

Form 3160-3
(June 2015)

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

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

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM014847
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other		6. If Indian, Allottee or Tribe Name
1c. Type of Completion: <input type="checkbox"/> Hydraulic Fracturing <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		7. If Unit or CA Agreement, Name and No.
2. Name of Operator LONGFELLOW ENERGY LP		8. Lease Name and Well No. ANGUS FEDERAL COM 17 002H
3a. Address , ,	3b. Phone No. (include area code)	9. API Well No. 30 015 48304
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SESE / 963 FSL / 243 FEL / LAT 32.8299465 / LONG -104.0891788 At proposed prod. zone SWSW / 685 FSL / 20 FWL / LAT 32.8291925 / LONG -104.1055387		10. Field and Pool, or Exploratory EMPIRE/GLORIETA-YESO, EAST
14. Distance in miles and direction from nearest town or post office* 18 miles		11. Sec., T. R. M. or Blk. and Survey or Area SEC 17/T17S/R29E/NMP
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 243 feet		12. County or Parish EDDY
16. No of acres in lease		13. State NM
17. Spacing Unit dedicated to this well 160.0		
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 25 feet		20. BLM/BIA Bond No. in file FED:
19. Proposed Depth 4150 feet / 9646 feet		
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3602 feet	22. Approximate date work will start* 11/01/2020	23. Estimated duration 60 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)

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

25. Signature (Electronic Submission)	Name (Printed/Typed) BRIAN WOOD / Ph: (672) 590-9933	Date 08/18/2020
Title President		
Approved by (Signature) (Electronic Submission)	Name (Printed/Typed) Cody Layton / Ph: (575) 234-5959	Date 05/05/2021
Title Assistant Field Manager Lands & Minerals		
Office Carlsbad Field Office		

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

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



(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 well, and any other required information, should be furnished when required by Federal agency offices.

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

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

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

NOTICES

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

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

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

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

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

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

The BLM connects this information to an evaluation of the technical, safety, and environmental factors involved with drilling for oil and/or gas on Federal and Indian oil and gas leases. This information will be used to analyze and approve applications. Response to this request is mandatory only if the operator elects to initiate drilling or reentry operations on an oil and gas lease. The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

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

Additional Operator Remarks

Location of Well

0. SHL: SESE / 963 FSL / 243 FEL / TWSP: 17S / RANGE: 29E / SECTION: 17 / LAT: 32.8299465 / LONG: -104.0891788 (TVD: 0 feet, MD: 0 feet)

PPP: SESW / 685 FSL / 2640 FWL / TWSP: 17S / RANGE: 29E / SECTION: 17 / LAT: 32.829193 / LONG: -104.097003 (TVD: 4150 feet, MD: 7022 feet)

PPP: SESE / 685 FSL / 100 FEL / TWSP: 17S / RANGE: 29E / SECTION: 17 / LAT: 32.8291839 / LONG: -104.0887137 (TVD: 4150 feet, MD: 4558 feet)

BHL: SWSW / 685 FSL / 20 FWL / TWSP: 17S / RANGE: 29E / SECTION: 17 / LAT: 32.8291925 / LONG: -104.1055387 (TVD: 4150 feet, MD: 9646 feet)

BLM Point of Contact

Name: Deborah Ham

Title: Legal Landlaw Examiner

Phone: (575) 234-5965

Email: dham@blm.gov

Review and Appeal Rights

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

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number 30-015- 48304		² Pool Code 96610		³ Pool Name EMPIRE; GLORIETA-YESO, EAST					
⁴ Property Code 330800		⁵ Property Name ANGUS FEDERAL COM 17			⁶ Well Number 002H				
⁷ OGRID No. 372210		⁸ Operator Name LONGFELLOW ENERGY, LP			⁹ Elevation 3601.6				
¹⁰ Surface Location									
UL or lot no. P	Section 17	Township 17 S	Range 29 E	Lot Idn	Feet from the 963	North/South line SOUTH	Feet from the 243	East/West line EAST	County EDDY
¹¹ Bottom Hole Location If Different From Surface									
UL or lot no. M	Section 17	Township 17 S	Range 29 E	Lot Idn	Feet from the 685	North/South line SOUTH	Feet from the 20	East/West line WEST	County EDDY
¹² Dedicated Acres 160.00		¹³ Joint or Infill		¹⁴ Consolidation Code C		¹⁵ Order No.			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

NOTE:
LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83). LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. VERTICAL DATUM NAVD88.

LAST TAKE POINT
685' FSL, 100' FWL
LAT. = 32.8291915°N
LONG. = 104.1052783°W

BOTTOM OF HOLE
LAT. = 32.8291925°N
LONG. = 104.1055387°W
NMSP EAST (FT)
N = 665468.53
E = 611308.32

FIRST TAKE POINT
685' FSL, 100' FEL
LAT. = 32.8291839°N
LONG. = 104.0887137°W

ANGUS FEDERAL COM 17 002H
ELEV. = 3601.6'
LAT. = 32.8299465°N (NAD83)
LONG. = 104.0891788°W
NMSP EAST (FT)
N = 665754.05
E = 616332.90

17 OPERATOR CERTIFICATION

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

8-15-20

Signature: *Brian Wood*
Date: **8-15-20**

Printed Name: **BRIAN WOOD**

E-mail Address: **brian@permitswest.com**

E-mail Address: **505 466-8120**

18 SURVEYOR CERTIFICATION

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

JULY 17, 2020

Date of Survey

Signature and Seal of Professional Surveyor: *Imon F. Jaramillo*

Certificate Number: **IMON F. JARAMILLO PLS 12797**

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

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

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: 8-14-20

X Original

Operator & OGRID No.: Longfellow Energy, LP (372210)

Amended - Reason for Amendment: _____

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

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

Well(s)/Production Facility – Name of facility

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

Well Name & Number	API	SHL (ULSTR)	SHL Footages	Expected MCF/D	Flare or Vent	Comments
Angus Federal Com 17 1H	30-015-	P-17-17s-29e	988' FSL & 243' FEL	225	<30 days	flare until well clean, then connect
Angus Federal Com 17 2H	30-015-	P-17-17s-29e	963' FSL & 243' FEL	225	<30 days	flare until well clean, then connect
Angus Federal Com 17 3H	30-015-	P-17-17s-29e	938' FSL & 243' FEL	225	<30 days	flare until well clean, then connect

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, if gas transporter system is in place. The gas produced from production facility is not yet dedicated, but will be connected to a 3rd party gathering system located in Eddy County, New Mexico. Gas will most likely be piped 100 yards west to Longfellow’s Phillips 17 Federal 1 (P-17-17s-29e) which is connected with DCP Operating Company LP (36785). Operator will provide (periodically) to Gas Transporter a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, Operator and Gas Transporter have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at an unknown Processing Plant located in Eddy County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

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

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

Alternatives to Reduce Flaring

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

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



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

Drilling Plan Data Report

05/06/2021

APD ID: 10400060426

Submission Date: 08/18/2020

Highlighted data
reflects the most
recent changes

Operator Name: LONGFELLOW ENERGY LP

Well Name: ANGUS FEDERAL COM 17

Well Number: 002H

[Show Final Text](#)

Well Type: OIL WELL

Well Work Type: Drill

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
824885	QUATERNARY	3602	0	0	OTHER : Caliche	USEABLE WATER	N
824886	RUSTLER ANHYDRITE	3382	220	220	ANHYDRITE	NONE	N
824887	SALADO	3287	315	315	GYPSUM	NONE	N
824888	YATES	2737	865	869	DOLOMITE	NATURAL GAS, OIL	N
824889	SEVEN RIVERS	2495	1107	1119	GYPSUM	NONE	N
824890	QUEEN	1928	1674	1703	SANDSTONE	OIL	N
824891	SAN ANDRES	1271	2331	2380	DOLOMITE	NATURAL GAS, OIL	N
824892	GLORIETA	-146	3748	3840	DOLOMITE	NATURAL GAS, OIL	N
824893	YESO	-201	3803	3897	DOLOMITE	NATURAL GAS, OIL	Y

Section 2 - Blowout Prevention

Pressure Rating (PSI): 3M

Rating Depth: 5000

Equipment: A 3000-psi BOP stack (rated to 5000') consisting of annular preventer and double (blind and pipe) ram will be used below surface casing to TD. BOP/BOPE will be tested by an independent service company to 250-psi low and 3000-psi high per Onshore Order 2 requirements. The system may be upgraded to a higher pressure, but still tested as described above. If the system is upgraded, then all the installed components will be functional and tested.

Requesting Variance? YES

Variance request: Variance is requested to use a flex-hose. Test certificate for a typical hose is attached, Certificate for the hose in use will be available on the rig before drilling starts.

Testing Procedure: 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 BOPE will include a speed head, Kelly cock and floor safety valve (inside BOP), and choke lines and choke manifold. BOP and choke diagrams are attached.

Choke Diagram Attachment:

Angus_2H_Choke_20200817134902.pdf

Operator Name: LONGFELLOW ENERGY LP

Well Name: ANGUS FEDERAL COM 17

Well Number: 002H

Angus_2H_Choke_20200817134902.pdf

BOP Diagram Attachment:

Angus_2H_BOP_20200817134908.pdf

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	Body SF
1	SURFACE	12.25	9.625	NEW	API	N	0	1250	0	1238	3602	2364	1250	J-55	36	LT&C	1.125	1.125	DRY	1.8	DRY	1.8
2	PRODUCTI ON	8.75	7.0	NEW	API	N	0	3500	0	3415	0	187	3500	L-80	32	BUTT	1.125	1.125	DRY	1.8	DRY	1.8
3	PRODUCTI ON	8.75	5.5	NEW	API	Y	3500	9646	3415	4150	187	-548	6146	L-80	20	BUTT	1.125	1.125	DRY	1.8	DRY	1.8

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Angus_2H_Casing_Design_Assumptions_20200817134958.pdf

Operator Name: LONGFELLOW ENERGY LP

Well Name: ANGUS FEDERAL COM 17

Well Number: 002H

Casing Attachments

Casing ID: 2 **String Type:** PRODUCTION

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

Angus_2H_Casing_Design_Assumptions_20200817135203.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Angus_2H_Casing_Design_Assumptions_20200817135226.pdf

Casing Design Assumptions and Worksheet(s):

Angus_2H_Casing_Design_Assumptions_20200817135235.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	1250	405	1.65	12.8	668	100	35/65 Poz C	None
SURFACE	Tail		0	1250	155	1.34	14.8	207	100	Class C	None
PRODUCTION	Lead		0	9646	250	1.65	12.6	412	50	35/65 Poz C	None
PRODUCTION	Tail		0	9646	1750	1.33	14.8	2327	50	Class C	None

Operator Name: LONGFELLOW ENERGY LP

Well Name: ANGUS FEDERAL COM 17

Well Number: 002H

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: All necessary mud products (LCM) will be on site to handle any abnormal hole condition that may be encountered while drilling this well.

Describe the mud monitoring system utilized: An electronic/mechanical mud monitor with a minimum pit volume totalizer, stroke counter, and flow sensor will be used.

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
0	1250	OTHER : Fresh water gel	8.4	9							
1250	3500	OTHER : Fresh water/cut brine	8.3	9.2							
3500	9646	OTHER : Cut brine	8.6	9.2							

Section 6 - Test, Logging, Coring

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

A mud logger will be used from GL to TD. Samples will be collected every 10' in the lateral pay zone.

No electric logs are planned at this time.

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

MUD LOG/GEOLOGICAL LITHOLOGY LOG,

Coring operation description for the well:

No core or drill stem test is planned.

Operator Name: LONGFELLOW ENERGY LP

Well Name: ANGUS FEDERAL COM 17

Well Number: 002H

Section 7 - Pressure

Anticipated Bottom Hole Pressure: 1826

Anticipated Surface Pressure: 912

Anticipated Bottom Hole Temperature(F): 110

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

Describe:

Contingency Plans geohazards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

Angus_2H_H2S_Plan_20200817135451.pdf

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Angus_2H_Horizontal_Plan_20200817135505.pdf

Other proposed operations facets description:

Other proposed operations facets attachment:

Angus_2H_Drill_Plan_20200817135511.pdf

CoFlex_Certs_20200817135524.pdf

Angus_2H_Speedhead_Specs_20200817135530.pdf

Other Variance attachment:



Longfellow Energy

Angus Fed Com 17-002H
Eddy Co NM
Northing: 665754.05
Easting: 616332.90
Plan 5



Azimuths to Grid North
 True North: -0.13°
 Magnetic North: 7.07°
 Magnetic Field
 Strength: 47895.9nT
 Dip Angle: 60.48°
 Date: 7/17/2020
 Model: HDGM_FILE

WELL DETAILS Angus Fed Com 17-002H						
3601.60						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	665754.05	616332.90	32.829946	-104.089179	

PROJECT DETAILS: Eddy Co NM
 Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: New Mexico Eastern Zone
 System Datum: Mean Sea Level

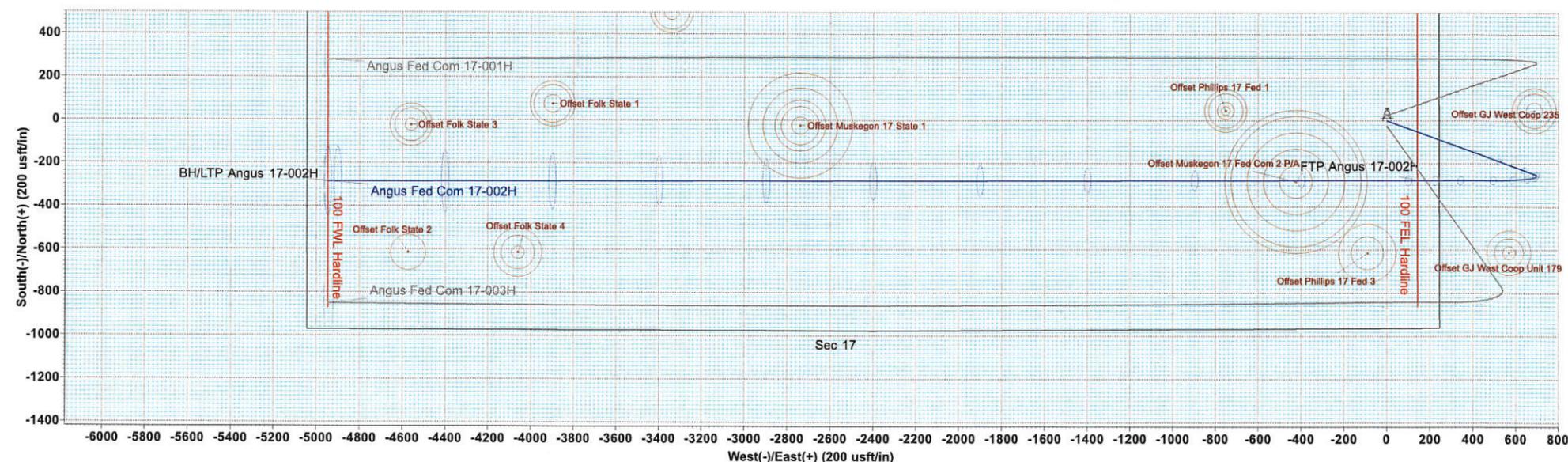
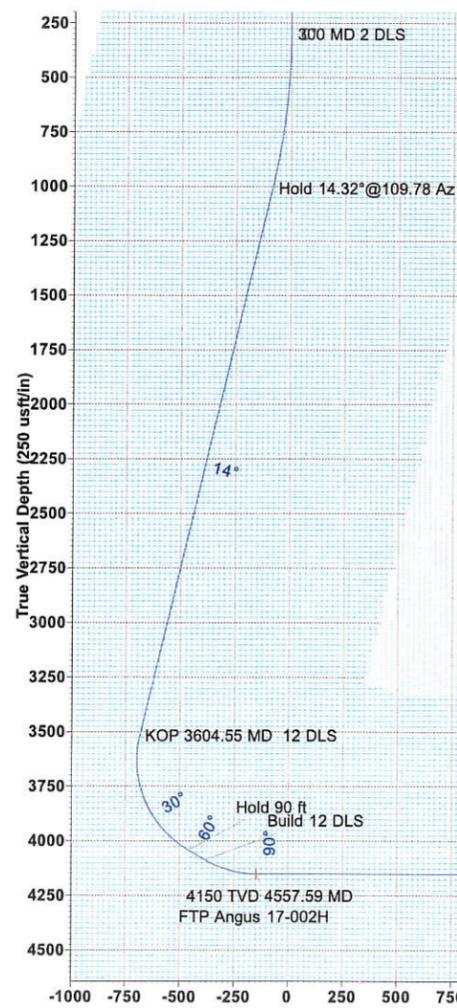
SECTION DETAILS										
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00		
1016.03	14.32	109.78	1008.59	-30.13	83.76	2.00	109.78	-83.75		
3604.55	14.32	109.78	3516.58	-246.81	686.24	0.00	0.00	-686.13		
4217.59	60.00	269.97	4041.03	-276.83	460.19	12.00	162.18	-460.06		
4307.59	60.00	269.97	4086.03	-276.86	382.25	0.00	0.00	-382.12		
4557.59	90.00	269.91	4150.00	-277.11	143.51	12.00	-0.12	-143.39	FTP Angus 17-002H	
9645.70	90.00	269.89	4150.00	-285.72	-4944.59	0.00	-90.42	4944.72	BH/LTP Angus 17-002H	

SITE DETAILS: Sec 17-17S-29E
 Site Centre Northing: 665754.40
 Easting: 616402.27
 Positional Uncertainty: 0.00
 Convergence: 0.13
 Local North: Grid

DESIGN TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	
FTP Angus 17-002H	4150.00	-277.11	143.51	665476.94	616476.41	
BH/LTP Angus 17-002H	4150.00	-285.72	-4944.59	665468.33	611388.31	

WELLBORE DETAILS: OH Wellbore
 Section 17-17S-29E
 SHL : Lat: 32.829947 Long: -104.089179 (Sec17)
 LTP: Lat: 32.829192 Long: -104.105279 (Sec 17)

Est 3601.6 GL 12 KB @ 3613.60usft
 Gr: 3601.60



- LEGEND**
- Angus Fed Com 17-001H, OH Wellbore, Plan 6 V5
 - Angus Fed Com 17-002H, OH Wellbore, Plan 7 V5
 - Offset Folk State 1, OH, As Drilled V5
 - Offset Folk State 2, OH, As Drilled V5
 - Offset Folk State 3, OH, As Drilled V5
 - Offset Folk State 4, OH, As Drilled V5
 - Offset GJ West Coop 235, OH, As Drilled V5
 - Offset GJ West Coop Unit 179, OH, As Drilled V5
 - Offset Muskegon 17 Fed Com 2 P/A FTP Angus 17-002H, OH, As Drilled V5
 - Offset Phillips 17 Fed 1, OH, As Drilled V5
 - Offset Phillips 17 Fed 2, OH, As Drilled V5
 - Offset Phillips 17 Fed 3, OH, As Drilled V5
 - Plan 5

Vertical Section at 269.97° (250 usft/in)



Scientific Drilling, Intl Planning Report

Database: Midland	Local Co-ordinate Reference: Well Angus Fed Com 17-002H
Company: Longfellow Energy	TVD Reference: Est 3601.6 GL 12 KB @ 3613.60usft
Project: Eddy Co NM	MD Reference: Est 3601.6 GL 12 KB @ 3613.60usft
Site: Sec 17-17S-29E	North Reference: Grid
Well: Angus Fed Com 17-002H	Survey Calculation Method: Minimum Curvature
Wellbore: OH Wellbore	
Design: Plan 5	

Project Eddy Co NM, Eddy County, New Mexico
Map System: US State Plane 1983 System Datum: Mean Sea Level
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

Site Sec 17-17S-29E		
Site Position:	Northing: 665,754.41 usft	Latitude: 32.829947
From: Lat/Long	Easting: 616,402.27 usft	Longitude: -104.088953
Position Uncertainty: 0.00 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.13 °

Well Angus Fed Com 17-002H
Well Position +N/-S -0.35 usft Northing: 665,754.05 usft Latitude: 32.829947
+E/-W -69.37 usft Easting: 616,332.90 usft Longitude: -104.089179
Position Uncertainty 3.00 usft Wellhead Elevation: 3,613.60 usft Ground Level: 3,601.60 usft

Wellbore OH Wellbore					
Magnetics	Model Name HDGM_FILE	Sample Date 7/17/2020	Declination (°) 7.20	Dip Angle (°) 60.48	Field Strength (nT) 47,895.90000000

Design Plan 5				
Audit Notes:				
Version:	Phase: PLAN	Tie On Depth: 0.00		
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	269.97

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
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,016.03	14.32	109.78	1,008.59	-30.13	83.76	2.00	2.00	0.00	109.78	
3,604.55	14.32	109.78	3,516.68	-246.81	686.24	0.00	0.00	0.00	0.00	
4,217.59	60.00	269.97	4,041.03	-276.83	460.19	12.00	7.45	26.13	162.18	
4,307.59	60.00	269.97	4,086.03	-276.86	382.25	0.00	0.00	0.00	0.00	
4,557.59	90.00	269.91	4,150.00	-277.11	143.51	12.00	12.00	-0.02	-0.12	FTP Angus 17-002H
9,645.70	90.00	269.89	4,150.00	-285.72	-4,944.59	0.00	0.00	0.00	-90.42	BH/LTP Angus 17-C



Scientific Drilling, Intl Planning Report

Database:	Midland	Local Co-ordinate Reference:	Well Angus Fed Com 17-002H
Company:	Longfellow Energy	TVD Reference:	Est 3601.6 GL 12 KB @ 3613.60usft
Project:	Eddy Co NM	MD Reference:	Est 3601.6 GL 12 KB @ 3613.60usft
Site:	Sec 17-17S-29E	North Reference:	Grid
Well:	Angus Fed Com 17-002H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH Wellbore		
Design:	Plan 5		

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300 MD 2 DLS										
400.00	2.00	109.78	399.98	-0.59	1.64	-1.64	2.00	2.00	0.00	0.00
500.00	4.00	109.78	499.84	-2.36	6.57	-6.57	2.00	2.00	0.00	0.00
600.00	6.00	109.78	599.45	-5.31	14.77	-14.77	2.00	2.00	0.00	0.00
700.00	8.00	109.78	698.70	-9.44	26.23	-26.23	2.00	2.00	0.00	0.00
800.00	10.00	109.78	797.47	-14.73	40.95	-40.95	2.00	2.00	0.00	0.00
900.00	12.00	109.78	895.62	-21.19	58.91	-58.90	2.00	2.00	0.00	0.00
1,000.00	14.00	109.78	993.06	-28.80	80.08	-80.06	2.00	2.00	0.00	0.00
1,016.03	14.32	109.78	1,008.59	-30.13	83.76	-83.75	2.00	2.00	0.00	0.00
Hold 14.32°@109.78 Az										
1,100.00	14.32	109.78	1,089.96	-37.16	103.31	-103.29	0.00	0.00	0.00	0.00
1,200.00	14.32	109.78	1,186.85	-45.53	126.58	-126.56	0.00	0.00	0.00	0.00
1,300.00	14.32	109.78	1,283.74	-53.90	149.86	-149.84	0.00	0.00	0.00	0.00
1,400.00	14.32	109.78	1,380.64	-62.27	173.13	-173.11	0.00	0.00	0.00	0.00
1,500.00	14.32	109.78	1,477.53	-70.64	196.41	-196.38	0.00	0.00	0.00	0.00
1,600.00	14.32	109.78	1,574.42	-79.01	219.68	-219.65	0.00	0.00	0.00	0.00
1,700.00	14.32	109.78	1,671.32	-87.38	242.96	-242.92	0.00	0.00	0.00	0.00
1,800.00	14.32	109.78	1,768.21	-95.75	266.23	-266.19	0.00	0.00	0.00	0.00
1,900.00	14.32	109.78	1,865.10	-104.12	289.51	-289.46	0.00	0.00	0.00	0.00
2,000.00	14.32	109.78	1,961.99	-112.49	312.79	-312.73	0.00	0.00	0.00	0.00
2,100.00	14.32	109.78	2,058.89	-120.86	336.06	-336.01	0.00	0.00	0.00	0.00
2,200.00	14.32	109.78	2,155.78	-129.24	359.34	-359.28	0.00	0.00	0.00	0.00
2,300.00	14.32	109.78	2,252.67	-137.61	382.61	-382.55	0.00	0.00	0.00	0.00
2,400.00	14.32	109.78	2,349.56	-145.98	405.89	-405.82	0.00	0.00	0.00	0.00
2,500.00	14.32	109.78	2,446.46	-154.35	429.16	-429.09	0.00	0.00	0.00	0.00
2,600.00	14.32	109.78	2,543.35	-162.72	452.44	-452.36	0.00	0.00	0.00	0.00
2,700.00	14.32	109.78	2,640.24	-171.09	475.71	-475.63	0.00	0.00	0.00	0.00
2,800.00	14.32	109.78	2,737.14	-179.46	498.99	-498.90	0.00	0.00	0.00	0.00
2,900.00	14.32	109.78	2,834.03	-187.83	522.26	-522.18	0.00	0.00	0.00	0.00
3,000.00	14.32	109.78	2,930.92	-196.20	545.54	-545.45	0.00	0.00	0.00	0.00
3,100.00	14.32	109.78	3,027.81	-204.57	568.81	-568.72	0.00	0.00	0.00	0.00
3,200.00	14.32	109.78	3,124.71	-212.94	592.09	-591.99	0.00	0.00	0.00	0.00
3,300.00	14.32	109.78	3,221.60	-221.31	615.36	-615.26	0.00	0.00	0.00	0.00
3,400.00	14.32	109.78	3,318.49	-229.69	638.64	-638.53	0.00	0.00	0.00	0.00
3,500.00	14.32	109.78	3,415.38	-238.06	661.91	-661.80	0.00	0.00	0.00	0.00
3,600.00	14.32	109.78	3,512.28	-246.43	685.19	-685.07	0.00	0.00	0.00	0.00
3,604.55	14.32	109.78	3,516.68	-246.81	686.24	-686.13	0.00	0.00	0.00	0.00
KOP 3604.55 MD 12 DLS										
3,700.00	4.87	155.51	3,610.79	-254.51	699.07	-698.96	12.00	-9.90	47.91	
3,800.00	10.70	248.81	3,710.11	-261.76	692.15	-692.03	12.00	5.84	93.30	
3,900.00	22.20	261.77	3,805.88	-267.84	664.69	-664.57	12.00	11.50	12.95	
4,000.00	34.04	266.03	3,893.93	-272.50	617.90	-617.78	12.00	11.84	4.27	
4,100.00	45.95	268.28	3,970.40	-275.53	553.82	-553.70	12.00	11.91	2.24	
4,200.00	57.90	269.76	4,031.96	-276.79	475.26	-475.13	12.00	11.94	1.48	
4,217.59	60.00	269.97	4,041.03	-276.83	460.19	-460.06	12.00	11.95	1.24	
Hold 90 ft										
4,300.00	60.00	269.97	4,082.24	-276.86	388.82	-388.69	0.00	0.00	0.00	
4,307.59	60.00	269.97	4,086.03	-276.86	382.25	-382.12	0.00	0.00	0.00	
Build 12 DLS										
4,400.00	71.09	269.95	4,124.23	-276.92	298.26	-298.13	12.00	12.00	-0.03	



Scientific Drilling, Intl Planning Report

Database:	Midland	Local Co-ordinate Reference:	Well Angus Fed Com 17-002H
Company:	Longfellow Energy	TVD Reference:	Est 3601.6 GL 12 KB @ 3613.60usft
Project:	Eddy Co NM	MD Reference:	Est 3601.6 GL 12 KB @ 3613.60usft
Site:	Sec 17-17S-29E	North Reference:	Grid
Well:	Angus Fed Com 17-002H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH Wellbore		
Design:	Plan 5		

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)
4,500.00	83.09	269.93	4,146.53	-277.03	200.96	-200.84	12.00	12.00	-0.02
4,557.59	90.00	269.91	4,150.00	-277.11	143.51	-143.39	12.00	12.00	-0.02
4150 TVD 4557.59 MD - FTP Angus 17-002H									
4,600.00	90.00	269.91	4,150.00	-277.17	101.10	-100.98	0.00	0.00	0.00
4,700.00	90.00	269.91	4,150.00	-277.32	1.10	-0.98	0.00	0.00	0.00
4,800.00	90.00	269.91	4,150.00	-277.47	-98.90	99.02	0.00	0.00	0.00
4,900.00	90.00	269.91	4,150.00	-277.62	-198.90	199.02	0.00	0.00	0.00
5,000.00	90.00	269.91	4,150.00	-277.77	-298.90	299.02	0.00	0.00	0.00
5,100.00	90.00	269.91	4,150.00	-277.93	-398.90	399.02	0.00	0.00	0.00
5,200.00	90.00	269.91	4,150.00	-278.08	-498.90	499.02	0.00	0.00	0.00
5,300.00	90.00	269.91	4,150.00	-278.24	-598.90	599.02	0.00	0.00	0.00
5,400.00	90.00	269.91	4,150.00	-278.39	-698.90	699.02	0.00	0.00	0.00
5,500.00	90.00	269.91	4,150.00	-278.55	-798.90	799.02	0.00	0.00	0.00
5,600.00	90.00	269.91	4,150.00	-278.71	-898.90	899.02	0.00	0.00	0.00
5,700.00	90.00	269.91	4,150.00	-278.86	-998.90	999.02	0.00	0.00	0.00
5,800.00	90.00	269.91	4,150.00	-279.02	-1,098.90	1,099.02	0.00	0.00	0.00
5,900.00	90.00	269.91	4,150.00	-279.18	-1,198.90	1,199.02	0.00	0.00	0.00
6,000.00	90.00	269.91	4,150.00	-279.34	-1,298.90	1,299.02	0.00	0.00	0.00
6,100.00	90.00	269.91	4,150.00	-279.50	-1,398.90	1,399.02	0.00	0.00	0.00
6,200.00	90.00	269.91	4,150.00	-279.67	-1,498.90	1,499.02	0.00	0.00	0.00
6,300.00	90.00	269.91	4,150.00	-279.83	-1,598.90	1,599.02	0.00	0.00	0.00
6,400.00	90.00	269.91	4,150.00	-279.99	-1,698.90	1,699.02	0.00	0.00	0.00
6,500.00	90.00	269.91	4,150.00	-280.16	-1,798.90	1,799.02	0.00	0.00	0.00
6,600.00	90.00	269.91	4,150.00	-280.32	-1,898.90	1,899.02	0.00	0.00	0.00
6,700.00	90.00	269.90	4,150.00	-280.49	-1,998.89	1,999.02	0.00	0.00	0.00
6,800.00	90.00	269.90	4,150.00	-280.65	-2,098.89	2,099.02	0.00	0.00	0.00
6,900.00	90.00	269.90	4,150.00	-280.82	-2,198.89	2,199.02	0.00	0.00	0.00
7,000.00	90.00	269.90	4,150.00	-280.99	-2,298.89	2,299.02	0.00	0.00	0.00
7,100.00	90.00	269.90	4,150.00	-281.16	-2,398.89	2,399.02	0.00	0.00	0.00
7,200.00	90.00	269.90	4,150.00	-281.33	-2,498.89	2,499.02	0.00	0.00	0.00
7,300.00	90.00	269.90	4,150.00	-281.50	-2,598.89	2,599.02	0.00	0.00	0.00
7,400.00	90.00	269.90	4,150.00	-281.67	-2,698.89	2,699.02	0.00	0.00	0.00
7,500.00	90.00	269.90	4,150.00	-281.84	-2,798.89	2,799.02	0.00	0.00	0.00
7,600.00	90.00	269.90	4,150.00	-282.01	-2,898.89	2,899.02	0.00	0.00	0.00
7,700.00	90.00	269.90	4,150.00	-282.19	-2,998.89	2,999.02	0.00	0.00	0.00
7,800.00	90.00	269.90	4,150.00	-282.36	-3,098.89	3,099.02	0.00	0.00	0.00
7,900.00	90.00	269.90	4,150.00	-282.54	-3,198.89	3,199.02	0.00	0.00	0.00
8,000.00	90.00	269.90	4,150.00	-282.71	-3,298.89	3,299.02	0.00	0.00	0.00
8,100.00	90.00	269.90	4,150.00	-282.89	-3,398.89	3,399.02	0.00	0.00	0.00
8,200.00	90.00	269.90	4,150.00	-283.07	-3,498.89	3,499.02	0.00	0.00	0.00
8,300.00	90.00	269.90	4,150.00	-283.25	-3,598.89	3,599.02	0.00	0.00	0.00
8,400.00	90.00	269.90	4,150.00	-283.42	-3,698.89	3,699.02	0.00	0.00	0.00
8,500.00	90.00	269.90	4,150.00	-283.60	-3,798.89	3,799.02	0.00	0.00	0.00
8,600.00	90.00	269.90	4,150.00	-283.78	-3,898.89	3,899.02	0.00	0.00	0.00
8,700.00	90.00	269.90	4,150.00	-283.97	-3,998.89	3,999.02	0.00	0.00	0.00
8,800.00	90.00	269.90	4,150.00	-284.15	-4,098.89	4,099.02	0.00	0.00	0.00
8,900.00	90.00	269.89	4,150.00	-284.33	-4,198.89	4,199.02	0.00	0.00	0.00
9,000.00	90.00	269.89	4,150.00	-284.51	-4,298.89	4,299.02	0.00	0.00	0.00
9,100.00	90.00	269.89	4,150.00	-284.70	-4,398.89	4,399.02	0.00	0.00	0.00
9,200.00	90.00	269.89	4,150.00	-284.88	-4,498.89	4,499.02	0.00	0.00	0.00
9,300.00	90.00	269.89	4,150.00	-285.07	-4,598.89	4,599.02	0.00	0.00	0.00
9,400.00	90.00	269.89	4,150.00	-285.26	-4,698.89	4,699.02	0.00	0.00	0.00
9,500.00	90.00	269.89	4,150.00	-285.44	-4,798.89	4,799.02	0.00	0.00	0.00



Scientific Drilling, Intl Planning Report

Database:	Midland	Local Co-ordinate Reference:	Well Angus Fed Com 17-002H
Company:	Longfellow Energy	TVD Reference:	Est 3601.6 GL 12 KB @ 3613.60usft
Project:	Eddy Co NM	MD Reference:	Est 3601.6 GL 12 KB @ 3613.60usft
Site:	Sec 17-17S-29E	North Reference:	Grid
Well:	Angus Fed Com 17-002H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH Wellbore		
Design:	Plan 5		

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)
9,600.00	90.00	269.89	4,150.00	-285.63	-4,898.89	4,899.02	0.00	0.00	0.00
9,645.70	90.00	269.89	4,150.00	-285.72	-4,944.59	4,944.72	0.00	0.00	0.00
TD 4150 TVD 9645.70 MD - BH/LTP Angus 17-002H									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BH/LTP Angus 17-002 - hit/miss target center - Shape - Point	0.00	0.00	4,150.00	-285.72	-4,944.59	665,468.34	611,388.31	32.829192	-104.105279
FTP Angus 17-002H - plan hits target center - Point	0.00	0.00	4,150.00	-277.11	143.51	665,476.95	616,476.42	32.829184	-104.088714

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
300.00	300.00	0.00	0.00	300 MD 2 DLS	
1,016.03	1,008.59	-30.13	83.76	Hold 14.32°@109.78 Az	
3,604.55	3,516.68	-246.81	686.24	KOP 3604.55 MD 12 DLS	
4,217.59	4,041.03	-276.83	460.19	Hold 90 ft	
4,307.59	4,086.03	-276.86	382.25	Build 12 DLS	
4,557.59	4,150.00	-277.11	143.51	4150 TVD 4557.59 MD	
9,645.70	4,150.00	-285.72	-4,944.59	TD 4150 TVD 9645.70 MD	

**PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL**

OPERATOR'S NAME: WELL NAME & NO.: SURFACE HOLE FOOTAGE: BOTTOM HOLE FOOTAGE: LOCATION: COUNTY:	LONGFELLOW ENERGY LP ANGUS FEDERAL COM 17 001H 988'/S & 243'/E 1250'/S & 20'/W Section 17, T.17 S., R.29 E., NMPM Eddy County, New Mexico
OPERATOR'S NAME: WELL NAME & NO.: SURFACE HOLE FOOTAGE: BOTTOM HOLE FOOTAGE: LOCATION: COUNTY:	LONGFELLOW ENERGY LP ANGUS FEDERAL COM 17 002H 963'/S & 243'/E 685'/S & 20'/W Section 17, T.17 S., R.29 E., NMPM Eddy County, New Mexico
OPERATOR'S NAME: WELL NAME & NO.: SURFACE HOLE FOOTAGE: BOTTOM HOLE FOOTAGE: LOCATION: COUNTY:	LONGFELLOW ENERGY LP ANGUS FEDERAL COM 17 003H 938'/S & 243'/E 120'/S & 20'/W Section 17, T.17 S., R.29 E., NMPM Eddy County, New Mexico
OPERATOR'S NAME: WELL NAME & NO.: SURFACE HOLE FOOTAGE: BOTTOM HOLE FOOTAGE: LOCATION: COUNTY:	LONGFELLOW ENERGY LP ANGUS FEDERAL COM 17 SWD 610'/S & 705'/E 610'/S & 705'/W Section 17, T.17 S., R.29 E., NMPM Eddy County, New Mexico

TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- General Provisions**
- Permit Expiration**
- Archaeology, Paleontology, and Historical Sites**
- Noxious Weeds**
- Special Requirements**
 - Cave/Karst
 - Hydrology
- Construction**
 - Notification
 - Topsoil
 - Closed Loop System
 - Well Pads
 - Roads
- Road Section Diagram**
- Production (Post Drilling)**
 - Well Structures & Facilities
- Interim Reclamation**
- Final Abandonment & Reclamation**

I. GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

V. SPECIAL REQUIREMENT(S)

Construction Mitigation

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD or project:

General Construction:

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

Pad Construction:

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.
- The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.
- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g., caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised (i.e. an access road crossing the berm cannot be lower than the berm height).
- Following a rain event, all fluids will vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

Road Construction:

- Turnout ditches and drainage leadoffs will not be constructed in such a manner as to alter the natural flow of water into or out of cave or karst features.
- Special restoration stipulations or realignment may be required if subsurface features are discovered during construction.

Buried Pipeline/Cable Construction:

- Rerouting of the buried line(s) may be required if a subsurface void is encountered during construction to minimize the potential subsidence/collapse of the feature(s) as well as the possibility of leaks/spills entering the karst drainage system.

Powerline Construction:

- Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems.
- Larger powerlines will adjust their pole spacing to avoid cave and karst features.
- Special restoration stipulations or realignment may be required if subsurface voids are encountered.

Surface Flowlines Installation:

- Flowlines will be routed around sinkholes and other karst features to minimize the possibility of leaks/spills from entering the karst drainage system.

Drilling Mitigation

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required:

- Closed loop system using steel tanks - all fluids and cuttings will be hauled off-site and disposed of properly at an authorized site
- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional drilling is only allowed at depths greater than 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost circulation zones will be logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See drilling COAs.

Production Mitigation

In order to mitigate the impacts from production activities and due to the nature of karst terrane, the following Conditions of Approval will apply to this APD:

- Tank battery locations and facilities will be bermed and lined with a 20 mil thick permanent liner that has a 4 oz. felt backing, or equivalent, to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.
- Development and implementation of a leak detection system to provide an early alert to operators when a leak has occurred.
- Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Residual and Cumulative Mitigation

The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be taken to correct the problem to the BLM's approval.

Plugging and Abandonment Mitigation

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. EXCLOSURE FENCING (CELLARS & PITS)

Exclosure Fencing

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

G. ON LEASE ACCESS ROADS

Road Width

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed thirty (30) feet.

Surfacing

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning

Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Ditching

Ditching shall be required on both sides of the road.

Turnouts

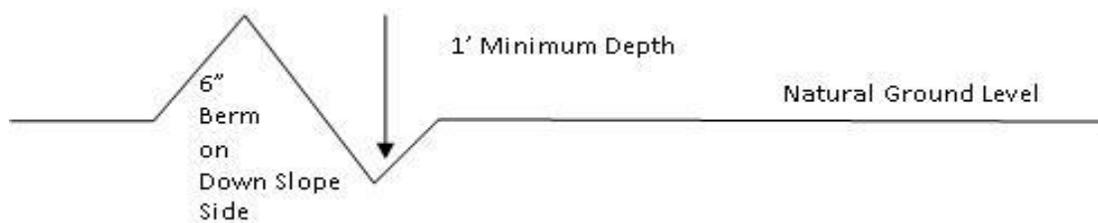
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

Cattle guards

An appropriately sized cattle guard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattle guards on the access road route shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattle guards that are in place and are utilized during lease operations.

Fence Requirement

Where entry is granted across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fences.

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Construction Steps

1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

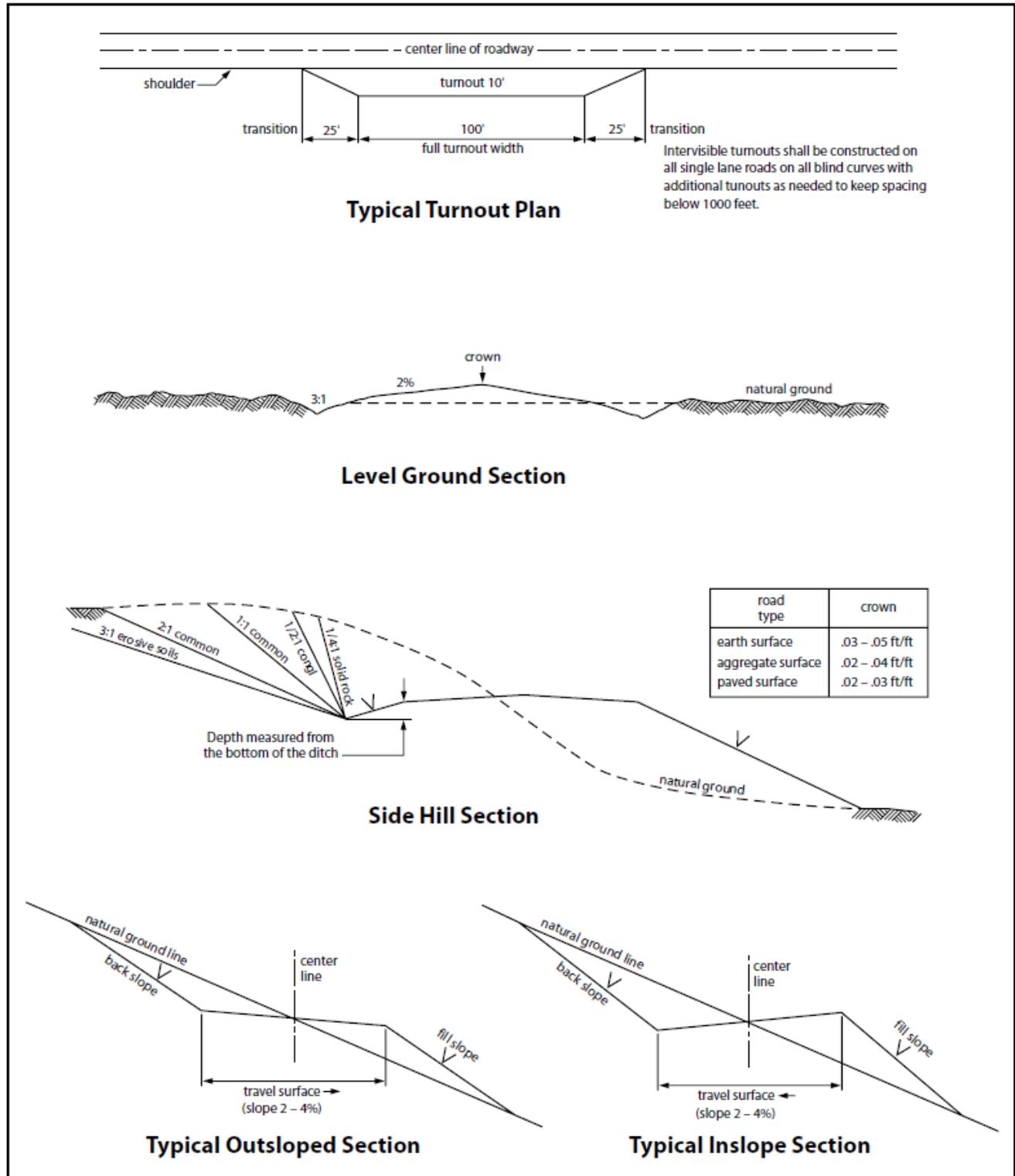


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

VII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Exclosure Netting (Open-top Tanks)

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

Chemical and Fuel Secondary Containment and Exclosure Screening

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

Open-Vent Exhaust Stack Exclosures

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

Containment Structures

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

Painting Requirement

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, **Shale Green** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

B. OIL AND GAS RELATED SITES

STANDARD STIPULATIONS FOR OIL AND GAS RELATED SITES

A copy of the application (Grant/Sundry Notice) and attachments, including stipulations and map, will be on location during construction. BLM personnel may request to view a copy of your permit during construction to ensure compliance with all stipulations.

The holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer, BLM.

1. The holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant and for all response costs, penalties, damages, claims, and other costs arising from the provisions of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Chap. 82, Section 6901 et. seq., from the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. Chap. 109, Section 9601 et. seq., and from other applicable environmental statutes.
2. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et. seq.) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized by this grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42

U.S.C. 9601, et. seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et. seq.) on the right-of-way (unless the release or threatened release is wholly unrelated to the right-of-way holder's activity on the right-of-way). This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. If, during any phase of the construction, operation, maintenance, or termination of the site or related pipeline(s), any oil or other pollutant should be discharged from site facilities, the pipeline(s) or from containers or vehicles impacting Federal lands, the control and total removal, disposal, and cleanup of such oil or other pollutant, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages to Federal lands resulting therefrom, the Authorized Officer may take such measures as deemed necessary to control and cleanup the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any liability or responsibility.

5. Sites shall be maintained in an orderly, sanitary condition at all times. Waste materials, both liquid and solid, shall be disposed of promptly at an appropriate, authorized waste disposal facility in accordance with all applicable State and Federal laws. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, petroleum products, brines, chemicals, oil drums, ashes, and equipment.

6. The operator will notify the Bureau of Land Management (BLM) authorized officer and nearest Fish and Wildlife Service (FWS) Law Enforcement office within 24 hours, if the operator discovers a dead or injured federally protected species (i.e., migratory bird species, bald or golden eagle, or species listed by the FWS as threatened or endangered) in or adjacent to a pit, trench, tank, exhaust stack, or fence. (If the operator is unable to contact the FWS Law Enforcement office, the operator must contact the nearest FWS Ecological Services office.)

7. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is **Shale Green**, Munsell Soil Color Chart Number 5Y 4/2.

8. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of

evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

9. A sales contract for removal of mineral material (caliche, sand, gravel, fill dirt) from an authorized pit, site, or on location must be obtained from the BLM prior to commencing construction. There are several options available for purchasing mineral material: contact the BLM office (575-234-5972).

10. The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

11. Once the site is no longer in service or use, the site must undergo final abandonment. At final abandonment, the site and access roads must undergo "final" reclamation so that the character and productivity of the land are restored. Earthwork for final reclamation must be completed within six (6) months of the abandonment of the site. All pads and facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact. After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

12. The holder shall stockpile an adequate amount of topsoil where blading occurs. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be segregated from other spoil piles. The topsoil will be used for final reclamation.

13. The holder will reseed all disturbed areas. Seeding will be done according to the attached seeding requirements, using the following seed mix.

- seed mixture 1
- seed mixture 2
- seed mixture 2/LPC
- seed mixture 3
- seed mixture 4
- Aplomado Falcon Mixture

14. In those areas where erosion control structures are required to stabilize soil conditions, the holder shall install such structures as are suitable for the specific soil

conditions being encountered and which are in accordance with sound management practices. Any earth work will require prior approval by the Authorized Officer.

15. Open-topped Tanks - The operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps

16. The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an

impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock enclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

17. Open-Vent Exhaust Stack Enclosures – The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (Recommended enclosure structures on open-vent exhaust stacks are in the shape of a cone.) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

18. Containment Structures - Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

19. Special Stipulations:

Watershed:

The entire well pad(s) will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad. The compacted berm shall be constructed at a minimum of 12 inches with impermeable mineral material (e.g. caliche). Topsoil shall not be used to construct the berm. No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad. The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed. Any water erosion that may occur due to the construction of the well pad during the life of the well will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The topsoil shall be stockpiled in an appropriate location to prevent loss of soil due to water or wind erosion and not used for berming or erosion control. If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.

Tank battery locations will be lined and bermed. A 20-mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank or 24-hour production, whichever is greater. Automatic shut off, check valves, or similar systems will be installed for tanks to minimize the effects of catastrophic line failures used in production or drilling.

Any water erosion that may occur due to the construction of the well pads or during the life of the wells, will be quickly corrected and proper measures will be taken to prevent future erosion. Stockpiling of topsoil is required. The topsoil reserved for reclamation purposes shall be stockpiled in appropriate locations to prevent loss of soil due to water or wind erosion and not be used for berming or erosion control.

Karst:*Construction Mitigation*

In order to mitigate the impacts from construction activities on cave and karst resources, the following Conditions of Approval will apply to this APD or project:

General Construction:

- No blasting
- The BLM, Carlsbad Field Office, will be informed immediately if any subsurface drainage channels, cave passages, or voids are penetrated during construction, and no additional construction shall occur until clearance has been issued by the Authorized Officer.
- All linear surface disturbance activities will avoid sinkholes and other karst features to lessen the possibility of encountering near surface voids during construction, minimize changes to runoff, and prevent untimely leaks and spills from entering the karst drainage system.
- All spills or leaks will be reported to the BLM immediately for their immediate and proper treatment.

Pad Construction:

- The pad will be constructed and leveled by adding the necessary fill and caliche – no blasting.

- The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.
- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g., caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised (i.e. an access road crossing the berm cannot be lower than the berm height).
- Following a rain event, all fluids will vacuumed off of the pad and hauled off-site and disposed at a proper disposal facility.

Road Construction:

- Turnout ditches and drainage leadoffs will not be constructed in such a manner as to alter the natural flow of water into or out of cave or karst features.
- Special restoration stipulations or realignment may be required if subsurface features are discovered during construction.

Buried Pipeline/Cable Construction:

- Rerouting of the buried line(s) may be required if a subsurface void is encountered during construction to minimize the potential subsidence/collapse of the feature(s) as well as the possibility of leaks/spills entering the karst drainage system.

Powerline Construction:

- Smaller powerlines will be routed around sinkholes and other karst features to avoid or lessen the possibility of encountering near surface voids and to minimize changes to runoff or possible leaks and spills from entering karst systems.
- Larger powerlines will adjust their pole spacing to avoid cave and karst features.
- Special restoration stipulations or realignment may be required if subsurface voids are encountered.

Surface Flowlines Installation:

- Flowlines will be routed around sinkholes and other karst features to minimize the possibility of leaks/spills from entering the karst drainage system.

Drilling Mitigation

Federal regulations and standard Conditions of Approval applied to all APDs require that adequate measures are taken to prevent contamination to the environment. Due to the extreme sensitivity of the cave and karst resources in this project area, the following additional Conditions of Approval will be added to this APD.

To prevent cave and karst resource contamination the following will be required:

- Closed loop system using steel tanks - all fluids and cuttings will be hauled off-site and disposed of properly at an authorized site
- Rotary drilling with fresh water where cave or karst features are expected to prevent contamination of freshwater aquifers.
- Directional drilling is only allowed at depths greater than 100 feet below the cave occurrence zone to prevent additional impacts resulting from directional drilling.
- Lost circulation zones will be logged and reported in the drilling report so BLM can assess the situation and work with the operator on corrective actions.
- Additional drilling, casing, and cementing procedures to protect cave zones and fresh water aquifers. See drilling COAs.

Production Mitigation

In order to mitigate the impacts from production activities and due to the nature of karst terrane, the following Conditions of Approval will apply to this APD:

- Tank battery locations and facilities will be bermed and lined with a 20 mil thick permanent liner that has a 4 oz. felt backing, or equivalent, to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.
- Development and implementation of a leak detection system to provide an early alert to operators when a leak has occurred.
- Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

Residual and Cumulative Mitigation

The operator will perform annual pressure monitoring on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be taken to correct the problem to the BLM's approval.

Plugging and Abandonment Mitigation

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

Range:

Cattleguards

Where a permanent cattleguard is approved, an appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s). Any existing cattleguard(s) on the access road shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguard(s) that are in place and are utilized during lease operations. A gate shall be constructed on one side of the cattleguard and fastened securely to H-braces.

Fence Requirement

Where entry granted across a fence line, the fence must be braced and tied off on both sides of the passageway prior to cutting. Once the work is completed, the fence will be restored to its prior condition, or better. The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

Livestock Watering Requirement

Any damage to structures that provide water to livestock throughout the life of the well, caused by operations from the well site, must be immediately corrected by the operator. The operator must notify the BLM office (575-234-5972) and the private surface landowner or the grazing allotment holder if any damage occurs to structures that provide water to livestock.

VIII. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

IX. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by

drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Seed Mixture 2, for Sandy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds tend to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast, and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

<u>Species</u>	<u>lb/acre</u>
Sand dropseed (Sporobolus cryptandrus)	1.0
Sand love grass (Eragrostis trichodes)	1.0
Plains bristlegrass (Setaria macrostachya)	2.0

*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	LONGFELLOW ENERGY LP
LEASE NO.:	NMNM014847
LOCATION:	Section 17, T.17 S., R.29 E., NMPM
COUNTY:	Eddy County, New Mexico

WELL NAME & NO.:	ANGUS FEDERAL COM 17 001H
SURFACE HOLE FOOTAGE:	988'/S & 243'/E
BOTTOM HOLE FOOTAGE:	1250'/S & 20'/W

WELL NAME & NO.:	ANGUS FEDERAL COM 17 002H
SURFACE HOLE FOOTAGE:	963'/S & 243'/E
BOTTOM HOLE FOOTAGE:	685'/S & 20'/W

WELL NAME & NO.:	ANGUS FEDERAL COM 17 003H
SURFACE HOLE FOOTAGE:	938'/S & 243'/E
BOTTOM HOLE FOOTAGE:	120'/S & 20'/W

COA

H2S	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Potash	<input checked="" type="radio"/> None	<input type="radio"/> Secretary	<input type="radio"/> R-111-P
Cave/Karst Potential	<input type="radio"/> Low	<input checked="" type="radio"/> Medium	<input type="radio"/> High
Cave/Karst Potential	<input type="radio"/> Critical		
Variance	<input type="radio"/> None	<input checked="" type="radio"/> Flex Hose	<input type="radio"/> Other
Wellhead	<input type="radio"/> Conventional	<input type="radio"/> Multibowl	<input checked="" type="radio"/> Both
Other	<input type="checkbox"/> 4 String Area	<input type="checkbox"/> Capitan Reef	<input type="checkbox"/> WIPP
Other	<input type="checkbox"/> Fluid Filled	<input type="checkbox"/> Cement Squeeze	<input type="checkbox"/> Pilot Hole
Special Requirements	<input type="checkbox"/> Water Disposal	<input checked="" type="checkbox"/> COM	<input type="checkbox"/> Unit

A. HYDROGEN SULFIDE

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

B. CASING

Casing Design:

1. The **9-5/8** inch surface casing shall be set at approximately **220** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - 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.

2. The minimum required fill of cement behind the **7 X 5-1/2** inch production casing is:

Option 1 (Single Stage):

- 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 or potash.

Option 2:

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

- b. Second stage above DV tool:
 - Cement to surface. If cement does not circulate, contact the appropriate BLM office.
Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

- ❖ In **Medium Cave/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.

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.

Option 1:

- a. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.

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

Option 2:

1. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, 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.

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)

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. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On 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: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 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, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug 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.

NMK03082021



H₂S Drilling Operations Plan

- a. All personnel will be trained in H₂S working conditions as required by Onshore Order 6 before drilling out of the surface casing.
- b. Two briefing areas will be established. Each will be $\geq 150'$ from the wellhead, perpendicular from one another, and easily entered and exited. See H₂S page 5 for more details.
- c. H₂S Safety Equipment/Systems:
 - i. Well Control Equipment
 - Flare line will be $\geq 150'$ from the wellhead and ignited by a pilot light.
 - Beware of SO₂ created by flaring.
 - Choke manifold will include a remotely operated choke.
 - Mud gas separator
 - ii. Protective Equipment for Essential Personnel
 - Every person on site will be required to wear a personal H₂S and SO₂ monitor at all times while on site. Monitors will not be worn on hard hats. Monitors will be worn on the front of the chest – not on the belt.
 - One self-contained breathing apparatus (SCBA) 30-minute rescue pack will be at each briefing area. Two 30-minute SCBA packs will be stored in the safety trailer.
 - Four work/escape packs will be on the rig floor. Each pack will have a long enough hose to allow unimpaired work activity.
 - Four emergency escape packs will be in the doghouse for emergency evacuation.
 - Hand signals will be used when wearing protective breathing apparatus.
 - Stokes litter or stretcher
 - Two full OSHA compliant body harnesses
 - A 100' long x 5/8" OSHA compliant rope
 - One 20-pound ABC fire extinguisher
 - iii. H₂S Detection & Monitoring Equipment
 - Every person on site will be required to wear a personal H₂S and SO₂ monitor at all times while on site. Monitors will not be worn on hard hats. Monitors will be worn on the front of the chest.



- A stationary detector with 3 sensors will be in the doghouse.
 - Sensors will be installed on the rig floor, bell nipple, and at the end of the flow line or where drilling fluids are discharged.
 - Visual alarm will be triggered at 10 ppm.
 - Audible alarm will be triggered at 10 ppm.
 - Calibration will occur at least every 30 days. Gas sample tubes will be kept in the safety trailer.
- iv. Visual Warning System
- Color-coded H₂S condition sign will be set at the entrance to the pad.
 - Color-coded condition flag will be installed to indicate current H₂S conditions.
 - Two wind socks will be installed that will be visible from all sides.
- v. Mud Program
- A water based mud with a pH of ≥ 10 will be maintained to control corrosion, H₂S gas returns to the surface, and minimize sulfide stress cracking and embrittlement.
 - Drilling mud containing H₂S gas will be degassed at an optimum location for the rig configuration.
 - This gas will be piped into the flare system.
 - Enough mud additives will be on location to scavenge and/or neutralize H₂S where formation pressures are unknown.
- vi. Metallurgy
- All equipment that has the potential to be exposed to H₂S will be suitable for H₂S service.
 - Equipment that will meet the metallurgical standards include the drill string, casing, wellhead, BOP assembly, casing head & spool, rotating head, kill lines, choke, choke manifold & lines, valves, mud-gas separators, DST tools, test units, tubing, flanges, and other related equipment (elastomer packings and seals).
- vii. Communication from well site
- Cell phones and/or two-way radios will be used to communicate from the well site.
- d. A remote-controlled choke, mud-gas separator, and a rotating head will be installed before drilling or testing any formation expected to contain H₂S.



Air Evacuation

Med Flight Air Ambulance (Albuquerque) (800) 842-4431

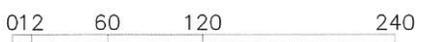
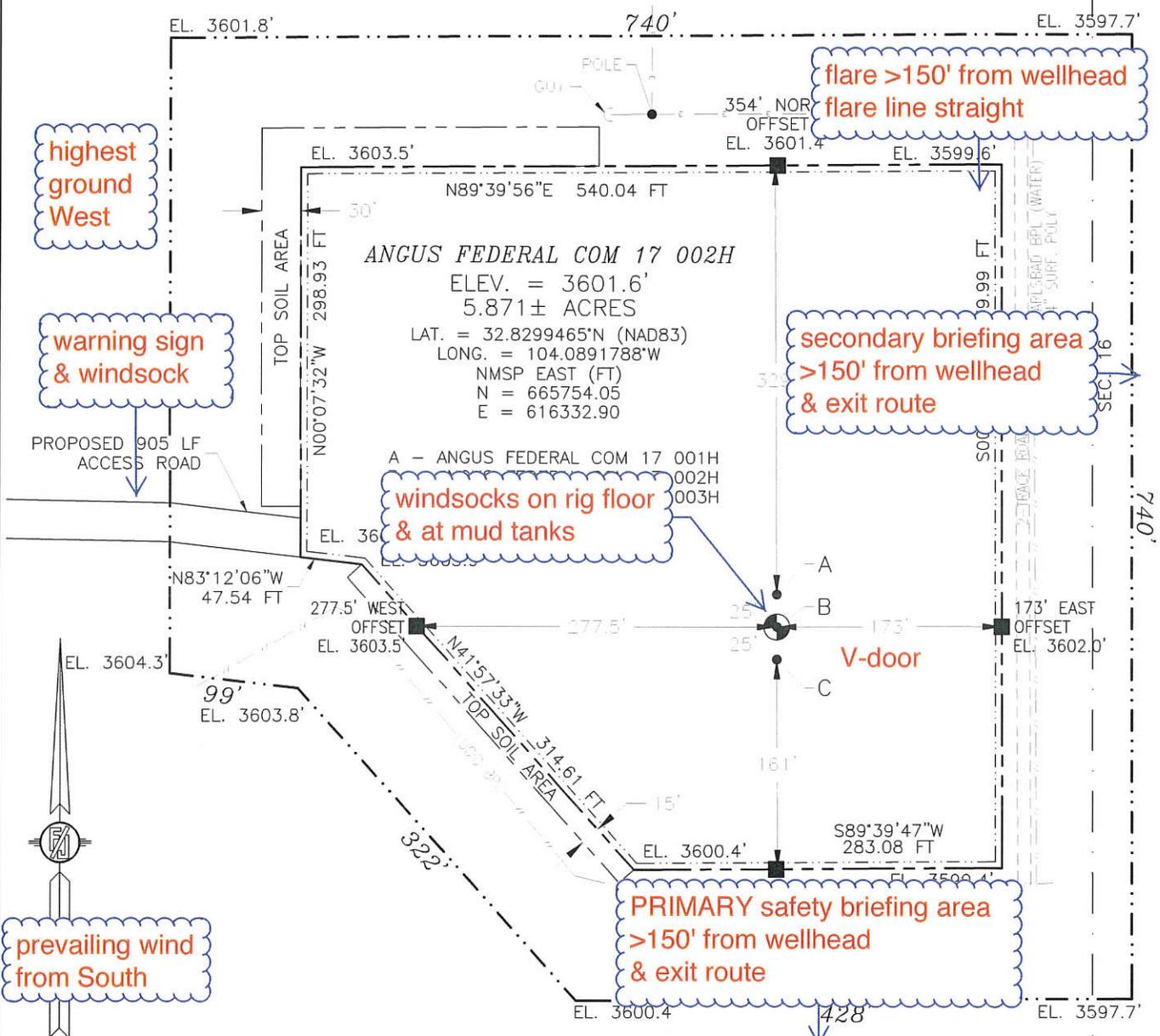
Lifeguard (Albuquerque) (888) 866-7256

Veterinarian

Artesia Animal Clinic (575) 748-2042

SECTION 17, TOWNSHIP 17 SOUTH, RANGE 29 EAST, N.M.P.M. EDDY COUNTY, STATE OF NEW MEXICO SITE MAP

NOTE: LATITUDE AND LONGITUDE COORDINATES ARE SHOWN USING THE NORTH AMERICAN DATUM OF 1983 (NAD83) LISTED NEW MEXICO STATE PLANE EAST COORDINATES ARE GRID (NAD83). BASIS OF BEARING AND DISTANCES USED ARE NEW MEXICO STATE PLANE EAST COORDINATES MODIFIED TO THE SURFACE. VERTICAL DATUM NAVD88.



DIRECTIONS TO LOCATION
 FROM STATE HIGHWAY 82 AND CR. 211 (OLD LOCO) GO NORTH ON CR. 211 1.19 MILES, TURN RIGHT ON CALICHE ROAD AND GO EAST 0.23 OF A MILE TO ROAD SURVEY AND FOLLOW FLAGS NORTH 94', THEN NORTHEAST 83', THEN EAST-NORTHEAST 137', THEN EAST 491', THEN EAST-SOUTHEAST 100' (TOTAL OF 905') TO THE SOUTHWEST PAD CORNER FOR THIS LOCATION.

LONGFELLOW ENERGY, LP
ANGUS FEDERAL COM 17 002H
 LOCATED 963 FT. FROM THE SOUTH LINE
 AND 243 FT. FROM THE EAST LINE OF
 SECTION 17, TOWNSHIP 17 SOUTH,
 RANGE 29 EAST, N.M.P.M.
 EDDY COUNTY, STATE OF NEW MEXICO

I, FILMON F. JARAMILLO, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I DESIGNED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT I AM NOT PROVIDING ANY SERVICES THAT DO NOT MEET THE MINIMUM STANDARDS FOR SURVEYING.



FILMON F. JARAMILLO, PLS. 279
MADRON SURVEYING, INC.
 501 SOUTH CANAL
 (505) 234-3341

JULY 17, 2020
 SURVEY NO. 8327

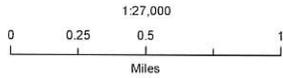
CARLSBAD, NEW MEXICO

Novo Oil and Gas Northern Delaware

Angus Federal Fed Com 17 Pad
H₂S Contingency Plan:
Radius Map

Section 17, Township 17S, Range 29E
Eddy County, New Mexico

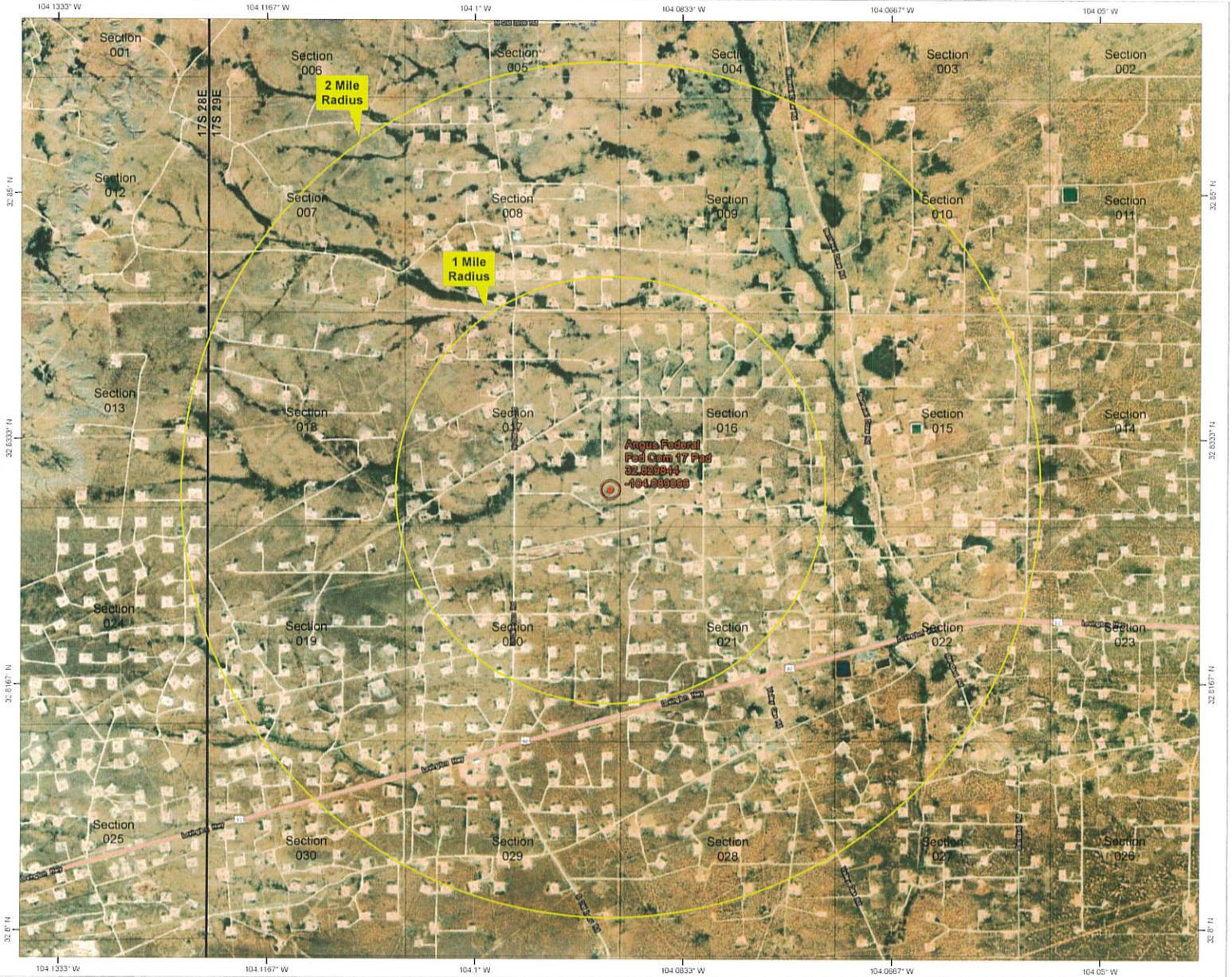
 Well Pad Location

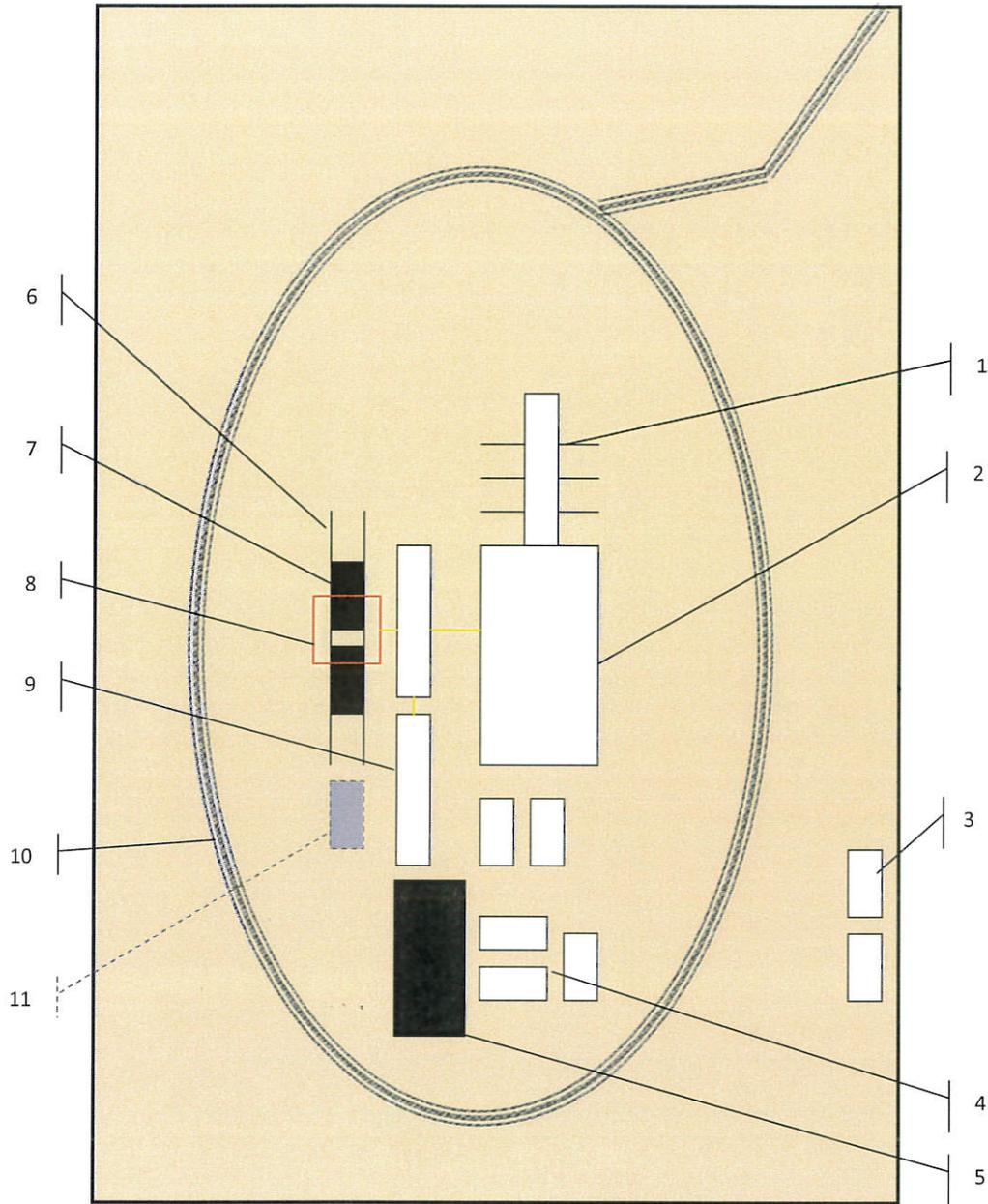


NAD 1983 New Mexico State Plane East
FIPS 3001 Feet



Prepared by Permits West, Inc., August 10, 2020
for Longellow Energy, LP





Schematic Closed Loop Drilling Rig*

1. Pipe Rack
2. Drill Rig
3. House Trailers/ Offices
4. Generator/Fuel/Storage
5. Overflow-Frac Tank
6. Skids
7. Roll Offs
8. Hopper or Centrifuge
9. Mud Tanks
10. Loop Drive
11. Generator (only for use with centrifuge)

*Not drawn to scale: Closed loop system requires at least 30 feet beyond mud tanks. Ideally 60 feet would be available

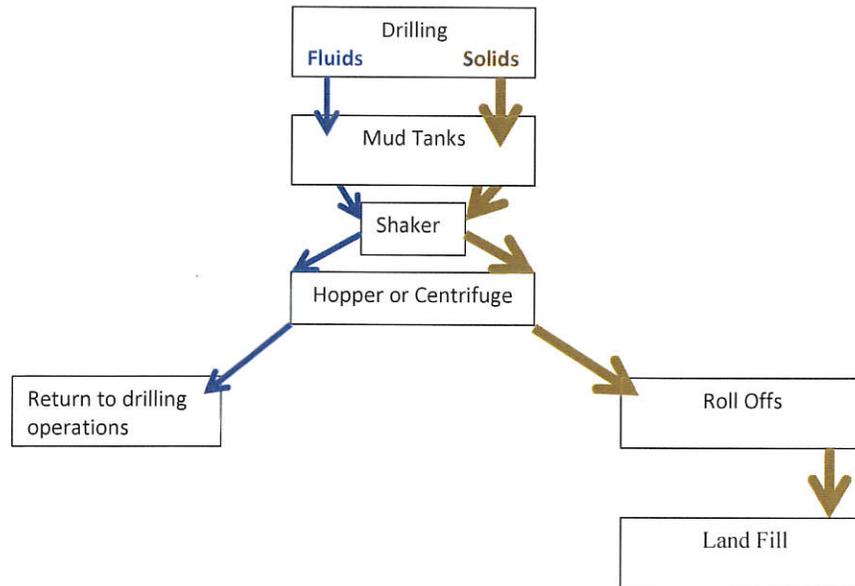


Above: Centrifugal Closed Loop System



Closed Loop Drilling System: Mud tanks to right (1)
Hopper in air to settle out solids (2)
Water return pipe (3)
Shaker between hopper and mud tanks (4)
Roll offs on skids (5)

Flow Chart for Drilling Fluids and Solids



Photos Courtesy of Gandy Corporation Oil Field Service

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

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

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

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

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

COMMENTS

Action 27187

COMMENTS

Operator: LONGFELLOW ENERGY, LP Suite 800 Dallas, TX75225	8115 Preston Road	OGRID: 372210	Action Number: 27187	Action Type: FORM 3160-3
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Created By	Comment	Comment Date
kpickford	KP GEO Review 5/11/2021	05/11/2021

District I
 1625 N. French Dr., Hobbs, NM 88240
 Phone:(575) 393-6161 Fax:(575) 393-0720
District II
 811 S. First St., Artesia, NM 88210
 Phone:(575) 748-1283 Fax:(575) 748-9720
District III
 1000 Rio Brazos Rd., Aztec, NM 87410
 Phone:(505) 334-6178 Fax:(505) 334-6170
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 1220 S. St Francis Dr., Santa Fe, NM 87505
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CONDITIONS

Action 27187

CONDITIONS OF APPROVAL

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OCD Reviewer	Condition
kpickford	Notify OCD 24 hours prior to casing & cement
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104
kpickford	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing
kpickford	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system