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

HOBBS OCD
NOV 04 2019
RECEIVED

5. Lease Serial No. NMNM020979	
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. IGLOO 19-24 STATE FED COM 13H (326170)
2. Name of Operator CAZA OPERATING LLC 249099	9. API Well No. 30-025-46480
3a. Address 200 N. Loraine Street, Suite 1550 Midland TX 79701 3b. Phone No. *(include area code)* (432)682-7424	10. Field and Pool, or Exploratory LEA / BONE SPRING, SOUTH (37580)
4. Location of Well *(Report location clearly and in accordance with any State requirements.*)* At surface NESW / 1620 FSL / 2365 FWL / LAT 32.55583 / LONG -103.49571 At proposed prod. zone NWSW / 1650 FSL / 330 FWL / LAT 32.555891 / LONG -103.521255	11. Sec., T. R. M. or Blk. and Survey or Area SEC 19 / T20S / R35E / NMP
14. Distance in miles and direction from nearest town or post office* 22.6 miles	12. County or Parish LEA / 13. State NM
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 270 feet 16. No of acres in lease 320 17. Spacing Unit dedicated to this well 240	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 500 feet 19. Proposed Depth 10458 feet / 18539 feet 20. BLM/BIA Bond No. in file FED: NMB000471	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3690 feet 22. Approximate date work will start* 08/17/2018 23. Estimated duration 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 (Electronic Submission)	Name *(Printed/Typed)* Tony B Sam / Ph: (432)682-7424	Date 12/30/2017
Title VP Operations		
Approved by *(Signature)* (Electronic Submission)	Name *(Printed/Typed)* Cody Layton / Ph: (575)234-5959	Date 10/18/2019
Title Assistant Field Manager Lands & Minerals	Office 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 11/4/19

APPROVED WITH CONDITIONS

KR 11/05/19

SL

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 10/18/2019

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 wen, 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 directionany 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 wen 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 win 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 conects this information to anow 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 Conection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Continued on page 3)

Additional Operator Remarks

Location of Well

1. SHL: NESW / 1620 FSL / 2365 FWL / TWSP: 20S / RANGE: 35E / SECTION: 19 / LAT: 32.55583 / LONG: -103.49571 (TVD: 0 feet, MD: 0 feet)
   PPP: NWSW / 1620 FSL / 0 FEL / TWSP: 20S / RANGE: 35E / SECTION: 24 / LAT: 32.555561 / LONG: -103.505173 (TVD: 10706 feet, MD: 13550 feet)
   BHL: NWSW / 1650 FSL / 330 FWL / TWSP: 20S / RANGE: 34E / SECTION: 24 / LAT: 32.555891 / LONG: -103.521255 (TVD: 10458 feet, MD: 18539 feet)

BLM Point of Contact

Name: Priscilla Perez
Title: Legal Instruments Examiner
Phone: 5752345934
Email: pperez@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.

PECOS DISTRICT DRILLING
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Caza Operating, LLC.**
LEASE NO.:	**NMNM-020979**
WELL NAME & NO.:	**Igloo 19-24 State Fed Com 13H**
SURFACE HOLE FOOTAGE:	**1620' FSL & 2365' FEL**
BOTTOM HOLE FOOTAGE	**1650' FSL & 0330' FWL Sec. 24, T. 20 S., R 34 E.**
LOCATION:	**Section 19, T. 20 S., R 35 E., NMPM**
COUNTY:	**County, New Mexico**

Communitization Agreement

- The operator will 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.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

a. Spudding well (minimum of 24 hours)
b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
c. BOPE tests (minimum of 4 hours)

☐ **Lea County**
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575) 3933612

1. A Hydrogen Sulfide (H2S) Drilling Plan shall be activated 500 feet prior to drilling into the **Yates** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.**

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. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a "Major" violation.**

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 is 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 submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

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.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

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.

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.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Capitan Reef
Possible of water flows in the Salado.
Possible lost circulation in the Red beds, Rustler, Capitan Reef, Delaware and Bone Spring.

1. The **13-3/8** inch surface casing shall be set at approximately **2000** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**

    a. If cement does not circulate to the 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 six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

    d. If cement falls back, remedial cementing will be done prior to drilling out that string.

Formation below the 13-3/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe and the mud weight for the bottom of the hole. Report results to BLM office.

If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:

- **Switch to fresh water mud to protect the Capitan Reef and use fresh water mud until setting the intermediate casing. The appropriate BLM office is to be notified for a PET to witness the switch to fresh water.**

- **Daily drilling reports from the Base of the Salt to the setting of the intermediate casing are to be submitted to the BLM CFO engineering staff via e-mail by 0800 hours each morning. Any lost circulation encountered is to be recorded on these drilling reports. The daily drilling report should show mud volume per shift/tour. Failure to submit these reports will result in an Incidence of Non-Compliance being issued for failure to comply with the Conditions of Approval. If not already planned, the operator shall run a caliper survey for the intermediate well bore and submit to the appropriate BLM office.**

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

Operator has proposed DV tool at depth of 3900', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

a. First stage to DV tool:___

☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage. **Excess calculates to negative 1% - Additional cement will be required.**

b. Second stage above DV tool:

☐ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to Capitan Reef.**

Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the hole. Report results to BLM office.

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

☐ Cement should tie-back at least **50 feet above the Capitan Reef** (Top of Capitan Reef estimated at 4570'). Operator shall provide method of verification.

4. 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.

C. 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 53.

2. Variance approved to use flex line from BOP to choke manifold. 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.** If the BLM inspector questions the

straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be psi. **5M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**

4. The appropriate BLM office shall be notified a minimum of hours in advance for a representative to witness the 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).

    a. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.

    b. 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.

    c. The results of the test shall be reported to the appropriate BLM office.

    d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

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 if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. WASTE MATERIAL AND FLUIDS

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.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

JAM 090619

Project: Igloo 19-24 State Fed Com 13H
Site: Igloo 19-24 State Fed Com 13H
Well: Igloo 19-24 State Fed Com 13H
Wellbore: Igloo 19-24 State Fed Com 13H
Design: 190826 Igloo 19-24 State Fed Com 13H

Caza Petroleum

Azimuths to Grid North
True North: -0.45°
Magnetic North: 6.21°

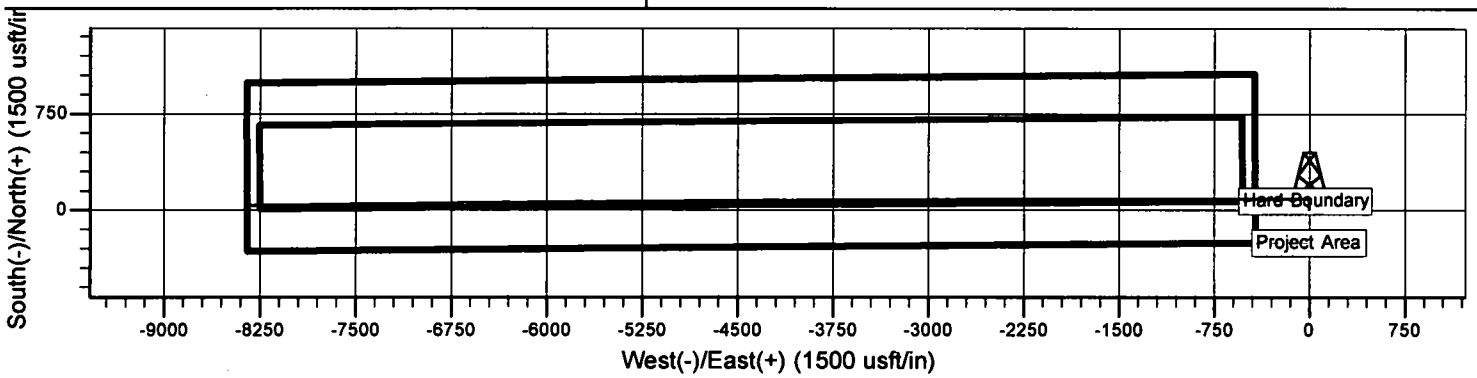
Magnetic Field
Strength: 48084.6snT
Dip Angle: 60.31°
Date: 10/21/2018
Model: IGRF2010

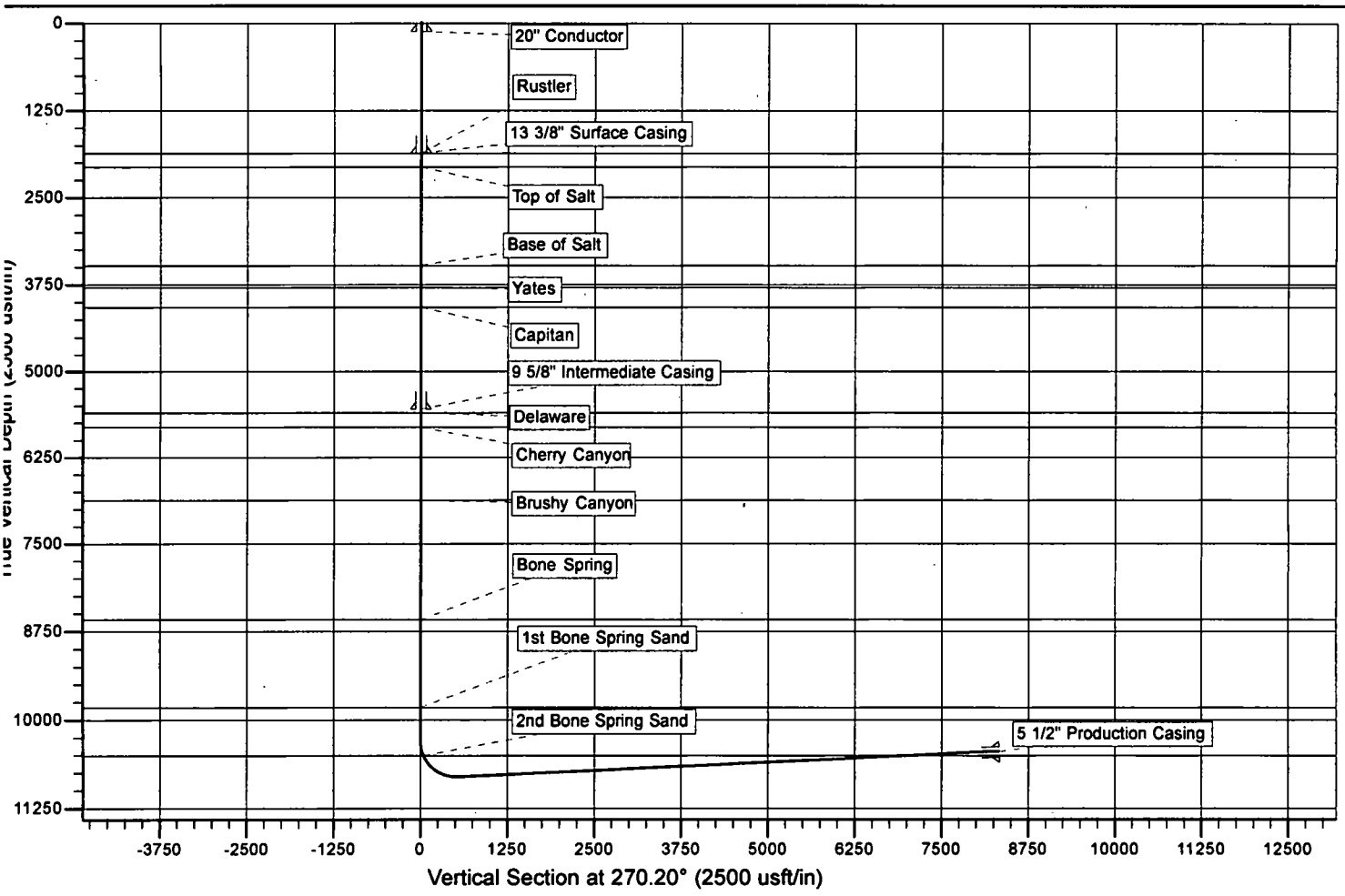
CASING DETAILS

TVD	MD	Name	Size
120.0	120.0	20" Conductor	20
1862.0	1862.0	13 3/8" Surface Casing	13-3/8
5547.0	5547.0	9 5/8" Intermediate Casing	9-5/8
10456.9	18944.0	5 1/2" Production Casing	5-1/2

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
1865.0	1865.0	Rustler	0.00	
2064.0	2064.0	Top of Salt	0.00	
3475.0	3475.0	Base of Salt	0.00	
3791.0	3791.0	Yates	0.00	
4073.0	4073.0	Capitan	0.00	
5600.0	5600.0	Delaware	0.00	
5812.0	5812.0	Cherry Canyon	0.00	
6870.0	6870.0	Brushy Canyon	0.00	
8584.0	8584.0	Bone Spring	0.00	
9823.0	9825.9	1st Bone Spring Sand	0.00	
10509.0	10518.5	2nd Bone Spring Sand	0.00	





Caza Petroleum

Caza Operating LLC

Igloo 19-24 State Fed Com 13H
Igloo 19-24 State Fed Com 13H
Igloo 19-24 State Fed Com 13H
Igloo 19-24 State Fed Com 13H

Plan: 190826 Igloo 19-24 State Fed Com 13H

Morcor Standard Plan

26 August, 2019

Caza Petroleum

Morcor Engineering

Morcor Standard Plan

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
Project:	Igloo 19-24 State Fed Com 13H	**TVD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Project Igloo 19-24 State Fed Com 13H

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site Igloo 19-24 State Fed Com 13H

Site Position:		**Northing:**	566,912.89 usft	**Latitude:**	32° 33' 20.542 N
From:	Lat/Long	**Easting:**	799,566.75 usft	**Longitude:**	103° 29' 42.799 W
Position Uncertainty:	1.0 usft	**Slot Radius:**	17-1/2 "	**Grid Convergence:**	0.45 °

Well Igloo 19-24 State Fed Com 13H

Well Position	**+N/-S**	0.0 usft	**Northing:**	566,912.89 usft	**Latitude:**	32° 33' 20.542 N
	+E/-W	0.0 usft	**Easting:**	799,566.75 usft	**Longitude:**	103° 29' 42.799 W
Position Uncertainty		1.0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	3,693.0 usft

Wellbore Igloo 19-24 State Fed Com 13H

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	10/21/2018	6.66	60.31	48,085

Design 190826 Igloo 19-24 State Fed Com 13H

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	270.20

Survey Tool Program **Date** 8/26/2019

From (usft)	**To (usft)**	**Survey (Wellbore)**	**Tool Name**	**Description**
0.0	18,944.0	190826 Igloo 19-24 State Fed Com 13H (I	MWD	MWD - Standard

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
Project:	Igloo 19-24 State Fed Com 13H	**TVD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
0.0	0.00	0.00	0.0	-3,715.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
100.0	0.00	0.00	100.0	-3,615.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
120.0	0.00	0.00	120.0	-3,595.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
20" Conductor										
200.0	0.00	0.00	200.0	-3,515.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
300.0	0.00	0.00	300.0	-3,415.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
400.0	0.00	0.00	400.0	-3,315.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
500.0	0.00	0.00	500.0	-3,215.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
600.0	0.00	0.00	600.0	-3,115.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
700.0	0.00	0.00	700.0	-3,015.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
800.0	0.00	0.00	800.0	-2,915.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
900.0	0.00	0.00	900.0	-2,815.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,000.0	0.00	0.00	1,000.0	-2,715.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,100.0	0.00	0.00	1,100.0	-2,615.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,200.0	0.00	0.00	1,200.0	-2,515.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,300.0	0.00	0.00	1,300.0	-2,415.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,400.0	0.00	0.00	1,400.0	-2,315.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,500.0	0.00	0.00	1,500.0	-2,215.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,600.0	0.00	0.00	1,600.0	-2,115.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,700.0	0.00	0.00	1,700.0	-2,015.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,800.0	0.00	0.00	1,800.0	-1,915.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
1,862.0	0.00	0.00	1,862.0	-1,853.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
13 3/8" Surface Casing										
1,865.0	0.00	0.00	1,865.0	-1,850.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Rustler										
1,900.0	0.00	0.00	1,900.0	-1,815.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,000.0	0.00	0.00	2,000.0	-1,715.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
Project:	Igloo 19-24 State Fed Com 13H	**TVD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
2,064.0	0.00	0.00	2,064.0	-1,651.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Top of Salt										
2,100.0	0.00	0.00	2,100.0	-1,615.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,200.0	0.00	0.00	2,200.0	-1,515.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,300.0	0.00	0.00	2,300.0	-1,415.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,400.0	0.00	0.00	2,400.0	-1,315.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,500.0	0.00	0.00	2,500.0	-1,215.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,600.0	0.00	0.00	2,600.0	-1,115.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,700.0	0.00	0.00	2,700.0	-1,015.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,800.0	0.00	0.00	2,800.0	-915.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
2,900.0	0.00	0.00	2,900.0	-815.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,000.0	0.00	0.00	3,000.0	-715.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,100.0	0.00	0.00	3,100.0	-615.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,200.0	0.00	0.00	3,200.0	-515.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,300.0	0.00	0.00	3,300.0	-415.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,400.0	0.00	0.00	3,400.0	-315.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,475.0	0.00	0.00	3,475.0	-240.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Base of Salt										
3,500.0	0.00	0.00	3,500.0	-215.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,600.0	0.00	0.00	3,600.0	-115.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,700.0	0.00	0.00	3,700.0	-15.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,791.0	0.00	0.00	3,791.0	76.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Yates										
3,800.0	0.00	0.00	3,800.0	85.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
3,900.0	0.00	0.00	3,900.0	185.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,000.0	0.00	0.00	4,000.0	285.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
Project:	Igloo 19-24 State Fed Com 13H	**TVD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
4,073.0	0.00	0.00	4,073.0	358.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Capitan										
4,100.0	0.00	0.00	4,100.0	385.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,200.0	0.00	0.00	4,200.0	485.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,300.0	0.00	0.00	4,300.0	585.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,400.0	0.00	0.00	4,400.0	685.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,500.0	0.00	0.00	4,500.0	785.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,600.0	0.00	0.00	4,600.0	885.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,700.0	0.00	0.00	4,700.0	985.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,800.0	0.00	0.00	4,800.0	1,085.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
4,900.0	0.00	0.00	4,900.0	1,185.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,000.0	0.00	0.00	5,000.0	1,285.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,100.0	0.00	0.00	5,100.0	1,385.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,200.0	0.00	0.00	5,200.0	1,485.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,300.0	0.00	0.00	5,300.0	1,585.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,400.0	0.00	0.00	5,400.0	1,685.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,500.0	0.00	0.00	5,500.0	1,785.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,547.0	0.00	0.00	5,547.0	1,832.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
9 5/8" Intermediate Casing										
5,600.0	0.00	0.00	5,600.0	1,885.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Delaware										
5,700.0	0.00	0.00	5,700.0	1,985.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,800.0	0.00	0.00	5,800.0	2,085.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
5,812.0	0.00	0.00	5,812.0	2,097.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Cherry Canyon										
5,900.0	0.00	0.00	5,900.0	2,185.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,000.0	0.00	0.00	6,000.0	2,285.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
Project:	Igloo 19-24 State Fed Com 13H	**TVD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
6,100.0	0.00	0.00	6,100.0	2,385.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,200.0	0.00	0.00	6,200.0	2,485.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,300.0	0.00	0.00	6,300.0	2,585.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,400.0	0.00	0.00	6,400.0	2,685.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,500.0	0.00	0.00	6,500.0	2,785.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,600.0	0.00	0.00	6,600.0	2,885.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,700.0	0.00	0.00	6,700.0	2,985.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,800.0	0.00	0.00	6,800.0	3,085.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
6,870.0	0.00	0.00	6,870.0	3,155.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Brushy Canyon										
6,900.0	0.00	0.00	6,900.0	3,185.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,000.0	0.00	0.00	7,000.0	3,285.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,100.0	0.00	0.00	7,100.0	3,385.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,200.0	0.00	0.00	7,200.0	3,485.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,300.0	0.00	0.00	7,300.0	3,585.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,400.0	0.00	0.00	7,400.0	3,685.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,500.0	0.00	0.00	7,500.0	3,785.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,600.0	0.00	0.00	7,600.0	3,885.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,700.0	0.00	0.00	7,700.0	3,985.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,800.0	0.00	0.00	7,800.0	4,085.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
7,900.0	0.00	0.00	7,900.0	4,185.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,000.0	0.00	0.00	8,000.0	4,285.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,100.0	0.00	0.00	8,100.0	4,385.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,200.0	0.00	0.00	8,200.0	4,485.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,300.0	0.00	0.00	8,300.0	4,585.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,400.0	0.00	0.00	8,400.0	4,685.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,500.0	0.00	0.00	8,500.0	4,785.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
Project:	Igloo 19-24 State Fed Com 13H	**TVD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
8,584.0	0.00	0.00	8,584.0	4,869.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Bone Spring										
8,600.0	0.00	0.00	8,600.0	4,885.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,700.0	0.00	0.00	8,700.0	4,985.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,800.0	0.00	0.00	8,800.0	5,085.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
8,900.0	0.00	0.00	8,900.0	5,185.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
9,000.0	0.00	0.00	9,000.0	5,285.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
9,100.0	0.00	0.00	9,100.0	5,385.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
9,164.0	0.00	0.00	9,164.0	5,449.0	0.0	0.0	799,566.75	566,912.89	0.00	0.00
Start Build 3.00										
9,200.0	1.08	0.00	9,200.0	5,485.0	0.3	0.0	799,566.75	566,913.23	0.00	3.00
9,300.0	4.08	0.00	9,299.9	5,584.9	4.8	0.0	799,566.75	566,917.73	0.02	3.00
9,364.0	6.00	0.00	9,363.6	5,648.6	10.5	0.0	799,566.75	566,923.35	0.04	3.00
Start 600.0 hold at 9364.0 MD										
9,400.0	6.00	0.00	9,399.4	5,684.4	14.2	0.0	799,566.75	566,927.12	0.05	0.00
9,500.0	6.00	0.00	9,498.9	5,783.9	24.7	0.0	799,566.75	566,937.57	0.09	0.00
9,600.0	6.00	0.00	9,598.3	5,883.3	35.1	0.0	799,566.75	566,948.02	0.12	0.00
9,700.0	6.00	0.00	9,697.8	5,982.8	45.6	0.0	799,566.75	566,958.48	0.16	0.00
9,800.0	6.00	0.00	9,797.2	6,082.2	56.0	0.0	799,566.75	566,968.93	0.20	0.00
9,825.9	6.00	0.00	9,823.0	6,108.0	58.7	0.0	799,566.75	566,971.64	0.21	0.00
1st Bone Spring Sand										
9,900.0	6.00	0.00	9,896.7	6,181.7	66.5	0.0	799,566.75	566,979.38	0.23	0.00
9,964.0	6.00	0.00	9,960.3	6,245.3	73.2	0.0	799,566.75	566,986.07	0.26	0.00
Start Drop -3.00										
10,000.0	4.92	0.00	9,996.2	6,281.2	76.6	0.0	799,566.75	566,989.50	0.27	3.00
10,100.0	1.92	0.00	10,096.0	6,381.0	82.6	0.0	799,566.75	566,995.46	0.29	3.00
10,164.0	0.00	0.00	10,160.0	6,445.0	83.6	0.0	799,566.75	566,996.53	0.29	3.00
Start 150.0 hold at 10164.0 MD										

Company:	Caza Operating LLC	**Local Co-ordinate Reference:**	Well Igloo 19-24 State Fed Com 13H
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Site:	Igloo 19-24 State Fed Com 13H	**MD Reference:**	WELL @ 3715.0usft (Original Well Elev)
Well:	Igloo 19-24 State Fed Com 13H	**North Reference:**	Grid
Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
10,200.0	0.00	270.00	10,196.0	6,481.0	83.6	0.0	799,566.75	566,996.53	0.29	0.00
10,300.0	0.00	270.00	10,296.0	6,581.0	83.6	0.0	799,566.75	566,996.53	0.29	0.00
10,314.0	0.00	270.00	10,310.0	6,595.0	83.6	0.0	799,566.75	566,996.53	0.29	0.00
Start Build 11.30										
10,400.0	9.72	270.00	10,395.6	6,680.6	83.6	-7.3	799,559.48	566,996.53	7.57	11.30
10,500.0	21.01	270.00	10,491.8	6,776.8	83.6	-33.7	799,533.02	566,996.53	34.02	11.30
10,518.5	23.11	270.00	10,509.0	6,794.0	83.6	-40.7	799,526.07	566,996.53	40.97	11.30
2nd Bone Spring Sand										
10,600.0	32.31	270.00	10,581.1	6,866.1	83.6	-78.5	799,488.22	566,996.53	78.82	11.30
10,700.0	43.61	270.00	10,659.8	6,944.8	83.6	-139.9	799,426.81	566,996.53	140.23	11.30
10,800.0	54.91	270.00	10,724.9	7,009.9	83.6	-215.6	799,351.17	566,996.53	215.87	11.30
10,900.0	66.20	270.00	10,774.0	7,059.0	83.6	-302.5	799,264.23	566,996.53	302.81	11.30
11,000.0	77.50	270.00	10,805.1	7,090.1	83.6	-397.4	799,169.36	566,996.53	397.69	11.30
11,100.0	88.80	270.00	10,817.0	7,102.0	83.6	-496.5	799,070.23	566,996.53	496.81	11.30
11,134.0	92.64	270.00	10,816.6	7,101.6	83.6	-530.5	799,036.24	566,996.53	530.80	11.30
Start Turn -0.01										
11,200.0	92.64	269.99	10,813.6	7,098.6	83.6	-596.4	798,970.31	566,996.53	596.73	0.01
11,300.0	92.64	269.98	10,808.9	7,093.9	83.6	-696.3	798,870.42	566,996.51	696.62	0.01
11,400.0	92.64	269.97	10,804.3	7,089.3	83.6	-796.2	798,770.52	566,996.47	796.52	0.01
11,500.0	92.64	269.96	10,799.7	7,084.7	83.5	-896.1	798,670.63	566,996.41	896.41	0.01
11,600.0	92.64	269.95	10,795.1	7,080.1	83.4	-996.0	798,570.73	566,996.34	996.30	0.01
11,700.0	92.64	269.94	10,790.5	7,075.5	83.4	-1,095.9	798,470.84	566,996.25	1,096.20	0.01
11,800.0	92.64	269.93	10,785.9	7,070.9	83.2	-1,195.8	798,370.95	566,996.14	1,196.09	0.01
11,900.0	92.64	269.92	10,781.3	7,066.3	83.1	-1,295.7	798,271.05	566,996.01	1,295.98	0.01
12,000.0	92.64	269.91	10,776.7	7,061.7	83.0	-1,395.6	798,171.16	566,995.86	1,395.87	0.01
12,100.0	92.64	269.90	10,772.1	7,057.1	82.8	-1,495.5	798,071.26	566,995.70	1,495.77	0.01
12,200.0	92.64	269.89	10,767.5	7,052.5	82.6	-1,595.4	797,971.37	566,995.52	1,595.66	0.01

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Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
12,300.0	92.64	269.88	10,762.9	7,047.9	82.4	-1,695.3	797,871.48	566,995.32	1,695.55	0.01
12,400.0	92.64	269.87	10,758.3	7,043.3	82.2	-1,795.2	797,771.58	566,995.10	1,795.44	0.01
12,500.0	92.64	269.86	10,753.7	7,038.7	82.0	-1,895.1	797,671.69	566,994.87	1,895.34	0.01
12,600.0	92.64	269.85	10,749.1	7,034.1	81.7	-1,995.0	797,571.80	566,994.61	1,995.23	0.01
12,700.0	92.64	269.84	10,744.5	7,029.5	81.5	-2,094.8	797,471.90	566,994.34	2,095.12	0.01
12,800.0	92.64	269.83	10,739.9	7,024.9	81.2	-2,194.7	797,372.01	566,994.06	2,195.01	0.01
12,900.0	92.64	269.82	10,735.3	7,020.3	80.9	-2,294.6	797,272.12	566,993.75	2,294.90	0.01
13,000.0	92.64	269.81	10,730.6	7,015.6	80.5	-2,394.5	797,172.22	566,993.42	2,394.79	0.01
13,100.0	92.64	269.80	10,726.0	7,011.0	80.2	-2,494.4	797,072.33	566,993.08	2,494.69	0.01
13,200.0	92.64	269.79	10,721.4	7,006.4	79.8	-2,594.3	796,972.44	566,992.72	2,594.58	0.01
13,300.0	92.64	269.78	10,716.8	7,001.8	79.5	-2,694.2	796,872.54	566,992.34	2,694.47	0.01
13,400.0	92.64	269.77	10,712.2	6,997.2	79.1	-2,794.1	796,772.65	566,991.95	2,794.36	0.01
13,500.0	92.64	269.76	10,707.6	6,992.6	78.6	-2,894.0	796,672.76	566,991.54	2,894.25	0.01
13,600.0	92.64	269.75	10,703.0	6,988.0	78.2	-2,993.9	796,572.86	566,991.10	2,994.14	0.01
13,700.0	92.64	269.74	10,698.4	6,983.4	77.8	-3,093.8	796,472.97	566,990.65	3,094.03	0.01
13,800.0	92.64	269.73	10,693.8	6,978.8	77.3	-3,193.7	796,373.08	566,990.19	3,193.92	0.01
13,900.0	92.64	269.72	10,689.2	6,974.2	76.8	-3,293.6	796,273.19	566,989.70	3,293.81	0.01
14,000.0	92.64	269.71	10,684.6	6,969.6	76.3	-3,393.5	796,173.29	566,989.20	3,393.70	0.01
14,100.0	92.64	269.70	10,680.0	6,965.0	75.8	-3,493.3	796,073.40	566,988.68	3,493.59	0.01
14,200.0	92.64	269.69	10,675.4	6,960.4	75.2	-3,593.2	795,973.51	566,988.14	3,593.48	0.01
14,300.0	92.64	269.68	10,670.8	6,955.8	74.7	-3,693.1	795,873.62	566,987.58	3,693.37	0.01
14,400.0	92.64	269.67	10,666.2	6,951.2	74.1	-3,793.0	795,773.72	566,987.01	3,793.26	0.01
14,500.0	92.64	269.66	10,661.6	6,946.6	73.5	-3,892.9	795,673.83	566,986.42	3,893.15	0.01
14,600.0	92.64	269.64	10,656.9	6,941.9	72.9	-3,992.8	795,573.94	566,985.81	3,993.04	0.01
14,700.0	92.64	269.63	10,652.3	6,937.3	72.3	-4,092.7	795,474.05	566,985.18	4,092.93	0.01
14,800.0	92.64	269.62	10,647.7	6,932.7	71.6	-4,192.6	795,374.16	566,984.53	4,192.82	0.01
14,900.0	92.64	269.61	10,643.1	6,928.1	71.0	-4,292.5	795,274.26	566,983.87	4,292.71	0.01

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Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
15,000.0	92.64	269.60	10,638.5	6,923.5	70.3	-4,392.4	795,174.37	566,983.19	4,392.60	0.01
15,100.0	92.64	269.59	10,633.9	6,918.9	69.6	-4,492.3	795,074.48	566,982.49	4,492.48	0.01
15,200.0	92.64	269.58	10,629.3	6,914.3	68.9	-4,592.2	794,974.59	566,981.77	4,592.37	0.01
15,300.0	92.64	269.57	10,624.7	6,909.7	68.1	-4,692.1	794,874.70	566,981.04	4,692.26	0.01
15,400.0	92.64	269.56	10,620.1	6,905.1	67.4	-4,791.9	794,774.81	566,980.28	4,792.15	0.01
15,500.0	92.64	269.55	10,615.5	6,900.5	66.6	-4,891.8	794,674.92	566,979.51	4,892.04	0.01
15,600.0	92.64	269.54	10,610.9	6,895.9	65.8	-4,991.7	794,575.03	566,978.72	4,991.92	0.01
15,700.0	92.64	269.53	10,606.3	6,891.3	65.0	-5,091.6	794,475.14	566,977.92	5,091.81	0.01
15,800.0	92.64	269.52	10,601.7	6,886.7	64.2	-5,191.5	794,375.25	566,977.09	5,191.70	0.01
15,900.0	92.64	269.51	10,597.1	6,882.1	63.4	-5,291.4	794,275.36	566,976.25	5,291.58	0.01
16,000.0	92.64	269.50	10,592.5	6,877.5	62.5	-5,391.3	794,175.47	566,975.39	5,391.47	0.01
16,100.0	92.64	269.49	10,587.9	6,872.9	61.6	-5,491.2	794,075.58	566,974.51	5,491.36	0.01
16,200.0	92.64	269.48	10,583.2	6,868.2	60.7	-5,591.1	793,975.69	566,973.62	5,591.24	0.01
16,300.0	92.64	269.47	10,578.6	6,863.6	59.8	-5,691.0	793,875.80	566,972.70	5,691.13	0.01
16,400.0	92.64	269.46	10,574.0	6,859.0	58.9	-5,790.8	793,775.91	566,971.77	5,791.02	0.01
16,500.0	92.64	269.45	10,569.4	6,854.4	57.9	-5,890.7	793,676.02	566,970.82	5,890.90	0.01
16,600.0	92.64	269.44	10,564.8	6,849.8	57.0	-5,990.6	793,576.13	566,969.86	5,990.79	0.01
16,700.0	92.64	269.43	10,560.2	6,845.2	56.0	-6,090.5	793,476.24	566,968.87	6,090.67	0.01
16,800.0	92.64	269.42	10,555.6	6,840.6	55.0	-6,190.4	793,376.35	566,967.87	6,190.56	0.01
16,900.0	92.64	269.41	10,551.0	6,836.0	54.0	-6,290.3	793,276.46	566,966.85	6,290.44	0.01
17,000.0	92.64	269.40	10,546.4	6,831.4	52.9	-6,390.2	793,176.57	566,965.81	6,390.32	0.01
17,100.0	92.64	269.39	10,541.8	6,826.8	51.9	-6,490.1	793,076.68	566,964.75	6,490.21	0.01
17,200.0	92.64	269.38	10,537.2	6,822.2	50.8	-6,590.0	792,976.80	566,963.68	6,590.09	0.01
17,300.0	92.64	269.37	10,532.6	6,817.6	49.7	-6,689.8	792,876.91	566,962.58	6,689.98	0.01
17,400.0	92.64	269.36	10,528.0	6,813.0	48.6	-6,789.7	792,777.02	566,961.47	6,789.86	0.01
17,500.0	92.64	269.35	10,523.4	6,808.4	47.5	-6,889.6	792,677.13	566,960.35	6,889.74	0.01
17,600.0	92.64	269.34	10,518.8	6,803.8	46.3	-6,989.5	792,577.25	566,959.20	6,989.62	0.01

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Wellbore:	Igloo 19-24 State Fed Com 13H	**Survey Calculation Method:**	Minimum Curvature
Design:	190826 Igloo 19-24 State Fed Com 13H	**Database:**	EDM 5000.1 Single User Db

Planned Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	Easting (usft)	Northing (usft)	V. Sec (usft)	DLeg (°/100usft)
17,700.0	92.64	269.33	10,514.2	6,799.2	45.1	-7,089.4	792,477.36	566,958.04	7,089.51	0.01
17,800.0	92.64	269.32	10,509.6	6,794.6	44.0	-7,189.3	792,377.47	566,956.86	7,189.39	0.01
17,900.0	92.64	269.31	10,504.9	6,789.9	42.8	-7,289.2	792,277.59	566,955.66	7,289.27	0.01
18,000.0	92.64	269.30	10,500.3	6,785.3	41.5	-7,389.1	792,177.70	566,954.44	7,389.15	0.01
18,100.0	92.64	269.29	10,495.7	6,780.7	40.3	-7,488.9	792,077.81	566,953.20	7,489.03	0.01
18,200.0	92.64	269.28	10,491.1	6,776.1	39.1	-7,588.8	791,977.93	566,951.95	7,588.91	0.01
18,300.0	92.64	269.27	10,486.5	6,771.5	37.8	-7,688.7	791,878.04	566,950.68	7,688.79	0.01
18,400.0	92.64	269.26	10,481.9	6,766.9	36.5	-7,788.6	791,778.16	566,949.39	7,788.68	0.01
18,500.0	92.64	269.25	10,477.3	6,762.3	35.2	-7,888.5	791,678.27	566,948.09	7,888.56	0.01
18,600.0	92.64	269.24	10,472.7	6,757.7	33.9	-7,988.4	791,578.38	566,946.76	7,988.44	0.01
18,700.0	92.64	269.22	10,468.1	6,753.1	32.5	-8,088.3	791,478.50	566,945.42	8,088.31	0.01
18,800.0	92.64	269.21	10,463.5	6,748.5	31.2	-8,188.1	791,378.62	566,944.06	8,188.19	0.01
18,900.0	92.64	269.20	10,458.9	6,743.9	29.8	-8,288.0	791,278.73	566,942.68	8,288.07	0.01
18,944.0	92.64	269.20	10,456.9	6,741.9	29.2	-8,332.0	791,234.78	566,942.07	8,332.02	0.01

TD at 18944.0 - 5 1/2" Production Casing

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
18,944.0	10,456.9	5 1/2" Production Casing	5-1/2	8-3/4
5,547.0	5,547.0	9 5/8" Intermediate Casing	9-5/8	12-1/4
120.0	120.0	20" Conductor	20	26
1,862.0	1,862.0	13 3/8" Surface Casing	13-3/8	17-1/2

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Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,475.0	3,475.0	Base of Salt		0.00	
1,865.0	1,865.0	Rustler		0.00	
5,812.0	5,812.0	Cherry Canyon		0.00	
4,073.0	4,073.0	Capitan		0.00	
9,825.9	9,823.0	1st Bone Spring Sand		0.00	
5,600.0	5,600.0	Delaware		0.00	
3,791.0	3,791.0	Yates		0.00	
8,584.0	8,584.0	Bone Spring		0.00	
6,870.0	6,870.0	Brushy Canyon		0.00	
2,064.0	2,064.0	Top of Salt		0.00	
10,518.5	10,509.0	2nd Bone Spring Sand		0.00	

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
9,164.0	9,164.0	0.0	0.0	Start Build 3.00
9,364.0	9,363.6	10.5	0.0	Start 600.0 hold at 9364.0 MD
9,964.0	9,960.3	73.2	0.0	Start Drop -3.00
10,164.0	10,160.0	83.6	0.0	Start 150.0 hold at 10164.0 MD
10,314.0	10,310.0	83.6	0.0	Start Build 11.30
11,134.0	10,816.6	83.6	-530.5	Start Turn -0.01
18,944.0	10,456.9	29.2	-8,332.0	TD at 18944.0

Checked By: _____ Approved By: _____ Date: _____

In a Lesser Prairie-Chicken section.

13 3/8	surface csg in a	17 1/2	inch hole.	Design Factors			SURFACE	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"	54.50	J 55	ST&C	4.72	1.22	0.95	2,000	109,000
"B"							**0**	**0**
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,038			**Tail Cmt**	**does not**	**circ to sfc.**	Totals:	2,000	109,000

Comparison of Proposed to Minimum Required Cement Volumes

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
17 1/2	0.6946	**1186**	2191	**1463**	50	**8.90**	1655	**2M**	1.56

Burst Frac Gradient(s) for Segment(s) A, B = 1.37, b All > 0.70,

9 5/8	casing inside the	13 3/8		Design Factors			INTERMEDIATE	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"	40.00	J 55	LT&C	2.35	1.3	0.77	3,800	152,000
"B"	**40.00**	**HCL 80**	**LT&C**	12.12	**1.47**	**1.12**	**1,726**	**69,040**
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,107						Totals:	5,526	221,040

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 2000 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
12 1/4	0.3132	**1300**	2769	**1848**	50	**10.00**	2736	**3M**	0.81
Setting Depths for D V Tool(s):		**3900**					sum of sx	Σ CuFt	Σ%excess
excess cmt by stage % :		**100**	11				1268	2525	37

Class 'C' tail cmt yld > 1.35

Burst Frac Gradient(s) for Segment(s): A, B, C, D = 1.04, b, c, d All > 0.70, OK.

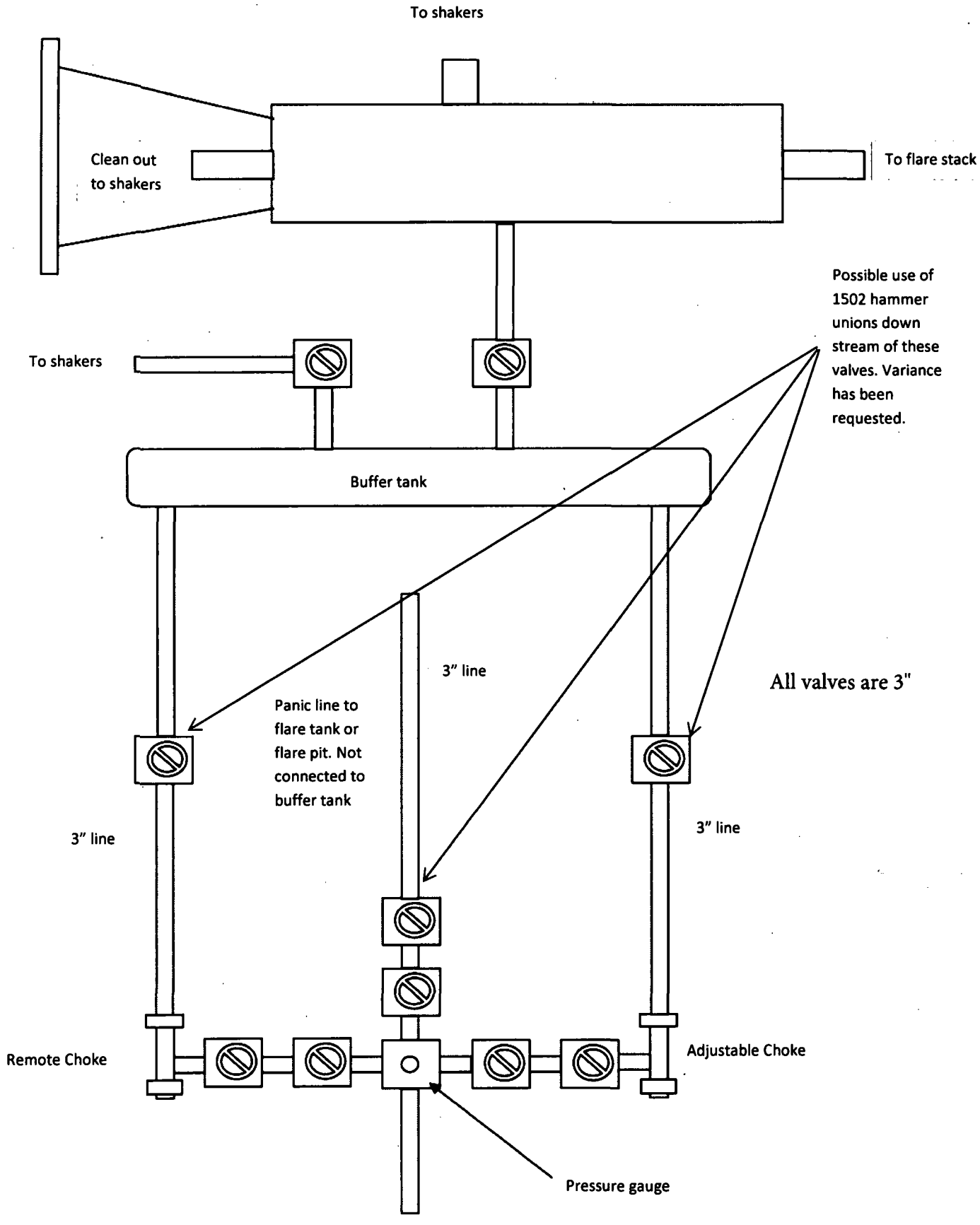
5 1/2	casing inside the	9 5/8		Design Factors			PRODUCTION	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	17.00	P 110	BUTT	2.97	1.54	2.08	10,254	174,318
"B"	**17.00**	**P 110**	**BUTT**	7.96	**1.34**	**2.08**	**8,285**	**140,845**
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,256						Totals:	18,539	315,163
B Segment Design Factors would be:				56.23	1.46	if it were a vertical wellbore.		

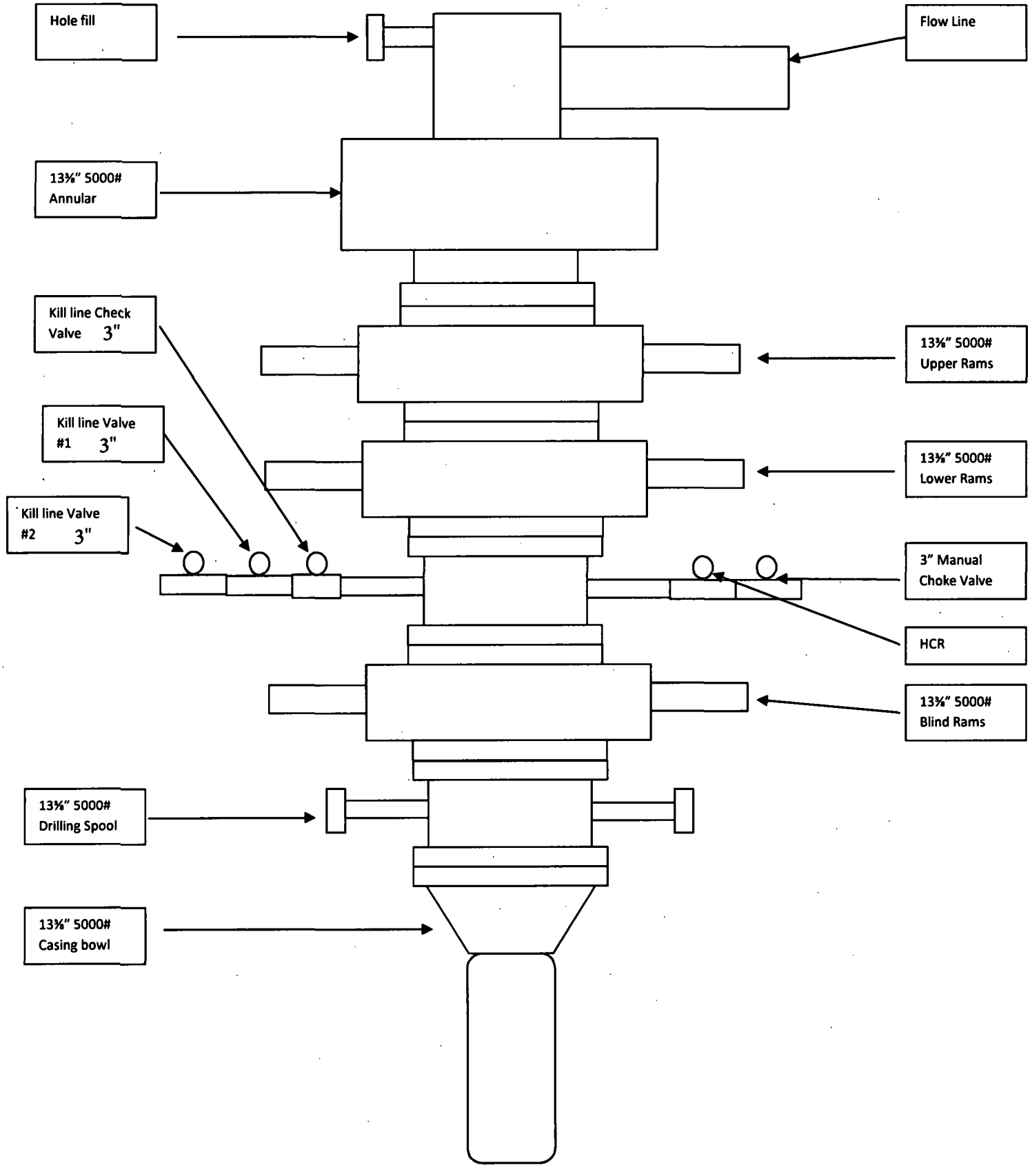
No Pilot Hole Planned	MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC
	18539	10825	10825	10254	93	10	11182

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 5526 overlap.

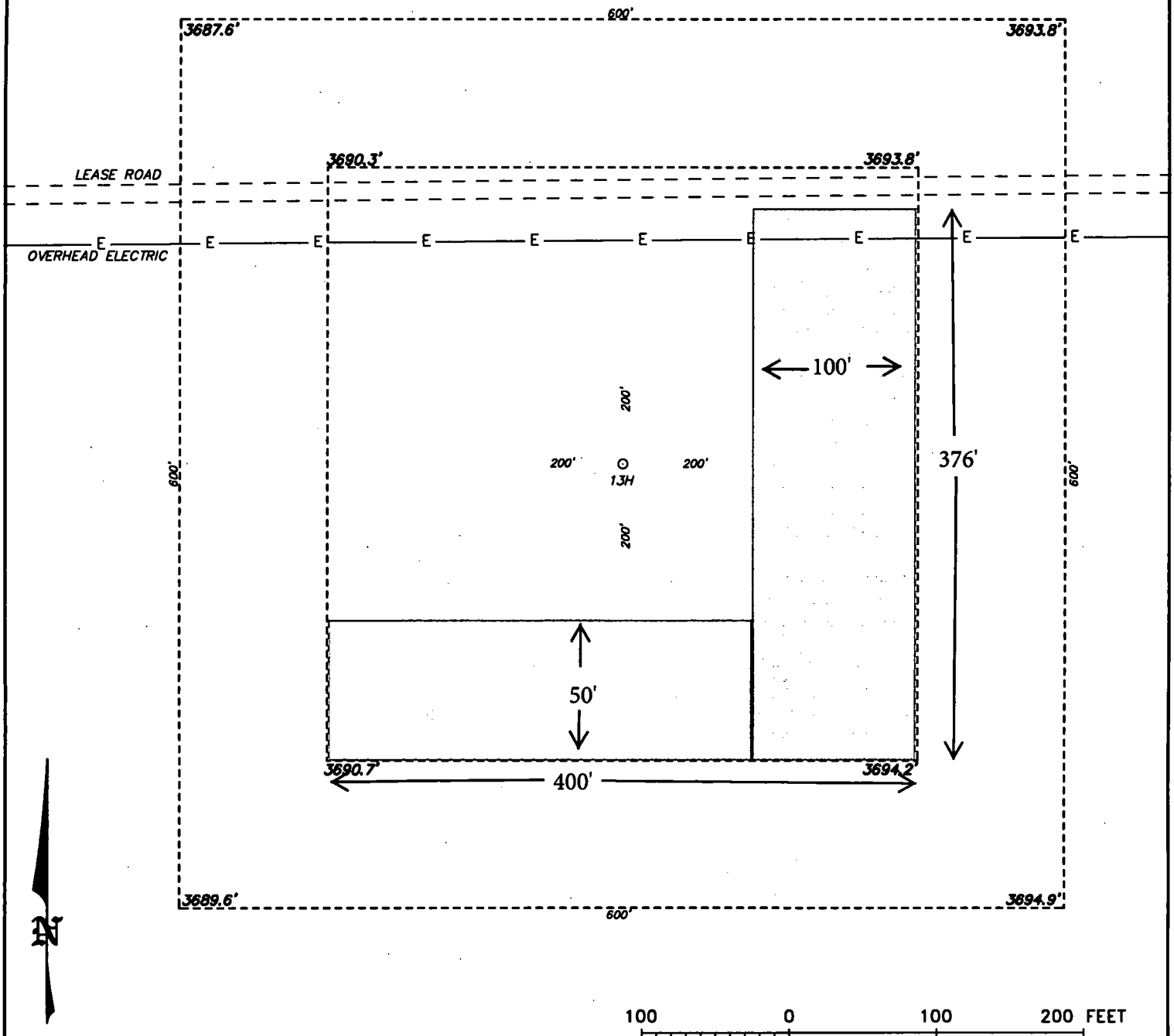
Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
8 3/4	0.2526	**3620**	7103	**4734**	50	**9.10**			1.35

Class 'H' tail cmt yld > 1.20


To shakers
Clean out to shakers
To flare stack
Possible use of 1502 hammer unions down stream of these valves. Variance has been requested.
To shakers
Buffer tank
3" line
All valves are 3"
Panic line to flare tank or flare pit. Not connected to buffer tank
3" line
3" line
Remote Choke
Adjustable Choke
Pressure gauge


Hole fill
Flow Line
13⅝" 5000#
Annular
Kill line Check
Valve 3"
13⅝" 5000#
Upper Rams
Kill line Valve
#1 3"
13⅝" 5000#
Lower Rams
Kill line Valve
#2 3"
3" Manual
Choke Valve
HCR
13⅝" 5000#
Blind Rams
13⅝" 5000#
Drilling Spool
13⅝" 5000#
Casing bowl

SECTION 19, TOWNSHIP 20 SOUTH, RANGE 35 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO.



100 0 100 200 FEET

SCALE: 1" = 100'

CAZA OPERATING, LLC.

REF: IGLOO 19-24 STATE FED COM 13H / WELL PAD TOPO

THE IGLOO 19-24 STATE FED COM 13H LOCATED 1620' FROM THE SOUTH LINE AND 2365' FROM THE EAST LINE OF SECTION 19, TOWNSHIP 20 SOUTH, RANGE 35 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO.

basin surveys
focused on excellence in the oilfield
P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(575) 393-7316 - Office
(575) 392-2206 - Fax
basinsurveys.com

W.O. Number: 33200	Drawn By: J GOAD	Date: 09-29-2017	Survey Date: 8-2-2017	Sheet 1 of 1 Sheets

IGLOO 19-24 STATE FED COM 13H
Located 1620' FSL and 2365' FEL
Section 19, Township 20 South, Range 35 East, N.M.P.M., Lea County, New Mexico.

basin surveys
focused on excellence in the oilfield

P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(575) 393-7316 - Office
(575) 392-2206 - Fax
basinsurveys.com

0' 1000' 2000' 3000' 4000'
SCALE: 1" = 2000'

W.O. Number: JG 33200

Survey Date: 8-2-2017

YELLOW TINT - USA LAND
BLUE TINT - STATE LAND
NATURAL COLOR - FEE LAND

N

CAZA OPERATING, LLC.

Caza Operating, LLC
200 N. Loraine, Ste. 1550
Midland, TX 79701

October 29, 2019

NMOCD District 1 - Hobbs
1625 N. French Drive
Hobbs, NM 88240

Ladies and Gentlemen:

Please find attached the supporting documents for the following BLM approved APD that was filed electronically. We are requesting an API number.

Igloo 19-24 State Fed Com 13H

Please send an electronic copy of the receipt to our contract engineer at the following email address: steve.morris@morcorengineering.com

Thank you for your assistance in this matter. Please call or email me if you have any questions.

Regards,

Tony Cook

Tony Cook
tcook@cazapetro.com
Sr. V.P., Development & Operations
432-682-7424 (O)
918-605-1377 (cell)

Attachments