Form 3160-3
(June 2015)

HOBBS OCD

APR 16 2019

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FORM APPROVED
OMB No. 1004-0137
Expires: January 31, 2018

F/S
(H)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR RE

5. Lease Serial No.
NMNM108973

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.
HARRIER FEDERAL COM
102H (325370)

2. Name of Operator
COG OPERATING LLC (229137)

9. API Well No.
30-025-45828

3a. Address
600 West Illinois Ave Midland TX 79701

3b. Phone No. *(include area code)*
(432)683-7443

10. Field and Pool, or Exploratory (97838)
JENNINGS / UPPER BONE SPRING SH

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface SWSW / 330 FSL / 750 FWL / LAT 32.065914 / LONG -103.651824
At proposed prod. zone NWNW / 640 FNL / 690 FWL / LAT 32.09359 / LONG -103.652011

11. Sec., T. R. M. or Blk. and Survey or Area
SEC 2 / T26S / R32E / NMP

14. Distance in miles and direction from nearest town or post office*
24 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)
330 feet

16. No of acres in lease
640

17. Spacing Unit dedicated to this well
320

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

19. Proposed Depth
9077 feet / 19214 feet

20. BLM/BIA Bond No. in file
FED: NMB000215

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
3247 feet

22. Approximate date work will start*
05/01/2019

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	Name *(Printed/Typed)*	Date
(Electronic Submission)	Mayte Reyes / Ph: (575)748-6945	01/17/2019

Title
Regulatory Analyst

Approved by *(Signature)*	Name *(Printed/Typed)*	Date
(Electronic Submission)	Cody Layton / Ph: (575)234-5959	04/05/2019

Title	Office
Assistant Field Manager Lands & Minerals	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 04/16/19

APPROVED WITH CONDITIONS

Approval Date: 04/05/2019

KA 04/18/19

(Continued on page 2)

*(Instructions on page 2)

INSTRUCTIONS

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

ITEM 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)

AFMSS

U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT

APD Print Report

04/08/2019

APD ID: 10400037652
Submission Date: 01/17/2019
Operator Name: COG OPERATING LLC
Federal/Indian APD: FED
Well Name: HARRIER FEDERAL COM
Well Number: 102H
Well Type: OIL WELL
Well Work Type: Drill

[redacted]

Show Final Text

Application

Section 1 - General

APD ID: 10400037652
Tie to previous NOS?
Submission Date: 01/17/2019
BLM Office: CARLSBAD
User: Mayte Reyes
Title: Regulatory Analyst
Federal/Indian APD: FED
Is the first lease penetrated for production Federal or Indian? FED
Lease number: NMNM108973
Lease Acres: 640
Surface access agreement in place?
Allotted?
Reservation:
Agreement in place? NO
Federal or Indian agreement:
Agreement number:
Agreement name:
Keep application confidential? YES
Permitting Agent? NO
APD Operator: COG OPERATING LLC
Operator letter of designation:

Operator Info

Operator Organization Name: COG OPERATING LLC
Operator Address: 600 West Illinois Ave
Zip: 79701
Operator PO Box:
Operator City: Midland
State: TX
Operator Phone: (432)683-7443
Operator Internet Address: RODOM@CONCHO.COM

Section 2 - Well Information

Well in Master Development Plan? NO
Master Development Plan name:
Well in Master SUPO? NO
Master SUPO name:
Well in Master Drilling Plan? NO
Master Drilling Plan name:

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Well Name: HARRIER FEDERAL COM **Well Number:** 102H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** JENNINGS **Pool Name:** UPPER BONE SPRING SHALE

Is the proposed well in an area containing other mineral resources? USEABLE WATER

Describe other minerals:

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

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** HARRIER FEDERAL COM **Number:** 305H, 102H AND 304H

Well Class: HORIZONTAL **Number of Legs:**

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: EXPLORATORY (WILDCAT)

Describe sub-type:

Distance to town: 24 Miles **Distance to nearest well:** 733 FT **Distance to lease line:** 330 FT

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: COH_Harrier_102H_C102_20190115073426.pdf

Well work start Date: 05/01/2019 **Duration:** 30 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number:

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	330	FSL	750	FWL	26S	32E	2	Aliquot SWSW	32.065914	-103.651824	LEA	NEW MEXICO	NEW MEXICO	S	STATE	3247	0	0
KOP Leg #1	330	FSL	750	FWL	26S	32E	2	Aliquot SWSW	32.065914	-103.651824	LEA	NEW MEXICO	NEW MEXICO	S	STATE	3247	0	0

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
PPP Leg #1	100	FSL	690	FWL	26S	32E	2	Aliquot SWSW	32.065281	-103.652015	LEA	NEW MEXICO	NEW MEXICO	S	STATE	-5805	9250	9052
PPP Leg #1	0	FSL	690	FWL	25S	32E	35	Aliquot SWSW	32.07971	-103.652013	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 108973	-5805	14300	9052
EXIT Leg #1	640	FNL	690	FWL	25S	32E	35	Aliquot NWNW	32.09359	-103.652011	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 108973	-6607	19000	9854
BHL Leg #1	640	FNL	690	FWL	25S	32E	35	Aliquot NWNW	32.09359	-103.652011	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 108973	-5830	19214	9077

Drilling Plan

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	UNKNOWN	3247	0	0		NONE	No
2	RUSTLER	2530	718	718		NONE	No
3	TOP SALT	2167	1081	1081		NONE	No
4	BASE OF SALT	-1099	4347	4347		NONE	No
5	LAMAR	-1316	4564	4564		NONE	No
6	BELL CANYON	-1354	4602	4602		NONE	No
7	CHERRY CANYON	-2363	5611	5611		NATURAL GAS,OIL	No
8	BRUSHY CANYON	-3956	7204	7204		NATURAL GAS,OIL	No
9	UPPER AVALON SHALE	-5521	8769	8769		NATURAL GAS,OIL	Yes
10	—	-5834	9082	9082		NATURAL GAS,OIL	No

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
11	—	-6147	9395	9395		NATURAL GAS,OIL	No
12	BONE SPRING 1ST	-6470	9718	9718		NATURAL GAS,OIL	No

Section 2 - Blowout Prevention

Pressure Rating (PSI): 2M **Rating Depth:** 4575

Equipment: Annular. The BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold.
Requesting Variance? NO

Variance request: 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.
Testing Procedure: 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 of the components installed will be functional and tested.

Choke Diagram Attachment:

COG_Harrier_102H_2M_Choke_20190103123007.pdf

BOP Diagram Attachment:

COG_Harrier_102H_2M_BOP_20190103123014.pdf

COG_Harrier_102H_Flex_Hose_20190103123023.pdf

Pressure Rating (PSI): 3M **Rating Depth:** 9077

Equipment: Annular. The BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold.
Requesting Variance? YES

Variance request: 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.
Testing Procedure: 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 of the components installed will be functional and tested.

Choke Diagram Attachment:

COG_Harrier_102H_3M_Choke_20190103123032.pdf

BOP Diagram Attachment:

COG_Harrier_102H_3M_BOP_20190103123039.pdf

COG_Harrier_102H_Flex_Hose_20190103123048.pdf

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Section 3 - Casing

Casing ID	String Type	Hole Size	Csg Size	Condition	Standard	Tapered String	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Calculated casing length MD	Grade	Weight	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	
1	SURFACE	17.5	13.375	NEW	API	N	0	745	0	745	-9530	-10415	745	J-55	54.5	STC	3.31	1.37	DRY	12.66	DRY	12 6
2	INTERMEDIATE	12.25	9.625	NEW	API	Y	0	4575	0	4575	-9530	-21730	4575	L-80	40	LTC	1.29	1.65	DRY	5.73	DRY	5.
3	PRODUCTION	8.75	5.5	NEW	API	N	0	19214	0	19214	-9530	-32300	19214	P-110	17	LTC	1.7	3.06	DRY	2.88	DRY	2.

Casing Attachments

Casing ID: 1 **String Type:** SURFACE

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Harrier_102H_Casing_Prog_20190103123118.pdf

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Casing Attachments

Casing ID: 2 **String Type:** INTERMEDIATE

Inspection Document:

Spec Document:

Tapered String Spec:

COG_Harrier_102H_Casing_Prog_20190103123128.pdf

Casing Design Assumptions and Worksheet(s):

COG_Harrier_102H_Casing_Prog_20190103123139.pdf

Casing ID: 3 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

COG_Harrier_102H_Casing_Prog_20190103123149.pdf

Section 4 - Cement

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
SURFACE	Lead		0	745	260	1.75	13.5	455	50	Class C	4% Gel + 1 % CaCl2
SURFACE	Tail		0	745	250	1.34	14.8	335	50	Class C	2% CaCl2
INTERMEDIATE	Lead		0	4575	870	2	12.7	1740	50	35:65:6 C Blend	No Additives
INTERMEDIATE	Tail		0	4575	250	1.34	14.8	335	50	Class C	2% CaCl

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
PRODUCTION	Lead		0	19214	630	2.5	11.9	1575	25	Lead: 50:50:10 H Blend	No additives
PRODUCTION	Tail		0	19214	2710	1.24	14.4	3360	25	Tail: 50:50:2 Class H Blend	No additives

Section 5 - Circulating Medium

Mud System Type: Closed

Will an air or gas system be Used? NO

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

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

Describe what will be on location to control well or mitigate other conditions: Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times

Describe the mud monitoring system utilized: PVT/Pason/Visual Monitoring

Circulating Medium Table

Top Depth	Bottom Depth	Mud Type	Min Weight (lbs/gal)	Max Weight (lbs/gal)	Density (lbs/cu ft)	Gel Strength (lbs/100 sqft)	PH	Viscosity (CP)	Salinity (ppm)	Filtration (cc)	Additional Characteristics
745	4575	OTHER : Saturated Brine	10	10.1							Saturated Brine
4575	19214	OTHER : CUT BRINE	8.6	9.3							Cut Brine
0	745	OTHER : Fresh water gel	8.6	8.8							Fresh water gel

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Section 6 - Test, Logging, Coring

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

None planned

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

CNL,GR

Coring operation description for the well:

None planned

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 4390 **Anticipated Surface Pressure:** 2222.12

Anticipated Bottom Hole Temperature(F): 150

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

COG_Harrier_102H_H2S_Schem_20190103123922.pdf

COG_Harrier_102H_H2S_SUP_20190103123930.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

COG_Harrier_102H_AC_Rprt_20190103123949.pdf

COG_Harrier_102H_Direct_Plan_20190103123958.pdf

Other proposed operations facets description:

GCP Attached.

Other proposed operations facets attachment:

COG_Harrier_102H_Drill_Prog_20190103124014.pdf

COG_Harrier_102H_GCP_20190103124037.pdf

Other Variance attachment:

SUPO

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Section 1 - Existing Roads

Will existing roads be used? YES

Existing Road Map:

COG_Harrier_102H_Existing_Rd._20190103124053.pdf

Existing Road Purpose: ACCESS,FLUID TRANSPORT **Row(s) Exist?** NO

ROW ID(s)

ID:

Do the existing roads need to be improved? NO

Existing Road Improvement Description:

Existing Road Improvement Attachment:

Section 2 - New or Reconstructed Access Roads

Will new roads be needed? YES

New Road Map:

COG_Harrier_102H_Maps_Plats_20190103124206.pdf

New road type: RESOURCE

Length: 90.4 Feet **Width (ft.):** 30

Max slope (%): 33 **Max grade (%):** 1

Army Corp of Engineers (ACOE) permit required? NO

ACOE Permit Number(s):

New road travel width: 14

New road access erosion control: Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.

New road access plan or profile prepared? NO

New road access plan attachment:

Access road engineering design? NO

Access road engineering design attachment:

Access surfacing type: OTHER

Access topsoil source: ONSITE

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Access surfacing type description: Caliche

Access onsite topsoil source depth: 6

Offsite topsoil source description:

Onsite topsoil removal process: Blading

Access other construction information: No turnouts are planned. Re-routing access road around proposed well location.

Access miscellaneous information:

Number of access turnouts: **Access turnout map:**

Drainage Control

New road drainage crossing: OTHER

Drainage Control comments: None necessary

Road Drainage Control Structures (DCS) description: None needed.

Road Drainage Control Structures (DCS) attachment:

Access Additional Attachments

Additional Attachment(s):

Section 3 - Location of Existing Wells

Existing Wells Map? YES

Attach Well map:

COG_Harrier_102H_1Mile_Data_20190103124227.pdf

Existing Wells description:

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

Submit or defer a Proposed Production Facilities plan? DEFER

Estimated Production Facilities description: A Central Tank Battery and facilities will be permitted and constructed at a later date, once the well is completed. The battery and facilities will be installed according to API specifications.

Section 5 - Location and Types of Water Supply

Water Source Table

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Water source use type: ICE PAD CONSTRUCTION & MAINTENANCE, STIMULATION, SURFACE CASING **Water source type:** OTHER

Describe type: Fresh Water.

Source latitude: **Source longitude:**

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: PRIVATE

Water source transport method: PIPELINE

Source transportation land ownership: PRIVATE

Water source volume (barrels): 450000 **Source volume (acre-feet):** 58.001892

Source volume (gal): 18900000

Water source use type: INTERMEDIATE/PRODUCTION CASING **Water source type:** OTHER

Describe type: Brine Water

Source latitude: **Source longitude:**

Source datum:

Water source permit type: PRIVATE CONTRACT

Source land ownership: COMMERCIAL

Water source transport method: TRUCKING

Source transportation land ownership: COMMERCIAL

Water source volume (barrels): 30000 **Source volume (acre-feet):** 3.866793

Source volume (gal): 1260000

Water source and transportation map:

COG_Harrier_102H_Brine_H2O_20190103124308.pdf

COG_Harrier_102H_Fresh_H2O_20190115074535.pdf

Water source comments: Fresh water will be obtained from Airacuda Frac Pond located in Section 31. T25S, R33E. Brine water will be obtained from the Malaga I Brine station in Section 2. T21S. R25E.

New water well? NO

New Water Well Info

Well latitude: **Well Longitude:** **Well datum:**

Well target aquifer:

Est. depth to top of aquifer(ft): **Est thickness of aquifer:**

Aquifer comments:

Aquifer documentation:

Well depth (ft): **Well casing type:**

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Well casing outside diameter (in.): **Well casing inside diameter (in.):**

New water well casing? **Used casing source:**

Drilling method: **Drill material:**

Grout material: **Grout depth:**

Casing length (ft.): **Casing top depth (ft.):**

Well Production type: **Completion Method:**

Water well additional information:

State appropriation permit:

Additional information attachment:

Section 6 - Construction Materials

Construction Materials description: Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be obtained from Oliver Kiehne Ranch and Cattle Co., caliche pit located in Section 4, T26S, R32E. P O Box 135, Orla, TX 79770. Phone (432) 448-6337.
Construction Materials source location attachment:

Section 7 - Methods for Handling Waste

Waste type: SEWAGE

Waste content description: Human waste and gray water

Amount of waste: 1000 gallons

Waste disposal frequency : One Time Only

Safe containment description: Waste will be properly contained and disposed of properly at a state approved disposal facility.
Safe containmant attachment:

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

Disposal location description: Trucked to an approved disposal facility

Waste type: DRILLING

Waste content description: Drilling fluids and produced oil land water while drilling and completion operations

Amount of waste: 6000 barrels

Waste disposal frequency : One Time Only

Safe containment description: All drilling waste will be stored safely and disposed of properly

Safe containmant attachment:

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

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Disposal type description:

Disposal location description: Trucked to an approved disposal facility

Waste type: GARBAGE

Waste content description: Garbage and trash produced during drilling and completion operations.

Amount of waste: 500 pounds

Waste disposal frequency : One Time Only

Safe containment description: Garbage and trash produced during drilling and completion operations will be collected in a trash container and disposed of properly at a state approved disposal facility

Safe containmant attachment:

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

Disposal type description:

Disposal location description: Trucked to an approved disposal facility.

Reserve Pit

Reserve Pit being used? NO

Temporary disposal of produced water into reserve pit?

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

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

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

Reserve pit liner

Reserve pit liner specifications and installation description

Cuttings Area

Cuttings Area being used? NO

Are you storing cuttings on location? YES

Description of cuttings location Roll off cutting containers on tracks

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

Cuttings area depth (ft.) **Cuttings area volume (cu. yd.)**

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

WCuttings area liner

Cuttings area liner specifications and installation description

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Section 8 - Ancillary Facilities

Are you requesting any Ancillary Facilities?: NO

Ancillary Facilities attachment:

Comments:

Section 9 - Well Site Layout

Well Site Layout Diagram:

COG_Harrier_102H_Layout_20190103124330.pdf

Comments: A Central Tank Battery and facilities will be permitted and constructed at a later date, once the well is completed. The battery and facilities will be installed according to API specifications.

Section 10 - Plans for Surface Reclamation

Type of disturbance: New Surface Disturbance

Multiple Well Pad Name: HARRIER FEDERAL COM

Multiple Well Pad Number: 305H, 102H AND 304H

Recontouring attachment:

Drainage/Erosion control construction: Immediately following construction approximately 400' of straw waddles will be placed on the north side of the location to reduce sediment impacts to fragile/sensitive soils.
Drainage/Erosion control reclamation: North 50', Northwest 50'

Well pad proposed disturbance (acres): 3.67
Road proposed disturbance (acres): 0.15
Powerline proposed disturbance (acres): 0
Pipeline proposed disturbance (acres): 0
Other proposed disturbance (acres): 0
Total proposed disturbance: 3.82

Well pad interim reclamation (acres): 0.15
Road interim reclamation (acres): 0
Powerline interim reclamation (acres): 0
Pipeline interim reclamation (acres): 0
Other interim reclamation (acres): 0
Total interim reclamation: 0.15

Well pad long term disturbance (acres): 2.35
Road long term disturbance (acres): 0.15
Powerline long term disturbance (acres): 0
Pipeline long term disturbance (acres): 0
Other long term disturbance (acres): 0
Total long term disturbance: 2.5

Disturbance Comments:

Reconstruction method: If needed, portions of the pad not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused. The stockpiled topsoil will be spread out over reclaimed area and reseeded with BLM approved seed mixture.
Topsoil redistribution: North 50', Northwest 50'

Soil treatment: None

Existing Vegetation at the well pad: Shinnery Oak/Mesquite grassland

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Existing Vegetation at the well pad attachment:

Existing Vegetation Community at the road: Shinnery Oak/Mesquite grassland

Existing Vegetation Community at the road attachment:

Existing Vegetation Community at the pipeline: Shinnery Oak/Mesquite grassland

Existing Vegetation Community at the pipeline attachment:

Existing Vegetation Community at other disturbances: N/A

Existing Vegetation Community at other disturbances attachment:

Non native seed used? NO

Non native seed description:

Seedling transplant description:

Will seedlings be transplanted for this project? NO

Seedling transplant description attachment:

Will seed be harvested for use in site reclamation? NO

Seed harvest description:

Seed harvest description attachment:

Seed Management

Seed Table

Seed type:

Seed source:

Seed name:

Source name:

Source address:

Source phone:

Seed cultivar:

Seed use location:

PLS pounds per acre:

Proposed seeding season:

Seed Summary

Total pounds/Acre:

Seed Type	Pounds/Acre

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Seed reclamation attachment:

Operator Contact/Responsible Official Contact Info

First Name: Gerald **Last Name:** Herrera

Phone: (432)260-7399 **Email:** gherrera@concho.com

Seedbed prep:

Seed BMP:

Seed method:

Existing invasive species? NO

Existing invasive species treatment description:

Existing invasive species treatment attachment:

Weed treatment plan description: N/A

Weed treatment plan attachment:

Monitoring plan description: N/A

Monitoring plan attachment:

Success standards: N/A

Pit closure description: N/A

Pit closure attachment:

COG_Harrier_102H_Closed_Loop_20190103124347.pdf

Section 11 - Surface Ownership

Disturbance type: WELL PAD

Describe:

Surface Owner: STATE GOVERNMENT

Other surface owner description:

BIA Local Office:

BOR Local Office:

COE Local Office:

DOD Local Office:

NPS Local Office:

State Local Office: STATE OF NEW MEXICO

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Military Local Office:

USFWS Local Office:

Other Local Office:

USFS Region:

USFS Forest/Grassland: **USFS Ranger District:**

Section 12 - Other Information

Right of Way needed? NO **Use APD as ROW?**

ROW Type(s):

ROW Applications

SUPO Additional Information: Surface Use & Operating Plan.

Use a previously conducted onsite? YES

Previous Onsite information: Onsite completed on 4/26/2018 by Rand French (COG); Gerald Herrera (COG) and Jeff Robertson (BLM).

Other SUPO Attachment

COG_Harrier_102H_1Mile_Data_20190115075506.pdf
COG_Harrier_102H_Brine_H2O_20190115075522.pdf
COG_Harrier_102H_Fresh_H2O_20190115075549.pdf
COG_Harrier_102H_Certification_20190115075600.pdf
COG_Harrier_102H_Closed_Loop_20190115075622.pdf
COG_Harrier_102H_Existing_Rd._20190115075632.pdf
COG_Harrier_102H_Layout_20190115075644.pdf
COG_Harrier_102H_Maps_Plats_20190115075702.pdf
COH_Harrier_102H_C102_20190115075721.pdf
COG_Harrier_102H_Reclamation_20190115075736.pdf
COG_Harrier_102H_SUP_20190117094347.pdf

PWD

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Section 1 - General

Would you like to address long-term produced water disposal? NO

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

Lined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

Do you propose to put the produced water to beneficial use?

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

Does the produced water have an annual average Total Dissolved Solids (TDS) concentration equal to or less than that of the existing water to be protected?

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

Unlined pit: do you have a reclamation bond for the pit?

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

Injection well number: **Injection well name:**

Assigned injection well API number? **Injection well API number:**

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner: **PWD disturbance (acres):**

Other PWD discharge volume (bbl/day):

Other PWD type description:

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

Bond Info

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB000215

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment:

Operator Certification

Operator Certification

I hereby certify that I, or someone under my direct supervision, have inspected the drill site and access route proposed herein; that I am familiar with the conditions which currently exist; that I have full knowledge of state and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

NAME: Mayte Reyes **Signed on:** 12/27/2018

Title: Regulatory Analyst

Street Address: 2208 W Main Street

City: Artesia **State:** NM **Zip:** 88210

Phone: (575)748-6945

Email address: Mreyes1@concho.com

Operator Name: COG OPERATING LLC

Well Name: HARRIER FEDERAL COM **Well Number:** 102H

Field Representative

Representative Name: Gerald Herrera

Street Address: 2208 West Main Street

City: Artesia **State:** NM **Zip:** 88210

Phone: (575)748-6940

Email address: gherrera@concho.com

Payment Info

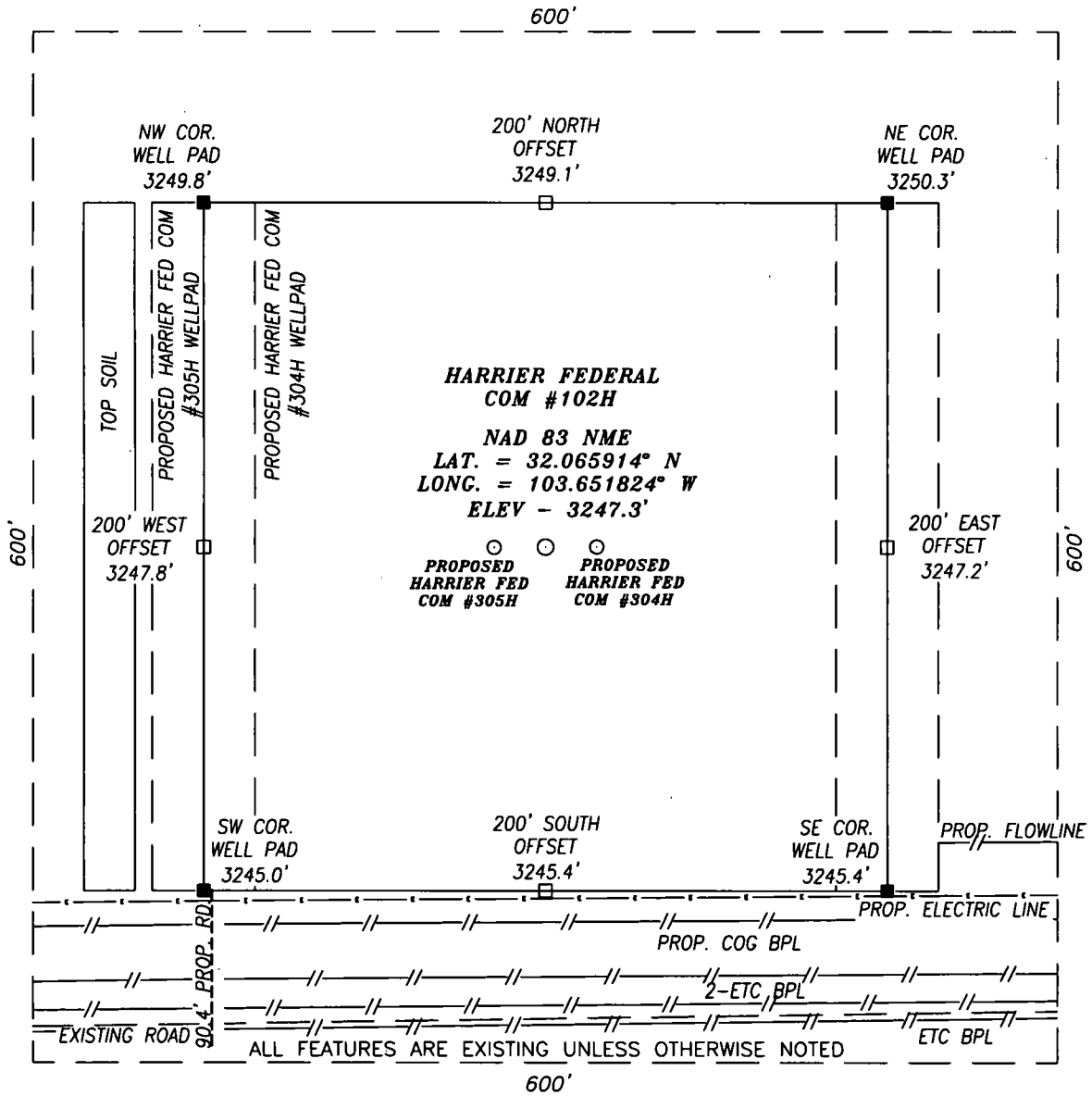
Payment

APD Fee Payment Method: PAY.GOV

pay.gov Tracking ID: 26EPP5RR

SECTION 2, TOWNSHIP 26 SOUTH, RANGE 32 EAST, N.M.P.M.,

LEA COUNTY NEW MEXICO



DIRECTIONS TO LOCATION
FROM THE INTERSECTION OF ST. HWY. 128 AND ORLA RD. (CR.1) GO SOUTH ON ORLA RD. (CR.1) FOR APPROX. 10.4 MILES; THEN TURN LEFT (EAST) ON PIPELINE RD. AND GO APPROX. 1.3 MILES TO THE PROPOSED RD.; THE PROPOSED WELL IS APPROX. 350 FEET NORTHEASTERLY.

HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
PH: (575) 746-2158
c.harcrow@harcrowsurveying.com

100 0 100 200 Feet

Scale: 1"=100'

CERTIFICATION
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

CHAD HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

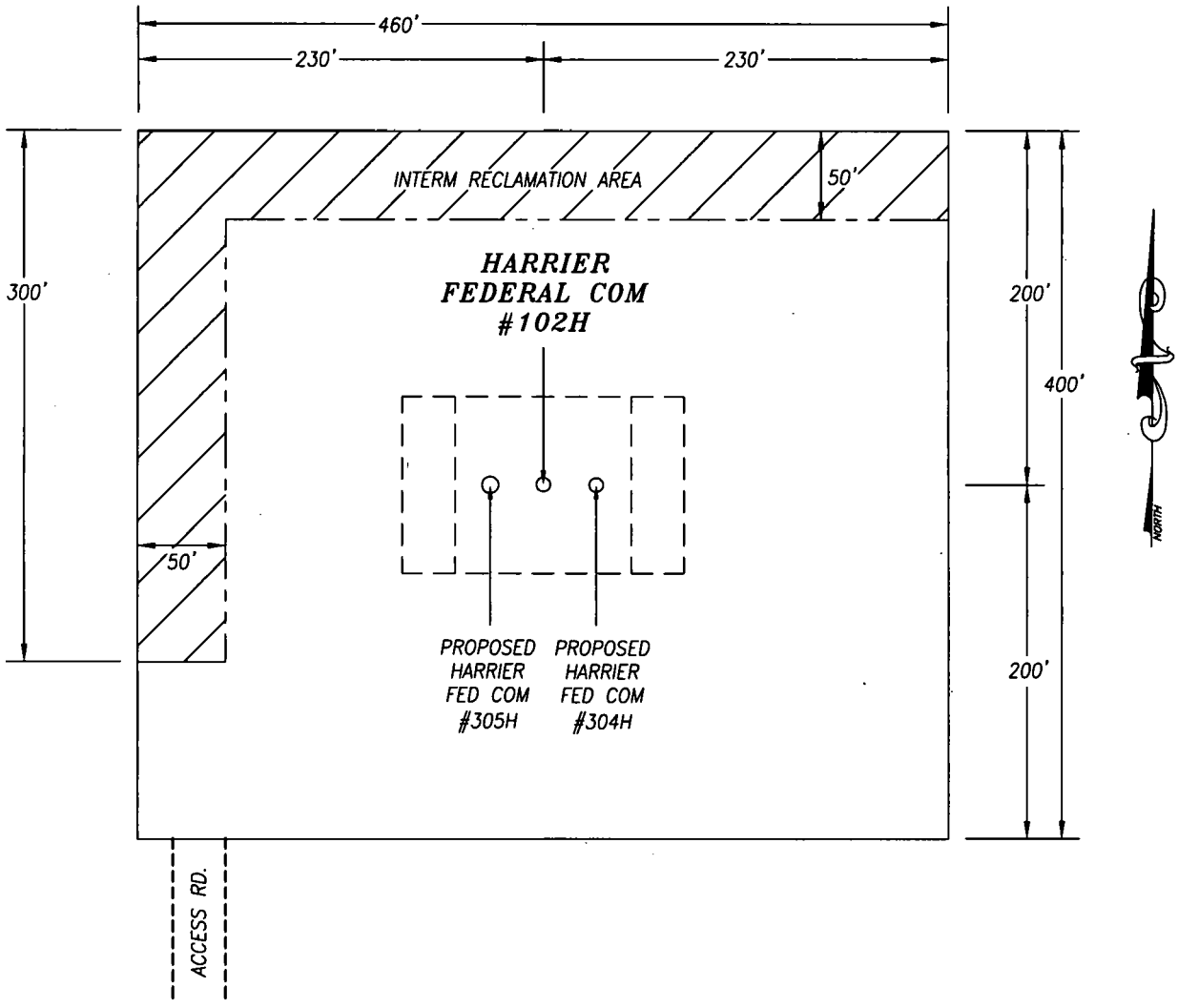
Chad Harcrow 12/17/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

COG OPERATING, LLC

HARRIER FEDERAL COM #102H
LOCATED 330 FEET FROM THE SOUTH LINE AND 750 FEET FROM THE WEST LINE OF SECTION 2, TOWNSHIP 26 SOUTH, RANGE 32 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO

SURVEY DATE: DECEMBER 12, 2018		600
DRAFTING DATE: DECEMBER 14, 2018		PAGE: 1 OF 1
APPROVED BY: CH	DRAWN BY: AM	FILE: 18-1703

RECLAMATION AND FACILITY DIAGRAM – PRODUCTION FACILITIES DIAGRAM
COG OPERATING, LLC
SECTION 2, TOWNSHIP 26 SOUTH, RANGE 32 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO.

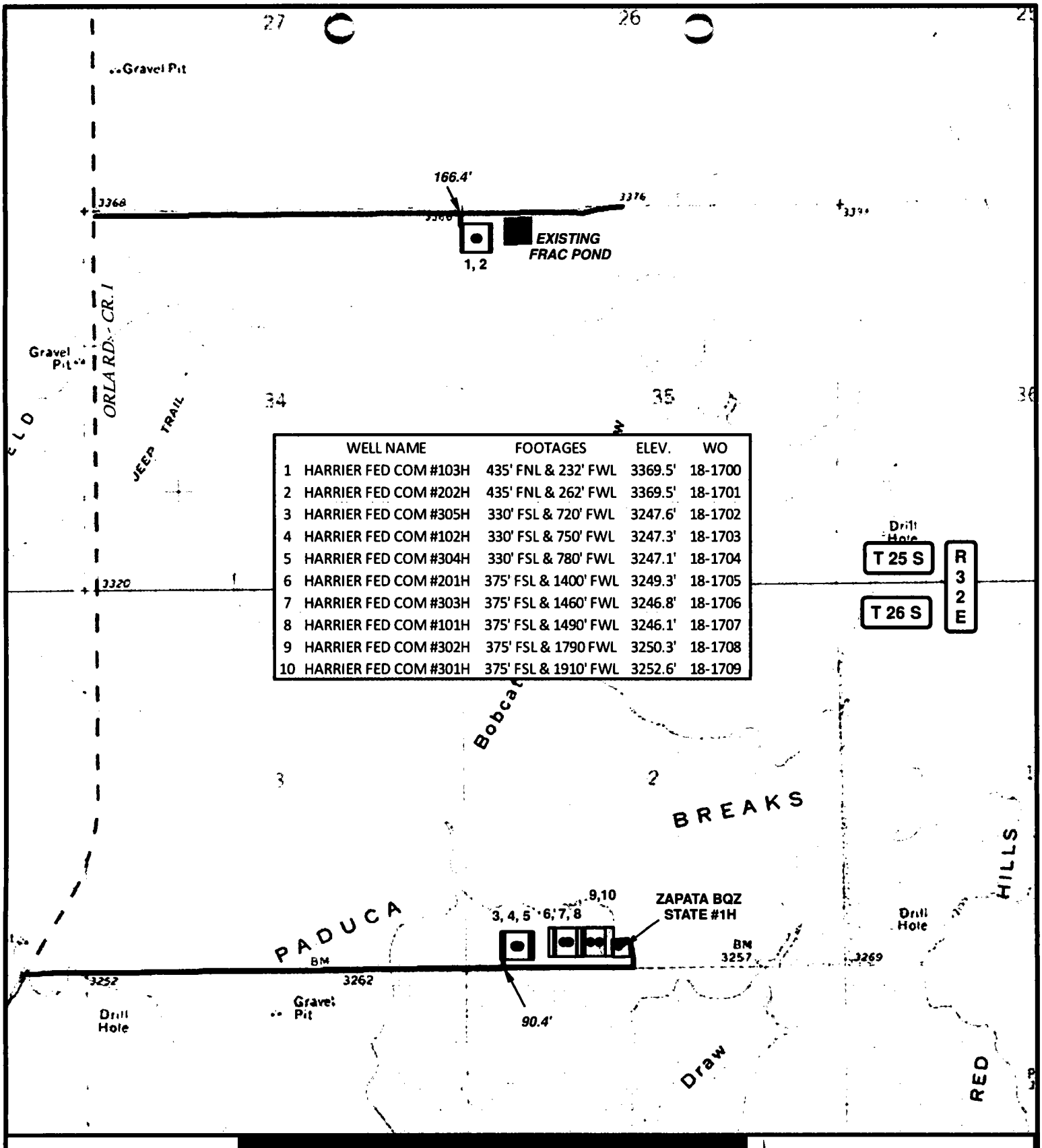


LEASE NAME WELL & WELL NUMBER: HARRIER FEDERAL COM #102H
LATITUDE: 32.065914° N
LONGITUDE: 103.651824° W

HARCROW SURVEYING, LLC
2314 W. MAIN ST, ARTESIA, N.M. 88210
PH: (575) 746-2158
c.harcrow@harcrowsurveying.com

100 0 100 200 Feet
Scale: 1"=100'

COG OPERATING, LLC	
SURVEY DATE: DECEMBER 12, 2018	RECLAMATION
REV. DRAFTING DATE: JAN 14, 2019	PAGE: 1 OF 1
APPROVED BY: CH / DRAWN BY: VD	FILE: 18-1703



	WELL NAME	FOOTAGES	ELEV.	WO
1	HARRIER FED COM #103H	435' FNL & 232' FWL	3369.5'	18-1700
2	HARRIER FED COM #202H	435' FNL & 262' FWL	3369.5'	18-1701
3	HARRIER FED COM #305H	330' FSL & 720' FWL	3247.6'	18-1702
4	HARRIER FED COM #102H	330' FSL & 750' FWL	3247.3'	18-1703
5	HARRIER FED COM #304H	330' FSL & 780' FWL	3247.1'	18-1704
6	HARRIER FED COM #201H	375' FSL & 1400' FWL	3249.3'	18-1705
7	HARRIER FED COM #303H	375' FSL & 1460' FWL	3246.8'	18-1706
8	HARRIER FED COM #101H	375' FSL & 1490' FWL	3246.1'	18-1707
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10	HARRIER FED COM #301H	375' FSL & 1910' FWL	3252.6'	18-1709

LEGEND

- WELL
- WELLPAD
- FRAC POND
- EXISTING ROAD
- PROPOSED ROAD

HARRIER FEDERAL COM WELLS

SECTIONS: 35 & 2	TOWNSHIP: 25 & 26 S.	RANGE: 32 E.
STATE: NEW MEXICO	COUNTY: LEA	SURVEY: N.M.P.M
W.O. # 18-1700-1709		LEASE: HARRIER FED

0 2,500 FEET

0 0.1 0.2 0.4 Miles

1 IN = 1,750 FT

LOCATION MAP TOPO 12/20/2018 A.M.

N

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COG OPERATING, LLC

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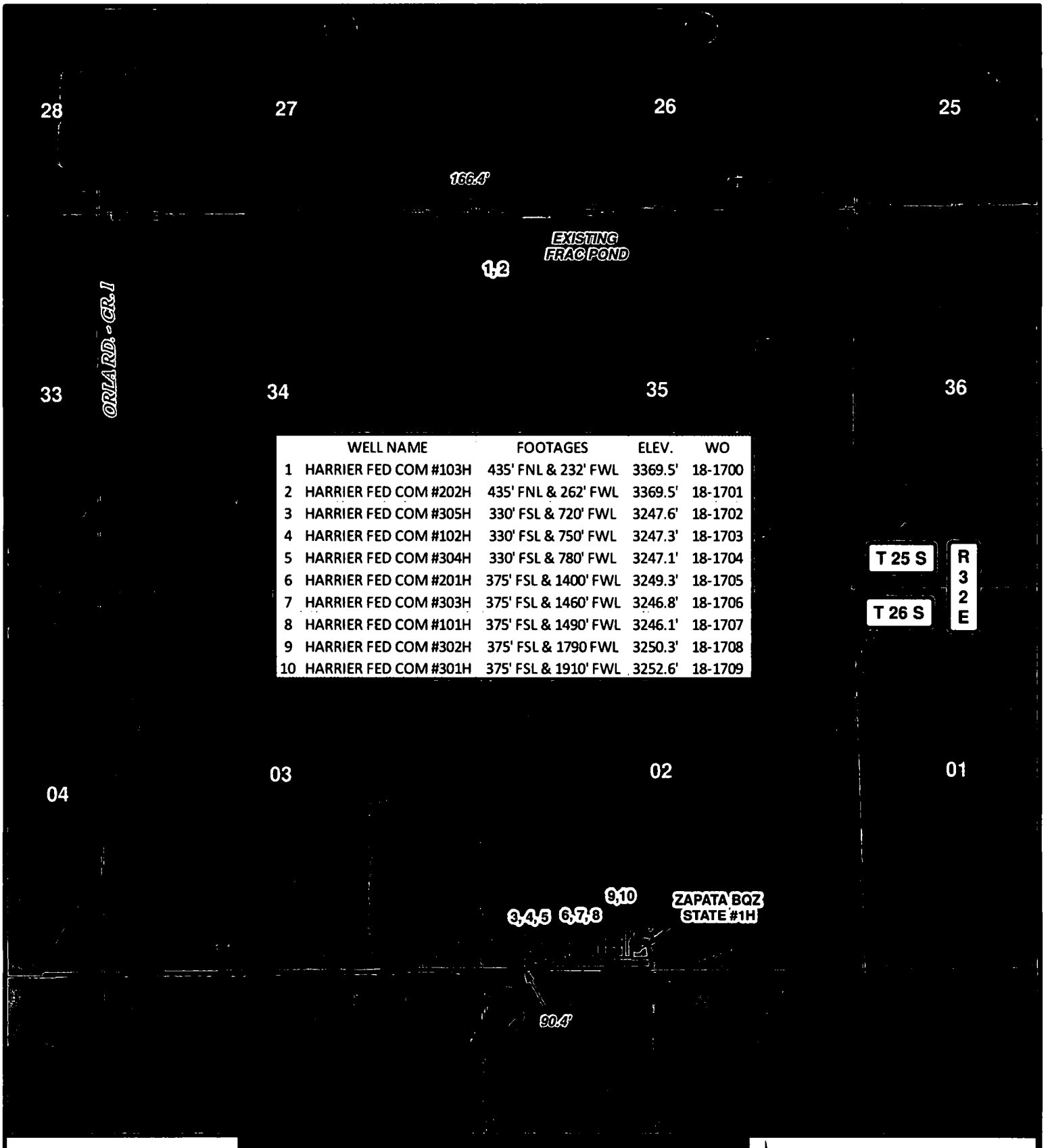
c.harcrow@harcrowsurveying.com



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LEGEND

- WELL
- WELLPAD
- FRAC POND
- EXISTING ROAD
- PROPOSED ROAD

HARRIER FEDERAL COM WELLS

SECTIONS: 35 & 2 | TOWNSHIP: 25 & 26 S. | RANGE: 32 E.

STATE: NEW MEXICO | COUNTY: LEA | SURVEY: N.M.P.M

W.O. # 18-1700-1709 | LEASE: HARRIER FED

0 2,500 FEET

0 0.1 0.2 0.4 Miles

1 IN = 1,750 FT

LOCATION MAP | IMAGERY | 12/20/2018 | A.M.

N

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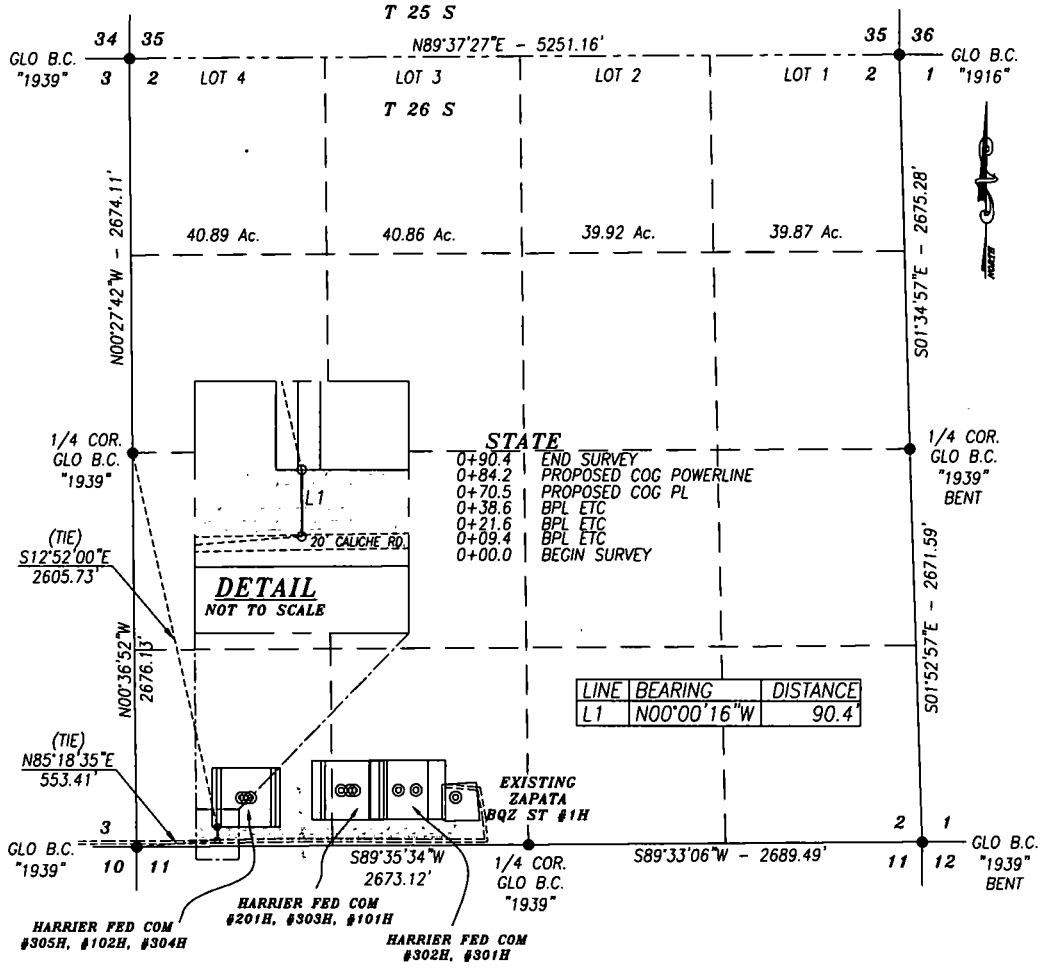
c.harcrow@harcrowsurveying.com

ACCESS ROAD PLAT
COG OPERATING, LLC

A PROPOSED ACCESS ROAD FROM EXISTING ROAD TO THE HARRIER FED COM #305H, #102H, #304H IN

SECTION 2, TOWNSHIP 25 SOUTH, RANGE 32 EAST, N.M.P.M.,

LEA COUNTY, NEW MEXICO.



DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE CROSSING STATE LAND IN SECTION 2, TOWNSHIP 25 SOUTH, RANGE 32 EAST, LEA COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND 15.0 FEET RIGHT OF THE FOLLOWING DECRIBED CENTERLINE SURVEY.

BEGINNING AT A POINT IN THE SW/4 SW/4 OF SAID SECTION, WHICH LIES N85°18'35"E 553.41 FEET FROM THE SOUTHWEST CORNER; THEN N00°00'16"W 90.4 FEET, TO A POINT IN THE SW/4 SW/4 LINE OF SAID SECTION, WHICH LIES S12°52'00"E 2605.73 FEET FROM WEST QUARTER CORNER.

SAID STRIP OF LAND BEING 90.4 FEET OR 5.48 RODS IN LENGTH, CONTAINING 0.004 ACRES MORE OR LESS AND BEING ENTIRELY LOCATED IN THE SW/4 SW/4.

BASIS OF BEARING:
BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM "NEW MEXICO EAST ZONE" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

CERTIFICATION
I, CHAD HARCROW, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

CHAD L. HARCROW NEW MEXICO 17777 LICENSED PROFESSIONAL SURVEYOR

Chad Harcrow 5/29/18
CHAD HARCROW N.M.P.S. NO. 17777 DATE

HARCROW SURVEYING, LLC
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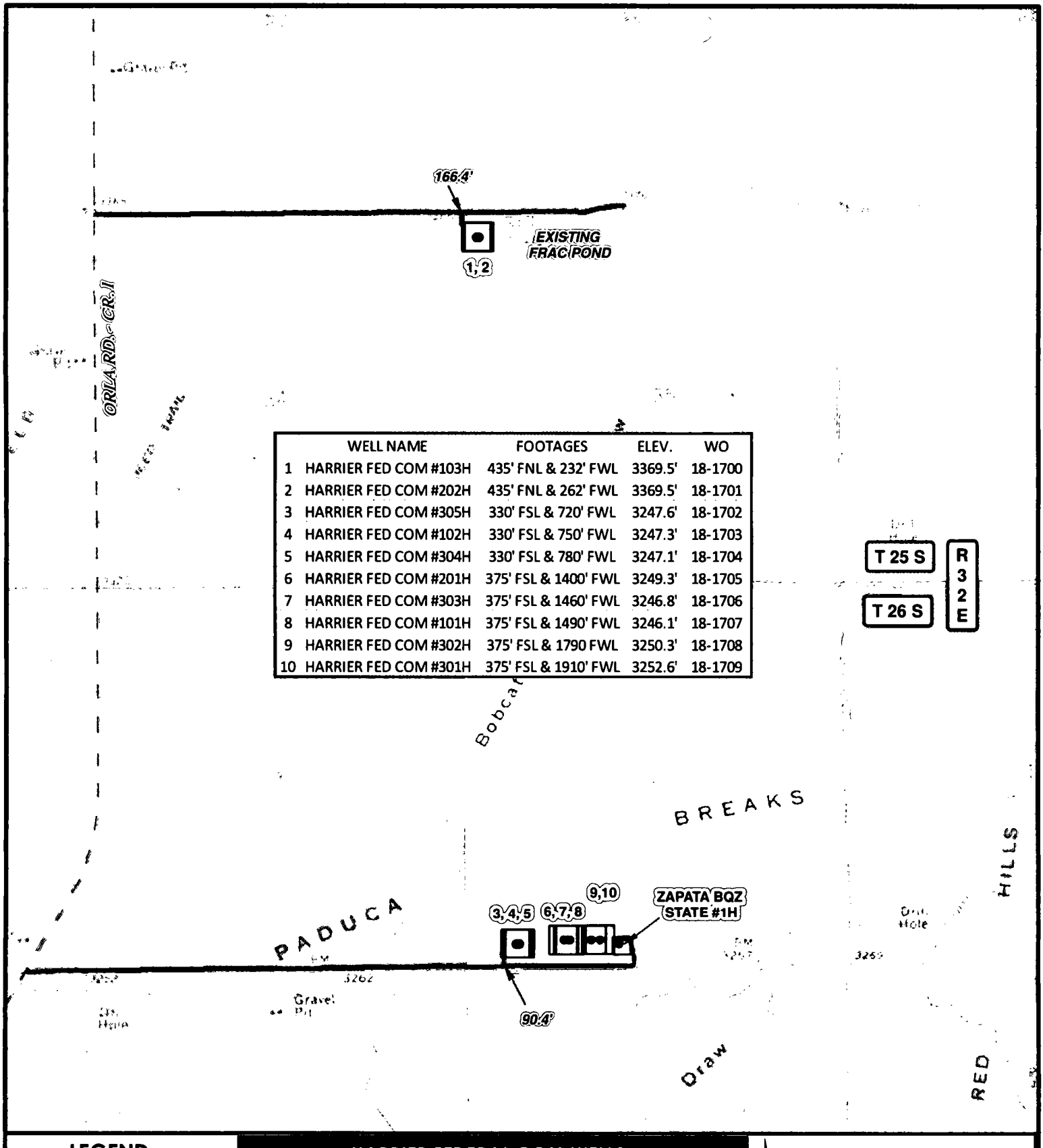
Texas Firm No. 10194089
c.harcrow@harcrowsurveying.com

1000 0 1000 2000 FEET
SCALE: 1"=1000'

COG OPERATING, LLC

SURVEY OF A PROPOSED ACCESS ROAD LOCATED IN SECTION 2, TOWNSHIP 25 SOUTH, RANGE 32 EAST, NMPM, LEA COUNTY, NEW MEXICO

SURVEY DATE: MAY 14, 2018	ACCESS ROAD
DRAFTING DATE: MAY 24, 2018	PAGE 1 OF 1
APPROVED BY: CH / DRAWN BY: VD	FILE: 18-501



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LEGEND

- WELL
- WELLPAD
- FRAC POND
- EXISTING ROAD
- PROPOSED ROAD
- PRIVATE
- STATE OF NM
- US BLM

HARRIER FEDERAL COM WELLS

SECTIONS: 35 & 2	TOWNSHIP: 25 & 26 S.	RANGE: 32 E.
STATE: NEW MEXICO	COUNTY: LEA	SURVEY: N.M.P.M
W.O. # 18-1700-1709		LEASE: HARRIER FED

0 2,500 FEET

0 0.1 0.2 0.4 Miles

1 IN = 1,750 FT

LOCATION MAP | LAND STATUS | 12/20/2018 | A.M.

N

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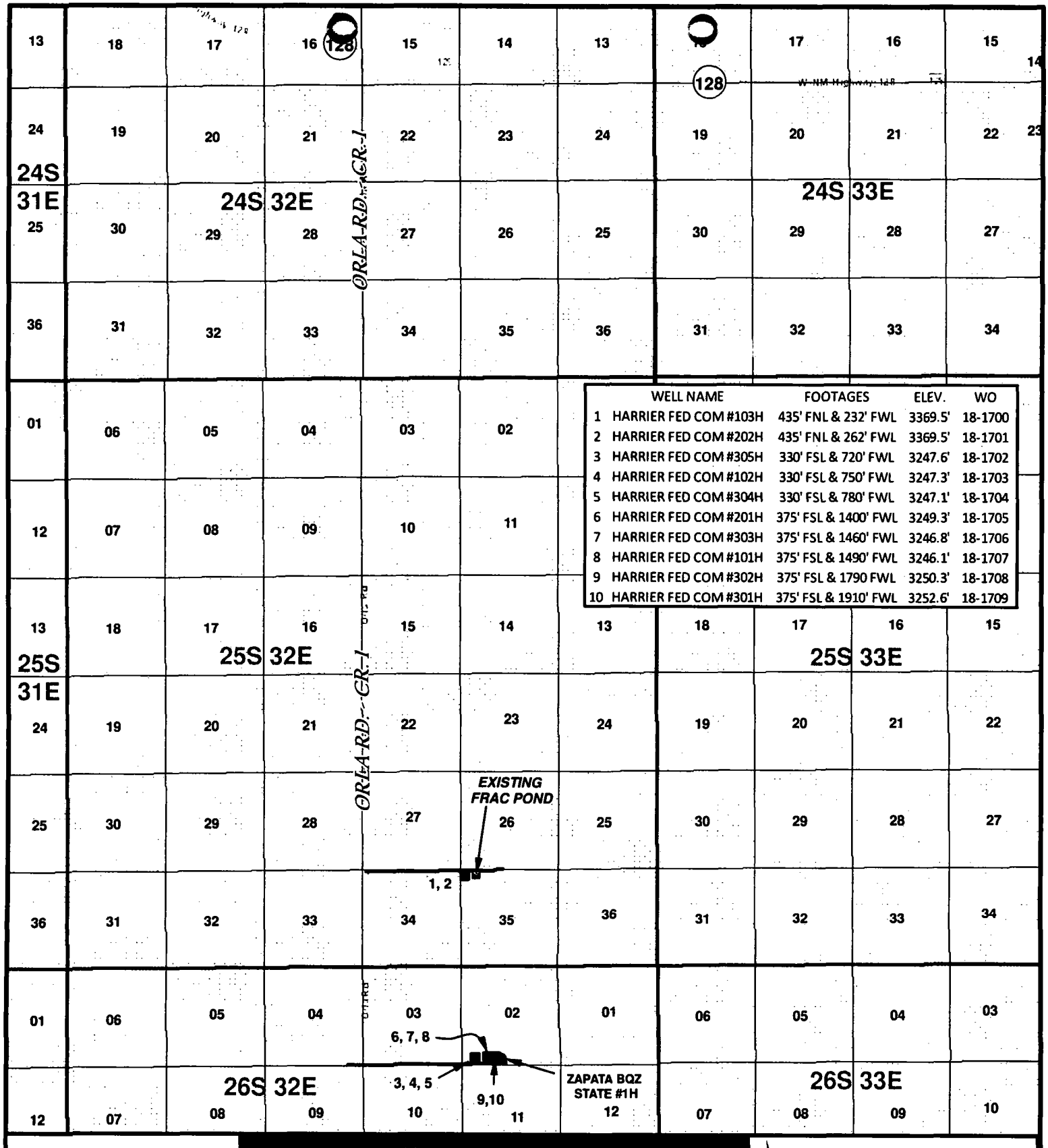

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LEGEND

- WELL
- WELLPAD
- FRAC POND
- EXISTING ROAD
- PROPOSED ROAD

HARRIER FEDERAL COM WELLS

SECTIONS: 35 & 2 TOWNSHIP: 25 & 26 S. RANGE: 32 E.

STATE: NEW MEXICO COUNTY: LEA SURVEY: N.M.P.M

W.O. # 18-1700-1709 LEASE: HARRIER FED

0 2,500 5,000 7,500 10,000 12,500 15,000 17,500 FEET

0 0.475 0.95 1.9 Miles 1 IN = 6,750 FT

LOCATION MAP VICINITY MAP 12/20/2018 A.M.

N

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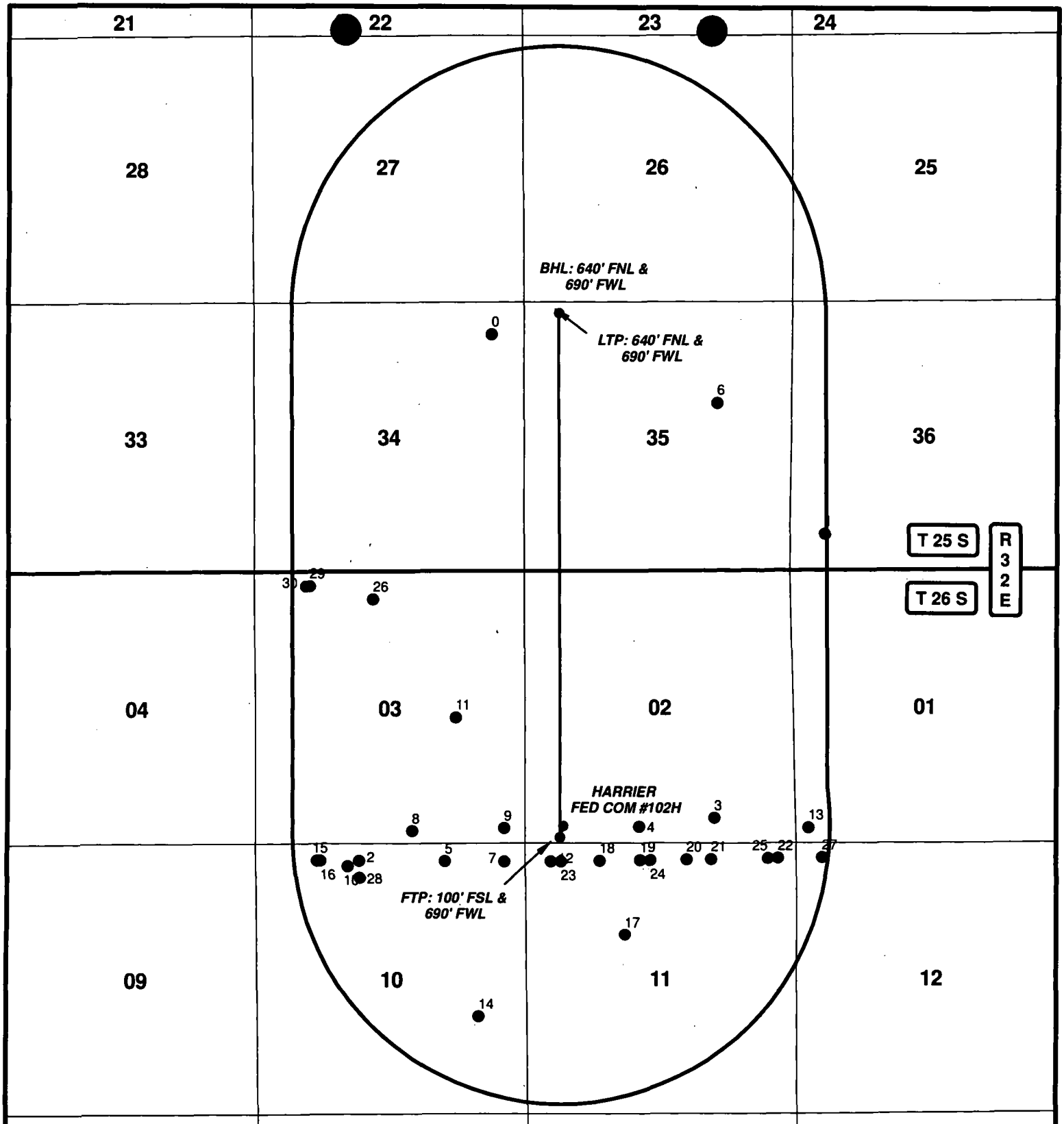
TEXAS FIRM NO. 10194089
c.harcrow@harcrowsurveying.com



DATA FOR "WELLS WITHIN 1 MI." IS TAKEN FROM THE NEW MEXICO EMNRD WEBSITE. THE DATA HAS BEEN UPDATED THROUGH SEPTEMBER 16, 2018.

LEGEND

- WELL
- BOTTOMHOLE
- WELLS WITHIN 1 MI.
- 1 MI. BUFFER

HARRIER FEDERAL COM #102H

SEC: 2	TWP: 26 S.	RGE: 32 E.	ELEVATION: 3247.3'
STATE: NEW MEXICO		COUNTY: LEA	330' FSL & 750' FWL
W.O. # 18-1703	LEASE: HARRIER FED COM		SURVEY: N.M.P.M

0 2,500 5,000 FEET

0 0.175 0.35 0.7 Miles

1 IN = 2,500 FT

1 MILE MAP 12/15/2018 V.D.

N

CONCHO

COG OPERATING, LLC

HARCROW SURVEYING, LLC.
2314 W. MAIN ST, ARTESIA, NM 88210
PH: (575) 746-2158 FAX: (575) 746-2158
TEXAS FIRM NO. 10194089
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HARRIER FEDERAL COM #102H 1 MILE DATA

FID	API	OPERATOR	RANGE	SECTION	TOWNSHIP	WELL_NAME	COMPL_STAT	EW_CD	FTG_EW	FTG_NS	LATITUDE	LONGITUDE	NS_CD
0	3002508245	W K BYROM	32E	34	25.0S	SUNSHINE ROYALTY FED 001	Plugged	E	660	660	32.092455	-103.656324	N
1	3002508248	FULLERTON OIL CO	32E	36	25.0S	BRADLEY STATE 001	Plugged	W	660	660	32.081655	-103.635074	S
2	3002539911	MEWBOURNE OIL CO	32E	10	26.0S	RED HILLS WEST UNIT 002H	New (Not drilled or compl)	W	1980	330	32.064044	-103.664856	N
3	3002539947	EOG Y RESOURCES, INC.	32E	2	26.0S	QUIJOTE BQJ STATE COM 001H	New (Not drilled or compl)	E	1650	480	32.066338	-103.64219	S
4	3002540001	EOG Y RESOURCES, INC.	32E	2	26.0S	ZAPATA BQZ STATE COM 001H	New (Not drilled or compl)	W	2180	330	32.065869	-103.646979	S
5	3002540423	COG PRODUCTION, LLC	32E	10	26.0S	BUFFLEHEAD 10 FEDERAL 001H	New (Not drilled or compl)	E	1650	330	32.064007	-103.659394	N
6	3002540572	COG OPERATING LLC	32E	35	25.0S	HARRIER 35 FEDERAL COM 001H	New (Not drilled or compl)	E	1500	1980	32.088756	-103.641915	N
7	3002540594	COG PRODUCTION, LLC	32E	10	26.0S	BUFFLEHEAD 10 FEDERAL 002H	New (Not drilled or compl)	E	480	330	32.063981	-103.655599	N
8	3002540684	COG PRODUCTION, LLC	32E	3	26.0S	PINTAIL 3 FEDERAL 001H	New (Not drilled or compl)	E	2290	260	32.065643	-103.661478	S
9	3002540685	COG PRODUCTION, LLC	32E	3	26.0S	PINTAIL 3 FEDERAL 002H	New (Not drilled or compl)	E	480	330	32.065795	-103.655608	S
10	3002540687	MEWBOURNE OIL CO	32E	10	26.0S	RED HILLS WEST UNIT 004H	New (Not drilled or compl)	W	1755	440	32.063747	-103.665588	N
11	3002541208	COG OPERATING LLC	32E	3	26.0S	PINTAIL 3 FEDERAL SWD 001	New (Not drilled or compl)	E	1400	2500	32.071782	-103.65869	S
12	3002541289	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 002H	New (Not drilled or compl)	W	430	330	32.063986	-103.652648	N
13	3002541290	BTA OIL PRODUCERS, LLC	32E	1	26.0S	MESA 8105 JV-P 003H	New (Not drilled or compl)	W	205	265	32.065819	-103.636155	S
14	3002541325	COG OPERATING LLC	32E	10	26.0S	BUFFLEHEAD 10 FEDERAL SWD 001C	New (Not drilled or compl)	E	990	1981	32.055559	-103.657301	S
15	3002541849	MEWBOURNE OIL CO	32E	10	26.0S	RED HILLS WEST UNIT 007H	New (Not drilled or compl)	W	1150	330	32.064063	-103.667548	N
16	3002542438	MEWBOURNE OIL CO	32E	10	26.0S	RED HILLS WEST UNIT 010C	New (Not drilled or compl)	W	1215	331	32.064058	-103.667338	N
17	3002542841	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA SWD 8105 JV-P 001	New (Not drilled or compl)	W	1900	1800	32.060002	-103.647902	N
18	3002542842	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 004H	New (Not drilled or compl)	W	1399	330	32.064024	-103.649504	N
19	3002542843	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 005H	New (Not drilled or compl)	W	2198	330	32.064055	-103.646913	N
20	3002542844	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 006H	New (Not drilled or compl)	E	2198	330	32.064091	-103.643941	N
21	3002542845	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 007H	New (Not drilled or compl)	E	1720	330	32.064109	-103.642391	N
22	3002542846	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 008H	New (Not drilled or compl)	E	400	330	32.06416	-103.638108	N
23	3002542855	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 020H	New (Not drilled or compl)	W	630	330	32.063994	-103.651999	N
24	3002542856	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 021H	New (Not drilled or compl)	W	2398	330	32.064063	-103.646264	N
25	3002542857	BTA OIL PRODUCERS, LLC	32E	11	26.0S	MESA 8105 JV-P 022H	New (Not drilled or compl)	E	600	330	32.064153	-103.638757	N
26	3002542909	MEWBOURNE OIL CO	32E	3	26.0S	RED HILLS WEST UNIT 016H	New (Not drilled or compl)	W	2310	550	32.078156	-103.663936	N
27	3002543079	BTA OIL PRODUCERS, LLC	32E	12	26.0S	MESA 8105 JV-P 009H	New (Not drilled or compl)	W	470	330	32.064194	-103.635286	N
28	3002543306	MEWBOURNE OIL CO	32E	10	26.0S	RED HILLS WEST UNIT 015H	New (Not drilled or compl)	W	1985	665	32.063123	-103.664846	N
29	3002543362	MEWBOURNE OIL CO	32E	3	26.0S	JENNINGS 34 W1MD FEDERAL COM 001H	New (Not drilled or compl)	W	1070	300	32.078857	-103.667968	N
30	3002543374	MEWBOURNE OIL CO	32E	3	26.0S	JENNINGS 34 A3MD FEDERAL COM 002H	New (Not drilled or compl)	W	990	300	32.078858	-103.668227	N

COG Production, LLC - Harrier Federal Com #102H

1. Geologic Formations

TVD of target	9,077' EOL	Pilot hole depth	NA
MD at TD:	19,214'	Deepest expected fresh water:	405'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	718	Water	
Top of Salt	1081	Salt	
Base of Salt	4347	Salt	
Lamar	4564	Salt Water	
Bell Canyon	4602	Salt Water	
Cherry Canyon	5611	Oil/Gas	
Brushy Canyon	7204	Oil/Gas	
U. Avalon Shale	8769	Target Oil/Gas	
M. Avalon Shale	9082	Not Penetrated	
L. Avalon Shale	9395	Not Penetrated	
Basal Avalon	X	Not Penetrated	
1st Bone Spring Sand	9718	Not Penetrated	
2nd Bone Spring Sand	X	Not Penetrated	
3rd Bone Spring Sand	X	Not Penetrated	

2. Casing Program

Hole Size	Casing Interval From	Casing Interval To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	745	13.375"	54.5	J55	STC	3.31	1.37	12.66
12.25"	0	4000	9.625"	40	J55	LTC	1.22	1.13	3.25
12.25"	4000	4575	9.625"	40	L80	LTC	1.29	1.65	5.73
8.75"	0	19,214	5.5"	17	P110	LTC	1.70	3.06	2.88
			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

	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.	260	13.5	1.75	9	12	Lead: Class C + 4% Gel + 1% CaCl2
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl2
Inter.	870	12.7	2.0	9.6	16	Lead: 35:65:6 C Blend
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl
5.5 Prod	630	11.9	2.5	19	72	Lead: 50:50:10 H Blend
	2710	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	4,075'	25% OH in Lateral (KOP to EOL) – 40% OH in Vertical

4. Pressure Control Equipment

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

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

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

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

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

5. Mud Program

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

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

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

6. Logging and Testing Procedures

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

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

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	4390 psi at 9077' TVD
Abnormal Temperature	NO 150 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

Concho Resources, Inc.

Lea County, NM (NAD 27 NME)
(Harrier Federal) Sec-2_T-26-S_R-32-E
Harrier Federal Com #102H

OWB

Plan: Plan #1

Standard Planning Report

24 December, 2018

INTREPID

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Project:	Lea County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**North Reference:**	Grid
Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

Project	Lea County, NM (NAD 27 NME)		
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	(Harrier Federal) Sec-2_T-26-S_R-32-E				
Site Position:		**Northing:**	388,326.40 usft	**Latitude:**	32° 3' 56.841 N
From:	Map	**Easting:**	711,291.50 usft	**Longitude:**	103° 39' 4.521 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.36 °

Well	Harrier Federal Com #102H					
Well Position	**+N/-S**	-0.2 usft	**Northing:**	388,326.20 usft	**Latitude:**	32° 3' 56.841 N
	+E/-W	-30.0 usft	**Easting:**	711,261.50 usft	**Longitude:**	103° 39' 4.869 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,247.1 usft

Wellbore	OWB				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	12/21/18	6.82	59.88	47,681.84348083

Design	Plan #1				
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	359.31	

Plan Survey Tool Program **Date** 12/24/18

	Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.0	8,466.5	Plan #1 (OWB)	Standard Keeper 104 Standard Wireline Keeper v	
2	8,466.5	19,213.1	Plan #1 (OWB)	MWD+IFR1+MS MWD + IFR1 + Multi-Statior	

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,259.7	5.19	189.30	5,259.3	-11.6	-1.9	2.00	2.00	-65.73	189.30	
8,466.5	5.19	189.30	8,453.0	-298.1	-48.8	0.00	0.00	0.00	0.00	
9,420.7	90.29	359.65	9,077.0	275.4	-61.8	10.00	8.92	17.85	170.31	
19,213.1	90.29	359.65	9,027.0	10,067.6	-121.1	0.00	0.00	0.00	0.00	PBHL (Harrier Fede

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Project:	Lea County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**North Reference:**	Grid
Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

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
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
NUDGE - DLS 2.00 TFO 189.30									
5,100.0	2.00	189.30	5,100.0	-1.7	-0.3	-1.7	2.00	2.00	0.00
5,200.0	4.00	189.30	5,199.8	-6.9	-1.1	-6.9	2.00	2.00	0.00

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Project:	Lea County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**North Reference:**	Grid
Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

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)
5,259.7	5.19	189.30	5,259.3	-11.6	-1.9	-11.6	2.00	2.00	0.00
HOLD - 3206.8 at 5259.7 MD									
5,300.0	5.19	189.30	5,299.5	-15.2	-2.5	-15.2	0.00	0.00	0.00
5,400.0	5.19	189.30	5,399.1	-24.1	-4.0	-24.1	0.00	0.00	0.00
5,500.0	5.19	189.30	5,498.7	-33.1	-5.4	-33.0	0.00	0.00	0.00
5,600.0	5.19	189.30	5,598.2	-42.0	-6.9	-41.9	0.00	0.00	0.00
5,700.0	5.19	189.30	5,697.8	-50.9	-8.3	-50.8	0.00	0.00	0.00
5,800.0	5.19	189.30	5,797.4	-59.9	-9.8	-59.8	0.00	0.00	0.00
5,900.0	5.19	189.30	5,897.0	-68.8	-11.3	-68.7	0.00	0.00	0.00
6,000.0	5.19	189.30	5,996.6	-77.7	-12.7	-77.6	0.00	0.00	0.00
6,100.0	5.19	189.30	6,096.2	-86.7	-14.2	-86.5	0.00	0.00	0.00
6,200.0	5.19	189.30	6,195.8	-95.6	-15.7	-95.4	0.00	0.00	0.00
6,300.0	5.19	189.30	6,295.4	-104.5	-17.1	-104.3	0.00	0.00	0.00
6,400.0	5.19	189.30	6,395.0	-113.5	-18.6	-113.2	0.00	0.00	0.00
6,500.0	5.19	189.30	6,494.6	-122.4	-20.0	-122.2	0.00	0.00	0.00
6,600.0	5.19	189.30	6,594.1	-131.3	-21.5	-131.1	0.00	0.00	0.00
6,700.0	5.19	189.30	6,693.7	-140.3	-23.0	-140.0	0.00	0.00	0.00
6,800.0	5.19	189.30	6,793.3	-149.2	-24.4	-148.9	0.00	0.00	0.00
6,900.0	5.19	189.30	6,892.9	-158.1	-25.9	-157.8	0.00	0.00	0.00
7,000.0	5.19	189.30	6,992.5	-167.1	-27.4	-166.7	0.00	0.00	0.00
7,100.0	5.19	189.30	7,092.1	-176.0	-28.8	-175.7	0.00	0.00	0.00
7,200.0	5.19	189.30	7,191.7	-185.0	-30.3	-184.6	0.00	0.00	0.00
7,300.0	5.19	189.30	7,291.3	-193.9	-31.7	-193.5	0.00	0.00	0.00
7,400.0	5.19	189.30	7,390.9	-202.8	-33.2	-202.4	0.00	0.00	0.00
7,500.0	5.19	189.30	7,490.4	-211.8	-34.7	-211.3	0.00	0.00	0.00
7,600.0	5.19	189.30	7,590.0	-220.7	-36.1	-220.2	0.00	0.00	0.00
7,700.0	5.19	189.30	7,689.6	-229.6	-37.6	-229.2	0.00	0.00	0.00
7,800.0	5.19	189.30	7,789.2	-238.6	-39.1	-238.1	0.00	0.00	0.00
7,900.0	5.19	189.30	7,888.8	-247.5	-40.5	-247.0	0.00	0.00	0.00
8,000.0	5.19	189.30	7,988.4	-256.4	-42.0	-255.9	0.00	0.00	0.00
8,100.0	5.19	189.30	8,088.0	-265.4	-43.4	-264.8	0.00	0.00	0.00
8,200.0	5.19	189.30	8,187.6	-274.3	-44.9	-273.7	0.00	0.00	0.00
8,300.0	5.19	189.30	8,287.2	-283.2	-46.4	-282.6	0.00	0.00	0.00
8,400.0	5.19	189.30	8,386.8	-292.2	-47.8	-291.6	0.00	0.00	0.00
8,466.5	5.19	189.30	8,453.0	-298.1	-48.8	-297.5	0.00	0.00	0.00
KOP - DLS 10.00 TFO 170.31									
8,500.0	1.98	205.86	8,486.4	-300.1	-49.3	-299.5	10.00	-9.61	49.47
8,550.0	3.34	344.53	8,536.4	-299.5	-50.1	-298.9	10.00	2.74	277.35
8,600.0	8.27	353.63	8,586.1	-294.5	-50.9	-293.9	10.00	9.86	18.21
8,650.0	13.26	355.94	8,635.2	-285.2	-51.7	-284.6	10.00	9.96	4.61
8,700.0	18.25	357.00	8,683.3	-271.7	-52.5	-271.0	10.00	9.98	2.12
8,750.0	23.24	357.62	8,730.1	-254.0	-53.3	-253.3	10.00	9.99	1.23
8,800.0	28.24	358.02	8,775.1	-232.3	-54.1	-231.6	10.00	9.99	0.81
8,850.0	33.24	358.32	8,818.1	-206.7	-54.9	-206.1	10.00	10.00	0.59
8,900.0	38.24	358.54	8,858.6	-177.6	-55.7	-176.9	10.00	10.00	0.45
8,950.0	43.23	358.72	8,896.5	-145.0	-56.5	-144.3	10.00	10.00	0.36
9,000.0	48.23	358.87	8,931.4	-109.2	-57.2	-108.5	10.00	10.00	0.30
9,050.0	53.23	359.00	8,963.0	-70.5	-58.0	-69.8	10.00	10.00	0.25
9,100.0	58.23	359.11	8,991.2	-29.2	-58.6	-28.5	10.00	10.00	0.22
9,150.0	63.23	359.21	9,015.6	14.4	-59.3	15.1	10.00	10.00	0.20
9,200.0	68.23	359.30	9,036.2	60.0	-59.9	60.7	10.00	10.00	0.18
9,250.0	73.23	359.39	9,052.6	107.2	-60.4	107.9	10.00	10.00	0.17
9,300.0	78.23	359.47	9,065.0	155.6	-60.9	156.3	10.00	10.00	0.16
9,350.0	83.23	359.55	9,073.0	204.9	-61.3	205.7	10.00	10.00	0.16

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Project:	Lea County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**North Reference:**	Grid
Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

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	88.23	359.62	9,076.7	254.8	-61.7	255.5	10.00	10.00	0.15
9,420.7	90.29	359.65	9,077.0	275.4	-61.8	276.2	10.00	10.00	0.15
EOC - 9792.5 hold at 9420.7 MD									
9,500.0	90.29	359.65	9,076.6	354.8	-62.3	355.5	0.00	0.00	0.00
9,600.0	90.29	359.65	9,076.1	454.8	-62.9	455.5	0.00	0.00	0.00
9,700.0	90.29	359.65	9,075.6	554.8	-63.5	555.5	0.00	0.00	0.00
9,800.0	90.29	359.65	9,075.1	654.8	-64.1	655.5	0.00	0.00	0.00
9,900.0	90.29	359.65	9,074.6	754.8	-64.7	755.5	0.00	0.00	0.00
10,000.0	90.29	359.65	9,074.1	854.8	-65.3	855.5	0.00	0.00	0.00
10,100.0	90.29	359.65	9,073.5	954.8	-65.9	955.5	0.00	0.00	0.00
10,200.0	90.29	359.65	9,073.0	1,054.8	-66.5	1,055.5	0.00	0.00	0.00
10,300.0	90.29	359.65	9,072.5	1,154.7	-67.1	1,155.5	0.00	0.00	0.00
10,400.0	90.29	359.65	9,072.0	1,254.7	-67.8	1,255.5	0.00	0.00	0.00
10,500.0	90.29	359.65	9,071.5	1,354.7	-68.4	1,355.5	0.00	0.00	0.00
10,600.0	90.29	359.65	9,071.0	1,454.7	-69.0	1,455.5	0.00	0.00	0.00
10,700.0	90.29	359.65	9,070.5	1,554.7	-69.6	1,555.5	0.00	0.00	0.00
10,800.0	90.29	359.65	9,070.0	1,654.7	-70.2	1,655.5	0.00	0.00	0.00
10,900.0	90.29	359.65	9,069.5	1,754.7	-70.8	1,755.5	0.00	0.00	0.00
11,000.0	90.29	359.65	9,068.9	1,854.7	-71.4	1,855.5	0.00	0.00	0.00
11,100.0	90.29	359.65	9,068.4	1,954.7	-72.0	1,955.4	0.00	0.00	0.00
11,200.0	90.29	359.65	9,067.9	2,054.7	-72.6	2,055.4	0.00	0.00	0.00
11,300.0	90.29	359.65	9,067.4	2,154.7	-73.2	2,155.4	0.00	0.00	0.00
11,400.0	90.29	359.65	9,066.9	2,254.7	-73.8	2,255.4	0.00	0.00	0.00
11,500.0	90.29	359.65	9,066.4	2,354.7	-74.4	2,355.4	0.00	0.00	0.00
11,600.0	90.29	359.65	9,065.9	2,454.7	-75.0	2,455.4	0.00	0.00	0.00
11,700.0	90.29	359.65	9,065.4	2,554.7	-75.6	2,555.4	0.00	0.00	0.00
11,800.0	90.29	359.65	9,064.9	2,654.7	-76.2	2,655.4	0.00	0.00	0.00
11,900.0	90.29	359.65	9,064.3	2,754.7	-76.8	2,755.4	0.00	0.00	0.00
12,000.0	90.29	359.65	9,063.8	2,854.7	-77.4	2,855.4	0.00	0.00	0.00
12,100.0	90.29	359.65	9,063.3	2,954.7	-78.0	2,955.4	0.00	0.00	0.00
12,200.0	90.29	359.65	9,062.8	3,054.7	-78.6	3,055.4	0.00	0.00	0.00
12,300.0	90.29	359.65	9,062.3	3,154.7	-79.3	3,155.4	0.00	0.00	0.00
12,400.0	90.29	359.65	9,061.8	3,254.7	-79.9	3,255.4	0.00	0.00	0.00
12,500.0	90.29	359.65	9,061.3	3,354.7	-80.5	3,355.4	0.00	0.00	0.00
12,600.0	90.29	359.65	9,060.8	3,454.7	-81.1	3,455.4	0.00	0.00	0.00
12,700.0	90.29	359.65	9,060.3	3,554.7	-81.7	3,555.4	0.00	0.00	0.00
12,800.0	90.29	359.65	9,059.8	3,654.7	-82.3	3,655.4	0.00	0.00	0.00
12,900.0	90.29	359.65	9,059.2	3,754.7	-82.9	3,755.4	0.00	0.00	0.00
13,000.0	90.29	359.65	9,058.7	3,854.7	-83.5	3,855.4	0.00	0.00	0.00
13,100.0	90.29	359.65	9,058.2	3,954.7	-84.1	3,955.4	0.00	0.00	0.00
13,200.0	90.29	359.65	9,057.7	4,054.7	-84.7	4,055.4	0.00	0.00	0.00
13,300.0	90.29	359.65	9,057.2	4,154.7	-85.3	4,155.4	0.00	0.00	0.00
13,400.0	90.29	359.65	9,056.7	4,254.7	-85.9	4,255.4	0.00	0.00	0.00
13,500.0	90.29	359.65	9,056.2	4,354.6	-86.5	4,355.4	0.00	0.00	0.00
13,600.0	90.29	359.65	9,055.7	4,454.6	-87.1	4,455.4	0.00	0.00	0.00
13,700.0	90.29	359.65	9,055.2	4,554.6	-87.7	4,555.4	0.00	0.00	0.00
13,800.0	90.29	359.65	9,054.6	4,654.6	-88.3	4,655.4	0.00	0.00	0.00
13,900.0	90.29	359.65	9,054.1	4,754.6	-88.9	4,755.4	0.00	0.00	0.00
14,000.0	90.29	359.65	9,053.6	4,854.6	-89.5	4,855.4	0.00	0.00	0.00
14,100.0	90.29	359.65	9,053.1	4,954.6	-90.1	4,955.4	0.00	0.00	0.00
14,200.0	90.29	359.65	9,052.6	5,054.6	-90.8	5,055.4	0.00	0.00	0.00
14,300.0	90.29	359.65	9,052.1	5,154.6	-91.4	5,155.3	0.00	0.00	0.00
14,400.0	90.29	359.65	9,051.6	5,254.6	-92.0	5,255.3	0.00	0.00	0.00

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Project:	Lea County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**North Reference:**	Grid
Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

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)
14,500.0	90.29	359.65	9,051.1	5,354.6	-92.6	5,355.3	0.00	0.00	0.00
14,600.0	90.29	359.65	9,050.6	5,454.6	-93.2	5,455.3	0.00	0.00	0.00
14,700.0	90.29	359.65	9,050.0	5,554.6	-93.8	5,555.3	0.00	0.00	0.00
14,800.0	90.29	359.65	9,049.5	5,654.6	-94.4	5,655.3	0.00	0.00	0.00
14,900.0	90.29	359.65	9,049.0	5,754.6	-95.0	5,755.3	0.00	0.00	0.00
15,000.0	90.29	359.65	9,048.5	5,854.6	-95.6	5,855.3	0.00	0.00	0.00
15,100.0	90.29	359.65	9,048.0	5,954.6	-96.2	5,955.3	0.00	0.00	0.00
15,200.0	90.29	359.65	9,047.5	6,054.6	-96.8	6,055.3	0.00	0.00	0.00
15,300.0	90.29	359.65	9,047.0	6,154.6	-97.4	6,155.3	0.00	0.00	0.00
15,400.0	90.29	359.65	9,046.5	6,254.6	-98.0	6,255.3	0.00	0.00	0.00
15,500.0	90.29	359.65	9,046.0	6,354.6	-98.6	6,355.3	0.00	0.00	0.00
15,600.0	90.29	359.65	9,045.5	6,454.6	-99.2	6,455.3	0.00	0.00	0.00
15,700.0	90.29	359.65	9,044.9	6,554.6	-99.8	6,555.3	0.00	0.00	0.00
15,800.0	90.29	359.65	9,044.4	6,654.6	-100.4	6,655.3	0.00	0.00	0.00
15,900.0	90.29	359.65	9,043.9	6,754.6	-101.0	6,755.3	0.00	0.00	0.00
16,000.0	90.29	359.65	9,043.4	6,854.6	-101.7	6,855.3	0.00	0.00	0.00
16,100.0	90.29	359.65	9,042.9	6,954.6	-102.3	6,955.3	0.00	0.00	0.00
16,200.0	90.29	359.65	9,042.4	7,054.6	-102.9	7,055.3	0.00	0.00	0.00
16,300.0	90.29	359.65	9,041.9	7,154.6	-103.5	7,155.3	0.00	0.00	0.00
16,400.0	90.29	359.65	9,041.4	7,254.6	-104.1	7,255.3	0.00	0.00	0.00
16,500.0	90.29	359.65	9,040.9	7,354.6	-104.7	7,355.3	0.00	0.00	0.00
16,600.0	90.29	359.65	9,040.3	7,454.6	-105.3	7,455.3	0.00	0.00	0.00
16,700.0	90.29	359.65	9,039.8	7,554.5	-105.9	7,555.3	0.00	0.00	0.00
16,800.0	90.29	359.65	9,039.3	7,654.5	-106.5	7,655.3	0.00	0.00	0.00
16,900.0	90.29	359.65	9,038.8	7,754.5	-107.1	7,755.3	0.00	0.00	0.00
17,000.0	90.29	359.65	9,038.3	7,854.5	-107.7	7,855.3	0.00	0.00	0.00
17,100.0	90.29	359.65	9,037.8	7,954.5	-108.3	7,955.3	0.00	0.00	0.00
17,200.0	90.29	359.65	9,037.3	8,054.5	-108.9	8,055.3	0.00	0.00	0.00
17,300.0	90.29	359.65	9,036.8	8,154.5	-109.5	8,155.3	0.00	0.00	0.00
17,400.0	90.29	359.65	9,036.3	8,254.5	-110.1	8,255.3	0.00	0.00	0.00
17,500.0	90.29	359.65	9,035.7	8,354.5	-110.7	8,355.3	0.00	0.00	0.00
17,600.0	90.29	359.65	9,035.2	8,454.5	-111.3	8,455.2	0.00	0.00	0.00
17,700.0	90.29	359.65	9,034.7	8,554.5	-111.9	8,555.2	0.00	0.00	0.00
17,800.0	90.29	359.65	9,034.2	8,654.5	-112.5	8,655.2	0.00	0.00	0.00
17,900.0	90.29	359.65	9,033.7	8,754.5	-113.2	8,755.2	0.00	0.00	0.00
18,000.0	90.29	359.65	9,033.2	8,854.5	-113.8	8,855.2	0.00	0.00	0.00
18,100.0	90.29	359.65	9,032.7	8,954.5	-114.4	8,955.2	0.00	0.00	0.00
18,200.0	90.29	359.65	9,032.2	9,054.5	-115.0	9,055.2	0.00	0.00	0.00
18,300.0	90.29	359.65	9,031.7	9,154.5	-115.6	9,155.2	0.00	0.00	0.00
18,400.0	90.29	359.65	9,031.2	9,254.5	-116.2	9,255.2	0.00	0.00	0.00
18,500.0	90.29	359.65	9,030.6	9,354.5	-116.8	9,355.2	0.00	0.00	0.00
18,600.0	90.29	359.65	9,030.1	9,454.5	-117.4	9,455.2	0.00	0.00	0.00
18,700.0	90.29	359.65	9,029.6	9,554.5	-118.0	9,555.2	0.00	0.00	0.00
18,800.0	90.29	359.65	9,029.1	9,654.5	-118.6	9,655.2	0.00	0.00	0.00
18,900.0	90.29	359.65	9,028.6	9,754.5	-119.2	9,755.2	0.00	0.00	0.00
19,000.0	90.29	359.65	9,028.1	9,854.5	-119.8	9,855.2	0.00	0.00	0.00
19,100.0	90.29	359.65	9,027.6	9,954.5	-120.4	9,955.2	0.00	0.00	0.00
19,200.0	90.29	359.65	9,027.1	10,054.5	-121.0	10,055.2	0.00	0.00	0.00
19,213.1	90.29	359.65	9,027.0	10,067.6	-121.1	10,068.3	0.00	0.00	0.00
TD at 19213.1									

Database:	EDM 5000.15 Single User Db	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Company:	Concho Resources, Inc.	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Project:	Lea County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**North Reference:**	Grid
Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OWB		
Design:	Plan #1		

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
PBHL (Harrier Federa - plan hits target center - Rectangle (sides W60.0 H10,299.0 D20.0)	-0.29	359.65	9,027.0	10,067.6	-121.1	398,393.80	711,140.40	32° 5' 36.476 N	103° 39' 5.537 W
FTP (Harrier Federal (- plan misses target center by 189.5usft at 9000.0usft MD (8931.4 TVD, -109.2 N, -57.2 E) - Point	0.00	0.00	9,077.0	-230.5	-57.7	388,095.70	711,203.80	32° 3' 54.563 N	103° 39' 5.557 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
717.5	717.5	Rustler			
1,080.5	1,080.5	TOS			
4,346.5	4,346.5	BOS (Fletcher)			
4,563.5	4,563.5	LMAR (Top Delaware)			
4,601.5	4,601.5	BLCN			
5,612.3	5,610.5	CYCN			
7,211.9	7,203.5	BYCN			
8,792.5	8,768.5	Bone Sprg (BSGL)			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
5,000.0	5,000.0	0.0	0.0	NUDGE - DLS 2.00 TFO 189.30
5,259.7	5,259.3	-11.6	-1.9	HOLD - 3206.8 at 5259.7 MD
8,466.5	8,453.0	-298.1	-48.8	KOP - DLS 10.00 TFO 170.31
9,420.7	9,077.0	275.4	-61.8	EOC - 9792.5 hold at 9420.7 MD
19,213.1	9,027.0	10,067.6	-121.1	TD at 19213.1

CONCHO

Concho Resources, Inc.
Project: Lea County, NM (NAD 27 NME)
Site: (Harrier Federal) Sec-2_T-26-S_R-32-E
Well: Harrier Federal Com #102H
Wellbore: OWB
Design: Plan #1
Lat: 32° 3' 56.841 N
Long: 103° 39' 4.869 W
Pad GL: 3247.1
KB: KB @ 3272.1usft (Latshaw 44)

INTREPID

WELL DETAILS: Harrier Federal Com #102H

	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
3247.1	0.0	0.0	388326.20	711261.50	32° 3' 56.841 N	103° 39' 4.869 W

SECTION DETAILS

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	
5000.0	0.00	0.00	5000.0	0.0	0.0	0.00	0.00	0.0	NUDGE - DLS 2.00 TFO 189.30
5259.7	5.19	189.30	5259.3	-11.6	-1.9	2.00	189.30	-11.6	HOLD - 3294.8 at 5259.7 MD
8468.8	5.19	189.30	8433.0	-298.1	-48.8	0.00	0.00	-297.5	KOP - DLS 10.00 TFO 170.31
9420.7	90.29	358.85	9077.0	275.4	-61.8	10.00	170.31	276.2	EOC - 9782.5 hold at 9420.7 MD
19213.1	90.29	358.85	9027.0	10067.6	-121.1	0.00	0.00	10068.3	TD at 19213.1

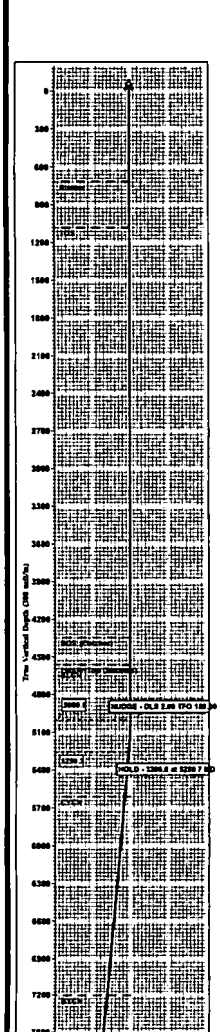
DESIGN TARGET DETAILS

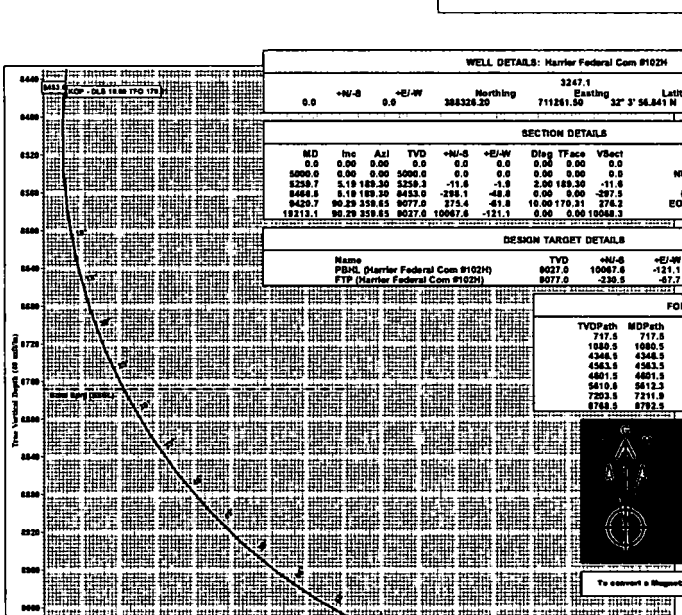
Name	TVD	+N/-S	+E/-W	Northing	Easting
PBHL (Harrier Federal Com #102H)	9027.0	10067.6	-121.1	398393.80	711140.40
FTP (Harrier Federal Com #102H)	9077.0	-330.5	-67.7	388095.70	711203.80

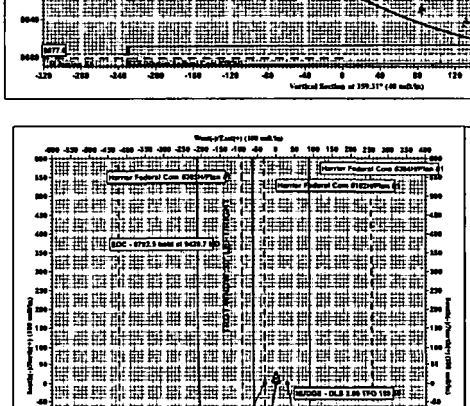
FORMATIONS

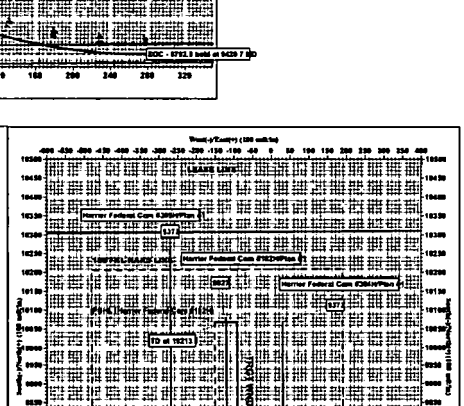
TVDPath	MDPath	Formation
717.5	717.5	Rustler
1080.5	1080.5	TOS
4346.5	4346.5	BOS (Fletcher)
4563.5	4563.5	LMAR (Top Delaware)
4801.5	4801.5	BLCN
5610.5	5612.3	CYCN
7203.5	7211.9	BYCN
8768.5	8782.5	Bone Sprg (BSGL)

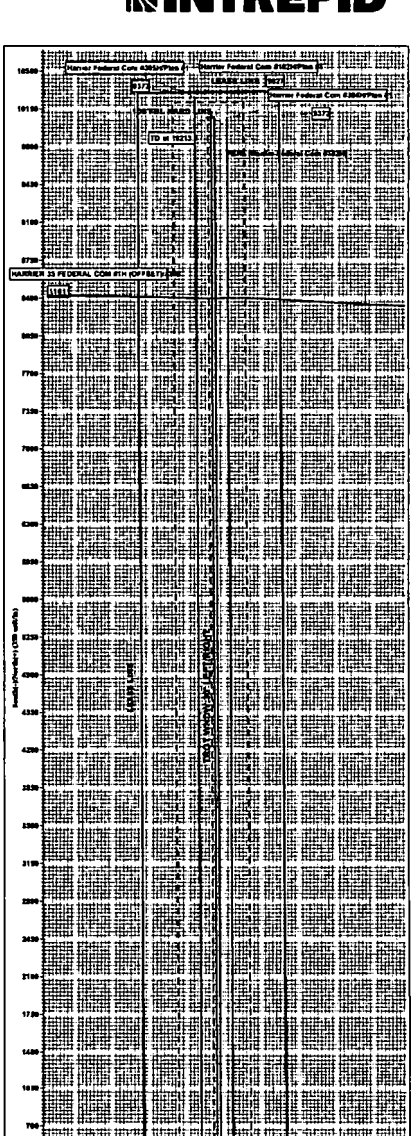
To convert a Magnetic Direction to a Grid Direction, Add 6.48°

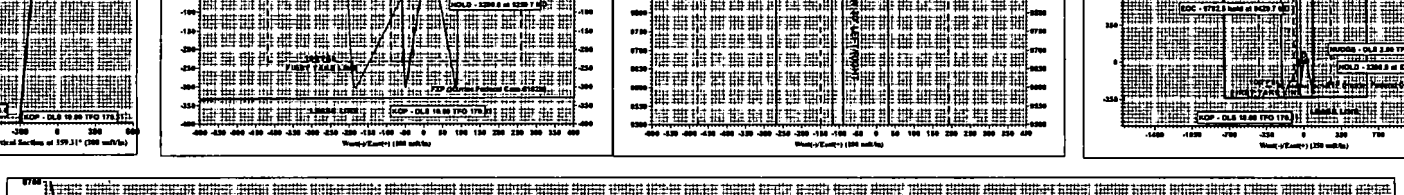












Concho Resources, Inc.

Lea County, NM (NAD 27 NME)
(Harrier Federal) Sec-2_T-26-S_R-32-E
Harrier Federal Com #102H

OWB
Plan #1

Anticollision Report

24 December, 2018

INTREPID

CONCHO

Intrepid
Anticollision Report

INTREPID

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,500.0 usft	**Error Surface:**	Pedal Curve
Warning Levels Evaluated at:	2.00 **Sigma**	**Casing Method:**	Not applied

Survey Tool Program **Date** 12/24/18

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	8,466.5	Plan #1 (OWB)	Standard Keeper 104	Standard Wireline Keeper ver 1.0.4
8,466.5	19,213.1	Plan #1 (OWB)	MWD+IFR1+MS	MWD + IFR1 + Multi-Station Correction

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
(Harrier Federal) Sec-2_T-26-S_R-32-E						
HARRIER 35 FEDERAL COM #1H (OFFSET) - OWB - A						Out of range
Harrier Federal Com #304H - OWB - Plan #1	5,000.0	5,000.0	30.0	23.1	4.351	CC, ES
Harrier Federal Com #304H - OWB - Plan #1	19,211.5	19,614.4	376.2	212.9	2.304	SF
Harrier Federal Com #305H - OWB - Plan #1	4,916.5	4,917.0	30.1	23.3	4.441	CC
Harrier Federal Com #305H - OWB - Plan #1	5,000.0	5,000.5	30.1	23.2	4.366	ES
Harrier Federal Com #305H - OWB - Plan #1	19,213.1	19,620.9	378.1	214.5	2.311	SF

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #304H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8868-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	89.62	0.2	30.0	30.0				
100.0	100.0	100.0	100.0	0.0	0.0	89.62	0.2	30.0	30.0	29.9	0.05	572.937	
200.0	200.0	200.0	200.0	0.2	0.2	89.62	0.2	30.0	30.0	29.8	0.19	156.256	
300.0	300.0	300.0	300.0	0.3	0.3	89.62	0.2	30.0	30.0	29.7	0.33	90.464	
400.0	400.0	400.0	400.0	0.4	0.4	89.62	0.2	30.0	30.0	29.5	0.47	63.660	
500.0	500.0	500.0	500.0	0.6	0.6	89.62	0.2	30.0	30.0	29.4	0.61	49.109	
600.0	600.0	600.0	600.0	0.7	0.7	89.62	0.2	30.0	30.0	29.3	0.75	39.972	
700.0	700.0	700.0	700.0	0.8	0.8	89.62	0.2	30.0	30.0	29.1	0.89	33.702	
800.0	800.0	800.0	800.0	1.0	1.0	89.62	0.2	30.0	30.0	29.0	1.03	29.132	
900.0	900.0	900.0	900.0	1.1	1.1	89.62	0.2	30.0	30.0	28.8	1.17	25.654	
1,000.0	1,000.0	1,000.0	1,000.0	1.2	1.2	89.62	0.2	30.0	30.0	28.7	1.31	22.918	
1,100.0	1,100.0	1,100.0	1,100.0	1.4	1.4	89.62	0.2	30.0	30.0	28.6	1.45	20.709	
1,200.0	1,200.0	1,200.0	1,200.0	1.5	1.5	89.62	0.2	30.0	30.0	28.4	1.59	18.888	
1,300.0	1,300.0	1,300.0	1,300.0	1.6	1.6	89.62	0.2	30.0	30.0	28.3	1.73	17.362	
1,400.0	1,400.0	1,400.0	1,400.0	1.8	1.8	89.62	0.2	30.0	30.0	28.1	1.87	16.064	
1,500.0	1,500.0	1,500.0	1,500.0	1.9	1.9	89.62	0.2	30.0	30.0	28.0	2.01	14.946	
1,600.0	1,600.0	1,600.0	1,600.0	2.0	2.0	89.62	0.2	30.0	30.0	27.9	2.15	13.974	
1,700.0	1,700.0	1,700.0	1,700.0	2.2	2.2	89.62	0.2	30.0	30.0	27.7	2.29	13.121	
1,800.0	1,800.0	1,800.0	1,800.0	2.3	2.3	89.62	0.2	30.0	30.0	27.6	2.43	12.366	
1,900.0	1,900.0	1,900.0	1,900.0	2.4	2.4	89.62	0.2	30.0	30.0	27.4	2.57	11.693	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #304H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8868-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
2,000.0	2,000.0	2,000.0	2,000.0	2.6	2.6	89.62	0.2	30.0	30.0	27.3	2.71	11.089	
2,100.0	2,100.0	2,100.0	2,100.0	2.7	2.7	89.62	0.2	30.0	30.0	27.2	2.85	10.545	
2,200.0	2,200.0	2,200.0	2,200.0	2.8	2.8	89.62	0.2	30.0	30.0	27.0	2.98	10.052	
2,300.0	2,300.0	2,300.0	2,300.0	2.9	2.9	89.62	0.2	30.0	30.0	26.9	3.12	9.602	
2,400.0	2,400.0	2,400.0	2,400.0	3.1	3.1	89.62	0.2	30.0	30.0	26.7	3.26	9.192	
2,500.0	2,500.0	2,500.0	2,500.0	3.2	3.2	89.62	0.2	30.0	30.0	26.6	3.40	8.814	
2,600.0	2,600.0	2,600.0	2,600.0	3.3	3.3	89.62	0.2	30.0	30.0	26.5	3.54	8.467	
2,700.0	2,700.0	2,700.0	2,700.0	3.5	3.5	89.62	0.2	30.0	30.0	26.3	3.68	8.146	
2,800.0	2,800.0	2,800.0	2,800.0	3.6	3.6	89.62	0.2	30.0	30.0	26.2	3.82	7.848	
2,900.0	2,900.0	2,900.0	2,900.0	3.7	3.7	89.62	0.2	30.0	30.0	26.0	3.96	7.572	
3,000.0	3,000.0	3,000.0	3,000.0	3.9	3.9	89.62	0.2	30.0	30.0	25.9	4.10	7.314	
3,100.0	3,100.0	3,100.0	3,100.0	4.0	4.0	89.62	0.2	30.0	30.0	25.8	4.24	7.073	
3,200.0	3,200.0	3,200.0	3,200.0	4.1	4.1	89.62	0.2	30.0	30.0	25.6	4.38	6.848	
3,300.0	3,300.0	3,300.0	3,300.0	4.3	4.3	89.62	0.2	30.0	30.0	25.5	4.52	6.636	
3,400.0	3,400.0	3,400.0	3,400.0	4.4	4.4	89.62	0.2	30.0	30.0	25.3	4.66	6.438	
3,500.0	3,500.0	3,500.0	3,500.0	4.5	4.5	89.62	0.2	30.0	30.0	25.2	4.80	6.250	
3,600.0	3,600.0	3,600.0	3,600.0	4.7	4.7	89.62	0.2	30.0	30.0	25.1	4.94	6.074	
3,700.0	3,700.0	3,700.0	3,700.0	4.8	4.8	89.62	0.2	30.0	30.0	24.9	5.08	5.907	
3,800.0	3,800.0	3,800.0	3,800.0	4.9	4.9	89.62	0.2	30.0	30.0	24.8	5.22	5.749	
3,900.0	3,900.0	3,900.0	3,900.0	5.1	5.1	89.62	0.2	30.0	30.0	24.6	5.36	5.599	
4,000.0	4,000.0	4,000.0	4,000.0	5.2	5.2	89.62	0.2	30.0	30.0	24.5	5.50	5.457	
4,100.0	4,100.0	4,100.0	4,100.0	5.3	5.3	89.62	0.2	30.0	30.0	24.4	5.64	5.321	
4,200.0	4,200.0	4,200.0	4,200.0	5.5	5.5	89.62	0.2	30.0	30.0	24.2	5.78	5.193	
4,300.0	4,300.0	4,300.0	4,300.0	5.6	5.6	89.62	0.2	30.0	30.0	24.1	5.92	5.070	
4,400.0	4,400.0	4,400.0	4,400.0	5.7	5.7	89.62	0.2	30.0	30.0	23.9	6.06	4.953	
4,500.0	4,500.0	4,500.0	4,500.0	5.9	5.9	89.62	0.2	30.0	30.0	23.8	6.20	4.842	
4,600.0	4,600.0	4,600.0	4,600.0	6.0	6.0	89.62	0.2	30.0	30.0	23.7	6.34	4.735	
4,700.0	4,700.0	4,700.0	4,700.0	6.1	6.1	89.62	0.2	30.0	30.0	23.5	6.48	4.633	
4,800.0	4,800.0	4,800.0	4,800.0	6.2	6.2	89.62	0.2	30.0	30.0	23.4	6.62	4.535	
4,900.0	4,900.0	4,900.0	4,900.0	6.4	6.4	89.62	0.2	30.0	30.0	23.2	6.75	4.441	
5,000.0	5,000.0	5,000.0	5,000.0	6.5	6.5	89.62	0.2	30.0	30.0	23.1	6.89	4.351	CC, ES
5,100.0	5,100.0	5,099.8	5,099.8	6.5	6.5	-99.67	-1.5	30.3	30.6	23.6	7.03	4.349	
5,200.0	5,199.8	5,199.6	5,199.5	6.5	6.5	-99.66	-6.6	31.2	32.4	25.2	7.18	4.510	
5,259.7	5,259.3	5,259.2	5,258.9	6.5	6.5	-99.85	-11.2	32.1	34.0	26.7	7.26	4.677	
5,300.0	5,299.5	5,299.5	5,299.0	6.4	6.4	-100.45	-14.4	32.6	35.1	27.8	7.32	4.800	
5,400.0	5,399.1	5,399.5	5,398.7	6.4	6.4	-101.79	-22.4	34.1	38.1	30.6	7.47	5.094	
5,500.0	5,498.7	5,499.4	5,498.3	6.4	6.4	-102.93	-30.4	35.5	41.0	33.4	7.63	5.376	
5,600.0	5,598.2	5,599.4	5,597.9	6.3	6.3	-103.92	-38.4	36.9	44.0	36.2	7.78	5.648	
5,700.0	5,697.8	5,699.3	5,697.5	6.3	6.3	-104.78	-46.4	38.4	46.9	39.0	7.94	5.910	
5,800.0	5,797.4	5,799.3	5,797.2	6.2	6.2	-105.54	-54.4	39.8	49.9	41.8	8.10	6.163	
5,900.0	5,897.0	5,899.2	5,896.8	6.2	6.2	-106.22	-62.4	41.2	52.9	44.6	8.25	6.408	
6,000.0	5,996.6	5,999.2	5,996.4	6.2	6.2	-106.82	-70.3	42.7	55.9	47.5	8.41	6.646	
6,100.0	6,096.2	6,099.1	6,096.0	6.2	6.2	-107.36	-78.3	44.1	58.9	50.3	8.56	6.877	
6,200.0	6,195.8	6,199.1	6,195.6	6.1	6.1	-107.85	-86.3	45.5	61.9	53.2	8.72	7.100	
6,300.0	6,295.4	6,299.0	6,295.3	6.1	6.1	-108.29	-94.3	47.0	64.9	56.0	8.87	7.317	
6,400.0	6,395.0	6,399.0	6,394.9	6.1	6.1	-108.70	-102.3	48.4	67.9	58.9	9.02	7.526	
6,500.0	6,494.6	6,499.0	6,494.5	6.1	6.1	-109.07	-110.3	49.9	70.9	61.8	9.18	7.730	
6,600.0	6,594.1	6,598.9	6,594.1	6.1	6.1	-109.41	-118.3	51.3	74.0	64.6	9.33	7.927	
6,700.0	6,693.7	6,698.9	6,693.8	6.0	6.0	-109.72	-126.3	52.7	77.0	67.5	9.48	8.118	
6,800.0	6,793.3	6,798.8	6,793.4	6.0	6.0	-110.01	-134.2	54.2	80.0	70.4	9.64	8.302	
6,900.0	6,892.9	6,898.8	6,893.0	6.0	6.0	-110.28	-142.2	55.6	83.0	73.2	9.79	8.481	
7,000.0	6,992.5	6,998.7	6,992.6	6.0	6.0	-110.53	-150.2	57.0	86.0	76.1	9.94	8.654	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #304H - OWB - Plan #1

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8868-MWD+IFR1+MS

Rule Assigned:

Offset Well Error: 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
7,100.0	7,092.1	7,098.7	7,092.3	6.0	6.0	-110.76	-158.2	58.5	89.1	79.0	10.10	8.821	
7,200.0	7,191.7	7,198.6	7,191.9	6.0	6.0	-110.98	-166.2	59.9	92.1	81.8	10.25	8.983	
7,300.0	7,291.3	7,298.6	7,291.5	6.0	6.0	-111.18	-174.2	61.3	95.1	84.7	10.41	9.139	
7,400.0	7,390.9	7,398.5	7,391.1	6.0	6.0	-111.37	-182.2	62.8	98.2	87.6	10.57	9.290	
7,500.0	7,490.4	7,498.5	7,490.8	6.1	6.1	-111.55	-190.2	64.2	101.2	90.5	10.73	9.436	
7,600.0	7,590.0	7,598.4	7,590.4	6.1	6.1	-111.72	-198.1	65.6	104.2	93.3	10.88	9.576	
7,700.0	7,689.6	7,698.4	7,690.0	6.1	6.1	-111.88	-206.1	67.1	107.3	96.2	11.04	9.712	
7,800.0	7,789.2	7,798.3	7,789.6	6.1	6.1	-112.03	-214.1	68.5	110.3	99.1	11.21	9.843	
7,900.0	7,888.8	7,898.3	7,889.2	6.1	6.1	-112.17	-222.1	69.9	113.3	102.0	11.37	9.969	
8,000.0	7,988.4	7,998.3	7,988.9	6.2	6.2	-112.31	-230.1	71.4	116.4	104.8	11.53	10.091	
8,100.0	8,088.0	8,098.2	8,088.5	6.2	6.2	-112.44	-238.1	72.8	119.4	107.7	11.70	10.209	
8,200.0	8,187.6	8,198.2	8,188.1	6.2	6.2	-112.56	-246.1	74.2	122.4	110.6	11.86	10.322	
8,300.0	8,287.2	8,298.1	8,287.7	6.3	6.3	-112.68	-254.1	75.7	125.5	113.5	12.03	10.431	
8,400.0	8,386.8	8,398.1	8,387.4	6.3	6.3	-112.79	-262.0	77.1	128.5	116.3	12.20	10.535	
8,466.5	8,453.0	8,464.6	8,453.6	6.4	6.3	-112.86	-267.4	78.1	130.5	118.2	12.30	10.612	
8,500.0	8,486.4	8,498.0	8,487.0	6.4	6.4	-129.09	-270.0	78.6	131.3	119.0	12.33	10.650	
8,550.0	8,536.4	8,547.8	8,536.6	6.4	6.4	94.32	-274.0	79.3	131.8	119.4	12.38	10.647	
8,600.0	8,586.1	8,596.9	8,585.6	6.5	6.4	89.12	-277.9	80.0	131.9	119.4	12.43	10.608	
8,650.0	8,635.2	8,645.1	8,633.6	6.5	6.4	92.35	-281.8	80.7	132.4	119.9	12.49	10.600	
8,700.0	8,683.3	8,692.0	8,680.3	6.5	6.5	98.07	-285.5	81.3	134.6	122.0	12.55	10.719	
8,750.0	8,730.1	8,737.1	8,725.3	6.6	6.5	104.90	-289.1	82.0	139.9	127.2	12.63	11.071	
8,800.0	8,775.1	8,780.3	8,768.3	6.6	6.5	111.88	-292.6	82.6	149.6	136.9	12.73	11.754	
8,850.0	8,818.1	8,821.0	8,808.9	6.7	6.6	118.28	-295.8	83.2	164.6	151.8	12.83	12.833	
8,900.0	8,858.6	8,859.1	8,846.9	6.7	6.6	123.66	-298.9	83.7	185.2	172.3	12.93	14.322	
8,950.0	8,896.5	8,903.2	8,890.9	6.8	6.6	129.32	-301.5	84.4	210.7	197.6	13.06	16.127	
9,000.0	8,931.4	8,954.6	8,942.2	6.9	6.6	134.74	-300.4	85.1	238.6	225.1	13.48	17.694	
9,050.0	8,963.0	9,011.2	8,998.5	7.0	6.6	139.47	-293.8	85.8	268.0	253.6	14.37	18.643	
9,100.0	8,991.2	9,074.9	9,060.6	7.1	6.7	143.67	-279.8	86.6	297.9	282.1	15.83	18.821	
9,150.0	9,015.6	9,148.0	9,129.4	7.1	6.7	147.46	-255.5	87.4	327.6	309.7	17.90	18.297	
9,200.0	9,036.2	9,233.5	9,205.2	7.2	6.8	150.91	-216.1	88.2	356.0	335.4	20.60	17.285	
9,250.0	9,052.6	9,335.5	9,286.7	7.3	6.9	153.98	-155.1	89.0	382.0	358.2	23.82	16.037	
9,300.0	9,065.0	9,457.7	9,368.4	7.4	7.1	156.55	-64.4	89.6	403.8	376.6	27.29	14.800	
9,350.0	9,073.0	9,602.1	9,437.4	7.6	7.4	158.40	62.0	89.8	419.6	389.2	30.37	13.814	
9,400.0	9,076.7	9,736.6	9,471.1	7.8	7.8	159.16	191.9	89.5	427.0	395.0	31.94	13.369	
9,420.7	9,077.0	9,817.8	9,477.0	7.9	8.1	159.33	272.7	89.1	427.5	395.2	32.30	13.235	
9,500.0	9,076.6	9,905.1	9,476.1	8.2	8.5	159.31	360.0	88.5	427.1	394.5	32.60	13.102	
9,600.0	9,076.1	10,005.1	9,475.0	8.7	8.9	159.29	460.0	87.9	426.5	393.5	33.04	12.910	
9,700.0	9,075.6	10,105.1	9,474.0	9.2	9.4	159.26	560.0	87.3	426.0	392.5	33.55	12.699	
9,800.0	9,075.1	10,205.1	9,472.9	9.7	10.0	159.23	660.0	86.7	425.5	391.4	34.12	12.470	
9,900.0	9,074.6	10,305.1	9,471.8	10.3	10.5	159.21	759.9	86.1	425.0	390.2	34.76	12.227	
10,000.0	9,074.1	10,405.1	9,470.8	10.9	11.1	159.18	859.9	85.5	424.4	389.0	35.45	11.973	
10,100.0	9,073.5	10,505.1	9,469.7	11.5	11.8	159.16	959.9	84.9	423.9	387.7	36.19	11.712	
10,200.0	9,073.0	10,605.1	9,468.6	12.2	12.4	159.13	1,059.9	84.2	423.4	386.4	36.99	11.445	
10,300.0	9,072.5	10,705.1	9,467.5	12.8	13.0	159.11	1,159.9	83.6	422.8	385.0	37.84	11.175	
10,400.0	9,072.0	10,805.1	9,466.5	13.5	13.7	159.08	1,259.9	83.0	422.3	383.6	38.73	10.905	
10,500.0	9,071.5	10,905.1	9,465.4	14.2	14.4	159.05	1,359.9	82.4	421.8	382.1	39.66	10.635	
10,600.0	9,071.0	11,005.1	9,464.3	14.9	15.0	159.03	1,459.9	81.8	421.3	380.6	40.63	10.368	
10,700.0	9,070.5	11,105.1	9,463.2	15.6	15.7	159.00	1,559.9	81.2	420.7	379.1	41.64	10.105	
10,800.0	9,070.0	11,205.1	9,462.2	16.3	16.4	158.97	1,659.9	80.6	420.2	377.5	42.68	9.846	
10,900.0	9,069.5	11,305.1	9,461.1	17.0	17.1	158.95	1,759.9	79.9	419.7	375.9	43.75	9.593	
11,000.0	9,068.9	11,405.1	9,460.0	17.7	17.8	158.92	1,859.8	79.3	419.2	374.3	44.85	9.346	
11,100.0	9,068.4	11,505.1	9,459.0	18.4	18.5	158.89	1,959.8	78.7	418.6	372.6	45.98	9.105	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #304H - OWB - Plan #1

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8868-MWD+IFR1+MS

Rule Assigned:

Offset Well Error: 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
11,200.0	9,067.9	11,605.1	9,457.9	19.1	19.2	158.87	2,059.8	78.1	418.1	371.0	47.13	8.872	
11,300.0	9,067.4	11,705.0	9,456.8	19.8	20.0	158.84	2,159.8	77.5	417.6	369.3	48.30	8.645	
11,400.0	9,066.9	11,805.0	9,455.7	20.5	20.7	158.82	2,259.8	76.9	417.0	367.5	49.50	8.425	
11,500.0	9,066.4	11,905.0	9,454.7	21.3	21.4	158.79	2,359.8	76.3	416.5	365.8	50.72	8.213	
11,600.0	9,065.9	12,005.0	9,453.6	22.0	22.1	158.76	2,459.8	75.6	416.0	364.0	51.95	8.007	
11,700.0	9,065.4	12,105.0	9,452.5	22.7	22.9	158.73	2,559.8	75.0	415.5	362.3	53.20	7.809	
11,800.0	9,064.9	12,205.0	9,451.5	23.5	23.6	158.71	2,659.8	74.4	414.9	360.5	54.47	7.618	
11,900.0	9,064.3	12,305.0	9,450.4	24.2	24.3	158.68	2,759.8	73.8	414.4	358.7	55.75	7.433	
12,000.0	9,063.8	12,405.0	9,449.3	24.9	25.1	158.65	2,859.8	73.2	413.9	356.8	57.05	7.255	
12,100.0	9,063.3	12,505.0	9,448.2	25.7	25.8	158.63	2,959.7	72.6	413.4	355.0	58.36	7.083	
12,200.0	9,062.8	12,605.0	9,447.2	26.4	26.5	158.60	3,059.7	72.0	412.8	353.1	59.68	6.917	
12,300.0	9,062.3	12,705.0	9,446.1	27.2	27.3	158.57	3,159.7	71.3	412.3	351.3	61.02	6.757	
12,400.0	9,061.8	12,805.0	9,445.0	27.9	28.0	158.54	3,259.7	70.7	411.8	349.4	62.36	6.603	
12,500.0	9,061.3	12,905.0	9,443.9	28.6	28.8	158.52	3,359.7	70.1	411.3	347.5	63.72	6.454	
12,600.0	9,060.8	13,005.0	9,442.9	29.4	29.5	158.49	3,459.7	69.5	410.7	345.6	65.08	6.311	
12,700.0	9,060.3	13,105.0	9,441.8	30.1	30.3	158.46	3,559.7	68.9	410.2	343.7	66.45	6.173	
12,800.0	9,059.8	13,205.0	9,440.7	30.9	31.0	158.43	3,659.7	68.3	409.7	341.8	67.83	6.040	
12,900.0	9,059.2	13,305.0	9,439.7	31.6	31.7	158.41	3,759.7	67.7	409.1	339.9	69.22	5.911	
13,000.0	9,058.7	13,405.0	9,438.6	32.4	32.5	158.38	3,859.7	67.0	408.6	338.0	70.62	5.787	
13,100.0	9,058.2	13,505.0	9,437.5	33.1	33.2	158.35	3,959.7	66.4	408.1	336.1	72.02	5.667	
13,200.0	9,057.7	13,605.0	9,436.4	33.9	34.0	158.32	4,059.6	65.8	407.6	334.1	73.43	5.551	
13,300.0	9,057.2	13,705.0	9,435.4	34.6	34.7	158.29	4,159.6	65.2	407.0	332.2	74.84	5.439	
13,400.0	9,056.7	13,805.0	9,434.3	35.4	35.5	158.27	4,259.6	64.6	406.5	330.3	76.26	5.331	
13,500.0	9,056.2	13,905.0	9,433.2	36.1	36.2	158.24	4,359.6	64.0	406.0	328.3	77.69	5.226	
13,600.0	9,055.7	14,005.0	9,432.2	36.9	37.0	158.21	4,459.6	63.4	405.5	326.4	79.12	5.125	
13,700.0	9,055.2	14,105.0	9,431.1	37.7	37.8	158.18	4,559.6	62.7	404.9	324.4	80.56	5.027	
13,800.0	9,054.6	14,205.0	9,430.0	38.4	38.5	158.15	4,659.6	62.1	404.4	322.4	82.00	4.932	
13,900.0	9,054.1	14,305.0	9,428.9	39.2	39.3	158.13	4,759.6	61.5	403.9	320.5	83.44	4.840	
14,000.0	9,053.6	14,405.0	9,427.9	39.9	40.0	158.10	4,859.6	60.9	403.4	318.5	84.89	4.752	
14,100.0	9,053.1	14,505.0	9,426.8	40.7	40.8	158.07	4,959.6	60.3	402.9	316.5	86.35	4.666	
14,200.0	9,052.6	14,605.0	9,425.7	41.4	41.5	158.04	5,059.6	59.7	402.3	314.5	87.80	4.582	
14,300.0	9,052.1	14,705.0	9,424.6	42.2	42.3	158.01	5,159.5	59.1	401.8	312.5	89.26	4.501	
14,400.0	9,051.6	14,805.0	9,423.6	42.9	43.0	157.98	5,259.5	58.4	401.3	310.6	90.73	4.423	
14,500.0	9,051.1	14,905.0	9,422.5	43.7	43.8	157.95	5,359.5	57.8	400.8	308.6	92.19	4.347	
14,600.0	9,050.6	15,005.0	9,421.4	44.5	44.5	157.92	5,459.5	57.2	400.2	306.6	93.66	4.273	
14,700.0	9,050.0	15,105.0	9,420.4	45.2	45.3	157.89	5,559.5	56.6	399.7	304.6	95.14	4.201	
14,800.0	9,049.5	15,205.0	9,419.3	46.0	46.1	157.87	5,659.5	56.0	399.2	302.6	96.61	4.132	
14,900.0	9,049.0	15,305.0	9,418.2	46.7	46.8	157.84	5,759.5	55.4	398.7	300.6	98.09	4.064	
15,000.0	9,048.5	15,405.0	9,417.1	47.5	47.6	157.81	5,859.5	54.8	398.1	298.6	99.57	3.998	
15,100.0	9,048.0	15,505.0	9,416.1	48.2	48.3	157.78	5,959.5	54.1	397.6	296.6	101.06	3.935	
15,200.0	9,047.5	15,605.0	9,415.0	49.0	49.1	157.75	6,059.5	53.5	397.1	294.5	102.54	3.872	
15,300.0	9,047.0	15,705.0	9,413.9	49.8	49.9	157.72	6,159.5	52.9	396.6	292.5	104.03	3.812	
15,400.0	9,046.5	15,805.0	9,412.8	50.5	50.6	157.69	6,259.4	52.3	396.0	290.5	105.52	3.753	
15,500.0	9,046.0	15,905.0	9,411.8	51.3	51.4	157.66	6,359.4	51.7	395.5	288.5	107.01	3.696	
15,600.0	9,045.5	16,005.0	9,410.7	52.0	52.1	157.63	6,459.4	51.1	395.0	286.5	108.51	3.640	
15,700.0	9,044.9	16,105.0	9,409.6	52.8	52.9	157.60	6,559.4	50.5	394.5	284.5	110.00	3.586	
15,800.0	9,044.4	16,205.0	9,408.6	53.6	53.6	157.57	6,659.4	49.8	394.0	282.5	111.50	3.533	
15,900.0	9,043.9	16,305.0	9,407.5	54.3	54.4	157.54	6,759.4	49.2	393.4	280.4	113.00	3.482	
16,000.0	9,043.4	16,405.0	9,406.4	55.1	55.2	157.51	6,859.4	48.6	392.9	278.4	114.50	3.432	
16,100.0	9,042.9	16,505.0	9,405.3	55.8	55.9	157.48	6,959.4	48.0	392.4	276.4	116.00	3.383	
16,200.0	9,042.4	16,605.0	9,404.3	56.6	56.7	157.45	7,059.4	47.4	391.9	274.4	117.51	3.335	
16,300.0	9,041.9	16,705.0	9,403.2	57.4	57.4	157.42	7,159.4	46.8	391.3	272.3	119.01	3.288	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #304H - OWB - Plan #1

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8868-MWD+IFR1+MS

Rule Assigned:

Offset Well Error: 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
16,400.0	9,041.4	16,805.0	9,402.1	58.1	58.2	157.39	7,259.3	46.2	390.8	270.3	120.52	3.243	
16,500.0	9,040.9	16,905.0	9,401.1	58.9	59.0	157.36	7,359.3	45.5	390.3	268.3	122.03	3.198	
16,600.0	9,040.3	17,005.0	9,400.0	59.6	59.7	157.33	7,459.3	44.9	389.8	266.2	123.54	3.155	
16,700.0	9,039.8	17,105.0	9,398.9	60.4	60.5	157.30	7,559.3	44.3	389.3	264.2	125.05	3.113	
16,800.0	9,039.3	17,205.0	9,397.8	61.2	61.2	157.27	7,659.3	43.7	388.7	262.2	126.56	3.072	
16,900.0	9,038.8	17,305.0	9,396.8	61.9	62.0	157.24	7,759.3	43.1	388.2	260.1	128.07	3.031	
17,000.0	9,038.3	17,405.0	9,395.7	62.7	62.8	157.20	7,859.3	42.5	387.7	258.1	129.59	2.992	
17,100.0	9,037.8	17,505.0	9,394.6	63.4	63.5	157.17	7,959.3	41.9	387.2	256.1	131.10	2.953	
17,200.0	9,037.3	17,605.0	9,393.5	64.2	64.3	157.14	8,059.3	41.2	386.6	254.0	132.62	2.915	
17,300.0	9,036.8	17,705.0	9,392.5	65.0	65.1	157.11	8,159.3	40.6	386.1	252.0	134.14	2.879	
17,400.0	9,036.3	17,805.0	9,391.4	65.7	65.8	157.08	8,259.3	40.0	385.6	249.9	135.66	2.843	
17,500.0	9,035.7	17,905.0	9,390.3	66.5	66.6	157.05	8,359.2	39.4	385.1	247.9	137.17	2.807	
17,600.0	9,035.2	18,004.9	9,389.3	67.3	67.3	157.02	8,459.2	38.8	384.6	245.9	138.70	2.773	
17,700.0	9,034.7	18,104.9	9,388.2	68.0	68.1	156.99	8,559.2	38.2	384.0	243.8	140.22	2.739	
17,800.0	9,034.2	18,204.9	9,387.1	68.8	68.9	156.95	8,659.2	37.6	383.5	241.8	141.74	2.706	
17,900.0	9,033.7	18,304.9	9,386.0	69.5	69.6	156.92	8,759.2	36.9	383.0	239.7	143.26	2.673	
18,000.0	9,033.2	18,404.9	9,385.0	70.3	70.4	156.89	8,859.2	36.3	382.5	237.7	144.78	2.642	
18,100.0	9,032.7	18,504.9	9,383.9	71.1	71.2	156.86	8,959.2	35.7	382.0	235.7	146.31	2.611	
18,200.0	9,032.2	18,604.9	9,382.8	71.8	71.9	156.83	9,059.2	35.1	381.4	233.6	147.83	2.580	
18,300.0	9,031.7	18,704.9	9,381.8	72.6	72.7	156.80	9,159.2	34.5	380.9	231.6	149.36	2.550	
18,400.0	9,031.2	18,804.9	9,380.7	73.4	73.4	156.76	9,259.2	33.9	380.4	229.5	150.89	2.521	
18,500.0	9,030.6	18,904.9	9,379.6	74.1	74.2	156.73	9,359.2	33.3	379.9	227.5	152.41	2.492	
18,600.0	9,030.1	19,004.9	9,378.5	74.9	75.0	156.70	9,459.1	32.6	379.4	225.4	153.94	2.464	
18,700.0	9,029.6	19,104.9	9,377.5	75.6	75.7	156.67	9,559.1	32.0	378.8	223.4	155.47	2.437	
18,800.0	9,029.1	19,204.9	9,376.4	76.4	76.5	156.63	9,659.1	31.4	378.3	221.3	157.00	2.410	
18,900.0	9,028.6	19,304.9	9,375.3	77.2	77.2	156.60	9,759.1	30.8	377.8	219.3	158.53	2.383	
19,000.0	9,028.1	19,404.9	9,374.2	77.9	78.0	156.57	9,859.1	30.2	377.3	217.2	160.06	2.357	
19,100.0	9,027.6	19,504.9	9,373.2	78.7	78.8	156.54	9,959.1	29.6	376.8	215.2	161.59	2.332	
19,200.0	9,027.1	19,604.9	9,372.1	79.5	79.5	156.50	10,059.1	29.0	376.3	213.1	163.12	2.307	
19,211.5	9,027.0	19,614.4	9,372.0	79.5	79.6	156.50	10,068.6	28.9	376.2	212.9	163.27	2.304	SF
19,213.1	9,027.0	19,614.4	9,372.0	79.6	79.6	156.50	10,068.6	28.9	376.2	212.9	163.27	2.304	

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #305H - OWB - Plan #1 — **Offset Site Error:** 0.0 usft

Survey Program: 0-Standard Keeper 104, 8874-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.5	0.5	0.0	0.0	-90.38	-0.2	-30.1	30.1				
100.0	100.0	100.5	100.5	0.0	0.1	-90.38	-0.2	-30.1	30.1	30.0	0.05	571.040	
200.0	200.0	200.5	200.5	0.2	0.2	-90.38	-0.2	-30.1	30.1	29.9	0.19	156.492	
300.0	300.0	300.5	300.5	0.3	0.3	-90.38	-0.2	-30.1	30.1	29.8	0.33	90.670	
400.0	400.0	400.5	400.5	0.4	0.4	-90.38	-0.2	-30.1	30.1	29.6	0.47	63.825	
500.0	500.0	500.5	500.5	0.6	0.6	-90.38	-0.2	-30.1	30.1	29.5	0.61	49.245	
600.0	600.0	600.5	600.5	0.7	0.7	-90.38	-0.2	-30.1	30.1	29.3	0.75	40.087	
700.0	700.0	700.5	700.5	0.8	0.8	-90.38	-0.2	-30.1	30.1	29.2	0.89	33.801	
800.0	800.0	800.5	800.5	1.0	1.0	-90.38	-0.2	-30.1	30.1	29.1	1.03	29.220	
900.0	900.0	900.5	900.5	1.1	1.1	-90.38	-0.2	-30.1	30.1	28.9	1.17	25.732	
1,000.0	1,000.0	1,000.5	1,000.5	1.2	1.2	-90.38	-0.2	-30.1	30.1	28.8	1.31	22.988	
1,100.0	1,100.0	1,100.5	1,100.5	1.4	1.4	-90.38	-0.2	-30.1	30.1	28.7	1.45	20.773	
1,200.0	1,200.0	1,200.5	1,200.5	1.5	1.5	-90.38	-0.2	-30.1	30.1	28.5	1.59	18.947	
1,300.0	1,300.0	1,300.5	1,300.5	1.6	1.6	-90.38	-0.2	-30.1	30.1	28.4	1.73	17.416	
1,400.0	1,400.0	1,400.5	1,400.5	1.8	1.8	-90.38	-0.2	-30.1	30.1	28.2	1.87	16.114	
1,500.0	1,500.0	1,500.5	1,500.5	1.9	1.9	-90.38	-0.2	-30.1	30.1	28.1	2.01	14.993	
1,600.0	1,600.0	1,600.5	1,600.5	2.0	2.0	-90.38	-0.2	-30.1	30.1	28.0	2.15	14.018	
1,700.0	1,700.0	1,700.5	1,700.5	2.2	2.2	-90.38	-0.2	-30.1	30.1	27.8	2.29	13.162	
1,800.0	1,800.0	1,800.5	1,800.5	2.3	2.3	-90.38	-0.2	-30.1	30.1	27.7	2.43	12.405	
1,900.0	1,900.0	1,900.5	1,900.5	2.4	2.4	-90.38	-0.2	-30.1	30.1	27.5	2.57	11.730	
2,000.0	2,000.0	2,000.5	2,000.5	2.6	2.6	-90.38	-0.2	-30.1	30.1	27.4	2.71	11.125	
2,100.0	2,100.0	2,100.5	2,100.5	2.7	2.7	-90.38	-0.2	-30.1	30.1	27.3	2.85	10.579	
2,200.0	2,200.0	2,200.5	2,200.5	2.8	2.8	-90.38	-0.2	-30.1	30.1	27.1	2.99	10.084	
2,300.0	2,300.0	2,300.5	2,300.5	2.9	3.0	-90.38	-0.2	-30.1	30.1	27.0	3.12	9.633	
2,400.0	2,400.0	2,400.5	2,400.5	3.1	3.1	-90.38	-0.2	-30.1	30.1	26.8	3.26	9.221	
2,500.0	2,500.0	2,500.5	2,500.5	3.2	3.2	-90.38	-0.2	-30.1	30.1	26.7	3.40	8.843	
2,600.0	2,600.0	2,600.5	2,600.5	3.3	3.3	-90.38	-0.2	-30.1	30.1	26.6	3.54	8.494	
2,700.0	2,700.0	2,700.5	2,700.5	3.5	3.5	-90.38	-0.2	-30.1	30.1	26.4	3.68	8.172	
2,800.0	2,800.0	2,800.5	2,800.5	3.6	3.6	-90.38	-0.2	-30.1	30.1	26.3	3.82	7.874	
2,900.0	2,900.0	2,900.5	2,900.5	3.7	3.7	-90.38	-0.2	-30.1	30.1	26.1	3.96	7.596	
3,000.0	3,000.0	3,000.5	3,000.5	3.9	3.9	-90.38	-0.2	-30.1	30.1	26.0	4.10	7.338	
3,100.0	3,100.0	3,100.5	3,100.5	4.0	4.0	-90.38	-0.2	-30.1	30.1	25.9	4.24	7.096	
3,200.0	3,200.0	3,200.5	3,200.5	4.1	4.1	-90.38	-0.2	-30.1	30.1	25.7	4.38	6.870	
3,300.0	3,300.0	3,300.5	3,300.5	4.3	4.3	-90.38	-0.2	-30.1	30.1	25.6	4.52	6.658	
3,400.0	3,400.0	3,400.5	3,400.5	4.4	4.4	-90.38	-0.2	-30.1	30.1	25.4	4.66	6.458	
3,500.0	3,500.0	3,500.5	3,500.5	4.5	4.5	-90.38	-0.2	-30.1	30.1	25.3	4.80	6.271	
3,600.0	3,600.0	3,600.5	3,600.5	4.7	4.7	-90.38	-0.2	-30.1	30.1	25.2	4.94	6.093	
3,700.0	3,700.0	3,700.5	3,700.5	4.8	4.8	-90.38	-0.2	-30.1	30.1	25.0	5.08	5.926	
3,800.0	3,800.0	3,800.5	3,800.5	4.9	4.9	-90.38	-0.2	-30.1	30.1	24.9	5.22	5.767	
3,900.0	3,900.0	3,900.5	3,900.5	5.1	5.1	-90.38	-0.2	-30.1	30.1	24.7	5.36	5.617	
4,000.0	4,000.0	4,000.5	4,000.5	5.2	5.2	-90.38	-0.2	-30.1	30.1	24.6	5.50	5.474	
4,100.0	4,100.0	4,100.5	4,100.5	5.3	5.3	-90.38	-0.2	-30.1	30.1	24.5	5.64	5.339	
4,200.0	4,200.0	4,200.5	4,200.5	5.5	5.5	-90.38	-0.2	-30.1	30.1	24.3	5.78	5.210	
4,300.0	4,300.0	4,300.5	4,300.5	5.6	5.6	-90.38	-0.2	-30.1	30.1	24.2	5.92	5.087	
4,400.0	4,400.0	4,400.5	4,400.5	5.7	5.7	-90.38	-0.2	-30.1	30.1	24.0	6.06	4.970	
4,500.0	4,500.0	4,500.5	4,500.5	5.9	5.9	-90.38	-0.2	-30.1	30.1	23.9	6.20	4.858	
4,600.0	4,600.0	4,600.5	4,600.5	6.0	6.0	-90.38	-0.2	-30.1	30.1	23.8	6.34	4.751	
4,700.0	4,700.0	4,700.5	4,700.5	6.1	6.1	-90.38	-0.2	-30.1	30.1	23.6	6.48	4.648	
4,800.0	4,800.0	4,800.5	4,800.5	6.2	6.2	-90.38	-0.2	-30.1	30.1	23.5	6.62	4.550	
4,900.0	4,900.0	4,900.5	4,900.5	6.4	6.4	-90.38	-0.2	-30.1	30.1	23.3	6.76	4.456	
4,916.5	4,916.5	4,917.0	4,917.0	6.4	6.4	-90.38	-0.2	-30.1	30.1	23.3	6.78	4.441	CC
5,000.0	5,000.0	5,000.5	5,000.5	6.5	6.5	-90.38	-0.2	-30.1	30.1	23.2	6.89	4.366	ES

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #305H - OWB - Plan #1

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8874-MWD+IFR1+MS — **Rule Assigned:** — **Offset Well Error:** 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,100.0	5,100.0	5,100.0	5,100.0	6.5	6.6	80.61	-1.8	-30.9	30.6	23.6	7.04	4.350	
5,200.0	5,199.8	5,199.5	5,199.4	6.5	6.5	81.47	-6.4	-33.2	32.1	24.9	7.19	4.468	
5,259.7	5,259.3	5,258.9	5,258.6	6.5	6.5	82.19	-10.6	-35.4	33.5	26.2	7.29	4.598	
5,300.0	5,299.5	5,299.2	5,298.7	6.4	6.5	82.76	-13.9	-37.0	34.5	27.2	7.35	4.699	
5,400.0	5,399.1	5,399.2	5,398.3	6.4	6.4	84.05	-21.9	-41.0	37.2	29.6	7.52	4.942	
5,500.0	5,498.7	5,499.1	5,497.8	6.4	6.4	85.16	-29.9	-45.0	39.8	32.1	7.69	5.173	
5,600.0	5,598.2	5,599.1	5,597.4	6.3	6.4	86.14	-37.9	-49.1	42.4	34.6	7.86	5.394	
5,700.0	5,697.8	5,699.1	5,696.9	6.3	6.3	87.00	-45.9	-53.1	45.1	37.0	8.04	5.606	
5,800.0	5,797.4	5,799.0	5,796.5	6.2	6.3	87.76	-53.9	-57.1	47.7	39.5	8.21	5.810	
5,900.0	5,897.0	5,899.0	5,896.1	6.2	6.3	88.45	-61.9	-61.2	50.4	42.0	8.39	6.007	
6,000.0	5,996.6	5,998.9	5,995.6	6.2	6.3	89.06	-69.9	-65.2	53.1	44.5	8.56	6.198	
6,100.0	6,096.2	6,098.9	6,095.2	6.2	6.3	89.62	-77.9	-69.2	55.7	47.0	8.73	6.383	
6,200.0	6,195.8	6,198.9	6,194.7	6.1	6.2	90.12	-85.9	-73.2	58.4	49.5	8.90	6.562	
6,300.0	6,295.4	6,298.8	6,294.3	6.1	6.2	90.59	-93.9	-77.3	61.1	52.0	9.07	6.735	
6,400.0	6,395.0	6,398.8	6,393.9	6.1	6.2	91.01	-101.9	-81.3	63.8	54.6	9.24	6.903	
6,500.0	6,494.6	6,498.8	6,493.4	6.1	6.2	91.40	-109.9	-85.3	66.5	57.1	9.41	7.065	
6,600.0	6,594.1	6,598.7	6,593.0	6.1	6.2	91.75	-117.9	-89.4	69.2	59.6	9.58	7.223	
6,700.0	6,693.7	6,698.7	6,692.5	6.0	6.2	92.08	-125.9	-93.4	71.9	62.1	9.75	7.376	
6,800.0	6,793.3	6,798.6	6,792.1	6.0	6.2	92.39	-133.9	-97.4	74.6	64.7	9.91	7.524	
6,900.0	6,892.9	6,898.6	6,891.7	6.0	6.2	92.68	-141.9	-101.4	77.3	67.2	10.08	7.667	
7,000.0	6,992.5	6,998.6	6,991.2	6.0	6.2	92.94	-150.0	-105.5	80.0	69.8	10.25	7.806	
7,100.0	7,092.1	7,098.5	7,090.8	6.0	6.2	93.19	-158.0	-109.5	82.7	72.3	10.42	7.940	
7,200.0	7,191.7	7,198.5	7,190.3	6.0	6.2	93.42	-166.0	-113.5	85.4	74.8	10.58	8.070	
7,300.0	7,291.3	7,298.5	7,289.9	6.0	6.3	93.64	-174.0	-117.6	88.1	77.4	10.75	8.196	
7,400.0	7,390.9	7,398.4	7,389.5	6.0	6.3	93.85	-182.0	-121.6	90.8	79.9	10.92	8.317	
7,500.0	7,490.4	7,498.4	7,489.0	6.1	6.3	94.04	-190.0	-125.6	93.5	82.5	11.09	8.435	
7,600.0	7,590.0	7,598.3	7,588.6	6.1	6.3	94.23	-198.0	-129.7	96.3	85.0	11.26	8.549	
7,700.0	7,689.6	7,698.3	7,688.1	6.1	6.4	94.40	-206.0	-133.7	99.0	87.5	11.43	8.659	
7,800.0	7,789.2	7,798.3	7,787.7	6.1	6.4	94.56	-214.0	-137.7	101.7	90.1	11.60	8.765	
7,900.0	7,888.8	7,898.2	7,887.3	6.1	6.5	94.72	-222.0	-141.7	104.4	92.6	11.77	8.867	
8,000.0	7,988.4	7,998.2	7,986.8	6.2	6.5	94.86	-230.0	-145.8	107.1	95.2	11.95	8.967	
8,100.0	8,088.0	8,098.2	8,086.4	6.2	6.5	95.00	-238.0	-149.8	109.8	97.7	12.12	9.062	
8,200.0	8,187.6	8,198.1	8,185.9	6.2	6.6	95.14	-246.0	-153.8	112.6	100.3	12.30	9.154	
8,300.0	8,287.2	8,298.1	8,285.5	6.3	6.6	95.26	-254.0	-157.9	115.3	102.8	12.47	9.243	
8,400.0	8,386.8	8,398.1	8,385.1	6.3	6.7	95.38	-262.0	-161.9	118.0	105.3	12.65	9.329	
8,466.5	8,453.0	8,464.5	8,451.3	6.4	6.7	95.46	-267.3	-164.6	119.8	107.1	12.74	9.402	
8,500.0	8,486.4	8,498.0	8,484.6	6.4	6.8	78.58	-270.0	-165.9	120.5	107.7	12.77	9.433	
8,550.0	8,536.4	8,547.8	8,534.2	6.4	6.8	-62.31	-274.0	-167.9	120.6	107.8	12.78	9.434	
8,600.0	8,586.1	8,596.9	8,583.1	6.5	6.8	-75.63	-277.9	-169.9	120.2	107.5	12.77	9.418	
8,624.1	8,609.9	8,620.3	8,606.4	6.5	6.8	-79.70	-279.8	-170.8	120.2	107.4	12.75	9.424	
8,650.0	8,635.2	8,645.1	8,631.1	6.5	6.9	-83.97	-281.8	-171.8	120.3	107.6	12.72	9.460	
8,700.0	8,683.3	8,692.0	8,677.8	6.5	6.9	-92.48	-285.6	-173.7	122.2	109.6	12.64	9.666	
8,750.0	8,730.1	8,737.1	8,722.8	6.6	6.9	-101.24	-289.2	-175.6	127.5	114.9	12.57	10.144	
8,800.0	8,775.1	8,780.3	8,765.8	6.6	7.0	-109.67	-292.6	-177.3	137.5	125.0	12.53	10.979	
8,850.0	8,818.1	8,821.1	8,806.4	6.7	7.0	-117.11	-295.9	-178.9	153.2	140.7	12.55	12.211	
8,900.0	8,858.6	8,859.2	8,844.3	6.7	7.0	-123.21	-298.9	-180.5	174.7	162.1	12.62	13.839	
8,950.0	8,896.5	8,901.6	8,886.6	6.8	7.0	-129.12	-301.7	-182.2	201.2	188.4	12.76	15.773	
9,000.0	8,931.4	8,952.3	8,937.2	6.9	7.0	-134.87	-301.2	-184.3	230.3	217.1	13.20	17.452	
9,050.0	8,963.0	9,008.1	8,992.7	7.0	7.0	-139.77	-295.4	-186.6	260.7	246.6	14.11	18.478	
9,100.0	8,991.2	9,071.0	9,054.1	7.1	7.1	-144.04	-282.5	-189.2	291.7	276.1	15.59	18.711	
9,150.0	9,015.6	9,143.1	9,122.4	7.1	7.1	-147.85	-259.4	-192.1	322.4	304.7	17.69	18.227	
9,200.0	9,036.2	9,227.8	9,198.0	7.2	7.2	-151.28	-221.7	-195.5	351.8	331.4	20.41	17.237	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #305H - OWB - Plan #1

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8874-MWD+IFR1+MS

Rule Assigned:

Offset Well Error: 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,250.0	9,052.6	9,329.1	9,280.0	7.3	7.3	-154.32	-162.6	-199.2	378.8	355.1	23.69	15.991	
9,300.0	9,065.0	9,451.5	9,363.4	7.4	7.5	-156.86	-73.3	-203.2	401.7	374.5	27.27	14.733	
9,350.0	9,073.0	9,597.4	9,435.2	7.6	7.8	-158.71	53.2	-207.0	418.4	387.9	30.51	13.711	
9,400.0	9,076.7	9,735.9	9,471.4	7.8	8.1	-159.50	186.5	-209.4	426.4	394.2	32.22	13.235	
9,420.7	9,077.0	9,819.1	9,477.9	7.9	8.4	-159.67	269.3	-210.2	427.1	394.4	32.63	13.090	
9,500.0	9,076.6	9,907.9	9,477.2	8.2	8.7	-159.65	358.1	-210.7	426.7	393.8	32.92	12.962	
9,600.0	9,076.1	10,007.9	9,476.1	8.7	9.1	-159.63	458.1	-211.3	426.2	392.9	33.36	12.777	
9,700.0	9,075.6	10,107.9	9,475.1	9.2	9.6	-159.60	558.1	-211.9	425.7	391.9	33.86	12.573	
9,800.0	9,075.1	10,207.9	9,474.0	9.7	10.2	-159.57	658.1	-212.5	425.2	390.8	34.43	12.351	
9,900.0	9,074.6	10,307.9	9,473.0	10.3	10.7	-159.55	758.0	-213.2	424.7	389.6	35.05	12.116	
10,000.0	9,074.1	10,407.9	9,471.9	10.9	11.3	-159.52	858.0	-213.8	424.2	388.5	35.74	11.870	
10,100.0	9,073.5	10,507.9	9,470.9	11.5	11.9	-159.49	958.0	-214.4	423.7	387.2	36.48	11.615	
10,200.0	9,073.0	10,607.9	9,469.8	12.2	12.5	-159.47	1,058.0	-215.0	423.2	385.9	37.27	11.355	
10,300.0	9,072.5	10,707.9	9,468.8	12.8	13.2	-159.44	1,158.0	-215.6	422.7	384.6	38.11	11.092	
10,400.0	9,072.0	10,807.9	9,467.7	13.5	13.8	-159.41	1,258.0	-216.2	422.2	383.2	38.99	10.828	
10,500.0	9,071.5	10,907.9	9,466.7	14.2	14.5	-159.39	1,358.0	-216.8	421.7	381.8	39.91	10.564	
10,600.0	9,071.0	11,007.9	9,465.6	14.9	15.1	-159.36	1,458.0	-217.4	421.2	380.3	40.88	10.303	
10,700.0	9,070.5	11,107.9	9,464.6	15.6	15.8	-159.33	1,558.0	-218.0	420.7	378.8	41.88	10.045	
10,800.0	9,070.0	11,207.9	9,463.5	16.3	16.5	-159.31	1,658.0	-218.7	420.2	377.2	42.91	9.791	
10,900.0	9,069.5	11,307.9	9,462.4	17.0	17.2	-159.28	1,758.0	-219.3	419.7	375.7	43.98	9.542	
11,000.0	9,068.9	11,407.9	9,461.4	17.7	17.9	-159.25	1,857.9	-219.9	419.1	374.1	45.07	9.299	
11,100.0	9,068.4	11,507.9	9,460.3	18.4	18.6	-159.23	1,957.9	-220.5	418.6	372.4	46.20	9.062	
11,200.0	9,067.9	11,607.9	9,459.3	19.1	19.3	-159.20	2,057.9	-221.1	418.1	370.8	47.34	8.832	
11,300.0	9,067.4	11,707.9	9,458.2	19.8	20.0	-159.17	2,157.9	-221.7	417.6	369.1	48.51	8.608	
11,400.0	9,066.9	11,807.9	9,457.2	20.5	20.8	-159.15	2,257.9	-222.3	417.1	367.4	49.71	8.392	
11,500.0	9,066.4	11,907.9	9,456.1	21.3	21.5	-159.12	2,357.9	-222.9	416.6	365.7	50.92	8.182	
11,600.0	9,065.9	12,007.9	9,455.1	22.0	22.2	-159.09	2,457.9	-223.5	416.1	364.0	52.15	7.979	
11,700.0	9,065.4	12,107.9	9,454.0	22.7	22.9	-159.06	2,557.9	-224.2	415.6	362.2	53.40	7.783	
11,800.0	9,064.9	12,207.9	9,453.0	23.5	23.7	-159.04	2,657.9	-224.8	415.1	360.4	54.67	7.594	
11,900.0	9,064.3	12,307.9	9,451.9	24.2	24.4	-159.01	2,757.9	-225.4	414.6	358.7	55.95	7.411	
12,000.0	9,063.8	12,407.9	9,450.9	24.9	25.1	-158.98	2,857.9	-226.0	414.1	356.9	57.24	7.235	
12,100.0	9,063.3	12,507.9	9,449.8	25.7	25.9	-158.95	2,957.8	-226.6	413.6	355.1	58.55	7.064	
12,200.0	9,062.8	12,607.9	9,448.8	26.4	26.6	-158.93	3,057.8	-227.2	413.1	353.2	59.87	6.900	
12,300.0	9,062.3	12,707.9	9,447.7	27.2	27.3	-158.90	3,157.8	-227.8	412.6	351.4	61.20	6.742	
12,400.0	9,061.8	12,807.9	9,446.7	27.9	28.1	-158.87	3,257.8	-228.4	412.1	349.6	62.54	6.589	
12,500.0	9,061.3	12,907.9	9,445.6	28.6	28.8	-158.84	3,357.8	-229.0	411.6	347.7	63.90	6.442	
12,600.0	9,060.8	13,007.9	9,444.6	29.4	29.6	-158.81	3,457.8	-229.7	411.1	345.8	65.26	6.299	
12,700.0	9,060.3	13,107.9	9,443.5	30.1	30.3	-158.79	3,557.8	-230.3	410.6	344.0	66.63	6.162	
12,800.0	9,059.8	13,207.9	9,442.5	30.9	31.1	-158.76	3,657.8	-230.9	410.1	342.1	68.01	6.030	
12,900.0	9,059.2	13,307.9	9,441.4	31.6	31.8	-158.73	3,757.8	-231.5	409.6	340.2	69.40	5.902	
13,000.0	9,058.7	13,407.9	9,440.3	32.4	32.6	-158.70	3,857.8	-232.1	409.1	338.3	70.79	5.779	
13,100.0	9,058.2	13,507.9	9,439.3	33.1	33.3	-158.67	3,957.8	-232.7	408.6	336.4	72.19	5.660	
13,200.0	9,057.7	13,607.9	9,438.2	33.9	34.0	-158.64	4,057.7	-233.3	408.1	334.5	73.60	5.544	
13,300.0	9,057.2	13,707.9	9,437.2	34.6	34.8	-158.62	4,157.7	-233.9	407.6	332.6	75.01	5.433	
13,400.0	9,056.7	13,807.9	9,436.1	35.4	35.5	-158.59	4,257.7	-234.5	407.1	330.6	76.43	5.326	
13,500.0	9,056.2	13,907.9	9,435.1	36.1	36.3	-158.56	4,357.7	-235.2	406.6	328.7	77.86	5.222	
13,600.0	9,055.7	14,007.9	9,434.0	36.9	37.0	-158.53	4,457.7	-235.8	406.1	326.8	79.29	5.121	
13,700.0	9,055.2	14,107.9	9,433.0	37.7	37.8	-158.50	4,557.7	-236.4	405.6	324.8	80.73	5.024	
13,800.0	9,054.6	14,207.9	9,431.9	38.4	38.6	-158.47	4,657.7	-237.0	405.1	322.9	82.17	4.930	
13,900.0	9,054.1	14,307.9	9,430.9	39.2	39.3	-158.44	4,757.7	-237.6	404.6	320.9	83.61	4.838	
14,000.0	9,053.6	14,407.9	9,429.8	39.9	40.1	-158.41	4,857.7	-238.2	404.1	319.0	85.06	4.750	
14,100.0	9,053.1	14,507.9	9,428.8	40.7	40.8	-158.39	4,957.7	-238.8	403.6	317.0	86.52	4.664	

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design: (Harrier Federal) Sec-2_T-26-S_R-32-E - Harrier Federal Com #305H - OWB - Plan #1

Offset Site Error: 0.0 usft

Survey Program: 0-Standard Keeper 104, 8874-MWD+IFR1+MS

Rule Assigned:

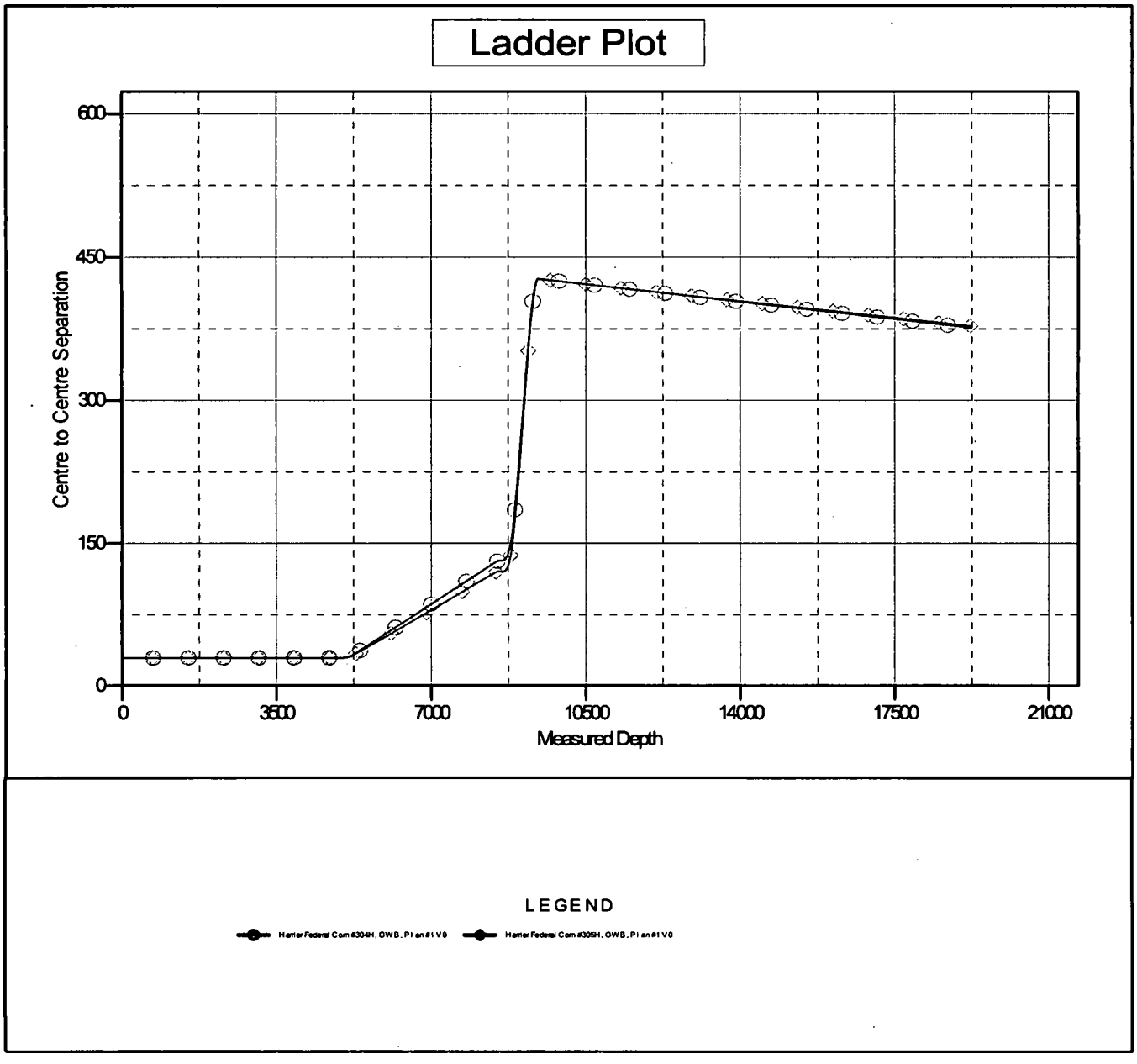
Offset Well Error: 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
14,200.0	9,052.6	14,607.9	9,427.7	41.4	41.6	-158.36	5,057.7	-239.4	403.1	315.1	87.97	4.581	
14,300.0	9,052.1	14,707.9	9,426.7	42.2	42.3	-158.33	5,157.7	-240.0	402.5	313.1	89.43	4.501	
14,400.0	9,051.6	14,807.9	9,425.6	42.9	43.1	-158.30	5,257.6	-240.7	402.0	311.1	90.90	4.423	
14,500.0	9,051.1	14,907.8	9,424.6	43.7	43.8	-158.27	5,357.6	-241.3	401.5	309.2	92.37	4.347	
14,600.0	9,050.6	15,007.8	9,423.5	44.5	44.6	-158.24	5,457.6	-241.9	401.0	307.2	93.84	4.274	
14,700.0	9,050.0	15,107.8	9,422.5	45.2	45.3	-158.21	5,557.6	-242.5	400.5	305.2	95.31	4.202	
14,800.0	9,049.5	15,207.8	9,421.4	46.0	46.1	-158.18	5,657.6	-243.1	400.0	303.3	96.79	4.133	
14,900.0	9,049.0	15,307.8	9,420.4	46.7	46.9	-158.15	5,757.6	-243.7	399.5	301.3	98.27	4.066	
15,000.0	9,048.5	15,407.8	9,419.3	47.5	47.6	-158.12	5,857.6	-244.3	399.0	299.3	99.75	4.000	
15,100.0	9,048.0	15,507.8	9,418.2	48.2	48.4	-158.09	5,957.6	-244.9	398.5	297.3	101.23	3.937	
15,200.0	9,047.5	15,607.8	9,417.2	49.0	49.1	-158.06	6,057.6	-245.5	398.0	295.3	102.72	3.875	
15,300.0	9,047.0	15,707.8	9,416.1	49.8	49.9	-158.03	6,157.6	-246.2	397.5	293.3	104.21	3.815	
15,400.0	9,046.5	15,807.8	9,415.1	50.5	50.6	-158.00	6,257.6	-246.8	397.0	291.3	105.70	3.756	
15,500.0	9,046.0	15,907.8	9,414.0	51.3	51.4	-157.97	6,357.5	-247.4	396.5	289.3	107.19	3.699	
15,600.0	9,045.5	16,007.8	9,413.0	52.0	52.2	-157.94	6,457.5	-248.0	396.0	287.4	108.69	3.644	
15,700.0	9,044.9	16,107.8	9,411.9	52.8	52.9	-157.91	6,557.5	-248.6	395.5	285.4	110.19	3.590	
15,800.0	9,044.4	16,207.8	9,410.9	53.6	53.7	-157.88	6,657.5	-249.2	395.0	283.4	111.69	3.537	
15,900.0	9,043.9	16,307.8	9,409.8	54.3	54.4	-157.85	6,757.5	-249.8	394.5	281.4	113.19	3.486	
16,000.0	9,043.4	16,407.8	9,408.8	55.1	55.2	-157.82	6,857.5	-250.4	394.0	279.4	114.69	3.436	
16,100.0	9,042.9	16,507.8	9,407.7	55.8	56.0	-157.79	6,957.5	-251.0	393.5	277.4	116.19	3.387	
16,200.0	9,042.4	16,607.8	9,406.7	56.6	56.7	-157.76	7,057.5	-251.7	393.0	275.3	117.70	3.339	
16,300.0	9,041.9	16,707.8	9,405.6	57.4	57.5	-157.73	7,157.5	-252.3	392.5	273.3	119.21	3.293	
16,400.0	9,041.4	16,807.8	9,404.6	58.1	58.2	-157.70	7,257.5	-252.9	392.0	271.3	120.71	3.248	
16,500.0	9,040.9	16,907.8	9,403.5	58.9	59.0	-157.67	7,357.5	-253.5	391.5	269.3	122.22	3.204	
16,600.0	9,040.3	17,007.8	9,402.5	59.6	59.8	-157.64	7,457.4	-254.1	391.0	267.3	123.73	3.160	
16,700.0	9,039.8	17,107.8	9,401.4	60.4	60.5	-157.60	7,557.4	-254.7	390.5	265.3	125.25	3.118	
16,800.0	9,039.3	17,207.8	9,400.4	61.2	61.3	-157.57	7,657.4	-255.3	390.1	263.3	126.76	3.077	
16,900.0	9,038.8	17,307.8	9,399.3	61.9	62.0	-157.54	7,757.4	-255.9	389.6	261.3	128.28	3.037	
17,000.0	9,038.3	17,407.8	9,398.3	62.7	62.8	-157.51	7,857.4	-256.5	389.1	259.3	129.79	2.998	
17,100.0	9,037.8	17,507.8	9,397.2	63.4	63.6	-157.48	7,957.4	-257.2	388.6	257.2	131.31	2.959	
17,200.0	9,037.3	17,607.8	9,396.1	64.2	64.3	-157.45	8,057.4	-257.8	388.1	255.2	132.83	2.922	
17,300.0	9,036.8	17,707.8	9,395.1	65.0	65.1	-157.42	8,157.4	-258.4	387.6	253.2	134.35	2.885	
17,400.0	9,036.3	17,807.8	9,394.0	65.7	65.8	-157.38	8,257.4	-259.0	387.1	251.2	135.87	2.849	
17,500.0	9,035.7	17,907.8	9,393.0	66.5	66.6	-157.35	8,357.4	-259.6	386.6	249.2	137.39	2.814	
17,600.0	9,035.2	18,007.8	9,391.9	67.3	67.4	-157.32	8,457.4	-260.2	386.1	247.2	138.91	2.779	
17,700.0	9,034.7	18,107.8	9,390.9	68.0	68.1	-157.29	8,557.4	-260.8	385.6	245.1	140.43	2.746	
17,800.0	9,034.2	18,207.8	9,389.8	68.8	68.9	-157.26	8,657.3	-261.4	385.1	243.1	141.96	2.713	
17,900.0	9,033.7	18,307.8	9,388.8	69.5	69.7	-157.23	8,757.3	-262.0	384.6	241.1	143.48	2.680	
18,000.0	9,033.2	18,407.8	9,387.7	70.3	70.4	-157.19	8,857.3	-262.6	384.1	239.1	145.01	2.649	
18,100.0	9,032.7	18,507.8	9,386.7	71.1	71.2	-157.16	8,957.3	-263.3	383.6	237.0	146.53	2.618	
18,200.0	9,032.2	18,607.8	9,385.6	71.8	71.9	-157.13	9,057.3	-263.9	383.1	235.0	148.06	2.587	
18,300.0	9,031.7	18,707.8	9,384.6	72.6	72.7	-157.10	9,157.3	-264.5	382.6	233.0	149.59	2.558	
18,400.0	9,031.2	18,807.8	9,383.5	73.4	73.5	-157.06	9,257.3	-265.1	382.1	231.0	151.12	2.528	
18,500.0	9,030.6	18,907.8	9,382.5	74.1	74.2	-157.03	9,357.3	-265.7	381.6	228.9	152.65	2.500	
18,600.0	9,030.1	19,007.8	9,381.4	74.9	75.0	-157.00	9,457.3	-266.3	381.1	226.9	154.18	2.472	
18,700.0	9,029.6	19,107.8	9,380.4	75.6	75.7	-156.97	9,557.3	-266.9	380.6	224.9	155.71	2.444	
18,800.0	9,029.1	19,207.8	9,379.3	76.4	76.5	-156.93	9,657.3	-267.5	380.1	222.9	157.24	2.417	
18,900.0	9,028.6	19,307.8	9,378.3	77.2	77.3	-156.90	9,757.2	-268.1	379.6	220.8	158.77	2.391	
19,000.0	9,028.1	19,407.8	9,377.2	77.9	78.0	-156.87	9,857.2	-268.8	379.1	218.8	160.30	2.365	
19,100.0	9,027.6	19,507.8	9,376.2	78.7	78.8	-156.84	9,957.2	-269.4	378.6	216.8	161.84	2.339	
19,200.0	9,027.1	19,607.8	9,375.1	79.5	79.6	-156.80	10,057.2	-270.0	378.1	214.7	163.37	2.314	
19,213.1	9,027.0	19,620.9	9,375.0	79.6	79.7	-156.80	10,070.3	-270.1	378.1	214.5	163.57	2.311	SF

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

Company:	Concho Resources, Inc.	**Local Co-ordinate Reference:**	Well Harrier Federal Com #102H
Project:	Lea County, NM (NAD 27 NME)	**TVD Reference:**	KB @ 3272.1usft (Latshaw 44)
Reference Site:	(Harrier Federal) Sec-2_T-26-S_R-32-E	**MD Reference:**	KB @ 3272.1usft (Latshaw 44)
Site Error:	0.0 usft	**North Reference:**	Grid
Reference Well:	Harrier Federal Com #102H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
Reference Wellbore	OWB	**Database:**	EDM 5000.15 Single User Db
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to KB @ 3272.1usft (Latshaw 44)	Coordinates are relative to: Harrier Federal Com #102H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.36°



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Well Error:	0.0 usft	**Output errors are at**	2.00 sigma
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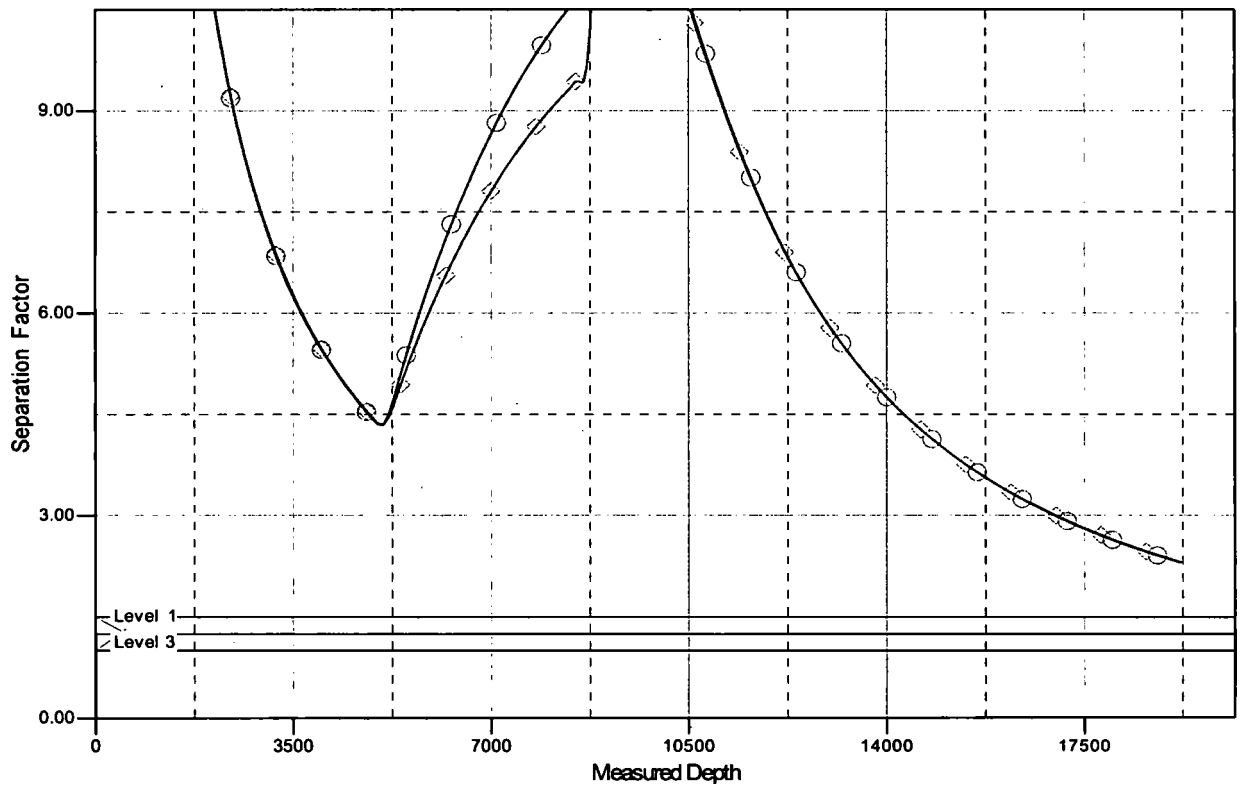
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Central Meridian is 104° 20' 0.000 W	Grid Convergence at Surface is: 0.36°

Separation Factor Plot

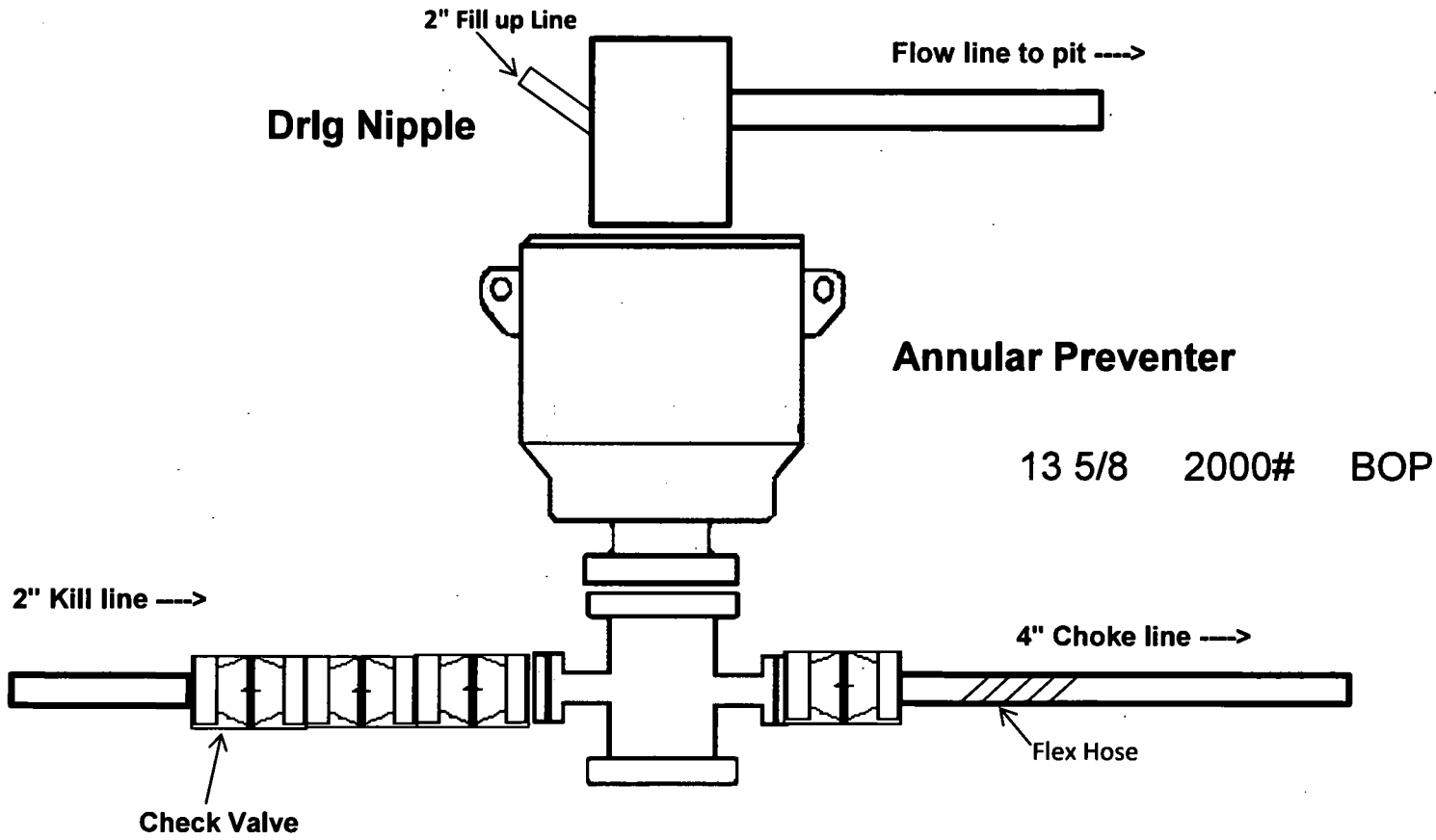


LEGEND

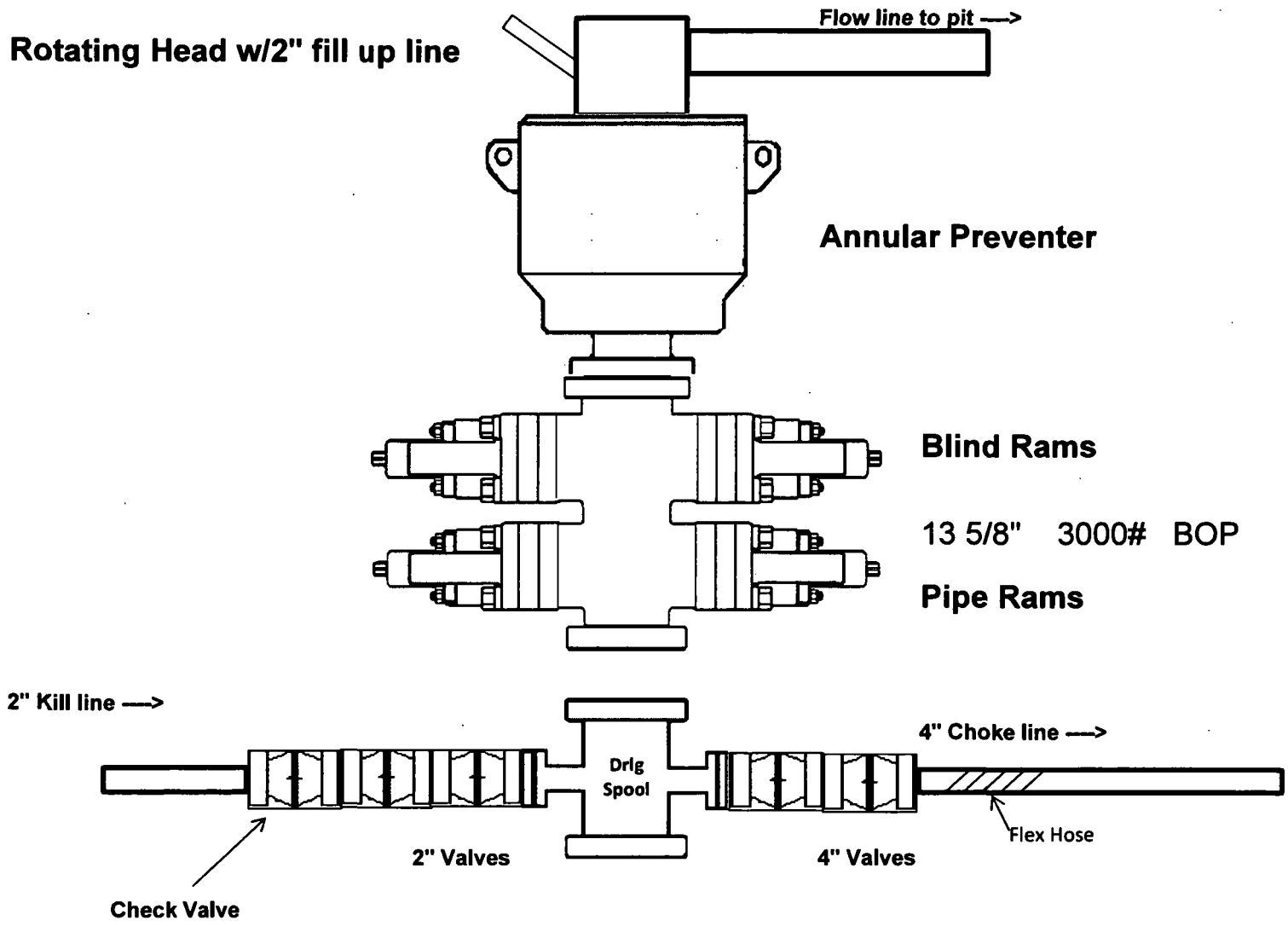
Harrier Federal Com #304H, OWB, Plan #1 V0 — Harrier Federal Com #305H, OWB, Plan #1 V0

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

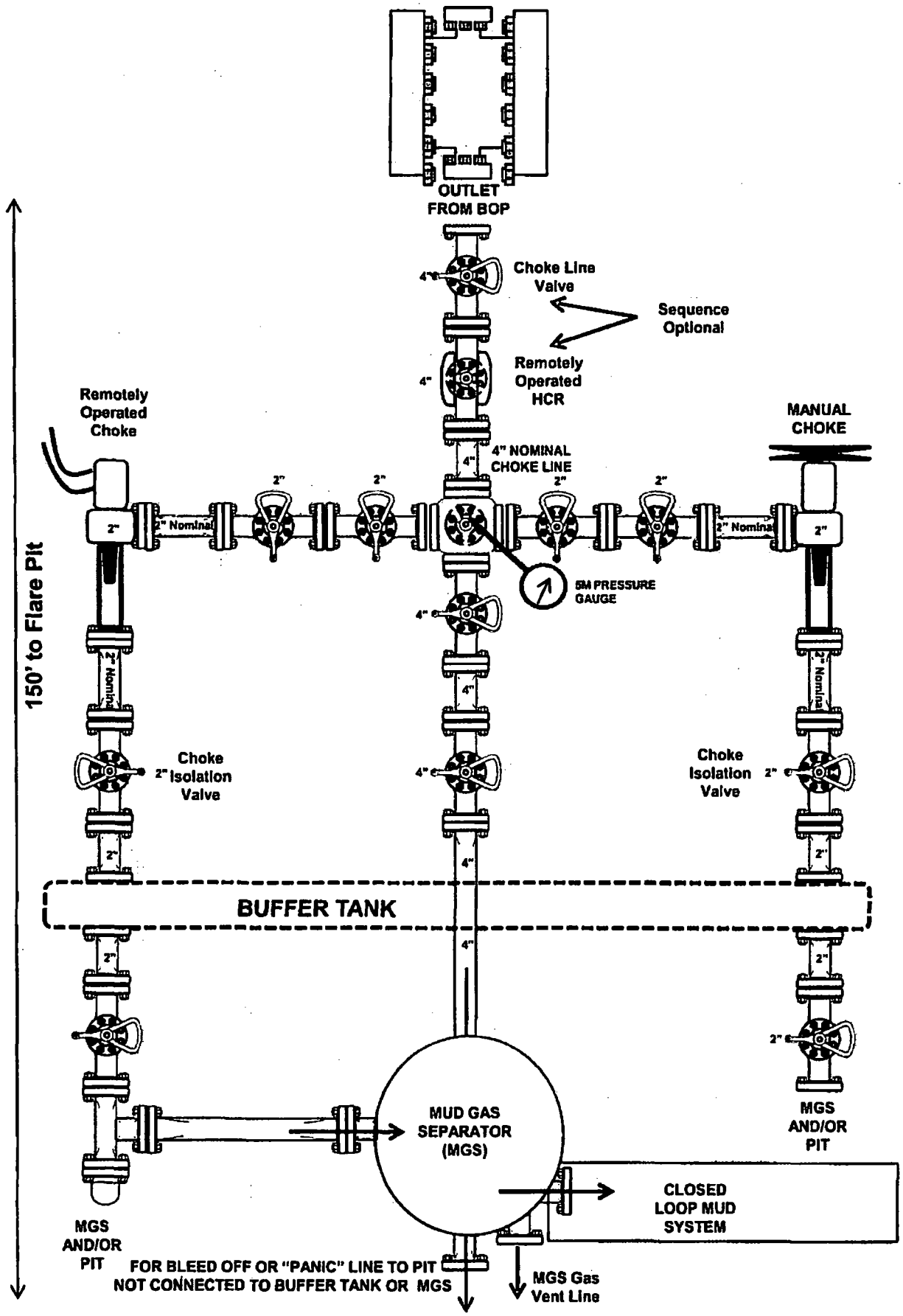
2,000 psi BOP Schematic



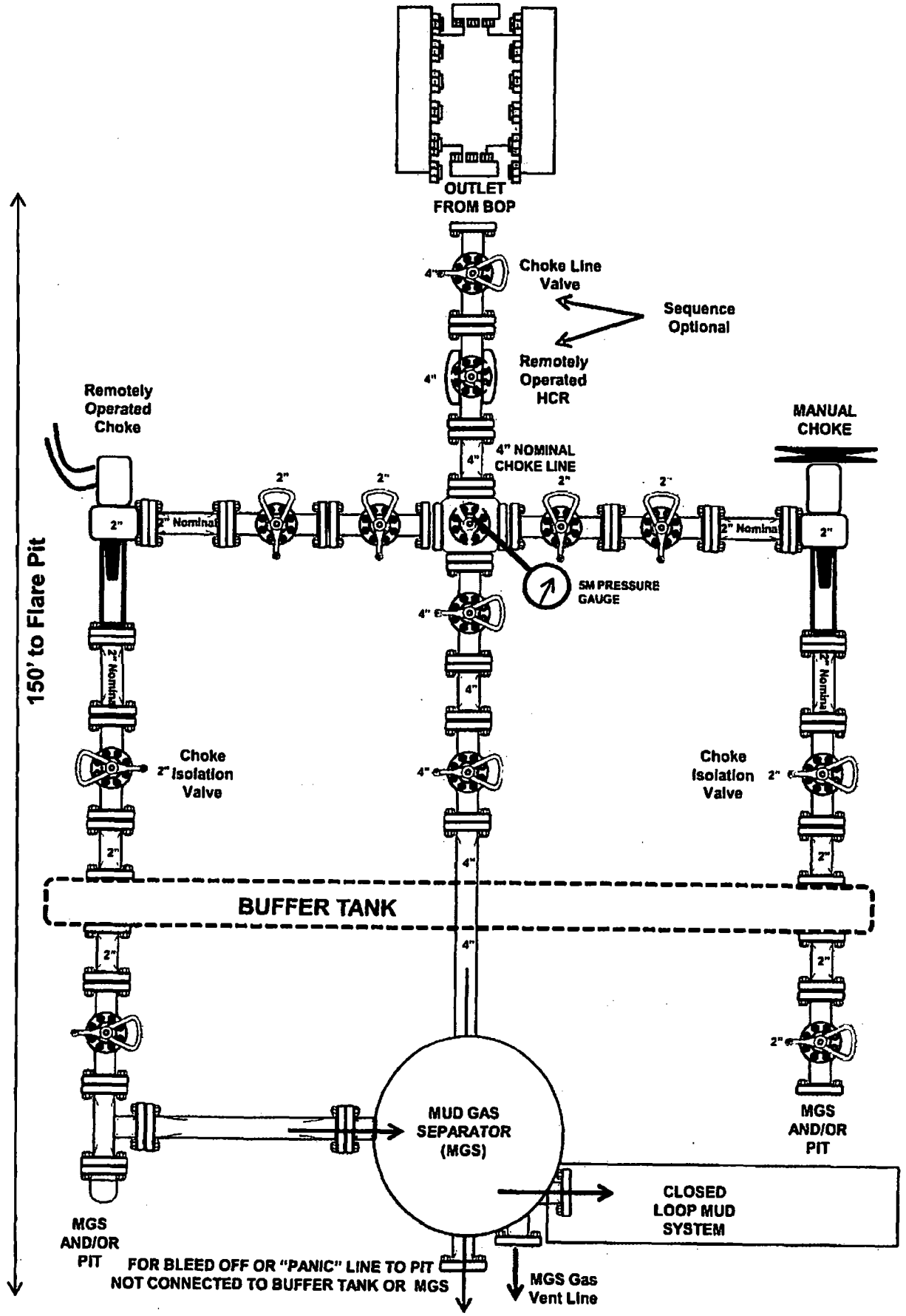
3,000 psi BOP Schematic



2M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



3M Choke Manifold Equipment (WITH MGS + CLOSED LOOP)



Midwest Hose
& Specialty, Inc.

Internal Hydrostatic Test Certificate

General Information		Hose Specifications	
Customer	LATSHAW DRILLING	Hose Assembly Type	Choke & Kill
MWH Sales Representative	ABYGAIL LOGAN	Certification	API 7K/FSL LEVEL2
Date Assembled	3/16/2018	Hose Grade	MUD
Location Assembled	OKC	Hose Working Pressure	N/A
Sales Order #	368223	Hose Lot # and Date Code	N/A
Customer Purchase Order #	412528	Hose I.D. (Inches)	3.35"
Assembly Serial # (Pick Ticket #)	454857	Hose O.D. (Inches)	5.77"
Hose Assembly Length	58'	Armor (yes/no)	YES

Fittings

End A		End B	
Stem (Part and Revision #)	R3.5X64-WB	Stem (Part and Revision #)	R3.5X64-WB
Stem (Heat #)	1770131	Stem (Heat #)	1770131
Ferrule (Part and Revision #)	RF3.5X5330	Ferrule (Part and Revision #)	RF3.5X5330
Ferrule (Heat #)	60860852	Ferrule (Heat #)	60860852
Connection . Flange Hammer Union Part	4-1/16 10K	Connection (Part #)	4-1/16 10K
Connection (Heat #)		Connection (Heat #)	
Nut (Part #)		Nut (Part #)	
Nut (Heat #)		Nut (Heat #)	
Dies Used	N/A	Dies Used	5.75"

Hydrostatic Test Requirements

Test Pressure (psi)	10,000	Hose assembly was tested with ambient water temperature.
Test Pressure Hold Time (minutes)	16	

Date Tested	Tested By	Approved By
3/16/2018		

Midwest Hose
& Specialty, Inc.

Certificate of Conformity

Customer: **LATSHAW DRILLING**	*Customer P.O.#* **412528**
Sales Order # **368223**	*Date Assembled:* **3/16/2018**

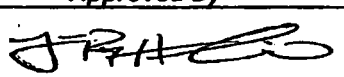
Specifications

Hose Assembly Type:	**Choke & Kill**	*Rig #*	**N/A**
Assembly Serial #	**454857**	*Hose Lot # and Date Code*	**N/A**
Hose Working Pressure (psi)	**N/A**	*Test Pressure (psi)*	**10000**
Hose Assembly Description:	**CK56-SS-5K-6410K-6410K-58.00' FT-TVM**		

We hereby certify that the above material supplied for the referenced purchase order to be true according to the requirements of the purchase order and current industry standards.

Supplier:
Midwest Hose & Specialty, Inc.
3312 S I-35 Service Rd
Oklahoma City, OK 73129

Comments:

Approved By	*Date*
	**3/19/2018**

Midwest Hose & Specialty, Inc.

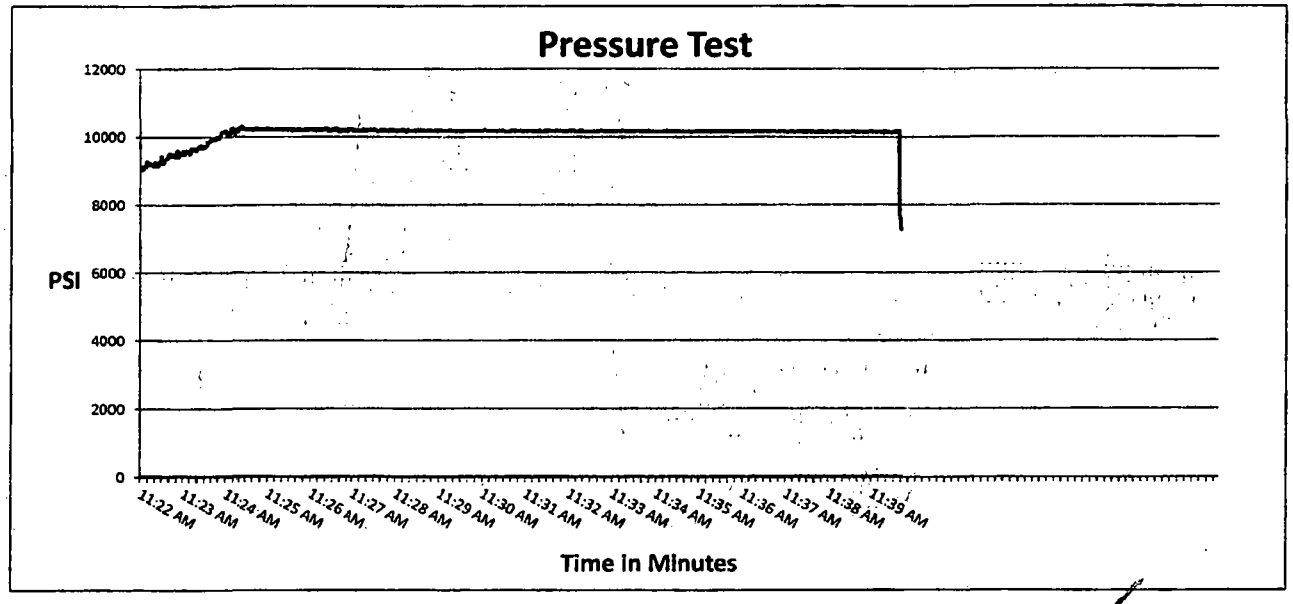
Internal Hydrostatic Test Graph

March 16, 2018

Customer: Latshaw

Pick Ticket #: 454857

Hose Specifications		Verification	
Hose Type	**Length**	**Type of Fitting**	**Coupling Method**
C&K	58'	4 1/16 10K	Swage
I.D.	**O.D.**	**Die Size**	**Final O.D.**
3.5"	5.22"	5.75"	5.77"
Working Pressure	**Burst Pressure**	**Hose Serial #**	**Hose Assembly Serial #**
10000 PSI	Standard Safety Multiplier Applies	43175	454857

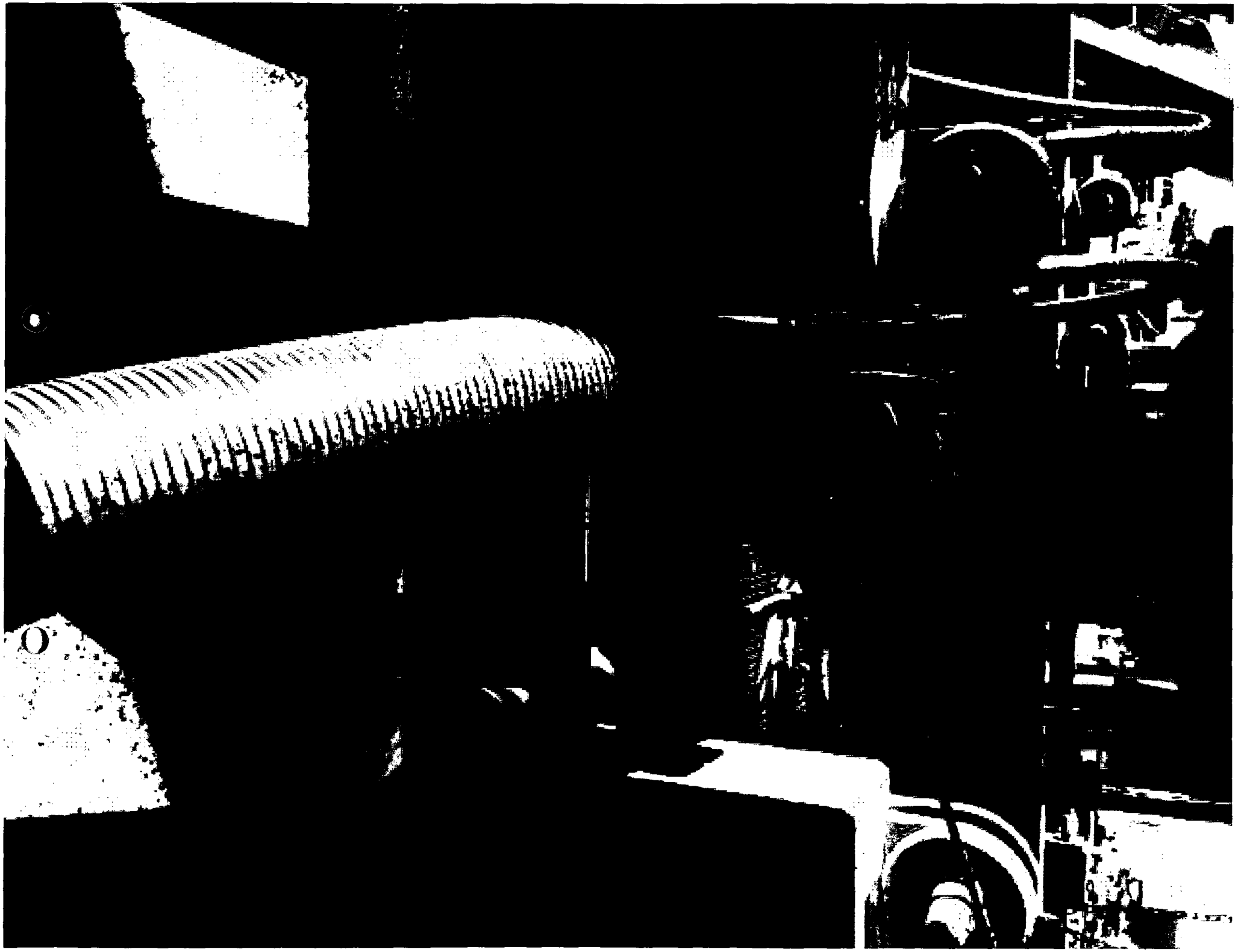


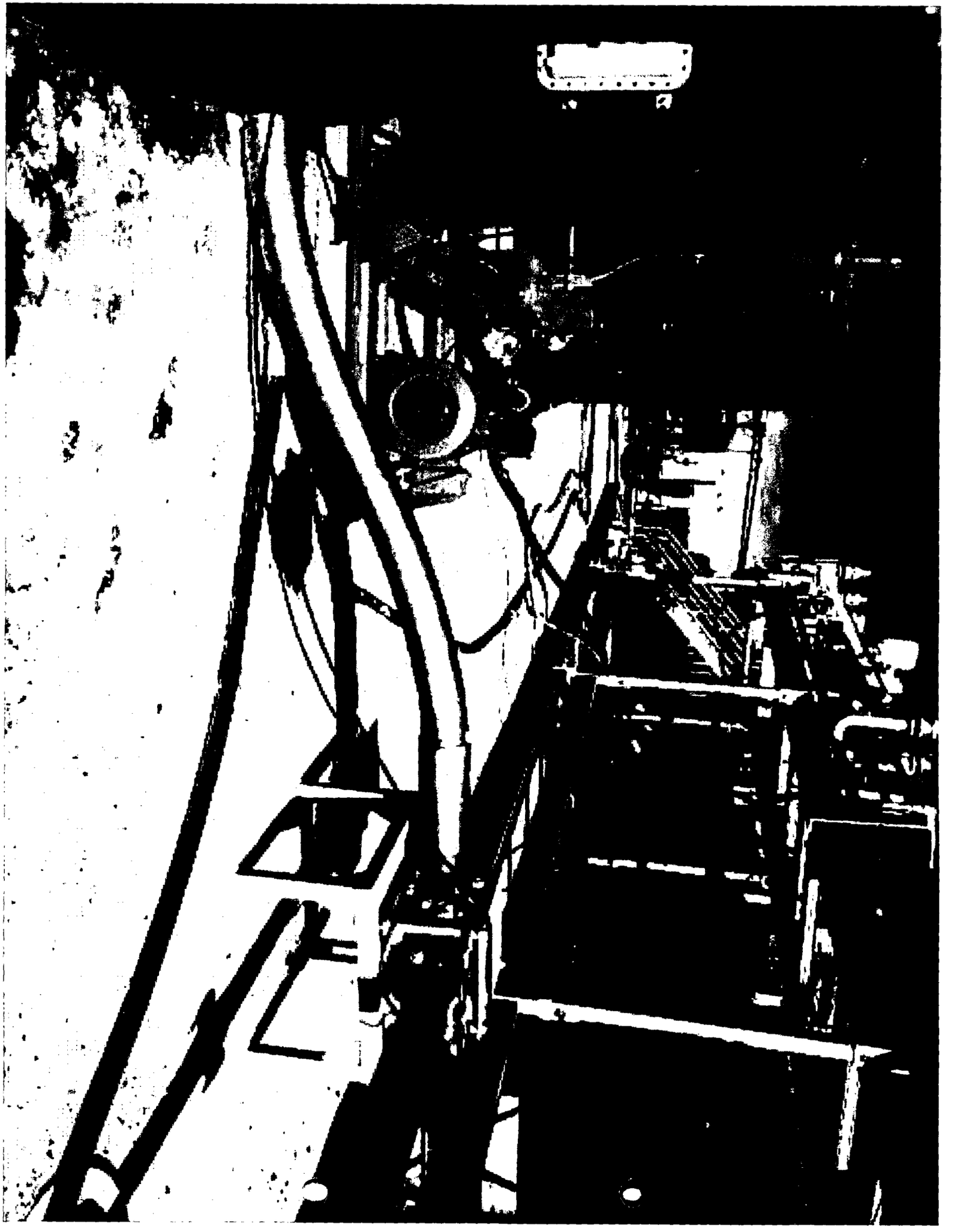
Test Pressure	Time Held at Test Pressure	Actual Burst Pressure	Peak Pressure
10000 PSI	16 Minutes		10400 PSI

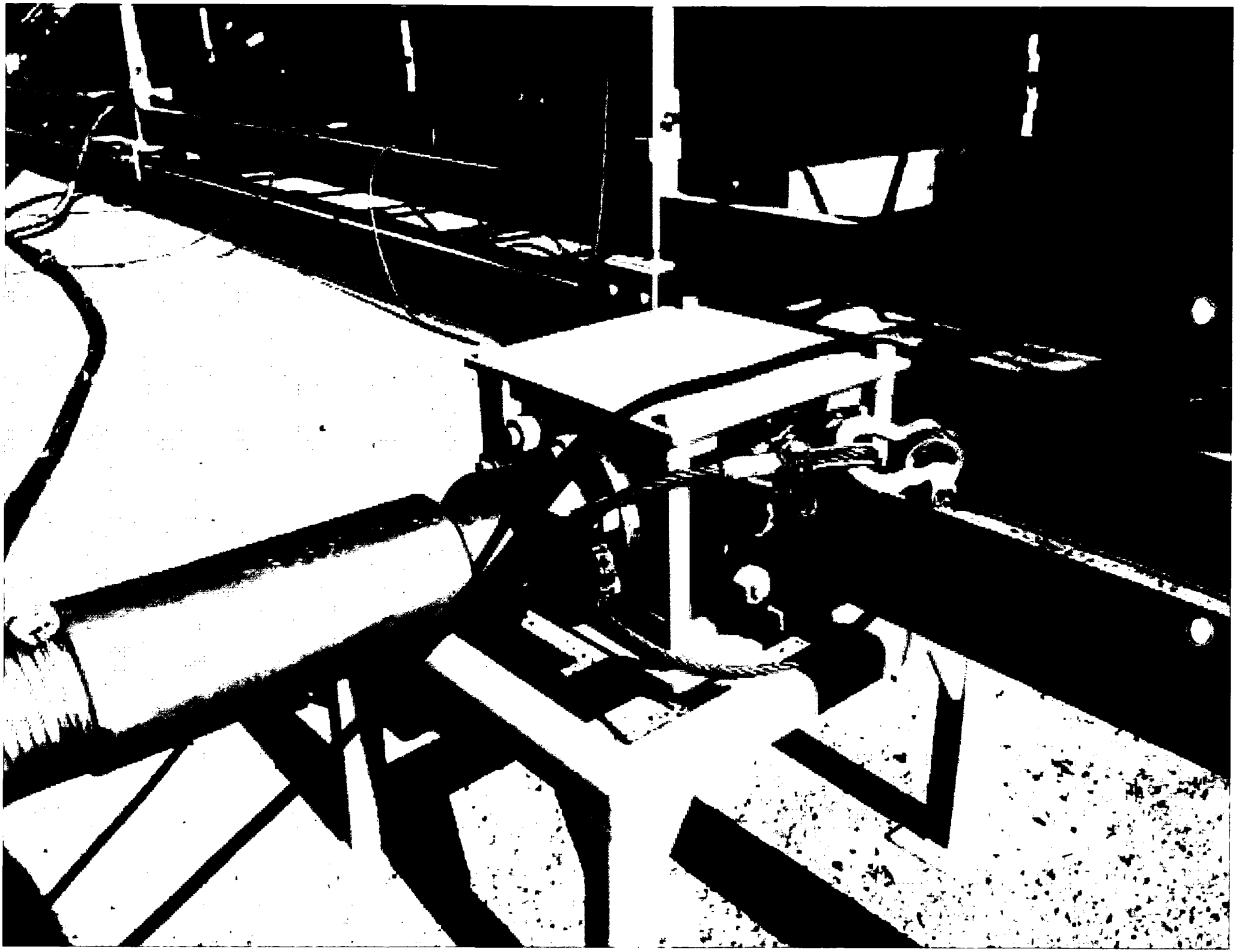
Comments: Hose assembly pressure tested with water at ambient temperature.

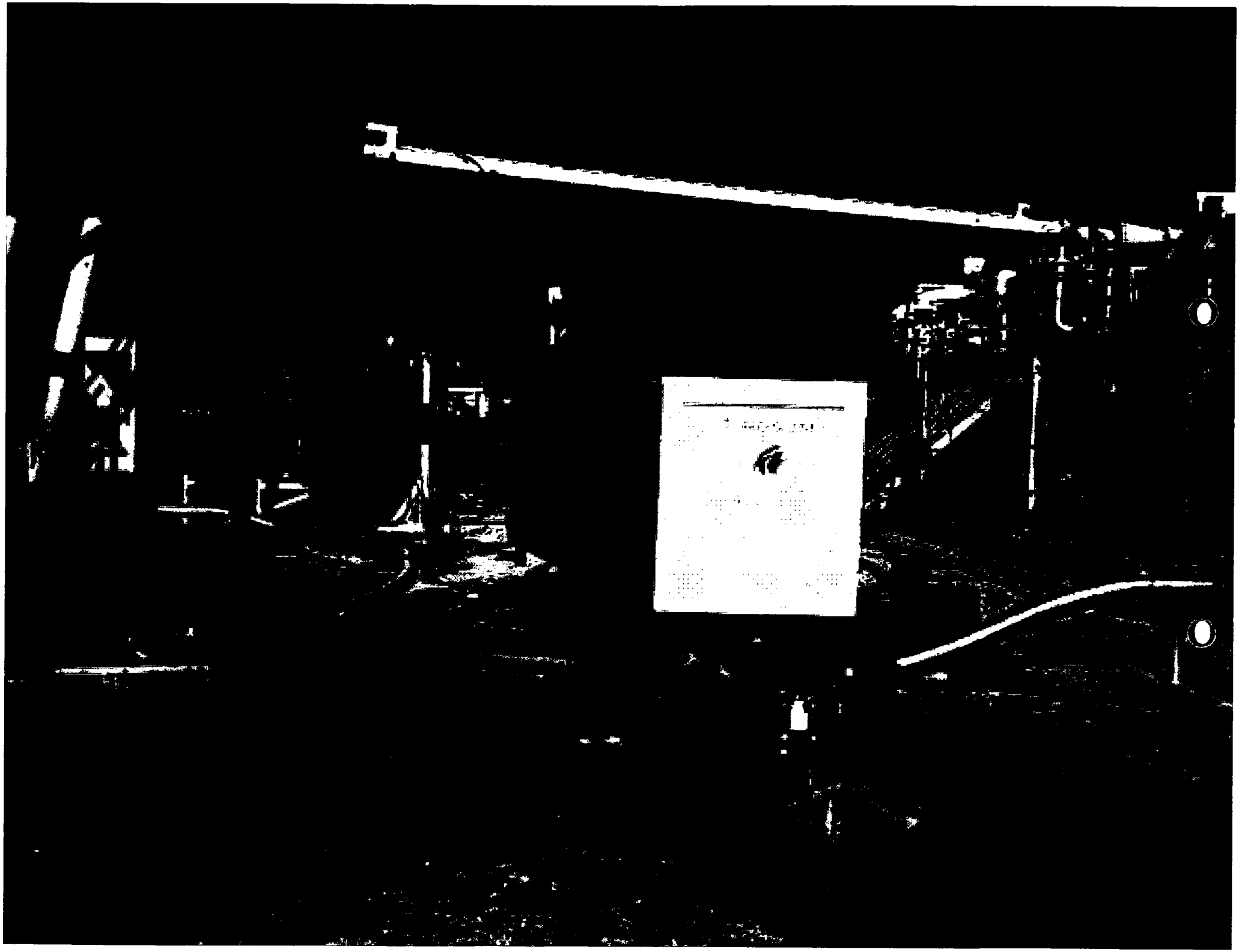
Tested By: *Zach Tillman*

Approved By: *James Hawkins*









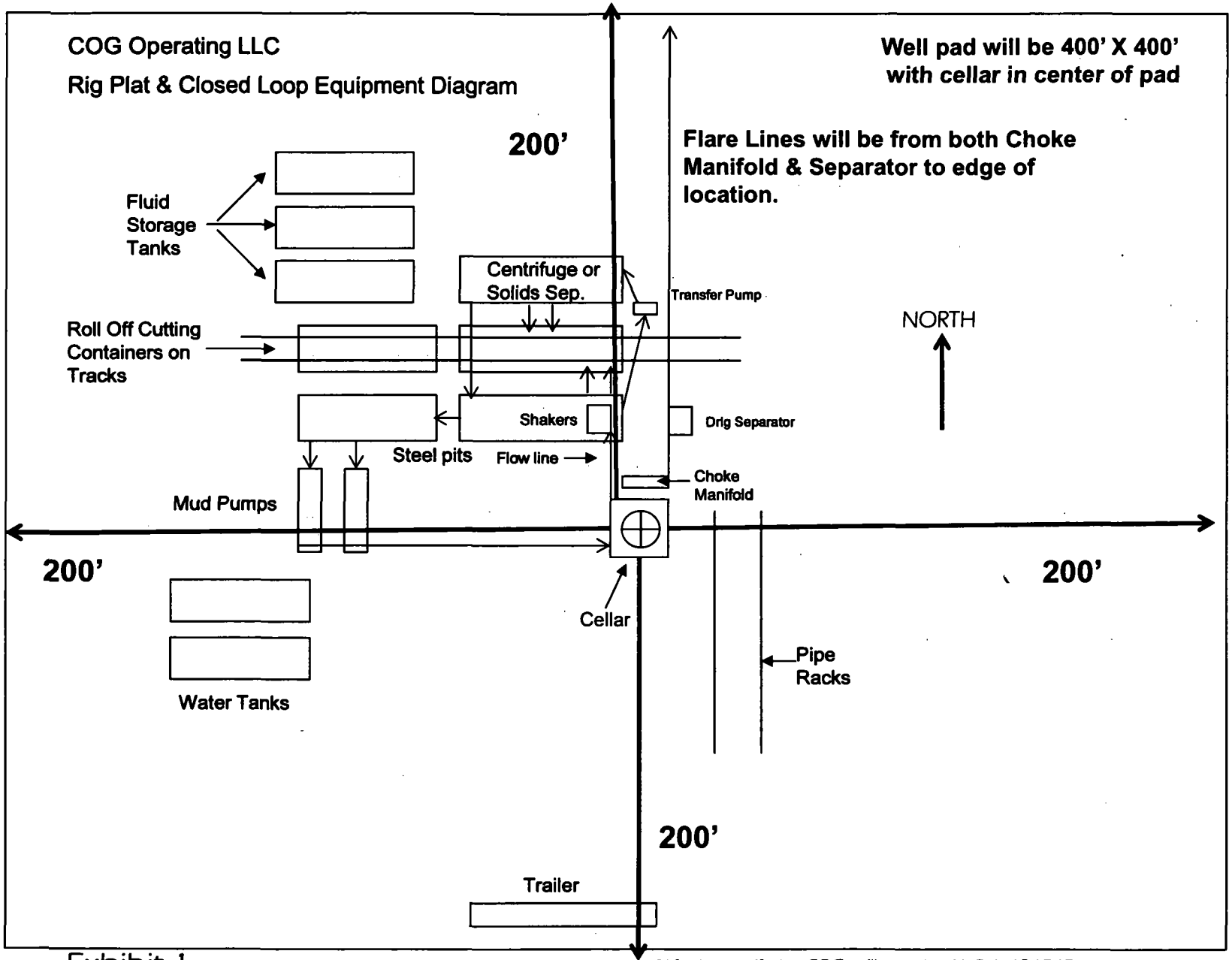
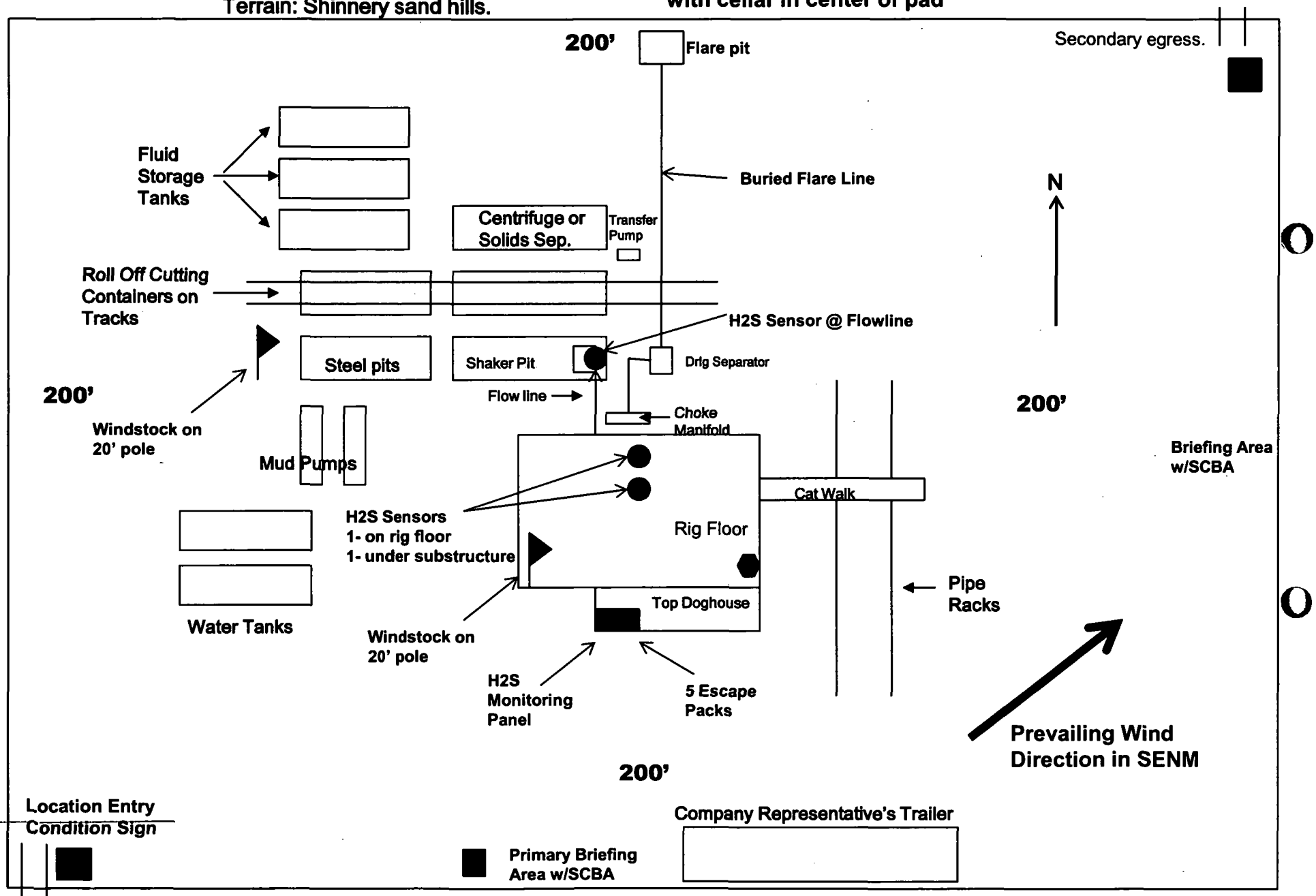


Exhibit 1

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

COG Operating LLC
H_2S Equipment Schematic
Terrain: Shinnery sand hills.

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



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.

WARNING

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

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating LLC
WELL NAME & NO.:	Harrier Federal Com 102H
SURFACE HOLE FOOTAGE:	330'/S & 750'/W
BOTTOM HOLE FOOTAGE	640'/N & 690'/W
LOCATION:	Section 2, T.26 S., R.32 E., NMPM
COUNTY:	Lea County, New Mexico

Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	○ Low	◉ Medium	○ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	◉ Conventional	○ Multibowl	
Other	☐ 4 String Area	☐ Capitan Reef	☐ WIPP

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** inch surface casing shall be set at approximately **845** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **Excess calculates to 23% - additional cement might be required.**

    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 will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

    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.

❖ In **Medium/Karst Areas** if cement does not circulate to surface on the first two casing strings , the cement on the 3rd casing string must come to surface.

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

   - Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

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

   - Cement should tie-back at least **200** feet into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).

2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi **Annular. In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular)**

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9 5/8** intermediate casing shoe shall be **3000 (3M)** psi.

D. SPECIAL REQUIREMENT (S)

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.

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GENERAL 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)

☒ Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After office hours call (575)

☒ Eddy County
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (575) 361-2822

☒ Lea County
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575) 393-3612

1. 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
      - Notify the BLM when moving in and removing the Spudder Rig.
      - 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.
      - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

2. 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.

3. 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.

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.

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.

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 that portion of any 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: 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. 5M or higher 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. 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. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
    e. 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.

5. The appropriate BLM office shall be notified a minimum of 4 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).

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.

c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).

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

f. 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.

g. 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.

h. BOP/BOPE must be tested by an independent service company 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

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

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.