

Form 3160-3
(June 2015)FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☐ DRILL ☐ REENTER 1b. Type of Well: ☐ Oil Well ☐ Gas Well ☐ Other 1c. Type of Completion: ☐ Hydraulic Fracturing ☐ Single Zone ☐ Multiple Zone		5. Lease Serial No. 6. If Indian, Allottee or Tribe Name 7. If Unit or CA Agreement, Name and No. 8. Lease Name and Well No. [39912]	
2. Name of Operator [229137]		9. API Well No. 30-025-46758	
3a. Address		3b. Phone No. (include area code)	
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface At proposed prod. zone		10. Field and Pool, or Exploratory [98094]	
11. Sec., T. R. M. or Blk. and Survey or Area		12. County or Parish	
13. State		14. Distance in miles and direction from nearest town or post office*	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)		16. No of acres in lease	
17. Spacing Unit dedicated to this well		18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.	
19. Proposed Depth		20. BLM/BIA Bond No. in file	
21. Elevations (Show whether DF, KDB, RT, GL, etc.)		22. Approximate date work will start*	
23. Estimated duration		24. Attachments	
The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)			
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).		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 requested by the BLM.	
25. Signature		Name (Printed/Typed)	
Title		Date	
Approved by (Signature)		Name (Printed/Typed)	
Title		Office	
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.			

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(Continued on page 2)

APPROVED WITH CONDITIONS

KZ
01/23/2020

*(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 I: 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.

ITEM 24: If the proposal will involve hydraulic fracturing operations, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

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 connects this information to an 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 Connection 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: NWNW / 250 FNL / 560 FWL / TWSP: 26S / RANGE: 34E / SECTION: 5 / LAT: 32.079044 / LONG: -103.498662 (TVD: 0 feet, MD: 0 feet)
PPP: NWNW / 100 FNL / 495 FWL / TWSP: 26S / RANGE: 34E / SECTION: 5 / LAT: 32.079456 / LONG: -103.498872 (TVD: 10166 feet, MD: 10210 feet)
BHL: SWSW / 50 FSL / 495 FWL / TWSP: 26S / RANGE: 34E / SECTION: 8 / LAT: 32.050836 / LONG: -103.498847 (TVD: 10402 feet, MD: 20511 feet)

BLM Point of Contact

Name: Deborah Ham
Title: Legal Landlaw Examiner
Phone: 5752345965
Email: dham@blm.gov

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

PECOS DISTRICT DRILLING OPERATIONS CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating LLC
LEASE NO.:	NMNM124664
WELL NAME & NO.:	Gunner 8 Federal Com 301H
SURFACE HOLE FOOTAGE:	250' FNL & 560' FWL
BOTTOM HOLE FOOTAGE:	50' FSL & 495' FWL
LOCATION:	Section 5, T 26S, R 34E, NMPM
COUNTY:	Lea County, New Mexico

H2S	☐ Yes	☒ No	
Potash	☒ None	☐ Secretary	☐ R-111-P
Cave/Karst Potential	☒ Low	☐ Medium	☐ High
Variance	☐ None	☒ Flex Hose	☐ Other
Wellhead	☐ Conventional	☒ Multibowl	☐ Both
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP
Other	☐ Fluid Filled	☐ Cement Squeeze	☐ Pilot Hole
Special Requirements	☐ Water Disposal	☒ COM	☐ Unit

A. HYDROGEN SULFIDE

1. Hydrogen Sulfide (H2S) monitors shall be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area shall meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **13-3/8"** surface casing shall be set at approximately **875'** (a minimum of 25' into the Rustler Anhydrite and above the salt) and cemented to surface.
 - a. **If cement does not circulate to surface**, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of **6 hours** after pumping cement, ideally between 8-10 hours after.
 - b. WOC time for a primary cement job will be a minimum of **8 hours** or **500 psi** compressive strength, whichever is greater. This is to include the lead cement.
 - c. If cement falls back, remedial cementing will be done prior to drilling out the shoe.
 - d. WOC time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 psi compressive strength, whichever is greater.

2. The **9-5/8"** intermediate casing shall be cemented to surface.
 - a. **If cement does not circulate to surface**, see B.1.a, c & d.
3. The **5-1/2"** production casing shall be cemented with at least **200' tie-back** into the previous casing. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

D. SPECIAL REQUIREMENTS

1. Submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
 - a. The well sign on location shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

DR 1/6/2020

GENERAL REQUIREMENTS

1. The BLM is to be notified in advance for a representative to witness:
 - a. Spudding the well (minimum of 24 hours)
 - b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
 - c. BOP/BOPE tests (minimum of 4 hours)
 - ☒ Eddy County: Call the Carlsbad Field Office, (575) 361-2822
 - ☒ Lea County: Call the Hobbs Field Station, (575) 393-3612
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig:
 - i. Notify the BLM when moving in and removing the Spudder Rig.
 - ii. Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - iii. BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
4. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be available upon request. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the

following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well-specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On the portion of well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

- a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in Onshore Order 2 III.A.2.i must be followed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the BOP/BOPE tests.
- a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
 - b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test which can be initiated immediately after bumping the plug (only applies to single-stage cement jobs).
 - c. The tests shall be done by an independent service company utilizing a test plug. The results of the test shall be made available upon request.
 - d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
 - e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.
 - f. BOP/BOPE must be tested within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth

exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

1. Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

1. All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.
2. Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

DISTRICT I
1625 N. FRENCH DR., HOBBBS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6176 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-025	Pool Code 97892	Pool Name Jason Tank; Upper Bone Spring
Property Code	Property Name GUNNER 8 FEDERAL COM	
OGRID No. 229137		Well Number 301H
Operator Name COG OPERATING, LLC		Elevation 3333.4'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26-S	34-E		250	NORTH	560	WEST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	8	26-S	34-E		50	SOUTH	495	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
640			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the Division.

Signature
 Date **6/4/19**

Stan Wagner
Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 30, 2019
Date of Survey

Signature & Seal of Professional Surveyor

Chad L. HARCROW
 Certificate No. **CHAD HARCROW 17777**
 W.O. # 19-745 DRAWN BY: WN

Intent ☒ As Drilled ☐API #
30-025-

Operator Name: COG Operating LLC	Property Name: Gunner 8 Federal Com	Well Number 301H
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Kick Off Point (KOP)

UL D	Section 5	Township 26S	Range 34E	Lot	Feet	From N/S	Feet	From E/W	County Lea
Latitude					Longitude				NAD 83

First Take Point (FTP)

UL D	Section 5	Township 26S	Range 34E	Lot	Feet 100	From N/S North	Feet 495	From E/W West	County Lea
Latitude 32.079456					Longitude -103.498872				NAD 83

Last Take Point (LTP)

UL M	Section 8	Township 26S	Range 34E	Lot	Feet 100	From N/S South	Feet 495	From E/W West	County Lea
Latitude 32.050974					Longitude -103.498847				NAD 83

Is this well the defining well for the Horizontal Spacing Unit?

☐ No

Is this well an infill well?

☐ Yes

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API #
30-025-

Operator Name: COG Operating LLC	Property Name: Gunner 8 Federal Com	Well Number 302H
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KZ 06/29/2018

COG Production, LLC - Gunner 8 Federal Com #301H**1. Geologic Formations**

TVD of target	10,402' EOL	Pilot hole depth	NA
MD at TD:	20,511'	Deepest expected fresh water:	150'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	850	Water	
Top of Salt	1210	Salt	
Base of Salt	5025	Salt	
Lamar	5270	Salt Water	
Bell Canyon	5285	Salt Water	
Cherry Canyon	6345	Oil/Gas	
Brushy Canyon	7979	Oil/Gas	
Bone Spring Lime	9480	Oil/Gas	
U. Avalon Shale	9703	Oil/Gas	
L. Avalon Shale	10018	Target Zone	
1st Bone Spring Sand	10427	Not Penetrated	
2nd Bone Spring Sand	11076	Not Penetrated	
3rd Bone Spring Sand	X	Not Penetrated	
0	0	Not Penetrated	

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	875	13.375"	54.5	J55	STC	2.82	1.15	10.78
12.25"	0	4000	9.625"	40	J55	LTC	1.22	0.99	3.25
12.25"	4000	5290	9.625"	40	HCL80	LTC	1.39	1.44	5.73
8.75"	0	20,511	5.5"	17	P110	LTC	1.49	2.67	2.52
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

COG Production, LLC - Gunner 8 Federal Com #301H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary?	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

COG Production, LLC - Gunner 8 Federal Com #301H

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	330	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl ₂
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl ₂
Inter.	1030	12.7	2.0	9.6	16	Lead: 35:65:6 C Blend
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
5.5 Prod	710	11.9	2.5	19	72	Lead: 50:50:10 H Blend
	2700	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	50%
1 st Intermediate	0'	50%
Production	4,790'	25% OH in Lateral (KOP to EOL) – 40% OH in Vertical

COG Production, LLC - Gunner 8 Federal Com #301H

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
12-1/4"	13-5/8"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram		
			Other*		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

X	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

COG Production, LLC - Gunner 8 Federal Com #301H

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.6 - 8.8	28-34	N/C
Surf csg	9-5/8" Int shoe	Saturated Brine	10 - 10.1	28-34	N/C
9-5/8" Int shoe	Lateral TD	Cut Brine	8.6 - 9.3	28-34	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
Y	No Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

COG Production, LLC - Gunner 8 Federal Com #301H**7. Drilling Conditions**

Condition	Specify what type and where?
BH Pressure at deepest TVD	5035 psi at 10402' TVD
Abnormal Temperature	NO 160 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

Hydrogen Sulfide (H₂S) monitors will be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

N H₂S is present

Y H₂S Plan attached

8. Other Facets of Operation

Y	Is it a walking operation?
N	Is casing pre-set?

x	H ₂ S Plan.
x	BOP & Choke Schematics.
x	Directional Plan

COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

- a. The hazards and characteristics of hydrogen sulfide (H₂S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H₂S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
- d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

- a. The effects of H₂S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
- b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
- c. The contents and requirements of the H₂S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H₂S zone (within 3 days or 500 feet) and weekly H₂S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H₂S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H₂S SAFETY EQUIPMENT AND SYSTEMS

Note: All H₂S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H₂S. If H₂S greater than 100 ppm is encountered in the gas stream we will shut in and install H₂S equipment.

- a. Well Control Equipment:
 - Flare line.
 - Choke manifold with remotely operated choke.
 - Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
 - Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

- b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.
- c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.
- d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.
- e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.
- f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
- g. Communication:
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

W A R N I N G

**YOU ARE ENTERING AN H₂S AREA
AUTHORIZED PERSONNEL ONLY**

- 1. BEARDS OR CONTACT LENSES NOT ALLOWED***
- 2. HARD HATS REQUIRED***
- 3. SMOKING IN DESIGNATED AREAS ONLY***
- 4. BE WIND CONSCIOUS AT ALL TIMES***
- 5. CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

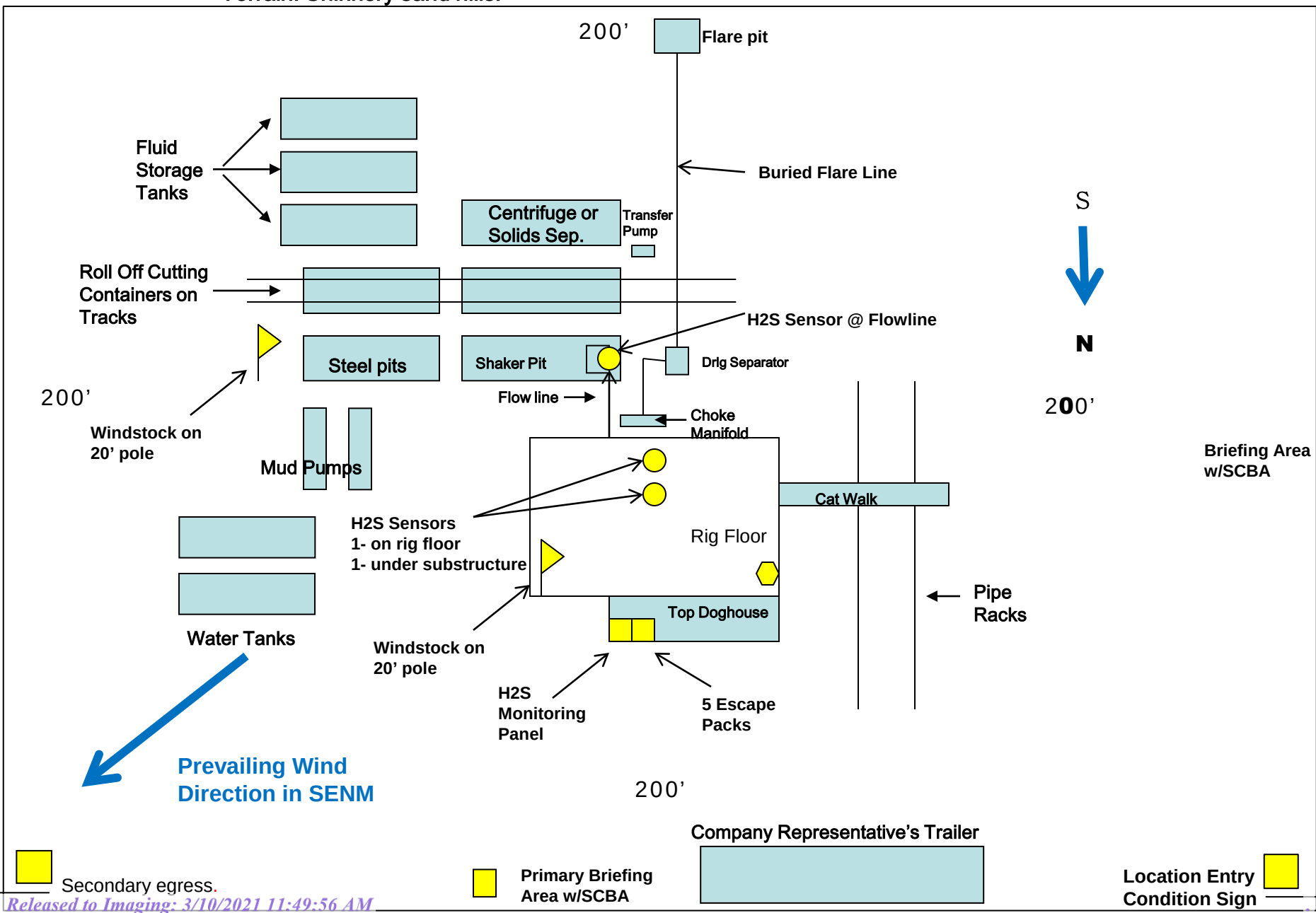
	<u>OFFICE</u>	<u>MOBILE</u>
COG OPERATING LLC OFFICE	575-748-6940	
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

	<u>OFFICE</u>
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

COC Operating LLC
H₂S Equipment Schematic
Terrain: Shinnery sand hills.

Well pad will be 400' x 400'
with cellar in center of pad



NORTHERN DELAWARE BASIN

LEA COUNTY, NM

BULLDOG

GUNNER 8 FED COM 301H

OWB

Plan: PWP1

Standard Survey Report

28 May, 2019

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

Project	LEA COUNTY, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		BULLDOG			
Site Position:		Northing:	398,637.10 usft	Latitude:	32° 5' 36.820 N
From:	Map	Easting:	741,887.40 usft	Longitude:	103° 33' 8.116 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.42 °

Well		GUNNER 8 FED COM 301H				
Well Position	+N/-S	0.0 usft	Northing:	393,436.00 usft	Latitude:	32° 4' 44.108 N
	+E/-W	0.0 usft	Easting:	758,670.60 usft	Longitude:	103° 29' 53.501 W
Position Uncertainty		3.0 usft	Wellhead Elevation:	usft	Ground Level:	3,333.4 usft

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM2015	1/24/2019	6.76	59.90	47,679.19641104

Design	PWP1				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	179.88	

Survey Tool Program	Date	5/28/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	9,752.0	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
9,752.0	20,511.3	PWP1 (OWB)	MWD+IFR1+MS	OWSG MWD + IFR1 + Multi-Station Correction	

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	

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Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
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
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00

Survey Report

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Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Start DLS 2.00 TFO 337.80									
5,600.0	2.00	337.80	5,600.0	1.6	-0.7	-1.6	2.00	2.00	0.00
5,610.3	2.21	337.80	5,610.2	2.0	-0.8	-2.0	2.00	2.00	0.00
Start 4141.4 hold at 5610.3 MD									
5,700.0	2.21	337.80	5,699.9	5.2	-2.1	-5.2	0.00	0.00	0.00
5,800.0	2.21	337.80	5,799.8	8.7	-3.6	-8.7	0.00	0.00	0.00
5,900.0	2.21	337.80	5,899.8	12.3	-5.0	-12.3	0.00	0.00	0.00
6,000.0	2.21	337.80	5,999.7	15.8	-6.5	-15.9	0.00	0.00	0.00
6,100.0	2.21	337.80	6,099.6	19.4	-7.9	-19.4	0.00	0.00	0.00
6,200.0	2.21	337.80	6,199.5	23.0	-9.4	-23.0	0.00	0.00	0.00
6,300.0	2.21	337.80	6,299.5	26.5	-10.8	-26.6	0.00	0.00	0.00
6,400.0	2.21	337.80	6,399.4	30.1	-12.3	-30.1	0.00	0.00	0.00
6,500.0	2.21	337.80	6,499.3	33.7	-13.7	-33.7	0.00	0.00	0.00
6,600.0	2.21	337.80	6,599.2	37.2	-15.2	-37.3	0.00	0.00	0.00
6,700.0	2.21	337.80	6,699.2	40.8	-16.6	-40.8	0.00	0.00	0.00
6,800.0	2.21	337.80	6,799.1	44.3	-18.1	-44.4	0.00	0.00	0.00
6,900.0	2.21	337.80	6,899.0	47.9	-19.5	-48.0	0.00	0.00	0.00
7,000.0	2.21	337.80	6,998.9	51.5	-21.0	-51.5	0.00	0.00	0.00
7,100.0	2.21	337.80	7,098.9	55.0	-22.5	-55.1	0.00	0.00	0.00
7,200.0	2.21	337.80	7,198.8	58.6	-23.9	-58.6	0.00	0.00	0.00
7,300.0	2.21	337.80	7,298.7	62.2	-25.4	-62.2	0.00	0.00	0.00
7,400.0	2.21	337.80	7,398.6	65.7	-26.8	-65.8	0.00	0.00	0.00
7,500.0	2.21	337.80	7,498.6	69.3	-28.3	-69.3	0.00	0.00	0.00
7,600.0	2.21	337.80	7,598.5	72.8	-29.7	-72.9	0.00	0.00	0.00
7,700.0	2.21	337.80	7,698.4	76.4	-31.2	-76.5	0.00	0.00	0.00
7,800.0	2.21	337.80	7,798.4	80.0	-32.6	-80.0	0.00	0.00	0.00
7,900.0	2.21	337.80	7,898.3	83.5	-34.1	-83.6	0.00	0.00	0.00
8,000.0	2.21	337.80	7,998.2	87.1	-35.5	-87.2	0.00	0.00	0.00
8,100.0	2.21	337.80	8,098.1	90.7	-37.0	-90.7	0.00	0.00	0.00
8,200.0	2.21	337.80	8,198.1	94.2	-38.4	-94.3	0.00	0.00	0.00
8,300.0	2.21	337.80	8,298.0	97.8	-39.9	-97.9	0.00	0.00	0.00
8,400.0	2.21	337.80	8,397.9	101.3	-41.4	-101.4	0.00	0.00	0.00
8,500.0	2.21	337.80	8,497.8	104.9	-42.8	-105.0	0.00	0.00	0.00
8,600.0	2.21	337.80	8,597.8	108.5	-44.3	-108.6	0.00	0.00	0.00
8,700.0	2.21	337.80	8,697.7	112.0	-45.7	-112.1	0.00	0.00	0.00
8,800.0	2.21	337.80	8,797.6	115.6	-47.2	-115.7	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)
8,900.0	2.21	337.80	8,897.5	119.2	-48.6	-119.3	0.00	0.00	0.00
9,000.0	2.21	337.80	8,997.5	122.7	-50.1	-122.8	0.00	0.00	0.00
9,100.0	2.21	337.80	9,097.4	126.3	-51.5	-126.4	0.00	0.00	0.00
9,200.0	2.21	337.80	9,197.3	129.8	-53.0	-130.0	0.00	0.00	0.00
9,300.0	2.21	337.80	9,297.2	133.4	-54.4	-133.5	0.00	0.00	0.00
9,400.0	2.21	337.80	9,397.2	137.0	-55.9	-137.1	0.00	0.00	0.00
9,500.0	2.21	337.80	9,497.1	140.5	-57.3	-140.7	0.00	0.00	0.00
9,600.0	2.21	337.80	9,597.0	144.1	-58.8	-144.2	0.00	0.00	0.00
9,700.0	2.21	337.80	9,696.9	147.7	-60.2	-147.8	0.00	0.00	0.00
9,751.7	2.21	337.80	9,748.6	149.5	-61.0	-149.6	0.00	0.00	0.00
Start DLS 10.00 TFO -158.29									
9,800.0	2.90	195.82	9,796.9	149.2	-61.7	-149.3	10.00	1.44	-293.92
9,900.0	12.81	183.09	9,895.8	135.7	-63.0	-135.8	10.00	9.91	-12.73
10,000.0	22.80	181.44	9,990.9	105.1	-64.1	-105.3	10.00	9.99	-1.65
10,100.0	32.79	180.76	10,079.3	58.6	-64.9	-58.7	10.00	10.00	-0.67
10,200.0	42.79	180.38	10,158.2	-2.6	-65.5	2.5	10.00	10.00	-0.38
10,300.0	52.79	180.12	10,225.3	-76.6	-65.8	76.5	10.00	10.00	-0.26
10,400.0	62.78	179.92	10,278.5	-161.1	-65.8	160.9	10.00	10.00	-0.20
10,500.0	72.78	179.75	10,316.3	-253.5	-65.5	253.4	10.00	10.00	-0.17
10,600.0	82.78	179.60	10,337.4	-351.2	-65.0	351.0	10.00	10.00	-0.15
10,668.7	89.65	179.50	10,342.0	-419.6	-64.4	419.5	10.00	10.00	-0.14
Start 9842.6 hold at 10668.7 MD									
10,700.0	89.65	179.50	10,342.2	-451.0	-64.2	450.8	0.00	0.00	0.00
10,800.0	89.65	179.50	10,342.8	-551.0	-63.3	550.8	0.00	0.00	0.00
10,900.0	89.65	179.50	10,343.4	-650.9	-62.4	650.8	0.00	0.00	0.00
11,000.0	89.65	179.50	10,344.0	-750.9	-61.6	750.8	0.00	0.00	0.00
11,100.0	89.65	179.50	10,344.6	-850.9	-60.7	850.8	0.00	0.00	0.00
11,200.0	89.65	179.50	10,345.2	-950.9	-59.8	950.8	0.00	0.00	0.00
11,300.0	89.65	179.50	10,345.8	-1,050.9	-58.9	1,050.8	0.00	0.00	0.00
11,400.0	89.65	179.50	10,346.4	-1,150.9	-58.1	1,150.8	0.00	0.00	0.00
11,500.0	89.65	179.50	10,347.0	-1,250.9	-57.2	1,250.8	0.00	0.00	0.00
11,600.0	89.65	179.50	10,347.7	-1,350.9	-56.3	1,350.8	0.00	0.00	0.00
11,700.0	89.65	179.50	10,348.3	-1,450.9	-55.5	1,450.8	0.00	0.00	0.00
11,800.0	89.65	179.50	10,348.9	-1,550.9	-54.6	1,550.8	0.00	0.00	0.00
11,900.0	89.65	179.50	10,349.5	-1,650.9	-53.7	1,650.8	0.00	0.00	0.00
12,000.0	89.65	179.50	10,350.1	-1,750.9	-52.8	1,750.8	0.00	0.00	0.00
12,100.0	89.65	179.50	10,350.7	-1,850.9	-52.0	1,850.8	0.00	0.00	0.00
12,200.0	89.65	179.50	10,351.3	-1,950.9	-51.1	1,950.8	0.00	0.00	0.00
12,300.0	89.65	179.50	10,351.9	-2,050.9	-50.2	2,050.8	0.00	0.00	0.00
12,400.0	89.65	179.50	10,352.5	-2,150.9	-49.4	2,150.8	0.00	0.00	0.00
12,500.0	89.65	179.50	10,353.1	-2,250.9	-48.5	2,250.8	0.00	0.00	0.00
12,600.0	89.65	179.50	10,353.7	-2,350.9	-47.6	2,350.7	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)	
12,700.0	89.65	179.50	10,354.4	-2,450.8	-46.7	2,450.7	0.00	0.00	0.00	
12,800.0	89.65	179.50	10,355.0	-2,550.8	-45.9	2,550.7	0.00	0.00	0.00	
12,900.0	89.65	179.50	10,355.6	-2,650.8	-45.0	2,650.7	0.00	0.00	0.00	
13,000.0	89.65	179.50	10,356.2	-2,750.8	-44.1	2,750.7	0.00	0.00	0.00	
13,100.0	89.65	179.50	10,356.8	-2,850.8	-43.3	2,850.7	0.00	0.00	0.00	
13,200.0	89.65	179.50	10,357.4	-2,950.8	-42.4	2,950.7	0.00	0.00	0.00	
13,300.0	89.65	179.50	10,358.0	-3,050.8	-41.5	3,050.7	0.00	0.00	0.00	
13,400.0	89.65	179.50	10,358.6	-3,150.8	-40.6	3,150.7	0.00	0.00	0.00	
13,500.0	89.65	179.50	10,359.2	-3,250.8	-39.8	3,250.7	0.00	0.00	0.00	
13,600.0	89.65	179.50	10,359.8	-3,350.8	-38.9	3,350.7	0.00	0.00	0.00	
13,700.0	89.65	179.50	10,360.5	-3,450.8	-38.0	3,450.7	0.00	0.00	0.00	
13,800.0	89.65	179.50	10,361.1	-3,550.8	-37.2	3,550.7	0.00	0.00	0.00	
13,900.0	89.65	179.50	10,361.7	-3,650.8	-36.3	3,650.7	0.00	0.00	0.00	
14,000.0	89.65	179.50	10,362.3	-3,750.8	-35.4	3,750.7	0.00	0.00	0.00	
14,100.0	89.65	179.50	10,362.9	-3,850.8	-34.5	3,850.7	0.00	0.00	0.00	
14,200.0	89.65	179.50	10,363.5	-3,950.8	-33.7	3,950.7	0.00	0.00	0.00	
14,300.0	89.65	179.50	10,364.1	-4,050.8	-32.8	4,050.7	0.00	0.00	0.00	
14,400.0	89.65	179.50	10,364.7	-4,150.8	-31.9	4,150.7	0.00	0.00	0.00	
14,500.0	89.65	179.50	10,365.3	-4,250.7	-31.1	4,250.7	0.00	0.00	0.00	
14,600.0	89.65	179.50	10,365.9	-4,350.7	-30.2	4,350.7	0.00	0.00	0.00	
14,700.0	89.65	179.50	10,366.6	-4,450.7	-29.3	4,450.7	0.00	0.00	0.00	
14,800.0	89.65	179.50	10,367.2	-4,550.7	-28.5	4,550.7	0.00	0.00	0.00	
14,900.0	89.65	179.50	10,367.8	-4,650.7	-27.6	4,650.7	0.00	0.00	0.00	
15,000.0	89.65	179.50	10,368.4	-4,750.7	-26.7	4,750.7	0.00	0.00	0.00	
15,100.0	89.65	179.50	10,369.0	-4,850.7	-25.8	4,850.6	0.00	0.00	0.00	
15,200.0	89.65	179.50	10,369.6	-4,950.7	-25.0	4,950.6	0.00	0.00	0.00	
15,300.0	89.65	179.50	10,370.2	-5,050.7	-24.1	5,050.6	0.00	0.00	0.00	
15,400.0	89.65	179.50	10,370.8	-5,150.7	-23.2	5,150.6	0.00	0.00	0.00	
15,500.0	89.65	179.50	10,371.4	-5,250.7	-22.4	5,250.6	0.00	0.00	0.00	
15,600.0	89.65	179.50	10,372.0	-5,350.7	-21.5	5,350.6	0.00	0.00	0.00	
15,700.0	89.65	179.50	10,372.7	-5,450.7	-20.6	5,450.6	0.00	0.00	0.00	
15,800.0	89.65	179.50	10,373.3	-5,550.7	-19.7	5,550.6	0.00	0.00	0.00	
15,900.0	89.65	179.50	10,373.9	-5,650.7	-18.9	5,650.6	0.00	0.00	0.00	
16,000.0	89.65	179.50	10,374.5	-5,750.7	-18.0	5,750.6	0.00	0.00	0.00	
16,100.0	89.65	179.50	10,375.1	-5,850.7	-17.1	5,850.6	0.00	0.00	0.00	
16,200.0	89.65	179.50	10,375.7	-5,950.6	-16.3	5,950.6	0.00	0.00	0.00	
16,300.0	89.65	179.50	10,376.3	-6,050.6	-15.4	6,050.6	0.00	0.00	0.00	
16,400.0	89.65	179.50	10,376.9	-6,150.6	-14.5	6,150.6	0.00	0.00	0.00	
16,500.0	89.65	179.50	10,377.5	-6,250.6	-13.6	6,250.6	0.00	0.00	0.00	
16,600.0	89.65	179.50	10,378.1	-6,350.6	-12.8	6,350.6	0.00	0.00	0.00	
16,700.0	89.65	179.50	10,378.8	-6,450.6	-11.9	6,450.6	0.00	0.00	0.00	
16,800.0	89.65	179.50	10,379.4	-6,550.6	-11.0	6,550.6	0.00	0.00	0.00	

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)	
16,900.0	89.65	179.50	10,380.0	-6,650.6	-10.2	6,650.6	0.00	0.00	0.00	
17,000.0	89.65	179.50	10,380.6	-6,750.6	-9.3	6,750.6	0.00	0.00	0.00	
17,100.0	89.65	179.50	10,381.2	-6,850.6	-8.4	6,850.6	0.00	0.00	0.00	
17,200.0	89.65	179.50	10,381.8	-6,950.6	-7.5	6,950.6	0.00	0.00	0.00	
17,300.0	89.65	179.50	10,382.4	-7,050.6	-6.7	7,050.6	0.00	0.00	0.00	
17,400.0	89.65	179.50	10,383.0	-7,150.6	-5.8	7,150.6	0.00	0.00	0.00	
17,500.0	89.65	179.50	10,383.6	-7,250.6	-4.9	7,250.5	0.00	0.00	0.00	
17,600.0	89.65	179.50	10,384.2	-7,350.6	-4.1	7,350.5	0.00	0.00	0.00	
17,700.0	89.65	179.50	10,384.9	-7,450.6	-3.2	7,450.5	0.00	0.00	0.00	
17,800.0	89.65	179.50	10,385.5	-7,550.6	-2.3	7,550.5	0.00	0.00	0.00	
17,900.0	89.65	179.50	10,386.1	-7,650.6	-1.4	7,650.5	0.00	0.00	0.00	
18,000.0	89.65	179.50	10,386.7	-7,750.5	-0.6	7,750.5	0.00	0.00	0.00	
18,100.0	89.65	179.50	10,387.3	-7,850.5	0.3	7,850.5	0.00	0.00	0.00	
18,200.0	89.65	179.50	10,387.9	-7,950.5	1.2	7,950.5	0.00	0.00	0.00	
18,300.0	89.65	179.50	10,388.5	-8,050.5	2.0	8,050.5	0.00	0.00	0.00	
18,400.0	89.65	179.50	10,389.1	-8,150.5	2.9	8,150.5	0.00	0.00	0.00	
18,500.0	89.65	179.50	10,389.7	-8,250.5	3.8	8,250.5	0.00	0.00	0.00	
18,600.0	89.65	179.50	10,390.3	-8,350.5	4.7	8,350.5	0.00	0.00	0.00	
18,700.0	89.65	179.50	10,391.0	-8,450.5	5.5	8,450.5	0.00	0.00	0.00	
18,800.0	89.65	179.50	10,391.6	-8,550.5	6.4	8,550.5	0.00	0.00	0.00	
18,900.0	89.65	179.50	10,392.2	-8,650.5	7.3	8,650.5	0.00	0.00	0.00	
19,000.0	89.65	179.50	10,392.8	-8,750.5	8.1	8,750.5	0.00	0.00	0.00	
19,100.0	89.65	179.50	10,393.4	-8,850.5	9.0	8,850.5	0.00	0.00	0.00	
19,200.0	89.65	179.50	10,394.0	-8,950.5	9.9	8,950.5	0.00	0.00	0.00	
19,300.0	89.65	179.50	10,394.6	-9,050.5	10.7	9,050.5	0.00	0.00	0.00	
19,400.0	89.65	179.50	10,395.2	-9,150.5	11.6	9,150.5	0.00	0.00	0.00	
19,500.0	89.65	179.50	10,395.8	-9,250.5	12.5	9,250.5	0.00	0.00	0.00	
19,600.0	89.65	179.50	10,396.4	-9,350.5	13.4	9,350.5	0.00	0.00	0.00	
19,700.0	89.65	179.50	10,397.1	-9,450.5	14.2	9,450.5	0.00	0.00	0.00	
19,800.0	89.65	179.50	10,397.7	-9,550.4	15.1	9,550.5	0.00	0.00	0.00	
19,900.0	89.65	179.50	10,398.3	-9,650.4	16.0	9,650.5	0.00	0.00	0.00	
20,000.0	89.65	179.50	10,398.9	-9,750.4	16.8	9,750.4	0.00	0.00	0.00	
20,100.0	89.65	179.50	10,399.5	-9,850.4	17.7	9,850.4	0.00	0.00	0.00	
20,200.0	89.65	179.50	10,400.1	-9,950.4	18.6	9,950.4	0.00	0.00	0.00	
20,300.0	89.65	179.50	10,400.7	-10,050.4	19.5	10,050.4	0.00	0.00	0.00	
20,400.0	89.65	179.50	10,401.3	-10,150.4	20.3	10,150.4	0.00	0.00	0.00	
20,500.0	89.65	179.50	10,401.9	-10,250.4	21.2	10,250.4	0.00	0.00	0.00	
20,511.3	89.65	179.50	10,402.0	-10,261.7	21.3	10,261.7	0.00	0.00	0.00	
TD at 20511.3										

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandriil Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandriil Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
FTP (GUNNER 8 FEC - plan misses target center by 237.5usft at 10210.8usft MD (10166.1 TVD, -10.1 N, -65.5 E) - Point	0.00	0.00	10,342.0	149.5	-66.3	393,585.50	758,604.30	32° 4' 45.592 N	103° 29' 54.258 W
LTP (GUNNER 8 FEC - plan hits target center - Point	0.00	0.00	10,401.7	-10,211.7	20.9	383,224.30	758,691.50	32° 3' 3.055 N	103° 29' 54.176 W
BHL (GUNNER 8 FEC - plan hits target center - Rectangle (sides W100.0 H10,411.5 D20.0)	-0.35	359.49	10,402.0	-10,261.7	21.3	383,174.30	758,691.90	32° 3' 2.561 N	103° 29' 54.176 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5500	5500	0	0	Start DLS 2.00 TFO 337.80
5610	5610	2	-1	Start 4141.4 hold at 5610.3 MD
9752	9749	149	-61	Start DLS 10.00 TFO -158.29
10,669	10,342	-420	-64	Start 9842.6 hold at 10668.7 MD
20,511	10,402	-10,262	21	TD at 20511.3

Checked By: _____ Approved By: _____ Date: _____

NORTHERN DELAWARE BASIN

**LEA COUNTY, NM
BULLDOG
GUNNER 8 FED COM 301H**

**OWB
PWP1**

Anticollision Report

28 May, 2019

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Reference	PWP1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.0 us
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISWWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve
Casing Method:	Not applied

Survey Tool Program		Date	5/28/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	9,752.0	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
9,752.0	20,511.3	PWP1 (OWB)	MWD+IFR1+MS	OWSG MWD + IFR1 + Multi-Station Correction	

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						
BULLDOG						
GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH	17,354.6	11,852.4	520.4	434.4	6.052	CC, ES
GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH	18,900.0	10,340.0	533.5	442.1	5.836	SF
GUNNER 8 FED COM 401H - OWB - PWP1	5,500.0	5,499.6	30.1	20.4	3.111	CC, ES, SF
GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WEL	9,815.9	19,727.0	496.7	339.3	3.154	CC, ES
GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WEL	9,850.0	19,727.0	497.4	339.6	3.151	SF

BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft	
Survey Program: 100-MWDD													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
							+N/-S (usft)	+E/-W (usft)						
0.0	0.0	135.8	135.8	3.0	3.0	-179.07	-9,322.0	-151.8	9,324.0					
100.0	100.0	247.6	247.6	3.0	3.2	-179.07	-9,320.7	-151.1	9,322.7	9,316.6	6.11	1,526.026		
200.0	200.0	393.8	393.8	3.0	3.5	-179.08	-9,318.4	-149.5	9,321.2	9,314.9	6.27	1,486.190		
300.0	300.0	478.6	478.5	3.0	3.7	-179.09	-9,316.9	-148.1	9,319.4	9,313.0	6.41	1,454.859		
400.0	400.0	551.6	551.5	3.0	3.9	-179.10	-9,315.8	-146.5	9,317.8	9,311.3	6.55	1,422.912		
500.0	500.0	623.4	623.3	3.1	4.0	-179.11	-9,314.9	-144.4	9,316.6	9,309.9	6.71	1,387.868		
600.0	600.0	17,225.0	9,706.0	3.1	130.9	-174.91	-1,741.8	-155.2	9,251.1	9,189.2	61.91	149.426		
700.0	700.0	17,225.0	9,706.0	3.1	130.9	-174.91	-1,741.8	-155.2	9,153.0	9,091.0	61.99	147.660		
800.0	800.0	17,225.0	9,706.0	3.2	130.9	-174.91	-1,741.8	-155.2	9,054.8	8,992.8	62.07	145.890		
900.0	900.0	17,225.0	9,706.0	3.2	130.9	-174.91	-1,741.8	-155.2	8,956.7	8,894.6	62.15	144.118		
1,000.0	1,000.0	17,225.0	9,706.0	3.2	130.9	-174.91	-1,741.8	-155.2	8,858.7	8,796.4	62.23	142.346		
1,100.0	1,100.0	17,225.0	9,706.0	3.3	130.9	-174.91	-1,741.8	-155.2	8,760.7	8,698.4	62.32	140.576		
1,200.0	1,200.0	17,225.0	9,706.0	3.4	130.9	-174.91	-1,741.8	-155.2	8,662.7	8,600.3	62.41	138.808		
1,300.0	1,300.0	17,225.0	9,706.0	3.4	130.9	-174.91	-1,741.8	-155.2	8,564.8	8,502.3	62.50	137.044		
1,400.0	1,400.0	17,225.0	9,706.0	3.5	130.9	-174.91	-1,741.8	-155.2	8,466.9	8,404.3	62.59	135.283		
1,500.0	1,500.0	17,225.0	9,706.0	3.5	130.9	-174.91	-1,741.8	-155.2	8,369.1	8,306.4	62.68	133.525		
1,600.0	1,600.0	17,225.0	9,706.0	3.6	130.9	-174.91	-1,741.8	-155.2	8,271.3	8,208.6	62.77	131.773		
1,700.0	1,700.0	17,225.0	9,706.0	3.7	130.9	-174.91	-1,741.8	-155.2	8,173.6	8,110.8	62.86	130.025		
1,800.0	1,800.0	17,225.0	9,706.0	3.8	130.9	-174.91	-1,741.8	-155.2	8,076.0	8,013.0	62.96	128.281		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,900.0	1,900.0	17,225.0	9,706.0	3.9	130.9	-174.91	-1,741.8	-155.2	7,978.4	7,915.3	63.05	126.543		
2,000.0	2,000.0	17,225.0	9,706.0	3.9	130.9	-174.91	-1,741.8	-155.2	7,880.8	7,817.7	63.14	124.809		
2,100.0	2,100.0	17,225.0	9,706.0	4.0	130.9	-174.91	-1,741.8	-155.2	7,783.4	7,720.1	63.24	123.081		
2,200.0	2,200.0	17,225.0	9,706.0	4.1	130.9	-174.91	-1,741.8	-155.2	7,685.9	7,622.6	63.33	121.358		
2,300.0	2,300.0	17,225.0	9,706.0	4.2	130.9	-174.91	-1,741.8	-155.2	7,588.6	7,525.2	63.43	119.641		
2,400.0	2,400.0	17,225.0	9,706.0	4.3	130.9	-174.91	-1,741.8	-155.2	7,491.3	7,427.8	63.52	117.929		
2,500.0	2,500.0	17,225.0	9,706.0	4.4	130.9	-174.91	-1,741.8	-155.2	7,394.1	7,330.5	63.62	116.223		
2,600.0	2,600.0	17,225.0	9,706.0	4.5	130.9	-174.91	-1,741.8	-155.2	7,297.0	7,233.3	63.72	114.522		
2,700.0	2,700.0	17,225.0	9,706.0	4.6	130.9	-174.91	-1,741.8	-155.2	7,200.0	7,136.1	63.81	112.828		
2,800.0	2,800.0	17,225.0	9,706.0	4.7	130.9	-174.91	-1,741.8	-155.2	7,103.0	7,039.1	63.91	111.140		
2,900.0	2,900.0	17,225.0	9,706.0	4.8	130.9	-174.91	-1,741.8	-155.2	7,006.1	6,942.1	64.01	109.457		
3,000.0	3,000.0	17,225.0	9,706.0	4.9	130.9	-174.91	-1,741.8	-155.2	6,909.3	6,845.2	64.11	107.781		
3,100.0	3,100.0	17,225.0	9,706.0	5.0	130.9	-174.91	-1,741.8	-155.2	6,812.6	6,748.4	64.20	106.111		
3,200.0	3,200.0	17,225.0	9,706.0	5.1	130.9	-174.91	-1,741.8	-155.2	6,716.0	6,651.7	64.30	104.448		
3,300.0	3,300.0	17,225.0	9,706.0	5.2	130.9	-174.91	-1,741.8	-155.2	6,619.5	6,555.1	64.40	102.792		
3,400.0	3,400.0	17,225.0	9,706.0	5.3	130.9	-174.91	-1,741.8	-155.2	6,523.1	6,458.6	64.49	101.142		
3,500.0	3,500.0	17,225.0	9,706.0	5.4	130.9	-174.91	-1,741.8	-155.2	6,426.9	6,362.3	64.59	99.500		
3,600.0	3,600.0	17,225.0	9,706.0	5.5	130.9	-174.91	-1,741.8	-155.2	6,330.7	6,266.0	64.69	97.864		
3,700.0	3,700.0	17,225.0	9,706.0	5.7	130.9	-174.91	-1,741.8	-155.2	6,234.6	6,169.9	64.78	96.236		
3,800.0	3,800.0	17,225.0	9,706.0	5.8	130.9	-174.91	-1,741.8	-155.2	6,138.7	6,073.8	64.88	94.616		
3,900.0	3,900.0	17,225.0	9,706.0	5.9	130.9	-174.91	-1,741.8	-155.2	6,042.9	5,977.9	64.98	93.003		
4,000.0	4,000.0	17,225.0	9,706.0	6.0	130.9	-174.91	-1,741.8	-155.2	5,947.3	5,882.2	65.07	91.398		
4,100.0	4,100.0	17,225.0	9,706.0	6.1	130.9	-174.91	-1,741.8	-155.2	5,851.8	5,786.6	65.16	89.801		
4,200.0	4,200.0	17,225.0	9,706.0	6.2	130.9	-174.91	-1,741.8	-155.2	5,756.4	5,691.2	65.26	88.213		
4,300.0	4,300.0	17,225.0	9,706.0	6.3	130.9	-174.91	-1,741.8	-155.2	5,661.2	5,595.9	65.35	86.633		
4,400.0	4,400.0	17,225.0	9,706.0	6.5	130.9	-174.91	-1,741.8	-155.2	5,566.2	5,500.8	65.44	85.062		
4,500.0	4,500.0	17,225.0	9,706.0	6.6	130.9	-174.91	-1,741.8	-155.2	5,471.4	5,405.8	65.52	83.501		
4,600.0	4,600.0	17,225.0	9,706.0	6.7	130.9	-174.91	-1,741.8	-155.2	5,376.7	5,311.1	65.61	81.949		
4,700.0	4,700.0	17,225.0	9,706.0	6.8	130.9	-174.91	-1,741.8	-155.2	5,282.2	5,216.5	65.69	80.406		
4,800.0	4,800.0	17,225.0	9,706.0	6.9	130.9	-174.91	-1,741.8	-155.2	5,188.0	5,122.2	65.78	78.874		
4,900.0	4,900.0	17,225.0	9,706.0	7.0	130.9	-174.91	-1,741.8	-155.2	5,093.9	5,028.1	65.85	77.352		
5,000.0	5,000.0	17,225.0	9,706.0	7.2	130.9	-174.91	-1,741.8	-155.2	5,000.1	4,934.2	65.93	75.840		
5,100.0	5,100.0	17,225.0	9,706.0	7.3	130.9	-174.91	-1,741.8	-155.2	4,906.6	4,840.6	66.00	74.340		
5,200.0	5,200.0	17,225.0	9,706.0	7.4	130.9	-174.91	-1,741.8	-155.2	4,813.3	4,747.2	66.07	72.851		
5,300.0	5,300.0	17,225.0	9,706.0	7.5	130.9	-174.91	-1,741.8	-155.2	4,720.2	4,654.1	66.13	71.374		
5,400.0	5,400.0	17,225.0	9,706.0	7.6	130.9	-174.91	-1,741.8	-155.2	4,627.5	4,561.3	66.19	69.910		
5,500.0	5,500.0	17,225.0	9,706.0	7.8	130.9	-174.91	-1,741.8	-155.2	4,535.1	4,468.8	66.25	68.458		
5,600.0	5,600.0	17,225.0	9,706.0	7.9	130.9	-154.72	-1,741.8	-155.2	4,443.6	4,377.3	66.29	67.038		
5,610.3	5,610.2	17,225.0	9,706.0	7.9	130.9	-154.90	-1,741.8	-155.2	4,434.3	4,368.0	66.29	66.895		
5,700.0	5,699.9	17,225.0	9,706.0	8.0	130.9	-154.90	-1,741.8	-155.2	4,353.3	4,287.0	66.31	65.654		
5,800.0	5,799.8	17,225.0	9,706.0	8.1	130.9	-154.90	-1,741.8	-155.2	4,263.5	4,197.1	66.32	64.286		
5,900.0	5,899.8	17,225.0	9,706.0	8.2	130.9	-154.90	-1,741.8	-155.2	4,174.1	4,107.7	66.32	62.935		
6,000.0	5,999.7	17,225.0	9,706.0	8.3	130.9	-154.90	-1,741.8	-155.2	4,085.1	4,018.8	66.32	61.602		
6,100.0	6,099.6	17,225.0	9,706.0	8.5	130.9	-154.90	-1,741.8	-155.2	3,996.8	3,930.5	66.30	60.287		
6,200.0	6,199.5	17,225.0	9,706.0	8.6	130.9	-154.90	-1,741.8	-155.2	3,908.9	3,842.7	66.26	58.990		
6,300.0	6,299.5	17,225.0	9,706.0	8.7	130.9	-154.90	-1,741.8	-155.2	3,821.7	3,755.5	66.22	57.714		
6,400.0	6,399.4	17,225.0	9,706.0	8.8	130.9	-154.90	-1,741.8	-155.2	3,735.1	3,669.0	66.16	56.459		
6,500.0	6,499.3	17,225.0	9,706.0	8.9	130.9	-154.90	-1,741.8	-155.2	3,649.2	3,583.2	66.08	55.226		
6,600.0	6,599.2	17,225.0	9,706.0	9.0	130.9	-154.90	-1,741.8	-155.2	3,564.1	3,498.1	65.98	54.016		
6,700.0	6,699.2	17,225.0	9,706.0	9.2	130.9	-154.90	-1,741.8	-155.2	3,479.7	3,413.8	65.86	52.831		
6,800.0	6,799.1	17,225.0	9,706.0	9.3	130.9	-154.90	-1,741.8	-155.2	3,396.2	3,330.5	65.73	51.672		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft	
Survey Program: 100-MWD													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
6,900.0	6,899.0	17,225.0	9,706.0	9.4	130.9	-154.90	-1,741.8	-155.2	3,313.6	3,248.0	65.56	50.541		
7,000.0	6,998.9	17,225.0	9,706.0	9.5	130.9	-154.90	-1,741.8	-155.2	3,231.9	3,166.6	65.37	49.439		
7,100.0	7,098.9	17,225.0	9,706.0	9.6	130.9	-154.90	-1,741.8	-155.2	3,151.4	3,086.2	65.15	48.368		
7,200.0	7,198.8	17,225.0	9,706.0	9.8	130.9	-154.90	-1,741.8	-155.2	3,071.9	3,007.0	64.91	47.330		
7,300.0	7,298.7	17,225.0	9,706.0	9.9	130.9	-154.90	-1,741.8	-155.2	2,993.8	2,929.1	64.62	46.327		
7,400.0	7,398.6	17,225.0	9,706.0	10.0	130.9	-154.90	-1,741.8	-155.2	2,916.9	2,852.6	64.30	45.362		
7,500.0	7,498.6	17,225.0	9,706.0	10.1	130.9	-154.90	-1,741.8	-155.2	2,841.5	2,777.5	63.94	44.436		
7,600.0	7,598.5	17,225.0	9,706.0	10.2	130.9	-154.90	-1,741.8	-155.2	2,767.6	2,704.1	63.55	43.553		
7,700.0	7,698.4	17,225.0	9,706.0	10.4	130.9	-154.90	-1,741.8	-155.2	2,695.4	2,632.3	63.10	42.716		
7,800.0	7,798.4	17,225.0	9,706.0	10.5	130.9	-154.90	-1,741.8	-155.2	2,625.1	2,562.5	62.61	41.927		
7,900.0	7,898.3	17,225.0	9,706.0	10.6	130.9	-154.90	-1,741.8	-155.2	2,556.7	2,494.6	62.07	41.190		
8,000.0	7,998.2	17,225.0	9,706.0	10.7	130.9	-154.90	-1,741.8	-155.2	2,490.5	2,429.0	61.48	40.508		
8,100.0	8,098.1	17,225.0	9,706.0	10.8	130.9	-154.90	-1,741.8	-155.2	2,426.6	2,365.7	60.84	39.884		
8,200.0	8,198.1	17,225.0	9,706.0	11.0	130.9	-154.90	-1,741.8	-155.2	2,365.1	2,305.0	60.15	39.322		
8,300.0	8,298.0	17,225.0	9,706.0	11.1	130.9	-154.90	-1,741.8	-155.2	2,306.4	2,247.0	59.41	38.823		
8,400.0	8,397.9	17,225.0	9,706.0	11.2	130.9	-154.90	-1,741.8	-155.2	2,250.6	2,192.0	58.62	38.391		
8,500.0	8,497.8	17,225.0	9,706.0	11.3	130.9	-154.90	-1,741.8	-155.2	2,197.9	2,140.1	57.80	38.027		
8,600.0	8,597.8	17,225.0	9,706.0	11.5	130.9	-154.90	-1,741.8	-155.2	2,148.6	2,091.7	56.95	37.732		
8,700.0	8,697.7	17,225.0	9,706.0	11.6	130.9	-154.90	-1,741.8	-155.2	2,102.9	2,046.9	56.07	37.503		
8,800.0	8,797.6	17,225.0	9,706.0	11.7	130.9	-154.90	-1,741.8	-155.2	2,061.1	2,005.9	55.20	37.339		
8,900.0	8,897.5	17,225.0	9,706.0	11.8	130.9	-154.90	-1,741.8	-155.2	2,023.3	1,969.0	54.34	37.232		
9,000.0	8,997.5	17,225.0	9,706.0	11.9	130.9	-154.90	-1,741.8	-155.2	1,989.8	1,936.3	53.53	37.173		
9,100.0	9,097.4	17,225.0	9,706.0	12.1	130.9	-154.90	-1,741.8	-155.2	1,960.9	1,908.1	52.78	37.151		
9,200.0	9,197.3	17,225.0	9,706.0	12.2	130.9	-154.90	-1,741.8	-155.2	1,936.7	1,884.6	52.13	37.149		
9,300.0	9,297.2	17,225.0	9,706.0	12.3	130.9	-154.90	-1,741.8	-155.2	1,917.4	1,865.8	51.61	37.152		
9,400.0	9,397.2	17,225.0	9,706.0	12.4	130.9	-154.90	-1,741.8	-155.2	1,903.2	1,852.0	51.24	37.141		
9,500.0	9,497.1	17,225.0	9,706.0	12.6	130.9	-154.90	-1,741.8	-155.2	1,894.2	1,843.1	51.05	37.102		
9,600.0	9,597.0	17,225.0	9,706.0	12.7	130.9	-154.90	-1,741.8	-155.2	1,890.4	1,839.4	51.06	37.023		
9,621.5	9,618.5	17,225.0	9,706.0	12.7	130.9	-154.90	-1,741.8	-155.2	1,890.3	1,839.2	51.09	37.000		
9,700.0	9,696.9	17,225.0	9,706.0	12.8	130.9	-154.90	-1,741.8	-155.2	1,891.9	1,840.6	51.27	36.898		
9,751.7	9,748.6	17,225.0	9,706.0	12.9	130.9	-154.90	-1,741.8	-155.2	1,894.8	1,843.3	51.47	36.816		
9,800.0	9,796.9	17,225.0	9,706.0	12.9	130.9	-12.97	-1,741.8	-155.2	1,896.7	1,845.0	51.63	36.734		
9,850.0	9,846.7	17,225.0	9,706.0	12.9	130.9	-2.62	-1,741.8	-155.2	1,895.7	1,843.8	51.90	36.526		
9,900.0	9,895.8	17,225.0	9,706.0	13.2	130.9	-0.27	-1,741.8	-155.2	1,891.6	1,839.1	52.48	36.043		
9,950.0	9,944.0	17,225.0	9,706.0	13.5	130.9	0.78	-1,741.8	-155.2	1,884.5	1,831.4	53.11	35.481		
10,000.0	9,990.9	17,225.0	9,706.0	13.8	130.9	1.41	-1,741.8	-155.2	1,874.5	1,820.7	53.78	34.853		
10,050.0	10,036.1	17,225.0	9,706.0	14.1	130.9	1.85	-1,741.8	-155.2	1,861.4	1,806.9	54.48	34.168		
10,100.0	10,079.3	17,225.0	9,706.0	14.3	130.9	2.20	-1,741.8	-155.2	1,845.4	1,790.2	55.20	33.433		
10,150.0	10,120.1	17,225.0	9,706.0	14.5	130.9	2.51	-1,741.8	-155.2	1,826.6	1,770.6	55.94	32.654		
10,200.0	10,158.2	17,225.0	9,706.0	14.8	130.9	2.80	-1,741.8	-155.2	1,804.8	1,748.2	56.69	31.838		
10,250.0	10,193.4	17,225.0	9,706.0	14.9	130.9	3.10	-1,741.8	-155.2	1,780.4	1,722.9	57.45	30.991		
10,300.0	10,225.3	17,225.0	9,706.0	15.1	130.9	3.42	-1,741.8	-155.2	1,753.2	1,695.0	58.21	30.119		
10,350.0	10,253.8	17,225.0	9,706.0	15.2	130.9	3.78	-1,741.8	-155.2	1,723.4	1,664.4	58.96	29.228		
10,400.0	10,278.5	17,225.0	9,706.0	15.3	130.9	4.19	-1,741.8	-155.2	1,691.1	1,631.4	59.71	28.322		
10,450.0	10,299.4	17,225.0	9,706.0	15.4	130.9	4.68	-1,741.8	-155.2	1,656.4	1,596.0	60.44	27.407		
10,500.0	10,316.3	17,225.0	9,706.0	15.5	130.9	5.26	-1,741.8	-155.2	1,619.4	1,558.2	61.14	26.487		
10,550.0	10,329.0	17,225.0	9,706.0	15.5	130.9	5.99	-1,741.8	-155.2	1,580.2	1,518.4	61.81	25.566		
10,600.0	10,337.4	17,225.0	9,706.0	15.6	130.9	6.93	-1,741.8	-155.2	1,539.0	1,476.6	62.44	24.648		
10,650.0	10,341.6	17,225.0	9,706.0	15.6	130.9	8.16	-1,741.8	-155.2	1,496.0	1,433.0	63.03	23.735		
10,668.7	10,342.0	17,225.0	9,706.0	15.6	130.9	8.73	-1,741.8	-155.2	1,479.5	1,416.3	63.22	23.401		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,700.0	10,342.2	17,225.0	9,706.0	15.6	130.9	8.73	-1,741.8	-155.2	1,451.7	1,388.1	63.53	22.849		
10,800.0	10,342.8	17,225.0	9,706.0	15.6	130.9	8.73	-1,741.8	-155.2	1,363.9	1,299.2	64.62	21.106		
10,900.0	10,343.4	17,225.0	9,706.0	15.7	130.9	8.73	-1,741.8	-155.2	1,277.9	1,212.0	65.90	19.392		
11,000.0	10,344.0	17,225.0	9,706.0	15.7	130.9	8.73	-1,741.8	-155.2	1,194.0	1,126.7	67.38	17.720		
11,100.0	10,344.6	17,225.0	9,706.0	15.7	130.9	8.73	-1,741.8	-155.2	1,112.9	1,043.8	69.12	16.100		
11,200.0	10,345.2	17,225.0	9,706.0	15.8	130.9	8.73	-1,741.8	-155.2	1,035.1	963.9	71.14	14.549		
11,300.0	10,345.8	17,225.0	9,706.0	15.8	130.9	8.73	-1,741.8	-155.2	961.3	887.9	73.46	13.086		
11,400.0	10,346.4	17,225.0	9,706.0	15.8	130.9	8.73	-1,741.8	-155.2	892.7	816.6	76.09	11.733		
11,500.0	10,347.0	17,225.0	9,706.0	15.9	130.9	8.73	-1,741.8	-155.2	830.5	751.5	78.97	10.517		
11,600.0	10,347.7	17,225.0	9,706.0	15.9	130.9	8.73	-1,741.8	-155.2	776.2	694.3	81.99	9.468		
11,700.0	10,348.3	17,225.0	9,706.0	16.0	130.9	8.73	-1,741.8	-155.2	731.7	646.8	84.92	8.617		
11,800.0	10,348.9	17,225.0	9,706.0	16.2	130.9	8.73	-1,741.8	-155.2	698.7	611.2	87.43	7.991		
11,900.0	10,349.5	17,225.0	9,706.0	16.7	130.9	8.73	-1,741.8	-155.2	678.9	589.8	89.16	7.614		
12,000.0	10,350.1	17,203.0	9,706.4	17.3	130.5	8.75	-1,763.8	-155.2	673.3	583.6	89.70	7.506		
12,100.0	10,350.7	17,104.6	9,708.2	18.0	129.0	8.84	-1,862.3	-155.2	672.1	582.7	89.42	7.517		
12,200.0	10,351.3	17,002.9	9,710.1	18.6	127.4	8.93	-1,963.9	-155.1	671.1	581.9	89.13	7.529		
12,300.0	10,351.9	16,903.5	9,711.8	19.3	125.8	8.95	-2,063.3	-154.4	670.0	581.2	88.85	7.541		
12,400.0	10,352.5	16,786.3	9,715.6	20.0	123.9	9.05	-2,180.4	-154.0	667.5	579.0	88.47	7.545		
12,500.0	10,353.1	16,674.9	9,720.8	20.7	122.1	8.84	-2,291.6	-149.9	663.0	575.0	87.99	7.534		
12,600.0	10,353.7	16,581.4	9,726.1	21.4	120.7	8.79	-2,384.9	-147.8	657.8	570.0	87.78	7.494		
12,700.0	10,354.4	16,487.4	9,730.0	22.1	119.2	8.61	-2,478.7	-144.3	653.9	566.4	87.52	7.472		
12,800.0	10,355.0	16,392.5	9,733.2	22.8	117.7	8.42	-2,573.5	-141.0	650.7	563.5	87.26	7.458		
12,900.0	10,355.6	16,288.2	9,736.3	23.5	116.0	8.09	-2,677.7	-135.9	647.8	560.9	86.87	7.457		
13,000.0	10,356.2	16,187.5	9,740.2	24.2	114.4	7.90	-2,778.2	-132.4	644.3	557.7	86.60	7.440		
13,100.0	10,356.8	16,092.4	9,743.6	25.0	112.9	7.81	-2,873.3	-130.2	641.1	554.7	86.42	7.418		
13,200.0	10,357.4	15,990.8	9,747.1	25.7	111.3	7.73	-2,974.8	-128.0	638.2	552.0	86.20	7.403		
13,300.0	10,358.0	15,888.3	9,750.9	26.4	109.7	7.66	-3,077.2	-125.9	634.9	548.9	85.99	7.383		
13,400.0	10,358.6	15,794.9	9,754.1	27.1	108.3	7.59	-3,170.5	-123.9	631.9	546.0	85.86	7.359		
13,500.0	10,359.2	15,705.0	9,755.7	27.9	106.8	7.37	-3,260.4	-120.6	630.4	544.7	85.72	7.354		
13,600.0	10,359.8	15,593.2	9,758.6	28.6	105.1	7.42	-3,372.1	-119.8	628.4	542.9	85.50	7.350		
13,700.0	10,360.5	15,495.2	9,761.9	29.3	103.5	7.58	-3,470.0	-120.5	625.9	540.5	85.44	7.326		
13,800.0	10,361.1	15,398.1	9,764.8	30.1	102.0	7.70	-3,567.0	-120.6	623.7	538.3	85.39	7.304		
13,900.0	10,361.7	15,302.4	9,766.9	30.8	100.6	7.90	-3,662.7	-121.7	622.4	537.0	85.38	7.290		
14,000.0	10,362.3	15,198.5	9,769.7	31.5	99.0	8.20	-3,766.6	-123.9	620.8	535.4	85.34	7.274		
14,100.0	10,362.9	15,101.1	9,772.2	32.3	97.5	8.36	-3,864.0	-124.4	619.0	533.7	85.31	7.256		
14,200.0	10,363.5	15,005.5	9,773.8	33.0	96.0	8.47	-3,959.5	-124.7	618.1	532.8	85.29	7.247		
14,300.0	10,364.1	14,896.1	9,776.0	33.7	94.3	8.72	-4,068.9	-126.1	617.1	531.9	85.19	7.243		
14,400.0	10,364.7	14,788.9	9,780.7	34.5	92.7	9.12	-4,176.0	-129.0	613.9	528.7	85.18	7.207		
14,500.0	10,365.3	14,692.2	9,784.7	35.2	91.2	9.37	-4,272.5	-130.3	610.7	525.5	85.22	7.166		
14,600.0	10,365.9	14,585.4	9,789.2	36.0	89.5	9.69	-4,379.2	-132.1	607.6	522.4	85.19	7.132		
14,700.0	10,366.6	14,486.4	9,793.4	36.7	88.0	9.51	-4,478.1	-128.7	603.6	518.5	85.08	7.094		
14,800.0	10,367.2	14,391.1	9,797.0	37.5	86.5	9.36	-4,573.3	-125.8	600.1	515.1	85.03	7.058		
14,900.0	10,367.8	14,287.9	9,801.0	38.2	85.0	9.38	-4,676.4	-124.6	596.9	511.9	84.96	7.025		
15,000.0	10,368.4	14,191.2	9,804.8	39.0	83.5	9.42	-4,773.0	-123.6	593.6	508.6	84.97	6.986		
15,100.0	10,369.0	14,089.8	9,808.9	39.7	82.0	9.54	-4,874.3	-123.4	590.3	505.4	84.95	6.949		
15,200.0	10,369.6	13,999.5	9,811.7	40.5	80.6	9.63	-4,964.5	-123.2	588.0	502.9	85.05	6.913		
15,300.0	10,370.2	13,887.3	9,815.4	41.2	79.0	9.86	-5,076.7	-124.1	585.6	500.6	84.96	6.893		
15,400.0	10,370.8	13,772.6	9,822.7	42.0	77.2	9.96	-5,191.2	-123.0	579.8	495.1	84.79	6.839		
15,500.0	10,371.4	13,682.6	9,827.8	42.7	75.9	9.77	-5,280.9	-119.5	574.3	489.4	84.84	6.769		
15,600.0	10,372.0	13,593.5	9,830.5	43.5	74.6	9.30	-5,369.8	-113.6	571.0	486.1	84.83	6.731		
15,700.0	10,372.7	13,491.8	9,833.1	44.2	73.1	8.92	-5,471.3	-108.6	568.4	483.7	84.73	6.708		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,800.0	10,373.3	13,387.5	9,836.9	45.0	71.6	8.73	-5,575.5	-105.2	565.0	480.3	84.66	6.674		
15,900.0	10,373.9	13,288.1	9,840.8	45.7	70.1	8.47	-5,674.7	-101.3	561.3	476.7	84.64	6.632		
16,000.0	10,374.5	13,191.4	9,844.2	46.5	68.8	8.25	-5,771.4	-97.9	558.0	473.3	84.66	6.591		
16,100.0	10,375.1	13,077.1	9,849.0	47.2	67.1	8.21	-5,885.5	-95.9	554.4	469.9	84.50	6.561		
16,200.0	10,375.7	12,973.8	9,856.2	48.0	65.7	8.36	-5,988.5	-95.5	548.2	463.6	84.54	6.484		
16,300.0	10,376.3	12,881.7	9,862.2	48.7	64.4	8.42	-6,080.5	-94.4	542.4	457.7	84.73	6.401		
16,400.0	10,376.9	12,766.7	9,870.1	49.5	62.8	8.41	-6,195.2	-92.3	535.9	451.4	84.52	6.341		
16,500.0	10,377.5	12,688.0	9,874.9	50.2	61.7	8.36	-6,273.7	-90.5	530.3	445.5	84.84	6.251		
16,600.0	10,378.1	12,589.4	9,878.6	51.0	60.4	8.26	-6,372.2	-88.3	527.1	442.1	84.92	6.206		
16,700.0	10,378.8	12,500.9	9,880.9	51.8	59.2	8.10	-6,460.6	-85.7	524.7	439.6	85.12	6.165		
16,800.0	10,379.4	12,402.8	9,882.2	52.5	57.9	7.93	-6,558.7	-83.2	523.9	438.7	85.21	6.148		
16,850.3	10,379.7	12,356.8	9,882.6	52.9	57.3	7.88	-6,604.7	-82.4	523.6	438.3	85.31	6.138		
16,900.0	10,380.0	12,312.2	9,882.6	53.3	56.7	7.83	-6,649.2	-81.5	523.9	438.5	85.41	6.134		
17,000.0	10,380.6	12,212.0	9,882.0	54.0	55.4	7.66	-6,749.5	-79.3	524.9	439.4	85.51	6.139		
17,100.0	10,381.2	12,099.8	9,882.7	54.8	54.0	7.52	-6,861.6	-76.9	524.7	439.1	85.52	6.135		
17,200.0	10,381.8	11,994.7	9,885.4	55.5	52.7	7.42	-6,966.6	-74.9	522.6	437.0	85.62	6.104		
17,300.0	10,382.4	11,900.7	9,887.7	56.3	51.6	7.35	-7,060.6	-73.2	520.7	434.9	85.84	6.066		
17,354.6	10,382.7	11,852.4	9,888.2	56.7	51.0	7.31	-7,108.9	-72.4	520.4	434.4	85.99	6.052 CC, ES		
17,400.0	10,383.0	11,812.3	9,888.2	57.0	50.5	7.26	-7,149.0	-71.6	520.6	434.5	86.11	6.046		
17,500.0	10,383.6	11,723.4	9,886.8	57.8	49.5	7.18	-7,237.9	-70.4	522.7	436.3	86.40	6.051		
17,600.0	10,384.2	11,625.4	9,884.1	58.6	48.3	7.25	-7,335.8	-70.5	526.2	439.5	86.65	6.073		
17,700.0	10,384.9	11,515.5	9,882.0	59.3	47.1	7.39	-7,445.7	-71.3	528.9	442.1	86.79	6.094		
17,800.0	10,385.5	11,410.4	9,882.3	60.1	46.0	7.52	-7,550.8	-71.6	529.3	442.3	86.98	6.086		
17,900.0	10,386.1	11,317.8	9,881.3	60.8	45.0	7.57	-7,643.4	-71.5	531.1	443.8	87.32	6.082		
18,000.0	10,386.7	11,209.7	9,880.4	61.6	43.9	7.56	-7,751.4	-70.6	532.5	444.9	87.55	6.082		
18,100.0	10,387.3	11,104.2	9,880.9	62.4	42.9	7.30	-7,856.9	-67.3	532.3	444.5	87.80	6.063		
18,200.0	10,387.9	11,005.9	9,881.6	63.1	42.0	6.96	-7,955.1	-63.3	531.9	443.8	88.14	6.035		
18,219.8	10,388.0	10,986.9	9,881.6	63.3	41.8	6.89	-7,974.1	-62.5	531.9	443.7	88.21	6.030		
18,300.0	10,388.5	10,907.6	9,881.7	63.9	41.1	6.60	-8,053.4	-59.1	532.0	443.5	88.50	6.011		
18,400.0	10,389.1	10,806.9	9,881.8	64.6	40.3	6.30	-8,154.0	-55.4	532.1	443.2	88.87	5.988		
18,500.0	10,389.7	10,708.4	9,882.1	65.4	39.5	6.10	-8,252.5	-52.8	532.3	443.0	89.30	5.960		
18,600.0	10,390.3	10,603.5	9,882.6	66.2	38.8	5.95	-8,357.3	-50.5	532.3	442.6	89.70	5.934		
18,700.0	10,391.0	10,504.8	9,883.6	66.9	38.1	5.79	-8,456.0	-48.1	531.7	441.5	90.19	5.895		
18,800.0	10,391.6	10,403.0	9,884.7	67.7	37.5	5.57	-8,557.7	-45.1	531.0	440.3	90.65	5.858		
18,814.2	10,391.6	10,392.3	9,884.8	67.8	37.5	5.54	-8,568.4	-44.7	530.9	440.2	90.75	5.851		
18,900.0	10,392.2	10,340.0	9,883.4	68.4	37.2	5.37	-8,620.7	-42.8	533.5	442.1	91.42	5.836 SF		
19,000.0	10,392.8	10,251.5	9,876.6	69.2	36.7	5.05	-8,708.9	-39.8	541.5	449.5	92.02	5.884		
19,100.0	10,393.4	10,175.9	9,869.7	70.0	36.4	4.76	-8,784.1	-36.9	551.3	458.6	92.66	5.949		
19,200.0	10,394.0	10,113.4	9,859.8	70.7	36.1	4.44	-8,845.7	-34.1	567.3	474.0	93.26	6.083		
19,300.0	10,394.6	10,059.0	9,847.8	71.5	35.9	4.14	-8,898.7	-31.7	589.9	496.2	93.68	6.297		
19,400.0	10,395.2	10,008.5	9,832.9	72.2	35.7	3.81	-8,946.8	-29.0	619.8	525.9	93.89	6.601		
19,500.0	10,395.8	9,958.7	9,814.7	73.0	35.5	3.52	-8,993.1	-26.8	656.6	562.6	93.92	6.991		
19,600.0	10,396.4	9,901.0	9,790.4	73.8	35.3	3.38	-9,045.5	-26.3	698.9	605.0	93.95	7.439		
19,700.0	10,397.1	9,856.6	9,769.7	74.5	35.2	3.40	-9,084.7	-27.4	746.1	652.4	93.66	7.966		
19,800.0	10,397.7	9,820.1	9,751.0	75.3	35.1	3.49	-9,116.1	-29.3	798.2	705.1	93.08	8.576		
19,900.0	10,398.3	9,793.0	9,735.7	76.0	35.1	3.60	-9,138.3	-31.3	855.9	763.7	92.18	9.285		
20,000.0	10,398.9	9,775.0	9,724.7	76.8	35.0	3.68	-9,152.4	-32.8	918.8	827.8	90.99	10.098		
20,100.0	10,399.5	9,743.0	9,703.7	77.6	35.0	3.82	-9,176.4	-35.8	985.8	895.6	90.17	10.932		
20,200.0	10,400.1	9,712.0	9,682.0	78.3	34.9	3.99	-9,198.3	-39.2	1,056.5	967.1	89.36	11.823		
20,300.0	10,400.7	9,712.0	9,682.0	79.1	34.9	3.99	-9,198.3	-39.2	1,130.3	1,042.6	87.71	12.886		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design												BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH		Offset Site Error:		0.0 usft	
Survey Program: 100-MWD														Offset Well Error:		3.0 usft	
Reference		Offset		Semi Major Axis		Distance							Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor					
20,400.0	10,401.3	9,680.0	9,658.1	79.8	34.8	4.18	-9,219.1	-43.3	1,206.8	1,119.7	87.05	13.864					
20,500.0	10,401.9	9,680.0	9,658.1	80.6	34.8	4.18	-9,219.1	-43.3	1,285.9	1,200.4	85.55	15.031					
20,511.3	10,402.0	9,668.9	9,649.4	80.7	34.8	4.23	-9,225.9	-44.6	1,294.8	1,209.1	85.70	15.109					

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.4	-0.4	3.0	3.0	-90.38	-0.2	-30.1	30.1					
100.0	100.0	100.4	99.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.00	5.017		
200.0	200.0	200.4	199.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.00	5.014		
300.0	300.0	300.4	299.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.01	5.009		
400.0	400.0	400.4	399.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.02	5.001		
500.0	500.0	500.4	499.6	3.1	3.1	-90.38	-0.2	-30.1	30.1	24.1	6.03	4.991		
600.0	600.0	600.4	599.6	3.1	3.1	-90.38	-0.2	-30.1	30.1	24.1	6.05	4.978		
700.0	700.0	700.4	699.6	3.1	3.1	-90.38	-0.2	-30.1	30.1	24.0	6.07	4.963		
800.0	800.0	800.4	799.6	3.2	3.2	-90.38	-0.2	-30.1	30.1	24.0	6.09	4.945		
900.0	900.0	900.4	899.6	3.2	3.2	-90.38	-0.2	-30.1	30.1	24.0	6.11	4.924		
1,000.0	1,000.0	1,000.4	999.6	3.2	3.2	-90.38	-0.2	-30.1	30.1	24.0	6.14	4.902		
1,100.0	1,100.0	1,100.4	1,099.6	3.3	3.3	-90.38	-0.2	-30.1	30.1	23.9	6.17	4.877		
1,200.0	1,200.0	1,200.4	1,199.6	3.4	3.4	-90.38	-0.2	-30.1	30.1	23.9	6.21	4.850		
1,300.0	1,300.0	1,300.4	1,299.6	3.4	3.4	-90.38	-0.2	-30.1	30.1	23.9	6.24	4.821		
1,400.0	1,400.0	1,400.4	1,399.6	3.5	3.5	-90.38	-0.2	-30.1	30.1	23.8	6.28	4.790		
1,500.0	1,500.0	1,500.4	1,499.6	3.5	3.5	-90.38	-0.2	-30.1	30.1	23.8	6.33	4.758		
1,600.0	1,600.0	1,600.4	1,599.6	3.6	3.6	-90.38	-0.2	-30.1	30.1	23.7	6.37	4.724		
1,700.0	1,700.0	1,700.4	1,699.6	3.7	3.7	-90.38	-0.2	-30.1	30.1	23.7	6.42	4.688		
1,800.0	1,800.0	1,800.4	1,799.6	3.8	3.8	-90.38	-0.2	-30.1	30.1	23.6	6.47	4.651		
1,900.0	1,900.0	1,900.4	1,899.6	3.9	3.9	-90.38	-0.2	-30.1	30.1	23.6	6.53	4.613		
2,000.0	2,000.0	2,000.4	1,999.6	3.9	3.9	-90.38	-0.2	-30.1	30.1	23.5	6.58	4.574		
2,100.0	2,100.0	2,100.4	2,099.6	4.0	4.0	-90.38	-0.2	-30.1	30.1	23.5	6.64	4.533		
2,200.0	2,200.0	2,200.4	2,199.6	4.1	4.1	-90.38	-0.2	-30.1	30.1	23.4	6.70	4.492		
2,300.0	2,300.0	2,300.4	2,299.6	4.2	4.2	-90.38	-0.2	-30.1	30.1	23.3	6.76	4.450		
2,400.0	2,400.0	2,400.4	2,399.6	4.3	4.3	-90.38	-0.2	-30.1	30.1	23.3	6.83	4.407		
2,500.0	2,500.0	2,500.4	2,499.6	4.4	4.4	-90.38	-0.2	-30.1	30.1	23.2	6.90	4.364		
2,600.0	2,600.0	2,600.4	2,599.6	4.5	4.5	-90.38	-0.2	-30.1	30.1	23.1	6.97	4.320		
2,700.0	2,700.0	2,700.4	2,699.6	4.6	4.6	-90.38	-0.2	-30.1	30.1	23.1	7.04	4.276		
2,800.0	2,800.0	2,800.4	2,799.6	4.7	4.7	-90.38	-0.2	-30.1	30.1	23.0	7.11	4.231		
2,900.0	2,900.0	2,900.4	2,899.6	4.8	4.8	-90.38	-0.2	-30.1	30.1	22.9	7.19	4.187		
3,000.0	3,000.0	3,000.4	2,999.6	4.9	4.9	-90.38	-0.2	-30.1	30.1	22.8	7.27	4.142		
3,100.0	3,100.0	3,100.4	3,099.6	5.0	5.0	-90.38	-0.2	-30.1	30.1	22.8	7.35	4.097		
3,200.0	3,200.0	3,200.4	3,199.6	5.1	5.1	-90.38	-0.2	-30.1	30.1	22.7	7.43	4.052		
3,300.0	3,300.0	3,300.4	3,299.6	5.2	5.2	-90.38	-0.2	-30.1	30.1	22.6	7.51	4.007		
3,400.0	3,400.0	3,400.4	3,399.6	5.3	5.3	-90.38	-0.2	-30.1	30.1	22.5	7.60	3.962		
3,500.0	3,500.0	3,500.4	3,499.6	5.4	5.4	-90.38	-0.2	-30.1	30.1	22.4	7.68	3.918		
3,600.0	3,600.0	3,600.4	3,599.6	5.5	5.5	-90.38	-0.2	-30.1	30.1	22.3	7.77	3.873		
3,700.0	3,700.0	3,700.4	3,699.6	5.7	5.7	-90.38	-0.2	-30.1	30.1	22.2	7.86	3.829		
3,800.0	3,800.0	3,800.4	3,799.6	5.8	5.8	-90.38	-0.2	-30.1	30.1	22.1	7.95	3.786		
3,900.0	3,900.0	3,900.4	3,899.6	5.9	5.9	-90.38	-0.2	-30.1	30.1	22.1	8.04	3.742		
4,000.0	4,000.0	4,000.4	3,999.6	6.0	6.0	-90.38	-0.2	-30.1	30.1	22.0	8.14	3.699		
4,100.0	4,100.0	4,100.4	4,099.6	6.1	6.1	-90.38	-0.2	-30.1	30.1	21.9	8.23	3.656		
4,200.0	4,200.0	4,200.4	4,199.6	6.2	6.2	-90.38	-0.2	-30.1	30.1	21.8	8.33	3.614		
4,300.0	4,300.0	4,300.4	4,299.6	6.3	6.3	-90.38	-0.2	-30.1	30.1	21.7	8.43	3.572		
4,400.0	4,400.0	4,400.4	4,399.6	6.5	6.5	-90.38	-0.2	-30.1	30.1	21.6	8.52	3.531		
4,500.0	4,500.0	4,500.4	4,499.6	6.6	6.6	-90.38	-0.2	-30.1	30.1	21.5	8.62	3.490		
4,600.0	4,600.0	4,600.4	4,599.6	6.7	6.7	-90.38	-0.2	-30.1	30.1	21.4	8.73	3.450		
4,700.0	4,700.0	4,700.4	4,699.6	6.8	6.8	-90.38	-0.2	-30.1	30.1	21.3	8.83	3.410		
4,800.0	4,800.0	4,800.4	4,799.6	6.9	6.9	-90.38	-0.2	-30.1	30.1	21.2	8.93	3.371		
4,900.0	4,900.0	4,900.4	4,899.6	7.0	7.0	-90.38	-0.2	-30.1	30.1	21.1	9.03	3.332		
5,000.0	5,000.0	5,000.4	4,999.6	7.2	7.2	-90.38	-0.2	-30.1	30.1	21.0	9.14	3.294		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error: 0.0 usft	
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
							+N/-S (usft)	+E/-W (usft)						
5,100.0	5,100.0	5,100.4	5,099.6	7.3	7.3	-90.38	-0.2	-30.1	30.1	20.9	9.24	3.256		
5,200.0	5,200.0	5,200.4	5,199.6	7.4	7.4	-90.38	-0.2	-30.1	30.1	20.7	9.35	3.219		
5,300.0	5,300.0	5,300.4	5,299.6	7.5	7.5	-90.38	-0.2	-30.1	30.1	20.6	9.46	3.182		
5,400.0	5,400.0	5,400.4	5,399.6	7.6	7.6	-90.38	-0.2	-30.1	30.1	20.5	9.57	3.146		
5,500.0	5,500.0	5,499.6	5,499.6	7.8	7.8	-90.38	-0.2	-30.1	30.1	20.4	9.68	3.111	CC, ES, SF	
5,600.0	5,600.0	5,598.8	5,598.8	7.9	7.9	-69.14	0.9	-31.4	30.8	21.0	9.79	3.143		
5,610.3	5,610.2	5,609.0	5,608.9	7.9	7.9	-69.34	1.1	-31.7	30.9	21.1	9.81	3.154		
5,700.0	5,699.9	5,701.6	5,698.3	8.0	8.0	-70.16	3.8	-35.0	32.9	23.0	9.91	3.321		
5,800.0	5,799.8	5,801.6	5,798.1	8.1	8.1	-70.74	6.9	-38.8	35.3	25.3	10.03	3.521		
5,900.0	5,899.8	5,901.6	5,898.0	8.2	8.1	-71.25	10.0	-42.6	37.7	27.5	10.14	3.716		
6,000.0	5,999.7	6,001.7	5,997.8	8.3	8.2	-71.70	13.1	-46.4	40.1	29.8	10.25	3.908		
6,100.0	6,099.6	6,101.7	6,097.7	8.5	8.3	-72.09	16.2	-50.2	42.4	32.1	10.37	4.095		
6,200.0	6,199.5	6,201.7	6,197.5	8.6	8.4	-72.45	19.3	-54.0	44.8	34.4	10.48	4.278		
6,300.0	6,299.5	6,301.8	6,297.4	8.7	8.5	-72.77	22.4	-57.8	47.2	36.6	10.60	4.456		
6,400.0	6,399.4	6,401.8	6,397.2	8.8	8.6	-73.06	25.5	-61.6	49.6	38.9	10.71	4.631		
6,500.0	6,499.3	6,501.8	6,497.1	8.9	8.7	-73.32	28.6	-65.5	52.0	41.2	10.83	4.801		
6,600.0	6,599.2	6,598.2	6,596.9	9.0	8.8	-73.56	31.7	-69.3	54.4	43.4	10.95	4.969		
6,700.0	6,699.2	6,701.9	6,696.8	9.2	8.9	-73.78	34.8	-73.1	56.8	45.7	11.07	5.131		
6,800.0	6,799.1	6,801.9	6,796.6	9.3	9.0	-73.98	37.9	-76.9	59.2	48.0	11.19	5.289		
6,900.0	6,899.0	6,901.9	6,896.5	9.4	9.1	-74.16	41.0	-80.7	61.6	50.3	11.31	5.444		
7,000.0	6,998.9	7,002.0	6,996.3	9.5	9.2	-74.34	44.1	-84.5	64.0	52.5	11.43	5.596		
7,100.0	7,098.9	7,102.0	7,096.2	9.6	9.3	-74.50	47.2	-88.3	66.4	54.8	11.55	5.743		
7,200.0	7,198.8	7,202.0	7,196.0	9.8	9.4	-74.64	50.3	-92.1	68.8	57.1	11.68	5.887		
7,300.0	7,298.7	7,302.0	7,295.9	9.9	9.5	-74.78	53.4	-95.9	71.1	59.3	11.80	6.028		
7,400.0	7,398.6	7,402.1	7,395.8	10.0	9.6	-74.91	56.5	-99.7	73.5	61.6	11.93	6.165		
7,500.0	7,498.6	7,502.1	7,495.6	10.1	9.7	-75.03	59.7	-103.6	75.9	63.9	12.06	6.298		
7,600.0	7,598.5	7,602.1	7,595.5	10.2	9.8	-75.15	62.8	-107.4	78.3	66.2	12.19	6.429		
7,700.0	7,698.4	7,702.2	7,695.3	10.4	9.9	-75.25	65.9	-111.2	80.7	68.4	12.31	6.556		
7,800.0	7,798.4	7,802.2	7,795.2	10.5	10.0	-75.35	69.0	-115.0	83.1	70.7	12.44	6.680		
7,900.0	7,898.3	7,902.2	7,895.0	10.6	10.1	-75.45	72.1	-118.8	85.5	73.0	12.58	6.801		
8,000.0	7,998.2	8,002.2	7,994.9	10.7	10.3	-75.54	75.2	-122.6	87.9	75.2	12.71	6.919		
8,100.0	8,098.1	8,097.7	8,094.7	10.8	10.4	-75.62	78.3	-126.4	90.3	77.5	12.84	7.036		
8,200.0	8,198.1	8,202.3	8,194.6	11.0	10.5	-75.71	81.4	-130.2	92.7	79.7	12.97	7.146		
8,300.0	8,298.0	8,297.7	8,294.4	11.1	10.6	-75.78	84.5	-134.0	95.1	82.0	13.11	7.258		
8,400.0	8,397.9	8,402.4	8,394.3	11.2	10.7	-75.86	87.6	-137.8	97.5	84.3	13.24	7.363		
8,500.0	8,497.8	8,497.6	8,494.1	11.3	10.8	-75.92	90.7	-141.7	99.9	86.5	13.38	7.469		
8,600.0	8,597.8	8,602.4	8,594.0	11.5	10.9	-75.99	93.8	-145.5	102.3	88.8	13.52	7.569		
8,700.0	8,697.7	8,702.4	8,693.8	11.6	11.0	-76.05	96.9	-149.3	104.7	91.1	13.66	7.668		
8,800.0	8,797.6	8,802.5	8,793.7	11.7	11.1	-76.11	100.0	-153.1	107.1	93.3	13.79	7.765		
8,900.0	8,897.5	8,902.5	8,893.5	11.8	11.2	-76.17	103.1	-156.9	109.5	95.6	13.93	7.860		
9,000.0	8,997.5	9,002.5	8,993.4	11.9	11.4	-76.23	106.2	-160.7	111.9	97.8	14.07	7.952		
9,100.0	9,097.4	9,102.6	9,093.2	12.1	11.5	-76.28	109.3	-164.5	114.3	100.1	14.21	8.042		
9,200.0	9,197.3	9,202.6	9,193.1	12.2	11.6	-76.33	112.4	-168.3	116.7	102.4	14.36	8.130		
9,300.0	9,297.2	9,302.6	9,292.9	12.3	11.7	-76.38	115.5	-172.1	119.1	104.6	14.50	8.216		
9,400.0	9,397.2	9,402.6	9,392.8	12.4	11.8	-76.43	118.6	-175.9	121.5	106.9	14.64	8.299		
9,500.0	9,497.1	9,502.7	9,492.6	12.6	11.9	-76.47	121.7	-179.7	123.9	109.1	14.78	8.381		
9,600.0	9,597.0	9,602.7	9,592.5	12.7	12.0	-76.51	124.8	-183.6	126.3	111.4	14.93	8.461		
9,700.0	9,696.9	9,702.7	9,692.3	12.8	12.1	-76.56	127.9	-187.4	128.7	113.6	15.07	8.539		
9,751.7	9,748.6	9,748.9	9,743.9	12.9	12.2	-76.58	129.6	-189.3	129.9	114.8	15.14	8.581		
9,800.0	9,796.9	9,802.8	9,792.1	12.9	12.3	66.15	131.1	-191.2	130.8	115.3	15.49	8.448		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error: 0.0 usft	
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
9,850.0	9,846.7	9,846.8	9,841.6	12.9	12.3	79.15	132.6	-193.1	131.3	115.2	16.17	8.121		
9,900.0	9,895.8	9,904.4	9,890.4	13.2	12.4	85.86	134.1	-194.9	132.1	115.4	16.67	7.921		
9,950.0	9,944.0	9,943.4	9,938.2	13.5	12.4	92.70	135.6	-196.7	134.0	116.5	17.43	7.685		
10,000.0	9,990.9	9,989.7	9,984.4	13.8	12.5	100.03	137.0	-198.5	138.3	119.7	18.61	7.432		
10,050.0	10,036.1	10,034.2	10,028.8	14.1	12.5	107.44	138.4	-200.2	146.4	126.3	20.15	7.268		
10,100.0	10,079.3	10,076.5	10,071.1	14.3	12.6	114.36	139.7	-201.8	159.3	137.5	21.83	7.300		
10,150.0	10,120.1	10,116.4	10,110.9	14.5	12.6	120.36	141.0	-203.3	177.6	154.2	23.40	7.590		
10,200.0	10,158.2	10,153.5	10,148.0	14.8	12.7	125.19	142.1	-204.8	201.1	176.4	24.70	8.141		
10,250.0	10,193.4	10,187.5	10,182.0	14.9	12.7	128.76	143.2	-206.1	229.6	203.9	25.71	8.930		
10,300.0	10,225.3	10,218.2	10,212.6	15.1	12.7	131.05	144.1	-207.2	262.4	236.0	26.45	9.920		
10,350.0	10,253.8	10,245.4	10,239.8	15.2	12.8	132.05	145.0	-208.3	299.1	272.1	26.99	11.079		
10,400.0	10,278.5	10,268.8	10,263.1	15.3	12.8	131.64	145.7	-209.1	338.9	311.6	27.38	12.378		
10,450.0	10,299.4	10,288.2	10,282.6	15.4	12.8	129.58	146.3	-209.9	381.5	353.8	27.66	13.791		
10,500.0	10,316.3	10,303.6	10,297.9	15.5	12.8	125.33	146.8	-210.5	426.1	398.3	27.86	15.298		
10,550.0	10,329.0	10,314.8	10,309.1	15.5	12.9	118.02	147.1	-210.9	472.4	444.4	27.99	16.879		
10,600.0	10,337.4	10,321.7	10,316.0	15.6	12.9	106.34	147.3	-211.2	519.9	491.8	28.08	18.517		
10,650.0	10,341.6	10,324.2	10,318.5	15.6	12.9	89.45	147.4	-211.3	568.1	540.0	28.13	20.195		
10,668.7	10,342.0	10,324.1	10,318.3	15.6	12.9	82.07	147.4	-211.3	586.2	558.1	28.15	20.828		
10,700.0	10,342.2	11,288.3	10,931.2	15.6	12.9	164.37	-448.8	-229.1	612.1	569.5	42.55	14.384		
10,800.0	10,342.8	11,388.3	10,931.8	15.6	12.9	164.37	-548.8	-228.3	612.1	569.3	42.74	14.321		
10,900.0	10,343.4	11,488.3	10,932.4	15.7	13.0	164.37	-648.8	-227.4	612.1	569.1	42.97	14.245		
11,000.0	10,344.0	11,588.3	10,933.0	15.7	13.0	164.37	-748.8	-226.5	612.1	568.8	43.23	14.159		
11,100.0	10,344.6	11,688.3	10,933.6	15.7	13.1	164.37	-848.8	-225.7	612.1	568.5	43.53	14.062		
11,200.0	10,345.2	11,788.3	10,934.2	15.8	13.1	164.37	-948.8	-224.8	612.1	568.2	43.86	13.956		
11,300.0	10,345.8	11,888.3	10,934.8	15.8	13.2	164.37	-1,048.8	-223.9	612.1	567.8	44.22	13.841		
11,400.0	10,346.4	11,988.3	10,935.4	15.8	13.3	164.37	-1,148.8	-223.0	612.1	567.5	44.62	13.718		
11,500.0	10,347.0	12,088.3	10,936.1	15.9	13.4	164.37	-1,248.8	-222.2	612.1	567.0	45.04	13.588		
11,600.0	10,347.7	12,188.3	10,936.7	15.9	13.5	164.37	-1,348.8	-221.3	612.1	566.6	45.50	13.452		
11,700.0	10,348.3	12,288.3	10,937.3	16.0	13.6	164.37	-1,448.7	-220.4	612.1	566.1	45.99	13.310		
11,800.0	10,348.9	12,388.3	10,937.9	16.2	13.8	164.37	-1,548.7	-219.6	612.1	565.6	46.50	13.163		
11,900.0	10,349.5	12,488.3	10,938.5	16.7	13.9	164.37	-1,648.7	-218.7	612.1	565.0	47.04	13.012		
12,000.0	10,350.1	12,588.3	10,939.1	17.3	14.1	164.37	-1,748.7	-217.8	612.1	564.5	47.60	12.858		
12,100.0	10,350.7	12,688.3	10,939.7	18.0	14.3	164.37	-1,848.7	-217.0	612.1	563.9	48.19	12.700		
12,200.0	10,351.3	12,788.3	10,940.3	18.6	14.5	164.37	-1,948.7	-216.1	612.1	563.3	48.81	12.540		
12,300.0	10,351.9	12,888.3	10,940.9	19.3	14.7	164.36	-2,048.7	-215.2	612.1	562.6	49.44	12.379		
12,400.0	10,352.5	12,988.3	10,941.5	20.0	15.0	164.36	-2,148.7	-214.3	612.1	562.0	50.10	12.216		
12,500.0	10,353.1	13,088.3	10,942.1	20.7	15.2	164.36	-2,248.7	-213.5	612.1	561.3	50.78	12.053		
12,600.0	10,353.7	13,188.3	10,942.8	21.4	15.5	164.36	-2,348.7	-212.6	612.1	560.6	51.48	11.889		
12,700.0	10,354.4	13,288.3	10,943.4	22.1	15.8	164.36	-2,448.7	-211.7	612.1	559.9	52.20	11.726		
12,800.0	10,355.0	13,388.3	10,944.0	22.8	16.1	164.36	-2,548.7	-210.9	612.1	559.1	52.93	11.563		
12,900.0	10,355.6	13,488.3	10,944.6	23.5	16.5	164.36	-2,648.7	-210.0	612.1	558.4	53.69	11.401		
13,000.0	10,356.2	13,588.3	10,945.2	24.2	16.8	164.36	-2,748.7	-209.1	612.1	557.6	54.46	11.239		
13,100.0	10,356.8	13,688.3	10,945.8	25.0	17.2	164.36	-2,848.7	-208.2	612.1	556.8	55.24	11.079		
13,200.0	10,357.4	13,788.3	10,946.4	25.7	17.6	164.36	-2,948.7	-207.4	612.1	556.0	56.05	10.921		
13,300.0	10,358.0	13,888.3	10,947.0	26.4	18.0	164.36	-3,048.7	-206.5	612.1	555.2	56.86	10.764		
13,400.0	10,358.6	13,988.3	10,947.6	27.1	18.4	164.36	-3,148.7	-205.6	612.1	554.4	57.69	10.609		
13,500.0	10,359.2	14,088.3	10,948.2	27.9	18.8	164.36	-3,248.6	-204.8	612.1	553.5	58.54	10.456		
13,600.0	10,359.8	14,188.3	10,948.9	28.6	19.2	164.36	-3,348.6	-203.9	612.1	552.7	59.39	10.306		
13,700.0	10,360.5	14,288.3	10,949.5	29.3	19.6	164.36	-3,448.6	-203.0	612.1	551.8	60.26	10.157		
13,800.0	10,361.1	14,388.3	10,950.1	30.1	20.0	164.36	-3,548.6	-202.2	612.1	550.9	61.14	10.011		
13,900.0	10,361.7	14,488.3	10,950.7	30.8	20.5	164.36	-3,648.6	-201.3	612.1	550.0	62.03	9.867		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
14,000.0	10,362.3	14,588.3	10,951.3	31.5	20.9	164.36	-3,748.6	-200.4	612.1	549.1	62.94	9.725		
14,100.0	10,362.9	14,688.3	10,951.9	32.3	21.3	164.36	-3,848.6	-199.5	612.1	548.2	63.85	9.586		
14,200.0	10,363.5	14,788.3	10,952.5	33.0	21.8	164.36	-3,948.6	-198.7	612.1	547.3	64.77	9.450		
14,300.0	10,364.1	14,888.3	10,953.1	33.7	22.2	164.36	-4,048.6	-197.8	612.1	546.4	65.70	9.315		
14,400.0	10,364.7	14,988.3	10,953.7	34.5	22.7	164.36	-4,148.6	-196.9	612.1	545.4	66.65	9.184		
14,500.0	10,365.3	15,088.3	10,954.3	35.2	23.2	164.36	-4,248.6	-196.1	612.1	544.5	67.60	9.055		
14,600.0	10,365.9	15,188.3	10,954.9	36.0	23.6	164.36	-4,348.6	-195.2	612.1	543.5	68.56	8.928		
14,700.0	10,366.6	15,288.3	10,955.6	36.7	24.1	164.36	-4,448.6	-194.3	612.1	542.5	69.52	8.804		
14,800.0	10,367.2	15,388.3	10,956.2	37.5	24.6	164.36	-4,548.6	-193.4	612.1	541.6	70.50	8.682		
14,900.0	10,367.8	15,488.3	10,956.8	38.2	25.0	164.36	-4,648.6	-192.6	612.1	540.6	71.48	8.563		
15,000.0	10,368.4	15,588.3	10,957.4	39.0	25.5	164.36	-4,748.6	-191.7	612.1	539.6	72.47	8.446		
15,100.0	10,369.0	15,688.3	10,958.0	39.7	26.0	164.36	-4,848.6	-190.8	612.1	538.6	73.47	8.331		
15,200.0	10,369.6	15,788.3	10,958.6	40.5	26.5	164.36	-4,948.5	-190.0	612.1	537.6	74.47	8.219		
15,300.0	10,370.2	15,888.3	10,959.2	41.2	26.9	164.36	-5,048.5	-189.1	612.1	536.6	75.48	8.109		
15,400.0	10,370.8	15,988.3	10,959.8	42.0	27.4	164.36	-5,148.5	-188.2	612.1	535.6	76.50	8.001		
15,500.0	10,371.4	16,088.3	10,960.4	42.7	27.9	164.36	-5,248.5	-187.4	612.1	534.5	77.52	7.896		
15,600.0	10,372.0	16,188.3	10,961.0	43.5	28.4	164.36	-5,348.5	-186.5	612.1	533.5	78.55	7.792		
15,700.0	10,372.7	16,288.3	10,961.7	44.2	28.9	164.36	-5,448.5	-185.6	612.1	532.5	79.58	7.691		
15,800.0	10,373.3	16,388.3	10,962.3	45.0	29.4	164.36	-5,548.5	-184.7	612.1	531.4	80.62	7.592		
15,900.0	10,373.9	16,488.3	10,962.9	45.7	29.9	164.36	-5,648.5	-183.9	612.1	530.4	81.66	7.495		
16,000.0	10,374.5	16,588.3	10,963.5	46.5	30.4	164.36	-5,748.5	-183.0	612.1	529.4	82.71	7.400		
16,100.0	10,375.1	16,688.3	10,964.1	47.2	30.9	164.36	-5,848.5	-182.1	612.1	528.3	83.76	7.307		
16,200.0	10,375.7	16,788.3	10,964.7	48.0	31.4	164.36	-5,948.5	-181.3	612.1	527.2	84.82	7.216		
16,300.0	10,376.3	16,888.3	10,965.3	48.7	31.9	164.36	-6,048.5	-180.4	612.1	526.2	85.88	7.127		
16,400.0	10,376.9	16,988.3	10,965.9	49.5	32.4	164.36	-6,148.5	-179.5	612.1	525.1	86.95	7.039		
16,500.0	10,377.5	17,088.3	10,966.5	50.2	32.9	164.36	-6,248.5	-178.6	612.1	524.0	88.02	6.954		
16,600.0	10,378.1	17,188.3	10,967.1	51.0	33.4	164.36	-6,348.5	-177.8	612.1	523.0	89.10	6.870		
16,700.0	10,378.8	17,288.3	10,967.7	51.8	33.9	164.36	-6,448.5	-176.9	612.1	521.9	90.17	6.787		
16,800.0	10,379.4	17,388.3	10,968.4	52.5	34.4	164.36	-6,548.5	-176.0	612.1	520.8	91.26	6.707		
16,900.0	10,380.0	17,488.3	10,969.0	53.3	34.9	164.36	-6,648.5	-175.2	612.1	519.7	92.34	6.628		
17,000.0	10,380.6	17,588.3	10,969.6	54.0	35.5	164.36	-6,748.4	-174.3	612.1	518.6	93.43	6.551		
17,100.0	10,381.2	17,688.3	10,970.2	54.8	36.0	164.36	-6,848.4	-173.4	612.1	517.5	94.53	6.475		
17,200.0	10,381.8	17,788.3	10,970.8	55.5	36.5	164.36	-6,948.4	-172.6	612.1	516.4	95.62	6.401		
17,300.0	10,382.4	17,888.3	10,971.4	56.3	37.0	164.36	-7,048.4	-171.7	612.1	515.3	96.72	6.328		
17,400.0	10,383.0	17,988.3	10,972.0	57.0	37.5	164.36	-7,148.4	-170.8	612.1	514.2	97.82	6.257		
17,500.0	10,383.6	18,088.3	10,972.6	57.8	38.1	164.36	-7,248.4	-169.9	612.1	513.1	98.93	6.187		
17,600.0	10,384.2	18,188.3	10,973.2	58.6	38.6	164.36	-7,348.4	-169.1	612.1	512.0	100.04	6.118		
17,700.0	10,384.9	18,288.3	10,973.8	59.3	39.1	164.36	-7,448.4	-168.2	612.1	510.9	101.15	6.051		
17,800.0	10,385.5	18,388.3	10,974.5	60.1	39.6	164.36	-7,548.4	-167.3	612.1	509.8	102.26	5.985		
17,900.0	10,386.1	18,488.3	10,975.1	60.8	40.2	164.36	-7,648.4	-166.5	612.1	508.7	103.38	5.920		
18,000.0	10,386.7	18,588.3	10,975.7	61.6	40.7	164.36	-7,748.4	-165.6	612.1	507.6	104.50	5.857		
18,100.0	10,387.3	18,688.3	10,976.3	62.4	41.2	164.36	-7,848.4	-164.7	612.1	506.4	105.62	5.795		
18,200.0	10,387.9	18,788.3	10,976.9	63.1	41.8	164.36	-7,948.4	-163.8	612.1	505.3	106.75	5.734		
18,300.0	10,388.5	18,888.3	10,977.5	63.9	42.3	164.36	-8,048.4	-163.0	612.1	504.2	107.87	5.674		
18,400.0	10,389.1	18,988.3	10,978.1	64.6	42.8	164.36	-8,148.4	-162.1	612.1	503.1	109.00	5.615		
18,500.0	10,389.7	19,088.3	10,978.7	65.4	43.4	164.36	-8,248.4	-161.2	612.1	501.9	110.13	5.557		
18,600.0	10,390.3	19,188.3	10,979.3	66.2	43.9	164.36	-8,348.4	-160.4	612.1	500.8	111.27	5.501		
18,700.0	10,391.0	19,288.3	10,979.9	66.9	44.4	164.36	-8,448.4	-159.5	612.1	499.7	112.40	5.445		
18,800.0	10,391.6	19,388.3	10,980.5	67.7	45.0	164.36	-8,548.3	-158.6	612.1	498.5	113.54	5.391		
18,900.0	10,392.2	19,488.3	10,981.2	68.4	45.5	164.36	-8,648.3	-157.8	612.1	497.4	114.68	5.337		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,000.0	10,392.8	19,588.3	10,981.8	69.2	46.1	164.36	-8,748.3	-156.9	612.1	496.2	115.82	5.285		
19,100.0	10,393.4	19,688.3	10,982.4	70.0	46.6	164.36	-8,848.3	-156.0	612.1	495.1	116.96	5.233		
19,200.0	10,394.0	19,788.3	10,983.0	70.7	47.2	164.36	-8,948.3	-155.1	612.1	493.9	118.11	5.182		
19,300.0	10,394.6	19,888.3	10,983.6	71.5	47.7	164.36	-9,048.3	-154.3	612.1	492.8	119.25	5.132		
19,400.0	10,395.2	19,988.3	10,984.2	72.2	48.3	164.36	-9,148.3	-153.4	612.1	491.7	120.40	5.083		
19,500.0	10,395.8	20,088.3	10,984.8	73.0	48.8	164.36	-9,248.3	-152.5	612.1	490.5	121.55	5.035		
19,600.0	10,396.4	20,188.3	10,985.4	73.8	49.4	164.36	-9,348.3	-151.7	612.1	489.3	122.71	4.988		
19,700.0	10,397.1	20,288.3	10,986.0	74.5	49.9	164.36	-9,448.3	-150.8	612.1	488.2	123.86	4.942		
19,800.0	10,397.7	20,388.3	10,986.6	75.3	50.5	164.36	-9,548.3	-149.9	612.1	487.0	125.01	4.896		
19,900.0	10,398.3	20,488.3	10,987.3	76.0	51.0	164.36	-9,648.3	-149.1	612.1	485.9	126.17	4.851		
20,000.0	10,398.9	20,588.3	10,987.9	76.8	51.6	164.36	-9,748.3	-148.2	612.1	484.7	127.33	4.807		
20,100.0	10,399.5	20,688.3	10,988.5	77.6	52.1	164.36	-9,848.3	-147.3	612.1	483.6	128.49	4.764		
20,200.0	10,400.1	20,788.3	10,989.1	78.3	52.7	164.36	-9,948.3	-146.4	612.1	482.4	129.65	4.721		
20,300.0	10,400.7	20,888.3	10,989.7	79.1	53.2	164.36	-10,048.3	-145.6	612.1	481.2	130.81	4.679		
20,400.0	10,401.3	20,988.3	10,990.3	79.8	53.8	164.36	-10,148.3	-144.7	612.1	480.1	131.97	4.638		
20,500.0	10,401.9	21,088.3	10,990.9	80.6	54.2	164.36	-10,248.3	-143.8	612.1	479.1	132.96	4.603		
20,511.3	10,402.0	21,099.6	10,991.0	80.7	54.2	164.36	-10,259.5	-143.7	612.1	479.0	133.07	4.600		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,808.3					
100.0	100.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,708.4	9,627.1	81.24	119.497		
200.0	200.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,608.4	9,527.1	81.34	118.130		
300.0	300.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,508.5	9,427.1	81.44	116.749		
400.0	400.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,408.6	9,327.0	81.56	115.364		
500.0	500.0	19,727.0	9,827.3	3.1	166.7	103.00	-86.7	375.6	9,308.7	9,227.0	81.67	113.981		
600.0	600.0	19,727.0	9,827.3	3.1	166.7	103.00	-86.7	375.6	9,208.8	9,127.0	81.78	112.599		
700.0	700.0	19,727.0	9,827.3	3.1	166.7	103.00	-86.7	375.6	9,108.9	9,027.0	81.90	111.220		
800.0	800.0	19,727.0	9,827.3	3.2	166.7	103.00	-86.7	375.6	9,008.9	8,926.9	82.02	109.843		
900.0	900.0	19,727.0	9,827.3	3.2	166.7	103.00	-86.7	375.6	8,909.0	8,826.9	82.13	108.469		
1,000.0	1,000.0	19,727.0	9,827.3	3.2	166.7	103.00	-86.7	375.6	8,809.1	8,726.9	82.25	107.099		
1,100.0	1,100.0	19,727.0	9,827.3	3.3	166.7	103.00	-86.7	375.6	8,709.2	8,626.9	82.37	105.730		
1,200.0	1,200.0	19,727.0	9,827.3	3.4	166.7	103.00	-86.7	375.6	8,609.3	8,526.8	82.49	104.365		
1,300.0	1,300.0	19,727.0	9,827.3	3.4	166.7	103.00	-86.7	375.6	8,509.4	8,426.8	82.61	103.003		
1,400.0	1,400.0	19,727.0	9,827.3	3.5	166.7	103.00	-86.7	375.6	8,409.5	8,326.8	82.74	101.643		
1,500.0	1,500.0	19,727.0	9,827.3	3.5	166.7	103.00	-86.7	375.6	8,309.6	8,226.8	82.86	100.286		
1,600.0	1,600.0	19,727.0	9,827.3	3.6	166.7	103.00	-86.7	375.6	8,209.7	8,126.8	82.98	98.931		
1,700.0	1,700.0	19,727.0	9,827.3	3.7	166.7	103.00	-86.7	375.6	8,109.9	8,026.8	83.11	97.580		
1,800.0	1,800.0	19,727.0	9,827.3	3.8	166.7	103.00	-86.7	375.6	8,010.0	7,926.7	83.24	96.231		
1,900.0	1,900.0	19,727.0	9,827.3	3.9	166.7	103.00	-86.7	375.6	7,910.1	7,826.7	83.37	94.885		
2,000.0	2,000.0	19,727.0	9,827.3	3.9	166.7	103.00	-86.7	375.6	7,810.2	7,726.7	83.50	93.541		
2,100.0	2,100.0	19,727.0	9,827.3	4.0	166.7	103.00	-86.7	375.6	7,710.3	7,626.7	83.63	92.200		
2,200.0	2,200.0	19,727.0	9,827.3	4.1	166.7	103.00	-86.7	375.6	7,610.5	7,526.7	83.76	90.861		
2,300.0	2,300.0	19,727.0	9,827.3	4.2	166.7	103.00	-86.7	375.6	7,510.6	7,426.7	83.89	89.525		
2,400.0	2,400.0	19,727.0	9,827.3	4.3	166.7	103.00	-86.7	375.6	7,410.7	7,326.7	84.03	88.192		
2,500.0	2,500.0	19,727.0	9,827.3	4.4	166.7	103.00	-86.7	375.6	7,310.9	7,226.7	84.17	86.861		
2,600.0	2,600.0	19,727.0	9,827.3	4.5	166.7	103.00	-86.7	375.6	7,211.0	7,126.7	84.31	85.533		
2,700.0	2,700.0	19,727.0	9,827.3	4.6	166.7	103.00	-86.7	375.6	7,111.2	7,026.7	84.45	84.208		
2,800.0	2,800.0	19,727.0	9,827.3	4.7	166.7	103.00	-86.7	375.6	7,011.3	6,926.7	84.59	82.885		
2,900.0	2,900.0	19,727.0	9,827.3	4.8	166.7	103.00	-86.7	375.6	6,911.5	6,826.7	84.74	81.565		
3,000.0	3,000.0	19,727.0	9,827.3	4.9	166.7	103.00	-86.7	375.6	6,811.6	6,726.7	84.88	80.247		
3,100.0	3,100.0	19,727.0	9,827.3	5.0	166.7	103.00	-86.7	375.6	6,711.8	6,626.7	85.03	78.932		
3,200.0	3,200.0	19,727.0	9,827.3	5.1	166.7	103.00	-86.7	375.6	6,611.9	6,526.8	85.18	77.620		
3,300.0	3,300.0	19,727.0	9,827.3	5.2	166.7	103.00	-86.7	375.6	6,512.1	6,426.8	85.34	76.310		
3,400.0	3,400.0	19,727.0	9,827.3	5.3	166.7	103.00	-86.7	375.6	6,412.3	6,326.8	85.49	75.003		
3,500.0	3,500.0	19,727.0	9,827.3	5.4	166.7	103.00	-86.7	375.6	6,312.5	6,226.8	85.65	73.699		
3,600.0	3,600.0	19,727.0	9,827.3	5.5	166.7	103.00	-86.7	375.6	6,212.7	6,126.9	85.81	72.398		
3,700.0	3,700.0	19,727.0	9,827.3	5.7	166.7	103.00	-86.7	375.6	6,112.9	6,026.9	85.98	71.100		
3,800.0	3,800.0	19,727.0	9,827.3	5.8	166.7	103.00	-86.7	375.6	6,013.1	5,926.9	86.14	69.804		
3,900.0	3,900.0	19,727.0	9,827.3	5.9	166.7	103.00	-86.7	375.6	5,913.3	5,827.0	86.31	68.512		
4,000.0	4,000.0	19,727.0	9,827.3	6.0	166.7	103.00	-86.7	375.6	5,813.5	5,727.0	86.48	67.222		
4,100.0	4,100.0	19,727.0	9,827.3	6.1	166.7	103.00	-86.7	375.6	5,713.7	5,627.1	86.66	65.935		
4,200.0	4,200.0	19,727.0	9,827.3	6.2	166.7	103.00	-86.7	375.6	5,613.9	5,527.1	86.83	64.652		
4,300.0	4,300.0	19,727.0	9,827.3	6.3	166.7	103.00	-86.7	375.6	5,514.2	5,427.2	87.01	63.371		
4,400.0	4,400.0	19,727.0	9,827.3	6.5	166.7	103.00	-86.7	375.6	5,414.4	5,327.2	87.20	62.094		
4,500.0	4,500.0	19,727.0	9,827.3	6.6	166.7	103.00	-86.7	375.6	5,314.7	5,227.3	87.38	60.820		
4,600.0	4,600.0	19,727.0	9,827.3	6.7	166.7	103.00	-86.7	375.6	5,215.0	5,127.4	87.57	59.549		
4,700.0	4,700.0	19,727.0	9,827.3	6.8	166.7	103.00	-86.7	375.6	5,115.2	5,027.5	87.77	58.281		
4,800.0	4,800.0	19,727.0	9,827.3	6.9	166.7	103.00	-86.7	375.6	5,015.5	4,927.6	87.97	57.017		
4,900.0	4,900.0	19,727.0	9,827.3	7.0	166.7	103.00	-86.7	375.6	4,915.8	4,827.7	88.17	55.756		
5,000.0	5,000.0	19,727.0	9,827.3	7.2	166.7	103.00	-86.7	375.6	4,816.1	4,727.8	88.37	54.499		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft	
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
							+N/-S (usft)	+E/-W (usft)						
5,100.0	5,100.0	19,727.0	9,827.3	7.3	166.7	103.00	-86.7	375.6	4,716.5	4,627.9	88.58	53.245		
5,200.0	5,200.0	19,727.0	9,827.3	7.4	166.7	103.00	-86.7	375.6	4,616.8	4,528.0	88.79	51.994		
5,300.0	5,300.0	19,727.0	9,827.3	7.5	166.7	103.00	-86.7	375.6	4,517.2	4,428.2	89.01	50.748		
5,400.0	5,400.0	19,727.0	9,827.3	7.6	166.7	103.00	-86.7	375.6	4,417.5	4,328.3	89.24	49.505		
5,500.0	5,500.0	19,727.0	9,827.3	7.8	166.7	103.00	-86.7	375.6	4,317.9	4,228.5	89.46	48.265		
5,600.0	5,600.0	19,727.0	9,827.3	7.9	166.7	139.62	-86.7	375.6	4,218.5	4,128.8	89.70	47.030		
5,610.3	5,610.2	19,727.0	9,827.3	7.9	166.7	140.73	-86.7	375.6	4,208.3	4,118.6	89.72	46.904		
5,700.0	5,699.9	19,727.0	9,827.3	8.0	166.7	140.73	-86.7	375.6	4,119.2	4,029.2	89.94	45.799		
5,800.0	5,799.8	19,727.0	9,827.3	8.1	166.7	140.73	-86.7	375.6	4,019.9	3,929.7	90.19	44.572		
5,900.0	5,899.8	19,727.0	9,827.3	8.2	166.7	140.73	-86.7	375.6	3,920.7	3,830.3	90.44	43.350		
6,000.0	5,999.7	19,727.0	9,827.3	8.3	166.7	140.73	-86.7	375.6	3,821.5	3,730.8	90.71	42.131		
6,100.0	6,099.6	19,727.0	9,827.3	8.5	166.7	140.73	-86.7	375.6	3,722.4	3,631.4	90.98	40.916		
6,200.0	6,199.5	19,727.0	9,827.3	8.6	166.7	140.73	-86.7	375.6	3,623.3	3,532.1	91.26	39.705		
6,300.0	6,299.5	19,727.0	9,827.3	8.7	166.7	140.73	-86.7	375.6	3,524.3	3,432.8	91.54	38.499		
6,400.0	6,399.4	19,727.0	9,827.3	8.8	166.7	140.73	-86.7	375.6	3,425.3	3,333.5	91.84	37.296		
6,500.0	6,499.3	19,727.0	9,827.3	8.9	166.7	140.73	-86.7	375.6	3,326.4	3,234.3	92.15	36.098		
6,600.0	6,599.2	19,727.0	9,827.3	9.0	166.7	140.73	-86.7	375.6	3,227.6	3,135.1	92.47	34.904		
6,700.0	6,699.2	19,727.0	9,827.3	9.2	166.7	140.73	-86.7	375.6	3,128.8	3,036.0	92.80	33.715		
6,800.0	6,799.1	19,727.0	9,827.3	9.3	166.7	140.73	-86.7	375.6	3,030.1	2,937.0	93.15	32.530		
6,900.0	6,899.0	19,727.0	9,827.3	9.4	166.7	140.73	-86.7	375.6	2,931.6	2,838.0	93.51	31.350		
7,000.0	6,998.9	19,727.0	9,827.3	9.5	166.7	140.73	-86.7	375.6	2,833.1	2,739.2	93.89	30.174		
7,100.0	7,098.9	19,727.0	9,827.3	9.6	166.7	140.73	-86.7	375.6	2,734.7	2,640.4	94.29	29.002		
7,200.0	7,198.8	19,727.0	9,827.3	9.8	166.7	140.73	-86.7	375.6	2,636.4	2,541.7	94.71	27.836		
7,300.0	7,298.7	19,727.0	9,827.3	9.9	166.7	140.73	-86.7	375.6	2,538.3	2,443.1	95.16	26.674		
7,400.0	7,398.6	19,727.0	9,827.3	10.0	166.7	140.73	-86.7	375.6	2,440.3	2,344.7	95.64	25.516		
7,500.0	7,498.6	19,727.0	9,827.3	10.1	166.7	140.73	-86.7	375.6	2,342.5	2,246.3	96.15	24.364		
7,600.0	7,598.5	19,727.0	9,827.3	10.2	166.7	140.73	-86.7	375.6	2,244.9	2,148.2	96.69	23.217		
7,700.0	7,698.4	19,727.0	9,827.3	10.4	166.7	140.73	-86.7	375.6	2,147.5	2,050.2	97.28	22.074		
7,800.0	7,798.4	19,727.0	9,827.3	10.5	166.7	140.73	-86.7	375.6	2,050.3	1,952.4	97.93	20.937		
7,900.0	7,898.3	19,727.0	9,827.3	10.6	166.7	140.73	-86.7	375.6	1,953.5	1,854.8	98.63	19.806		
8,000.0	7,998.2	19,727.0	9,827.3	10.7	166.7	140.73	-86.7	375.6	1,856.9	1,757.5	99.41	18.680		
8,100.0	8,098.1	19,727.0	9,827.3	10.8	166.7	140.73	-86.7	375.6	1,760.8	1,660.5	100.27	17.561		
8,200.0	8,198.1	19,727.0	9,827.3	11.0	166.7	140.73	-86.7	375.6	1,665.1	1,563.9	101.24	16.448		
8,300.0	8,298.0	19,727.0	9,827.3	11.1	166.7	140.73	-86.7	375.6	1,570.0	1,467.7	102.33	15.343		
8,400.0	8,397.9	19,727.0	9,827.3	11.2	166.7	140.73	-86.7	375.6	1,475.5	1,371.9	103.57	14.246		
8,500.0	8,497.8	19,727.0	9,827.3	11.3	166.7	140.73	-86.7	375.6	1,381.8	1,276.7	105.01	13.158		
8,600.0	8,597.8	19,727.0	9,827.3	11.5	166.7	140.73	-86.7	375.6	1,289.0	1,182.3	106.68	12.083		
8,700.0	8,697.7	19,727.0	9,827.3	11.6	166.7	140.73	-86.7	375.6	1,197.4	1,088.7	108.64	11.022		
8,800.0	8,797.6	19,727.0	9,827.3	11.7	166.7	140.73	-86.7	375.6	1,107.2	996.2	110.95	9.979		
8,900.0	8,897.5	19,727.0	9,827.3	11.8	166.7	140.73	-86.7	375.6	1,018.9	905.1	113.72	8.959		
9,000.0	8,997.5	19,727.0	9,827.3	11.9	166.7	140.73	-86.7	375.6	932.9	815.8	117.04	7.971		
9,100.0	9,097.4	19,727.0	9,827.3	12.1	166.7	140.73	-86.7	375.6	850.0	728.9	121.03	7.023		
9,200.0	9,197.3	19,727.0	9,827.3	12.2	166.7	140.73	-86.7	375.6	771.1	645.3	125.80	6.130		
9,300.0	9,297.2	19,727.0	9,827.3	12.3	166.7	140.73	-86.7	375.6	697.8	566.4	131.40	5.310		
9,400.0	9,397.2	19,727.0	9,827.3	12.4	166.7	140.73	-86.7	375.6	631.7	494.0	137.74	4.586		
9,500.0	9,497.1	19,727.0	9,827.3	12.6	166.7	140.73	-86.7	375.6	575.6	431.1	144.43	3.985		
9,600.0	9,597.0	19,727.0	9,827.3	12.7	166.7	140.73	-86.7	375.6	532.4	381.8	150.62	3.535		
9,700.0	9,696.9	19,727.0	9,827.3	12.8	166.7	140.73	-86.7	375.6	505.6	350.5	155.11	3.260		
9,751.7	9,748.6	19,727.0	9,827.3	12.9	166.7	140.73	-86.7	375.6	499.1	342.8	156.40	3.192		
9,800.0	9,796.9	19,727.0	9,827.3	12.9	166.7	-77.51	-86.7	375.6	496.9	339.6	157.27	3.159		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,815.9	9,812.7	19,727.0	9,827.3	12.9	166.7	-71.76	-86.7	375.6	496.7	339.3	157.48	3.154 CC, ES		
9,850.0	9,846.7	19,727.0	9,827.3	12.9	166.7	-67.12	-86.7	375.6	497.4	339.6	157.85	3.151 SF		
9,900.0	9,895.8	19,727.0	9,827.3	13.2	166.7	-64.50	-86.7	375.6	500.9	342.9	158.01	3.170		
9,950.0	9,944.0	19,727.0	9,827.3	13.5	166.7	-62.94	-86.7	375.6	507.1	349.2	157.90	3.212		
10,000.0	9,990.9	19,727.0	9,827.3	13.8	166.7	-61.59	-86.7	375.6	516.1	358.6	157.48	3.277		
10,050.0	10,036.1	19,727.0	9,827.3	14.1	166.7	-60.23	-86.7	375.6	527.5	370.7	156.71	3.366		
10,100.0	10,079.3	19,727.0	9,827.3	14.3	166.7	-58.79	-86.7	375.6	541.1	385.5	155.61	3.477		
10,150.0	10,120.1	19,727.0	9,827.3	14.5	166.7	-57.24	-86.7	375.6	556.7	402.5	154.19	3.610		
10,200.0	10,158.2	19,727.0	9,827.3	14.8	166.7	-55.60	-86.7	375.6	574.0	421.5	152.47	3.765		
10,250.0	10,193.4	19,727.0	9,827.3	14.9	166.7	-53.87	-86.7	375.6	592.7	442.2	150.50	3.938		
10,300.0	10,225.3	19,724.4	9,827.3	15.1	166.6	-51.97	-89.3	375.6	612.6	464.3	148.26	4.132		
10,350.0	10,253.8	19,682.7	9,828.2	15.2	165.9	-48.55	-131.0	375.2	631.8	486.1	145.67	4.337		
10,400.0	10,278.5	19,638.8	9,829.1	15.3	165.2	-45.71	-174.9	374.9	648.8	505.4	143.44	4.523		
10,450.0	10,299.4	19,594.9	9,830.0	15.4	164.5	-43.47	-218.8	374.5	663.3	521.7	141.58	4.685		
10,500.0	10,316.3	19,552.1	9,830.7	15.5	163.8	-41.78	-261.6	374.3	675.2	535.1	140.07	4.820		
10,550.0	10,329.0	19,508.6	9,831.2	15.5	163.1	-40.54	-305.1	374.2	684.3	545.4	138.87	4.927		
10,600.0	10,337.4	19,465.0	9,831.4	15.6	162.4	-39.74	-348.6	374.5	690.5	552.6	137.98	5.005		
10,650.0	10,341.6	19,419.4	9,831.4	15.6	161.6	-39.35	-394.2	375.0	693.9	556.5	137.37	5.051		
10,668.7	10,342.0	19,396.2	9,831.5	15.6	161.2	-39.31	-417.5	375.4	694.2	557.1	137.14	5.062		
10,700.0	10,342.2	19,357.2	9,831.9	15.6	160.6	-39.32	-456.5	375.7	694.1	557.3	136.78	5.075		
10,800.0	10,342.8	19,259.4	9,833.7	15.6	159.0	-39.37	-554.3	376.3	693.0	557.1	135.85	5.101		
10,893.5	10,343.3	19,169.7	9,834.1	15.7	157.5	-39.34	-643.9	376.7	692.8	557.9	134.93	5.135		
10,900.0	10,343.4	19,163.4	9,834.1	15.7	157.4	-39.33	-650.2	376.6	692.8	558.0	134.85	5.138		
11,000.0	10,344.0	19,063.3	9,832.9	15.7	155.8	-39.10	-750.4	375.4	692.9	559.2	133.64	5.185		
11,100.0	10,344.6	18,961.6	9,831.2	15.7	154.1	-38.78	-852.0	373.2	692.8	560.4	132.34	5.235		
11,160.3	10,345.0	18,902.7	9,829.8	15.7	153.1	-38.54	-910.8	371.4	692.7	561.1	131.54	5.266		
11,200.0	10,345.2	18,864.4	9,828.9	15.8	152.5	-38.39	-949.1	370.4	692.7	561.7	131.03	5.287		
11,300.0	10,345.8	18,764.5	9,826.8	15.8	150.9	-38.06	-1,048.9	368.3	692.9	563.1	129.80	5.338		
11,400.0	10,346.4	18,653.2	9,826.9	15.8	149.0	-37.88	-1,160.2	366.9	692.1	563.4	128.67	5.378		
11,500.0	10,347.0	18,562.6	9,827.2	15.9	147.5	-37.79	-1,250.9	366.5	691.4	563.6	127.87	5.407		
11,600.0	10,347.7	18,462.2	9,826.8	15.9	145.9	-37.64	-1,351.2	365.9	691.3	564.4	126.93	5.447		
11,626.3	10,347.8	18,436.6	9,826.6	15.9	145.5	-37.59	-1,376.9	365.6	691.3	564.6	126.68	5.457		
11,700.0	10,348.3	18,365.5	9,825.8	16.0	144.3	-37.43	-1,447.9	364.8	691.4	565.4	125.98	5.488		
11,800.0	10,348.9	18,270.1	9,824.3	16.2	142.7	-37.23	-1,543.3	364.1	692.2	567.1	125.07	5.535		
11,900.0	10,349.5	18,173.0	9,823.0	16.7	141.1	-37.08	-1,640.4	364.3	693.4	569.2	124.22	5.582		
12,000.0	10,350.1	18,072.9	9,821.0	17.3	139.5	-36.94	-1,740.4	364.9	695.3	571.9	123.38	5.635		
12,100.0	10,350.7	17,956.7	9,821.2	18.0	137.6	-36.89	-1,856.7	365.4	695.3	572.8	122.52	5.675		
12,200.0	10,351.3	17,852.6	9,823.5	18.6	135.9	-36.97	-1,960.7	366.3	694.0	572.1	121.92	5.693		
12,300.0	10,351.9	17,753.0	9,825.6	19.3	134.2	-37.01	-2,060.3	366.7	692.6	571.2	121.33	5.708		
12,400.0	10,352.5	17,658.9	9,827.1	20.0	132.7	-37.02	-2,154.4	367.0	691.5	570.7	120.79	5.725		
12,453.6	10,352.9	17,609.1	9,827.3	20.4	131.9	-37.00	-2,204.2	367.2	691.4	570.9	120.48	5.738		
12,500.0	10,353.1	17,565.8	9,827.3	20.7	131.2	-36.97	-2,247.5	367.4	691.5	571.3	120.19	5.753		
12,600.0	10,353.7	17,469.2	9,826.6	21.4	129.6	-36.87	-2,344.1	367.7	692.2	572.7	119.53	5.791		
12,700.0	10,354.4	17,371.6	9,825.5	22.1	128.0	-36.77	-2,441.7	368.1	693.3	574.5	118.86	5.833		
12,800.0	10,355.0	17,272.9	9,824.3	22.8	126.3	-36.66	-2,540.4	368.8	694.7	576.5	118.20	5.878		
12,900.0	10,355.6	17,172.3	9,823.5	23.5	124.7	-36.62	-2,641.0	370.1	696.1	578.5	117.59	5.920		
13,000.0	10,356.2	17,060.1	9,825.2	24.2	122.8	-36.82	-2,753.1	373.4	696.6	579.4	117.12	5.947		
13,100.0	10,356.8	16,955.0	9,828.7	25.0	121.1	-37.15	-2,858.1	377.2	696.1	579.3	116.83	5.958		
13,200.0	10,357.4	16,838.9	9,835.8	25.7	119.2	-37.66	-2,973.9	381.0	693.0	576.5	116.53	5.947		
13,300.0	10,358.0	16,748.9	9,840.5	26.4	117.7	-37.97	-3,063.7	383.3	690.4	574.0	116.42	5.931		
13,400.0	10,358.6	16,650.3	9,843.5	27.1	116.1	-38.13	-3,162.3	384.8	688.9	572.8	116.05	5.936		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design		BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH											Offset Site Error:		0.0 usft
Survey Program:		100- VES GyroFlex, 9207-MWD											Offset Well Error:		3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
13,500.0	10,359.2	16,549.7	9,846.8	27.9	114.4	-38.26	-3,262.8	385.6	686.8	571.1	115.62	5.940			
13,595.3	10,359.8	16,466.8	9,848.3	28.6	113.1	-38.31	-3,345.7	386.2	685.8	570.5	115.31	5.947			
13,600.0	10,359.8	16,463.0	9,848.4	28.6	113.0	-38.31	-3,349.5	386.3	685.8	570.5	115.29	5.948			
13,700.0	10,360.5	16,376.8	9,847.9	29.3	111.6	-38.31	-3,435.7	387.7	687.1	572.2	114.88	5.981			
13,800.0	10,361.1	16,279.4	9,845.9	30.1	110.0	-38.20	-3,533.0	389.0	689.5	575.2	114.30	6.033			
13,900.0	10,361.7	16,175.3	9,843.5	30.8	108.3	-38.04	-3,637.2	389.9	691.8	578.2	113.63	6.088			
14,000.0	10,362.3	16,050.1	9,843.2	31.5	106.2	-37.99	-3,762.3	391.0	692.6	579.7	112.83	6.138			
14,100.0	10,362.9	15,949.7	9,846.0	32.3	104.6	-38.04	-3,862.7	390.8	690.3	577.9	112.37	6.143			
14,200.0	10,363.5	15,857.3	9,847.4	33.0	103.0	-38.03	-3,955.1	390.9	689.1	577.1	111.97	6.154			
14,264.4	10,363.9	15,797.6	9,848.0	33.5	102.1	-38.04	-4,014.8	391.4	688.9	577.1	111.72	6.166			
14,300.0	10,364.1	15,764.6	9,848.2	33.7	101.5	-38.05	-4,047.8	391.8	688.9	577.3	111.59	6.174			
14,400.0	10,364.7	15,669.0	9,848.5	34.5	100.0	-38.08	-4,143.3	393.4	689.7	578.5	111.18	6.203			
14,500.0	10,365.3	15,569.3	9,848.4	35.2	98.3	-38.11	-4,243.0	395.2	690.8	580.0	110.73	6.238			
14,600.0	10,365.9	15,475.5	9,847.8	36.0	96.8	-38.09	-4,336.8	396.6	692.2	581.9	110.30	6.275			
14,700.0	10,366.6	15,386.8	9,846.0	36.7	95.3	-38.04	-4,425.5	398.4	694.9	585.0	109.87	6.325			
14,800.0	10,367.2	15,301.0	9,843.1	37.5	93.9	-37.98	-4,511.2	401.0	699.5	590.0	109.41	6.393			
14,900.0	10,367.8	15,171.1	9,839.2	38.2	91.8	-37.95	-4,641.0	405.3	704.1	595.3	108.73	6.475			
15,000.0	10,368.4	15,069.1	9,839.3	39.0	90.1	-38.00	-4,742.9	407.4	705.2	596.9	108.30	6.512			
15,100.0	10,369.0	14,970.0	9,839.4	39.7	88.5	-38.07	-4,841.9	409.7	706.5	598.6	107.90	6.548			
15,200.0	10,369.6	14,860.2	9,841.1	40.5	86.7	-38.21	-4,951.8	412.1	706.5	599.1	107.45	6.575			
15,215.8	10,369.7	14,845.9	9,841.3	40.6	86.4	-38.23	-4,966.1	412.4	706.5	599.1	107.41	6.578			
15,300.0	10,370.2	14,768.5	9,842.3	41.2	85.1	-38.35	-5,043.4	414.5	707.0	599.8	107.18	6.596			
15,400.0	10,370.8	14,665.7	9,842.8	42.0	83.5	-38.45	-5,146.2	417.1	708.2	601.4	106.77	6.633			
15,500.0	10,371.4	14,558.4	9,844.9	42.7	81.7	-38.58	-5,253.4	419.0	707.7	601.4	106.34	6.655			
15,600.0	10,372.0	14,458.5	9,846.5	43.5	80.1	-38.70	-5,353.3	420.9	707.5	601.5	105.98	6.676			
15,700.0	10,372.7	14,357.0	9,848.8	44.2	78.4	-38.85	-5,454.7	422.8	706.8	601.2	105.61	6.692			
15,792.6	10,373.2	14,269.0	9,850.4	44.9	77.0	-38.95	-5,542.8	424.3	706.4	601.1	105.32	6.708			
15,800.0	10,373.3	14,262.1	9,850.5	45.0	76.8	-38.96	-5,549.6	424.4	706.4	601.1	105.30	6.709			
15,900.0	10,373.9	14,168.2	9,851.3	45.7	75.3	-39.04	-5,643.5	426.3	707.0	602.0	104.97	6.735			
16,000.0	10,374.5	14,078.3	9,850.5	46.5	73.8	-39.00	-5,733.4	427.6	708.5	603.9	104.60	6.774			
16,100.0	10,375.1	13,989.9	9,848.1	47.2	72.4	-38.91	-5,821.8	429.3	711.7	607.5	104.20	6.831			
16,200.0	10,375.7	13,892.2	9,844.2	48.0	70.8	-38.76	-5,919.3	431.5	716.2	612.5	103.71	6.905			
16,300.0	10,376.3	13,769.5	9,841.2	48.7	68.8	-38.66	-6,042.0	433.9	719.4	616.3	103.08	6.979			
16,400.0	10,376.9	13,660.5	9,841.4	49.5	67.0	-38.64	-6,151.0	434.8	719.7	617.1	102.57	7.016			
16,500.0	10,377.5	13,558.0	9,841.9	50.2	65.3	-38.58	-6,253.5	435.0	719.3	617.2	102.13	7.044			
16,600.0	10,378.1	13,460.0	9,842.4	51.0	63.7	-38.54	-6,351.5	435.2	719.0	617.3	101.74	7.067			
16,624.7	10,378.3	13,436.6	9,842.4	51.2	63.3	-38.53	-6,374.8	435.3	719.0	617.3	101.65	7.073			
16,700.0	10,378.8	13,365.4	9,842.3	51.8	62.2	-38.48	-6,446.1	435.5	719.2	617.8	101.38	7.094			
16,800.0	10,379.4	13,268.5	9,841.8	52.5	60.6	-38.42	-6,543.0	436.3	720.0	619.0	101.00	7.129			
16,900.0	10,380.0	13,179.4	9,840.9	53.3	59.2	-38.38	-6,632.1	437.6	721.7	621.0	100.67	7.169			
17,000.0	10,380.6	13,063.5	9,839.3	54.0	57.3	-38.28	-6,747.9	438.9	723.5	623.4	100.11	7.227			
17,100.0	10,381.2	12,959.1	9,839.9	54.8	55.6	-38.29	-6,852.3	440.0	723.6	623.9	99.71	7.257			
17,200.0	10,381.8	12,849.5	9,841.8	55.5	53.8	-38.32	-6,961.9	440.4	722.4	623.1	99.25	7.278			
17,300.0	10,382.4	12,751.4	9,844.0	56.3	52.2	-38.38	-7,059.9	441.0	720.9	622.0	98.95	7.286			
17,400.0	10,383.0	12,655.6	9,846.8	57.0	50.7	-38.55	-7,155.7	442.8	719.7	621.0	98.69	7.292			
17,455.3	10,383.4	12,605.9	9,847.8	57.5	49.8	-38.61	-7,205.4	443.7	719.5	620.9	98.58	7.299			
17,500.0	10,383.6	12,562.9	9,848.2	57.8	49.1	-38.64	-7,248.4	444.4	719.6	621.1	98.45	7.309			
17,600.0	10,384.2	12,460.9	9,849.1	58.6	47.5	-38.70	-7,350.4	446.0	719.8	621.6	98.11	7.336			
17,700.0	10,384.9	12,347.2	9,850.8	59.3	45.7	-38.74	-7,464.0	446.9	719.1	621.4	97.63	7.365			
17,800.0	10,385.5	12,228.8	9,854.6	60.1	43.7	-38.75	-7,582.4	445.5	715.7	618.7	97.03	7.376			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
17,900.0	10,386.1	12,116.8	9,861.2	60.8	41.9	-38.90	-7,694.1	444.1	710.3	613.8	96.52	7.359		
18,000.0	10,386.7	12,034.2	9,867.3	61.6	40.6	-39.20	-7,776.5	445.2	705.3	608.8	96.53	7.307		
18,100.0	10,387.3	11,943.8	9,873.0	62.4	39.1	-39.60	-7,866.7	448.0	702.3	605.9	96.42	7.284		
18,200.0	10,387.9	11,850.3	9,876.8	63.1	37.6	-39.84	-7,960.1	450.0	700.4	604.2	96.23	7.279		
18,300.0	10,388.5	11,757.0	9,878.9	63.9	36.1	-39.92	-8,053.4	450.8	699.2	603.2	96.02	7.282		
18,400.0	10,389.1	11,638.4	9,881.8	64.6	34.3	-39.98	-8,171.9	450.9	697.3	601.8	95.52	7.300		
18,500.0	10,389.7	11,537.6	9,886.3	65.4	32.6	-40.15	-8,272.6	451.3	694.0	598.7	95.26	7.285		
18,600.0	10,390.3	11,451.1	9,890.5	66.2	31.3	-40.43	-8,359.0	453.3	691.7	596.5	95.20	7.266		
18,700.0	10,391.0	11,347.5	9,894.9	66.9	29.6	-40.75	-8,462.5	456.1	690.1	595.2	94.94	7.269		
18,800.0	10,391.6	11,243.8	9,899.0	67.7	28.0	-40.97	-8,566.1	457.5	687.9	593.2	94.70	7.264		
18,900.0	10,392.2	11,146.1	9,901.9	68.4	26.5	-41.06	-8,663.7	457.8	685.7	591.2	94.55	7.253		
19,000.0	10,392.8	11,047.8	9,903.8	69.2	25.0	-41.04	-8,762.0	457.1	683.8	589.4	94.40	7.244		
19,100.0	10,393.4	10,944.3	9,905.1	70.0	23.4	-40.95	-8,865.5	456.0	682.1	587.9	94.18	7.242		
19,200.0	10,394.0	10,841.1	9,909.1	70.7	21.9	-41.08	-8,968.6	456.0	679.0	585.0	94.00	7.223		
19,300.0	10,394.6	10,750.5	9,912.7	71.5	20.5	-41.30	-9,059.1	457.6	677.0	583.0	94.00	7.202		
19,400.0	10,395.2	10,656.4	9,915.0	72.2	19.2	-41.43	-9,153.2	458.9	676.0	582.0	94.00	7.192		
19,500.0	10,395.8	10,558.4	9,915.3	73.0	17.8	-41.39	-9,251.2	459.4	675.9	581.9	94.00	7.190		
19,600.0	10,396.4	10,435.5	9,917.0	73.8	16.1	-41.32	-9,374.1	458.7	674.5	580.7	93.77	7.194		
19,700.0	10,397.1	10,334.7	9,920.0	74.5	14.9	-41.22	-9,474.8	455.8	670.3	576.5	93.84	7.143		
19,782.5	10,397.6	10,277.4	9,920.0	75.1	14.2	-41.04	-9,532.0	453.8	668.4	574.2	94.22	7.094		
19,800.0	10,397.7	10,268.1	9,919.7	75.3	14.1	-40.99	-9,541.3	453.5	668.5	574.2	94.31	7.089		
19,900.0	10,398.3	10,210.1	9,914.4	76.0	13.5	-40.52	-9,599.0	451.5	673.0	578.3	94.62	7.112		
20,000.0	10,398.9	10,157.0	9,904.8	76.8	13.0	-39.79	-9,651.2	449.1	684.0	589.3	94.66	7.226		
20,100.0	10,399.5	10,097.4	9,889.5	77.6	12.6	-38.77	-9,708.7	446.8	701.5	607.0	94.54	7.420		
20,200.0	10,400.1	10,062.0	9,878.4	78.3	12.3	-38.10	-9,742.3	445.7	725.5	631.9	93.56	7.754		
20,300.0	10,400.7	10,014.8	9,860.0	79.1	12.1	-37.10	-9,785.8	445.1	756.9	664.4	92.59	8.175		
20,400.0	10,401.3	9,967.0	9,837.8	79.8	11.9	-35.96	-9,828.1	444.2	794.9	703.4	91.50	8.687		
20,500.0	10,401.9	9,926.3	9,816.4	80.6	11.7	-34.89	-9,862.7	443.1	838.4	748.4	90.02	9.313		
20,511.3	10,402.0	9,921.5	9,813.8	80.7	11.7	-34.76	-9,866.7	442.9	843.7	753.8	89.86	9.389		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrell Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrell Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

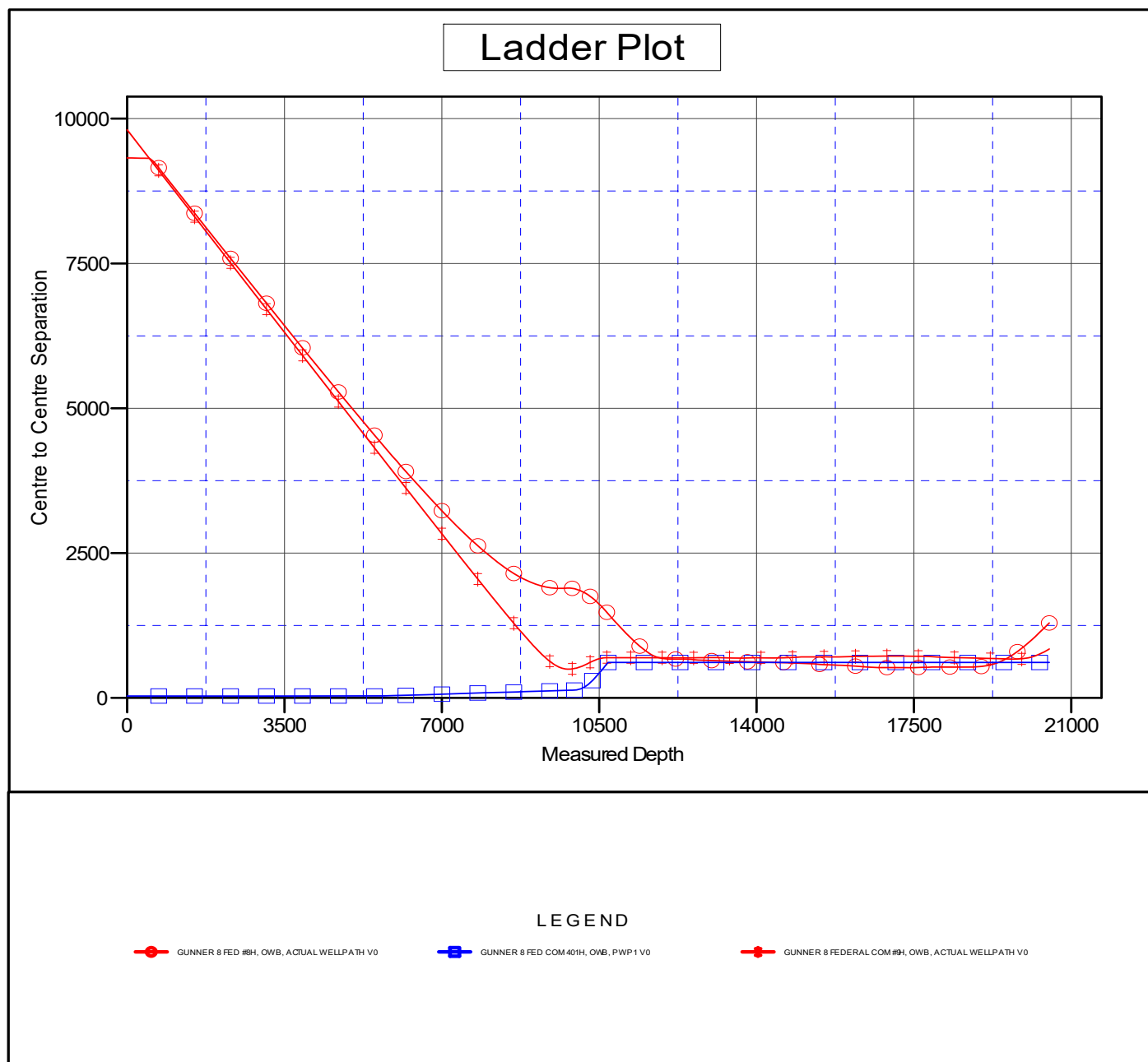
Reference Depths are relative to RKB = 3333.4' + 27' @ 3360.4usft (ScCoordinates are relative to: GUNNER 8 FED COM 301H)

Offset Depths are relative to Offset Datum

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Central Meridian is 104° 20' 0.000 W

Grid Convergence at Surface is: 0.44°



CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrell Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrell Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

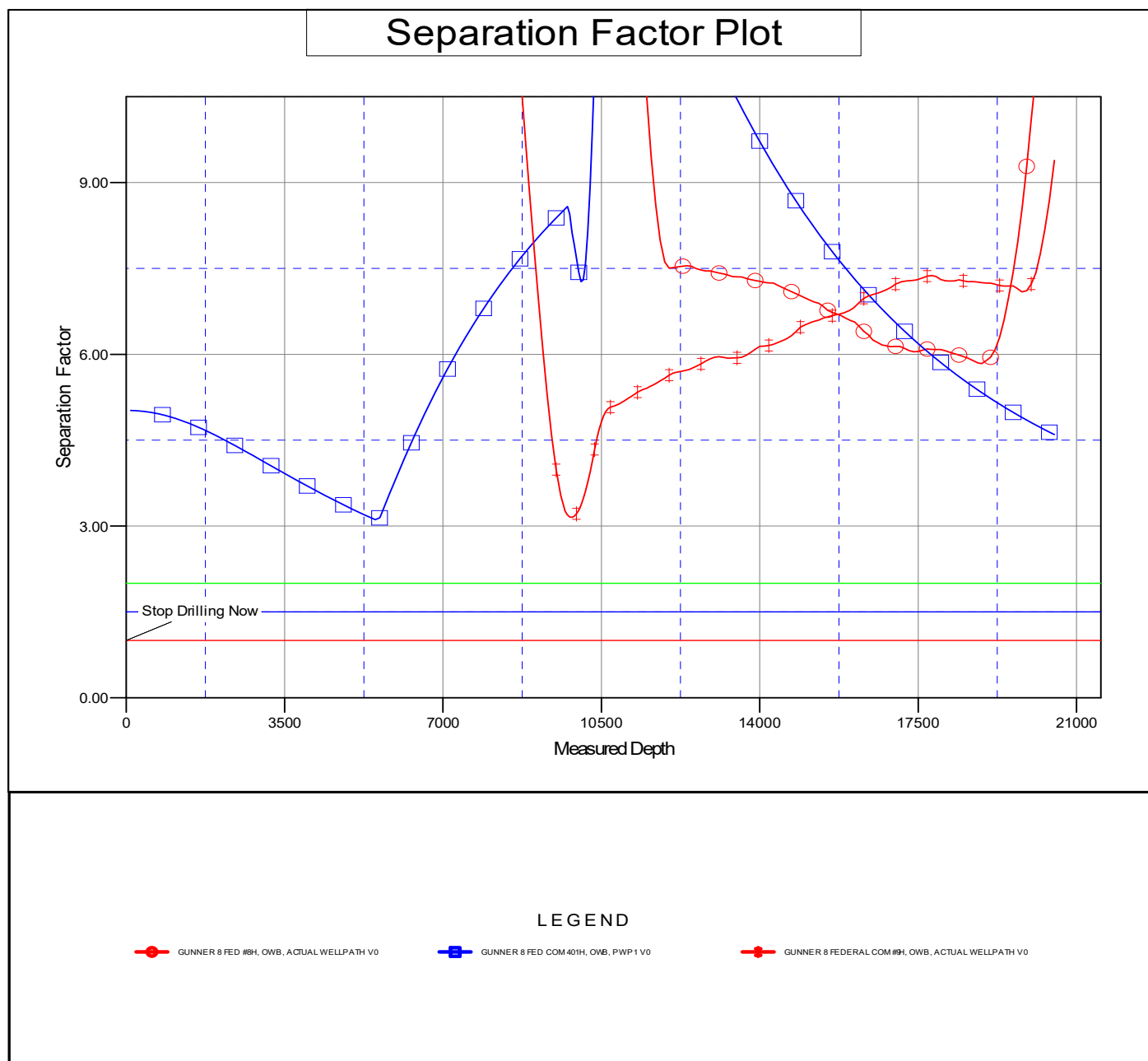
Reference Depths are relative to RKB = 3333.4' + 27' @ 3360.4usft (ScCoordinates are relative to: GUNNER 8 FED COM 301H

Offset Depths are relative to Offset Datum

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Central Meridian is 104° 20' 0.000 W

Grid Convergence at Surface is: 0.44°

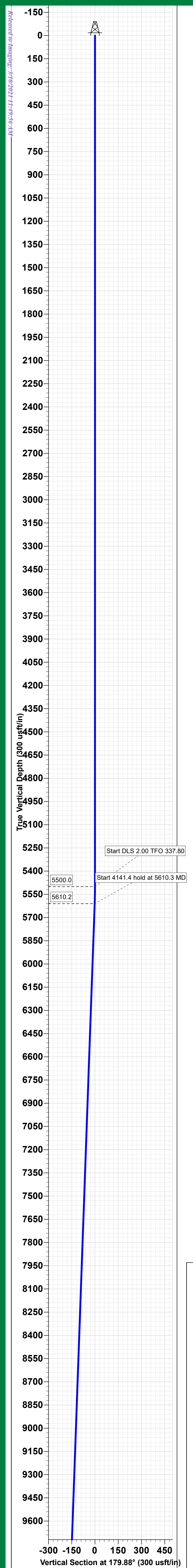


CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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Page 19

COMPASS 5000.14 Build 85

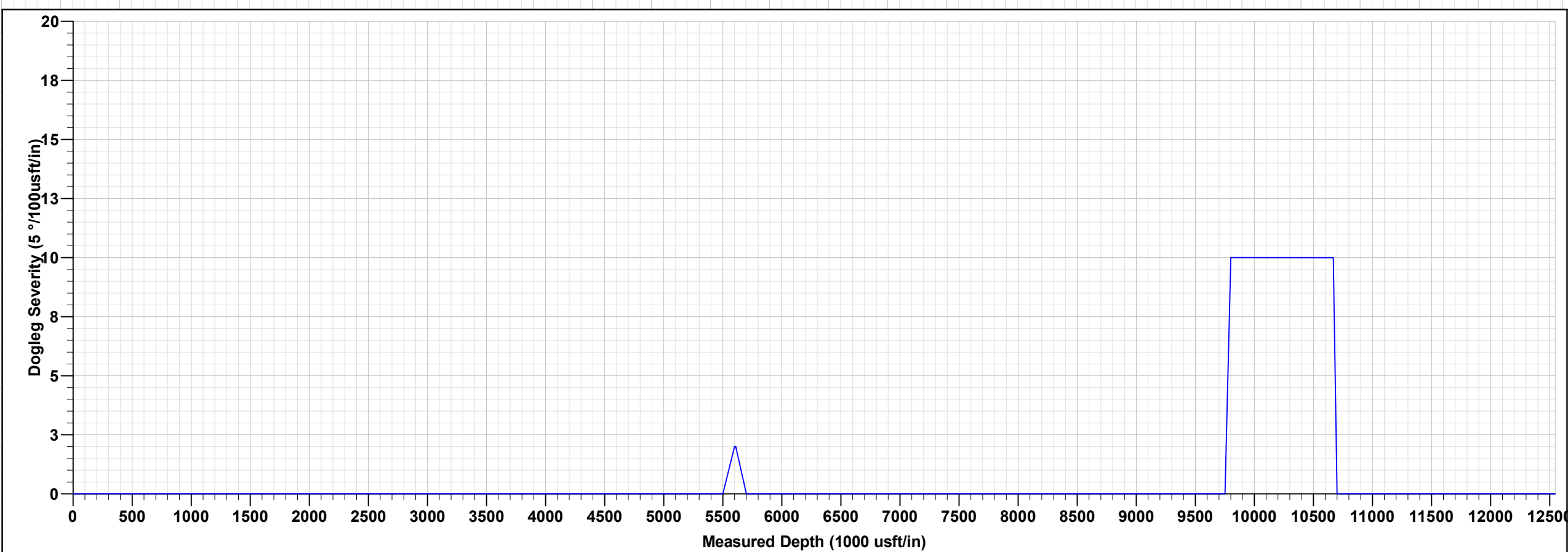
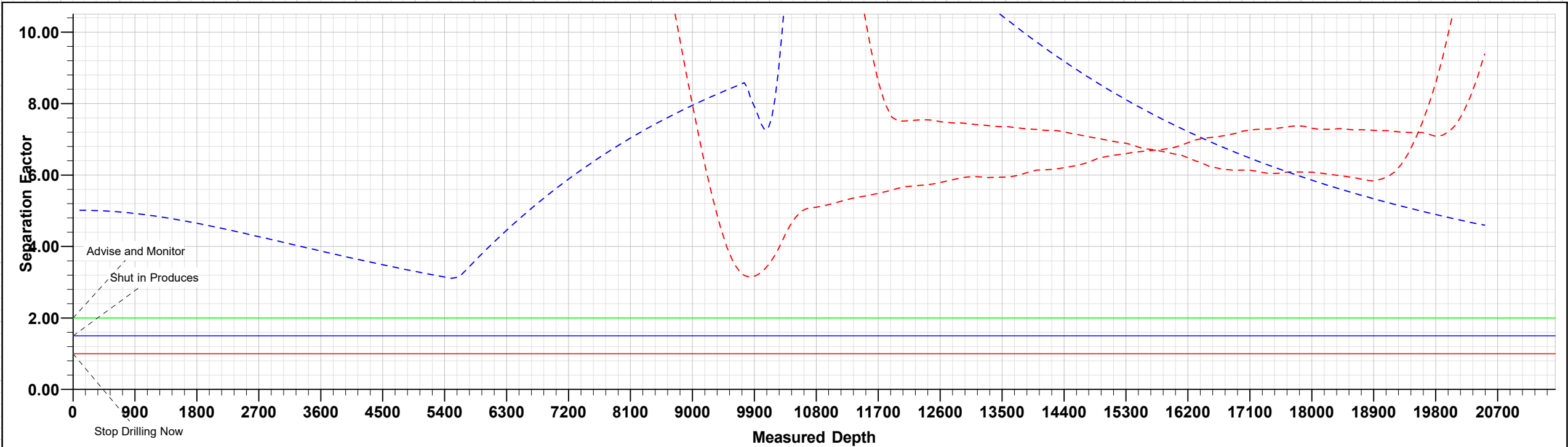


Project: LEA COUNTY, NM
Site: BULLDOG
Well: GUNNER 8 FED COM 301H
Wellbore: OWB
Design: PWP1
GL: 3333.4
RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)

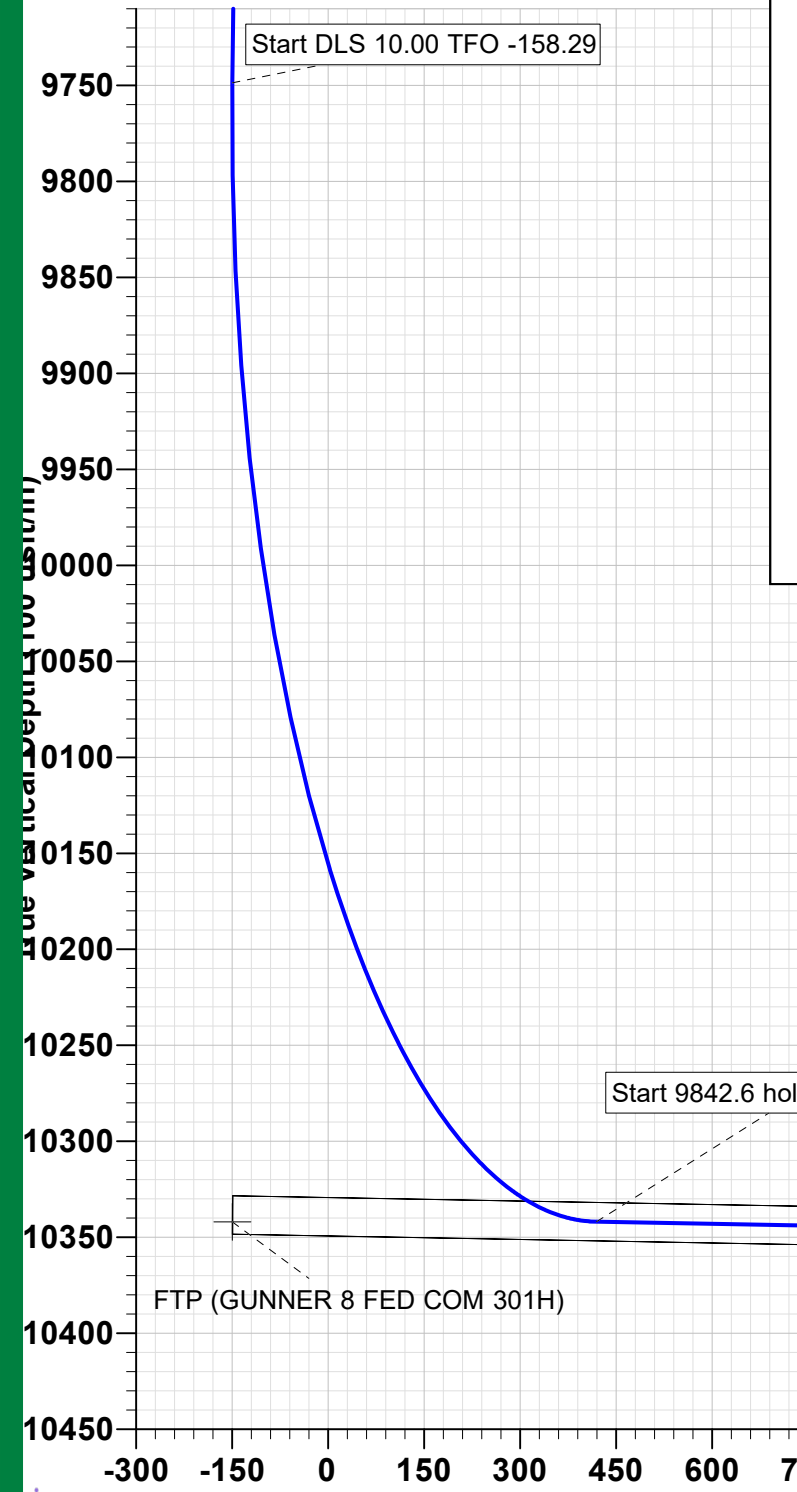
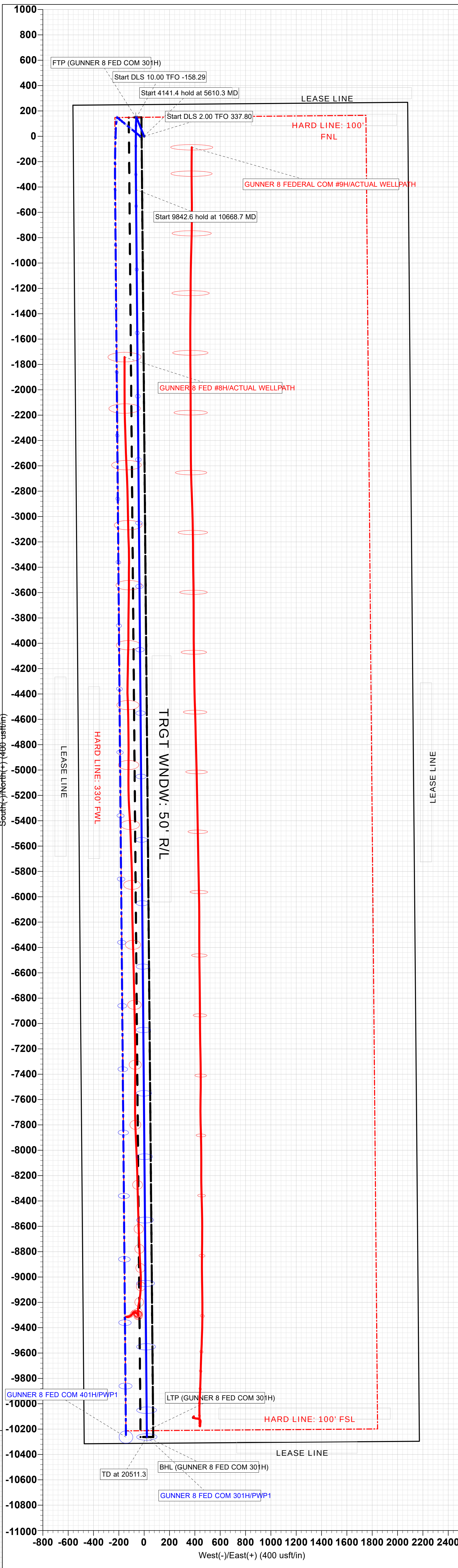
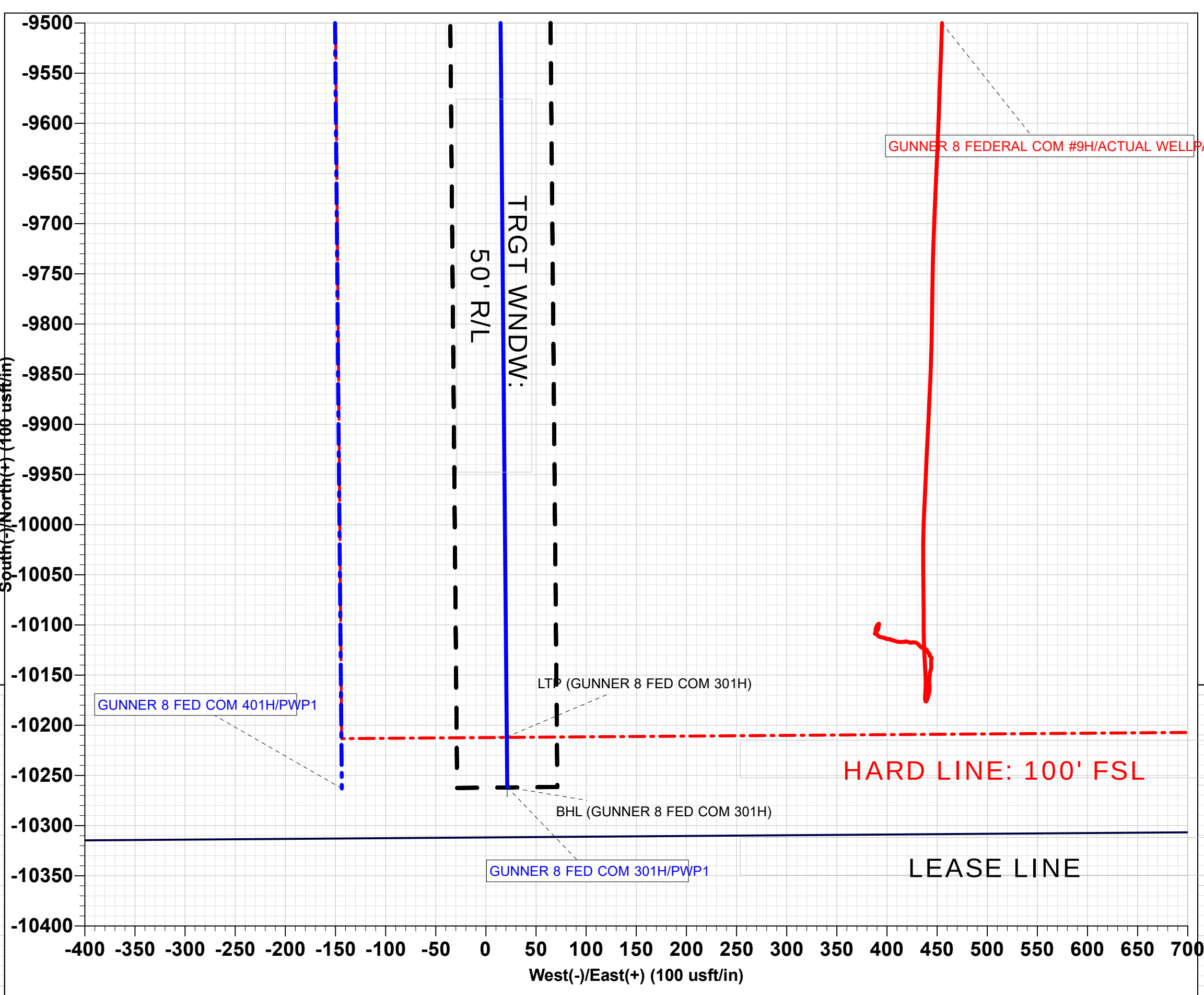
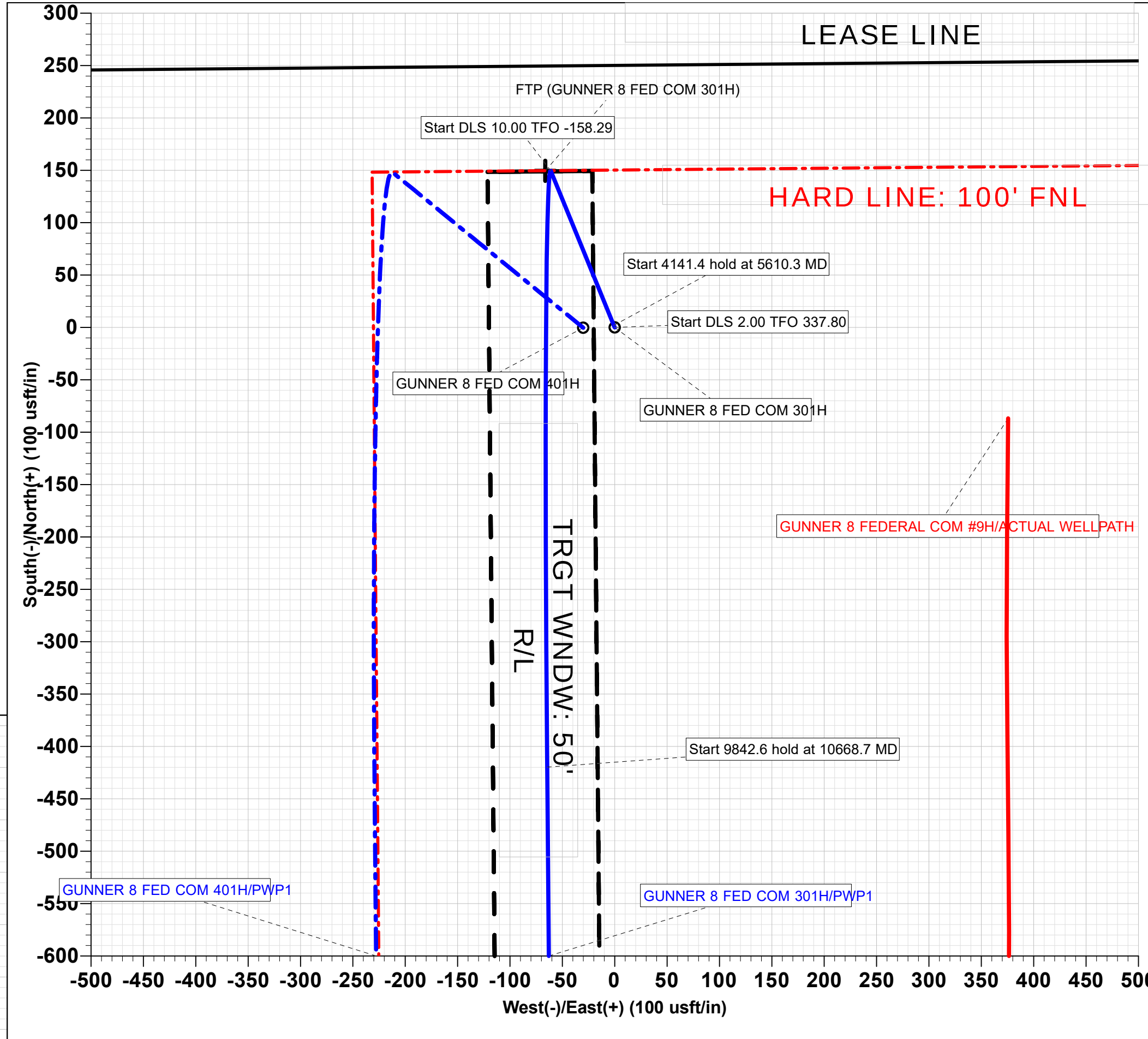
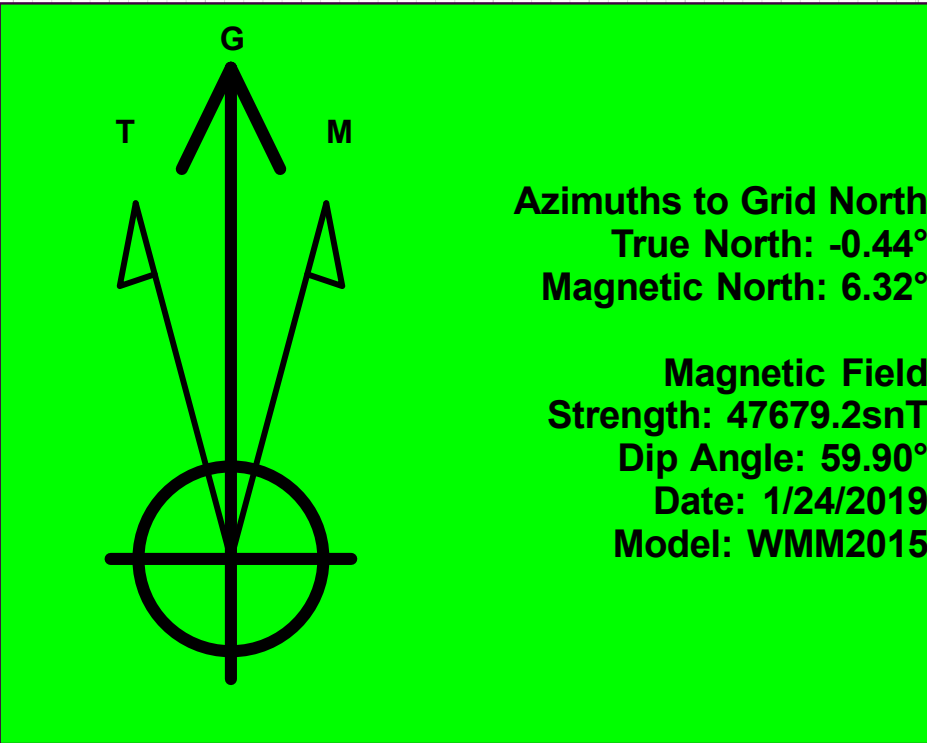


WELL DETAILS: GUNNER 8 FED COM 301H					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	393436.00	758670.60	32° 4' 44.108 N	103° 29' 53.501 W

DESIGN TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude
FTP (GUNNER 8 FED COM 301H)	10342.0	149.5	-66.3	393585.50	758604.30	32° 4' 45.592 N
LTP (GUNNER 8 FED COM 301H)	10401.7	-10211.7	20.9	383224.30	758691.50	32° 3' 3.055 N
BHL (GUNNER 8 FED COM 301H)	10402.0	-10261.7	21.3	383174.30	758691.90	32° 3' 2.561 N



GUNNER 8 FED COM 301H									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
5500.0	0.00	0.00	5500.0	0.0	0.0	0.00	0.00	0.0	Start DLS 2.00 TFO 337.80
5610.3	2.21	337.80	5610.2	2.0	-0.8	2.00	337.80	-2.0	Start 4141.4 hold at 5610.3 MD
9751.7	2.21	337.80	9748.6	149.5	-61.0	0.00	0.00	-149.6	Start DLS 10.00 TFO -158.29
10668.7	89.65	179.50	10342.0	-419.6	-64.4	10.00	-158.29	419.5	Start 9842.6 hold at 10668.7 MD
20511.3	89.65	179.50	10402.0	-10261.7	21.3	0.00	0.00	10261.7	TD at 20511.3



TRGT WNDW: 10' A/B

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: 5/22/19

☒ Original Operator & OGRID No.: COG Operating LLC, (229137)
☐ Amended - Reason for Amendment:

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomple to new zone, re-frac) activity.

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Gunner 8 Federal Com 301H	30-025-	D-5-26S-34E	250' FNL & 560' FWL	±4400	None Planned	APD Submission Plan Subject to change
Gunner 8 Federal Com 302H	30-025-	D-5-26S-34E	430' FNL & 988' FWL	±4400	None Planned	APD Submission Plan Subject to change
Gunner 8 Federal Com 401H	30-025-	D-5-26S-34E	250' FNL & 530' FWL	±1600	None Planned	APD Submission Plan Subject to change
Gunner 8 Federal Com 402H	30-025-	D-5-26S-34E	430' FNL & 958' FWL	±1600	None Planned	APD Submission Plan Subject to change
Gunner 8 Federal Com 403H	30-025-	D-5-26S-34E	430' FNL & 1018' FWL	±1600	None Planned	APD Submission Plan Subject to change

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is dedicated to **ETC Field Services LLC** and will be connected to **Jal** low pressure gathering system located in **Lea** County, New Mexico. **COG Operating LLC** provides (periodically) to **ETC Field Services LLC** a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, **COG Operating LLC** and **ETC Field Services LLC** have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at **ETC Field Services LLC** Processing Plant located in Sec. 33, Twn. 24S, Rng 37E, **Lea** County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on Gas Transporter system at that time. Based on current information, it is Operator's belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease

- Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
 - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
 - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines

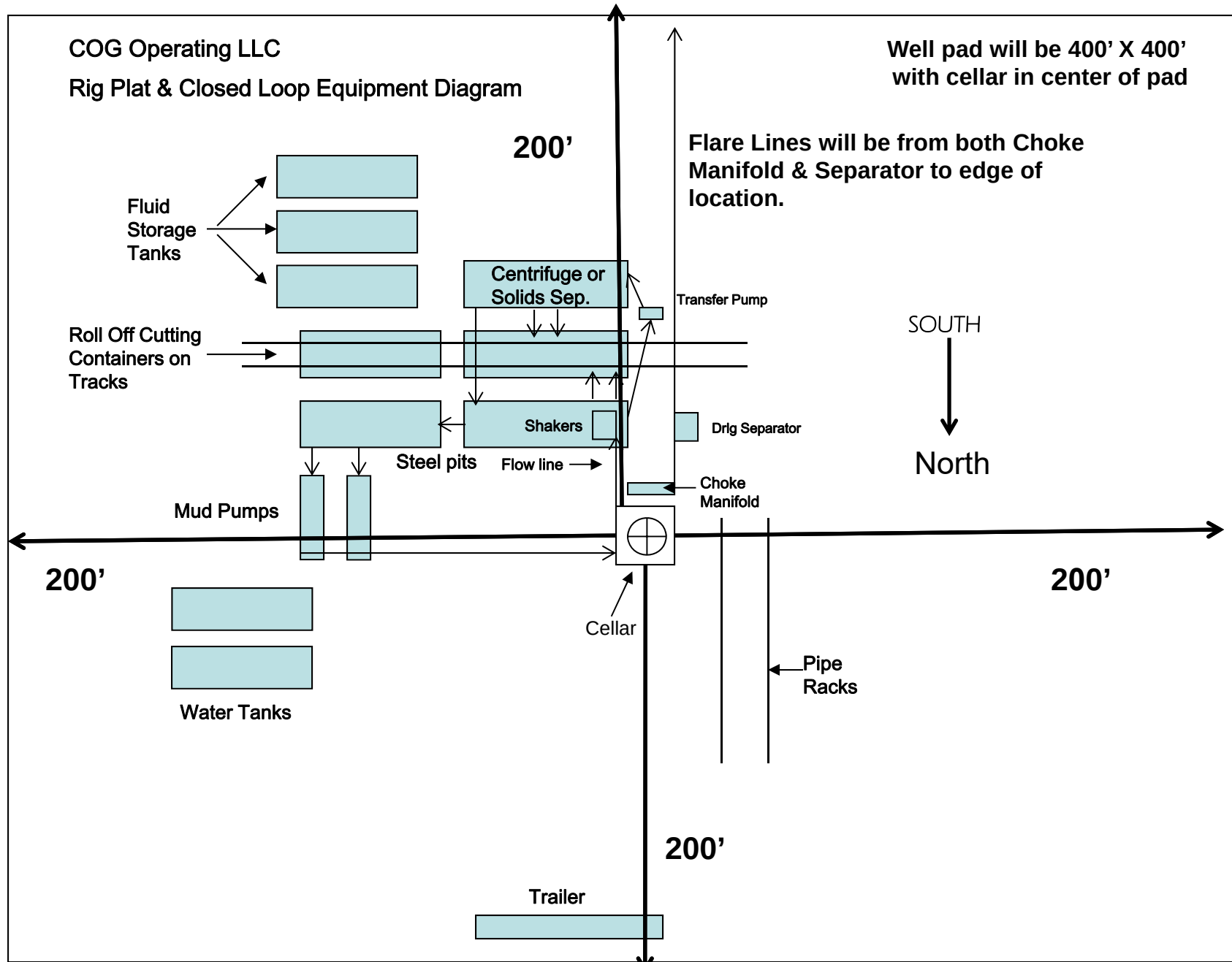


Exhibit 1

"I further certify that COG will comply with Rule 19.15.17 NMAC by using a Closed Loop System."

DISTRICT I
1625 N. FRENCH DR., ROSS, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6176 Fax: (505) 334-6170

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-025-46758	Pool Code 97892	Pool Name WC-025 G-06 S263407P; UPR BONE SPRIN
Property Code 39912	Property Name GUNNER 8 FEDERAL COM	Well Number 301H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3333.4'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	5	26-S	34-E		250	NORTH	560	WEST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	8	26-S	34-E		50	SOUTH	495	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
640			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

Y=393738.6 N X=799295.4 E 100' FSL & 495' FWL Y=393642.9 N X=799791.3 E LAT.=32.079456° N LONG.=103.498872° W GRID AZ. TO FTP 336°04'22" 100' FSL & 495' FWL Y=383281.4 N X=799879.0 E LAT.=32.050974° N LONG.=103.498847° W Y=383177.8 N X=799384.9 E		250' S.L. LEASE X-ING LAT.=32.076109° N LONG.=103.498869° W Y=393761.6 N X=801937.5 E NAD 83 NME SURFACE LOCATION Y=393493.4 N X=799857.6 E LAT.=32.079044° N LONG.=103.498662° W SECTION 5 SECTION 8 NAD 83 NME PROPOSED BOTTOM HOLE LOCATION Y=383231.4 N X=799879.4 E LAT.=32.050836° N LONG.=103.498847° W Y=383197.3 N X=802030.8 E		FEE NMNM124664
--	--	---	--	--

OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unless mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the Division.

Stan Wagner 6/4/19
Signature Date

Stan Wagner
Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 30, 2019
Date of Survey

Signature & Seal of Professional Surveyor



Chad Harcrow 5/10/19
Certificate No. CHAD HARCROW 17777
W.O. # 19-745 DRAWN BY: WN

Intent ☒ As Drilled ☐

API # 30-025-		
Operator Name: COG Operating LLC	Property Name: Gunner 8 Federal Com	Well Number 301H

Kick Off Point (KOP)

UL D	Section 5	Township 26S	Range 34E	Lot	Feet	From N/S	Feet	From E/W	County Lea
Latitude					Longitude				NAD 83

First Take Point (FTP)

UL D	Section 5	Township 26S	Range 34E	Lot	Feet 100	From N/S North	Feet 495	From E/W West	County Lea
Latitude 32.079456					Longitude -103.498872				NAD 83

Last Take Point (LTP)

UL M	Section 8	Township 26S	Range 34E	Lot	Feet 100	From N/S South	Feet 495	From E/W West	County Lea
Latitude 32.050974					Longitude -103.498847				NAD 83

Is this well the defining well for the Horizontal Spacing Unit?

☐ No

Is this well an infill well?

☐ Yes

If infill is yes please provide API if available, Operator Name and well number for Defining well for Horizontal Spacing Unit.

API # 30-025-		
Operator Name: COG Operating LLC	Property Name: Gunner 8 Federal Com	Well Number 302H

KZ 06/29/2018

COG Production, LLC - Gunner 8 Federal Com #301H**1. Geologic Formations**

TVD of target	10,402' EOL	Pilot hole depth	NA
MD at TD:	20,511'	Deepest expected fresh water:	150'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	850	Water	
Top of Salt	1210	Salt	
Base of Salt	5025	Salt	
Lamar	5270	Salt Water	
Bell Canyon	5285	Salt Water	
Cherry Canyon	6345	Oil/Gas	
Brushy Canyon	7979	Oil/Gas	
Bone Spring Lime	9480	Oil/Gas	
U. Avalon Shale	9703	Oil/Gas	
L. Avalon Shale	10018	Target Zone	
1st Bone Spring Sand	10427	Not Penetrated	
2nd Bone Spring Sand	11076	Not Penetrated	
3rd Bone Spring Sand	X	Not Penetrated	
0	0	Not Penetrated	

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	875	13.375"	54.5	J55	STC	2.82	1.15	10.78
12.25"	0	4000	9.625"	40	J55	LTC	1.22	0.99	3.25
12.25"	4000	5290	9.625"	40	HCL80	LTC	1.39	1.44	5.73
8.75"	0	20,511	5.5"	17	P110	LTC	1.49	2.67	2.52
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

COG Production, LLC - Gunner 8 Federal Com #301H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary?	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

COG Production, LLC - Gunner 8 Federal Com #301H

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	330	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl ₂
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl ₂
Inter.	1030	12.7	2.0	9.6	16	Lead: 35:65:6 C Blend
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
5.5 Prod	710	11.9	2.5	19	72	Lead: 50:50:10 H Blend
	2700	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results

Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	50%
1 st Intermediate	0'	50%
Production	4,790'	25% OH in Lateral (KOP to EOL) – 40% OH in Vertical

COG Production, LLC - Gunner 8 Federal Com #301H

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
---	---

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	x	Tested to:
12-1/4"	13-5/8"	2M	Annular	x	2000 psi
			Blind Ram		2M
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	3M	Annular	x	50% testing pressure
			Blind Ram	x	3M
			Pipe Ram	x	
			Double Ram		
			Other*		

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

X	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

COG Production, LLC - Gunner 8 Federal Com #301H

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.6 - 8.8	28-34	N/C
Surf csg	9-5/8" Int shoe	Saturated Brine	10 - 10.1	28-34	N/C
9-5/8" Int shoe	Lateral TD	Cut Brine	8.6 - 9.3	28-34	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---	-----------------------------

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
Y	No Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

COG Production, LLC - Gunner 8 Federal Com #301H**7. Drilling Conditions**

Condition	Specify what type and where?
BH Pressure at deepest TVD	5035 psi at 10402' TVD
Abnormal Temperature	NO 160 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

Hydrogen Sulfide (H₂S) monitors will be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.

N H₂S is present

Y H₂S Plan attached

8. Other Facets of Operation

Y	Is it a walking operation?
N	Is casing pre-set?

x	H ₂ S Plan.
x	BOP & Choke Schematics.
x	Directional Plan

NORTHERN DELAWARE BASIN

LEA COUNTY, NM

BULLDOG

GUNNER 8 FED COM 301H

OWB

Plan: PWP1

Standard Survey Report

28 May, 2019

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

Project	LEA COUNTY, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		BULLDOG			
Site Position:		Northing:	398,637.10 usft	Latitude:	32° 5' 36.820 N
From:	Map	Easting:	741,887.40 usft	Longitude:	103° 33' 8.116 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.42 °

Well	GUNNER 8 FED COM 301H					
Well Position	+N/-S	0.0 usft	Northing:	393,436.00 usft	Latitude:	32° 4' 44.108 N
	+E/-W	0.0 usft	Easting:	758,670.60 usft	Longitude:	103° 29' 53.501 W
Position Uncertainty		3.0 usft	Wellhead Elevation:	usft	Ground Level:	3,333.4 usft

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM2015	1/24/2019	6.76	59.90	47,679.19641104

Design	PWP1				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	179.88	

Survey Tool Program	Date	5/28/2019			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	9,752.0	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
9,752.0	20,511.3	PWP1 (OWB)	MWD+IFR1+MS	OWSG MWD + IFR1 + Multi-Station Correction	

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	

Survey Report

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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)
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
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
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00

Survey Report

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Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Start DLS 2.00 TFO 337.80									
5,600.0	2.00	337.80	5,600.0	1.6	-0.7	-1.6	2.00	2.00	0.00
5,610.3	2.21	337.80	5,610.2	2.0	-0.8	-2.0	2.00	2.00	0.00
Start 4141.4 hold at 5610.3 MD									
5,700.0	2.21	337.80	5,699.9	5.2	-2.1	-5.2	0.00	0.00	0.00
5,800.0	2.21	337.80	5,799.8	8.7	-3.6	-8.7	0.00	0.00	0.00
5,900.0	2.21	337.80	5,899.8	12.3	-5.0	-12.3	0.00	0.00	0.00
6,000.0	2.21	337.80	5,999.7	15.8	-6.5	-15.9	0.00	0.00	0.00
6,100.0	2.21	337.80	6,099.6	19.4	-7.9	-19.4	0.00	0.00	0.00
6,200.0	2.21	337.80	6,199.5	23.0	-9.4	-23.0	0.00	0.00	0.00
6,300.0	2.21	337.80	6,299.5	26.5	-10.8	-26.6	0.00	0.00	0.00
6,400.0	2.21	337.80	6,399.4	30.1	-12.3	-30.1	0.00	0.00	0.00
6,500.0	2.21	337.80	6,499.3	33.7	-13.7	-33.7	0.00	0.00	0.00
6,600.0	2.21	337.80	6,599.2	37.2	-15.2	-37.3	0.00	0.00	0.00
6,700.0	2.21	337.80	6,699.2	40.8	-16.6	-40.8	0.00	0.00	0.00
6,800.0	2.21	337.80	6,799.1	44.3	-18.1	-44.4	0.00	0.00	0.00
6,900.0	2.21	337.80	6,899.0	47.9	-19.5	-48.0	0.00	0.00	0.00
7,000.0	2.21	337.80	6,998.9	51.5	-21.0	-51.5	0.00	0.00	0.00
7,100.0	2.21	337.80	7,098.9	55.0	-22.5	-55.1	0.00	0.00	0.00
7,200.0	2.21	337.80	7,198.8	58.6	-23.9	-58.6	0.00	0.00	0.00
7,300.0	2.21	337.80	7,298.7	62.2	-25.4	-62.2	0.00	0.00	0.00
7,400.0	2.21	337.80	7,398.6	65.7	-26.8	-65.8	0.00	0.00	0.00
7,500.0	2.21	337.80	7,498.6	69.3	-28.3	-69.3	0.00	0.00	0.00
7,600.0	2.21	337.80	7,598.5	72.8	-29.7	-72.9	0.00	0.00	0.00
7,700.0	2.21	337.80	7,698.4	76.4	-31.2	-76.5	0.00	0.00	0.00
7,800.0	2.21	337.80	7,798.4	80.0	-32.6	-80.0	0.00	0.00	0.00
7,900.0	2.21	337.80	7,898.3	83.5	-34.1	-83.6	0.00	0.00	0.00
8,000.0	2.21	337.80	7,998.2	87.1	-35.5	-87.2	0.00	0.00	0.00
8,100.0	2.21	337.80	8,098.1	90.7	-37.0	-90.7	0.00	0.00	0.00
8,200.0	2.21	337.80	8,198.1	94.2	-38.4	-94.3	0.00	0.00	0.00
8,300.0	2.21	337.80	8,298.0	97.8	-39.9	-97.9	0.00	0.00	0.00
8,400.0	2.21	337.80	8,397.9	101.3	-41.4	-101.4	0.00	0.00	0.00
8,500.0	2.21	337.80	8,497.8	104.9	-42.8	-105.0	0.00	0.00	0.00
8,600.0	2.21	337.80	8,597.8	108.5	-44.3	-108.6	0.00	0.00	0.00
8,700.0	2.21	337.80	8,697.7	112.0	-45.7	-112.1	0.00	0.00	0.00
8,800.0	2.21	337.80	8,797.6	115.6	-47.2	-115.7	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)
8,900.0	2.21	337.80	8,897.5	119.2	-48.6	-119.3	0.00	0.00	0.00
9,000.0	2.21	337.80	8,997.5	122.7	-50.1	-122.8	0.00	0.00	0.00
9,100.0	2.21	337.80	9,097.4	126.3	-51.5	-126.4	0.00	0.00	0.00
9,200.0	2.21	337.80	9,197.3	129.8	-53.0	-130.0	0.00	0.00	0.00
9,300.0	2.21	337.80	9,297.2	133.4	-54.4	-133.5	0.00	0.00	0.00
9,400.0	2.21	337.80	9,397.2	137.0	-55.9	-137.1	0.00	0.00	0.00
9,500.0	2.21	337.80	9,497.1	140.5	-57.3	-140.7	0.00	0.00	0.00
9,600.0	2.21	337.80	9,597.0	144.1	-58.8	-144.2	0.00	0.00	0.00
9,700.0	2.21	337.80	9,696.9	147.7	-60.2	-147.8	0.00	0.00	0.00
9,751.7	2.21	337.80	9,748.6	149.5	-61.0	-149.6	0.00	0.00	0.00
Start DLS 10.00 TFO -158.29									
9,800.0	2.90	195.82	9,796.9	149.2	-61.7	-149.3	10.00	1.44	-293.92
9,900.0	12.81	183.09	9,895.8	135.7	-63.0	-135.8	10.00	9.91	-12.73
10,000.0	22.80	181.44	9,990.9	105.1	-64.1	-105.3	10.00	9.99	-1.65
10,100.0	32.79	180.76	10,079.3	58.6	-64.9	-58.7	10.00	10.00	-0.67
10,200.0	42.79	180.38	10,158.2	-2.6	-65.5	2.5	10.00	10.00	-0.38
10,300.0	52.79	180.12	10,225.3	-76.6	-65.8	76.5	10.00	10.00	-0.26
10,400.0	62.78	179.92	10,278.5	-161.1	-65.8	160.9	10.00	10.00	-0.20
10,500.0	72.78	179.75	10,316.3	-253.5	-65.5	253.4	10.00	10.00	-0.17
10,600.0	82.78	179.60	10,337.4	-351.2	-65.0	351.0	10.00	10.00	-0.15
10,668.7	89.65	179.50	10,342.0	-419.6	-64.4	419.5	10.00	10.00	-0.14
Start 9842.6 hold at 10668.7 MD									
10,700.0	89.65	179.50	10,342.2	-451.0	-64.2	450.8	0.00	0.00	0.00
10,800.0	89.65	179.50	10,342.8	-551.0	-63.3	550.8	0.00	0.00	0.00
10,900.0	89.65	179.50	10,343.4	-650.9	-62.4	650.8	0.00	0.00	0.00
11,000.0	89.65	179.50	10,344.0	-750.9	-61.6	750.8	0.00	0.00	0.00
11,100.0	89.65	179.50	10,344.6	-850.9	-60.7	850.8	0.00	0.00	0.00
11,200.0	89.65	179.50	10,345.2	-950.9	-59.8	950.8	0.00	0.00	0.00
11,300.0	89.65	179.50	10,345.8	-1,050.9	-58.9	1,050.8	0.00	0.00	0.00
11,400.0	89.65	179.50	10,346.4	-1,150.9	-58.1	1,150.8	0.00	0.00	0.00
11,500.0	89.65	179.50	10,347.0	-1,250.9	-57.2	1,250.8	0.00	0.00	0.00
11,600.0	89.65	179.50	10,347.7	-1,350.9	-56.3	1,350.8	0.00	0.00	0.00
11,700.0	89.65	179.50	10,348.3	-1,450.9	-55.5	1,450.8	0.00	0.00	0.00
11,800.0	89.65	179.50	10,348.9	-1,550.9	-54.6	1,550.8	0.00	0.00	0.00
11,900.0	89.65	179.50	10,349.5	-1,650.9	-53.7	1,650.8	0.00	0.00	0.00
12,000.0	89.65	179.50	10,350.1	-1,750.9	-52.8	1,750.8	0.00	0.00	0.00
12,100.0	89.65	179.50	10,350.7	-1,850.9	-52.0	1,850.8	0.00	0.00	0.00
12,200.0	89.65	179.50	10,351.3	-1,950.9	-51.1	1,950.8	0.00	0.00	0.00
12,300.0	89.65	179.50	10,351.9	-2,050.9	-50.2	2,050.8	0.00	0.00	0.00
12,400.0	89.65	179.50	10,352.5	-2,150.9	-49.4	2,150.8	0.00	0.00	0.00
12,500.0	89.65	179.50	10,353.1	-2,250.9	-48.5	2,250.8	0.00	0.00	0.00
12,600.0	89.65	179.50	10,353.7	-2,350.9	-47.6	2,350.7	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)	
12,700.0	89.65	179.50	10,354.4	-2,450.8	-46.7	2,450.7	0.00	0.00	0.00	
12,800.0	89.65	179.50	10,355.0	-2,550.8	-45.9	2,550.7	0.00	0.00	0.00	
12,900.0	89.65	179.50	10,355.6	-2,650.8	-45.0	2,650.7	0.00	0.00	0.00	
13,000.0	89.65	179.50	10,356.2	-2,750.8	-44.1	2,750.7	0.00	0.00	0.00	
13,100.0	89.65	179.50	10,356.8	-2,850.8	-43.3	2,850.7	0.00	0.00	0.00	
13,200.0	89.65	179.50	10,357.4	-2,950.8	-42.4	2,950.7	0.00	0.00	0.00	
13,300.0	89.65	179.50	10,358.0	-3,050.8	-41.5	3,050.7	0.00	0.00	0.00	
13,400.0	89.65	179.50	10,358.6	-3,150.8	-40.6	3,150.7	0.00	0.00	0.00	
13,500.0	89.65	179.50	10,359.2	-3,250.8	-39.8	3,250.7	0.00	0.00	0.00	
13,600.0	89.65	179.50	10,359.8	-3,350.8	-38.9	3,350.7	0.00	0.00	0.00	
13,700.0	89.65	179.50	10,360.5	-3,450.8	-38.0	3,450.7	0.00	0.00	0.00	
13,800.0	89.65	179.50	10,361.1	-3,550.8	-37.2	3,550.7	0.00	0.00	0.00	
13,900.0	89.65	179.50	10,361.7	-3,650.8	-36.3	3,650.7	0.00	0.00	0.00	
14,000.0	89.65	179.50	10,362.3	-3,750.8	-35.4	3,750.7	0.00	0.00	0.00	
14,100.0	89.65	179.50	10,362.9	-3,850.8	-34.5	3,850.7	0.00	0.00	0.00	
14,200.0	89.65	179.50	10,363.5	-3,950.8	-33.7	3,950.7	0.00	0.00	0.00	
14,300.0	89.65	179.50	10,364.1	-4,050.8	-32.8	4,050.7	0.00	0.00	0.00	
14,400.0	89.65	179.50	10,364.7	-4,150.8	-31.9	4,150.7	0.00	0.00	0.00	
14,500.0	89.65	179.50	10,365.3	-4,250.7	-31.1	4,250.7	0.00	0.00	0.00	
14,600.0	89.65	179.50	10,365.9	-4,350.7	-30.2	4,350.7	0.00	0.00	0.00	
14,700.0	89.65	179.50	10,366.6	-4,450.7	-29.3	4,450.7	0.00	0.00	0.00	
14,800.0	89.65	179.50	10,367.2	-4,550.7	-28.5	4,550.7	0.00	0.00	0.00	
14,900.0	89.65	179.50	10,367.8	-4,650.7	-27.6	4,650.7	0.00	0.00	0.00	
15,000.0	89.65	179.50	10,368.4	-4,750.7	-26.7	4,750.7	0.00	0.00	0.00	
15,100.0	89.65	179.50	10,369.0	-4,850.7	-25.8	4,850.6	0.00	0.00	0.00	
15,200.0	89.65	179.50	10,369.6	-4,950.7	-25.0	4,950.6	0.00	0.00	0.00	
15,300.0	89.65	179.50	10,370.2	-5,050.7	-24.1	5,050.6	0.00	0.00	0.00	
15,400.0	89.65	179.50	10,370.8	-5,150.7	-23.2	5,150.6	0.00	0.00	0.00	
15,500.0	89.65	179.50	10,371.4	-5,250.7	-22.4	5,250.6	0.00	0.00	0.00	
15,600.0	89.65	179.50	10,372.0	-5,350.7	-21.5	5,350.6	0.00	0.00	0.00	
15,700.0	89.65	179.50	10,372.7	-5,450.7	-20.6	5,450.6	0.00	0.00	0.00	
15,800.0	89.65	179.50	10,373.3	-5,550.7	-19.7	5,550.6	0.00	0.00	0.00	
15,900.0	89.65	179.50	10,373.9	-5,650.7	-18.9	5,650.6	0.00	0.00	0.00	
16,000.0	89.65	179.50	10,374.5	-5,750.7	-18.0	5,750.6	0.00	0.00	0.00	
16,100.0	89.65	179.50	10,375.1	-5,850.7	-17.1	5,850.6	0.00	0.00	0.00	
16,200.0	89.65	179.50	10,375.7	-5,950.6	-16.3	5,950.6	0.00	0.00	0.00	
16,300.0	89.65	179.50	10,376.3	-6,050.6	-15.4	6,050.6	0.00	0.00	0.00	
16,400.0	89.65	179.50	10,376.9	-6,150.6	-14.5	6,150.6	0.00	0.00	0.00	
16,500.0	89.65	179.50	10,377.5	-6,250.6	-13.6	6,250.6	0.00	0.00	0.00	
16,600.0	89.65	179.50	10,378.1	-6,350.6	-12.8	6,350.6	0.00	0.00	0.00	
16,700.0	89.65	179.50	10,378.8	-6,450.6	-11.9	6,450.6	0.00	0.00	0.00	
16,800.0	89.65	179.50	10,379.4	-6,550.6	-11.0	6,550.6	0.00	0.00	0.00	

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

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)	
16,900.0	89.65	179.50	10,380.0	-6,650.6	-10.2	6,650.6	0.00	0.00	0.00	
17,000.0	89.65	179.50	10,380.6	-6,750.6	-9.3	6,750.6	0.00	0.00	0.00	
17,100.0	89.65	179.50	10,381.2	-6,850.6	-8.4	6,850.6	0.00	0.00	0.00	
17,200.0	89.65	179.50	10,381.8	-6,950.6	-7.5	6,950.6	0.00	0.00	0.00	
17,300.0	89.65	179.50	10,382.4	-7,050.6	-6.7	7,050.6	0.00	0.00	0.00	
17,400.0	89.65	179.50	10,383.0	-7,150.6	-5.8	7,150.6	0.00	0.00	0.00	
17,500.0	89.65	179.50	10,383.6	-7,250.6	-4.9	7,250.5	0.00	0.00	0.00	
17,600.0	89.65	179.50	10,384.2	-7,350.6	-4.1	7,350.5	0.00	0.00	0.00	
17,700.0	89.65	179.50	10,384.9	-7,450.6	-3.2	7,450.5	0.00	0.00	0.00	
17,800.0	89.65	179.50	10,385.5	-7,550.6	-2.3	7,550.5	0.00	0.00	0.00	
17,900.0	89.65	179.50	10,386.1	-7,650.6	-1.4	7,650.5	0.00	0.00	0.00	
18,000.0	89.65	179.50	10,386.7	-7,750.5	-0.6	7,750.5	0.00	0.00	0.00	
18,100.0	89.65	179.50	10,387.3	-7,850.5	0.3	7,850.5	0.00	0.00	0.00	
18,200.0	89.65	179.50	10,387.9	-7,950.5	1.2	7,950.5	0.00	0.00	0.00	
18,300.0	89.65	179.50	10,388.5	-8,050.5	2.0	8,050.5	0.00	0.00	0.00	
18,400.0	89.65	179.50	10,389.1	-8,150.5	2.9	8,150.5	0.00	0.00	0.00	
18,500.0	89.65	179.50	10,389.7	-8,250.5	3.8	8,250.5	0.00	0.00	0.00	
18,600.0	89.65	179.50	10,390.3	-8,350.5	4.7	8,350.5	0.00	0.00	0.00	
18,700.0	89.65	179.50	10,391.0	-8,450.5	5.5	8,450.5	0.00	0.00	0.00	
18,800.0	89.65	179.50	10,391.6	-8,550.5	6.4	8,550.5	0.00	0.00	0.00	
18,900.0	89.65	179.50	10,392.2	-8,650.5	7.3	8,650.5	0.00	0.00	0.00	
19,000.0	89.65	179.50	10,392.8	-8,750.5	8.1	8,750.5	0.00	0.00	0.00	
19,100.0	89.65	179.50	10,393.4	-8,850.5	9.0	8,850.5	0.00	0.00	0.00	
19,200.0	89.65	179.50	10,394.0	-8,950.5	9.9	8,950.5	0.00	0.00	0.00	
19,300.0	89.65	179.50	10,394.6	-9,050.5	10.7	9,050.5	0.00	0.00	0.00	
19,400.0	89.65	179.50	10,395.2	-9,150.5	11.6	9,150.5	0.00	0.00	0.00	
19,500.0	89.65	179.50	10,395.8	-9,250.5	12.5	9,250.5	0.00	0.00	0.00	
19,600.0	89.65	179.50	10,396.4	-9,350.5	13.4	9,350.5	0.00	0.00	0.00	
19,700.0	89.65	179.50	10,397.1	-9,450.5	14.2	9,450.5	0.00	0.00	0.00	
19,800.0	89.65	179.50	10,397.7	-9,550.4	15.1	9,550.5	0.00	0.00	0.00	
19,900.0	89.65	179.50	10,398.3	-9,650.4	16.0	9,650.5	0.00	0.00	0.00	
20,000.0	89.65	179.50	10,398.9	-9,750.4	16.8	9,750.4	0.00	0.00	0.00	
20,100.0	89.65	179.50	10,399.5	-9,850.4	17.7	9,850.4	0.00	0.00	0.00	
20,200.0	89.65	179.50	10,400.1	-9,950.4	18.6	9,950.4	0.00	0.00	0.00	
20,300.0	89.65	179.50	10,400.7	-10,050.4	19.5	10,050.4	0.00	0.00	0.00	
20,400.0	89.65	179.50	10,401.3	-10,150.4	20.3	10,150.4	0.00	0.00	0.00	
20,500.0	89.65	179.50	10,401.9	-10,250.4	21.2	10,250.4	0.00	0.00	0.00	
20,511.3	89.65	179.50	10,402.0	-10,261.7	21.3	10,261.7	0.00	0.00	0.00	
TD at 20511.3										

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandriil Freedom)
Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandriil Freedom)
Well:	GUNNER 8 FED COM 301H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	PWP1	Database:	EDM_Users

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
FTP (GUNNER 8 FEC - plan misses target center by 237.5usft at 10210.8usft MD (10166.1 TVD, -10.1 N, -65.5 E) - Point	0.00	0.00	10,342.0	149.5	-66.3	393,585.50	758,604.30	32° 4' 45.592 N	103° 29' 54.258 W
LTP (GUNNER 8 FEC - plan hits target center - Point	0.00	0.00	10,401.7	-10,211.7	20.9	383,224.30	758,691.50	32° 3' 3.055 N	103° 29' 54.176 W
BHL (GUNNER 8 FEC - plan hits target center - Rectangle (sides W100.0 H10,411.5 D20.0)	-0.35	359.49	10,402.0	-10,261.7	21.3	383,174.30	758,691.90	32° 3' 2.561 N	103° 29' 54.176 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5500	5500	0	0	Start DLS 2.00 TFO 337.80
5610	5610	2	-1	Start 4141.4 hold at 5610.3 MD
9752	9749	149	-61	Start DLS 10.00 TFO -158.29
10,669	10,342	-420	-64	Start 9842.6 hold at 10668.7 MD
20,511	10,402	-10,262	21	TD at 20511.3

Checked By: _____ Approved By: _____ Date: _____

NORTHERN DELAWARE BASIN

**LEA COUNTY, NM
BULLDOG
GUNNER 8 FED COM 301H**

**OWB
PWP1**

Anticollision Report

28 May, 2019

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Reference	PWP1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.0 us
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve
Casing Method:	Not applied

Survey Tool Program		Date	5/28/2019		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	9,752.0	PWP1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4	
9,752.0	20,511.3	PWP1 (OWB)	MWD+IFR1+MS	OWSG MWD + IFR1 + Multi-Station Correction	

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						
BULLDOG						
GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH	17,354.6	11,852.4	520.4	434.4	6.052	CC, ES
GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH	18,900.0	10,340.0	533.5	442.1	5.836	SF
GUNNER 8 FED COM 401H - OWB - PWP1	5,500.0	5,499.6	30.1	20.4	3.111	CC, ES, SF
GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WEL	9,815.9	19,727.0	496.7	339.3	3.154	CC, ES
GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WEL	9,850.0	19,727.0	497.4	339.6	3.151	SF

BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH												Offset Site Error:	0.0 usft
Survey Program: 100-MWD												Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	135.8	135.8	3.0	3.0	-179.07	-9,322.0	-151.8	9,324.0				
100.0	100.0	247.6	247.6	3.0	3.2	-179.07	-9,320.7	-151.1	9,322.7	9,316.6	6.11	1,526.026	
200.0	200.0	393.8	393.8	3.0	3.5	-179.08	-9,318.4	-149.5	9,321.2	9,314.9	6.27	1,486.190	
300.0	300.0	478.6	478.5	3.0	3.7	-179.09	-9,316.9	-148.1	9,319.4	9,313.0	6.41	1,454.859	
400.0	400.0	551.6	551.5	3.0	3.9	-179.10	-9,315.8	-146.5	9,317.8	9,311.3	6.55	1,422.912	
500.0	500.0	623.4	623.3	3.1	4.0	-179.11	-9,314.9	-144.4	9,316.6	9,309.9	6.71	1,387.868	
600.0	600.0	17,225.0	9,706.0	3.1	130.9	-174.91	-1,741.8	-155.2	9,251.1	9,189.2	61.91	149.426	
700.0	700.0	17,225.0	9,706.0	3.1	130.9	-174.91	-1,741.8	-155.2	9,153.0	9,091.0	61.99	147.660	
800.0	800.0	17,225.0	9,706.0	3.2	130.9	-174.91	-1,741.8	-155.2	9,054.8	8,992.8	62.07	145.890	
900.0	900.0	17,225.0	9,706.0	3.2	130.9	-174.91	-1,741.8	-155.2	8,956.7	8,894.6	62.15	144.118	
1,000.0	1,000.0	17,225.0	9,706.0	3.2	130.9	-174.91	-1,741.8	-155.2	8,858.7	8,796.4	62.23	142.346	
1,100.0	1,100.0	17,225.0	9,706.0	3.3	130.9	-174.91	-1,741.8	-155.2	8,760.7	8,698.4	62.32	140.576	
1,200.0	1,200.0	17,225.0	9,706.0	3.4	130.9	-174.91	-1,741.8	-155.2	8,662.7	8,600.3	62.41	138.808	
1,300.0	1,300.0	17,225.0	9,706.0	3.4	130.9	-174.91	-1,741.8	-155.2	8,564.8	8,502.3	62.50	137.044	
1,400.0	1,400.0	17,225.0	9,706.0	3.5	130.9	-174.91	-1,741.8	-155.2	8,466.9	8,404.3	62.59	135.283	
1,500.0	1,500.0	17,225.0	9,706.0	3.5	130.9	-174.91	-1,741.8	-155.2	8,369.1	8,306.4	62.68	133.525	
1,600.0	1,600.0	17,225.0	9,706.0	3.6	130.9	-174.91	-1,741.8	-155.2	8,271.3	8,208.6	62.77	131.773	
1,700.0	1,700.0	17,225.0	9,706.0	3.7	130.9	-174.91	-1,741.8	-155.2	8,173.6	8,110.8	62.86	130.025	
1,800.0	1,800.0	17,225.0	9,706.0	3.8	130.9	-174.91	-1,741.8	-155.2	8,076.0	8,013.0	62.96	128.281	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,900.0	1,900.0	17,225.0	9,706.0	3.9	130.9	-174.91	-1,741.8	-155.2	7,978.4	7,915.3	63.05	126.543		
2,000.0	2,000.0	17,225.0	9,706.0	3.9	130.9	-174.91	-1,741.8	-155.2	7,880.8	7,817.7	63.14	124.809		
2,100.0	2,100.0	17,225.0	9,706.0	4.0	130.9	-174.91	-1,741.8	-155.2	7,783.4	7,720.1	63.24	123.081		
2,200.0	2,200.0	17,225.0	9,706.0	4.1	130.9	-174.91	-1,741.8	-155.2	7,685.9	7,622.6	63.33	121.358		
2,300.0	2,300.0	17,225.0	9,706.0	4.2	130.9	-174.91	-1,741.8	-155.2	7,588.6	7,525.2	63.43	119.641		
2,400.0	2,400.0	17,225.0	9,706.0	4.3	130.9	-174.91	-1,741.8	-155.2	7,491.3	7,427.8	63.52	117.929		
2,500.0	2,500.0	17,225.0	9,706.0	4.4	130.9	-174.91	-1,741.8	-155.2	7,394.1	7,330.5	63.62	116.223		
2,600.0	2,600.0	17,225.0	9,706.0	4.5	130.9	-174.91	-1,741.8	-155.2	7,297.0	7,233.3	63.72	114.522		
2,700.0	2,700.0	17,225.0	9,706.0	4.6	130.9	-174.91	-1,741.8	-155.2	7,200.0	7,136.1	63.81	112.828		
2,800.0	2,800.0	17,225.0	9,706.0	4.7	130.9	-174.91	-1,741.8	-155.2	7,103.0	7,039.1	63.91	111.140		
2,900.0	2,900.0	17,225.0	9,706.0	4.8	130.9	-174.91	-1,741.8	-155.2	7,006.1	6,942.1	64.01	109.457		
3,000.0	3,000.0	17,225.0	9,706.0	4.9	130.9	-174.91	-1,741.8	-155.2	6,909.3	6,845.2	64.11	107.781		
3,100.0	3,100.0	17,225.0	9,706.0	5.0	130.9	-174.91	-1,741.8	-155.2	6,812.6	6,748.4	64.20	106.111		
3,200.0	3,200.0	17,225.0	9,706.0	5.1	130.9	-174.91	-1,741.8	-155.2	6,716.0	6,651.7	64.30	104.448		
3,300.0	3,300.0	17,225.0	9,706.0	5.2	130.9	-174.91	-1,741.8	-155.2	6,619.5	6,555.1	64.40	102.792		
3,400.0	3,400.0	17,225.0	9,706.0	5.3	130.9	-174.91	-1,741.8	-155.2	6,523.1	6,458.6	64.49	101.142		
3,500.0	3,500.0	17,225.0	9,706.0	5.4	130.9	-174.91	-1,741.8	-155.2	6,426.9	6,362.3	64.59	99.500		
3,600.0	3,600.0	17,225.0	9,706.0	5.5	130.9	-174.91	-1,741.8	-155.2	6,330.7	6,266.0	64.69	97.864		
3,700.0	3,700.0	17,225.0	9,706.0	5.7	130.9	-174.91	-1,741.8	-155.2	6,234.6	6,169.9	64.78	96.236		
3,800.0	3,800.0	17,225.0	9,706.0	5.8	130.9	-174.91	-1,741.8	-155.2	6,138.7	6,073.8	64.88	94.616		
3,900.0	3,900.0	17,225.0	9,706.0	5.9	130.9	-174.91	-1,741.8	-155.2	6,042.9	5,977.9	64.98	93.003		
4,000.0	4,000.0	17,225.0	9,706.0	6.0	130.9	-174.91	-1,741.8	-155.2	5,947.3	5,882.2	65.07	91.398		
4,100.0	4,100.0	17,225.0	9,706.0	6.1	130.9	-174.91	-1,741.8	-155.2	5,851.8	5,786.6	65.16	89.801		
4,200.0	4,200.0	17,225.0	9,706.0	6.2	130.9	-174.91	-1,741.8	-155.2	5,756.4	5,691.2	65.26	88.213		
4,300.0	4,300.0	17,225.0	9,706.0	6.3	130.9	-174.91	-1,741.8	-155.2	5,661.2	5,595.9	65.35	86.633		
4,400.0	4,400.0	17,225.0	9,706.0	6.5	130.9	-174.91	-1,741.8	-155.2	5,566.2	5,500.8	65.44	85.062		
4,500.0	4,500.0	17,225.0	9,706.0	6.6	130.9	-174.91	-1,741.8	-155.2	5,471.4	5,405.8	65.52	83.501		
4,600.0	4,600.0	17,225.0	9,706.0	6.7	130.9	-174.91	-1,741.8	-155.2	5,376.7	5,311.1	65.61	81.949		
4,700.0	4,700.0	17,225.0	9,706.0	6.8	130.9	-174.91	-1,741.8	-155.2	5,282.2	5,216.5	65.69	80.406		
4,800.0	4,800.0	17,225.0	9,706.0	6.9	130.9	-174.91	-1,741.8	-155.2	5,188.0	5,122.2	65.78	78.874		
4,900.0	4,900.0	17,225.0	9,706.0	7.0	130.9	-174.91	-1,741.8	-155.2	5,093.9	5,028.1	65.85	77.352		
5,000.0	5,000.0	17,225.0	9,706.0	7.2	130.9	-174.91	-1,741.8	-155.2	5,000.1	4,934.2	65.93	75.840		
5,100.0	5,100.0	17,225.0	9,706.0	7.3	130.9	-174.91	-1,741.8	-155.2	4,906.6	4,840.6	66.00	74.340		
5,200.0	5,200.0	17,225.0	9,706.0	7.4	130.9	-174.91	-1,741.8	-155.2	4,813.3	4,747.2	66.07	72.851		
5,300.0	5,300.0	17,225.0	9,706.0	7.5	130.9	-174.91	-1,741.8	-155.2	4,720.2	4,654.1	66.13	71.374		
5,400.0	5,400.0	17,225.0	9,706.0	7.6	130.9	-174.91	-1,741.8	-155.2	4,627.5	4,561.3	66.19	69.910		
5,500.0	5,500.0	17,225.0	9,706.0	7.8	130.9	-174.91	-1,741.8	-155.2	4,535.1	4,468.8	66.25	68.458		
5,600.0	5,600.0	17,225.0	9,706.0	7.9	130.9	-154.72	-1,741.8	-155.2	4,443.6	4,377.3	66.29	67.038		
5,610.3	5,610.2	17,225.0	9,706.0	7.9	130.9	-154.90	-1,741.8	-155.2	4,434.3	4,368.0	66.29	66.895		
5,700.0	5,699.9	17,225.0	9,706.0	8.0	130.9	-154.90	-1,741.8	-155.2	4,353.3	4,287.0	66.31	65.654		
5,800.0	5,799.8	17,225.0	9,706.0	8.1	130.9	-154.90	-1,741.8	-155.2	4,263.5	4,197.1	66.32	64.286		
5,900.0	5,899.8	17,225.0	9,706.0	8.2	130.9	-154.90	-1,741.8	-155.2	4,174.1	4,107.7	66.32	62.935		
6,000.0	5,999.7	17,225.0	9,706.0	8.3	130.9	-154.90	-1,741.8	-155.2	4,085.1	4,018.8	66.32	61.602		
6,100.0	6,099.6	17,225.0	9,706.0	8.5	130.9	-154.90	-1,741.8	-155.2	3,996.8	3,930.5	66.30	60.287		
6,200.0	6,199.5	17,225.0	9,706.0	8.6	130.9	-154.90	-1,741.8	-155.2	3,908.9	3,842.7	66.26	58.990		
6,300.0	6,299.5	17,225.0	9,706.0	8.7	130.9	-154.90	-1,741.8	-155.2	3,821.7	3,755.5	66.22	57.714		
6,400.0	6,399.4	17,225.0	9,706.0	8.8	130.9	-154.90	-1,741.8	-155.2	3,735.1	3,669.0	66.16	56.459		
6,500.0	6,499.3	17,225.0	9,706.0	8.9	130.9	-154.90	-1,741.8	-155.2	3,649.2	3,583.2	66.08	55.226		
6,600.0	6,599.2	17,225.0	9,706.0	9.0	130.9	-154.90	-1,741.8	-155.2	3,564.1	3,498.1	65.98	54.016		
6,700.0	6,699.2	17,225.0	9,706.0	9.2	130.9	-154.90	-1,741.8	-155.2	3,479.7	3,413.8	65.86	52.831		
6,800.0	6,799.1	17,225.0	9,706.0	9.3	130.9	-154.90	-1,741.8	-155.2	3,396.2	3,330.5	65.73	51.672		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error: 0.0 usft	
Survey Program: 100-MWD													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
6,900.0	6,899.0	17,225.0	9,706.0	9.4	130.9	-154.90	-1,741.8	-155.2	3,313.6	3,248.0	65.56	50.541		
7,000.0	6,998.9	17,225.0	9,706.0	9.5	130.9	-154.90	-1,741.8	-155.2	3,231.9	3,166.6	65.37	49.439		
7,100.0	7,098.9	17,225.0	9,706.0	9.6	130.9	-154.90	-1,741.8	-155.2	3,151.4	3,086.2	65.15	48.368		
7,200.0	7,198.8	17,225.0	9,706.0	9.8	130.9	-154.90	-1,741.8	-155.2	3,071.9	3,007.0	64.91	47.330		
7,300.0	7,298.7	17,225.0	9,706.0	9.9	130.9	-154.90	-1,741.8	-155.2	2,993.8	2,929.1	64.62	46.327		
7,400.0	7,398.6	17,225.0	9,706.0	10.0	130.9	-154.90	-1,741.8	-155.2	2,916.9	2,852.6	64.30	45.362		
7,500.0	7,498.6	17,225.0	9,706.0	10.1	130.9	-154.90	-1,741.8	-155.2	2,841.5	2,777.5	63.94	44.436		
7,600.0	7,598.5	17,225.0	9,706.0	10.2	130.9	-154.90	-1,741.8	-155.2	2,767.6	2,704.1	63.55	43.553		
7,700.0	7,698.4	17,225.0	9,706.0	10.4	130.9	-154.90	-1,741.8	-155.2	2,695.4	2,632.3	63.10	42.716		
7,800.0	7,798.4	17,225.0	9,706.0	10.5	130.9	-154.90	-1,741.8	-155.2	2,625.1	2,562.5	62.61	41.927		
7,900.0	7,898.3	17,225.0	9,706.0	10.6	130.9	-154.90	-1,741.8	-155.2	2,556.7	2,494.6	62.07	41.190		
8,000.0	7,998.2	17,225.0	9,706.0	10.7	130.9	-154.90	-1,741.8	-155.2	2,490.5	2,429.0	61.48	40.508		
8,100.0	8,098.1	17,225.0	9,706.0	10.8	130.9	-154.90	-1,741.8	-155.2	2,426.6	2,365.7	60.84	39.884		
8,200.0	8,198.1	17,225.0	9,706.0	11.0	130.9	-154.90	-1,741.8	-155.2	2,365.1	2,305.0	60.15	39.322		
8,300.0	8,298.0	17,225.0	9,706.0	11.1	130.9	-154.90	-1,741.8	-155.2	2,306.4	2,247.0	59.41	38.823		
8,400.0	8,397.9	17,225.0	9,706.0	11.2	130.9	-154.90	-1,741.8	-155.2	2,250.6	2,192.0	58.62	38.391		
8,500.0	8,497.8	17,225.0	9,706.0	11.3	130.9	-154.90	-1,741.8	-155.2	2,197.9	2,140.1	57.80	38.027		
8,600.0	8,597.8	17,225.0	9,706.0	11.5	130.9	-154.90	-1,741.8	-155.2	2,148.6	2,091.7	56.95	37.732		
8,700.0	8,697.7	17,225.0	9,706.0	11.6	130.9	-154.90	-1,741.8	-155.2	2,102.9	2,046.9	56.07	37.503		
8,800.0	8,797.6	17,225.0	9,706.0	11.7	130.9	-154.90	-1,741.8	-155.2	2,061.1	2,005.9	55.20	37.339		
8,900.0	8,897.5	17,225.0	9,706.0	11.8	130.9	-154.90	-1,741.8	-155.2	2,023.3	1,969.0	54.34	37.232		
9,000.0	8,997.5	17,225.0	9,706.0	11.9	130.9	-154.90	-1,741.8	-155.2	1,989.8	1,936.3	53.53	37.173		
9,100.0	9,097.4	17,225.0	9,706.0	12.1	130.9	-154.90	-1,741.8	-155.2	1,960.9	1,908.1	52.78	37.151		
9,200.0	9,197.3	17,225.0	9,706.0	12.2	130.9	-154.90	-1,741.8	-155.2	1,936.7	1,884.6	52.13	37.149		
9,300.0	9,297.2	17,225.0	9,706.0	12.3	130.9	-154.90	-1,741.8	-155.2	1,917.4	1,865.8	51.61	37.152		
9,400.0	9,397.2	17,225.0	9,706.0	12.4	130.9	-154.90	-1,741.8	-155.2	1,903.2	1,852.0	51.24	37.141		
9,500.0	9,497.1	17,225.0	9,706.0	12.6	130.9	-154.90	-1,741.8	-155.2	1,894.2	1,843.1	51.05	37.102		
9,600.0	9,597.0	17,225.0	9,706.0	12.7	130.9	-154.90	-1,741.8	-155.2	1,890.4	1,839.4	51.06	37.023		
9,621.5	9,618.5	17,225.0	9,706.0	12.7	130.9	-154.90	-1,741.8	-155.2	1,890.3	1,839.2	51.09	37.000		
9,700.0	9,696.9	17,225.0	9,706.0	12.8	130.9	-154.90	-1,741.8	-155.2	1,891.9	1,840.6	51.27	36.898		
9,751.7	9,748.6	17,225.0	9,706.0	12.9	130.9	-154.90	-1,741.8	-155.2	1,894.8	1,843.3	51.47	36.816		
9,800.0	9,796.9	17,225.0	9,706.0	12.9	130.9	-12.97	-1,741.8	-155.2	1,896.7	1,845.0	51.63	36.734		
9,850.0	9,846.7	17,225.0	9,706.0	12.9	130.9	-2.62	-1,741.8	-155.2	1,895.7	1,843.8	51.90	36.526		
9,900.0	9,895.8	17,225.0	9,706.0	13.2	130.9	-0.27	-1,741.8	-155.2	1,891.6	1,839.1	52.48	36.043		
9,950.0	9,944.0	17,225.0	9,706.0	13.5	130.9	0.78	-1,741.8	-155.2	1,884.5	1,831.4	53.11	35.481		
10,000.0	9,990.9	17,225.0	9,706.0	13.8	130.9	1.41	-1,741.8	-155.2	1,874.5	1,820.7	53.78	34.853		
10,050.0	10,036.1	17,225.0	9,706.0	14.1	130.9	1.85	-1,741.8	-155.2	1,861.4	1,806.9	54.48	34.168		
10,100.0	10,079.3	17,225.0	9,706.0	14.3	130.9	2.20	-1,741.8	-155.2	1,845.4	1,790.2	55.20	33.433		
10,150.0	10,120.1	17,225.0	9,706.0	14.5	130.9	2.51	-1,741.8	-155.2	1,826.6	1,770.6	55.94	32.654		
10,200.0	10,158.2	17,225.0	9,706.0	14.8	130.9	2.80	-1,741.8	-155.2	1,804.8	1,748.2	56.69	31.838		
10,250.0	10,193.4	17,225.0	9,706.0	14.9	130.9	3.10	-1,741.8	-155.2	1,780.4	1,722.9	57.45	30.991		
10,300.0	10,225.3	17,225.0	9,706.0	15.1	130.9	3.42	-1,741.8	-155.2	1,753.2	1,695.0	58.21	30.119		
10,350.0	10,253.8	17,225.0	9,706.0	15.2	130.9	3.78	-1,741.8	-155.2	1,723.4	1,664.4	58.96	29.228		
10,400.0	10,278.5	17,225.0	9,706.0	15.3	130.9	4.19	-1,741.8	-155.2	1,691.1	1,631.4	59.71	28.322		
10,450.0	10,299.4	17,225.0	9,706.0	15.4	130.9	4.68	-1,741.8	-155.2	1,656.4	1,596.0	60.44	27.407		
10,500.0	10,316.3	17,225.0	9,706.0	15.5	130.9	5.26	-1,741.8	-155.2	1,619.4	1,558.2	61.14	26.487		
10,550.0	10,329.0	17,225.0	9,706.0	15.5	130.9	5.99	-1,741.8	-155.2	1,580.2	1,518.4	61.81	25.566		
10,600.0	10,337.4	17,225.0	9,706.0	15.6	130.9	6.93	-1,741.8	-155.2	1,539.0	1,476.6	62.44	24.648		
10,650.0	10,341.6	17,225.0	9,706.0	15.6	130.9	8.16	-1,741.8	-155.2	1,496.0	1,433.0	63.03	23.735		
10,668.7	10,342.0	17,225.0	9,706.0	15.6	130.9	8.73	-1,741.8	-155.2	1,479.5	1,416.3	63.22	23.401		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,700.0	10,342.2	17,225.0	9,706.0	15.6	130.9	8.73	-1,741.8	-155.2	1,451.7	1,388.1	63.53	22.849		
10,800.0	10,342.8	17,225.0	9,706.0	15.6	130.9	8.73	-1,741.8	-155.2	1,363.9	1,299.2	64.62	21.106		
10,900.0	10,343.4	17,225.0	9,706.0	15.7	130.9	8.73	-1,741.8	-155.2	1,277.9	1,212.0	65.90	19.392		
11,000.0	10,344.0	17,225.0	9,706.0	15.7	130.9	8.73	-1,741.8	-155.2	1,194.0	1,126.7	67.38	17.720		
11,100.0	10,344.6	17,225.0	9,706.0	15.7	130.9	8.73	-1,741.8	-155.2	1,112.9	1,043.8	69.12	16.100		
11,200.0	10,345.2	17,225.0	9,706.0	15.8	130.9	8.73	-1,741.8	-155.2	1,035.1	963.9	71.14	14.549		
11,300.0	10,345.8	17,225.0	9,706.0	15.8	130.9	8.73	-1,741.8	-155.2	961.3	887.9	73.46	13.086		
11,400.0	10,346.4	17,225.0	9,706.0	15.8	130.9	8.73	-1,741.8	-155.2	892.7	816.6	76.09	11.733		
11,500.0	10,347.0	17,225.0	9,706.0	15.9	130.9	8.73	-1,741.8	-155.2	830.5	751.5	78.97	10.517		
11,600.0	10,347.7	17,225.0	9,706.0	15.9	130.9	8.73	-1,741.8	-155.2	776.2	694.3	81.99	9.468		
11,700.0	10,348.3	17,225.0	9,706.0	16.0	130.9	8.73	-1,741.8	-155.2	731.7	646.8	84.92	8.617		
11,800.0	10,348.9	17,225.0	9,706.0	16.2	130.9	8.73	-1,741.8	-155.2	698.7	611.2	87.43	7.991		
11,900.0	10,349.5	17,225.0	9,706.0	16.7	130.9	8.73	-1,741.8	-155.2	678.9	589.8	89.16	7.614		
12,000.0	10,350.1	17,203.0	9,706.4	17.3	130.5	8.75	-1,763.8	-155.2	673.3	583.6	89.70	7.506		
12,100.0	10,350.7	17,104.6	9,708.2	18.0	129.0	8.84	-1,862.3	-155.2	672.1	582.7	89.42	7.517		
12,200.0	10,351.3	17,002.9	9,710.1	18.6	127.4	8.93	-1,963.9	-155.1	671.1	581.9	89.13	7.529		
12,300.0	10,351.9	16,903.5	9,711.8	19.3	125.8	8.95	-2,063.3	-154.4	670.0	581.2	88.85	7.541		
12,400.0	10,352.5	16,786.3	9,715.6	20.0	123.9	9.05	-2,180.4	-154.0	667.5	579.0	88.47	7.545		
12,500.0	10,353.1	16,674.9	9,720.8	20.7	122.1	8.84	-2,291.6	-149.9	663.0	575.0	87.99	7.534		
12,600.0	10,353.7	16,581.4	9,726.1	21.4	120.7	8.79	-2,384.9	-147.8	657.8	570.0	87.78	7.494		
12,700.0	10,354.4	16,487.4	9,730.0	22.1	119.2	8.61	-2,478.7	-144.3	653.9	566.4	87.52	7.472		
12,800.0	10,355.0	16,392.5	9,733.2	22.8	117.7	8.42	-2,573.5	-141.0	650.7	563.5	87.26	7.458		
12,900.0	10,355.6	16,288.2	9,736.3	23.5	116.0	8.09	-2,677.7	-135.9	647.8	560.9	86.87	7.457		
13,000.0	10,356.2	16,187.5	9,740.2	24.2	114.4	7.90	-2,778.2	-132.4	644.3	557.7	86.60	7.440		
13,100.0	10,356.8	16,092.4	9,743.6	25.0	112.9	7.81	-2,873.3	-130.2	641.1	554.7	86.42	7.418		
13,200.0	10,357.4	15,990.8	9,747.1	25.7	111.3	7.73	-2,974.8	-128.0	638.2	552.0	86.20	7.403		
13,300.0	10,358.0	15,888.3	9,750.9	26.4	109.7	7.66	-3,077.2	-125.9	634.9	548.9	85.99	7.383		
13,400.0	10,358.6	15,794.9	9,754.1	27.1	108.3	7.59	-3,170.5	-123.9	631.9	546.0	85.86	7.359		
13,500.0	10,359.2	15,705.0	9,755.7	27.9	106.8	7.37	-3,260.4	-120.6	630.4	544.7	85.72	7.354		
13,600.0	10,359.8	15,593.2	9,758.6	28.6	105.1	7.42	-3,372.1	-119.8	628.4	542.9	85.50	7.350		
13,700.0	10,360.5	15,495.2	9,761.9	29.3	103.5	7.58	-3,470.0	-120.5	625.9	540.5	85.44	7.326		
13,800.0	10,361.1	15,398.1	9,764.8	30.1	102.0	7.70	-3,567.0	-120.6	623.7	538.3	85.39	7.304		
13,900.0	10,361.7	15,302.4	9,766.9	30.8	100.6	7.90	-3,662.7	-121.7	622.4	537.0	85.38	7.290		
14,000.0	10,362.3	15,198.5	9,769.7	31.5	99.0	8.20	-3,766.6	-123.9	620.8	535.4	85.34	7.274		
14,100.0	10,362.9	15,101.1	9,772.2	32.3	97.5	8.36	-3,864.0	-124.4	619.0	533.7	85.31	7.256		
14,200.0	10,363.5	15,005.5	9,773.8	33.0	96.0	8.47	-3,959.5	-124.7	618.1	532.8	85.29	7.247		
14,300.0	10,364.1	14,896.1	9,776.0	33.7	94.3	8.72	-4,068.9	-126.1	617.1	531.9	85.19	7.243		
14,400.0	10,364.7	14,788.9	9,780.7	34.5	92.7	9.12	-4,176.0	-129.0	613.9	528.7	85.18	7.207		
14,500.0	10,365.3	14,692.2	9,784.7	35.2	91.2	9.37	-4,272.5	-130.3	610.7	525.5	85.22	7.166		
14,600.0	10,365.9	14,585.4	9,789.2	36.0	89.5	9.69	-4,379.2	-132.1	607.6	522.4	85.19	7.132		
14,700.0	10,366.6	14,486.4	9,793.4	36.7	88.0	9.51	-4,478.1	-128.7	603.6	518.5	85.08	7.094		
14,800.0	10,367.2	14,391.1	9,797.0	37.5	86.5	9.36	-4,573.3	-125.8	600.1	515.1	85.03	7.058		
14,900.0	10,367.8	14,287.9	9,801.0	38.2	85.0	9.38	-4,676.4	-124.6	596.9	511.9	84.96	7.025		
15,000.0	10,368.4	14,191.2	9,804.8	39.0	83.5	9.42	-4,773.0	-123.6	593.6	508.6	84.97	6.986		
15,100.0	10,369.0	14,089.8	9,808.9	39.7	82.0	9.54	-4,874.3	-123.4	590.3	505.4	84.95	6.949		
15,200.0	10,369.6	13,999.5	9,811.7	40.5	80.6	9.63	-4,964.5	-123.2	588.0	502.9	85.05	6.913		
15,300.0	10,370.2	13,887.3	9,815.4	41.2	79.0	9.86	-5,076.7	-124.1	585.6	500.6	84.96	6.893		
15,400.0	10,370.8	13,772.6	9,822.7	42.0	77.2	9.96	-5,191.2	-123.0	579.8	495.1	84.79	6.839		
15,500.0	10,371.4	13,682.6	9,827.8	42.7	75.9	9.77	-5,280.9	-119.5	574.3	489.4	84.84	6.769		
15,600.0	10,372.0	13,593.5	9,830.5	43.5	74.6	9.30	-5,369.8	-113.6	571.0	486.1	84.83	6.731		
15,700.0	10,372.7	13,491.8	9,833.1	44.2	73.1	8.92	-5,471.3	-108.6	568.4	483.7	84.73	6.708		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,800.0	10,373.3	13,387.5	9,836.9	45.0	71.6	8.73	-5,575.5	-105.2	565.0	480.3	84.66	6.674		
15,900.0	10,373.9	13,288.1	9,840.8	45.7	70.1	8.47	-5,674.7	-101.3	561.3	476.7	84.64	6.632		
16,000.0	10,374.5	13,191.4	9,844.2	46.5	68.8	8.25	-5,771.4	-97.9	558.0	473.3	84.66	6.591		
16,100.0	10,375.1	13,077.1	9,849.0	47.2	67.1	8.21	-5,885.5	-95.9	554.4	469.9	84.50	6.561		
16,200.0	10,375.7	12,973.8	9,856.2	48.0	65.7	8.36	-5,988.5	-95.5	548.2	463.6	84.54	6.484		
16,300.0	10,376.3	12,881.7	9,862.2	48.7	64.4	8.42	-6,080.5	-94.4	542.4	457.7	84.73	6.401		
16,400.0	10,376.9	12,766.7	9,870.1	49.5	62.8	8.41	-6,195.2	-92.3	535.9	451.4	84.52	6.341		
16,500.0	10,377.5	12,688.0	9,874.9	50.2	61.7	8.36	-6,273.7	-90.5	530.3	445.5	84.84	6.251		
16,600.0	10,378.1	12,589.4	9,878.6	51.0	60.4	8.26	-6,372.2	-88.3	527.1	442.1	84.92	6.206		
16,700.0	10,378.8	12,500.9	9,880.9	51.8	59.2	8.10	-6,460.6	-85.7	524.7	439.6	85.12	6.165		
16,800.0	10,379.4	12,402.8	9,882.2	52.5	57.9	7.93	-6,558.7	-83.2	523.9	438.7	85.21	6.148		
16,850.3	10,379.7	12,356.8	9,882.6	52.9	57.3	7.88	-6,604.7	-82.4	523.6	438.3	85.31	6.138		
16,900.0	10,380.0	12,312.2	9,882.6	53.3	56.7	7.83	-6,649.2	-81.5	523.9	438.5	85.41	6.134		
17,000.0	10,380.6	12,212.0	9,882.0	54.0	55.4	7.66	-6,749.5	-79.3	524.9	439.4	85.51	6.139		
17,100.0	10,381.2	12,099.8	9,882.7	54.8	54.0	7.52	-6,861.6	-76.9	524.7	439.1	85.52	6.135		
17,200.0	10,381.8	11,994.7	9,885.4	55.5	52.7	7.42	-6,966.6	-74.9	522.6	437.0	85.62	6.104		
17,300.0	10,382.4	11,900.7	9,887.7	56.3	51.6	7.35	-7,060.6	-73.2	520.7	434.9	85.84	6.066		
17,354.6	10,382.7	11,852.4	9,888.2	56.7	51.0	7.31	-7,108.9	-72.4	520.4	434.4	85.99	6.052 CC, ES		
17,400.0	10,383.0	11,812.3	9,888.2	57.0	50.5	7.26	-7,149.0	-71.6	520.6	434.5	86.11	6.046		
17,500.0	10,383.6	11,723.4	9,886.8	57.8	49.5	7.18	-7,237.9	-70.4	522.7	436.3	86.40	6.051		
17,600.0	10,384.2	11,625.4	9,884.1	58.6	48.3	7.25	-7,335.8	-70.5	526.2	439.5	86.65	6.073		
17,700.0	10,384.9	11,515.5	9,882.0	59.3	47.1	7.39	-7,445.7	-71.3	528.9	442.1	86.79	6.094		
17,800.0	10,385.5	11,410.4	9,882.3	60.1	46.0	7.52	-7,550.8	-71.6	529.3	442.3	86.98	6.086		
17,900.0	10,386.1	11,317.8	9,881.3	60.8	45.0	7.57	-7,643.4	-71.5	531.1	443.8	87.32	6.082		
18,000.0	10,386.7	11,209.7	9,880.4	61.6	43.9	7.56	-7,751.4	-70.6	532.5	444.9	87.55	6.082		
18,100.0	10,387.3	11,104.2	9,880.9	62.4	42.9	7.30	-7,856.9	-67.3	532.3	444.5	87.80	6.063		
18,200.0	10,387.9	11,005.9	9,881.6	63.1	42.0	6.96	-7,955.1	-63.3	531.9	443.8	88.14	6.035		
18,219.8	10,388.0	10,986.9	9,881.6	63.3	41.8	6.89	-7,974.1	-62.5	531.9	443.7	88.21	6.030		
18,300.0	10,388.5	10,907.6	9,881.7	63.9	41.1	6.60	-8,053.4	-59.1	532.0	443.5	88.50	6.011		
18,400.0	10,389.1	10,806.9	9,881.8	64.6	40.3	6.30	-8,154.0	-55.4	532.1	443.2	88.87	5.988		
18,500.0	10,389.7	10,708.4	9,882.1	65.4	39.5	6.10	-8,252.5	-52.8	532.3	443.0	89.30	5.960		
18,600.0	10,390.3	10,603.5	9,882.6	66.2	38.8	5.95	-8,357.3	-50.5	532.3	442.6	89.70	5.934		
18,700.0	10,391.0	10,504.8	9,883.6	66.9	38.1	5.79	-8,456.0	-48.1	531.7	441.5	90.19	5.895		
18,800.0	10,391.6	10,403.0	9,884.7	67.7	37.5	5.57	-8,557.7	-45.1	531.0	440.3	90.65	5.858		
18,814.2	10,391.6	10,392.3	9,884.8	67.8	37.5	5.54	-8,568.4	-44.7	530.9	440.2	90.75	5.851		
18,900.0	10,392.2	10,340.0	9,883.4	68.4	37.2	5.37	-8,620.7	-42.8	533.5	442.1	91.42	5.836 SF		
19,000.0	10,392.8	10,251.5	9,876.6	69.2	36.7	5.05	-8,708.9	-39.8	541.5	449.5	92.02	5.884		
19,100.0	10,393.4	10,175.9	9,869.7	70.0	36.4	4.76	-8,784.1	-36.9	551.3	458.6	92.66	5.949		
19,200.0	10,394.0	10,113.4	9,859.8	70.7	36.1	4.44	-8,845.7	-34.1	567.3	474.0	93.26	6.083		
19,300.0	10,394.6	10,059.0	9,847.8	71.5	35.9	4.14	-8,898.7	-31.7	589.9	496.2	93.68	6.297		
19,400.0	10,395.2	10,008.5	9,832.9	72.2	35.7	3.81	-8,946.8	-29.0	619.8	525.9	93.89	6.601		
19,500.0	10,395.8	9,958.7	9,814.7	73.0	35.5	3.52	-8,993.1	-26.8	656.6	562.6	93.92	6.991		
19,600.0	10,396.4	9,901.0	9,790.4	73.8	35.3	3.38	-9,045.5	-26.3	698.9	605.0	93.95	7.439		
19,700.0	10,397.1	9,856.6	9,769.7	74.5	35.2	3.40	-9,084.7	-27.4	746.1	652.4	93.66	7.966		
19,800.0	10,397.7	9,820.1	9,751.0	75.3	35.1	3.49	-9,116.1	-29.3	798.2	705.1	93.08	8.576		
19,900.0	10,398.3	9,793.0	9,735.7	76.0	35.1	3.60	-9,138.3	-31.3	855.9	763.7	92.18	9.285		
20,000.0	10,398.9	9,775.0	9,724.7	76.8	35.0	3.68	-9,152.4	-32.8	918.8	827.8	90.99	10.098		
20,100.0	10,399.5	9,743.0	9,703.7	77.6	35.0	3.82	-9,176.4	-35.8	985.8	895.6	90.17	10.932		
20,200.0	10,400.1	9,712.0	9,682.0	78.3	34.9	3.99	-9,198.3	-39.2	1,056.5	967.1	89.36	11.823		
20,300.0	10,400.7	9,712.0	9,682.0	79.1	34.9	3.99	-9,198.3	-39.2	1,130.3	1,042.6	87.71	12.886		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED #8H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
20,400.0	10,401.3	9,680.0	9,658.1	79.8	34.8	4.18	-9,219.1	-43.3	1,206.8	1,119.7	87.05	13.864		
20,500.0	10,401.9	9,680.0	9,658.1	80.6	34.8	4.18	-9,219.1	-43.3	1,285.9	1,200.4	85.55	15.031		
20,511.3	10,402.0	9,668.9	9,649.4	80.7	34.8	4.23	-9,225.9	-44.6	1,294.8	1,209.1	85.70	15.109		

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	0.4	-0.4	3.0	3.0	-90.38	-0.2	-30.1	30.1					
100.0	100.0	100.4	99.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.00	5.017		
200.0	200.0	200.4	199.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.00	5.014		
300.0	300.0	300.4	299.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.01	5.009		
400.0	400.0	400.4	399.6	3.0	3.0	-90.38	-0.2	-30.1	30.1	24.1	6.02	5.001		
500.0	500.0	500.4	499.6	3.1	3.1	-90.38	-0.2	-30.1	30.1	24.1	6.03	4.991		
600.0	600.0	600.4	599.6	3.1	3.1	-90.38	-0.2	-30.1	30.1	24.1	6.05	4.978		
700.0	700.0	700.4	699.6	3.1	3.1	-90.38	-0.2	-30.1	30.1	24.0	6.07	4.963		
800.0	800.0	800.4	799.6	3.2	3.2	-90.38	-0.2	-30.1	30.1	24.0	6.09	4.945		
900.0	900.0	900.4	899.6	3.2	3.2	-90.38	-0.2	-30.1	30.1	24.0	6.11	4.924		
1,000.0	1,000.0	1,000.4	999.6	3.2	3.2	-90.38	-0.2	-30.1	30.1	24.0	6.14	4.902		
1,100.0	1,100.0	1,100.4	1,099.6	3.3	3.3	-90.38	-0.2	-30.1	30.1	23.9	6.17	4.877		
1,200.0	1,200.0	1,200.4	1,199.6	3.4	3.4	-90.38	-0.2	-30.1	30.1	23.9	6.21	4.850		
1,300.0	1,300.0	1,300.4	1,299.6	3.4	3.4	-90.38	-0.2	-30.1	30.1	23.9	6.24	4.821		
1,400.0	1,400.0	1,400.4	1,399.6	3.5	3.5	-90.38	-0.2	-30.1	30.1	23.8	6.28	4.790		
1,500.0	1,500.0	1,500.4	1,499.6	3.5	3.5	-90.38	-0.2	-30.1	30.1	23.8	6.33	4.758		
1,600.0	1,600.0	1,600.4	1,599.6	3.6	3.6	-90.38	-0.2	-30.1	30.1	23.7	6.37	4.724		
1,700.0	1,700.0	1,700.4	1,699.6	3.7	3.7	-90.38	-0.2	-30.1	30.1	23.7	6.42	4.688		
1,800.0	1,800.0	1,800.4	1,799.6	3.8	3.8	-90.38	-0.2	-30.1	30.1	23.6	6.47	4.651		
1,900.0	1,900.0	1,900.4	1,899.6	3.9	3.9	-90.38	-0.2	-30.1	30.1	23.6	6.53	4.613		
2,000.0	2,000.0	2,000.4	1,999.6	3.9	3.9	-90.38	-0.2	-30.1	30.1	23.5	6.58	4.574		
2,100.0	2,100.0	2,100.4	2,099.6	4.0	4.0	-90.38	-0.2	-30.1	30.1	23.5	6.64	4.533		
2,200.0	2,200.0	2,200.4	2,199.6	4.1	4.1	-90.38	-0.2	-30.1	30.1	23.4	6.70	4.492		
2,300.0	2,300.0	2,300.4	2,299.6	4.2	4.2	-90.38	-0.2	-30.1	30.1	23.3	6.76	4.450		
2,400.0	2,400.0	2,400.4	2,399.6	4.3	4.3	-90.38	-0.2	-30.1	30.1	23.3	6.83	4.407		
2,500.0	2,500.0	2,500.4	2,499.6	4.4	4.4	-90.38	-0.2	-30.1	30.1	23.2	6.90	4.364		
2,600.0	2,600.0	2,600.4	2,599.6	4.5	4.5	-90.38	-0.2	-30.1	30.1	23.1	6.97	4.320		
2,700.0	2,700.0	2,700.4	2,699.6	4.6	4.6	-90.38	-0.2	-30.1	30.1	23.1	7.04	4.276		
2,800.0	2,800.0	2,800.4	2,799.6	4.7	4.7	-90.38	-0.2	-30.1	30.1	23.0	7.11	4.231		
2,900.0	2,900.0	2,900.4	2,899.6	4.8	4.8	-90.38	-0.2	-30.1	30.1	22.9	7.19	4.187		
3,000.0	3,000.0	3,000.4	2,999.6	4.9	4.9	-90.38	-0.2	-30.1	30.1	22.8	7.27	4.142		
3,100.0	3,100.0	3,100.4	3,099.6	5.0	5.0	-90.38	-0.2	-30.1	30.1	22.8	7.35	4.097		
3,200.0	3,200.0	3,200.4	3,199.6	5.1	5.1	-90.38	-0.2	-30.1	30.1	22.7	7.43	4.052		
3,300.0	3,300.0	3,300.4	3,299.6	5.2	5.2	-90.38	-0.2	-30.1	30.1	22.6	7.51	4.007		
3,400.0	3,400.0	3,400.4	3,399.6	5.3	5.3	-90.38	-0.2	-30.1	30.1	22.5	7.60	3.962		
3,500.0	3,500.0	3,500.4	3,499.6	5.4	5.4	-90.38	-0.2	-30.1	30.1	22.4	7.68	3.918		
3,600.0	3,600.0	3,600.4	3,599.6	5.5	5.5	-90.38	-0.2	-30.1	30.1	22.3	7.77	3.873		
3,700.0	3,700.0	3,700.4	3,699.6	5.7	5.7	-90.38	-0.2	-30.1	30.1	22.2	7.86	3.829		
3,800.0	3,800.0	3,800.4	3,799.6	5.8	5.8	-90.38	-0.2	-30.1	30.1	22.1	7.95	3.786		
3,900.0	3,900.0	3,900.4	3,899.6	5.9	5.9	-90.38	-0.2	-30.1	30.1	22.1	8.04	3.742		
4,000.0	4,000.0	4,000.4	3,999.6	6.0	6.0	-90.38	-0.2	-30.1	30.1	22.0	8.14	3.699		
4,100.0	4,100.0	4,100.4	4,099.6	6.1	6.1	-90.38	-0.2	-30.1	30.1	21.9	8.23	3.656		
4,200.0	4,200.0	4,200.4	4,199.6	6.2	6.2	-90.38	-0.2	-30.1	30.1	21.8	8.33	3.614		
4,300.0	4,300.0	4,300.4	4,299.6	6.3	6.3	-90.38	-0.2	-30.1	30.1	21.7	8.43	3.572		
4,400.0	4,400.0	4,400.4	4,399.6	6.5	6.5	-90.38	-0.2	-30.1	30.1	21.6	8.52	3.531		
4,500.0	4,500.0	4,500.4	4,499.6	6.6	6.6	-90.38	-0.2	-30.1	30.1	21.5	8.62	3.490		
4,600.0	4,600.0	4,600.4	4,599.6	6.7	6.7	-90.38	-0.2	-30.1	30.1	21.4	8.73	3.450		
4,700.0	4,700.0	4,700.4	4,699.6	6.8	6.8	-90.38	-0.2	-30.1	30.1	21.3	8.83	3.410		
4,800.0	4,800.0	4,800.4	4,799.6	6.9	6.9	-90.38	-0.2	-30.1	30.1	21.2	8.93	3.371		
4,900.0	4,900.0	4,900.4	4,899.6	7.0	7.0	-90.38	-0.2	-30.1	30.1	21.1	9.03	3.332		
5,000.0	5,000.0	5,000.4	4,999.6	7.2	7.2	-90.38	-0.2	-30.1	30.1	21.0	9.14	3.294		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design		BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1											Offset Site Error:	0.0 usft
Survey Program:		0-Standard Keeper 104, 21103-MWD+IFR1+MS											Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
							+N/-S (usft)	+E/-W (usft)						
5,100.0	5,100.0	5,100.4	5,099.6	7.3	7.3	-90.38	-0.2	-30.1	30.1	20.9	9.24	3.256	3.111 CC, ES, SF	
5,200.0	5,200.0	5,200.4	5,199.6	7.4	7.4	-90.38	-0.2	-30.1	30.1	20.7	9.35	3.219		
5,300.0	5,300.0	5,300.4	5,299.6	7.5	7.5	-90.38	-0.2	-30.1	30.1	20.6	9.46	3.182		
5,400.0	5,400.0	5,400.4	5,399.6	7.6	7.6	-90.38	-0.2	-30.1	30.1	20.5	9.57	3.146		
5,500.0	5,500.0	5,499.6	5,499.6	7.8	7.8	-90.38	-0.2	-30.1	30.1	20.4	9.68			
5,600.0	5,600.0	5,598.8	5,598.8	7.9	7.9	-69.14	0.9	-31.4	30.8	21.0	9.79	3.143		
5,610.3	5,610.2	5,609.0	5,608.9	7.9	7.9	-69.34	1.1	-31.7	30.9	21.1	9.81	3.154		
5,700.0	5,699.9	5,701.6	5,698.3	8.0	8.0	-70.16	3.8	-35.0	32.9	23.0	9.91	3.321		
5,800.0	5,799.8	5,801.6	5,798.1	8.1	8.1	-70.74	6.9	-38.8	35.3	25.3	10.03	3.521		
5,900.0	5,899.8	5,901.6	5,898.0	8.2	8.1	-71.25	10.0	-42.6	37.7	27.5	10.14	3.716		
6,000.0	5,999.7	6,001.7	5,997.8	8.3	8.2	-71.70	13.1	-46.4	40.1	29.8	10.25	3.908		
6,100.0	6,099.6	6,101.7	6,097.7	8.5	8.3	-72.09	16.2	-50.2	42.4	32.1	10.37	4.095		
6,200.0	6,199.5	6,201.7	6,197.5	8.6	8.4	-72.45	19.3	-54.0	44.8	34.4	10.48	4.278		
6,300.0	6,299.5	6,301.8	6,297.4	8.7	8.5	-72.77	22.4	-57.8	47.2	36.6	10.60	4.456		
6,400.0	6,399.4	6,401.8	6,397.2	8.8	8.6	-73.06	25.5	-61.6	49.6	38.9	10.71	4.631		
6,500.0	6,499.3	6,501.8	6,497.1	8.9	8.7	-73.32	28.6	-65.5	52.0	41.2	10.83	4.801		
6,600.0	6,599.2	6,598.2	6,596.9	9.0	8.8	-73.56	31.7	-69.3	54.4	43.4	10.95	4.969		
6,700.0	6,699.2	6,701.9	6,696.8	9.2	8.9	-73.78	34.8	-73.1	56.8	45.7	11.07	5.131		
6,800.0	6,799.1	6,801.9	6,796.6	9.3	9.0	-73.98	37.9	-76.9	59.2	48.0	11.19	5.289		
6,900.0	6,899.0	6,901.9	6,896.5	9.4	9.1	-74.16	41.0	-80.7	61.6	50.3	11.31	5.444		
7,000.0	6,998.9	7,002.0	6,996.3	9.5	9.2	-74.34	44.1	-84.5	64.0	52.5	11.43	5.596		
7,100.0	7,098.9	7,102.0	7,096.2	9.6	9.3	-74.50	47.2	-88.3	66.4	54.8	11.55	5.743		
7,200.0	7,198.8	7,202.0	7,196.0	9.8	9.4	-74.64	50.3	-92.1	68.8	57.1	11.68	5.887		
7,300.0	7,298.7	7,302.0	7,295.9	9.9	9.5	-74.78	53.4	-95.9	71.1	59.3	11.80	6.028		
7,400.0	7,398.6	7,402.1	7,395.8	10.0	9.6	-74.91	56.5	-99.7	73.5	61.6	11.93	6.165		
7,500.0	7,498.6	7,502.1	7,495.6	10.1	9.7	-75.03	59.7	-103.6	75.9	63.9	12.06	6.298		
7,600.0	7,598.5	7,602.1	7,595.5	10.2	9.8	-75.15	62.8	-107.4	78.3	66.2	12.19	6.429		
7,700.0	7,698.4	7,702.2	7,695.3	10.4	9.9	-75.25	65.9	-111.2	80.7	68.4	12.31	6.556		
7,800.0	7,798.4	7,802.2	7,795.2	10.5	10.0	-75.35	69.0	-115.0	83.1	70.7	12.44	6.680		
7,900.0	7,898.3	7,902.2	7,895.0	10.6	10.1	-75.45	72.1	-118.8	85.5	73.0	12.58	6.801		
8,000.0	7,998.2	8,002.2	7,994.9	10.7	10.3	-75.54	75.2	-122.6	87.9	75.2	12.71	6.919		
8,100.0	8,098.1	8,097.7	8,094.7	10.8	10.4	-75.62	78.3	-126.4	90.3	77.5	12.84	7.036		
8,200.0	8,198.1	8,202.3	8,194.6	11.0	10.5	-75.71	81.4	-130.2	92.7	79.7	12.97	7.146		
8,300.0	8,298.0	8,297.7	8,294.4	11.1	10.6	-75.78	84.5	-134.0	95.1	82.0	13.11	7.258		
8,400.0	8,397.9	8,402.4	8,394.3	11.2	10.7	-75.86	87.6	-137.8	97.5	84.3	13.24	7.363		
8,500.0	8,497.8	8,497.6	8,494.1	11.3	10.8	-75.92	90.7	-141.7	99.9	86.5	13.38	7.469		
8,600.0	8,597.8	8,602.4	8,594.0	11.5	10.9	-75.99	93.8	-145.5	102.3	88.8	13.52	7.569		
8,700.0	8,697.7	8,702.4	8,693.8	11.6	11.0	-76.05	96.9	-149.3	104.7	91.1	13.66	7.668		
8,800.0	8,797.6	8,802.5	8,793.7	11.7	11.1	-76.11	100.0	-153.1	107.1	93.3	13.79	7.765		
8,900.0	8,897.5	8,902.5	8,893.5	11.8	11.2	-76.17	103.1	-156.9	109.5	95.6	13.93	7.860		
9,000.0	8,997.5	9,002.5	8,993.4	11.9	11.4	-76.23	106.2	-160.7	111.9	97.8	14.07	7.952		
9,100.0	9,097.4	9,102.6	9,093.2	12.1	11.5	-76.28	109.3	-164.5	114.3	100.1	14.21	8.042		
9,200.0	9,197.3	9,202.6	9,193.1	12.2	11.6	-76.33	112.4	-168.3	116.7	102.4	14.36	8.130		
9,300.0	9,297.2	9,302.6	9,292.9	12.3	11.7	-76.38	115.5	-172.1	119.1	104.6	14.50	8.216		
9,400.0	9,397.2	9,402.6	9,392.8	12.4	11.8	-76.43	118.6	-175.9	121.5	106.9	14.64	8.299		
9,500.0	9,497.1	9,502.7	9,492.6	12.6	11.9	-76.47	121.7	-179.7	123.9	109.1	14.78	8.381		
9,600.0	9,597.0	9,602.7	9,592.5	12.7	12.0	-76.51	124.8	-183.6	126.3	111.4	14.93	8.461		
9,700.0	9,696.9	9,702.7	9,692.3	12.8	12.1	-76.56	127.9	-187.4	128.7	113.6	15.07	8.539		
9,751.7	9,748.6	9,748.9	9,743.9	12.9	12.2	-76.58	129.6	-189.3	129.9	114.8	15.14	8.581		
9,800.0	9,796.9	9,802.8	9,792.1	12.9	12.3	66.15	131.1	-191.2	130.8	115.3	15.49	8.448		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,850.0	9,846.7	9,846.8	9,841.6	12.9	12.3	79.15	132.6	-193.1	131.3	115.2	16.17	8.121		
9,900.0	9,895.8	9,904.4	9,890.4	13.2	12.4	85.86	134.1	-194.9	132.1	115.4	16.67	7.921		
9,950.0	9,944.0	9,943.4	9,938.2	13.5	12.4	92.70	135.6	-196.7	134.0	116.5	17.43	7.685		
10,000.0	9,990.9	9,989.7	9,984.4	13.8	12.5	100.03	137.0	-198.5	138.3	119.7	18.61	7.432		
10,050.0	10,036.1	10,034.2	10,028.8	14.1	12.5	107.44	138.4	-200.2	146.4	126.3	20.15	7.268		
10,100.0	10,079.3	10,076.5	10,071.1	14.3	12.6	114.36	139.7	-201.8	159.3	137.5	21.83	7.300		
10,150.0	10,120.1	10,116.4	10,110.9	14.5	12.6	120.36	141.0	-203.3	177.6	154.2	23.40	7.590		
10,200.0	10,158.2	10,153.5	10,148.0	14.8	12.7	125.19	142.1	-204.8	201.1	176.4	24.70	8.141		
10,250.0	10,193.4	10,187.5	10,182.0	14.9	12.7	128.76	143.2	-206.1	229.6	203.9	25.71	8.930		
10,300.0	10,225.3	10,218.2	10,212.6	15.1	12.7	131.05	144.1	-207.2	262.4	236.0	26.45	9.920		
10,350.0	10,253.8	10,245.4	10,239.8	15.2	12.8	132.05	145.0	-208.3	299.1	272.1	26.99	11.079		
10,400.0	10,278.5	10,268.8	10,263.1	15.3	12.8	131.64	145.7	-209.1	338.9	311.6	27.38	12.378		
10,450.0	10,299.4	10,288.2	10,282.6	15.4	12.8	129.58	146.3	-209.9	381.5	353.8	27.66	13.791		
10,500.0	10,316.3	10,303.6	10,297.9	15.5	12.8	125.33	146.8	-210.5	426.1	398.3	27.86	15.298		
10,550.0	10,329.0	10,314.8	10,309.1	15.5	12.9	118.02	147.1	-210.9	472.4	444.4	27.99	16.879		
10,600.0	10,337.4	10,321.7	10,316.0	15.6	12.9	106.34	147.3	-211.2	519.9	491.8	28.08	18.517		
10,650.0	10,341.6	10,324.2	10,318.5	15.6	12.9	89.45	147.4	-211.3	568.1	540.0	28.13	20.195		
10,668.7	10,342.0	10,324.1	10,318.3	15.6	12.9	82.07	147.4	-211.3	586.2	558.1	28.15	20.828		
10,700.0	10,342.2	11,288.3	10,931.2	15.6	12.9	164.37	-448.8	-229.1	612.1	569.5	42.55	14.384		
10,800.0	10,342.8	11,388.3	10,931.8	15.6	12.9	164.37	-548.8	-228.3	612.1	569.3	42.74	14.321		
10,900.0	10,343.4	11,488.3	10,932.4	15.7	13.0	164.37	-648.8	-227.4	612.1	569.1	42.97	14.245		
11,000.0	10,344.0	11,588.3	10,933.0	15.7	13.0	164.37	-748.8	-226.5	612.1	568.8	43.23	14.159		
11,100.0	10,344.6	11,688.3	10,933.6	15.7	13.1	164.37	-848.8	-225.7	612.1	568.5	43.53	14.062		
11,200.0	10,345.2	11,788.3	10,934.2	15.8	13.1	164.37	-948.8	-224.8	612.1	568.2	43.86	13.956		
11,300.0	10,345.8	11,888.3	10,934.8	15.8	13.2	164.37	-1,048.8	-223.9	612.1	567.8	44.22	13.841		
11,400.0	10,346.4	11,988.3	10,935.4	15.8	13.3	164.37	-1,148.8	-223.0	612.1	567.5	44.62	13.718		
11,500.0	10,347.0	12,088.3	10,936.1	15.9	13.4	164.37	-1,248.8	-222.2	612.1	567.0	45.04	13.588		
11,600.0	10,347.7	12,188.3	10,936.7	15.9	13.5	164.37	-1,348.8	-221.3	612.1	566.6	45.50	13.452		
11,700.0	10,348.3	12,288.3	10,937.3	16.0	13.6	164.37	-1,448.7	-220.4	612.1	566.1	45.99	13.310		
11,800.0	10,348.9	12,388.3	10,937.9	16.2	13.8	164.37	-1,548.7	-219.6	612.1	565.6	46.50	13.163		
11,900.0	10,349.5	12,488.3	10,938.5	16.7	13.9	164.37	-1,648.7	-218.7	612.1	565.0	47.04	13.012		
12,000.0	10,350.1	12,588.3	10,939.1	17.3	14.1	164.37	-1,748.7	-217.8	612.1	564.5	47.60	12.858		
12,100.0	10,350.7	12,688.3	10,939.7	18.0	14.3	164.37	-1,848.7	-217.0	612.1	563.9	48.19	12.700		
12,200.0	10,351.3	12,788.3	10,940.3	18.6	14.5	164.37	-1,948.7	-216.1	612.1	563.3	48.81	12.540		
12,300.0	10,351.9	12,888.3	10,940.9	19.3	14.7	164.36	-2,048.7	-215.2	612.1	562.6	49.44	12.379		
12,400.0	10,352.5	12,988.3	10,941.5	20.0	15.0	164.36	-2,148.7	-214.3	612.1	562.0	50.10	12.216		
12,500.0	10,353.1	13,088.3	10,942.1	20.7	15.2	164.36	-2,248.7	-213.5	612.1	561.3	50.78	12.053		
12,600.0	10,353.7	13,188.3	10,942.8	21.4	15.5	164.36	-2,348.7	-212.6	612.1	560.6	51.48	11.889		
12,700.0	10,354.4	13,288.3	10,943.4	22.1	15.8	164.36	-2,448.7	-211.7	612.1	559.9	52.20	11.726		
12,800.0	10,355.0	13,388.3	10,944.0	22.8	16.1	164.36	-2,548.7	-210.9	612.1	559.1	52.93	11.563		
12,900.0	10,355.6	13,488.3	10,944.6	23.5	16.5	164.36	-2,648.7	-210.0	612.1	558.4	53.69	11.401		
13,000.0	10,356.2	13,588.3	10,945.2	24.2	16.8	164.36	-2,748.7	-209.1	612.1	557.6	54.46	11.239		
13,100.0	10,356.8	13,688.3	10,945.8	25.0	17.2	164.36	-2,848.7	-208.2	612.1	556.8	55.24	11.079		
13,200.0	10,357.4	13,788.3	10,946.4	25.7	17.6	164.36	-2,948.7	-207.4	612.1	556.0	56.05	10.921		
13,300.0	10,358.0	13,888.3	10,947.0	26.4	18.0	164.36	-3,048.7	-206.5	612.1	555.2	56.86	10.764		
13,400.0	10,358.6	13,988.3	10,947.6	27.1	18.4	164.36	-3,148.7	-205.6	612.1	554.4	57.69	10.609		
13,500.0	10,359.2	14,088.3	10,948.2	27.9	18.8	164.36	-3,248.6	-204.8	612.1	553.5	58.54	10.456		
13,600.0	10,359.8	14,188.3	10,948.9	28.6	19.2	164.36	-3,348.6	-203.9	612.1	552.7	59.39	10.306		
13,700.0	10,360.5	14,288.3	10,949.5	29.3	19.6	164.36	-3,448.6	-203.0	612.1	551.8	60.26	10.157		
13,800.0	10,361.1	14,388.3	10,950.1	30.1	20.0	164.36	-3,548.6	-202.2	612.1	550.9	61.14	10.011		
13,900.0	10,361.7	14,488.3	10,950.7	30.8	20.5	164.36	-3,648.6	-201.3	612.1	550.0	62.03	9.867		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error:	0.0 usft
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
14,000.0	10,362.3	14,588.3	10,951.3	31.5	20.9	164.36	-3,748.6	-200.4	612.1	549.1	62.94	9.725		
14,100.0	10,362.9	14,688.3	10,951.9	32.3	21.3	164.36	-3,848.6	-199.5	612.1	548.2	63.85	9.586		
14,200.0	10,363.5	14,788.3	10,952.5	33.0	21.8	164.36	-3,948.6	-198.7	612.1	547.3	64.77	9.450		
14,300.0	10,364.1	14,888.3	10,953.1	33.7	22.2	164.36	-4,048.6	-197.8	612.1	546.4	65.70	9.315		
14,400.0	10,364.7	14,988.3	10,953.7	34.5	22.7	164.36	-4,148.6	-196.9	612.1	545.4	66.65	9.184		
14,500.0	10,365.3	15,088.3	10,954.3	35.2	23.2	164.36	-4,248.6	-196.1	612.1	544.5	67.60	9.055		
14,600.0	10,365.9	15,188.3	10,954.9	36.0	23.6	164.36	-4,348.6	-195.2	612.1	543.5	68.56	8.928		
14,700.0	10,366.6	15,288.3	10,955.6	36.7	24.1	164.36	-4,448.6	-194.3	612.1	542.5	69.52	8.804		
14,800.0	10,367.2	15,388.3	10,956.2	37.5	24.6	164.36	-4,548.6	-193.4	612.1	541.6	70.50	8.682		
14,900.0	10,367.8	15,488.3	10,956.8	38.2	25.0	164.36	-4,648.6	-192.6	612.1	540.6	71.48	8.563		
15,000.0	10,368.4	15,588.3	10,957.4	39.0	25.5	164.36	-4,748.6	-191.7	612.1	539.6	72.47	8.446		
15,100.0	10,369.0	15,688.3	10,958.0	39.7	26.0	164.36	-4,848.6	-190.8	612.1	538.6	73.47	8.331		
15,200.0	10,369.6	15,788.3	10,958.6	40.5	26.5	164.36	-4,948.5	-190.0	612.1	537.6	74.47	8.219		
15,300.0	10,370.2	15,888.3	10,959.2	41.2	26.9	164.36	-5,048.5	-189.1	612.1	536.6	75.48	8.109		
15,400.0	10,370.8	15,988.3	10,959.8	42.0	27.4	164.36	-5,148.5	-188.2	612.1	535.6	76.50	8.001		
15,500.0	10,371.4	16,088.3	10,960.4	42.7	27.9	164.36	-5,248.5	-187.4	612.1	534.5	77.52	7.896		
15,600.0	10,372.0	16,188.3	10,961.0	43.5	28.4	164.36	-5,348.5	-186.5	612.1	533.5	78.55	7.792		
15,700.0	10,372.7	16,288.3	10,961.7	44.2	28.9	164.36	-5,448.5	-185.6	612.1	532.5	79.58	7.691		
15,800.0	10,373.3	16,388.3	10,962.3	45.0	29.4	164.36	-5,548.5	-184.7	612.1	531.4	80.62	7.592		
15,900.0	10,373.9	16,488.3	10,962.9	45.7	29.9	164.36	-5,648.5	-183.9	612.1	530.4	81.66	7.495		
16,000.0	10,374.5	16,588.3	10,963.5	46.5	30.4	164.36	-5,748.5	-183.0	612.1	529.4	82.71	7.400		
16,100.0	10,375.1	16,688.3	10,964.1	47.2	30.9	164.36	-5,848.5	-182.1	612.1	528.3	83.76	7.307		
16,200.0	10,375.7	16,788.3	10,964.7	48.0	31.4	164.36	-5,948.5	-181.3	612.1	527.2	84.82	7.216		
16,300.0	10,376.3	16,888.3	10,965.3	48.7	31.9	164.36	-6,048.5	-180.4	612.1	526.2	85.88	7.127		
16,400.0	10,376.9	16,988.3	10,965.9	49.5	32.4	164.36	-6,148.5	-179.5	612.1	525.1	86.95	7.039		
16,500.0	10,377.5	17,088.3	10,966.5	50.2	32.9	164.36	-6,248.5	-178.6	612.1	524.0	88.02	6.954		
16,600.0	10,378.1	17,188.3	10,967.1	51.0	33.4	164.36	-6,348.5	-177.8	612.1	523.0	89.10	6.870		
16,700.0	10,378.8	17,288.3	10,967.7	51.8	33.9	164.36	-6,448.5	-176.9	612.1	521.9	90.17	6.787		
16,800.0	10,379.4	17,388.3	10,968.4	52.5	34.4	164.36	-6,548.5	-176.0	612.1	520.8	91.26	6.707		
16,900.0	10,380.0	17,488.3	10,969.0	53.3	34.9	164.36	-6,648.5	-175.2	612.1	519.7	92.34	6.628		
17,000.0	10,380.6	17,588.3	10,969.6	54.0	35.5	164.36	-6,748.4	-174.3	612.1	518.6	93.43	6.551		
17,100.0	10,381.2	17,688.3	10,970.2	54.8	36.0	164.36	-6,848.4	-173.4	612.1	517.5	94.53	6.475		
17,200.0	10,381.8	17,788.3	10,970.8	55.5	36.5	164.36	-6,948.4	-172.6	612.1	516.4	95.62	6.401		
17,300.0	10,382.4	17,888.3	10,971.4	56.3	37.0	164.36	-7,048.4	-171.7	612.1	515.3	96.72	6.328		
17,400.0	10,383.0	17,988.3	10,972.0	57.0	37.5	164.36	-7,148.4	-170.8	612.1	514.2	97.82	6.257		
17,500.0	10,383.6	18,088.3	10,972.6	57.8	38.1	164.36	-7,248.4	-169.9	612.1	513.1	98.93	6.187		
17,600.0	10,384.2	18,188.3	10,973.2	58.6	38.6	164.36	-7,348.4	-169.1	612.1	512.0	100.04	6.118		
17,700.0	10,384.9	18,288.3	10,973.8	59.3	39.1	164.36	-7,448.4	-168.2	612.1	510.9	101.15	6.051		
17,800.0	10,385.5	18,388.3	10,974.5	60.1	39.6	164.36	-7,548.4	-167.3	612.1	509.8	102.26	5.985		
17,900.0	10,386.1	18,488.3	10,975.1	60.8	40.2	164.36	-7,648.4	-166.5	612.1	508.7	103.38	5.920		
18,000.0	10,386.7	18,588.3	10,975.7	61.6	40.7	164.36	-7,748.4	-165.6	612.1	507.6	104.50	5.857		
18,100.0	10,387.3	18,688.3	10,976.3	62.4	41.2	164.36	-7,848.4	-164.7	612.1	506.4	105.62	5.795		
18,200.0	10,387.9	18,788.3	10,976.9	63.1	41.8	164.36	-7,948.4	-163.8	612.1	505.3	106.75	5.734		
18,300.0	10,388.5	18,888.3	10,977.5	63.9	42.3	164.36	-8,048.4	-163.0	612.1	504.2	107.87	5.674		
18,400.0	10,389.1	18,988.3	10,978.1	64.6	42.8	164.36	-8,148.4	-162.1	612.1	503.1	109.00	5.615		
18,500.0	10,389.7	19,088.3	10,978.7	65.4	43.4	164.36	-8,248.4	-161.2	612.1	501.9	110.13	5.557		
18,600.0	10,390.3	19,188.3	10,979.3	66.2	43.9	164.36	-8,348.4	-160.4	612.1	500.8	111.27	5.501		
18,700.0	10,391.0	19,288.3	10,979.9	66.9	44.4	164.36	-8,448.4	-159.5	612.1	499.7	112.40	5.445		
18,800.0	10,391.6	19,388.3	10,980.5	67.7	45.0	164.36	-8,548.3	-158.6	612.1	498.5	113.54	5.391		
18,900.0	10,392.2	19,488.3	10,981.2	68.4	45.5	164.36	-8,648.3	-157.8	612.1	497.4	114.68	5.337		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.14 Build 85

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FED COM 401H - OWB - PWP1													Offset Site Error: 0.0 usft	
Survey Program: 0-Standard Keeper 104, 21103-MWD+IFR1+MS													Offset Well Error: 3.0 usft	
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
19,000.0	10,392.8	19,588.3	10,981.8	69.2	46.1	164.36	-8,748.3	-156.9	612.1	496.2	115.82	5.285		
19,100.0	10,393.4	19,688.3	10,982.4	70.0	46.6	164.36	-8,848.3	-156.0	612.1	495.1	116.96	5.233		
19,200.0	10,394.0	19,788.3	10,983.0	70.7	47.2	164.36	-8,948.3	-155.1	612.1	493.9	118.11	5.182		
19,300.0	10,394.6	19,888.3	10,983.6	71.5	47.7	164.36	-9,048.3	-154.3	612.1	492.8	119.25	5.132		
19,400.0	10,395.2	19,988.3	10,984.2	72.2	48.3	164.36	-9,148.3	-153.4	612.1	491.7	120.40	5.083		
19,500.0	10,395.8	20,088.3	10,984.8	73.0	48.8	164.36	-9,248.3	-152.5	612.1	490.5	121.55	5.035		
19,600.0	10,396.4	20,188.3	10,985.4	73.8	49.4	164.36	-9,348.3	-151.7	612.1	489.3	122.71	4.988		
19,700.0	10,397.1	20,288.3	10,986.0	74.5	49.9	164.36	-9,448.3	-150.8	612.1	488.2	123.86	4.942		
19,800.0	10,397.7	20,388.3	10,986.6	75.3	50.5	164.36	-9,548.3	-149.9	612.1	487.0	125.01	4.896		
19,900.0	10,398.3	20,488.3	10,987.3	76.0	51.0	164.36	-9,648.3	-149.1	612.1	485.9	126.17	4.851		
20,000.0	10,398.9	20,588.3	10,987.9	76.8	51.6	164.36	-9,748.3	-148.2	612.1	484.7	127.33	4.807		
20,100.0	10,399.5	20,688.3	10,988.5	77.6	52.1	164.36	-9,848.3	-147.3	612.1	483.6	128.49	4.764		
20,200.0	10,400.1	20,788.3	10,989.1	78.3	52.7	164.36	-9,948.3	-146.4	612.1	482.4	129.65	4.721		
20,300.0	10,400.7	20,888.3	10,989.7	79.1	53.2	164.36	-10,048.3	-145.6	612.1	481.2	130.81	4.679		
20,400.0	10,401.3	20,988.3	10,990.3	79.8	53.8	164.36	-10,148.3	-144.7	612.1	480.1	131.97	4.638		
20,500.0	10,401.9	21,088.3	10,990.9	80.6	54.2	164.36	-10,248.3	-143.8	612.1	479.1	132.96	4.603		
20,511.3	10,402.0	21,099.6	10,991.0	80.7	54.2	164.36	-10,259.5	-143.7	612.1	479.0	133.07	4.600		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.0	0.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,808.3					
100.0	100.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,708.4	9,627.1	81.24	119.497		
200.0	200.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,608.4	9,527.1	81.34	118.130		
300.0	300.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,508.5	9,427.1	81.44	116.749		
400.0	400.0	19,727.0	9,827.3	3.0	166.7	103.00	-86.7	375.6	9,408.6	9,327.0	81.56	115.364		
500.0	500.0	19,727.0	9,827.3	3.1	166.7	103.00	-86.7	375.6	9,308.7	9,227.0	81.67	113.981		
600.0	600.0	19,727.0	9,827.3	3.1	166.7	103.00	-86.7	375.6	9,208.8	9,127.0	81.78	112.599		
700.0	700.0	19,727.0	9,827.3	3.1	166.7	103.00	-86.7	375.6	9,108.9	9,027.0	81.90	111.220		
800.0	800.0	19,727.0	9,827.3	3.2	166.7	103.00	-86.7	375.6	9,008.9	8,926.9	82.02	109.843		
900.0	900.0	19,727.0	9,827.3	3.2	166.7	103.00	-86.7	375.6	8,909.0	8,826.9	82.13	108.469		
1,000.0	1,000.0	19,727.0	9,827.3	3.2	166.7	103.00	-86.7	375.6	8,809.1	8,726.9	82.25	107.099		
1,100.0	1,100.0	19,727.0	9,827.3	3.3	166.7	103.00	-86.7	375.6	8,709.2	8,626.9	82.37	105.730		
1,200.0	1,200.0	19,727.0	9,827.3	3.4	166.7	103.00	-86.7	375.6	8,609.3	8,526.8	82.49	104.365		
1,300.0	1,300.0	19,727.0	9,827.3	3.4	166.7	103.00	-86.7	375.6	8,509.4	8,426.8	82.61	103.003		
1,400.0	1,400.0	19,727.0	9,827.3	3.5	166.7	103.00	-86.7	375.6	8,409.5	8,326.8	82.74	101.643		
1,500.0	1,500.0	19,727.0	9,827.3	3.5	166.7	103.00	-86.7	375.6	8,309.6	8,226.8	82.86	100.286		
1,600.0	1,600.0	19,727.0	9,827.3	3.6	166.7	103.00	-86.7	375.6	8,209.7	8,126.8	82.98	98.931		
1,700.0	1,700.0	19,727.0	9,827.3	3.7	166.7	103.00	-86.7	375.6	8,109.9	8,026.8	83.11	97.580		
1,800.0	1,800.0	19,727.0	9,827.3	3.8	166.7	103.00	-86.7	375.6	8,010.0	7,926.7	83.24	96.231		
1,900.0	1,900.0	19,727.0	9,827.3	3.9	166.7	103.00	-86.7	375.6	7,910.1	7,826.7	83.37	94.885		
2,000.0	2,000.0	19,727.0	9,827.3	3.9	166.7	103.00	-86.7	375.6	7,810.2	7,726.7	83.50	93.541		
2,100.0	2,100.0	19,727.0	9,827.3	4.0	166.7	103.00	-86.7	375.6	7,710.3	7,626.7	83.63	92.200		
2,200.0	2,200.0	19,727.0	9,827.3	4.1	166.7	103.00	-86.7	375.6	7,610.5	7,526.7	83.76	90.861		
2,300.0	2,300.0	19,727.0	9,827.3	4.2	166.7	103.00	-86.7	375.6	7,510.6	7,426.7	83.89	89.525		
2,400.0	2,400.0	19,727.0	9,827.3	4.3	166.7	103.00	-86.7	375.6	7,410.7	7,326.7	84.03	88.192		
2,500.0	2,500.0	19,727.0	9,827.3	4.4	166.7	103.00	-86.7	375.6	7,310.9	7,226.7	84.17	86.861		
2,600.0	2,600.0	19,727.0	9,827.3	4.5	166.7	103.00	-86.7	375.6	7,211.0	7,126.7	84.31	85.533		
2,700.0	2,700.0	19,727.0	9,827.3	4.6	166.7	103.00	-86.7	375.6	7,111.2	7,026.7	84.45	84.208		
2,800.0	2,800.0	19,727.0	9,827.3	4.7	166.7	103.00	-86.7	375.6	7,011.3	6,926.7	84.59	82.885		
2,900.0	2,900.0	19,727.0	9,827.3	4.8	166.7	103.00	-86.7	375.6	6,911.5	6,826.7	84.74	81.565		
3,000.0	3,000.0	19,727.0	9,827.3	4.9	166.7	103.00	-86.7	375.6	6,811.6	6,726.7	84.88	80.247		
3,100.0	3,100.0	19,727.0	9,827.3	5.0	166.7	103.00	-86.7	375.6	6,711.8	6,626.7	85.03	78.932		
3,200.0	3,200.0	19,727.0	9,827.3	5.1	166.7	103.00	-86.7	375.6	6,611.9	6,526.8	85.18	77.620		
3,300.0	3,300.0	19,727.0	9,827.3	5.2	166.7	103.00	-86.7	375.6	6,512.1	6,426.8	85.34	76.310		
3,400.0	3,400.0	19,727.0	9,827.3	5.3	166.7	103.00	-86.7	375.6	6,412.3	6,326.8	85.49	75.003		
3,500.0	3,500.0	19,727.0	9,827.3	5.4	166.7	103.00	-86.7	375.6	6,312.5	6,226.8	85.65	73.699		
3,600.0	3,600.0	19,727.0	9,827.3	5.5	166.7	103.00	-86.7	375.6	6,212.7	6,126.9	85.81	72.398		
3,700.0	3,700.0	19,727.0	9,827.3	5.7	166.7	103.00	-86.7	375.6	6,112.9	6,026.9	85.98	71.100		
3,800.0	3,800.0	19,727.0	9,827.3	5.8	166.7	103.00	-86.7	375.6	6,013.1	5,926.9	86.14	69.804		
3,900.0	3,900.0	19,727.0	9,827.3	5.9	166.7	103.00	-86.7	375.6	5,913.3	5,827.0	86.31	68.512		
4,000.0	4,000.0	19,727.0	9,827.3	6.0	166.7	103.00	-86.7	375.6	5,813.5	5,727.0	86.48	67.222		
4,100.0	4,100.0	19,727.0	9,827.3	6.1	166.7	103.00	-86.7	375.6	5,713.7	5,627.1	86.66	65.935		
4,200.0	4,200.0	19,727.0	9,827.3	6.2	166.7	103.00	-86.7	375.6	5,613.9	5,527.1	86.83	64.652		
4,300.0	4,300.0	19,727.0	9,827.3	6.3	166.7	103.00	-86.7	375.6	5,514.2	5,427.2	87.01	63.371		
4,400.0	4,400.0	19,727.0	9,827.3	6.5	166.7	103.00	-86.7	375.6	5,414.4	5,327.2	87.20	62.094		
4,500.0	4,500.0	19,727.0	9,827.3	6.6	166.7	103.00	-86.7	375.6	5,314.7	5,227.3	87.38	60.820		
4,600.0	4,600.0	19,727.0	9,827.3	6.7	166.7	103.00	-86.7	375.6	5,215.0	5,127.4	87.57	59.549		
4,700.0	4,700.0	19,727.0	9,827.3	6.8	166.7	103.00	-86.7	375.6	5,115.2	5,027.5	87.77	58.281		
4,800.0	4,800.0	19,727.0	9,827.3	6.9	166.7	103.00	-86.7	375.6	5,015.5	4,927.6	87.97	57.017		
4,900.0	4,900.0	19,727.0	9,827.3	7.0	166.7	103.00	-86.7	375.6	4,915.8	4,827.7	88.17	55.756		
5,000.0	5,000.0	19,727.0	9,827.3	7.2	166.7	103.00	-86.7	375.6	4,816.1	4,727.8	88.37	54.499		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.0	5,100.0	19,727.0	9,827.3	7.3	166.7	103.00	-86.7	375.6	4,716.5	4,627.9	88.58	53.245		
5,200.0	5,200.0	19,727.0	9,827.3	7.4	166.7	103.00	-86.7	375.6	4,616.8	4,528.0	88.79	51.994		
5,300.0	5,300.0	19,727.0	9,827.3	7.5	166.7	103.00	-86.7	375.6	4,517.2	4,428.2	89.01	50.748		
5,400.0	5,400.0	19,727.0	9,827.3	7.6	166.7	103.00	-86.7	375.6	4,417.5	4,328.3	89.24	49.505		
5,500.0	5,500.0	19,727.0	9,827.3	7.8	166.7	103.00	-86.7	375.6	4,317.9	4,228.5	89.46	48.265		
5,600.0	5,600.0	19,727.0	9,827.3	7.9	166.7	139.62	-86.7	375.6	4,218.5	4,128.8	89.70	47.030		
5,610.3	5,610.2	19,727.0	9,827.3	7.9	166.7	140.73	-86.7	375.6	4,208.3	4,118.6	89.72	46.904		
5,700.0	5,699.9	19,727.0	9,827.3	8.0	166.7	140.73	-86.7	375.6	4,119.2	4,029.2	89.94	45.799		
5,800.0	5,799.8	19,727.0	9,827.3	8.1	166.7	140.73	-86.7	375.6	4,019.9	3,929.7	90.19	44.572		
5,900.0	5,899.8	19,727.0	9,827.3	8.2	166.7	140.73	-86.7	375.6	3,920.7	3,830.3	90.44	43.350		
6,000.0	5,999.7	19,727.0	9,827.3	8.3	166.7	140.73	-86.7	375.6	3,821.5	3,730.8	90.71	42.131		
6,100.0	6,099.6	19,727.0	9,827.3	8.5	166.7	140.73	-86.7	375.6	3,722.4	3,631.4	90.98	40.916		
6,200.0	6,199.5	19,727.0	9,827.3	8.6	166.7	140.73	-86.7	375.6	3,623.3	3,532.1	91.26	39.705		
6,300.0	6,299.5	19,727.0	9,827.3	8.7	166.7	140.73	-86.7	375.6	3,524.3	3,432.8	91.54	38.499		
6,400.0	6,399.4	19,727.0	9,827.3	8.8	166.7	140.73	-86.7	375.6	3,425.3	3,333.5	91.84	37.296		
6,500.0	6,499.3	19,727.0	9,827.3	8.9	166.7	140.73	-86.7	375.6	3,326.4	3,234.3	92.15	36.098		
6,600.0	6,599.2	19,727.0	9,827.3	9.0	166.7	140.73	-86.7	375.6	3,227.6	3,135.1	92.47	34.904		
6,700.0	6,699.2	19,727.0	9,827.3	9.2	166.7	140.73	-86.7	375.6	3,128.8	3,036.0	92.80	33.715		
6,800.0	6,799.1	19,727.0	9,827.3	9.3	166.7	140.73	-86.7	375.6	3,030.1	2,937.0	93.15	32.530		
6,900.0	6,899.0	19,727.0	9,827.3	9.4	166.7	140.73	-86.7	375.6	2,931.6	2,838.0	93.51	31.350		
7,000.0	6,998.9	19,727.0	9,827.3	9.5	166.7	140.73	-86.7	375.6	2,833.1	2,739.2	93.89	30.174		
7,100.0	7,098.9	19,727.0	9,827.3	9.6	166.7	140.73	-86.7	375.6	2,734.7	2,640.4	94.29	29.002		
7,200.0	7,198.8	19,727.0	9,827.3	9.8	166.7	140.73	-86.7	375.6	2,636.4	2,541.7	94.71	27.836		
7,300.0	7,298.7	19,727.0	9,827.3	9.9	166.7	140.73	-86.7	375.6	2,538.3	2,443.1	95.16	26.674		
7,400.0	7,398.6	19,727.0	9,827.3	10.0	166.7	140.73	-86.7	375.6	2,440.3	2,344.7	95.64	25.516		
7,500.0	7,498.6	19,727.0	9,827.3	10.1	166.7	140.73	-86.7	375.6	2,342.5	2,246.3	96.15	24.364		
7,600.0	7,598.5	19,727.0	9,827.3	10.2	166.7	140.73	-86.7	375.6	2,244.9	2,148.2	96.69	23.217		
7,700.0	7,698.4	19,727.0	9,827.3	10.4	166.7	140.73	-86.7	375.6	2,147.5	2,050.2	97.28	22.074		
7,800.0	7,798.4	19,727.0	9,827.3	10.5	166.7	140.73	-86.7	375.6	2,050.3	1,952.4	97.93	20.937		
7,900.0	7,898.3	19,727.0	9,827.3	10.6	166.7	140.73	-86.7	375.6	1,953.5	1,854.8	98.63	19.806		
8,000.0	7,998.2	19,727.0	9,827.3	10.7	166.7	140.73	-86.7	375.6	1,856.9	1,757.5	99.41	18.680		
8,100.0	8,098.1	19,727.0	9,827.3	10.8	166.7	140.73	-86.7	375.6	1,760.8	1,660.5	100.27	17.561		
8,200.0	8,198.1	19,727.0	9,827.3	11.0	166.7	140.73	-86.7	375.6	1,665.1	1,563.9	101.24	16.448		
8,300.0	8,298.0	19,727.0	9,827.3	11.1	166.7	140.73	-86.7	375.6	1,570.0	1,467.7	102.33	15.343		
8,400.0	8,397.9	19,727.0	9,827.3	11.2	166.7	140.73	-86.7	375.6	1,475.5	1,371.9	103.57	14.246		
8,500.0	8,497.8	19,727.0	9,827.3	11.3	166.7	140.73	-86.7	375.6	1,381.8	1,276.7	105.01	13.158		
8,600.0	8,597.8	19,727.0	9,827.3	11.5	166.7	140.73	-86.7	375.6	1,289.0	1,182.3	106.68	12.083		
8,700.0	8,697.7	19,727.0	9,827.3	11.6	166.7	140.73	-86.7	375.6	1,197.4	1,088.7	108.64	11.022		
8,800.0	8,797.6	19,727.0	9,827.3	11.7	166.7	140.73	-86.7	375.6	1,107.2	996.2	110.95	9.979		
8,900.0	8,897.5	19,727.0	9,827.3	11.8	166.7	140.73	-86.7	375.6	1,018.9	905.1	113.72	8.959		
9,000.0	8,997.5	19,727.0	9,827.3	11.9	166.7	140.73	-86.7	375.6	932.9	815.8	117.04	7.971		
9,100.0	9,097.4	19,727.0	9,827.3	12.1	166.7	140.73	-86.7	375.6	850.0	728.9	121.03	7.023		
9,200.0	9,197.3	19,727.0	9,827.3	12.2	166.7	140.73	-86.7	375.6	771.1	645.3	125.80	6.130		
9,300.0	9,297.2	19,727.0	9,827.3	12.3	166.7	140.73	-86.7	375.6	697.8	566.4	131.40	5.310		
9,400.0	9,397.2	19,727.0	9,827.3	12.4	166.7	140.73	-86.7	375.6	631.7	494.0	137.74	4.586		
9,500.0	9,497.1	19,727.0	9,827.3	12.6	166.7	140.73	-86.7	375.6	575.6	431.1	144.43	3.985		
9,600.0	9,597.0	19,727.0	9,827.3	12.7	166.7	140.73	-86.7	375.6	532.4	381.8	150.62	3.535		
9,700.0	9,696.9	19,727.0	9,827.3	12.8	166.7	140.73	-86.7	375.6	505.6	350.5	155.11	3.260		
9,751.7	9,748.6	19,727.0	9,827.3	12.9	166.7	140.73	-86.7	375.6	499.1	342.8	156.40	3.192		
9,800.0	9,796.9	19,727.0	9,827.3	12.9	166.7	-77.51	-86.7	375.6	496.9	339.6	157.27	3.159		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
9,815.9	9,812.7	19,727.0	9,827.3	12.9	166.7	-71.76	-86.7	375.6	496.7	339.3	157.48	3.154 CC, ES		
9,850.0	9,846.7	19,727.0	9,827.3	12.9	166.7	-67.12	-86.7	375.6	497.4	339.6	157.85	3.151 SF		
9,900.0	9,895.8	19,727.0	9,827.3	13.2	166.7	-64.50	-86.7	375.6	500.9	342.9	158.01	3.170		
9,950.0	9,944.0	19,727.0	9,827.3	13.5	166.7	-62.94	-86.7	375.6	507.1	349.2	157.90	3.212		
10,000.0	9,990.9	19,727.0	9,827.3	13.8	166.7	-61.59	-86.7	375.6	516.1	358.6	157.48	3.277		
10,050.0	10,036.1	19,727.0	9,827.3	14.1	166.7	-60.23	-86.7	375.6	527.5	370.7	156.71	3.366		
10,100.0	10,079.3	19,727.0	9,827.3	14.3	166.7	-58.79	-86.7	375.6	541.1	385.5	155.61	3.477		
10,150.0	10,120.1	19,727.0	9,827.3	14.5	166.7	-57.24	-86.7	375.6	556.7	402.5	154.19	3.610		
10,200.0	10,158.2	19,727.0	9,827.3	14.8	166.7	-55.60	-86.7	375.6	574.0	421.5	152.47	3.765		
10,250.0	10,193.4	19,727.0	9,827.3	14.9	166.7	-53.87	-86.7	375.6	592.7	442.2	150.50	3.938		
10,300.0	10,225.3	19,724.4	9,827.3	15.1	166.6	-51.97	-89.3	375.6	612.6	464.3	148.26	4.132		
10,350.0	10,253.8	19,682.7	9,828.2	15.2	165.9	-48.55	-131.0	375.2	631.8	486.1	145.67	4.337		
10,400.0	10,278.5	19,638.8	9,829.1	15.3	165.2	-45.71	-174.9	374.9	648.8	505.4	143.44	4.523		
10,450.0	10,299.4	19,594.9	9,830.0	15.4	164.5	-43.47	-218.8	374.5	663.3	521.7	141.58	4.685		
10,500.0	10,316.3	19,552.1	9,830.7	15.5	163.8	-41.78	-261.6	374.3	675.2	535.1	140.07	4.820		
10,550.0	10,329.0	19,508.6	9,831.2	15.5	163.1	-40.54	-305.1	374.2	684.3	545.4	138.87	4.927		
10,600.0	10,337.4	19,465.0	9,831.4	15.6	162.4	-39.74	-348.6	374.5	690.5	552.6	137.98	5.005		
10,650.0	10,341.6	19,419.4	9,831.4	15.6	161.6	-39.35	-394.2	375.0	693.9	556.5	137.37	5.051		
10,668.7	10,342.0	19,396.2	9,831.5	15.6	161.2	-39.31	-417.5	375.4	694.2	557.1	137.14	5.062		
10,700.0	10,342.2	19,357.2	9,831.9	15.6	160.6	-39.32	-456.5	375.7	694.1	557.3	136.78	5.075		
10,800.0	10,342.8	19,259.4	9,833.7	15.6	159.0	-39.37	-554.3	376.3	693.0	557.1	135.85	5.101		
10,893.5	10,343.3	19,169.7	9,834.1	15.7	157.5	-39.34	-643.9	376.7	692.8	557.9	134.93	5.135		
10,900.0	10,343.4	19,163.4	9,834.1	15.7	157.4	-39.33	-650.2	376.6	692.8	558.0	134.85	5.138		
11,000.0	10,344.0	19,063.3	9,832.9	15.7	155.8	-39.10	-750.4	375.4	692.9	559.2	133.64	5.185		
11,100.0	10,344.6	18,961.6	9,831.2	15.7	154.1	-38.78	-852.0	373.2	692.8	560.4	132.34	5.235		
11,160.3	10,345.0	18,902.7	9,829.8	15.7	153.1	-38.54	-910.8	371.4	692.7	561.1	131.54	5.266		
11,200.0	10,345.2	18,864.4	9,828.9	15.8	152.5	-38.39	-949.1	370.4	692.7	561.7	131.03	5.287		
11,300.0	10,345.8	18,764.5	9,826.8	15.8	150.9	-38.06	-1,048.9	368.3	692.9	563.1	129.80	5.338		
11,400.0	10,346.4	18,653.2	9,826.9	15.8	149.0	-37.88	-1,160.2	366.9	692.1	563.4	128.67	5.378		
11,500.0	10,347.0	18,562.6	9,827.2	15.9	147.5	-37.79	-1,250.9	366.5	691.4	563.6	127.87	5.407		
11,600.0	10,347.7	18,462.2	9,826.8	15.9	145.9	-37.64	-1,351.2	365.9	691.3	564.4	126.93	5.447		
11,626.3	10,347.8	18,436.6	9,826.6	15.9	145.5	-37.59	-1,376.9	365.6	691.3	564.6	126.68	5.457		
11,700.0	10,348.3	18,365.5	9,825.8	16.0	144.3	-37.43	-1,447.9	364.8	691.4	565.4	125.98	5.488		
11,800.0	10,348.9	18,270.1	9,824.3	16.2	142.7	-37.23	-1,543.3	364.1	692.2	567.1	125.07	5.535		
11,900.0	10,349.5	18,173.0	9,823.0	16.7	141.1	-37.08	-1,640.4	364.3	693.4	569.2	124.22	5.582		
12,000.0	10,350.1	18,072.9	9,821.0	17.3	139.5	-36.94	-1,740.4	364.9	695.3	571.9	123.38	5.635		
12,100.0	10,350.7	17,956.7	9,821.2	18.0	137.6	-36.89	-1,856.7	365.4	695.3	572.8	122.52	5.675		
12,200.0	10,351.3	17,852.6	9,823.5	18.6	135.9	-36.97	-1,960.7	366.3	694.0	572.1	121.92	5.693		
12,300.0	10,351.9	17,753.0	9,825.6	19.3	134.2	-37.01	-2,060.3	366.7	692.6	571.2	121.33	5.708		
12,400.0	10,352.5	17,658.9	9,827.1	20.0	132.7	-37.02	-2,154.4	367.0	691.5	570.7	120.79	5.725		
12,453.6	10,352.9	17,609.1	9,827.3	20.4	131.9	-37.00	-2,204.2	367.2	691.4	570.9	120.48	5.738		
12,500.0	10,353.1	17,565.8	9,827.3	20.7	131.2	-36.97	-2,247.5	367.4	691.5	571.3	120.19	5.753		
12,600.0	10,353.7	17,469.2	9,826.6	21.4	129.6	-36.87	-2,344.1	367.7	692.2	572.7	119.53	5.791		
12,700.0	10,354.4	17,371.6	9,825.5	22.1	128.0	-36.77	-2,441.7	368.1	693.3	574.5	118.86	5.833		
12,800.0	10,355.0	17,272.9	9,824.3	22.8	126.3	-36.66	-2,540.4	368.8	694.7	576.5	118.20	5.878		
12,900.0	10,355.6	17,172.3	9,823.5	23.5	124.7	-36.62	-2,641.0	370.1	696.1	578.5	117.59	5.920		
13,000.0	10,356.2	17,060.1	9,825.2	24.2	122.8	-36.82	-2,753.1	373.4	696.6	579.4	117.12	5.947		
13,100.0	10,356.8	16,955.0	9,828.7	25.0	121.1	-37.15	-2,858.1	377.2	696.1	579.3	116.83	5.958		
13,200.0	10,357.4	16,838.9	9,835.8	25.7	119.2	-37.66	-2,973.9	381.0	693.0	576.5	116.53	5.947		
13,300.0	10,358.0	16,748.9	9,840.5	26.4	117.7	-37.97	-3,063.7	383.3	690.4	574.0	116.42	5.931		
13,400.0	10,358.6	16,650.3	9,843.5	27.1	116.1	-38.13	-3,162.3	384.8	688.9	572.8	116.05	5.936		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
13,500.0	10,359.2	16,549.7	9,846.8	27.9	114.4	-38.26	-3,262.8	385.6	686.8	571.1	115.62	5.940		
13,595.3	10,359.8	16,466.8	9,848.3	28.6	113.1	-38.31	-3,345.7	386.2	685.8	570.5	115.31	5.947		
13,600.0	10,359.8	16,463.0	9,848.4	28.6	113.0	-38.31	-3,349.5	386.3	685.8	570.5	115.29	5.948		
13,700.0	10,360.5	16,376.8	9,847.9	29.3	111.6	-38.31	-3,435.7	387.7	687.1	572.2	114.88	5.981		
13,800.0	10,361.1	16,279.4	9,845.9	30.1	110.0	-38.20	-3,533.0	389.0	689.5	575.2	114.30	6.033		
13,900.0	10,361.7	16,175.3	9,843.5	30.8	108.3	-38.04	-3,637.2	389.9	691.8	578.2	113.63	6.088		
14,000.0	10,362.3	16,050.1	9,843.2	31.5	106.2	-37.99	-3,762.3	391.0	692.6	579.7	112.83	6.138		
14,100.0	10,362.9	15,949.7	9,846.0	32.3	104.6	-38.04	-3,862.7	390.8	690.3	577.9	112.37	6.143		
14,200.0	10,363.5	15,857.3	9,847.4	33.0	103.0	-38.03	-3,955.1	390.9	689.1	577.1	111.97	6.154		
14,264.4	10,363.9	15,797.6	9,848.0	33.5	102.1	-38.04	-4,014.8	391.4	688.9	577.1	111.72	6.166		
14,300.0	10,364.1	15,764.6	9,848.2	33.7	101.5	-38.05	-4,047.8	391.8	688.9	577.3	111.59	6.174		
14,400.0	10,364.7	15,669.0	9,848.5	34.5	100.0	-38.08	-4,143.3	393.4	689.7	578.5	111.18	6.203		
14,500.0	10,365.3	15,569.3	9,848.4	35.2	98.3	-38.11	-4,243.0	395.2	690.8	580.0	110.73	6.238		
14,600.0	10,365.9	15,475.5	9,847.8	36.0	96.8	-38.09	-4,336.8	396.6	692.2	581.9	110.30	6.275		
14,700.0	10,366.6	15,386.8	9,846.0	36.7	95.3	-38.04	-4,425.5	398.4	694.9	585.0	109.87	6.325		
14,800.0	10,367.2	15,301.0	9,843.1	37.5	93.9	-37.98	-4,511.2	401.0	699.5	590.0	109.41	6.393		
14,900.0	10,367.8	15,171.1	9,839.2	38.2	91.8	-37.95	-4,641.0	405.3	704.1	595.3	108.73	6.475		
15,000.0	10,368.4	15,069.1	9,839.3	39.0	90.1	-38.00	-4,742.9	407.4	705.2	596.9	108.30	6.512		
15,100.0	10,369.0	14,970.0	9,839.4	39.7	88.5	-38.07	-4,841.9	409.7	706.5	598.6	107.90	6.548		
15,200.0	10,369.6	14,860.2	9,841.1	40.5	86.7	-38.21	-4,951.8	412.1	706.5	599.1	107.45	6.575		
15,215.8	10,369.7	14,845.9	9,841.3	40.6	86.4	-38.23	-4,966.1	412.4	706.5	599.1	107.41	6.578		
15,300.0	10,370.2	14,768.5	9,842.3	41.2	85.1	-38.35	-5,043.4	414.5	707.0	599.8	107.18	6.596		
15,400.0	10,370.8	14,665.7	9,842.8	42.0	83.5	-38.45	-5,146.2	417.1	708.2	601.4	106.77	6.633		
15,500.0	10,371.4	14,558.4	9,844.9	42.7	81.7	-38.58	-5,253.4	419.0	707.7	601.4	106.34	6.655		
15,600.0	10,372.0	14,458.5	9,846.5	43.5	80.1	-38.70	-5,353.3	420.9	707.5	601.5	105.98	6.676		
15,700.0	10,372.7	14,357.0	9,848.8	44.2	78.4	-38.85	-5,454.7	422.8	706.8	601.2	105.61	6.692		
15,792.6	10,373.2	14,269.0	9,850.4	44.9	77.0	-38.95	-5,542.8	424.3	706.4	601.1	105.32	6.708		
15,800.0	10,373.3	14,262.1	9,850.5	45.0	76.8	-38.96	-5,549.6	424.4	706.4	601.1	105.30	6.709		
15,900.0	10,373.9	14,168.2	9,851.3	45.7	75.3	-39.04	-5,643.5	426.3	707.0	602.0	104.97	6.735		
16,000.0	10,374.5	14,078.3	9,850.5	46.5	73.8	-39.00	-5,733.4	427.6	708.5	603.9	104.60	6.774		
16,100.0	10,375.1	13,989.9	9,848.1	47.2	72.4	-38.91	-5,821.8	429.3	711.7	607.5	104.20	6.831		
16,200.0	10,375.7	13,892.2	9,844.2	48.0	70.8	-38.76	-5,919.3	431.5	716.2	612.5	103.71	6.905		
16,300.0	10,376.3	13,769.5	9,841.2	48.7	68.8	-38.66	-6,042.0	433.9	719.4	616.3	103.08	6.979		
16,400.0	10,376.9	13,660.5	9,841.4	49.5	67.0	-38.64	-6,151.0	434.8	719.7	617.1	102.57	7.016		
16,500.0	10,377.5	13,558.0	9,841.9	50.2	65.3	-38.58	-6,253.5	435.0	719.3	617.2	102.13	7.044		
16,600.0	10,378.1	13,460.0	9,842.4	51.0	63.7	-38.54	-6,351.5	435.2	719.0	617.3	101.74	7.067		
16,624.7	10,378.3	13,436.6	9,842.4	51.2	63.3	-38.53	-6,374.8	435.3	719.0	617.3	101.65	7.073		
16,700.0	10,378.8	13,365.4	9,842.3	51.8	62.2	-38.48	-6,446.1	435.5	719.2	617.8	101.38	7.094		
16,800.0	10,379.4	13,268.5	9,841.8	52.5	60.6	-38.42	-6,543.0	436.3	720.0	619.0	101.00	7.129		
16,900.0	10,380.0	13,179.4	9,840.9	53.3	59.2	-38.38	-6,632.1	437.6	721.7	621.0	100.67	7.169		
17,000.0	10,380.6	13,063.5	9,839.3	54.0	57.3	-38.28	-6,747.9	438.9	723.5	623.4	100.11	7.227		
17,100.0	10,381.2	12,959.1	9,839.9	54.8	55.6	-38.29	-6,852.3	440.0	723.6	623.9	99.71	7.257		
17,200.0	10,381.8	12,849.5	9,841.8	55.5	53.8	-38.32	-6,961.9	440.4	722.4	623.1	99.25	7.278		
17,300.0	10,382.4	12,751.4	9,844.0	56.3	52.2	-38.38	-7,059.9	441.0	720.9	622.0	98.95	7.286		
17,400.0	10,383.0	12,655.6	9,846.8	57.0	50.7	-38.55	-7,155.7	442.8	719.7	621.0	98.69	7.292		
17,455.3	10,383.4	12,605.9	9,847.8	57.5	49.8	-38.61	-7,205.4	443.7	719.5	620.9	98.58	7.299		
17,500.0	10,383.6	12,562.9	9,848.2	57.8	49.1	-38.64	-7,248.4	444.4	719.6	621.1	98.45	7.309		
17,600.0	10,384.2	12,460.9	9,849.1	58.6	47.5	-38.70	-7,350.4	446.0	719.8	621.6	98.11	7.336		
17,700.0	10,384.9	12,347.2	9,850.8	59.3	45.7	-38.74	-7,464.0	446.9	719.1	621.4	97.63	7.365		
17,800.0	10,385.5	12,228.8	9,854.6	60.1	43.7	-38.75	-7,582.4	445.5	715.7	618.7	97.03	7.376		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

Offset Design BULLDOG - GUNNER 8 FEDERAL COM #9H - OWB - ACTUAL WELLPATH													Offset Site Error:	0.0 usft
Survey Program: 100- VES GyroFlex, 9207-MWD													Offset Well Error:	3.0 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
17,900.0	10,386.1	12,116.8	9,861.2	60.8	41.9	-38.90	-7,694.1	444.1	710.3	613.8	96.52	7.359		
18,000.0	10,386.7	12,034.2	9,867.3	61.6	40.6	-39.20	-7,776.5	445.2	705.3	608.8	96.53	7.307		
18,100.0	10,387.3	11,943.8	9,873.0	62.4	39.1	-39.60	-7,866.7	448.0	702.3	605.9	96.42	7.284		
18,200.0	10,387.9	11,850.3	9,876.8	63.1	37.6	-39.84	-7,960.1	450.0	700.4	604.2	96.23	7.279		
18,300.0	10,388.5	11,757.0	9,878.9	63.9	36.1	-39.92	-8,053.4	450.8	699.2	603.2	96.02	7.282		
18,400.0	10,389.1	11,638.4	9,881.8	64.6	34.3	-39.98	-8,171.9	450.9	697.3	601.8	95.52	7.300		
18,500.0	10,389.7	11,537.6	9,886.3	65.4	32.6	-40.15	-8,272.6	451.3	694.0	598.7	95.26	7.285		
18,600.0	10,390.3	11,451.1	9,890.5	66.2	31.3	-40.43	-8,359.0	453.3	691.7	596.5	95.20	7.266		
18,700.0	10,391.0	11,347.5	9,894.9	66.9	29.6	-40.75	-8,462.5	456.1	690.1	595.2	94.94	7.269		
18,800.0	10,391.6	11,243.8	9,899.0	67.7	28.0	-40.97	-8,566.1	457.5	687.9	593.2	94.70	7.264		
18,900.0	10,392.2	11,146.1	9,901.9	68.4	26.5	-41.06	-8,663.7	457.8	685.7	591.2	94.55	7.253		
19,000.0	10,392.8	11,047.8	9,903.8	69.2	25.0	-41.04	-8,762.0	457.1	683.8	589.4	94.40	7.244		
19,100.0	10,393.4	10,944.3	9,905.1	70.0	23.4	-40.95	-8,865.5	456.0	682.1	587.9	94.18	7.242		
19,200.0	10,394.0	10,841.1	9,909.1	70.7	21.9	-41.08	-8,968.6	456.0	679.0	585.0	94.00	7.223		
19,300.0	10,394.6	10,750.5	9,912.7	71.5	20.5	-41.30	-9,059.1	457.6	677.0	583.0	94.00	7.202		
19,400.0	10,395.2	10,656.4	9,915.0	72.2	19.2	-41.43	-9,153.2	458.9	676.0	582.0	94.00	7.192		
19,500.0	10,395.8	10,558.4	9,915.3	73.0	17.8	-41.39	-9,251.2	459.4	675.9	581.9	94.00	7.190		
19,600.0	10,396.4	10,435.5	9,917.0	73.8	16.1	-41.32	-9,374.1	458.7	674.5	580.7	93.77	7.194		
19,700.0	10,397.1	10,334.7	9,920.0	74.5	14.9	-41.22	-9,474.8	455.8	670.3	576.5	93.84	7.143		
19,782.5	10,397.6	10,277.4	9,920.0	75.1	14.2	-41.04	-9,532.0	453.8	668.4	574.2	94.22	7.094		
19,800.0	10,397.7	10,268.1	9,919.7	75.3	14.1	-40.99	-9,541.3	453.5	668.5	574.2	94.31	7.089		
19,900.0	10,398.3	10,210.1	9,914.4	76.0	13.5	-40.52	-9,599.0	451.5	673.0	578.3	94.62	7.112		
20,000.0	10,398.9	10,157.0	9,904.8	76.8	13.0	-39.79	-9,651.2	449.1	684.0	589.3	94.66	7.226		
20,100.0	10,399.5	10,097.4	9,889.5	77.6	12.6	-38.77	-9,708.7	446.8	701.5	607.0	94.54	7.420		
20,200.0	10,400.1	10,062.0	9,878.4	78.3	12.3	-38.10	-9,742.3	445.7	725.5	631.9	93.56	7.754		
20,300.0	10,400.7	10,014.8	9,860.0	79.1	12.1	-37.10	-9,785.8	445.1	756.9	664.4	92.59	8.175		
20,400.0	10,401.3	9,967.0	9,837.8	79.8	11.9	-35.96	-9,828.1	444.2	794.9	703.4	91.50	8.687		
20,500.0	10,401.9	9,926.3	9,816.4	80.6	11.7	-34.89	-9,862.7	443.1	838.4	748.4	90.02	9.313		
20,511.3	10,402.0	9,921.5	9,813.8	80.7	11.7	-34.76	-9,866.7	442.9	843.7	753.8	89.86	9.389		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

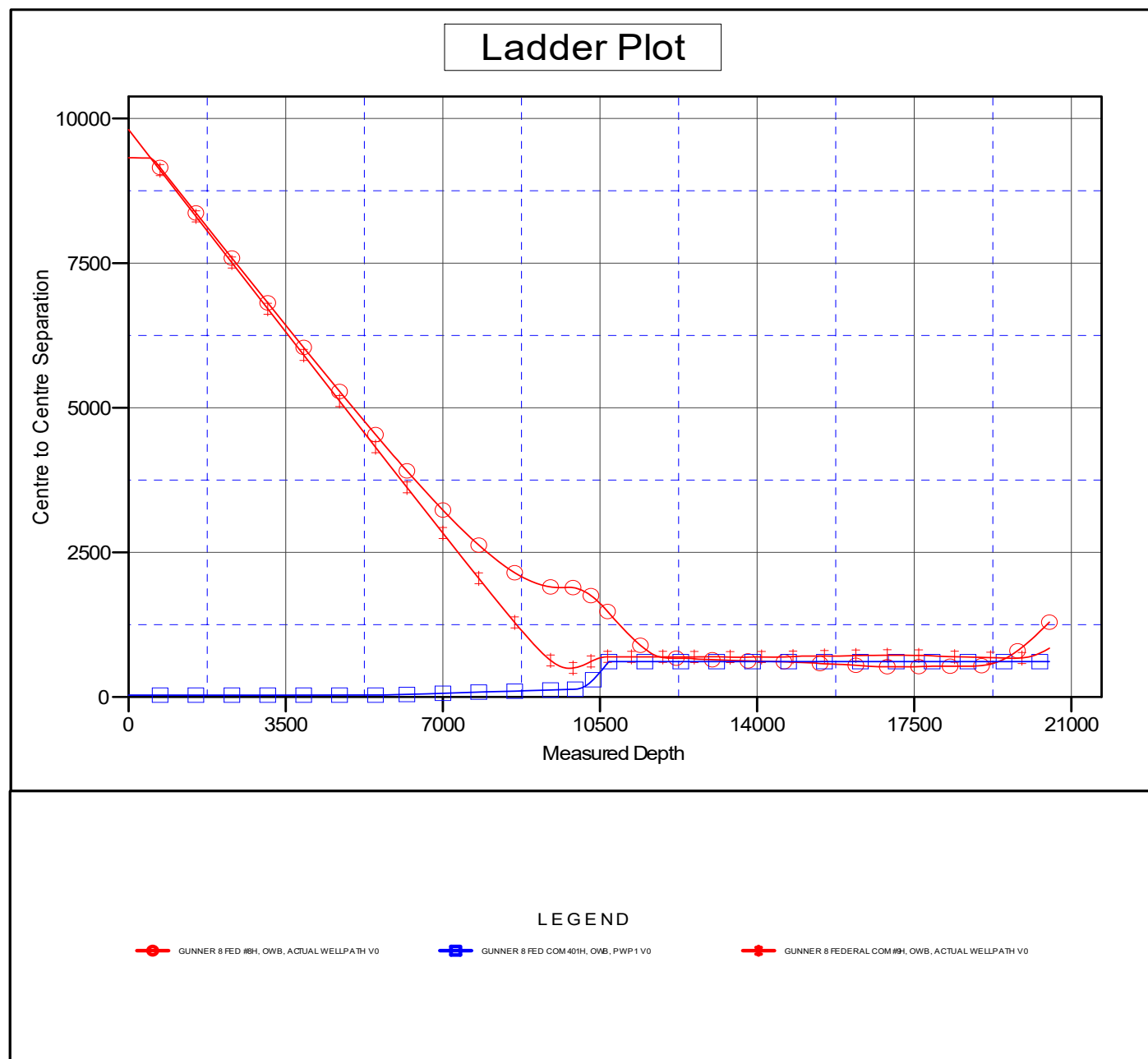
Reference Depths are relative to RKB = 3333.4' + 27' @ 3360.4usft (ScCoordinates are relative to: GUNNER 8 FED COM 301H)

Offset Depths are relative to Offset Datum

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Central Meridian is 104° 20' 0.000 W

Grid Convergence at Surface is: 0.44°



CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Anticollision Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well GUNNER 8 FED COM 301H
Project:	LEA COUNTY, NM	TVD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrell Freedom)
Reference Site:	BULLDOG	MD Reference:	RKB = 3333.4' + 27' @ 3360.4usft (Scandrell Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	GUNNER 8 FED COM 301H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OWB	Database:	EDM_Users
Reference Design:	PWP1	Offset TVD Reference:	Offset Datum

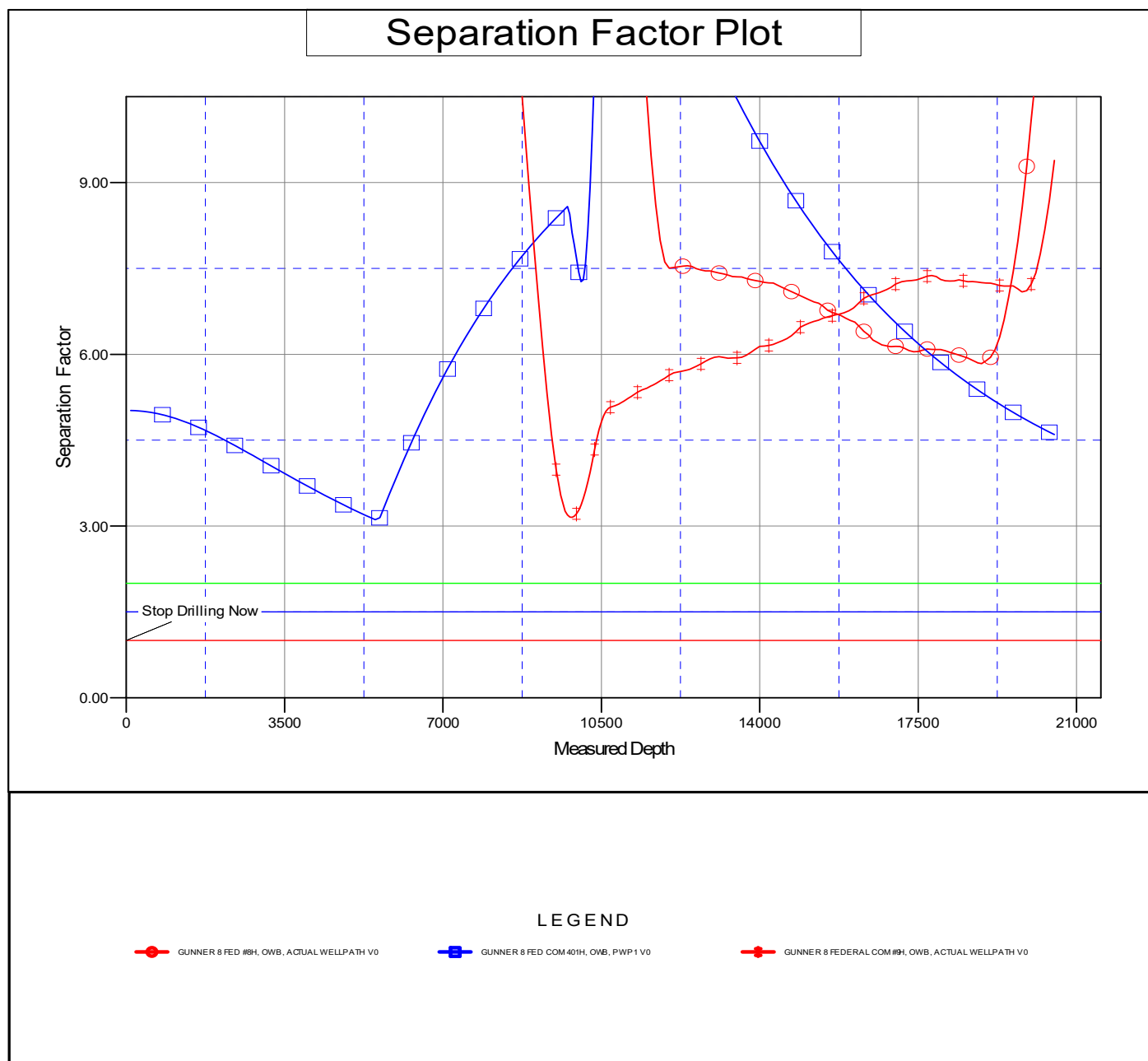
Reference Depths are relative to RKB = 3333.4' + 27' @ 3360.4usft (ScCoordinates are relative to: GUNNER 8 FED COM 301H

Offset Depths are relative to Offset Datum

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Central Meridian is 104° 20' 0.000 W

Grid Convergence at Surface is: 0.44°

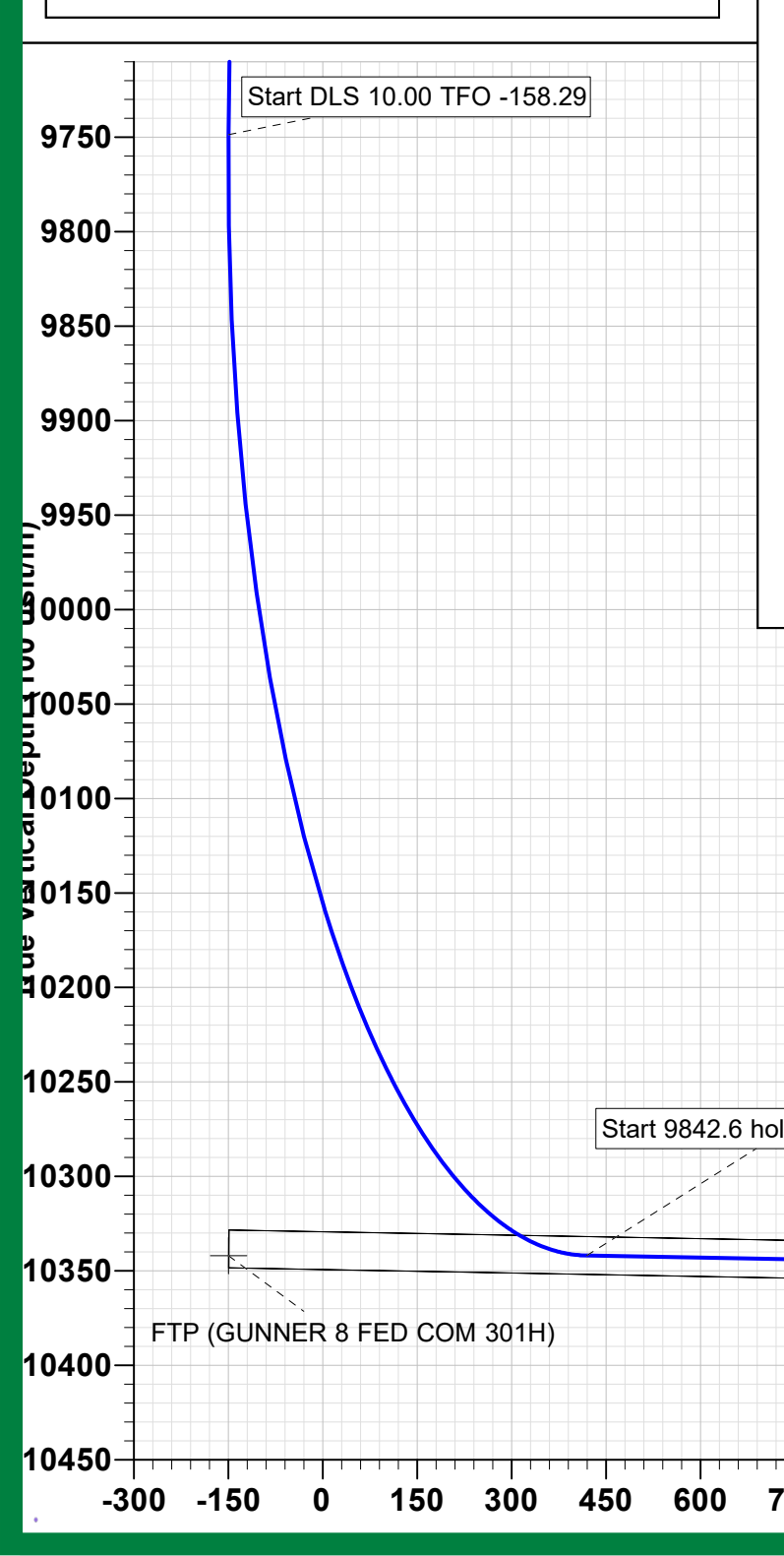


CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

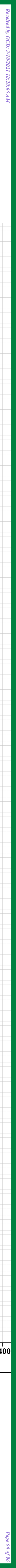
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COMPASS 5000.14 Build 85

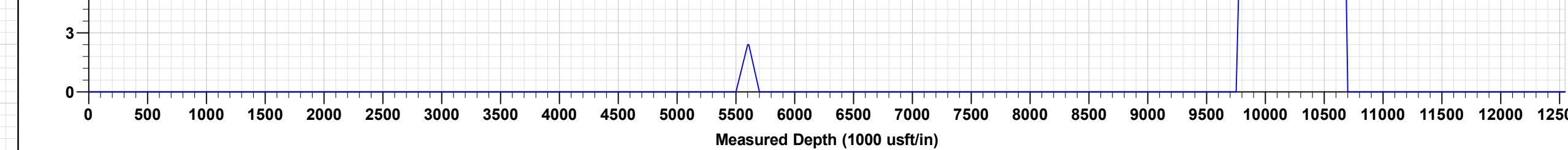
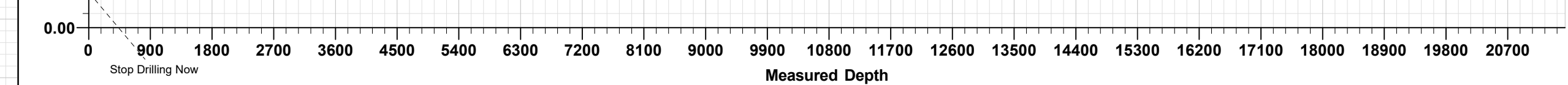


RKB = 3333.4' + 27' @ 3360.4usft (Scandrill Freedom)

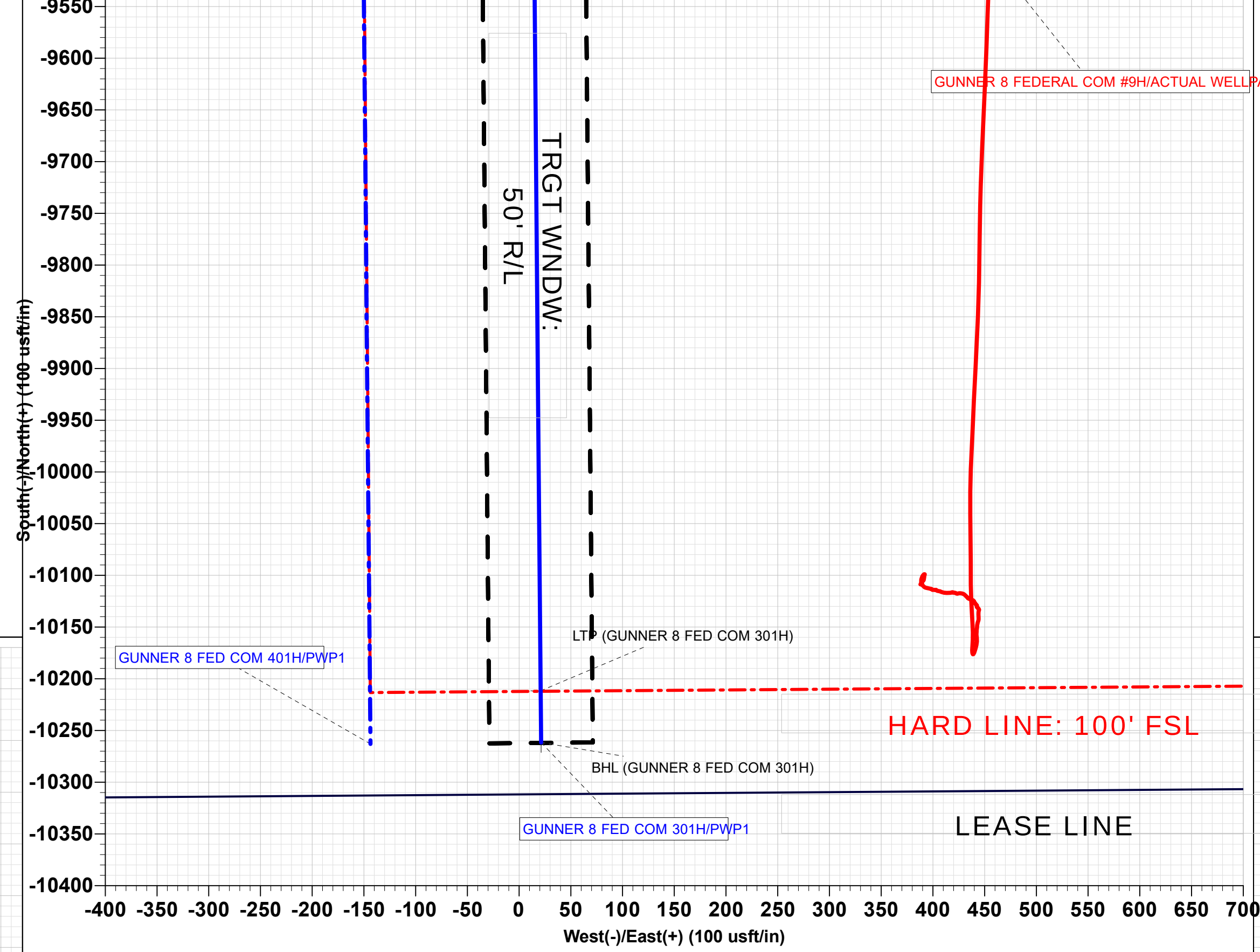
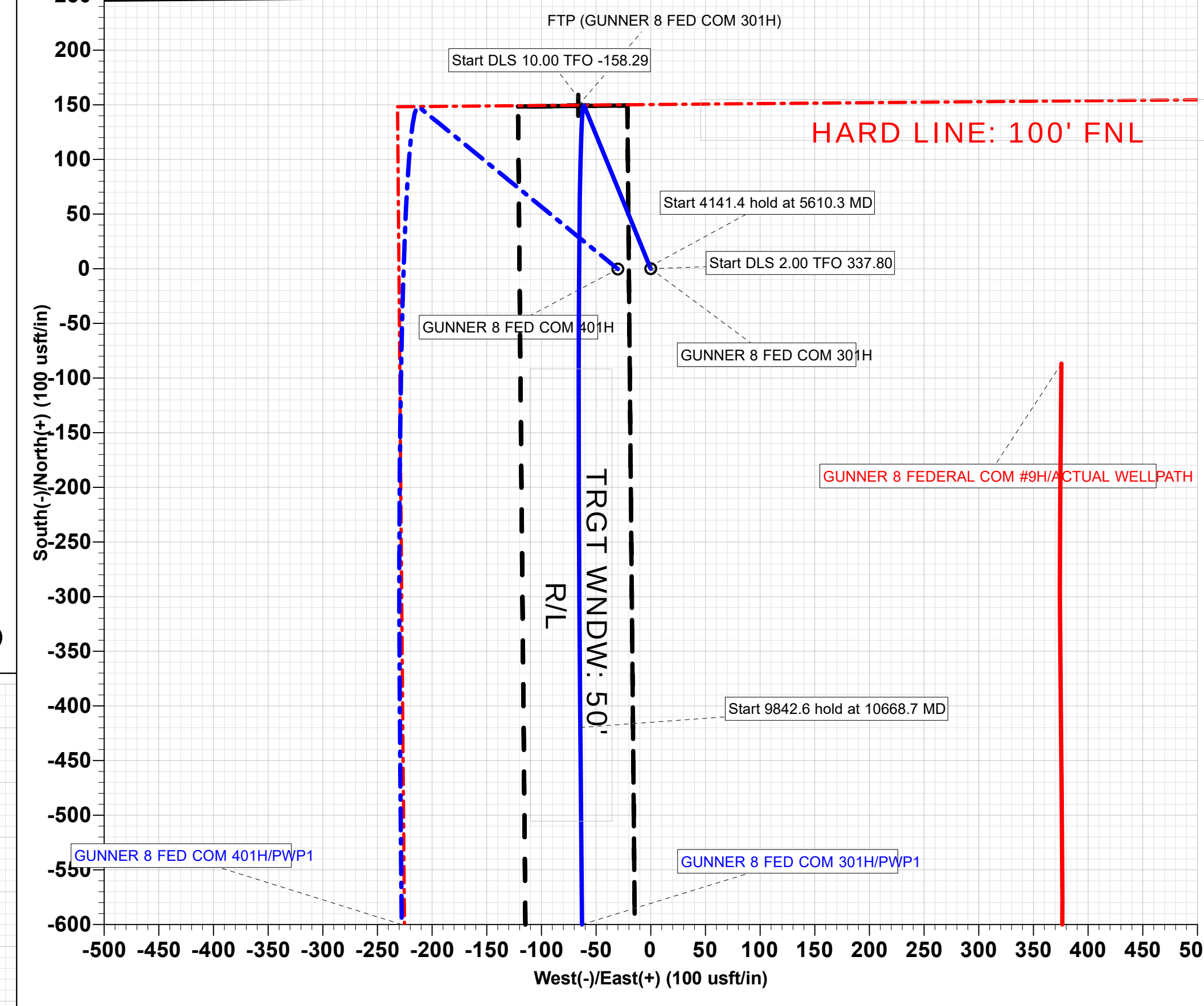
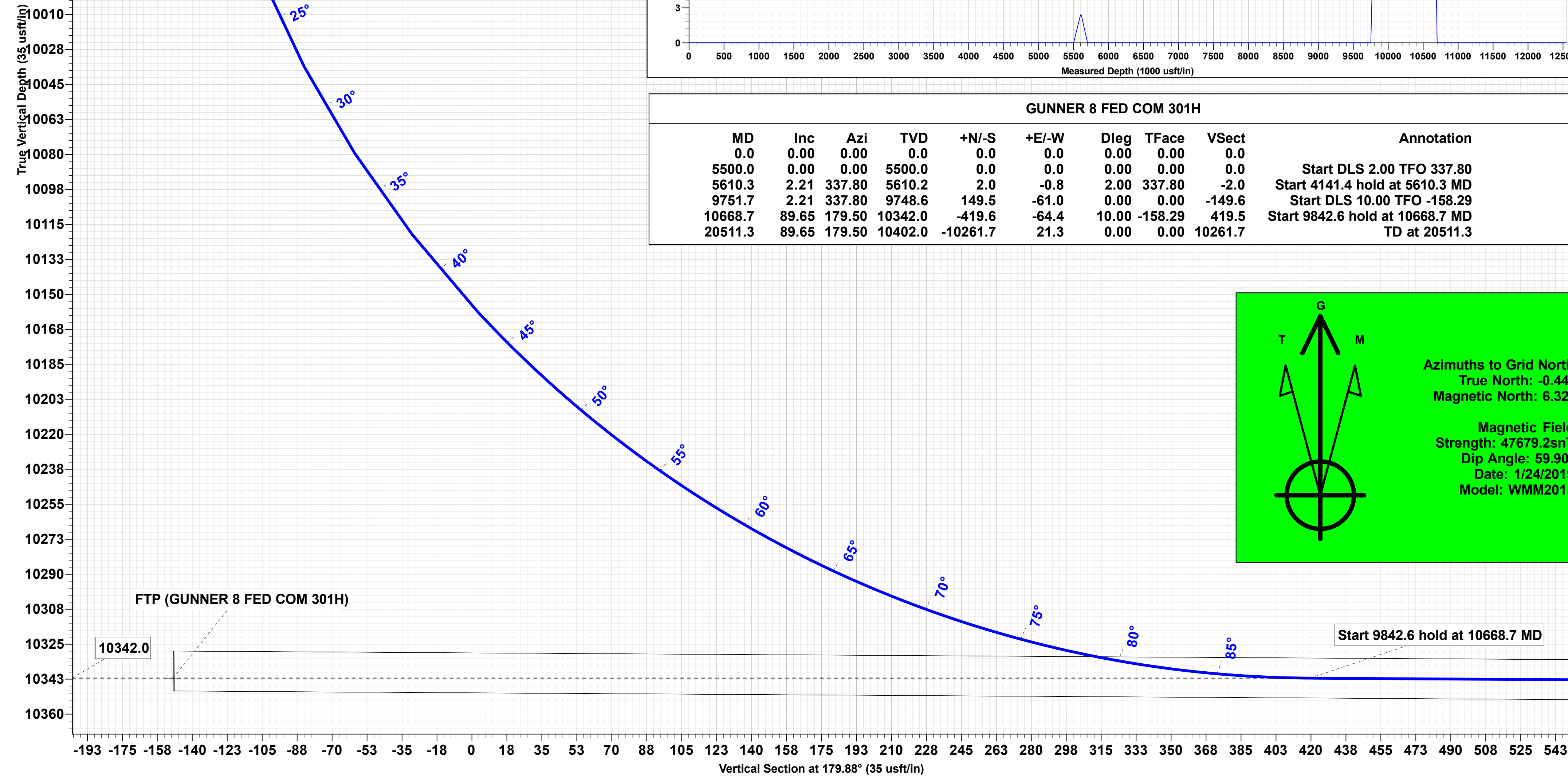


+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	393436.00	758670.60	32° 4' 44.108 N	103° 29' 53.501 W

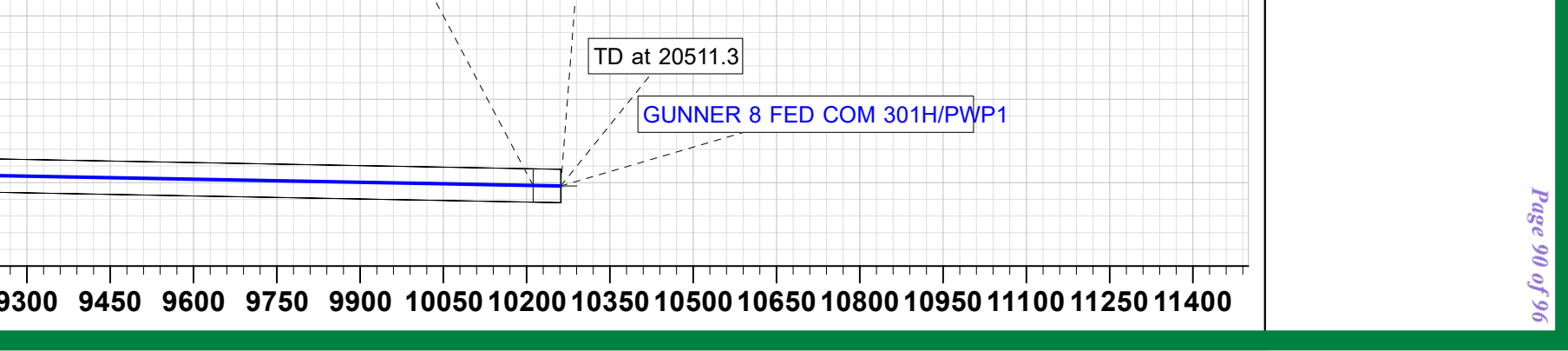
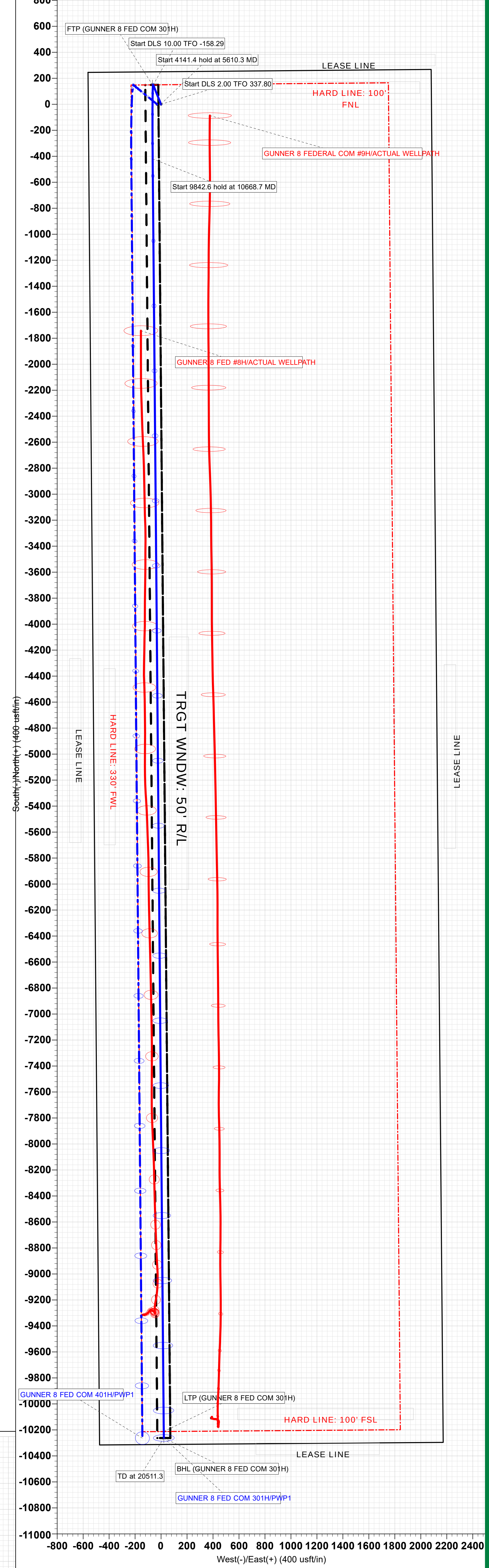
name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FTP (GUNNER 8 FED COM 301H)	10342.0	149.5	-66.3	393585.50	758604.30	32° 4' 45.592 N	103° 29' 54.258 W
LTP (GUNNER 8 FED COM 301H)	10401.7	-10211.7	20.9	383224.30	758691.50	32° 3' 3.055 N	103° 29' 54.176 W
BHL (GUNNER 8 FED COM 301H)	10402.0	-10261.7	21.3	383174.30	758691.90	32° 3' 2.561 N	103° 29' 54.176 W



MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
0.0	0.0	0.0	0.0			0.0	0.0	0.0	
5500.0	0.0	0.0	5500.0			0.0	0.0	0.0	Start DLS 2.00 TFD 337.80
5810.0	2.21	337.80	0.0	-2.0	-2.0	0.0	337.80	0.0	Start 4141.4 hold at 5510.0
7751.7	2.21	337.80	9748.6	149.5	-61.0	0.0	0.0	-149.6	Start DLS 10.00 TFD -158.29
10668.7	89.65	179.50	10342.0	-419.6	-64.4	0.0	-158.29	419.5	Start 9842.6 hold at 10668.7
20511.3	89.65	179.50	10402.0	-10261.7	21.3	0.0	0.0	10261.7	TD at 20511.3



TRGT WNDW: 10' A/B



COG OPERATING LLC
HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

1. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

- a. The hazards and characteristics of hydrogen sulfide (H₂S).
- b. The proper use and maintenance of personal protective equipment and life support systems.
- c. The proper use of H₂S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
- d. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

- a. The effects of H₂S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
- b. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
- c. The contents and requirements of the H₂S Drilling Operations Plan and the Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H₂S zone (within 3 days or 500 feet) and weekly H₂S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H₂S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

2. H₂S SAFETY EQUIPMENT AND SYSTEMS

Note: All H₂S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H₂S. If H₂S greater than 100 ppm is encountered in the gas stream we will shut in and install H₂S equipment.

- a. Well Control Equipment:
 - Flare line.
 - Choke manifold with remotely operated choke.
 - Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
 - Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head.

- b. Protective equipment for essential personnel:
Mark II Surviveair 30-minute units located in the dog house and at briefing areas.
- c. H2S detection and monitoring equipment:
2 - portable H2S monitor positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 ppm are reached.
- d. Visual warning systems:
Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.
- e. Mud Program:
The mud program has been designed to minimize the volume of H2S circulated to the surface.
- f. Metallurgy:
All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H2S service.
- g. Communication:
Company vehicles equipped with cellular telephone.

COG OPERATING LLC has conducted a review to determine if an H2S contingency plan is required for the above referenced well. We were able to conclude that any potential hazardous volume would be minimal. H2S concentrations of wells in this area from surface to TD are low enough; therefore, we do not believe that an H2S contingency plan is necessary.

W A R N I N G

**YOU ARE ENTERING AN H₂S AREA
AUTHORIZED PERSONNEL ONLY**

- 1. BEARDS OR CONTACT LENSES NOT ALLOWED***
- 2. HARD HATS REQUIRED***
- 3. SMOKING IN DESIGNATED AREAS ONLY***
- 4. BE WIND CONSCIOUS AT ALL TIMES***
- 5. CK WITH COG OPERATING LLC FOREMAN AT MAIN OFFICE***

COG OPERATING LLC

1-575-748-6940

EMERGENCY CALL LIST

	<u>OFFICE</u>	<u>MOBILE</u>
COG OPERATING LLC OFFICE	575-748-6940	
SETH WILD	432-683-7443	432-528-3633
WALTER ROYE	575-748-6940	432-934-1886

EMERGENCY RESPONSE NUMBERS

	<u>OFFICE</u>
STATE POLICE	575-748-9718
EDDY COUNTY SHERIFF	575-746-2701
EMERGENCY MEDICAL SERVICES (AMBULANCE)	911 or 575-746-2701
EDDY COUNTY EMERGENCY MANAGEMENT (HARRY BURGESS)	575-887-9511
STATE EMERGENCY RESPONSE CENTER (SERC)	575-476-9620
CARLSBAD POLICE DEPARTMENT	575-885-2111
CARLSBAD FIRE DEPARTMENT	575-885-3125
NEW MEXICO OIL CONSERVATION DIVISION	575-748-1283
INDIAN FIRE & SAFETY	800-530-8693
HALLIBURTON SERVICES	800-844-8451

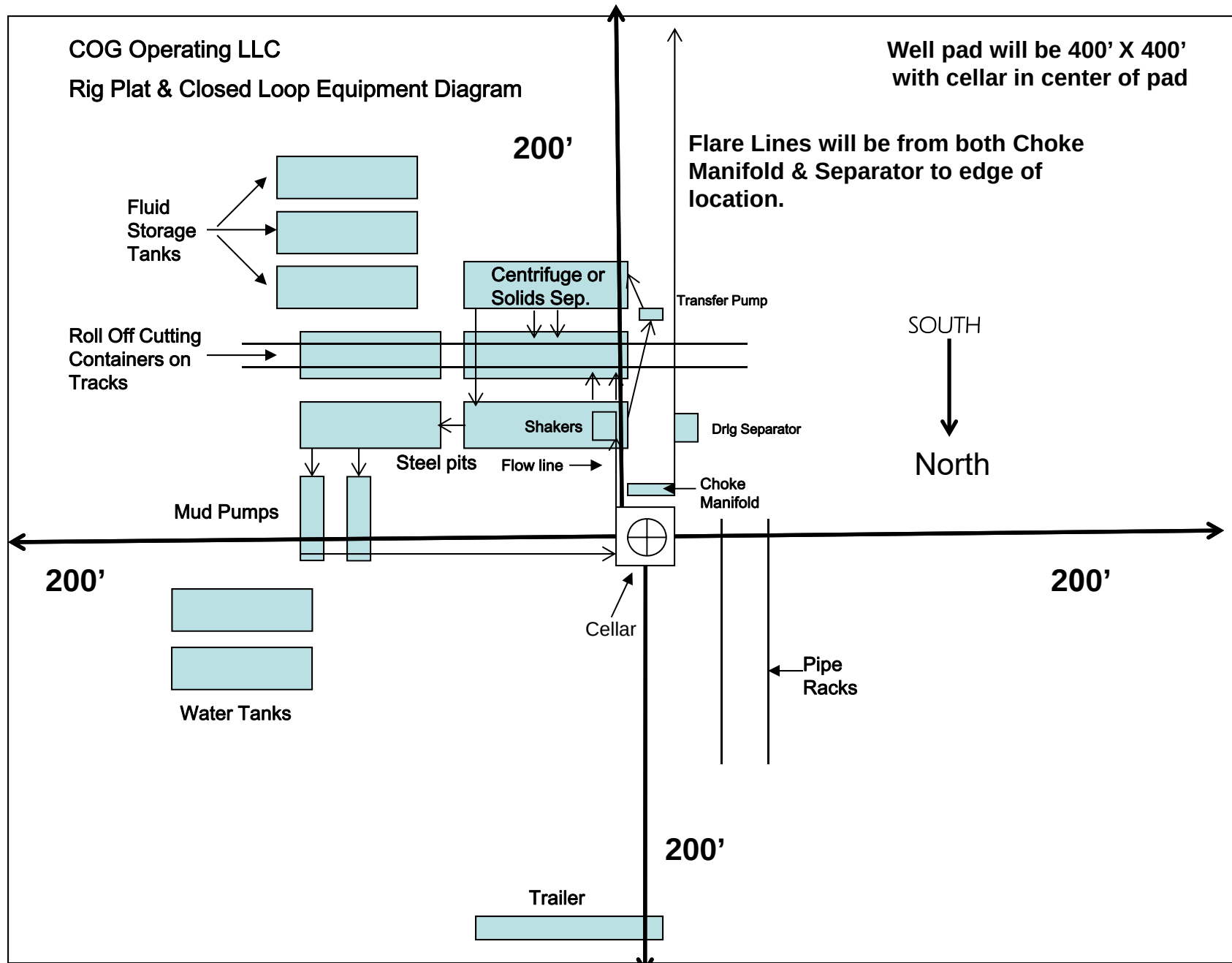


Exhibit 1

"I further certify that COG will comply with Rule 19.15.17 NMAC by using a Closed Loop System."

District I

1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720

District II

811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720

District III

1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170

District IV

1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 20393

CONDITIONS OF APPROVAL

Operator:	COG OPERATING LLC	600 W Illinois Ave	Midland, TX79701	OGRID:	229137	Action Number:	20393	Action Type:	FORM 3160-3
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OCD Reviewer	Condition
pkautz	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
pkautz	Will require a File As Drilled C-102 and a Directional Survey with the C-104