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

5. Lease Serial No.
NMNM123528

6. If Indian, Allotee or Tribe Name

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

7. If Unit or CA Agreement, Name and No.

8. Lease Name and Well No.
SEBASTIAN FEDERAL COM
704H [40400]

2. Name of Operator
COG OPERATING LLC [229137]

9. API Well No. 30-025-46988

3a. Address	3b. Phone No. *(include area code)*	10. Field and Pool, or Exploratory
600 West Illinois Ave Midland TX 79701	(432)683-7443	[98135] WC-025 G-09 S243310P; UPF

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface NWNE / 250 FNL / 2225 FEL / LAT 32.224138 / LONG -103.507685
At proposed prod. zone SWSE / 50 FSL / 2310 FEL / LAT 32.195948 / LONG -103.507932

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 18 / T24S / R34E / NMP

14. Distance in miles and direction from nearest town or post office*	12. County or Parish	13. State
19 miles	LEA	NM

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
100 feet	239.57	640

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
660 feet	12370 feet / 22256 feet	FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)	22. Approximate date work will start*	23. Estimated duration
3585 feet	01/01/2020	30 days

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)*	Date
(Electronic Submission)	Stan Wagner / Ph: (432)253-9685	06/27/2019

Title
Regulatory Advisor

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Christopher Walls / Ph: (575)234-2234	03/13/2020

Title	Office
Petroleum Engineer	CARLSBAD

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.

GCP REC 03/17/2020

SL

APPROVED WITH CONDITIONS

KZ
03/17/2020

Approval Date: 03/13/2020

(Continued on page 2)

*(Instructions on page 2)

PECOS DISTRICT
DRILLING OPERATIONS
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**COG Operating LLC**
LEASE NO.:	**NMNM123528**
WELL NAME & NO.:	**Sebastian Federal Com 704H**
SURFACE HOLE FOOTAGE:	**250' FNL & 2225' FEL**
BOTTOM HOLE FOOTAGE	**50' FSL & 2310' FEL**
LOCATION:	**Section 18, T 24S, 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 **1315'** (deepest usable fresh water anticipated at 1290') 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.
   b. Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.
      i. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with the second stage.
      ii. Second stage via DV tool: Cement to surface. If cement does not circulate, contact the appropriate BLM office.
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.
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the intermediate casing shoe shall be **10,000 (10M)** psi. **Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi).**
3. Required safety valves, with appropriate wrenches and subs for the drill string being utilized, will be in the open position and accessible on the rig floor.

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 03/13/2020

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 intergrity 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 intergrity 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.

COG Operating, LLC - Sebastian Federal Com 704H

1. Geologic Formations

TVD of target	12,370' EOL	Pilot hole depth	NA
MD at TD:	22,257'	Deepest expected fresh water:	650'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	1256	Water	
Top of Salt	1825	Salt	
Base of Salt	4900	Salt	
Lamar	5123	Salt Water	
Bell Canyon	5177	Salt Water	
Cherry Canyon	6139	Oil/Gas	
Brushy Canyon	7504	Oil/Gas	
Bone Spring Lime	8910	Oil/Gas	
1st Bone Spring Sand	9963	Oil/Gas	
2nd Bone Spring Sand	10602	Oil/Gas	
3rd Bone Spring Sand	11488	Oil/Gas	
Wolfcamp	11887	Oil/Gas	
Wolfcamp A Shale	11952	Target Oil/Gas	
Wolfcamp B	12234	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	1285	13.375”	54.5	J55	STC	1.97	5.48	7.34
12.25”	0	11400	9.625”	47	HCL80	BTC	1.55	1.10	2.09
8.5	0	22,257	5.5”	23	P110	BTC	1.81	2.13	2.54
				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 Operating, LLC - Sebastian Federal Com 704H

	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 3rd 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 2nd 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?	

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	580	13.5	1.75	9	12	Lead: Class C + 4% Gel
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter. Stage1	940	11	2.8	19	48	Lead: NeoCem
	300	16.4	1.1	5	8	Tail: Class H
DV Tool @ 5125'						
Inter. Stage2	700	11	2.8	19	48	Lead: NeoCem
	115	14.8	1.35	6.34	8	Tail: Class C + 2% Cacl
5.5 Prod	400	12.7	2	10.6	16	Lead: 35:65:6 H Blend
	2990	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%
1st Intermediate	0’	50%
Production	10,900'	35%

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"	5M	Annular	x	2500 psi
			Blind Ram		5M
			Pipe Ram	x	
			Double Ram	x	
			Other*		
8-3/4"	13-5/8"	10M	5M Annular	x	5000 psi
			Blind Ram		10M
			Pipe Ram	x	
			Double Ram	x	
			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.

Y	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.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.4 - 8.6	28-29	N/C
Surf csg	Int shoe	Diesel Brine Emul	8.6 - 9.4	30-40	N/C
Int shoe	Lateral TD	OBM	10.5 - 12.5	30-40	20

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.
N	Are 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	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	8045 psi at 12370' TVD
Abnormal Temperature	NO 180 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	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan
x	5M Annular Variance

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 (H_2S).
b. The proper use and maintenance of personal protective equipment and life support systems.
c. The proper use of H_2S 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 H_2S 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. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S 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 H_2S 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

	OFFICE	MOBILE
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

	OFFICE
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

CONCHO

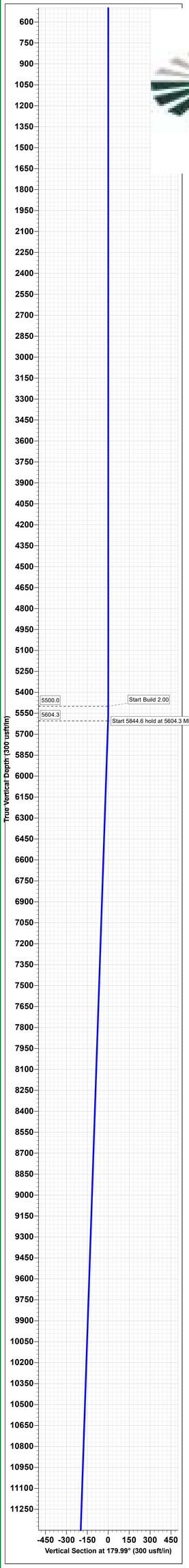
Project:	LEA COUNTY, NM
Site:	BULLDOG
Well:	SEBASTIAN FEDERAL COM 704H
Wellbore:	OWB
Design:	PWP0
GL:	3586.0
KB=24' @ 3610.0usft (ENSIGN 155)	

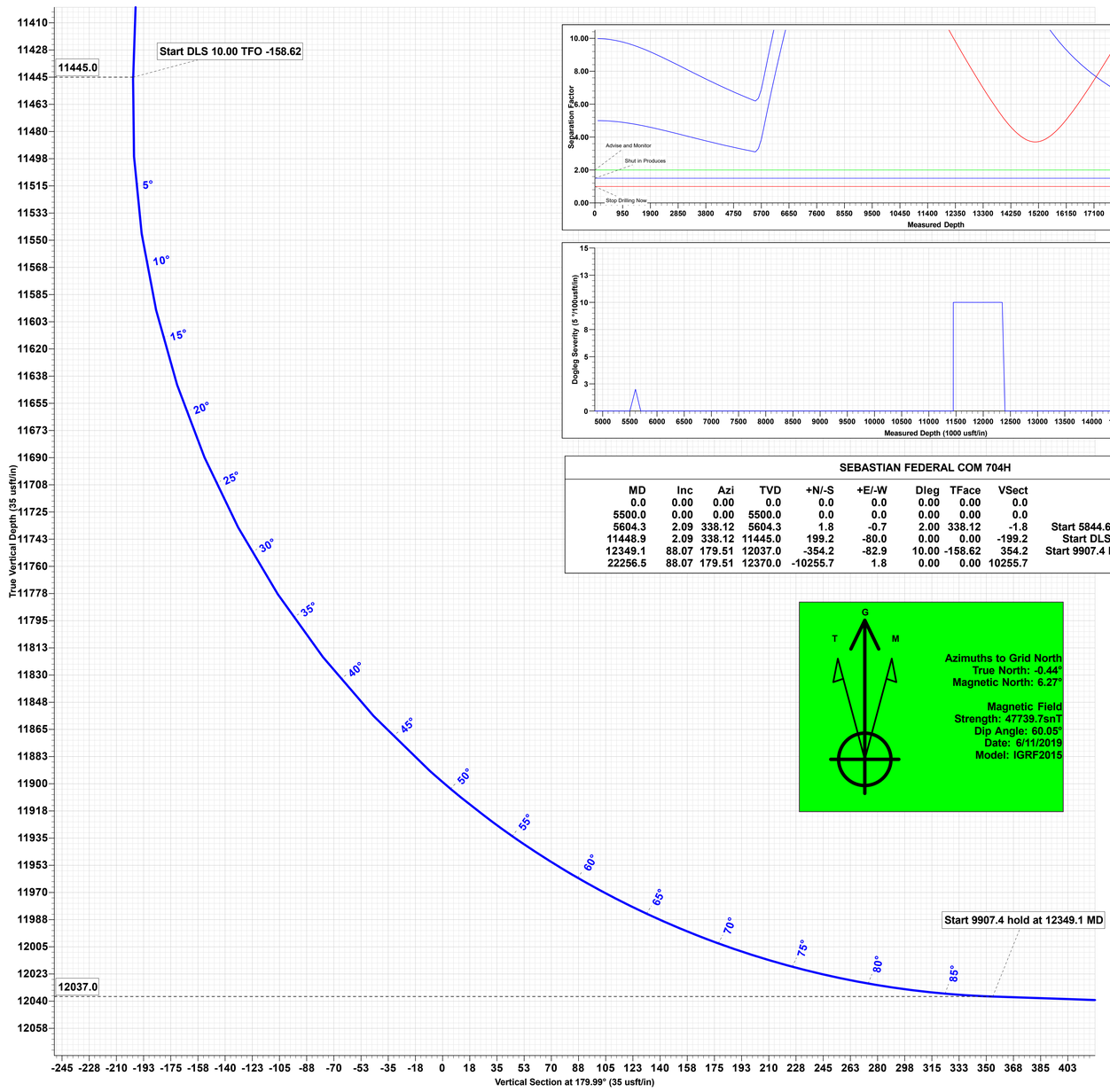
WELL DETAILS: SEBASTIAN FEDERAL COM 704H

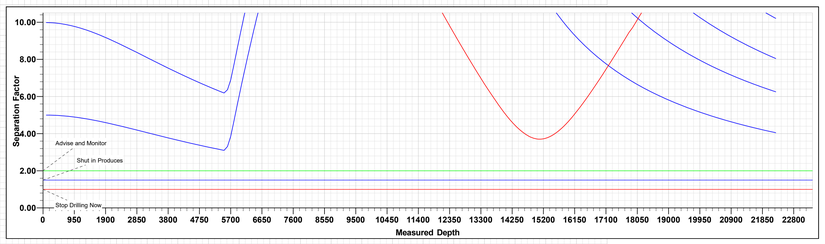
+N/-S	+E/-W	Northing	Easting	Latittude	Longitude
0.0	0.0	446197.40	755473.60	32° 13' 26.450 N	103° 30' 25.950 W

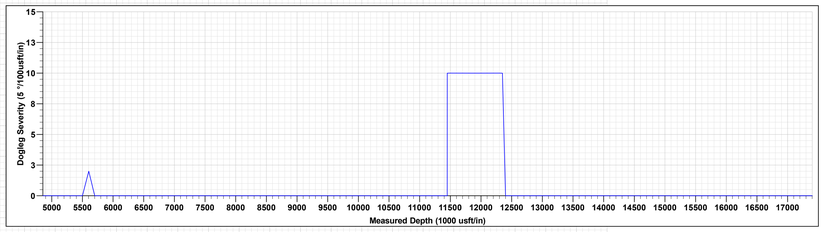
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FTP (SEBASTIAN FEDERAL COM 704H)	12037.0	149.2	-86.7	446346.60	755386.90	32° 13' 27.933 N	103° 30' 26.946 W
LTP (SEBASTIAN FEDERAL COM 704H)	12368.3	-10205.7	1.3	435991.70	755474.90	32° 11' 45.461 N	103° 30' 26.848 W
BHL (SEBASTIAN FEDERAL COM 704H)	12370.0	-10255.7	1.8	435941.70	755475.40	32° 11' 44.966 N	103° 30' 26.847 W



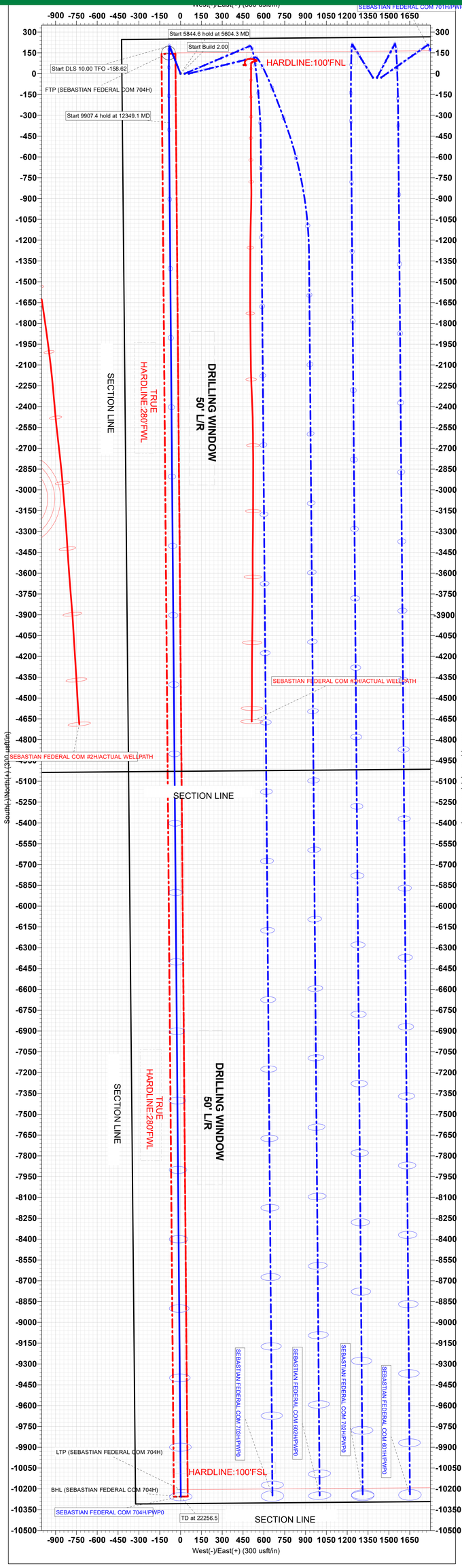


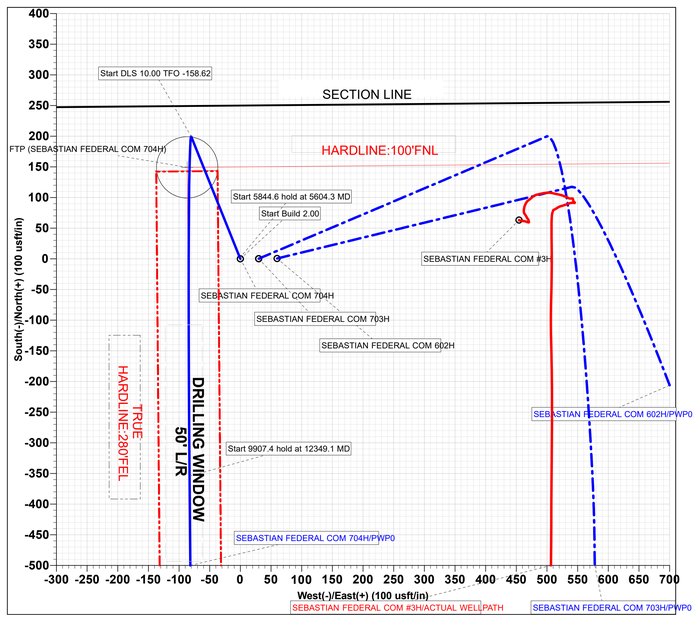


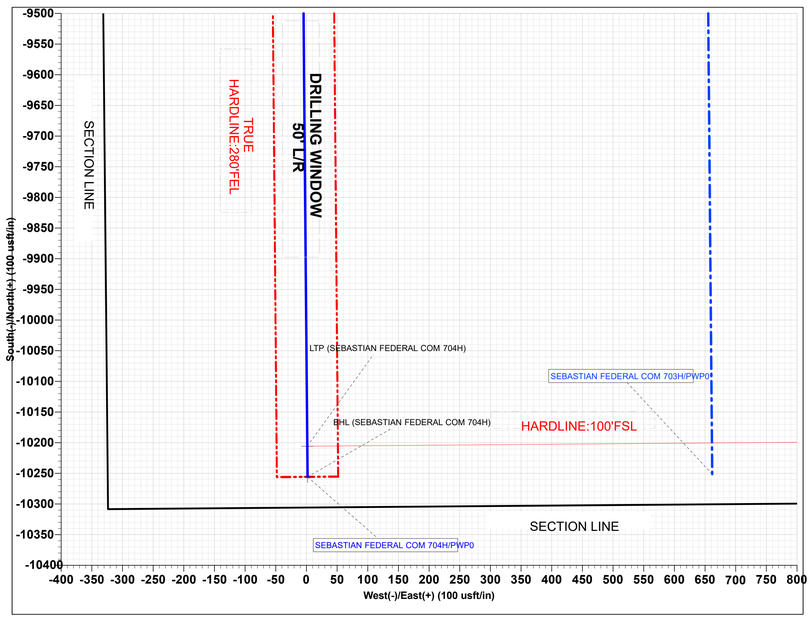


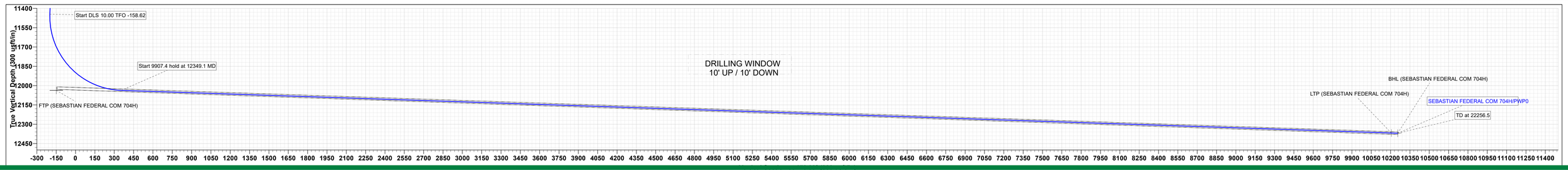
SEBASTIAN FEDERAL COM 704H

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 Build 2.00
5604.3	2.09	338.12	5604.3	1.8	-0.7	2.00	338.12	-1.8	Start 5844.6 hold at 5604.3 MD
11448.9	2.09	338.12	11445.0	199.2	-80.0	0.00	0.00	-199.2	Start DLS 10.00 TFO -158.62
12349.1	88.07	179.51	12037.0	-354.2	-82.9	10.00	-158.62	354.2	Start 9907.4 hold at 12349.1 MD
22256.5	88.07	179.51	12370.0	-10255.7	1.8	0.00	0.00	10255.7	TD at 22256.5









NORTHERN DELAWARE BASIN

LEA COUNTY, NM
BULLDOG
SEBASTIAN FEDERAL COM 704H

OWB

Plan: PWP0

Standard Survey Report

11 June, 2019

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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 SEBASTIAN FEDERAL COM 704H

Well Position	**+N/-S**	0.0 usft	**Northing:**	446,197.40 usft	**Latitude:**	32° 13' 26.450 N
	+E/-W	0.0 usft	**Easting:**	755,473.60 usft	**Longitude:**	103° 30' 25.950 W
Position Uncertainty		3.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,586.0 usft

Wellbore OWB

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/11/2019	6.71	60.05	47,739.67194190

Design PWP0

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	179.99

Survey Tool Program **Date** 6/11/2019

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	11,488.9	PWP0 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
11,488.9	22,256.5	PWP0 (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
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

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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)
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
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

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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)
5,300.0	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 Build 2.00									
5,600.0	2.00	338.12	5,600.0	1.6	-0.7	-1.6	2.00	2.00	0.00
5,604.3	2.09	338.12	5,604.3	1.8	-0.7	-1.8	2.00	2.00	0.00
Start 5844.6 hold at 5604.3 MD									
5,700.0	2.09	338.12	5,699.9	5.0	-2.0	-5.0	0.00	0.00	0.00
5,800.0	2.09	338.12	5,799.8	8.4	-3.4	-8.4	0.00	0.00	0.00
5,900.0	2.09	338.12	5,899.8	11.8	-4.7	-11.8	0.00	0.00	0.00
6,000.0	2.09	338.12	5,999.7	15.1	-6.1	-15.1	0.00	0.00	0.00
6,100.0	2.09	338.12	6,099.6	18.5	-7.4	-18.5	0.00	0.00	0.00
6,200.0	2.09	338.12	6,199.6	21.9	-8.8	-21.9	0.00	0.00	0.00
6,300.0	2.09	338.12	6,299.5	25.3	-10.1	-25.3	0.00	0.00	0.00
6,400.0	2.09	338.12	6,399.4	28.6	-11.5	-28.6	0.00	0.00	0.00
6,500.0	2.09	338.12	6,499.4	32.0	-12.9	-32.0	0.00	0.00	0.00
6,600.0	2.09	338.12	6,599.3	35.4	-14.2	-35.4	0.00	0.00	0.00
6,700.0	2.09	338.12	6,699.3	38.8	-15.6	-38.8	0.00	0.00	0.00
6,800.0	2.09	338.12	6,799.2	42.2	-16.9	-42.2	0.00	0.00	0.00
6,900.0	2.09	338.12	6,899.1	45.5	-18.3	-45.5	0.00	0.00	0.00
7,000.0	2.09	338.12	6,999.1	48.9	-19.6	-48.9	0.00	0.00	0.00
7,100.0	2.09	338.12	7,099.0	52.3	-21.0	-52.3	0.00	0.00	0.00
7,200.0	2.09	338.12	7,198.9	55.7	-22.4	-55.7	0.00	0.00	0.00
7,300.0	2.09	338.12	7,298.9	59.0	-23.7	-59.0	0.00	0.00	0.00
7,400.0	2.09	338.12	7,398.8	62.4	-25.1	-62.4	0.00	0.00	0.00
7,500.0	2.09	338.12	7,498.7	65.8	-26.4	-65.8	0.00	0.00	0.00
7,600.0	2.09	338.12	7,598.7	69.2	-27.8	-69.2	0.00	0.00	0.00
7,700.0	2.09	338.12	7,698.6	72.6	-29.1	-72.6	0.00	0.00	0.00
7,800.0	2.09	338.12	7,798.5	75.9	-30.5	-75.9	0.00	0.00	0.00
7,900.0	2.09	338.12	7,898.5	79.3	-31.9	-79.3	0.00	0.00	0.00
8,000.0	2.09	338.12	7,998.4	82.7	-33.2	-82.7	0.00	0.00	0.00
8,100.0	2.09	338.12	8,098.3	86.1	-34.6	-86.1	0.00	0.00	0.00
8,200.0	2.09	338.12	8,198.3	89.4	-35.9	-89.5	0.00	0.00	0.00
8,300.0	2.09	338.12	8,298.2	92.8	-37.3	-92.8	0.00	0.00	0.00
8,400.0	2.09	338.12	8,398.1	96.2	-38.6	-96.2	0.00	0.00	0.00
8,500.0	2.09	338.12	8,498.1	99.6	-40.0	-99.6	0.00	0.00	0.00
8,600.0	2.09	338.12	8,598.0	103.0	-41.3	-103.0	0.00	0.00	0.00
8,700.0	2.09	338.12	8,697.9	106.3	-42.7	-106.3	0.00	0.00	0.00
8,800.0	2.09	338.12	8,797.9	109.7	-44.1	-109.7	0.00	0.00	0.00
8,900.0	2.09	338.12	8,897.8	113.1	-45.4	-113.1	0.00	0.00	0.00
9,000.0	2.09	338.12	8,997.7	116.5	-46.8	-116.5	0.00	0.00	0.00
9,100.0	2.09	338.12	9,097.7	119.9	-48.1	-119.9	0.00	0.00	0.00
9,200.0	2.09	338.12	9,197.6	123.2	-49.5	-123.2	0.00	0.00	0.00
9,300.0	2.09	338.12	9,297.5	126.6	-50.8	-126.6	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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)
9,400.0	2.09	338.12	9,397.5	130.0	-52.2	-130.0	0.00	0.00	0.00
9,500.0	2.09	338.12	9,497.4	133.4	-53.6	-133.4	0.00	0.00	0.00
9,600.0	2.09	338.12	9,597.3	136.7	-54.9	-136.8	0.00	0.00	0.00
9,700.0	2.09	338.12	9,697.3	140.1	-56.3	-140.1	0.00	0.00	0.00
9,800.0	2.09	338.12	9,797.2	143.5	-57.6	-143.5	0.00	0.00	0.00
9,900.0	2.09	338.12	9,897.1	146.9	-59.0	-146.9	0.00	0.00	0.00
10,000.0	2.09	338.12	9,997.1	150.3	-60.3	-150.3	0.00	0.00	0.00
10,100.0	2.09	338.12	10,097.0	153.6	-61.7	-153.6	0.00	0.00	0.00
10,200.0	2.09	338.12	10,196.9	157.0	-63.1	-157.0	0.00	0.00	0.00
10,300.0	2.09	338.12	10,296.9	160.4	-64.4	-160.4	0.00	0.00	0.00
10,400.0	2.09	338.12	10,396.8	163.8	-65.8	-163.8	0.00	0.00	0.00
10,500.0	2.09	338.12	10,496.7	167.1	-67.1	-167.2	0.00	0.00	0.00
10,600.0	2.09	338.12	10,596.7	170.5	-68.5	-170.5	0.00	0.00	0.00
10,700.0	2.09	338.12	10,696.6	173.9	-69.8	-173.9	0.00	0.00	0.00
10,800.0	2.09	338.12	10,796.5	177.3	-71.2	-177.3	0.00	0.00	0.00
10,900.0	2.09	338.12	10,896.5	180.7	-72.6	-180.7	0.00	0.00	0.00
11,000.0	2.09	338.12	10,996.4	184.0	-73.9	-184.0	0.00	0.00	0.00
11,100.0	2.09	338.12	11,096.3	187.4	-75.3	-187.4	0.00	0.00	0.00
11,200.0	2.09	338.12	11,196.3	190.8	-76.6	-190.8	0.00	0.00	0.00
11,300.0	2.09	338.12	11,296.2	194.2	-78.0	-194.2	0.00	0.00	0.00
11,400.0	2.09	338.12	11,396.1	197.5	-79.3	-197.6	0.00	0.00	0.00
11,448.9	2.09	338.12	11,445.0	199.2	-80.0	-199.2	0.00	0.00	0.00
Start DLS 10.00 TFO -158.62									
11,500.0	3.26	192.97	11,496.1	198.6	-80.7	-198.7	10.00	2.29	-284.04
11,600.0	13.19	182.73	11,594.9	184.4	-81.9	-184.5	10.00	9.93	-10.24
11,700.0	23.18	181.26	11,689.8	153.3	-82.8	-153.3	10.00	9.99	-1.47
11,800.0	33.18	180.65	11,777.9	106.1	-83.6	-106.2	10.00	10.00	-0.61
11,900.0	43.17	180.29	11,856.4	44.4	-84.1	-44.4	10.00	10.00	-0.35
12,000.0	53.17	180.05	11,923.0	-30.0	-84.3	30.0	10.00	10.00	-0.24
12,100.0	63.17	179.87	11,975.6	-114.9	-84.2	114.8	10.00	10.00	-0.18
12,200.0	73.17	179.71	12,012.8	-207.6	-83.9	207.6	10.00	10.00	-0.15
12,300.0	83.17	179.58	12,033.3	-305.3	-83.3	305.3	10.00	10.00	-0.14
12,349.1	88.07	179.51	12,037.0	-354.2	-82.9	354.2	10.00	10.00	-0.13
Start 9907.4 hold at 12349.1 MD									
12,400.0	88.07	179.51	12,038.7	-405.1	-82.4	405.1	0.00	0.00	0.00
12,500.0	88.07	179.51	12,042.1	-505.1	-81.6	505.1	0.00	0.00	0.00
12,600.0	88.07	179.51	12,045.4	-605.0	-80.7	605.0	0.00	0.00	0.00
12,700.0	88.07	179.51	12,048.8	-704.9	-79.9	704.9	0.00	0.00	0.00
12,800.0	88.07	179.51	12,052.2	-804.9	-79.0	804.9	0.00	0.00	0.00
12,900.0	88.07	179.51	12,055.5	-904.8	-78.2	904.8	0.00	0.00	0.00
13,000.0	88.07	179.51	12,058.9	-1,004.8	-77.3	1,004.7	0.00	0.00	0.00
13,100.0	88.07	179.51	12,062.2	-1,104.7	-76.5	1,104.7	0.00	0.00	0.00
13,200.0	88.07	179.51	12,065.6	-1,204.6	-75.6	1,204.6	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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)
13,300.0	88.07	179.51	12,069.0	-1,304.6	-74.7	1,304.6	0.00	0.00	0.00
13,400.0	88.07	179.51	12,072.3	-1,404.5	-73.9	1,404.5	0.00	0.00	0.00
13,500.0	88.07	179.51	12,075.7	-1,504.5	-73.0	1,504.4	0.00	0.00	0.00
13,600.0	88.07	179.51	12,079.1	-1,604.4	-72.2	1,604.4	0.00	0.00	0.00
13,700.0	88.07	179.51	12,082.4	-1,704.3	-71.3	1,704.3	0.00	0.00	0.00
13,800.0	88.07	179.51	12,085.8	-1,804.3	-70.5	1,804.3	0.00	0.00	0.00
13,900.0	88.07	179.51	12,089.1	-1,904.2	-69.6	1,904.2	0.00	0.00	0.00
14,000.0	88.07	179.51	12,092.5	-2,004.2	-68.8	2,004.1	0.00	0.00	0.00
14,100.0	88.07	179.51	12,095.9	-2,104.1	-67.9	2,104.1	0.00	0.00	0.00
14,200.0	88.07	179.51	12,099.2	-2,204.0	-67.1	2,204.0	0.00	0.00	0.00
14,300.0	88.07	179.51	12,102.6	-2,304.0	-66.2	2,304.0	0.00	0.00	0.00
14,400.0	88.07	179.51	12,105.9	-2,403.9	-65.3	2,403.9	0.00	0.00	0.00
14,500.0	88.07	179.51	12,109.3	-2,503.9	-64.5	2,503.8	0.00	0.00	0.00
14,600.0	88.07	179.51	12,112.7	-2,603.8	-63.6	2,603.8	0.00	0.00	0.00
14,700.0	88.07	179.51	12,116.0	-2,703.7	-62.8	2,703.7	0.00	0.00	0.00
14,800.0	88.07	179.51	12,119.4	-2,803.7	-61.9	2,803.7	0.00	0.00	0.00
14,900.0	88.07	179.51	12,122.7	-2,903.6	-61.1	2,903.6	0.00	0.00	0.00
15,000.0	88.07	179.51	12,126.1	-3,003.6	-60.2	3,003.5	0.00	0.00	0.00
15,100.0	88.07	179.51	12,129.5	-3,103.5	-59.4	3,103.5	0.00	0.00	0.00
15,200.0	88.07	179.51	12,132.8	-3,203.4	-58.5	3,203.4	0.00	0.00	0.00
15,300.0	88.07	179.51	12,136.2	-3,303.4	-57.7	3,303.4	0.00	0.00	0.00
15,400.0	88.07	179.51	12,139.5	-3,403.3	-56.8	3,403.3	0.00	0.00	0.00
15,500.0	88.07	179.51	12,142.9	-3,503.3	-55.9	3,503.2	0.00	0.00	0.00
15,600.0	88.07	179.51	12,146.3	-3,603.2	-55.1	3,603.2	0.00	0.00	0.00
15,700.0	88.07	179.51	12,149.6	-3,703.1	-54.2	3,703.1	0.00	0.00	0.00
15,800.0	88.07	179.51	12,153.0	-3,803.1	-53.4	3,803.1	0.00	0.00	0.00
15,900.0	88.07	179.51	12,156.4	-3,903.0	-52.5	3,903.0	0.00	0.00	0.00
16,000.0	88.07	179.51	12,159.7	-4,003.0	-51.7	4,002.9	0.00	0.00	0.00
16,100.0	88.07	179.51	12,163.1	-4,102.9	-50.8	4,102.9	0.00	0.00	0.00
16,200.0	88.07	179.51	12,166.4	-4,202.8	-50.0	4,202.8	0.00	0.00	0.00
16,300.0	88.07	179.51	12,169.8	-4,302.8	-49.1	4,302.8	0.00	0.00	0.00
16,400.0	88.07	179.51	12,173.2	-4,402.7	-48.3	4,402.7	0.00	0.00	0.00
16,500.0	88.07	179.51	12,176.5	-4,502.7	-47.4	4,502.6	0.00	0.00	0.00
16,600.0	88.07	179.51	12,179.9	-4,602.6	-46.5	4,602.6	0.00	0.00	0.00
16,700.0	88.07	179.51	12,183.2	-4,702.5	-45.7	4,702.5	0.00	0.00	0.00
16,800.0	88.07	179.51	12,186.6	-4,802.5	-44.8	4,802.5	0.00	0.00	0.00
16,900.0	88.07	179.51	12,190.0	-4,902.4	-44.0	4,902.4	0.00	0.00	0.00
17,000.0	88.07	179.51	12,193.3	-5,002.4	-43.1	5,002.3	0.00	0.00	0.00
17,100.0	88.07	179.51	12,196.7	-5,102.3	-42.3	5,102.3	0.00	0.00	0.00
17,200.0	88.07	179.51	12,200.0	-5,202.2	-41.4	5,202.2	0.00	0.00	0.00
17,300.0	88.07	179.51	12,203.4	-5,302.2	-40.6	5,302.2	0.00	0.00	0.00
17,400.0	88.07	179.51	12,206.8	-5,402.1	-39.7	5,402.1	0.00	0.00	0.00
17,500.0	88.07	179.51	12,210.1	-5,502.1	-38.9	5,502.0	0.00	0.00	0.00
17,600.0	88.07	179.51	12,213.5	-5,602.0	-38.0	5,602.0	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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)
17,700.0	88.07	179.51	12,216.9	-5,701.9	-37.1	5,701.9	0.00	0.00	0.00
17,800.0	88.07	179.51	12,220.2	-5,801.9	-36.3	5,801.9	0.00	0.00	0.00
17,900.0	88.07	179.51	12,223.6	-5,901.8	-35.4	5,901.8	0.00	0.00	0.00
18,000.0	88.07	179.51	12,226.9	-6,001.8	-34.6	6,001.7	0.00	0.00	0.00
18,100.0	88.07	179.51	12,230.3	-6,101.7	-33.7	6,101.7	0.00	0.00	0.00
18,200.0	88.07	179.51	12,233.7	-6,201.6	-32.9	6,201.6	0.00	0.00	0.00
18,300.0	88.07	179.51	12,237.0	-6,301.6	-32.0	6,301.6	0.00	0.00	0.00
18,400.0	88.07	179.51	12,240.4	-6,401.5	-31.2	6,401.5	0.00	0.00	0.00
18,500.0	88.07	179.51	12,243.7	-6,501.5	-30.3	6,501.4	0.00	0.00	0.00
18,600.0	88.07	179.51	12,247.1	-6,601.4	-29.5	6,601.4	0.00	0.00	0.00
18,700.0	88.07	179.51	12,250.5	-6,701.3	-28.6	6,701.3	0.00	0.00	0.00
18,800.0	88.07	179.51	12,253.8	-6,801.3	-27.7	6,801.3	0.00	0.00	0.00
18,900.0	88.07	179.51	12,257.2	-6,901.2	-26.9	6,901.2	0.00	0.00	0.00
19,000.0	88.07	179.51	12,260.5	-7,001.2	-26.0	7,001.1	0.00	0.00	0.00
19,100.0	88.07	179.51	12,263.9	-7,101.1	-25.2	7,101.1	0.00	0.00	0.00
19,200.0	88.07	179.51	12,267.3	-7,201.0	-24.3	7,201.0	0.00	0.00	0.00
19,300.0	88.07	179.51	12,270.6	-7,301.0	-23.5	7,301.0	0.00	0.00	0.00
19,400.0	88.07	179.51	12,274.0	-7,400.9	-22.6	7,400.9	0.00	0.00	0.00
19,500.0	88.07	179.51	12,277.4	-7,500.9	-21.8	7,500.8	0.00	0.00	0.00
19,600.0	88.07	179.51	12,280.7	-7,600.8	-20.9	7,600.8	0.00	0.00	0.00
19,700.0	88.07	179.51	12,284.1	-7,700.7	-20.0	7,700.7	0.00	0.00	0.00
19,800.0	88.07	179.51	12,287.4	-7,800.7	-19.2	7,800.7	0.00	0.00	0.00
19,900.0	88.07	179.51	12,290.8	-7,900.6	-18.3	7,900.6	0.00	0.00	0.00
20,000.0	88.07	179.51	12,294.2	-8,000.6	-17.5	8,000.5	0.00	0.00	0.00
20,100.0	88.07	179.51	12,297.5	-8,100.5	-16.6	8,100.5	0.00	0.00	0.00
20,200.0	88.07	179.51	12,300.9	-8,200.4	-15.8	8,200.4	0.00	0.00	0.00
20,300.0	88.07	179.51	12,304.2	-8,300.4	-14.9	8,300.4	0.00	0.00	0.00
20,400.0	88.07	179.51	12,307.6	-8,400.3	-14.1	8,400.3	0.00	0.00	0.00
20,500.0	88.07	179.51	12,311.0	-8,500.3	-13.2	8,500.2	0.00	0.00	0.00
20,600.0	88.07	179.51	12,314.3	-8,600.2	-12.4	8,600.2	0.00	0.00	0.00
20,700.0	88.07	179.51	12,317.7	-8,700.1	-11.5	8,700.1	0.00	0.00	0.00
20,800.0	88.07	179.51	12,321.0	-8,800.1	-10.6	8,800.1	0.00	0.00	0.00
20,900.0	88.07	179.51	12,324.4	-8,900.0	-9.8	8,900.0	0.00	0.00	0.00
21,000.0	88.07	179.51	12,327.8	-9,000.0	-8.9	8,999.9	0.00	0.00	0.00
21,100.0	88.07	179.51	12,331.1	-9,099.9	-8.1	9,099.9	0.00	0.00	0.00
21,200.0	88.07	179.51	12,334.5	-9,199.8	-7.2	9,199.8	0.00	0.00	0.00
21,300.0	88.07	179.51	12,337.9	-9,299.8	-6.4	9,299.8	0.00	0.00	0.00
21,400.0	88.07	179.51	12,341.2	-9,399.7	-5.5	9,399.7	0.00	0.00	0.00
21,500.0	88.07	179.51	12,344.6	-9,499.7	-4.7	9,499.6	0.00	0.00	0.00
21,600.0	88.07	179.51	12,347.9	-9,599.6	-3.8	9,599.6	0.00	0.00	0.00
21,700.0	88.07	179.51	12,351.3	-9,699.5	-3.0	9,699.5	0.00	0.00	0.00
21,800.0	88.07	179.51	12,354.7	-9,799.5	-2.1	9,799.5	0.00	0.00	0.00
21,900.0	88.07	179.51	12,358.0	-9,899.4	-1.2	9,899.4	0.00	0.00	0.00

Survey Report

Company:	NORTHERN DELAWARE BASIN	**Local Co-ordinate Reference:**	Well SEBASTIAN FEDERAL COM 704H
Project:	LEA COUNTY, NM	**TVD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Site:	BULLDOG	**MD Reference:**	KB=24' @ 3610.0usft (ENSIGN 155)
Well:	SEBASTIAN FEDERAL COM 704H	**North Reference:**	Grid
Wellbore:	OWB	**Survey Calculation Method:**	Minimum Curvature
Design:	PWP0	**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)
22,000.0	88.07	179.51	12,361.4	-9,999.3	-0.4	9,999.3	0.00	0.00	0.00
22,100.0	88.07	179.51	12,364.7	-10,099.3	0.5	10,099.3	0.00	0.00	0.00
22,200.0	88.07	179.51	12,368.1	-10,199.2	1.3	10,199.2	0.00	0.00	0.00
22,256.5	88.07	179.51	12,370.0	-10,255.7	1.8	10,255.7	0.00	0.00	0.00
TD at 22256.5									

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 (SEBASTIAN FE	0.00	0.00	12,037.0	149.2	-86.7	446,346.60	755,386.90	32° 13' 27.933 N	103° 30' 26.946 W
- plan misses target center by 202.4usft at 11942.4usft MD (11886.2 TVD, 14.3 N, -84.2 E)									
- Circle (radius 50.0)									
LTP (SEBASTIAN FE	0.00	0.00	12,368.3	-10,205.7	1.3	435,991.70	755,474.90	32° 11' 45.461 N	103° 30' 26.848 W
- plan misses target center by 6.5usft at 22200.0usft MD (12368.1 TVD, -10199.2 N, 1.3 E)									
- Point									
BHL (SEBASTIAN FE	-1.93	359.51	12,370.0	-10,255.7	1.8	435,941.70	755,475.40	32° 11' 44.966 N	103° 30' 26.847 W
- plan hits target center									
- Rectangle (sides W100.0 H10,405.0 D20.0)									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
5500	5500	0	0	Start Build 2.00
5604	5604	2	-1	Start 5844.6 hold at 5604.3 MD
11,449	11,445	199	-80	Start DLS 10.00 TFO -158.62
12,349	12,037	-354	-83	Start 9907.4 hold at 12349.1 MD
22,257	12,370	-10,256	2	TD at 22256.5

Checked By: _____ Approved By: _____ Date: _____