or releases. Chemical spills and releases shall be reported in accordance with applicable state and federal laws, including the Emergency Planning and Community Right-to-Know Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Oil Pollution Act, and the Clean Water Act, as applicable.
- c. **Remediation of spills/releases.** When threatened or actual significant adverse environmental impacts on any air, water, soil or other environmental resource from a spill/release exist or when necessary to ensure compliance with the concentration levels in Table 910-1 with consideration to WQCC ground water standards and classifications, the Director may require operators to submit a Site Investigation and Remediation Workplan, Form 27.
- (1) Such spills/releases shall be remediated in accordance with Rules 909 and 910.
 - (2) The operator shall make good faith efforts to notify and consult with the affected Surface Owner, or the Surface Owner's appointed tenant, prior to commencing operations to remediate E&P waste from a spill/release in an area not being utilized for oil and gas operations. Such efforts shall not unreasonably delay commencement of remediation approved by the Director.

d. **Spill/release prevention.**

- (1) **Secondary containment.** Secondary containment structures shall be sufficiently impervious to contain discharged material. Secondary containment that was constructed before May 1, 2009 on federal land, or before April 1, 2009 on other land, shall comply with the rules in effect at the time of construction. Secondary containment constructed on or after May 1, 2009 on federal land, or on or after April 1, 2009 on other land shall be constructed or installed around all tanks containing oil, condensate, or produced water with greater than 3,500 milligrams per liter (mg/l) total dissolved solids (TDS) and shall be sufficient to contain the contents of the largest single tank and sufficient freeboard to contain precipitation. Operators are also subject to tank and containment requirements under Rules 603. and 604. This requirement shall not apply to water tanks with a capacity of fifty (50) barrels or less.
- (2) **Spill/release evaluation.** Operators shall determine and document the cause of a spill/release of E & P Waste or produced fluids and, to the extent practicable, identify and timely implement measures to prevent spills/releases due to similar causes in the future.

907. MANAGEMENT OF E&P WASTE

a. **General requirements.**

- (1) **Operator obligations.** Operators shall ensure that E&P waste is properly stored, handled, transported, treated, recycled, or disposed to prevent threatened or actual significant adverse environmental impacts to air, water, soil or biological resources or to the extent necessary to ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC ground water standards and classifications.
- (2) E&P waste management activities shall be conducted, and facilities constructed and operated, to protect the waters of the state from significant adverse environmental impacts from E&P waste, except as permitted by applicable laws and regulations.
- (3) **Reuse and recycling.** To encourage and promote waste minimization, operators may propose plans for managing E&P waste through beneficial use, reuse, and recycling by submitting a written management plan to the Director for approval on a Sundry Notice, Form 4, if applicable. Such plans shall describe, at a minimum, the type(s) of waste, the proposed use of the waste, method of waste treatment, product quality assurance, and shall include a copy of any certification or authorization that may be required by other laws and regulations. The Director may require additional information.

b. **Waste transportation.**

- (1) E&P waste, when transported off-site within Colorado for treatment or disposal, shall be transported to facilities authorized by the Director or waste disposal facilities approved to receive E&P waste by the Colorado Department of Public Health and Environment. When transported to facilities outside of Colorado for treatment or disposal, E&P waste shall be transported to facilities authorized and permitted by the appropriate regulatory agency in the receiving state.

(2) **Waste generator requirements.** Generators of E&P waste that is transported off-site shall maintain, for not less than five (5) years, copies of each invoice, bill, or ticket and such other records as necessary to document the following requirements A through F:

- A. The date of the transport;
- B. The identity of the waste generator;
- C. The identity of the waste transporter;
- D. The location of the waste pickup site;
- E. The type and volume of waste; and
- F. The name and location of the treatment or disposal site.

Such records shall be signed by the transporter, made available for inspection by the Director during normal business hours, and copies thereof shall be furnished to the Director upon request.

c. Produced water.

(1) **Treatment of produced water.** Produced water shall be treated prior to placement in a production pit to prevent crude oil and condensate from entering the pit.

(2) **Produced water disposal.** Produced water may be disposed as follows:

- A. Injection into a Class II well, permitted in accordance with Rule 325.;
- B. Evaporation/percolation in a properly permitted pit;
- C. Disposal at permitted commercial facilities;
- D. Disposal by roadspreading on lease roads outside sensitive areas for produced waters with less than 3,500 mg/l TDS when authorized by the surface owner and in accordance with an approved waste management plan per Rule 907.a.(3). Roadspreading of produced waters shall not impact waters of the state, shall not result in pooling or runoff, and the adjacent soils shall meet the concentration levels in Table 910-1. Flowback fluids shall not be used for dust suppression.
- E. Discharging into state waters, in accordance with the Water Quality Control Act and the rules and regulations promulgated thereunder.
 - i. Operators shall provide the Colorado discharge permit number, latitude and longitude coordinates, in accordance with Rule 215.f, of the discharge outfall, and sources of produced water on a Source of Produced Water for Disposal, Form 26, and shall include a U.S.G.S. topographic map showing the location of the discharge outfall.
 - ii. Produced water discharged pursuant to this subsection (2).E. may be put to beneficial use in accordance with applicable state statutes and regulations governing the use and administration of water.

F. Evaporation in a properly lined pit at a centralized E&P waste management facility permitted in accordance with Rule 908.

- (3) **Produced water reuse and recycling.** Produced water may be reused for enhanced recovery, drilling, and other approved uses in a manner consistent with existing water rights and in consideration of water quality standards and classifications established by the WQCC for waters of the state, or any point of compliance established by the Director pursuant to Rule 324D.
- (4) **Mitigation.** Water produced during operation of an oil or gas well may be used to provide an alternative domestic water supply to surface owners within the oil or gas field, in accordance with all applicable laws, including, but not limited to, obtaining the necessary approvals from the WQCD for constructing a new "waterworks," as defined by Section 25-1-107(1)(X)(II)(A), C.R.S. Any produced water not so used shall be disposed of in accordance with subsection (2) or (3). Providing produced water for domestic use within the meaning of this subsection (4) shall not constitute an admission by the operator that the well is dewatering or impacting any existing water well. The water produced shall be to the benefit of the surface owner within the oil and gas field and may not be sold for profit or traded.

d. **Drilling fluids.**

- (1) **Recycling and reuse.** Drilling pit contents may be recycled to another drilling pit for reuse consistent with Rule 903.
- (2) **Treatment and disposal.** Drilling fluids may be treated or disposed as follows:
- A. Injection into a Class II well permitted in accordance with Rule 325;
 - B. Disposal at a commercial solid waste disposal facility; or
 - C. Land treatment or land application at a centralized E&P waste management facility permitted in accordance with Rule 908.
- (3) **Additional authorized disposal of water-based bentonitic drilling fluids.** Water-based bentonitic drilling fluids may be disposed as follows:
- A. Drying and burial in pits on non-crop land. The resulting concentrations shall not exceed the concentration levels in Table 910-1, below; or
 - B. Land application as follows:
 - i. **Applicability.** Acceptable methods of land application include, but are not limited to, production facility construction and maintenance, and lease road maintenance.
 - ii. **Land application requirements.** The average thickness of water-based bentonitic drilling fluid waste applied shall be no more than three (3) inches prior to incorporation. The waste shall be applied to prevent ponding or erosion and shall be incorporated as a beneficial amendment into the native soils within ten (10) days of application. The resulting concentrations shall not exceed those in Table 910-1.

- iii. **Surface owner approval.** Operators shall obtain written authorization from the surface owner prior to land application of water-based bentonitic drilling fluids.
 - iv. **Operator obligations.** Operators shall maintain a record of the source, the volume, and the location where the land application of the water-based bentonitic drilling fluid occurred. Upon the Director's written request, this information shall be provided within five (5) business days, in a format readily reviewable by the Director. Operators with control and authority over the wells from which the water-based bentonitic drilling fluid wastes are obtained retain responsibility for the land application operation, and shall diligently cooperate with the Director in responding to complaints regarding land application of water-based bentonitic drilling fluids.
 - v. **Approval.** Prior Director approval is not required for reuse of water-based bentonitic drilling fluids for land application as a soil amendment.
- e. **Oily waste.** Oily waste includes those materials containing crude oil, condensate or other E&P waste, such as soil, frac sand, drilling fluids, and pit sludge that contain hydrocarbons.

(1) Oily waste may be treated or disposed as follows:

- A. Disposal at a commercial solid waste disposal facility;
- B. Land treatment onsite; or
- C. Land treatment at a centralized E&P waste management facility permitted in accordance with Rule 908.

(2) Land treatment requirements:

- A. In the case of a reportable spill, Operators shall submit a Site Investigation and Remediation Workplan, Form 27, for prior approval by the Director. Treatment shall thereafter be completed in accordance with the workplan and Rules 909. and 910.
- B. Free oil shall be removed from the oily waste prior to land treatment.
- C. Oily waste shall be spread evenly to prevent pooling, ponding, or runoff.
- D. Contamination of stormwater runoff, ground water, or surface water shall be prevented.
- E. Biodegradation shall be enhanced by disking, tilling, aerating, or addition of nutrients, microbes, water or other amendments, as appropriate.
- F. Land-treated oily waste incorporated in place or beneficially reused shall not exceed the concentrations in Table 910-1.
- G. When land treatment occurs in an area not being utilized for oil and gas operations, operators shall obtain prior written surface owner approval. When land treatment occurs on an approved Oil and Gas Location prior

to completion of interim reclamation or on the surface disturbance remaining after interim reclamation, notice shall be provided to the surface owner.

H. Land treatment shall be conducted in a manner that does not preclude compliance with reclamation rules 1003 and 1004.

f. **Other E&P Waste.** Other E&P waste such as workover fluids, tank bottoms, pigging wastes from gathering and flow lines, and natural gas gathering, processing, and storage wastes may be treated or disposed of as follows:

- (1) Disposal at a commercial solid waste disposal facility;
- (2) Treatment at a centralized E&P waste management facility permitted in accordance with Rule 908;
- (3) Injection into a Class II injection well permitted in accordance with Rule 325; or
- (4) An alternative method proposed in a waste management plan in accordance with rule 907.a.(3) and approved by the Director.

907A. MANAGEMENT OF NON-E&P WASTE

- a. Certain wastes generated by oil and gas-related activities are non-E&P wastes and are not exempt from regulation as solid or hazardous wastes. These wastes need to be properly identified and disposed of in accordance with state and federal regulations.
- b. Certain wastes generated by oil and gas-related activities can either be E&P wastes or non-E&P wastes depending on the circumstances of their generation.
- c. The hazardous waste regulations require that a hazardous waste determination be made for any non-E&P solid waste. Hazardous wastes require storage, treatment, and disposal practices in accordance with 6 C.C.R. 1007-3. All non-hazardous/non-E&P wastes are considered solid waste which require storage, treatment, and disposal in accordance with 6 C.C.R. 1007-2.

908. CENTRALIZED E&P WASTE MANAGEMENT FACILITIES

- a. **Applicability.** Operators may establish non-commercial, centralized E&P waste management facilities for the treatment, disposal, recycling or beneficial reuse of E&P waste. This rule applies only to non-commercial facilities, which means the operator does not represent itself as providing E&P waste management services to third parties, except as part of a unitized area or joint operating agreement or in response to an emergency. Centralized facilities may include components such as land treatment or land application sites, pits, and recycling equipment.
- b. **Permit requirements.** Before any person shall commence construction of a centralized E&P waste management facility, such person shall file with the Director an application on Form 28 and pay a filing and service fee established by the Commission (see Appendix III), and obtain the Director's approval. The application shall contain the following:
 - (1) The name, address, phone and fax number of the operator, and a designated contact person.

- (2) The name, address, and phone number of the surface owner of the site, if not the operator, and the written authorization of such surface owner.
- (3) The legal description of the site.
- (4) A general topographic, geologic, and hydrologic description of the site, including immediately adjacent land uses, a topographic map of a scale no less than 1:24,000 showing the location, and the average annual precipitation and evaporation rates at the site.
- (5) **Centralized facility siting requirements.**
 - A. A site plan showing drainage patterns and any diversion or containment structures, and facilities such as roads, fencing, tanks, pits, buildings, and other construction details.
 - B. Scaled drawings of entire sections containing the proposed facility. The field measured distances from the nearer north or south and nearer east or west section lines shall be measured at ninety (90) degrees from said section lines to facility boundaries and referenced on the drawing. A survey shall be provided including a complete description of established monuments or collateral evidence found and all aliquot corners.
 - C. The facility shall be designed to control public access, prevent unauthorized vehicular traffic, provide for site security both during and after operating hours, and prevent illegal dumping of wastes. Appropriate measures shall also be implemented to prevent access to the centralized facility by wildlife or domestic animals.
 - D. Centralized facilities shall have a fire lane of at least ten (10) feet in width around the active treatment areas and within the perimeter fence. In addition, a buffer zone of at least ten (10) feet shall be maintained within the perimeter fire lane.
 - E. Surface water diversion structures, including, but not limited to, berms and ditches, shall be constructed to accommodate a one hundred (100) year, twenty four (24) hour event. The facility shall be designed and constructed with a run-on control system to prevent flow onto the facility during peak discharge and a run-off control system to contain the water volume from a twenty-five (25) year, twenty-four (24) hour storm.
- (6) **Waste profile.** For each type of waste, the amounts to be received and managed by the facility shall be estimated on a monthly average basis. For each waste type to be treated, a characteristic waste profile shall be completed.
- (7) **Facility design and engineering.** Facility design and engineering data, including plans and elevations, design basis, calculations, and process description.
 - A. Geologic data, including, but not limited to:
 - i. Type and thickness of unconsolidated soils;
 - ii. Type and thickness of consolidated bedrock, if applicable;
 - iii. Local and regional geologic structures; and

iv. Any geologic hazards that may affect the design and operation of the facility.

B. Hydrologic data, including, but not limited to:

- i. Surface water features within two (2) miles;
- ii. Depth to shallow ground water and major aquifers;
- iii. Water wells within one (1) mile of the site boundary and well depth, depth to water, screened intervals, yields, and aquifer name;
- iv. Hydrologic properties of shallow ground water and major aquifers including flow direction, flow rate, and potentiometric surface;
- v. Site location in relation to the floodplain of nearby surface water features;
- vi. Existing quality of shallow ground water; and
- vii. An evaluation of the potential for impacts to nearby surface water and ground water.

C. Engineering data, including, but not limited to:

- i. Type and quantity of material required for use as a liner, including design components;
- ii. Location and depth of cut for liners;
- iii. Location, dimensions, and grades of all surface water diversion structures;
- iv. Location and dimensions of all surface water containment structures; and
- v. Location of all proposed facility structures and access roads.

(8) **Operating plan.** An operating plan, including, but not limited to:

- A. A detailed description of the method of treatment, loading rates, and application of nutrients and soil amendments;
- B. Dust and moisture control;
- C. Sampling;
- D. Inspection and maintenance;
- E. Emergency response;
- F. Record-keeping;
- G. Site security;

- H. Hours of operation;
- I. Noise and odor mitigation; and
- J. Final disposition of waste. Where treated waste will be beneficially reused, a description of reuse and method of product quality assurance shall be included.

(9) Ground water monitoring.

A. Water Wells.

Water samples shall be collected from water wells known to the operator or registered with the Colorado State Engineer within a one (1) mile radius of the proposed facility and shall be analyzed to establish baseline water quality. Analytical parameters shall be selected based upon the proposed waste stream and shall include, at a minimum, all major cations and anions, total dissolved solids, iron and manganese, nutrients (nitrates, nitrites, selenium), benzene, toluene, ethylbenzene, xylenes, pH, and specific conductance. Operators shall use reasonable good faith efforts to identify and obtain access to such water wells for the purpose of collecting water samples. If access cannot be obtained, then the operator shall notify the Director of the wells for which access was not obtained and sampling of such wells by the operator shall not be required. Not conducting sampling because access to water wells cannot be obtained shall not be grounds for denial of the proposed facility.

Copies of all test results described above shall be provided to the Director and the water well owner within three (3) months of collecting the samples. Laboratory results shall also be submitted to the Director in an electronic data deliverable format.

B. Site-specific monitoring wells.

- i. Where applicable, the Director shall require ground water monitoring to ensure compliance with the concentration levels in Table 910-1 and WQCC standards and classifications by establishing points of compliance, unless an oil and gas operator demonstrates to the satisfaction of the Director that an alternative method offering equivalent protection of public health, safety, and welfare, including the environment and wildlife resources, can be employed and provided the operator employs a dual liner with a leak detection system that provides for immediate leak detection from the uppermost liner. All monitoring well construction must be completed in accordance with the State Engineer's regulations on well construction, "Water Well Construction Rules" (2 C.C.R. 402-2).
- ii. Where monitoring is required, the direction of flow, ground water gradient and quality of water shall be established by the installation of a minimum of three (3) monitor wells, including an up-gradient well and two (2) down-gradient wells that will serve as points of compliance, or other methods authorized by the Director.

- (10) **Surface water monitoring.** Where applicable, the Director shall require baseline and periodic surface water monitoring to ensure compliance with WQCC surface water standards and classifications. Operators shall use reasonable good faith efforts to obtain access to such surface water for the purpose of collecting water samples. If access cannot be obtained, then the operator shall notify the Director of the surface water for which access was not obtained and sampling of such surface water by the operator shall not be required. Not conducting sampling because access to surface water cannot be obtained shall not be grounds for denial of the proposed facility.
- (11) **Contingency plan.** A contingency plan that describes the emergency response operations for the facility, 24-hour contact information for the person who has authority to initiate emergency response actions, and an outline of responsibilities under the joint operating agreement regarding maintenance, closure, and monitoring of the facility.
- c. **Permit approval.** The Director shall endeavor to approve or deny the properly completed permit within thirty (30) days after receipt and may condition permit approval as necessary to prevent any threatened or actual significant adverse environmental impact on air, water, soil or biological resources or to the extent necessary to ensure compliance with the concentration levels in Table 910-1, with consideration to WQCC ground water standards and classifications.
- d. **Financial assurance.** The operator of a centralized E&P waste management facility shall submit for the Director's approval such financial assurance as required by Rule 704. prior to issuance of the operating permit.
- e. **Facility modifications.** Throughout the life of the facility the operator shall submit proposed modifications to the facility design, operating plan, permit data, or permit conditions to the Director for prior approval.
- f. **Annual permit review.** To ensure compliance with permit conditions and the 900 Series rules, the facility permit shall be subject to an annual review by the Director. To facilitate this review, the operator shall submit an annual report summarizing operations, including the types and volumes of waste actually handled at the facility. The Director may require additional information.
- g. **Closure.**
- (1) **Preliminary closure plan.** A general preliminary plan for closure shall be submitted with the Centralized E&P Waste Management Facility Permit, Form 28. The preliminary closure plan shall include, but not be limited to:
- A. A general plan for closure and reclamation of the entire facility, including a description of the activities required to decommission and remove all equipment, close and reclaim pits, dispose of or treat residual waste, collect samples as needed to verify compliance with soil and ground water standards, implement post-closure monitoring, and complete other remediation, as required.
- B. An estimate of the cost to close and reclaim the entire facility and to conduct post-closure monitoring. Cost estimates shall be subject to review by the Director.

- (2) **Final closure plan.** A detailed Site Investigation and Remediation Workplan, Form 27, shall be submitted at least sixty (60) days prior to closure for approval by the Director. The workplan shall include, but not be limited to, a description of the activities required to decommission and remove all equipment, close and reclaim pits, dispose of or treat residual waste, collect samples as needed to verify compliance with soil and ground water standards, implement post-closure monitoring, and complete other remediation, as required.
- h. Operators may be subject to local requirements for zoning and construction of facilities and shall provide copies of any approval notices, permits, or other similar types of notifications for the facility from local governments or other agencies to the Director for review prior to issuance of the operating permit.

909. SITE INVESTIGATION, REMEDIATION, AND CLOSURE

- a. **Applicability.** This section applies to the closure and remediation of pits other than drilling pits constructed pursuant to Rule 903.a.(3); investigation, reporting and remediation of spills/releases; permitted waste management facilities including treatment facilities; plugged and abandoned wellsites; sites impacted by E&P waste management practices; or other sites as designated by the Director.
- b. **General site investigation and remediation requirements.**
- (1) **Sensitive Area Determination.** Operators shall complete a sensitive area determination in accordance with Rule 901.e.
 - (2) **Sampling and analyses.** Sampling and analysis of soil and ground water shall be conducted in accordance with Rule 910. to determine the horizontal and vertical extent of any contamination in excess of the concentrations in Table 910-1.
 - (3) **Management of E&P waste.** E&P waste shall be managed in accordance with Rule 907.
 - (4) **Pit evacuation.** Prior to backfilling and site reclamation, E&P waste shall be treated or disposed in accordance with Rule 907. and the 1000 Series rules.
 - (5) **Remediation.** Remediation shall be performed in a manner to mitigate, remove, or reduce contamination that exceeds the concentrations in Table 910-1 in order to ensure protection of public health, safety, and welfare, and to prevent and mitigate significant adverse environmental impacts. Soil that does not meet concentrations in Table 910-1 shall be remediated. Ground water that does not meet concentrations in Table 910-1 shall be remediated in accordance with a Site Investigation and Remediation Workplan, Form 27.
 - (6) **Reclamation.** Remediation sites shall be reclaimed in accordance with the 1000 Series rules for reclamation.
- c. **Site Investigation And Remediation Workplan, Form 27.** Operators shall prepare and submit for prior Director approval a Site Investigation and Remediation Workplan, Form 27, for the following operations and remediation activities:
- (1) Unlined pit closure when required by Rule 905.
 - (2) Remediation of spills/releases in accordance with Rule 906.

- (3) Land treatment of oily waste in accordance with Rule 907.e.
 - (4) Closure of centralized E&P waste management facilities in accordance with Rule 908.g.
 - (5) Remediation of impacted ground water in accordance with Rule 910.b.(4).
- d. **Multiple sites.** Remediation of multiple sites may be submitted on a single workplan with prior Director approval.
- e. **Closure.**
- (1) Remediation and reclamation shall be complete upon compliance with the concentrations in Table 910-1, or upon compliance with an approved workplan.
 - (2) **Notification of completion.** Within thirty (30) days after conclusion of site remediation and reclamation activities operators shall provide the following notification of completion:
 - A. Operators conducting remediation operations in accordance with Rule 909.b. shall submit to the Director a Site Investigation and Remediation Workplan, Form 27, containing information sufficient to demonstrate compliance with these rules.
 - B. Operators conducting remediation under an approved workplan shall submit to the Director, by adding or attaching to the original workplan, information sufficient to demonstrate compliance with the workplan.
- f. **Release of financial assurance.** Financial assurance required by Rule 706. may be held by the Director until the required remediation of soil and/or ground water impacts is completed in accordance with the approved workplan, or until cleanup goals are met.

910. CONCENTRATIONS AND SAMPLING FOR SOIL AND GROUND WATER

- a. **Soil and groundwater concentrations.** The concentrations for soil and ground water are in Table 910-1. Ground water standards and analytical methods are derived from the ground water standards and classifications established by WQCC.
- b. **Sampling and analysis.**
- (1) **Existing workplans.** Sampling and analysis for sites subject to an approved workplan shall be conducted in accordance with the workplan and the sampling and analysis requirements described in this rule.
 - (2) **Methods for sampling and analysis.** Sampling and analysis for site investigation or confirmation of successful remediation shall be conducted to determine the nature and extent of impact and confirm compliance with appropriate concentration levels in Table 910-1.
 - A. **Field analysis.** Field measurements and field tests shall be conducted using appropriate equipment, calibrated and operated according to manufacturer specifications, by personnel trained and familiar with the equipment.

- B. **Sample collection.** Samples shall be collected, preserved, documented, and shipped using standard environmental sampling procedures in a manner to ensure accurate representation of site conditions.
- C. **Laboratory analytical methods.** Laboratories shall analyze samples using standard methods (such as EPA SW-846 or API RP-45) appropriate for detecting the target analyte. The method selected shall have detection limits less than or equal to the concentrations in Table 910-1.
- D. **Background sampling.** Samples of comparable, nearby, non-impacted, native soil, ground water or other medium may be required by the Director for establishing background conditions.

(3) **Soil sampling and analysis.**

- A. **Applicability.** If soil contamination is suspected or known to exist as a result of spills/releases or E&P waste management, representative samples of soil shall be collected and analyzed in accordance with this rule.
- B. **Sample collection.** Samples shall be collected from areas most likely to have been impacted, and the horizontal and vertical extent of contamination shall be determined. The number and location of samples shall be appropriate to the impact.
- C. **Sample analysis.** Soil samples shall be analyzed for contaminants listed in Table 910-1 as appropriate to assess the impact or confirm remediation. The analytical parameters shall be selected based on site-specific conditions and process knowledge and shall be agreed to and approved by the Director.
- D. **Soil impacted by produced water.** For impacts to soil due to produced water, samples from comparable, nearby non-impacted native soil shall be collected and analyzed for purposes of establishing background soil conditions including pH and electrical conductivity (EC). Where EC of the impacted soil exceeds the level in Table 910-1, the sodium adsorption ratio (SAR) shall also be determined.
- E. **Soil impacted by hydrocarbons.** For impacts to soil due to hydrocarbons, samples shall be analyzed for TPH or organic compounds per Table 910-1 as determined by site-specific conditions and process knowledge..

(4) **Ground water sampling and analysis.**

- A. **Applicability.** Operators shall collect and analyze representative samples of ground water in accordance with these rules under the following circumstances:
 - (i) Where ground water contamination is suspected or known to exceed the concentrations in Table 910-1;
 - (ii) Where impacted soils are in contact with ground water; or
 - (iii) Where impacts to soils extend down to the high water table.

- B. **Sample collection.** Samples shall be collected from areas most likely to have been impacted, downgradient or in the middle of excavated areas. The number and location of samples shall be appropriate to determine the horizontal and vertical extent of the impact. If the concentrations in Table 910-1 are exceeded, the direction of flow and a ground water gradient shall be established, unless the extent of the contamination and migration can otherwise be adequately determined.
- C. **Sample analysis.** Ground water samples shall be analyzed for benzene, toluene, ethylbenzene, xylene, and API RP-45 constituents, or other parameters appropriate for evaluating the impact. The analytical parameters shall be selected based on site-specific conditions and process knowledge and shall be agreed to and approved by the Director.
- D. **Impacted ground water.** Where ground water contaminants exceed the concentrations listed in Table 910-1, operators shall notify the Director and submit to the Director for prior approval a Site Investigation and Remediation Workplan, Form 27, for the investigation, remediation, or monitoring of ground water to meet the required concentrations in Table 910-1.

911. PIT, BURIED OR PARTIALLY BURIED PRODUCED WATER VESSEL, BLOWDOWN PIT, AND BASIC SEDIMENT/TANK BOTTOM PIT MANAGEMENT REQUIREMENTS PRIOR TO DECEMBER 30, 1997.

- a. **Applicability.** This rule applies to the management, operation, closure and remediation of drilling, production and special purpose pits, buried or partially buried produced water vessels, blowdown pits, and basic sediment/tank bottom pits put into service prior to December 30, 1997 and unlined skim pits put into service prior to July 1, 1995. For pits constructed after December 30, 1997 and skim pits constructed after July 1, 1995, operators shall comply with the requirements contained in Rules 901. through 910.
- b. **Inventory.** Operators were required to submit to the Director no later than December 31, 1995, an inventory identifying production pits, buried or partially buried produced water vessels, blowdown pits, and basic sediment/tank bottom pits that existed on June 30, 1995. The inventory required operators to provide the facility name, a description of the location, type, capacity and use of pit/vessel, whether netted or fenced, lined or unlined, and where available, water quality data. Operators who have failed to submit the required inventory are in continuing violation of this rule.
- c. **Sensitive area determination.**
 - (1) For unlined production and special purpose pits constructed prior to July 1, 1995 and not closed by December 30, 1997, operators were required to determine whether the pit was located within a sensitive area in accordance with the Sensitive Area Determination Decision Tree, Figure 901-1 (now Rule 901.e.) and submit data evaluated and analysis used in the determination to the Director on a Sundry Notice, Form 4. In December 2008, Figure 901-1 was deleted from the 900-Series Rules.
 - (2) For steel, fiberglass, concrete, or other similar produced water vessels that were buried or partially buried and located in sensitive areas prior to December 30, 1997, operators were required to test such vessels for integrity, unless a monitoring or leak detection system was put in place.

d. The following permitting/reporting requirements applied to pits constructed prior to December 30, 1997:

(1) A Sundry Notice, Form 4, including the name, address, and phone number of the primary contact person operating the production pit for the operator, the facility name, a description of the location, type, capacity and use of pit, engineering design, installation features and water quality data, if available, was required for the following:

A. Lined production pits and lined special purpose pits constructed after July 1, 1995.

B. Unlined production pits constructed prior to July 1, 1995 which are lined in accordance with Rule 905. by December 30, 1997.

(2) An Application For Permit For Unlined Pit, Form 15 was required for the following:

A. Unlined production pits and special purpose pits in sensitive areas constructed prior to July 1, 1995, and not closed by December 30, 1997.

B. Unlined production pits outside sensitive areas constructed after July 1, 1995 and not closed by December 30, 1997.

(3) An Application For Permit For Unlined Pit, Form 15 and a variance under Rule 904.e.(1). (repealed, now Rule 502.b.) was required for unlined production pits and unlined special purpose pits in sensitive areas constructed after July 1, 1995.

(4) A Sundry Notice, Form 4 was required for unlined production pits outside sensitive areas receiving produced water at an average daily rate of five (5) or less barrels per day calculated on a monthly basis for each month of operation constructed prior to December 30, 1997.

e. The Director may have established points of compliance for unlined production pits and special purpose pits and for lined production pits in sensitive areas constructed after July 1, 1995.

f. Closure requirements.

(1) Operators of production or special purpose pits existing on July 1, 1995 which were closed before December 30, 1997, were required to submit a Sundry Notice, Form 4, within thirty (30) days of December 30, 1997. The Sundry Notice, Form 4 shall include a copy of the existing pit permit, if a permit was obtained, and a description of the closure process.

(2) Pits closed prior to December 30, 1997 were required to be reclaimed in accordance with the 1000 Series rules. Pits closed after December 30, 1997 shall be closed in accordance with the 900 Series rules and reclaimed in accordance with the 1000 Series rules.

(3) Operators of steel, fiberglass, concrete or other similar produced water vessels buried or partially buried and located in sensitive areas were required to repair or replace vessels and tanks found to be leaking. Operators shall repair or replace vessels and tanks found to be leaking. Operators shall submit to the Director a Sundry Notice, Form 4, describing the integrity testing results and action taken within thirty (30) days of December 30, 1997.

- (4) Closure of pits and steel, fiberglass, concrete or other similar produced water vessels, and associated remediation operations conducted prior to December 30, 1997 are not subject to Rules 905., 906., 907., 909. and 910.

912. VENTING OR FLARING NATURAL GAS

- a. The unnecessary or excessive venting or flaring of natural gas produced from a well is prohibited.
- b. Except for gas flared or vented during an upset condition, well maintenance, well stimulation flowback, purging operations, or a productivity test, gas from a well shall be flared or vented only after notice has been given and approval obtained from the Director on a Sundry Notice, Form 4, stating the estimated volume and content of the gas. The notice shall indicate whether the gas contains more than one (1) ppm of hydrogen sulfide. If necessary to protect the public health, safety or welfare, the Director may require the flaring of gas.
- c. Gas flared, vented or used on the lease shall be estimated based on a gas-oil ratio test or other equivalent test approved by the Director, and reported on Operator's Monthly Report of Operations, Form 7.
- d. Flared gas that is subject to Sundry Notice, Form 4, shall be directed to a controlled flare in accordance with Rule 903.b.(2) or other combustion device operated as efficiently as possible to provide maximum reduction of air contaminants where practicable and without endangering the safety of the well site personnel and the public.
- e. Operators shall notify the local emergency dispatch or the local governmental designee of any natural gas flaring. Notice shall be given prior to flaring when flaring can be reasonably anticipated, or as soon as possible, but in no event more than two (2) hours after the flaring occurs.

**Table 910-1
CONCENTRATION LEVELS¹**

Contaminant of Concern	Concentrations
Organic Compounds in Soil	
TPH (total volatile and extractable petroleum hydrocarbons)	500 mg/kg
Benzene	0.17 mg/kg²
Toluene	85 mg/kg²
Ethylbenzene	100 mg/kg²
Xylenes (total)	175 mg/kg²
Acenaphthene	1,000 mg/kg²
Anthracene	1,000 mg/kg²
Benz(a)anthracene	0.22 mg/kg²
Benzo(b)fluoranthene	0.22 mg/kg²
Benzo(k)fluoranthene	2.2 mg/kg²
Benzo(a)pyrene	0.022 mg/kg²
Chrysene	22 mg/kg²
Dibenzo(a,h)anthracene	0.022 mg/kg²
Fluoranthene	1,000 mg/kg²
Fluorene	1,000 mg/kg²
Indeno(1,2,3,c,d)pyrene	0.22 mg/kg²
Naphthalene	23 mg/kg²
Pyrene	1,000 mg/kg²

Organic Compounds in Ground Water	
Benzene	5 µg/l ³
Toluene	560 to 1,000 µg/l ³
Ethylbenzene	700 µg/l ³
Xylenes (Total)	1,400 to 10,000 µg/l ^{3,4}
Inorganics in Soils	
Electrical Conductivity (EC)	<4 mmhos/cm or 2x background
Sodium Adsorption Ratio (SAR)	<12 ⁵
pH	6-9
Inorganics in Ground Water	
Total Dissolved Solids (TDS)	<1.25 x background ³
Chlorides	<1.25 x background ³
Sulfates	<1.25 x background ³
Metals in Soils	
Arsenic	0.39 mg/kg ²
Barium (LDNR True Total Barium)	15,000 mg/kg ²
Boron (Hot Water Soluble)	2 mg/l ³
Cadmium	70 mg/kg ^{3,6}
Chromium (III)	120,000 mg/kg ²
Chromium (VI)	23 mg/kg ^{2,6}
Copper	3,100 mg/kg ²
Lead (inorganic)	400 mg/kg ²
Mercury	23 mg/kg ²
Nickel (soluble salts)	1,600 mg/kg ^{2,6}
Selenium	390 mg/kg ^{2,6}
Silver	390 mg/kg ²
Zinc	23,000 mg/kg ^{2,6}
Liquid Hydrocarbons in Soils and Ground Water	
Liquid hydrocarbons including condensate and oil	Below detection level

COGCC recommends that the latest version of EPA SW 846 analytical methods be used where possible and that analyses of samples be performed by laboratories that maintain state or national accreditation programs.

¹ Consideration shall be given to background levels in native soils and ground water.

² Concentrations taken from CDPHE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007).

³ Concentrations taken from CDPHE-WQCC Regulation 41 - The Basic Standards for Ground Water.

⁴ For this range of standards, the first number in the range is a strictly health-based value, based on the WQCC's established methodology for human health-based standards. The second number in the range is a maximum contaminant level (MCL), established under the Federal Safe Drinking Water Act which has been determined to be an acceptable level of this chemical in public water supplies, taking treatability and laboratory detection limits into account. The WQCC intends that control requirements for this chemical be implemented to attain a level of ambient water quality that is at least equal to the first number in the range except as follows: 1) where ground water quality exceeds the first number in the range due to a release of contaminants that occurred prior to September 14, 2004 (regardless of the date of discovery or subsequent migration of such contaminants) clean-up levels for the entire contaminant plume shall be no more restrictive than the second number in the range or the ground water quality resulting from such release, whichever is more protective, and 2) whenever the WQCC has adopted alternative, site-specific standards for the chemical, the site-specific standards shall apply instead of these statewide standards.

⁵ Analysis by USDA Agricultural Handbook 60 method (20B) with soluble cations determined by method (2). Method (20B) = estimation of exchangeable sodium percentage and exchangeable potassium percentage from soluble cations. Method (2) = saturated paste method (note: each analysis requires a unique sample of at least 500 grams). If soils are saturated, USDA Agricultural Handbook 60 with soluble cations determined by method (3A) saturation extraction method.

⁶ The table value for these inorganic constituents is taken from the CDPHE-HMWMD Table 1 Colorado Soil Evaluation Values (December 2007). However, because these values are high, it is possible that site-specific geochemical conditions may exist that could allow these constituents to migrate into ground water at

levels exceeding ground water standards even though the concentrations are below the table values. Therefore, when these constituents are present as contaminants, a secondary evaluation of their leachability must be performed to ensure ground water protection.

T6N, R81W, 6th P.M.

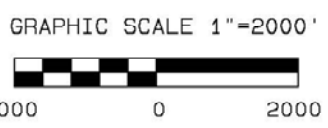
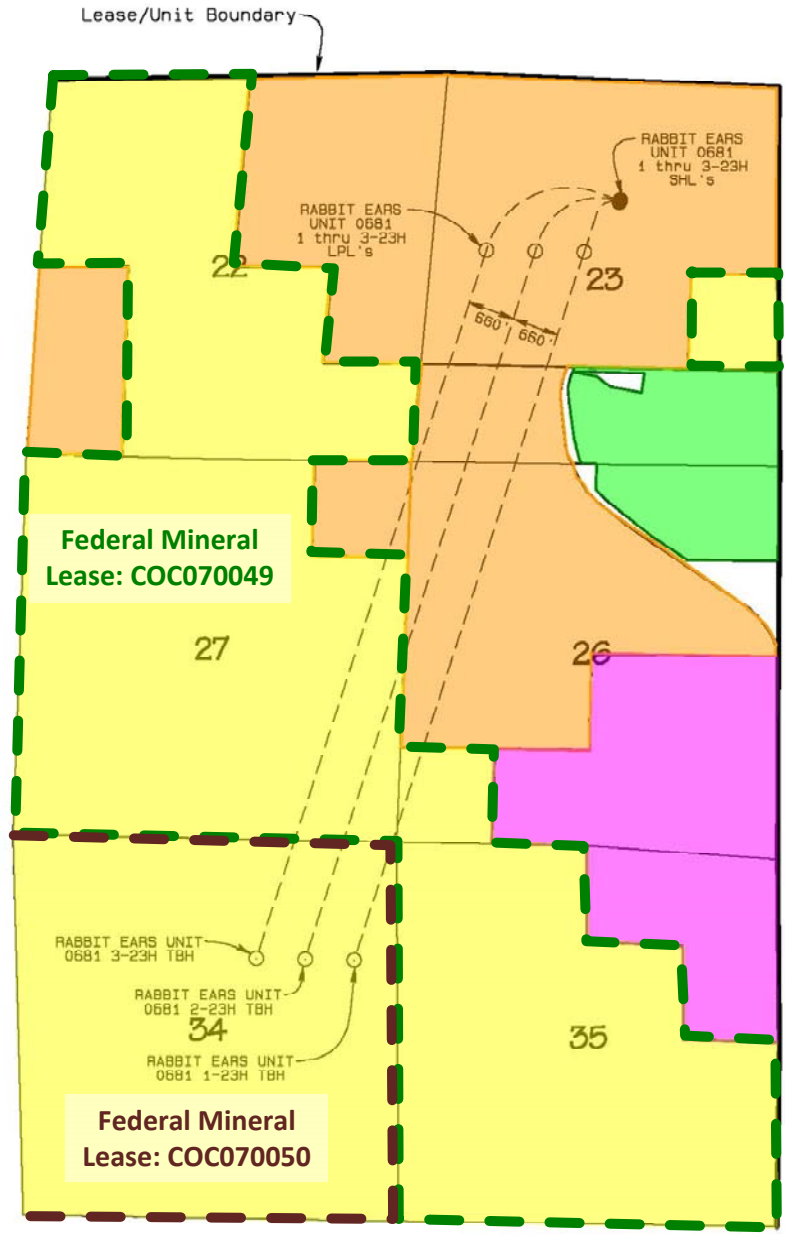
SandRidge Exploration & Production, LLC

BASIS OF BEARINGS:
US STATE PLANE 1983
CO NORTH 0501 GRID

Lease Area Plan
RABBIT EARS 0680 S23 PAD
located as shown in Sections 23, 26,
27, 34 and 35, T6N, R81W, 6th P.M.,
Jackson County, Colorado.

LEGEND

PROPOSED WELL ●
PROPOSED BHL/LPL ○



- FEE
- FEE
- USA
- FEE

RP ——— RABBIT EARS UNIT

NORTH PARK ENGINEERING & CONSULTING, INC.

P. O. BOX 395
WALDEN, CO 80480
(970) 723-3725

DATE OF FIELD WORK: MAR 20, 2016	DRAWING COMPLETION: JUN 8, 2016
SURVEYED BY: ADL	DRAWN BY: TKH
	CHECKED BY: RRM

United States Department of the Interior
Bureau of Land Management
 LITTLE SNAKE FIELD OFFICE
 455 EMERSON STREET
 CRAIG, CO, 81625 -1129
 Phone: (970) 826-5000

Receipt

No: 3647186

Transaction #: 3751173	
Date of Transaction: 08/30/2016	
CUSTOMER:	
SANDRIDGE E & P LLC 123 ROBERT S KERR AVE OKLAHOMA CITY,OK 73102-6406 US	

LINE #	QTY	DESCRIPTION	REMARKS	UNIT PRICE	TOTAL
1	3.00	OIL & GAS / APPLICATION FOR PERMIT TO DRILL (APD) / APD FEE	APD FEES FOR RABBIT EARS 0681 1-23H, 0681 2-23H, AND 0681 3-23H	9500.00	28500.00
TOTAL:					\$28,500.00

PAYMENT INFORMATION				
1	AMOUNT:	9500.00	POSTMARKED:	N/A
	TYPE:	CHECK	RECEIVED:	08/30/2016
	CHECK NO:	2460		
	NAME:	SANDRIDGE E & P LLC 123 ROBERT S KERR AVE OKLAHOMA CITY OK 73102-6406 US		
2	AMOUNT:	9500.00	POSTMARKED:	N/A
	TYPE:	CHECK	RECEIVED:	08/30/2016
	CHECK NO:	2461		
	NAME:	SANDRIDGE E & P LLC 123 ROBERT S KERR AVE OKLAHOMA CITY OK 73102-6406 US		
3	AMOUNT:	9500.00	POSTMARKED:	N/A
	TYPE:	CHECK	RECEIVED:	08/30/2016
	CHECK NO:	2462		
	NAME:	SANDRIDGE E & P LLC 123 ROBERT S KERR AVE OKLAHOMA CITY OK 73102-6406 US		

REMARKS

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