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

HOBBS OCD

JUL 02 2019

RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☑ DRILL ☐ REENTER	5. Lease Serial No. NMNM137469
1b. Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other	6. If Indian, Allotee or Tribe Name
1c. Type of Completion: ☐ Hydraulic Fracturing ☑ Single Zone ☐ Multiple Zone	7. If Unit or CA Agreement, Name and No.
	8. Lease Name and Well No. NANDINA ~~FED COM~~ 25 36 31 FED COM 091H 97267
2. Name of Operator AMEREDEV OPERATING LLC (372224)	9. API Well No. 30-025-46193
3a. Address 5707 Southwest Parkway, Building 1, Suite 275 Austin TX	3b. Phone No. *(include area code)* (737)300-4700
	10. Field and Pool, or Exploratory 97098 WC-025 ~~G-08 S263620C~~ / ~~LWR~~ BONE SP
4. Location of Well *(Report location clearly and in accordance with any State requirements.*)* At surface LOT 4 / 230 FSL / 980 FWL / LAT 32.0802061 / LONG -103.3095584 At proposed prod. zone LOT 1 / 50 FNL / 660 FWL / LAT 32.108475 / LONG -103.3106034	11. Sec., T. R. M. or Blk. and Survey or Area SEC 31 / T25S / R36E / NMP

14. Distance in miles and direction from nearest town or post office* 7 miles	12. County or Parish LEA	13. State NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 230 feet	16. No of acres in lease 600.28	17. Spacing Unit dedicated to this well 320
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 2634 feet	19. Proposed Depth 11647 feet / 21889 feet	20. BLM/BIA Bond No. in file FED: NMB001478
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3023 feet	22. Approximate date work will start* 05/01/2019	23. Estimated duration 90 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, and the Hydraulic Fracturing rule per 43 CFR 3162.3-3 (as applicable)

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be requested by the BLM.

25. Signature (Electronic Submission)	Name *(Printed/Typed)* Christie Hanna / Ph: (737)300-4723	Date 11/30/2018
Title Senior Engineering Technician		
Approved by *(Signature)* (Electronic Submission)	Name *(Printed/Typed)* Cody Layton / Ph: (575)234-5959	Date 06/28/2019
Title Assistant Field Manager Lands & Minerals	Office CARLSBAD	

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

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

GCP Rec 07/02/19

APPROVED WITH CONDITIONS

KZ 07/08/19

(Continued on page 2)

*(Instructions on page 2)

Approval Date: 06/28/2019

PSF Dtc: 6/28/19

INSTRUCTIONS

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

ITEM I: If the proposal is to redrill to the same reservoir at a different subsurface location or to a new reservoir, use this form with appropriate notations. Consult applicable Federal regulations concerning subsequent work proposals or reports on the well.

ITEM 4: Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local Federal offices for specific instructions.

ITEM 14: Needed only when location of well cannot readily be found by road from the land or lease description. A plat, or plats, separate or on the reverse side, showing the roads to, and the surveyed location of, the wen, and any other required information, should be furnished when required by Federal agency offices.

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

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

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

NOTICES

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

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

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

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

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

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

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

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

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Approval Date: 06/28/2019

Additional Operator Remarks

Location of Well

1. SHL: LOT 4 / 230 FSL / 980 FWL / TWSP: 25S / RANGE: 36E / SECTION: 31 / LAT: 32.0802061 / LONG: -103.3095584 (TVD: 0 feet, MD: 0 feet)
   PPP: SWSW / 0 FSL / 664 FWL / TWSP: 25S / RANGE: 36E / SECTION: 30 / LAT: 32.0940751 / LONG: -103.3105982 (TVD: 11647 feet, MD: 16650 feet)
   BHL: LOT 1 / 50 FNL / 660 FWL / TWSP: 25S / RANGE: 36E / SECTION: 30 / LAT: 32.108475 / LONG: -103.3106034 (TVD: 11647 feet, MD: 21889 feet)

BLM Point of Contact

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

Approval Date: 06/28/2019

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.

253631 Lot 4 APD Nandina Fed Com 25 36 31 091H 30015 NMNM137469 Ameredev 12-55
06232019 NMK

Cap KFC

13 3/8	surface csg in a	17 1/2	inch hole.		Design Factors		SURFACE	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	68.00	J 55	BUTT	14.18	3.94	0.64	1,109	75,412
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,500			Tail Cmt	does not	circ to sfc.	Totals:	1,109	75,412

Comparison of Proposed to Minimum Required Cement Volumes

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
17 1/2	0.6946	704	1155	823	40	8.60	2973	3M	1.56

Burst Frac Gradient(s) for Segment(s) A, B = , b All > 0.70, OK. Alternate Burst = 1.16 > 0.7

9 5/8	casing inside the	13 3/8			Design Factors		INTERMEDIATE	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	40.00	HCL 80	BUTT	2.07	0.78	0.91	11,081	443,240
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	11,081	443,240

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 1109 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
12 1/4	0.3132	look ↘	0	3514		9.40	3791	5M	0.81
D V Tool(s):			5077				sum of sx	Σ CuFt	Σ%excess
t by stage % :		101	21				2581	5778	64

Class 'H' tail cmt yld > 1.20

Burst Frac Gradient(s) for Segment(s): A, B, C, D = 0.52, b, c, d
<0.70 a Problem!! Alternate Burst = 1.52 > 1 & Alt Collapse = 1.17 > 1.125

Tail cmt

5 1/2	casing inside the	9 5/8			Design Factors		PRODUCTION	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	20.00	HCP 110	BUTT	2.75	1.83	1.95	11,100	222,000
"B"	20.00	HCP 110	BUTT	7.85	1.60	1.95	10,790	215,798
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,442						Totals:	21,890	437,798

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 11081 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
8 1/2	0.2291	4674	6263	5371	17	10.50			1.23

Class 'H' tail cmt yld > 1.20

0		5 1/2			Design Factors			
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"							0	0
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	0	0

Cmt vol calc below includes this csg, TOC intended 0 ft from surface or a 21890 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
0			0	0					

Carlsbad Field Office 6/24/2019

Approval Date: 06/28/2019

253631 Lot 4 APD Nandina Fed Com 25 36 31 091H 30015 NMNM137469 Ameredev 12-55
06232019 NMK_ContingencyPlan

Cap KFC

13 3/8	surface csg in a	17 1/2	inch hole.		Design Factors		SURFACE	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	54.50	J 55	BUTT	14.12	2.28	1.12	1,109	60,441
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig: 1,427			Tail Cmt	does not	circ to sfc.	Totals:	1,109	60,441

Comparison of Proposed to Minimum Required Cement Volumes

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
17 1/2	0.6946	1537	2621	825	218	8.60	1345	2M	1.56

9 5/8	casing inside the	13 3/8			Design Factors		INTERMEDIATE	
Segment	#/ft	Grade	Coupling	Body	Collapse	Burst	Length	Weight
"A"	40.00	HCL 80	BUTT	4.57	1.73	0.74	5,013	200,520
"B"							0	0
w/8.4#/g mud, 30min Sfc Csg Test psig:						Totals:	5,013	200,520

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 1109 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
12 1/4	0.3132	look ↘	0	1644		9.40	5448	10M	0.81

MASP is within 10% of 5000psig, need

Burst Frac Gradient(s) for Segment(s): A, B, C, D = 1.15, b, c, d
All > 0.70, OK.

7 5/8	casing inside the	9 5/8	A Buoyant		Design Factors		INTERMEDIATE	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"	29.70	HCL 80	FJM	2.09	0.9	1.12	10,200	302,940
"B"	29.70	HCL 80	FJM	3.68	0.82	1.12	947	28,126
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,244						Totals:	11,147	331,066

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 5013 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
8 3/4	0.1005	683	1339	1172	14	14.00	5908	10M	0.56

Class 'H' tail cmt yld > 1.20 MASP is within 10% of 5000psig, need exrta equip?

Alt Collapse = 1.23 > 1.125

Tail cmt

5 1/2	casing inside the	7 5/8			Design Factors		PRODUCTION	
Segment	#/ft	Grade	Coupling	Joint	Collapse	Burst	Length	Weight
"A"	20.00	CYHP 110	TMK UPSF	1.29	1.47	1.7	11,147	222,940
"B"	20.00	CYHP 110	TMK UPSF	65.50	1.51	1.7	10,743	214,858
w/8.4#/g mud, 30min Sfc Csg Test psig: 2,452						Totals:	21,890	437,798
Segment Design Factors would be:				2.81	1.58	if it were a vertical wellbore.		

No Pilot Hole Planned	MTD	Max VTD	Csg VD	Curve KOP	Dogleg°	Severity°	MEOC
	21890	11647	11647	11100	90	10	11981.39

The cement volume(s) are intended to achieve a top of 0 ft from surface or a 11147 overlap.

Hole Size	Annular Volume	1 Stage Cmt Sx	1 Stage CuFt Cmt	Min Cu Ft	1 Stage % Excess	Drilling Mud Wt	Calc MASP	Req'd BOPE	Min Dist Hole-Cplg
6 3/4	0.0835	1751	2346	1937	21	14.00			0.49

Class 'H' tail cmt yld > 1.20 MASP is within 10% of 5000psig, need exrta equip?

Carlsbad Field Office 6/24/2019

Approval Date: 06/28/2019

PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	AMERIDEV OPERATING LLC
LEASE NO.:	NMNM137469
WELL NAME & NO.:	091H – NANDINA FED COM 25 36 31
SURFACE HOLE FOOTAGE:	230'/S & 980'/W
BOTTOM HOLE FOOTAGE	50'/N & 660'/W
LOCATION:	SECTION 31, T25S, R36E, NMPM
COUNTY:	LEA

COA

H2S	○ Yes	◉ No	
Potash	◉ None	○ Secretary	○ R-111-P
Cave/Karst Potential	◉ Low	○ Medium	○ High
Variance	○ None	◉ Flex Hose	○ Other
Wellhead	○ Conventional	◉ Multibowl	○ Both
Other	☐ 4 String Area	☑ Capitan Reef	☐ WIPP

A. HYDROGEN SULFIDE

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

B. CASING

Primary Casing Design:

1. The **13-3/8** inch surface casing shall be set at approximately **1109** feet (a minimum of 25 feet 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.

❖ **Special Capitan Reef requirements.** If lost circulation (50% or greater) occurs below the Base of the Salt, the operator shall do the following:

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

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

Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.

2. The minimum required fill of cement behind the **9-5/8** inch **1st intermediate** casing is:

   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. **Excess calculates to 21% - additional cement might be required.**

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

   - Cement should tie-back at least **50** feet on top of Capitan Reef Top. Operator shall provide method of verification. **Excess calculates to 17% - additional cement might be required.**

Alternate Casing Design:

2nd Intermediate casing must be kept fluid filled to meet BLM minimum collapse requirement.

3. The minimum required fill of cement behind the **7-5/8** inch **2nd intermediate** casing is:

    - Cement to surface. If cement does not circulate see B.1.a, c-d above. **Excess calculates to 14% - additional cement might be required.**

    In the case of lost circulation, operator has proposed to pump down 9 5/8" X 7 5/8" annulus. Operator must run a CBL from TD of the 7 5/8" casing to surface. Submit results to the BLM.

    Pilot hole is required to have a plug at the bottom of the hole. If two plugs are set, the BLM is to be contacted (575-361-2822) prior to tag of bottom plug, which must be a minimum of 200' in length. Operator can set one plug from bottom of pilot hole to kick-off point and save the WOC time for tagging the first plug. Note plug tops on subsequent drilling report.

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

    - Cement should tie-back at least **50** feet on top of Capitan Reef Top. Operator shall provide method of verification. **Excess calculates to 21% - additional cement might be required.**

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:

Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **10,000 (10M)** psi.

Option 2:

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 10,000 (10M) 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.

Variance approved to use a 5M annular. The annular must be tested to full working pressure (5000 psi.)

D. SPECIAL REQUIREMENT(S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Carlsbad Field Office, 620 E Greene St. Carlsbad, New Mexico 88220, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

GENERAL REQUIREMENTS

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

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

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

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

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

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
   a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
   b. When the operator proposes to set surface casing with Spudder Rig
      - Notify the BLM when moving in and removing the Spudder Rig.
      - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
      - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.

2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log (one log per well pad is acceptable) 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 intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing intergrity test can be done (prior to the cement setting up) immediately after bumping the plug.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.

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

6. On 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. 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.

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

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. 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.

f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes. This test shall be performed prior to the test at full stack pressure.

g. 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.

Waste Minimization Plan (WMP)

In the interest of resource development, submission of additional well gas capture development plan information is deferred but may be required by the BLM Authorized Officer at a later date.

NMK6242019

PECOS DISTRICT
SURFACE USE
CONDITIONS OF APPROVAL

Environmental Assessment DOI-BLM- NM-P020-2019-0838-EA

Ameredev Operating LLC
Nandina Fed Com 25 36 31 071H
Nandina Fed Com 25 36 31 081H
Nandina Fed Com 25 36 31 091H
Nandina Fed Com 25 36 31 102H
Nandina Fed Com 25 36 31 112H
Nandina Fed Com 25 36 31 122H

Lease No. NMNM137469

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.

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)

Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken: Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

Hydrology:
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 top soil 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.

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 twenty-five (25) 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.

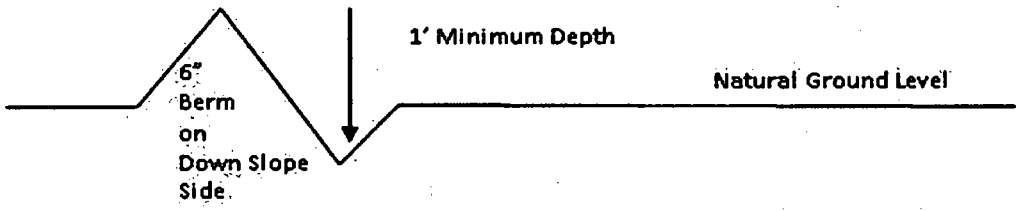
Turnouts
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outsloping 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 foot road with 4% road slope: $\frac{400'}{4\%} + 100' = 200'$ 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 3. Redistribute topsoil
2. Construct road 4. Revegetate slopes

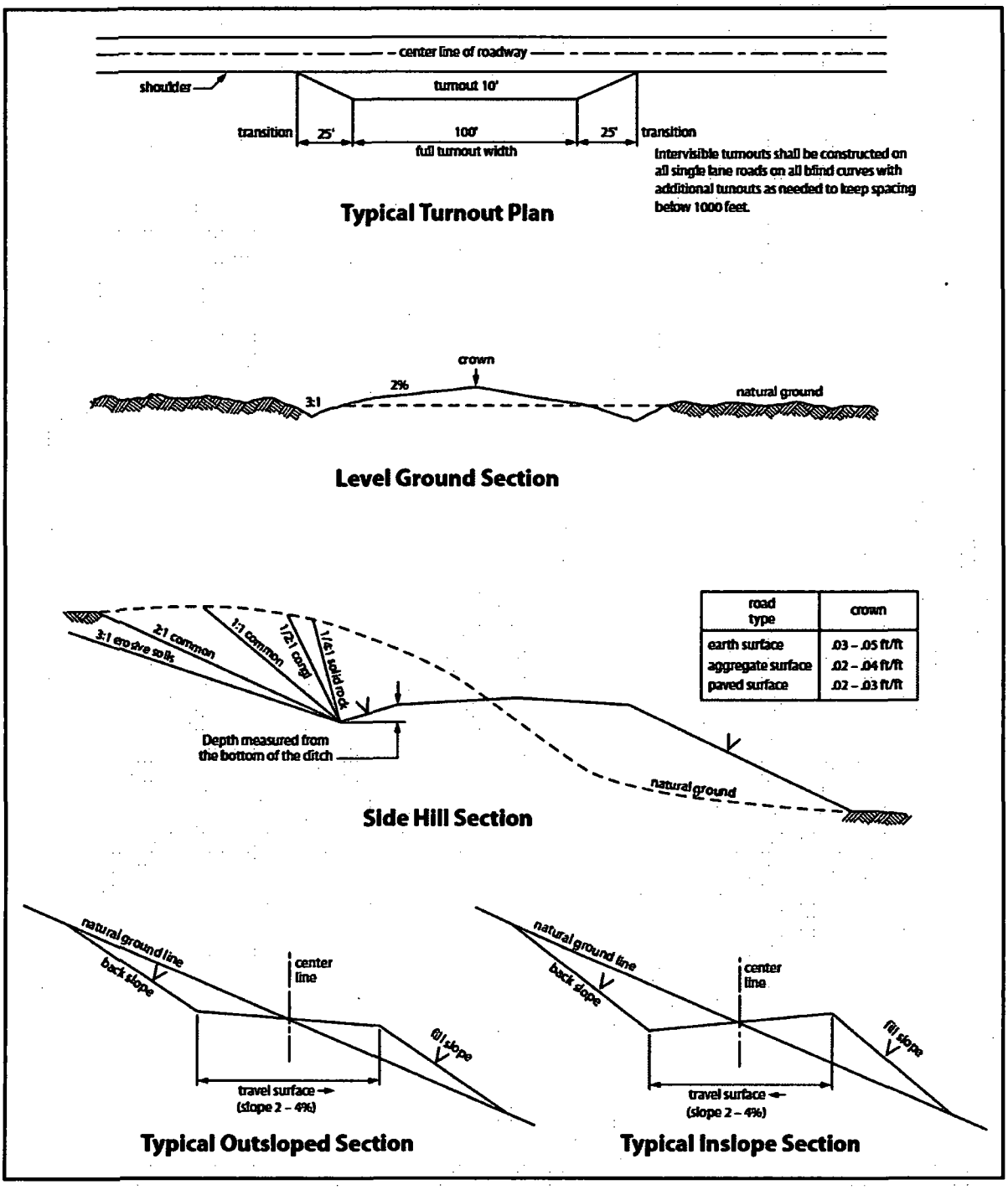


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

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).

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).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture for LPC Sand/Shinnery 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 have a tendency 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:

Species	lb/acre
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

*Pounds of pure live seed:

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

Approval Date: 06/28/2019

AFMSS

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

Operator Certification Data Report

06/28/2019

Operator Certification

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

NAME: Christie Hanna **Signed on:** 05/24/2019

Title: Senior Engineering Technician

Street Address: 5707 Southwest Parkway, Building 1, Suite 275

City: Austin **State:** TX **Zip:** 78735

Phone: (737)300-4723

Email address: channa@ameredev.com

Field Representative

Representative Name: ZACHARY BOYD

Street Address: 5707 SOUTHWEST PARKWAY, BLDG 1, STE. 275

City: AUSTIN **State:** TX **Zip:** 78735

Phone: (737)300-4700

Email address: zboyd@ameredev.com

APD ID: 10400036853 **Submission Date:** 11/30/2018

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

Well Type: OIL WELL **Well Work Type:** Drill

[redacted]

Show Final Text

Section 1 - General

APD ID: 10400036853 **Tie to previous NOS?** **Submission Date:** 11/30/2018

BLM Office: CARLSBAD **User:** Christie Hanna **Title:** Senior Engineering Technician

Federal/Indian APD: FED **Is the first lease penetrated for production Federal or Indian?** FED

Lease number: NMNM137469 **Lease Acres:** 600.28

Surface access agreement in place? **Allotted?** **Reservation:**

Agreement in place? NO **Federal or Indian agreement:**

Agreement number:

Agreement name:

Keep application confidential? NO

Permitting Agent? NO **APD Operator:** AMEREDEV OPERATING LLC

Operator letter of designation:

Operator Info

Operator Organization Name: AMEREDEV OPERATING LLC

Operator Address: 5707 Southwest Parkway, Building 1, Suite 275 **Zip:** 78735

Operator PO Box:

Operator City: Austin **State:** TX

Operator Phone: (737)300-4700

Operator Internet Address:

Section 2 - Well Information

Well in Master Development Plan? NO **Master Development Plan name:**

Well in Master SUPO? NO **Master SUPO name:**

Well in Master Drilling Plan? NO **Master Drilling Plan name:**

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H **Well API Number:**

Field/Pool or Exploratory? Field and Pool **Field Name:** WC-025 G-08 S263620C **Pool Name:** LWR BONE SPRING

Is the proposed well in an area containing other mineral resources? USEABLE WATER,NATURAL GAS,CO2,OIL

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

Describe other minerals:

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

Type of Well Pad: MULTIPLE WELL **Multiple Well Pad Name:** NANDINA **Number:** 091H

Well Class: HORIZONTAL **Number of Legs:** 1

Well Work Type: Drill

Well Type: OIL WELL

Describe Well Type:

Well sub-Type: INFILL

Describe sub-type:

Distance to town: 7 Miles **Distance to nearest well:** 2634 FT [redacted]

Reservoir well spacing assigned acres Measurement: 320 Acres

Well plat: NANDINA_FED_COM_25_36_31_091H___BLM_LEASE_MAP_REV_20181130091140.pdf

NANDINA_FED_COM_25_36_31_091H___C_102_REV___SIG_20181130091142.pdf

NANDINA_FED_COM_25_36_31_091H___EXH_2A_2B_REV_20181130091143.pdf

NANDINA_FED_COM_25_36_31_091H___VICINITY_MAP_REV_20181130091143.pdf

NANDINA_FED_COM_25_36_31_091H___GAS_CAPTURE_PLAN_20181130091157.pdf

WELLSITE_20190524124855.pdf

Well work start Date: 05/01/2019 **Duration:** 90 DAYS

Section 3 - Well Location Table

Survey Type: RECTANGULAR

Describe Survey Type:

Datum: NAD83 **Vertical Datum:** NAVD88

Survey number: 18329

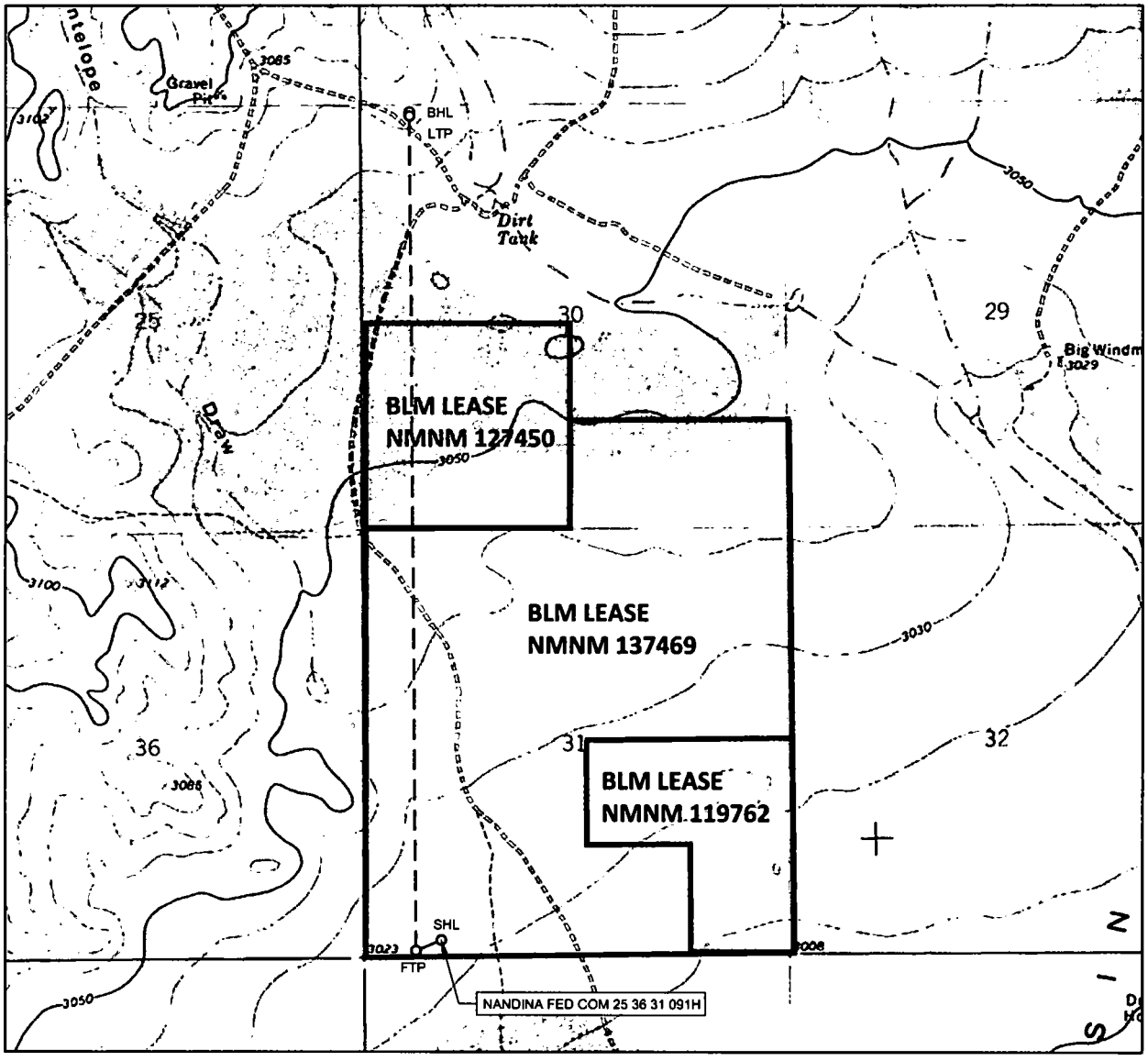
	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
SHL Leg #1	230	FSL	980	FWL	25S	36E	31	Lot 4	32.0802061	-103.3095584	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 137469	3023	0	0

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

	NS-Foot	NS Indicator	EW-Foot	EW Indicator	Twsp	Range	Section	Aliquot/Lot/Tract	Latitude	Longitude	County	State	Meridian	Lease Type	Lease Number	Elevation	MD	TVD
KOP Leg #1	101	FSL	853	FWL	25S	36E	31	Aliquot SWSW	32.0797414	-103.3098068	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 137469	-8051	11081	11074
PPP Leg #1	0	FSL	664	FWL	25S	36E	30	Aliquot SWSW	32.0940751	-103.3105982	LEA	NEW MEXICO	NEW MEXICO	F	NMNM 127450	-8624	16650	11647
EXIT Leg #1	50	FNL	660	FWL	25S	36E	30	Lot 1	32.108475	-103.3106034	LEA	NEW MEXICO	NEW MEXICO	F	FEE	-8624	21889	11647
BHL Leg #1	50	FNL	660	FWL	25S	36E	30	Lot 1	32.108475	-103.3106034	LEA	NEW MEXICO	NEW MEXICO	F	FEE	-8624	21889	11647

LOCATION & ELEVATION VERIFICATION MAP



AMEREDEV

AMEREDEV OPERATING, LLC

LEASE NAME & WELL NO.: NANDINA FED COM 25 36 31 091H

SECTION 31 TWP 25-S RGE 36-E SURVEY N.M.P.M.
COUNTY LEA STATE NM ELEVATION 3023'
DESCRIPTION 230' FSL & 980' FWL

LATITUDE N 32.0802061 LONGITUDE W 103.3095584

-N-

SCALE: 1" = 2000'

0' 1000' 2000'

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S:\SURVEY\AMEREDEV_OPERATING_LLC\NANDINA_FED_COM\FINAL_PRODUCTS\LO_NANDINA_FED_COM_25_36_31_091H_REV1.DWG 11/16/2018 11:11:21 AM ccaston

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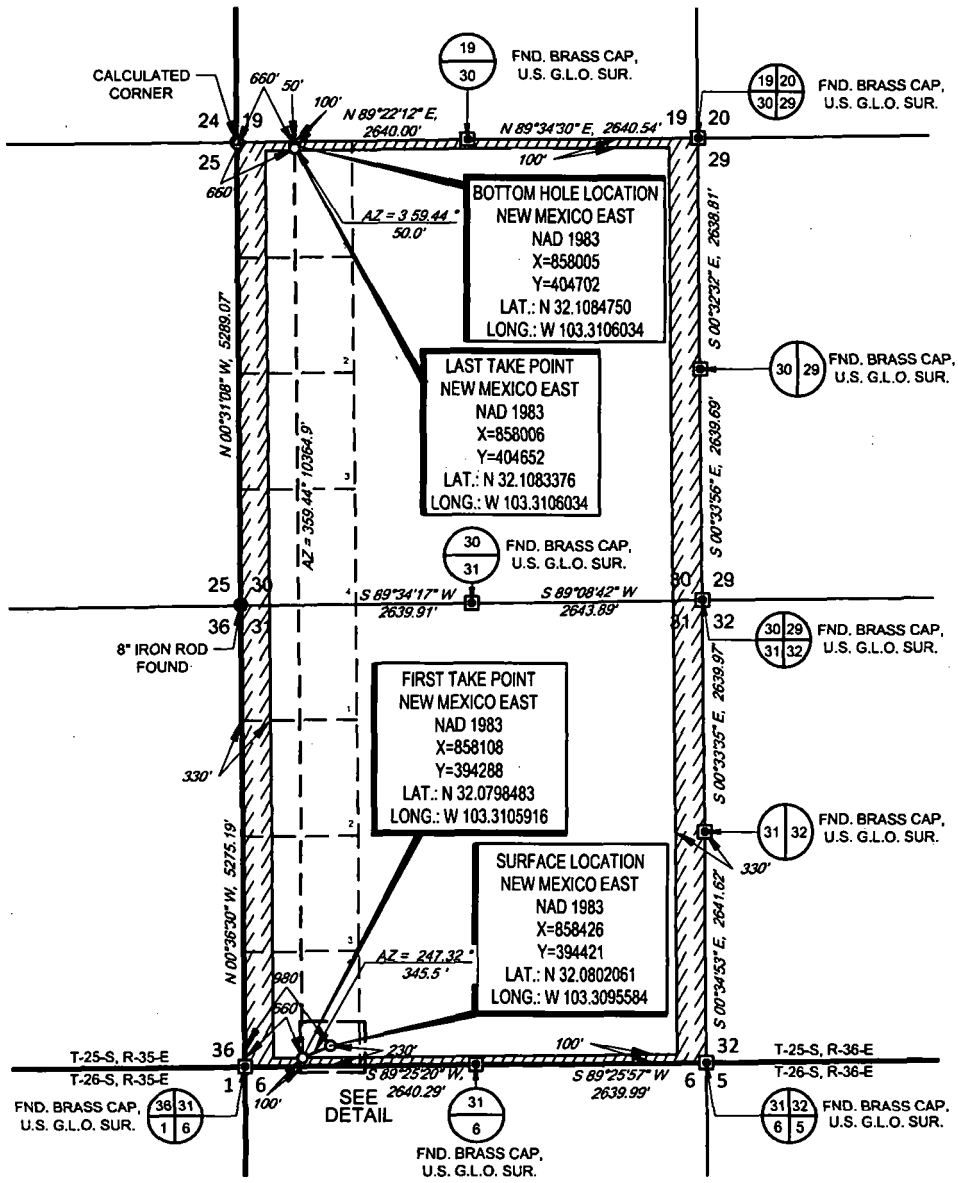
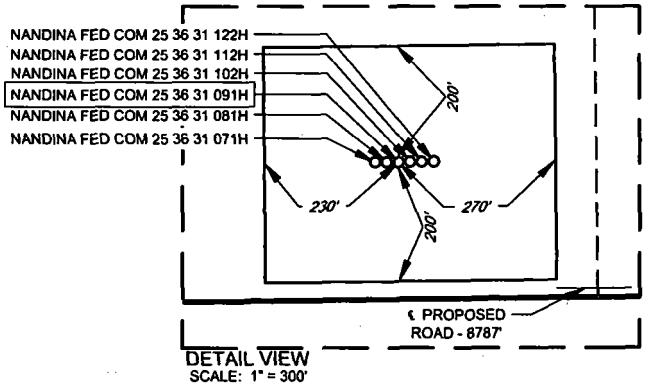
EXHIBIT 2A

SECTION 31, TOWNSHIP 25-S, RANGE 36-E, N.M.P.M.
LEA COUNTY, NEW MEXICO





DETAIL VIEW
SCALE: 1" = 300'

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

LEASE NAME & WELL NO.: NANDINA FED COM 25 36 31 091H

SECTION 31 TWP 25-S RGE 36-E SURVEY N.M.P.M.
COUNTY LEA STATE NM
DESCRIPTION 230' FSL & 980' FWL

DISTANCE & DIRECTION
FROM INT. OF 3RD ST /NM-205/ERVING PAN RD. & NM-128, HEAD SOUTH ON

MICHAEL B. BROWN
NEW MEXICO
18329
PROFESSIONAL SURVEYOR

EXHIBIT 2B

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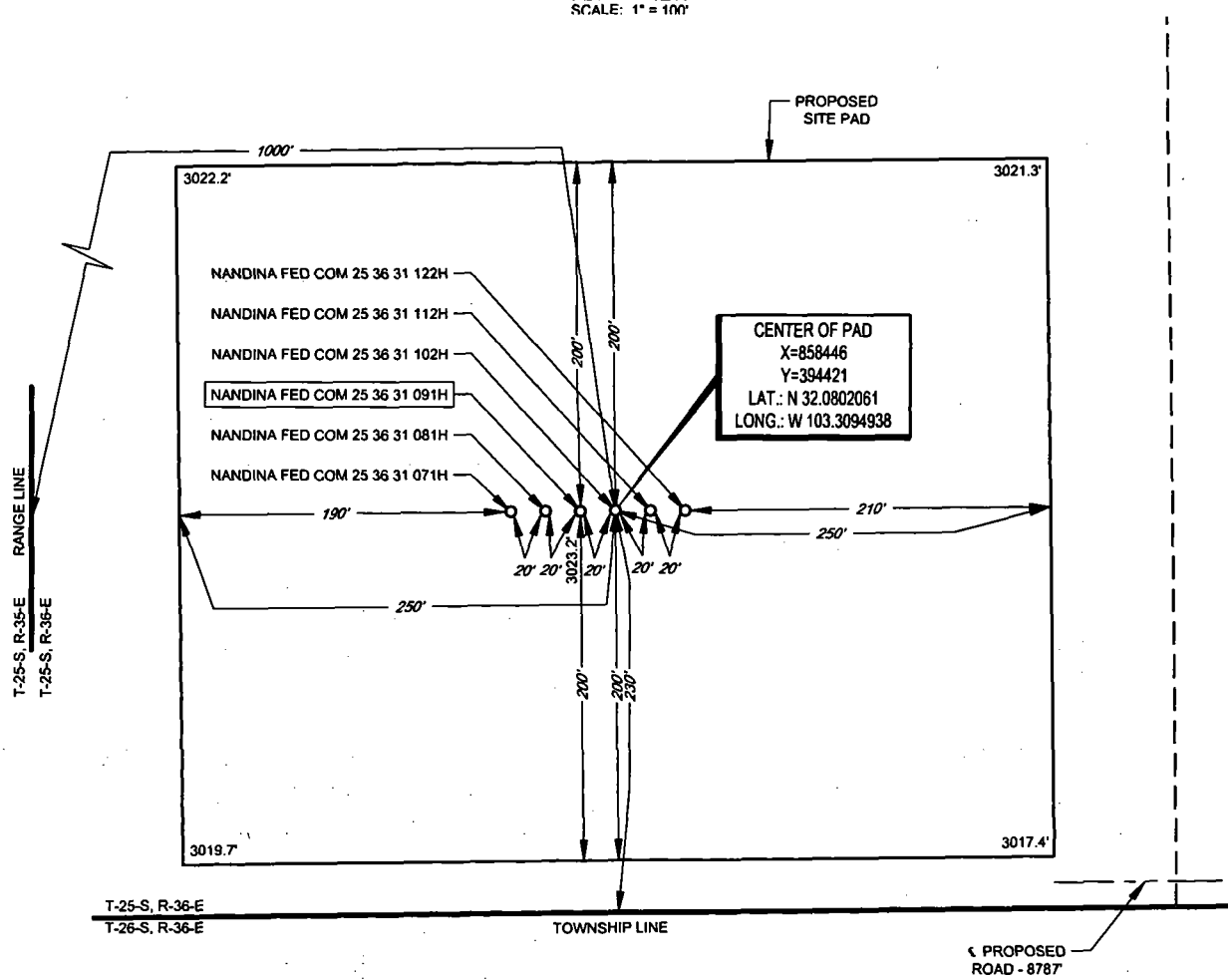
AMEREDEV OPERATING, LLC

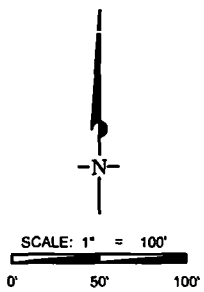
SECTION 31, TOWNSHIP 25-S, RANGE 36-E, N.M.P.M.
LEA COUNTY, NEW MEXICO
DETAIL VIEW
SCALE: 1" = 100'



LEASE NAME & WELL NO.: NANDINA FED COM 25 36 31 091H

091H LATITUDE N 32.0802061 091H LONGITUDE W 103.3095584

CENTER OF PAD IS 230' FSL & 1000' FWL



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ORIGINAL DOCUMENT SIZE: 8.5" X 11"

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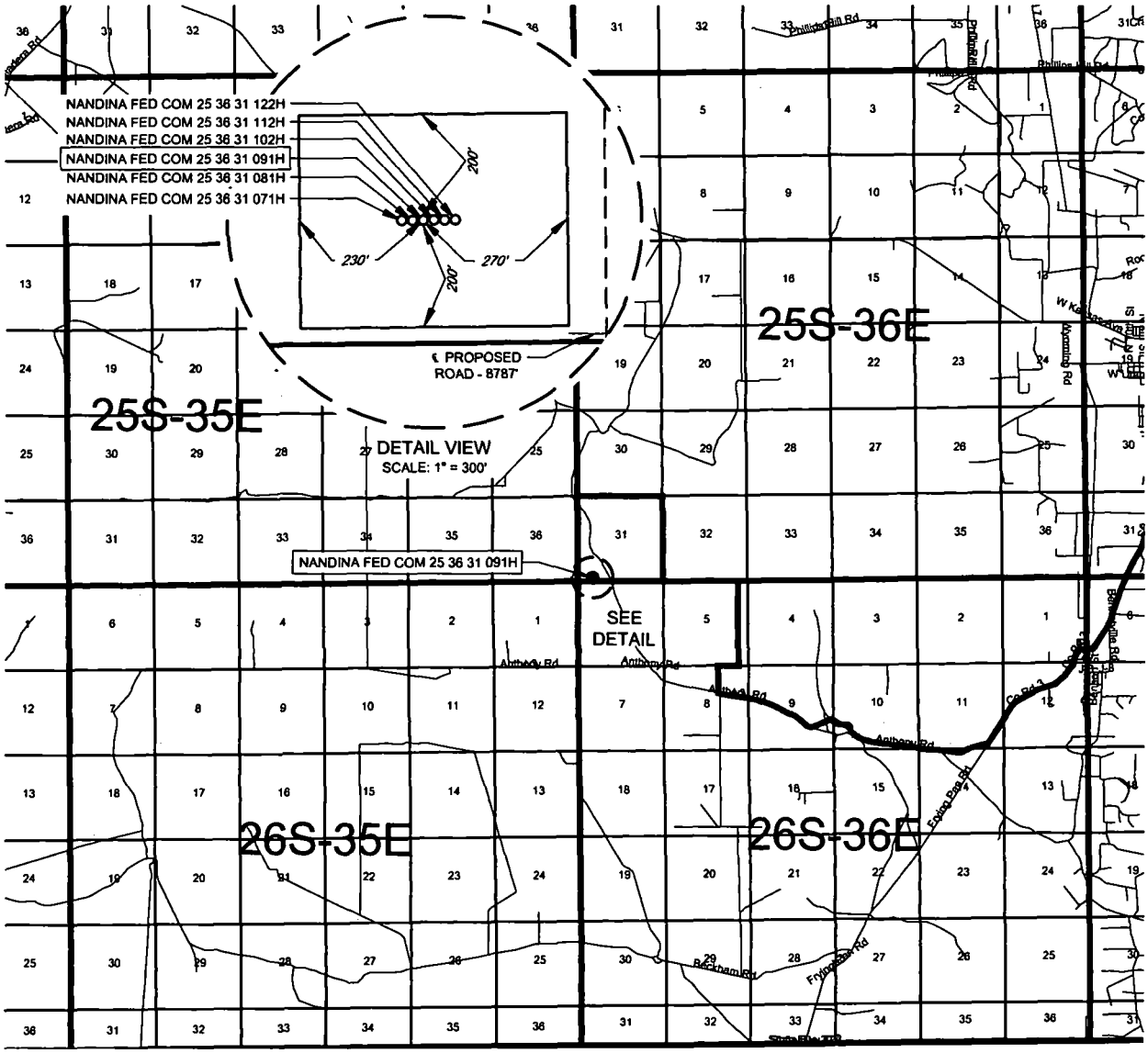
EXHIBIT 2

VICINITY MAP



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AMEREDEV OPERATING, LLC

LEASE NAME & WELL NO.: NANDINA FED COM 25 36 31 091H

SECTION 31 TWP 25-S RGE 36-E SURVEY N.M.P.M.
COUNTY LEA STATE NM
DESCRIPTION 230' FSL & 980' FWL

DISTANCE & DIRECTION
FROM INT. OF 3RD ST./NM-205/FRYING PAN RD. & NM-128, HEAD SOUTH ON 3RD ST./NM-205/FRYING PAN RD. ±5.6 MILES, THENCE WEST (RIGHT) ON ANTHONY RD. ±3.4 MILES, THENCE NORTH (RIGHT) TO CONTINUE ON ANTHONY RD. ±0.3 MILES, THENCE EAST (RIGHT) ON PIPELINE RD. ±0.3 MILES, THENCE NORTH (LEFT) ON A LEASE RD. ±1.0 MILES, THENCE WEST (LEFT) ON A LEASE RD. ±8787 FEET TO A POINT ±345 FEET SOUTHEAST OF THE LOCATION.

THIS EASEMENT/SERVITUDE LOCATION SHOWN HEREON HAS BEEN SURVEYED ON THE GROUND UNDER MY SUPERVISION AND PREPARED ACCORDING TO THE EVIDENCE FOUND AT THE TIME OF SURVEY, AND DATA PROVIDED BY AMEREDEV OPERATING LLC. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE. THIS SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.

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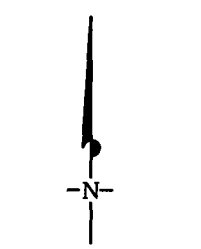

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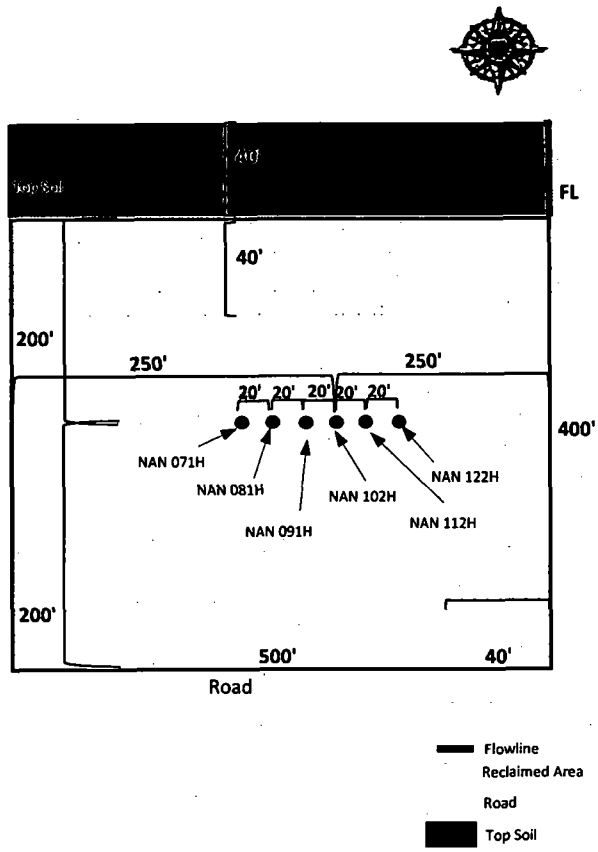
Ameredev Operating, LLC
Nandina Fed Com 25 36 31 091H
Section 31, Township 25S, Range 36E
Lea County, New Mexico



Nandina Fed Com 25 36 31 071H SHL: 25S 36E 230' FSL 940' FWL
Nandina Fed Com 25 36 31 081H SHL: 25S 36E 230' FSL 960' FWL
Nandina Fed Com 25 36 31 091H SHL: 25S 36E 230' FSL 980' FWL
Nandina Fed Com 25 36 31 102H SHL: 25S 36E 230' FSL 1000' FWL
Nandina Fed Com 25 36 31 112H SHL: 25S 36E 230' FSL 1020' FWL
Nandina Fed Com 25 36 31 122H SHL: 25S 36E 230' FSL 1040' FWL

Exhibit 3 – Well Site Diagram

APD ID: 10400036853 **Submission Date:** 11/30/2018

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

Well Type: OIL WELL **Well Work Type:** Drill

[redacted]

Show Final Text

Section 1 - Geologic Formations

Formation ID	Formation Name	Elevation	True Vertical Depth	Measured Depth	Lithologies	Mineral Resources	Producing Formation
1	RUSTLER ANHYDRITE	3023	984	984	ANHYDRITE	NONE	No
2	SALADO	1609	1413	1413	SALT	NONE	No
3	TANSILL	-360	3382	3382	LIMESTONE	NONE	No
4	CAPITAN REEF	-733	3755	3755	LIMESTONE	USEABLE WATER	No
5	LAMAR	-2005	5027	5027	LIMESTONE	NONE	No
6	BELL CANYON	-2094	5116	5116	SANDSTONE	NATURAL GAS,OIL	No
7	BRUSHY CANYON	-4277	7299	7299	SANDSTONE	NATURAL GAS,OIL	No
8	BONE SPRING LIME	-5419	8441	8441	LIMESTONE	NONE	No
9	BONE SPRING 1ST	-6777	9799	9799	SANDSTONE	NATURAL GAS,OIL	No
10	BONE SPRING 2ND	-7262	10284	10284	SANDSTONE	NATURAL GAS,OIL	No
11	BONE SPRING 3RD	-7817	10839	10839	LIMESTONE	NATURAL GAS,OIL	No
12	BONE SPRING 3RD	-8449	11471	11471	SANDSTONE	NATURAL GAS,OIL	Yes

Section 2 - Blowout Prevention

Pressure Rating (PSI): 10M **Rating Depth:** 15000

[redacted]

Requesting Variance? YES

[redacted]

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

Choke Diagram Attachment:

10M_Choke_Manifold_REV_20190524125004.pdf

BOP Diagram Attachment:

5M_BOP_System_20181130094528.pdf

5M_Annular_Preventer_Variance_and_Well_Control_Plan_20190524125017.pdf

Pressure_Control_Plan_Single_Well_MB4_3String_Big_Hole_BLM_20190524125017.pdf

4_String_MB_Ameredev_Wellhead_Drawing_net_REV_20190524125031.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																					
2	INTERMEDIATE																					
3	PRODUCTION																					

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

13.375_68.00__J55_BTC_20190524125214.pdf

Nandina_Fed_Com_25_36_31_091H___Wellbore_Diagram_and_CDA_20190524125256.pdf

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

Casing Attachments

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

9.625_40_SeAH80HC_4100_Collapse_20190524125224.pdf

Nandina_Fed_Com_25_36_31_091H___Wellbore_Diagram_and_CDA_20190524125248.pdf

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

Inspection Document:

Spec Document:

Tapered String Spec:

Casing Design Assumptions and Worksheet(s):

5.50_20_USS_P110_HC_BTC_API_20190524125231.pdf

Nandina_Fed_Com_25_36_31_091H___Wellbore_Diagram_and_CDA_20190524125241.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
	Lead					1.76					
	Tail										
	Lead					2.47					

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

String Type	Lead/Tail	Stage Tool Depth	Top MD	Bottom MD	Quantity(sx)	Yield	Density	Cu Ft	Excess%	Cement type	Additives
	Tail										
	Lead					2.47					
	Tail										
	Lead					1.34					

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 supplies (e.g. bentonite, cedar bark) for fluid control will be on site.

Describe the mud monitoring system utilized: An electronic pit volume totalizer (PVT) will be utilized on the circulating system to monitor pit volume, flow rate, pump pressure, and pump rate.

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	1109	WATER-BASED MUD	8.4	8.6							

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

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
1109	11081	OTHER : Diesel Brine Emulsion	8.5	9.4							
11081	11647	OIL-BASED MUD	10.5	12.5							

Section 6 - Test, Logging, Coring

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

A directional survey, measurement while drilling and a mudlog/geologic lithology log will all be run from surface to TD.

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

DS,MWD,MUDLOG

Coring operation description for the well:

No coring will be done on this well.

Section 7 - Pressure

[redacted]

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

Describe:

Contingency Plans geoharzards description:

Contingency Plans geohazards attachment:

Hydrogen Sulfide drilling operations plan required? YES

Hydrogen sulfide drilling operations plan:

H2S_Plan_20181130101625.pdf

Operator Name: AMEREDEV OPERATING LLC

Well Name: NANDINA FED COM 25 36 31 **Well Number:** 091H

Section 8 - Other Information

Proposed horizontal/directional/multi-lateral plan submission:

Amerdev_Nandrina_Fed_Com_25_36_81_Well_No._091H_rev1_20190524131221.pdf

5M_Annular_Preventer_Variance_and_Well_Control_Plan_20190524131233.pdf

Pressure_Control_Plan_Single_Well_MB4_3String_Big_Hole_BLM_20190524131233.pdf

Other proposed operations facets description:

[redacted]

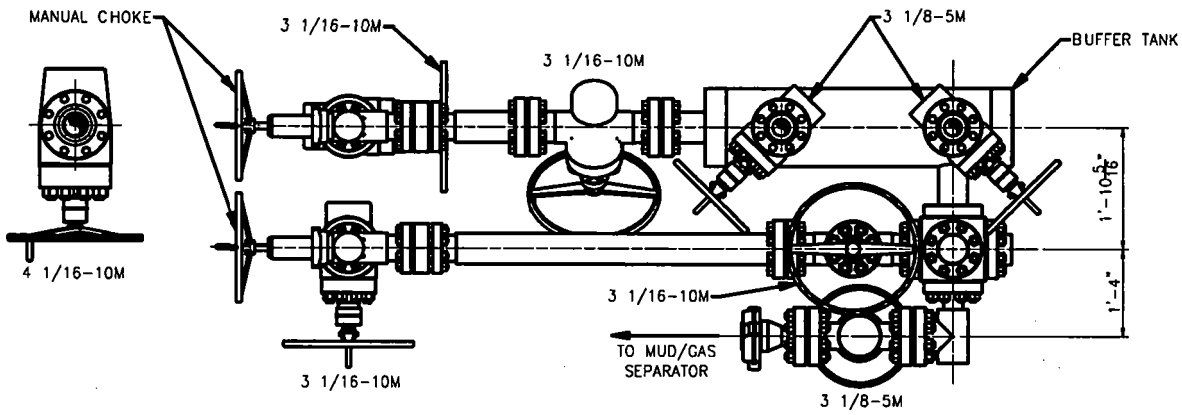
Other proposed operations facets attachment:

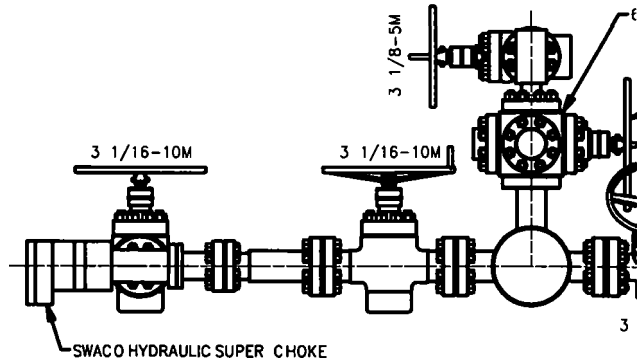
CAPITAN_PROTECTION_CONTINGENCY_PLAN_20190524131246.pdf

Other Variance attachment:

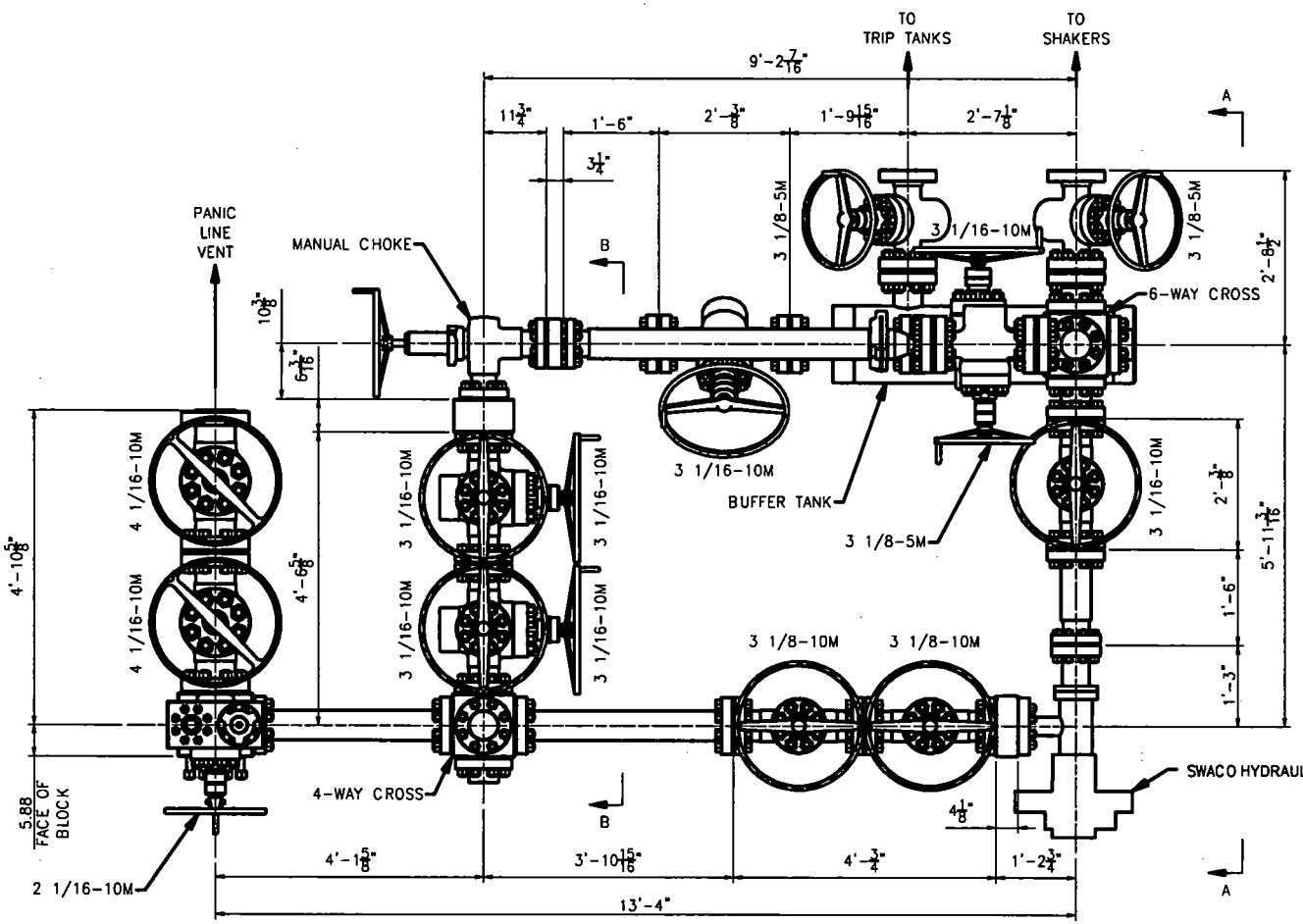
R616___CoC_for_hoses_12_18_17_20181130101711.pdf

Requested_Exceptions___3_String_Revised_01312019_20190524131257.pdf

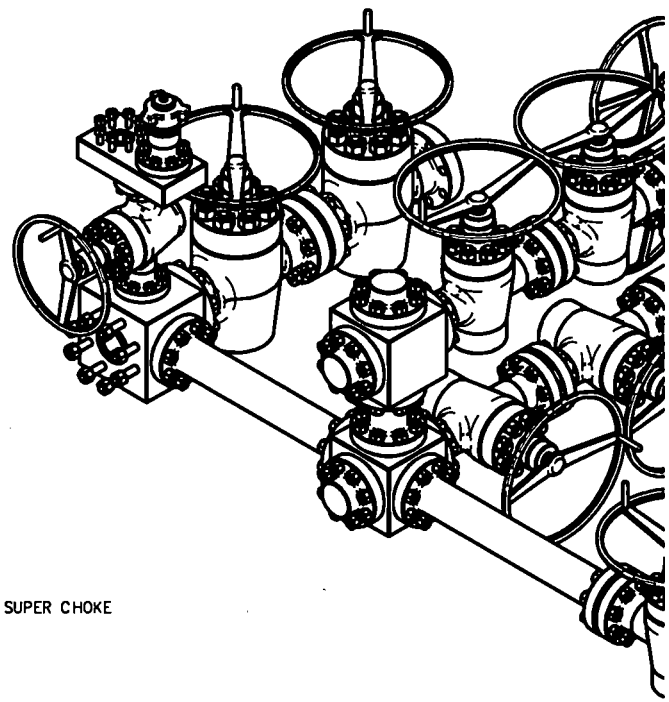


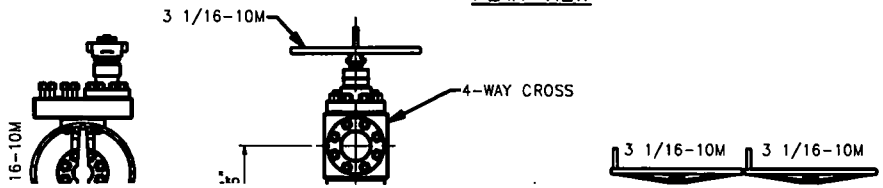


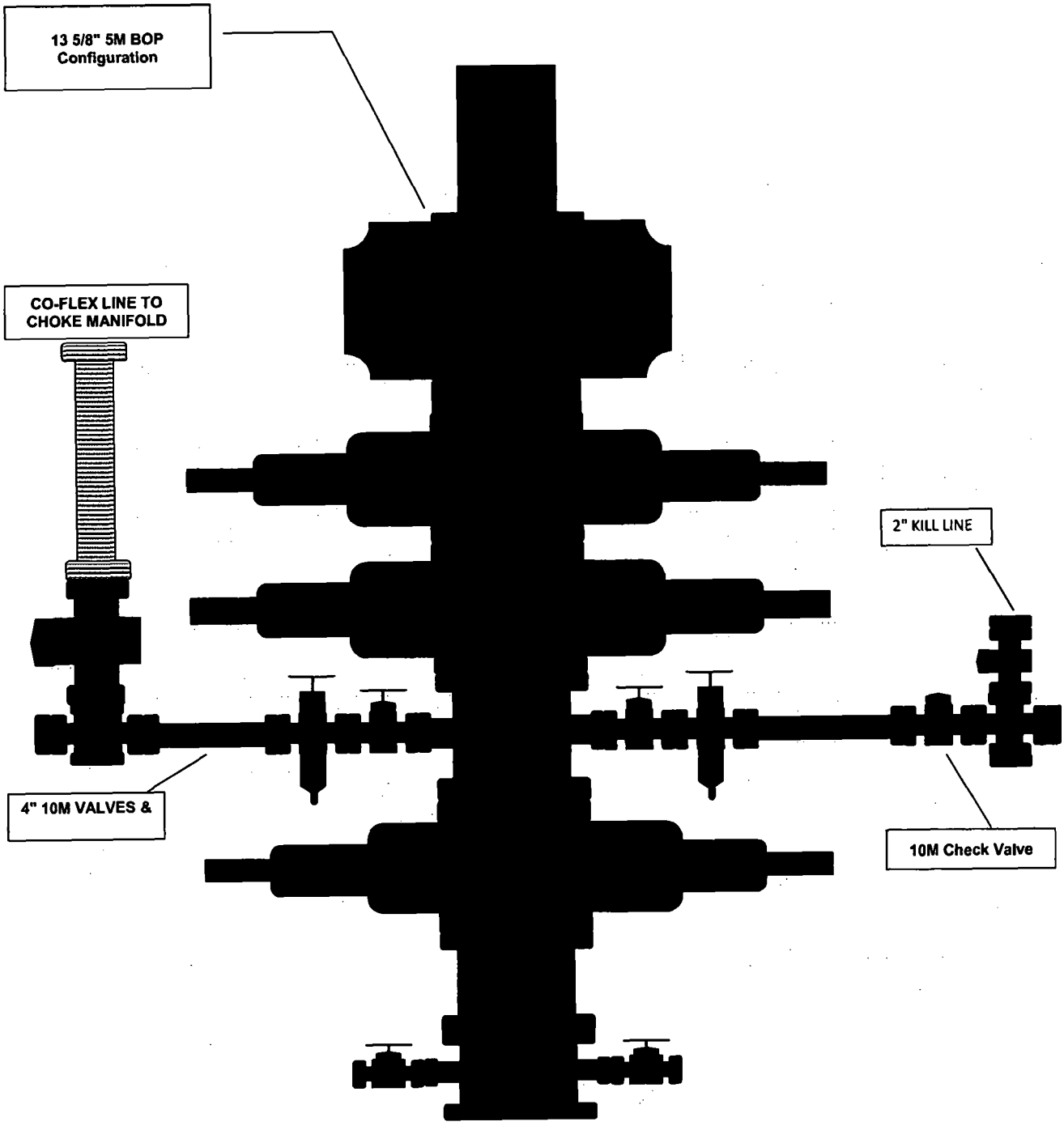
VIEW A-A



PLAN VIEW






13 5/8" 5M BOP
Configuration
CO-FLEX LINE TO
CHOKE MANIFOLD
2" KILL LINE
4" 10M VALVES &
10M Check Valve

AMEREDEV

5M Annular Preventer Variance Request and Well Control Procedures

Note: A copy of the Well Control Plan must be available at multiple locations on the rig for review by rig personnel, as well as review by the BLM PET/PE, and a copy must be maintained on the rig floor.

Dual Isolation Design for 5M Annular Exception

Ameredev will utilize 13-5/8" 10M (5M Annular) BOPE System consisting of:

- 13-5/8" 5M Annular
- 13-5/8" 10M Upper Pipe Rams
  - 3-1/2" – 5-1/2" Variable Bore Ram
- 13-5/8" 10M Blind Rams
- 13-5/8" 10M Drilling Spool /w 2 - 4" 10M Outlets Double 10M Isolation Valves
- 13-5/8" 10M Lower Blind Rams
  - 3-1/2" – 5-1/2" Variable Bore Ram

All drilling components and casing associated to exposure > 5000 psi BHP requiring a 10M system will have a double isolation (secondary barrier) below the 5M Annular that would provide a barrier to flow. The mud system will always be primary barrier, it will be maintained by adjusting values based on tourly mud tests and monitoring a PVT System to maintain static wellbore conditions, displacement procedures will be followed and recorded on daily drilling reports during tripping operations. Surge and swab pressure values will be calculated and maintained and static flow check will be monitored at previous casing shoe and verified static well conditions prior to tripping out of hole and again prior to pulling last joint of drill pipe through BOPE. The below table, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Drill Components	Size	Primary Barrier	Secondary Barrier	Third Barrier
Drillpipe	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
HWDP Drillpipe	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Drill Collars	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Production Casing	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Open Hole	13-5/8	Drilling Fluid	Blind Rams	
All Drilling Components in 10M Environment will have OD that will allow full Operational RATED WORKING PRESSURE for system design. Kill line with minimum 2" ID will be available outside substructure with 10M Check Valve for OOH Kill Operations				

Well Control Procedures

Proper well control procedures are dependent to differentiating well conditions, to cover the basic well control operations there are will be standard drilling ahead, tripping pipe, tripping BHA, running casing, and pipe out of the hole/open hole scenarios that will be defined by procedures below. Initial Shut In Pressure can be taken against the Uppermost BOPE component the 5M Annular, pressure control can be transferred from the lesser 5M Annular to the 10M Upper Pipe Rams if needed. Shut In Pressures may be equal to or less than the Rated Working Pressure but at no time will the pressure on the annular preventer exceed the Rated Working Pressure of the annular. The annular will be tested to 5,000 psi. This will be the Rated Working Pressure of the annular preventer. All scenarios will be written such as shut in will be performed by closing the 10,000 psi Upper Pipe Rams for faster Accumulator pressure recovery to allow safer reaction to controlling wellbore pressure.

Shutting In While Drilling

1. Sound alarm signaling well control event to Rig Crew
2. Space out drill string to allow FOSV installation
3. Shut down pumps
4. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
5. Install open, full open safety valve and close valve, Close Chokes
6. Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

Shutting In While Tripping

1. Sound alarm signaling well control event to Rig Crew
2. Space out drill string to allow FOSV installation
3. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install open, full open safety valve and close valve, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting In While Running Casing

1. Sound alarm signaling well control event to Rig Crew
2. Space out casing to allow circulating swedge installation
3. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install circulating swedge, Close high pressure, low torque valves, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold Pre-job safety meeting and discuss kill procedure

Shutting in while out of hole

1. Sound alarm signaling well control event to Rig Crew
2. Shut-in well: close blind rams and open HCR against Open Chokes and Valves Open to working pressure gauge
3. Close Chokes, Verify well is shut-in and monitor pressures
4. Notify supervisory personnel
5. Record data (SIDP, SICP, Pit Gain, and Time)
6. Hold Pre-job safety meeting and discuss kill procedure

Shutting in prior to pulling BHA through stack

Prior to pulling last joint of drill pipe thru the stack space out and check flow
If flowing see steps below.

1. Sound alarm signaling well control event to Rig Crew
2. Shut in upper pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
3. Install open, full open safety valve and close valve, Close Chokes
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and ram preventer and combo immediately available

1. Sound alarm signaling well control event to Rig Crew
2. Space out BHA with upset just beneath the compatible pipe ram
3. Shut in upper compatible pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install open, full open safety valve and close valve, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

*FOSV will be on rig floor in open position with operating handle for each type of connection utilized and tested to 10,000 psi

Shutting in while BHA is in the stack and no ram preventer or combo immediately available

1. Sound alarm signaling well control event to Rig Crew
2. If possible pick up high enough, to pull string clear and follow "Open Hole" scenario

If not possible to pick up high enough:

3. Stab Crossover, make up one joint/stand of drill pipe, and install open, full open safety valve (Leave Open)
4. Space out drill string with upset just beneath the compatible pipe ram.
5. Shut in upper compatible pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
6. Close FOSV, Close Chokes, Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

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Pressure Control Plan

Pressure Control Equipment

- Following setting of 13-3/8" Surface Casing Ameredev will install 13-5/8 MB4 Multi Bowl Casing Head by welding on a 13-5/8 SOW x 13-5/8" 5M in combination with 13-5/8 5M x 13-5/8 10M B-Sec to Land Intm #1 and a 13-5/8 10M x 13-5/8 10M shouldered to land C-Sec to Land Intm #2 (Installation procedure witnessed and verified by a manufacturer's representative).

- Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Ameredev will install a 5M System Blowout Preventer (BOPE) with a 5M Annular Preventer and related equipment (BOPE). Full testing will be performed utilizing a full isolation test plug and limited to 5,000 psi MOP of MB4 Multi Bowl Casing Head. Pressure will be held for 10 min or until provisions of test are met on all valves and rams. The 5M Annular Preventer will be tested to 50% of approved working pressure (2,500 psi). Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Setting of 9-5/8" Intermediate will be done by landing a wellhead hanger in the 13-5/8" 5M Bowl, Cementing and setting Well Head Packing seals and testing same. (Installation procedure witnessed and verified by a manufacturer's representative) Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Full testing will be performed utilizing a full isolation test plug to 10,000 psi MOP of MB4 Multi Bowl B-Section. Pressure will be held for 10 min or until provisions of test are met on all valves and rams. The 5M Annular Preventer will be tested to 100% of approved working pressure (5,000 psi).

- Before drilling >20ft of new formation under the 9-5/8" Casing Shoe a pressure integrity test of the Casing Shoe will be performed to minimum of the MWE anticipated to control formation pressure to the next casing depth.

- Following setting of 5-1/2" Production Casing and adequate WOC time Ameredev will break 10M System Blowout Preventer (BOP) from 10M DOL-2 Casing Head, install annulus casing slips and test same (Installation procedure witnessed and verified by a manufacturer's representative) and install 11" 10M x 5-1/8" 15M Tubing Head (Installation procedure witnessed and verified by a manufacturer's representative). Ameredev will test head to 70% casing design and install Dry Hole cap with needle valve and pressure gauge to monitor well awaiting completion.

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Pressure Control Plan

- Slow pump speeds will be taken daily by each crew and recorded on Daily Drilling Report after mudding up.

- A choke manifold and accumulator with floor and remote operating stations will be functional and in place after installation of BOPE, as well as full functioning mud gas separator.

- Weekly BOPE pit level drills will be conducted by each crew and recorded on Daily Drilling Report.

- BOP will be fully operated when out of hole and will be documented on the daily drilling log.

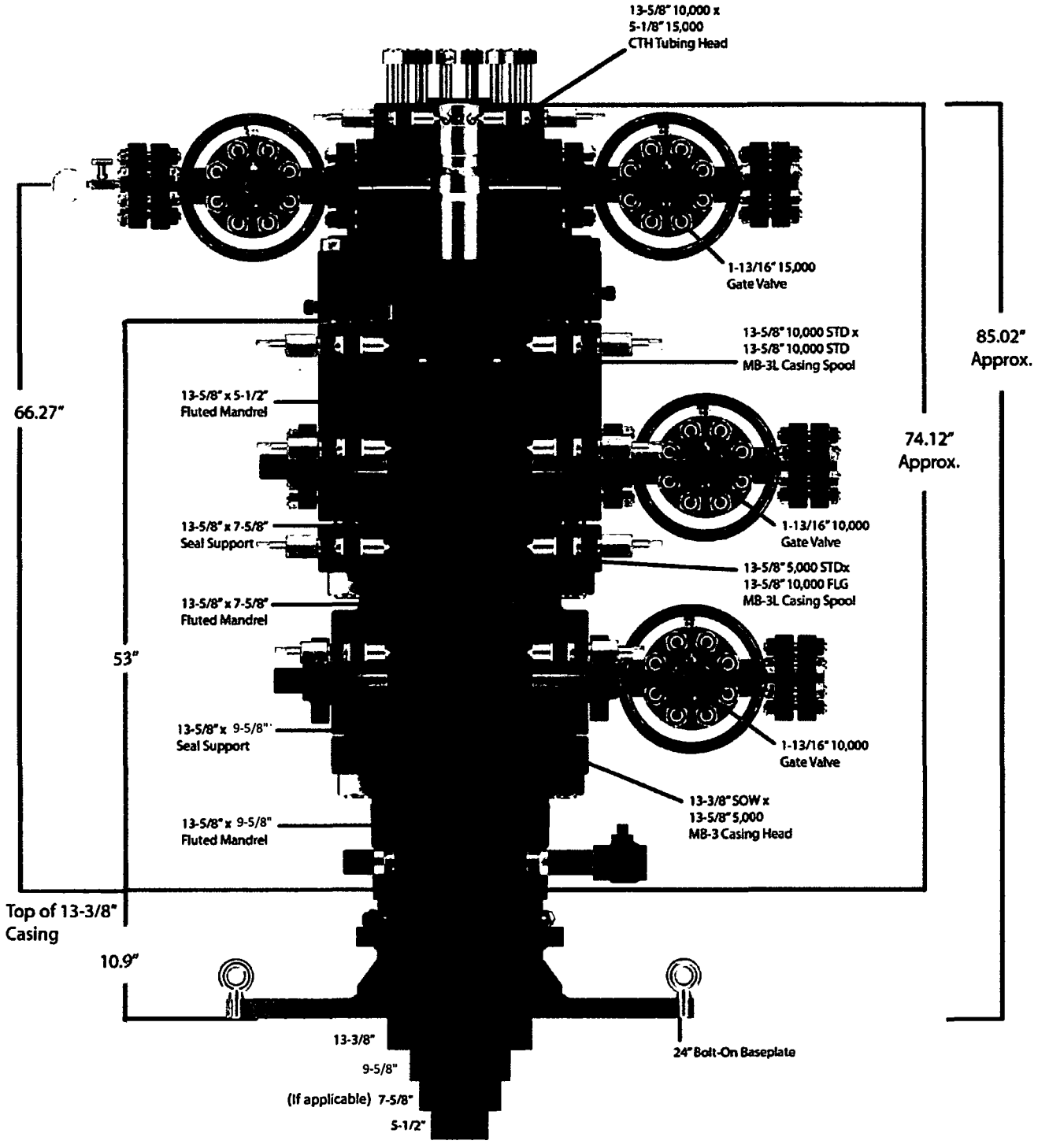
- All B.O.P.s and associated equipment will be tested in accordance with Onshore Order #2

- All B.O.P. testing will be done by an independent service company.

- The B.O.P. will be tested within 21 days of the original test if drilling takes more time than planned.

- Ameredev requests a variance to connect the B.O.P. choke outlet to the choke manifold using a co-flex hose with a 10,000 psi working pressure that has been tested to 15,000psi and is built to API Spec 16C. Once the flex line is installed it will be tied down with safety clamps. (certifications will be sent to Carlsbad BLM Office prior to install)

- Ameredev requests a variance to install a 5M Annular Preventer on the 10M System to drill the Production Hole below the 9-5/8" Intermediate Section. 5M Annular will be tested to 100% working pressure (5,000 psi). A full well control procedure will be included to isolate well bore.



Quotation

Downing Wellhead Equipment

Oklahoma City,
Oklahoma - USA

Reference Data:

16925 AMEREDEV

TITLE:

AMEREDEV

DRAWN			SIZE	DWG. NO.	REV.
CHECKED			A		
APPROVED			Scale:	Weight:	Sheet:

PERFORMANCE DATA

API BTC **13.375 in** **68.00 lbs/ft** **J-55**

Technical Data Sheet

Tubular Parameters

Size	13.375	in	Minimum Yield	55,000	psi
Nominal Weight	68.00	lbs/ft	Minimum Tensile	75,000	psi
Grade	J-55		Yield Load	1,069,000	lbs
PE Weight	66.10	lbs/ft	Tensile Load	1,458,000	lbs
Wall Thickness	0.480	in	Min. Internal Yield Pressure	3,500	psi
Nominal ID	12.415	in	Collapse Pressure	1,950	psi
Drift Diameter	12.259	in			
Nom. Pipe Body Area	19.445	in^2			

Connection Parameters

Connection OD	14.375	in
Coupling Length	10.625	in
Threads Per Inch	5.000	in
Standoff Thread Turns	1.000	
Make-Up Loss	4.513	in
Yield Load In Tension	—	lbs
Min. Internal Yield Pressure	3,500	psi

Printed on: February-13-2015

IPSCO

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Wellbore Schematic

Well:	Nandina Fed Com 25-36-31 091H	**Co. Well ID:**	xxxxxx
SHL:	Sec. 31 25S-36E 230' FSL & 980' FWL	**AFE No.:**	xxxx-xxx
BHL:	Sec. 30 25S-36E 50' FNL & 660' FWL	**API No.:**	xxxxxxxxxx
	Lea, NM	**GL:**	3,023'
Wellhead:	A - 13-5/8" 10M x 13-5/8" SOW	**Field:**	Delaware
	B - 13-5/8" 10M x 13-5/8" 10M	**Objective:**	Third Bone Spring
	C - 13-5/8" 10M x 13-5/8" 10M	**TVD:**	11,647'
	Tubing Spool - 5-1/8" 15M x 13-3/8" 10M	**MD:**	21,890'
Xmas Tree:	2-9/16" 10M	**Rig:**	TBD **KB:** 27'
Tubing:	2-7/8" L-80 6.5# 8rd EUE	**E-Mail:**	Wellsite2@ameredev.com

Hole Size	Formation Tops		Logs	Cement	Mud Weight
17.5"	Rustler	984'		704 Sacks TOC 0' 100% Excess	8.4-8.6 ppg WBM
	13.375" 68# J-55 BTC	**1,109'**			
12.25"	Salado	1,413'		896 Sacks TOC 0' 50% Excess	8.5 - 9.4 ppg Diesel Brine Emulsion
	Tansill	3,382'			
	Capitan Reef	3,755'			
	Lamar	5,027'			
	DV Tool	**5,077'**			
	Bell Canyon	5,116'		1,723 Sacks TOC 0' 50% Excess	
	Brushy Canyon	7,299'			
	Bone Spring Lime	8,441'			
	First Bone Spring	9,799'			
	Second Bone Spring	10,284'			
	Third Bone Spring Upper	10,839'			
	9.625" 40# L-80HC BTC	**11,081'**			
8.5" 12° Build @ 11,081' MD thru 12,726' MD	Third Bone Spring	11,471'		4,674 Sacks TOC 0' 25% Excess	10.5 - 12.5 ppg OBM
	5.5" 20# P-110CYHP BTC	**21,890'**			
	Target Third Bone Spring 11647 TVD // 21890 MD				

Casing Design and Safety Factor Check

Casing Specifications						
Segment	**Hole ID**	**Depth**	**OD**	**Weight**	**Grade**	**Coupling**
Surface	17.5	1,109'	13.375	68	J-55	BTC
Intermediate	12.25	11,081'	9.625	40	HCL-80	BTC
Prod Segment A	8.5	11,081'	5.5	20	CYHP-110	BTC
Prod Segment B	8.5	21,890'	5.5	20	CYHP-110	BTC

Check Surface Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
14.375	1,069	915	4,100	3,450
Safety Factors				
1.56	14.18	12.13	8.28	0.64
Check Intermediate Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
7.625	940	558	6700	9460
Safety Factors				
2.31	2.12	2.16	1.24	1.25
Check Prod Casing, Segment A				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
1.36	3.13	2.81	1.78	1.90
Check Prod Casing, Segment B				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
1.36	64.31	57.86	1.69	1.90

U.S. Steel Tubular Products

Product Information
5.5 in. 20 lb/ft (0.361 in. wall) P-110 HC Casing
STAR SEAL - CDC™

Grade(s)	P-110 HC		
MECHANICAL PROPERTIES			
	Yield Strength		
	Minimum	110	ksi
	Maximum	140	ksi
	Tensile Strength		
	Minimum	125	ksi
PIPE PROPERTIES			
Dimensions, Nominal	Pipe Outside Diameter	5.500	in.
	Wall	0.361	in.
	Pipe Inside Diameter	4.778	in.
	Pipe Drift		
	API	4.653	in.
	Special (If Applicable)	N/A	in.
	Weight, T&C	20.00	lbs/ft
	Weight, Plain End	19.83	lbs/ft
	Pipe Cross Sectional Area	5.828	sq. in.
Performance Properties	Minimum Pipe Body Yield Strength	641	1,000 lbs
	Minimum Collapse Pressure	12,200	psi
	Minimum Internal Yield Pressure	12,640	psi
CONNECTION PROPERTIES			
Dimensions, Nominal	Connection Outside Diameter	6.050	in.
	Connection Inside Diameter	4.778	in.
	Connection Drift		
	API	4.653	in.
	Special (If Applicable)	N/A	in.
	Makeup Loss	4.63	in.
	Critical Area	5.828	in.
	Joint Efficiency	100	%
Performance Properties	Joint Strength	667	1,000 lbs
	Compression Rating	400	1,000 lbs
	API Collapse Pressure Rating	12,200	psi
	API Internal Pressure Resistance	12,360	psi
	Maximum Uniaxial Bend Rating	57.2	deg/100 ft
Recommended Torque Values	Minimum Shoulder Torque	5,000	ft-lbs
	Maximum Shoulder Torque	7,500	ft-lbs
	Connection Yield Torque	16,100	ft-lbs

U.S. Steel Tubular Products, Inc.
600 Grant Street
Pittsburgh, PA 15219

6/9/2009

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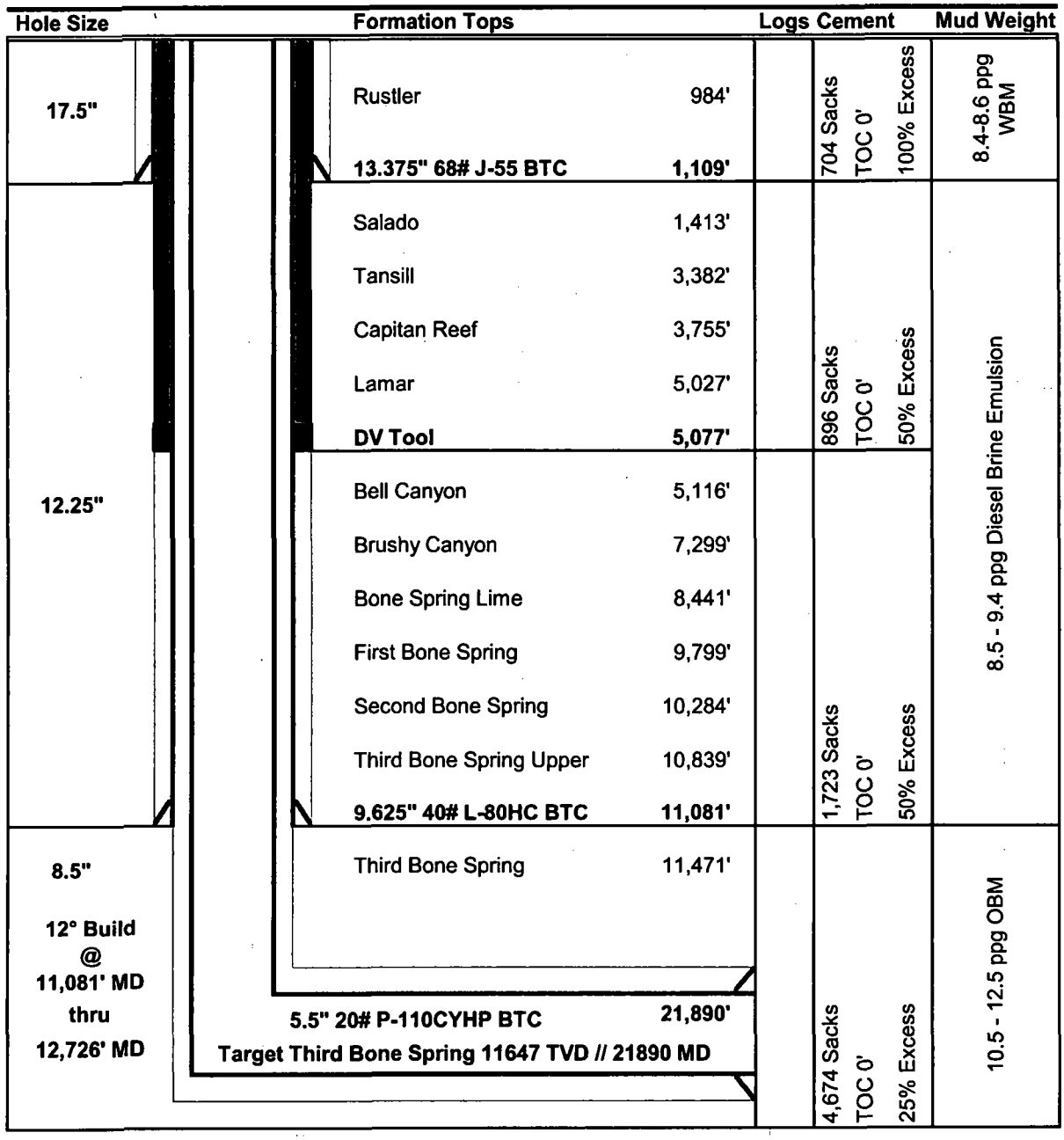
Wellbore Schematic

Well:	Nandina Fed Com 25-36-31 091H	**Co. Well ID:**	xxxxxx
SHL:	Sec. 31 25S-36E 230' FSL & 980' FWL	**AFE No.:**	xxxx-xxx
BHL:	Sec. 30 25S-36E 50' FNL & 660' FWL	**API No.:**	xxxxxxxxxx
	Lea, NM	**GL:**	3,023'
Wellhead:	A - 13-5/8" 10M x 13-5/8" SOW	**Field:**	Delaware
	B - 13-5/8" 10M x 13-5/8" 10M	**Objective:**	Third Bone Spring
	C - 13-5/8" 10M x 13-5/8" 10M	**TVD:**	11,647'
	Tubing Spool - 5-1/8" 15M x 13-3/8" 10M	**MD:**	21,890'
Xmas Tree:	2-9/16" 10M	**Rig:**	TBD **KB:** 27'
Tubing:	2-7/8" L-80 6.5# 8rd EUE	**E-Mail:**	Wellsite2@ameredev.com



Casing Design and Safety Factor Check

Casing Specifications						
Segment	**Hole ID**	**Depth**	**OD**	**Weight**	**Grade**	**Coupling**
Surface	17.5	1,109'	13.375	68	J-55	BTC
Intermediate	12.25	11,081'	9.625	40	HCL-80	BTC
Prod Segment A	8.5	11,081'	5.5	20	CYHP-110	BTC
Prod Segment B	8.5	21,890'	5.5	20	CYHP-110	BTC

Check Surface Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
14.375	1,069	915	4,100	3,450
Safety Factors				
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Check Intermediate Casing				
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7.625	940	558	6700	9460
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5.777	728	655	12780	14360
Safety Factors				
1.36	3.13	2.81	1.78	1.90
Check Prod Casing, Segment B				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
1.36	64.31	57.86	1.69	1.90

SĕAH

9.625" 40# .395" SEAH-80 HIGH COLLAPSE

(SEAH-80 IS A NON HEAT TREATED PRODUCT)

Dimensions (Nominal)

Outside Diameter	**9.625**	**in.**
Wall	**0.395**	**in.**
Inside Diameter	**8.835**	**in.**
Drift	**8.750**	**in.**
Weight, T&C	**40.000**	**lbs./ft.**
Weight, PE	**38.970**	**lbs./ft.**

Performance Properties

Collapse	**4100**	**psi**
Internal Yield Pressure at Minimum Yield		
PE	**5750**	**psi**
LTC	**5750**	**psi**
BTC	**5750**	**psi**
Yield Strength, Pipe Body	**916**	**1000 lbs.**
Joint Strength		
LTC	**717**	**1000 lbs.**
BTC	**915**	**1000 lbs.**

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Wellbore Schematic

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	Tubing Spool - 5-1/8" 15M x 13-3/8" 10M	**MD:**	21,890'
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Tubing:	2-7/8" L-80 6.5# 8rd EUE	**E-Mail:**	Wellsite2@ameredev.com

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	Lamar	5,027'			
	DV Tool	**5,077'**			
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	First Bone Spring	9,799'			
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	5.5" 20# P-110CYHP BTC	**21,890'**			
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Safety Factors				
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OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
1.36	64.31	57.86	1.69	1.90

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H_2S Drilling Operation Plan

1. **All Company and Contract personnel admitted on location must be trained by a qualified H_2S safety instructor to the following:**
    a. Characteristics of H_2S
    b. Physical effects and hazards
    c. Principal and operation of H_2s detectors, warning system and briefing areas
    d. Evacuation procedure, routes and first aid
    e. Proper use of safety equipment and life support systems
    f. Essential personnel meeting Medical Evaluation criteria will receive additional training on the proper use of 30 minute pressure demand air packs.

2. **Briefing Area:**
    a. Two perpendicular areas will be designated by signs and readily accessible.
    b. Upon location entry there will be a designated area to establish all safety compliance criteria (1.) has been met.

3. **H_2S Detection and Alarm Systems:**
    a. H_2S sensors/detectors shall be located on the drilling rig floor, in the base of the sub structure/cellar area, and on the mud pits in the shale shaker area. Additional H_2S detectors may be placed as deemed necessary. All detectors will be set to initiate visual alarm at 10 ppm and visual with audible at 14 ppm and all equipment will be calibrated every 30 days or as needed.
    b. An audio alarm will be installed on the derrick floor and in the top doghouse.

4. **Protective Equipment for Essential Personnel:**
    a. **Breathing Apparatus:**
        i. Rescue Packs (SCBA) - 1 Unit shall be placed at each briefing area.
        ii. Two (SCBA) Units will be stored in safety trailer on location.
        iii. Work/Escape packs - 1 Unit will be available on rig floor in doghouse for emergency evacuation for driller.
    b. **Auxiliary Rescue Equipment:**
        i. Stretcher
        ii. 2 - OSHA full body harnesses
        iii. 100 ft. 5/8" OSHA approved rope
        iv. 1 - 20# class ABC fire extinguisher

5. **Windsock and/or Wind Streamers:**
    a. Windsock at mud pit area should be high enough to be visible.
    b. Windsock on the rig floor should be high enough to be visible.

6. **Communication:**
    a. While working under mask scripting boards will be used for communication where applicable.
    b. Hand signals will be used when script boards are not applicable.

c. Two way radios will be used to communicate off location in case of emergency help is required. In most cases cellular telephones will be available at Drilling Foreman's Office.

7. **Drill Stem Testing:** - No Planned DST at this time.

8. **Mud program:**
   a. If H2S is encountered, mud system will be altered if necessary to maintain control of formation. A mud gas separator will be brought into service along with H2S scavengers if necessary.

9. **Metallurgy:**

   a. All drill strings, casing, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H_2S service.
   b. Drilling Contractor supervisor will be required to be familiar with the effect H_2S has on tubular goods and other mechanical equipment provided through contractor.

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H_2S Contingency Plan

Emergency Procedures

In the event of a release of H_2S, the first responder(s) must:

- Isolate the area and prevent entry by other persons into the 100 ppm ROE.
- Evacuate any public places encompassed by the 100 ppm ROE.
- Be equipped with H_2S monitors and air packs in order to control the release.
- Use the "buddy system" to ensure no injuries occur during the response.
- Take precautions to avoid personal injury during this operation.
- Contact Operator and/or local officials the aid in operation. See list of phone numbers attached.
- Have received training in the:
    - Detection of H_2S and
    - Measures for protection against the gas,
    - Equipment used for protection and emergency response.

Ignition of Gas Source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO_2). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally, the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever there is an ignition of the gas.

Characteristics of H_2S and SO_2

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H_2S	1.189 Air=1	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO_2	2.21 Air=1	2 ppm	N/A	1000 ppm

Contacting Authorities

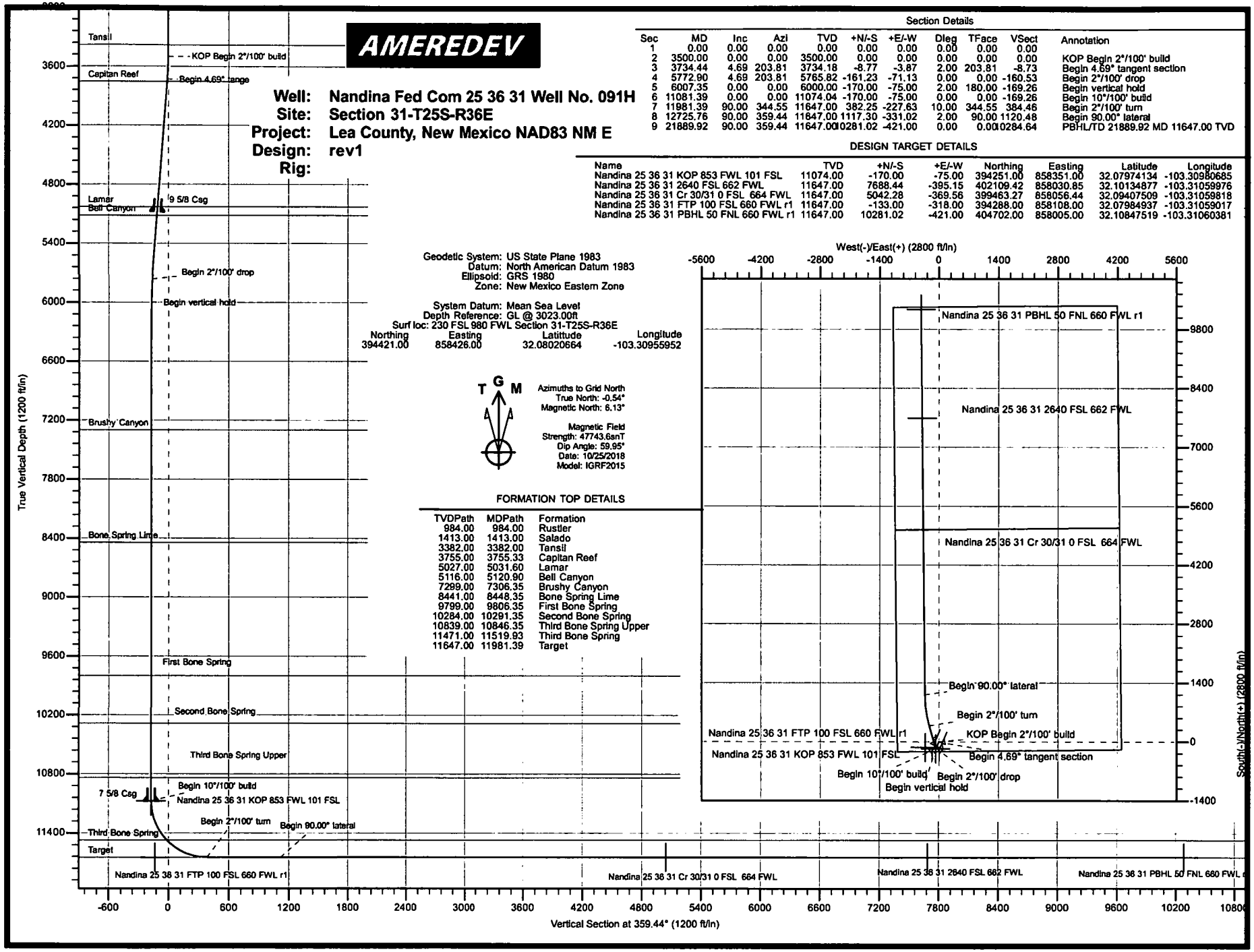
Ameredev Operating LLC personnel must liaise with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including direction to site. The following call list of essential and potential responders has been prepared for use during a release. Ameredev Operating LLC's response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER)

AMEREDEV

H_2S Contingency Plan

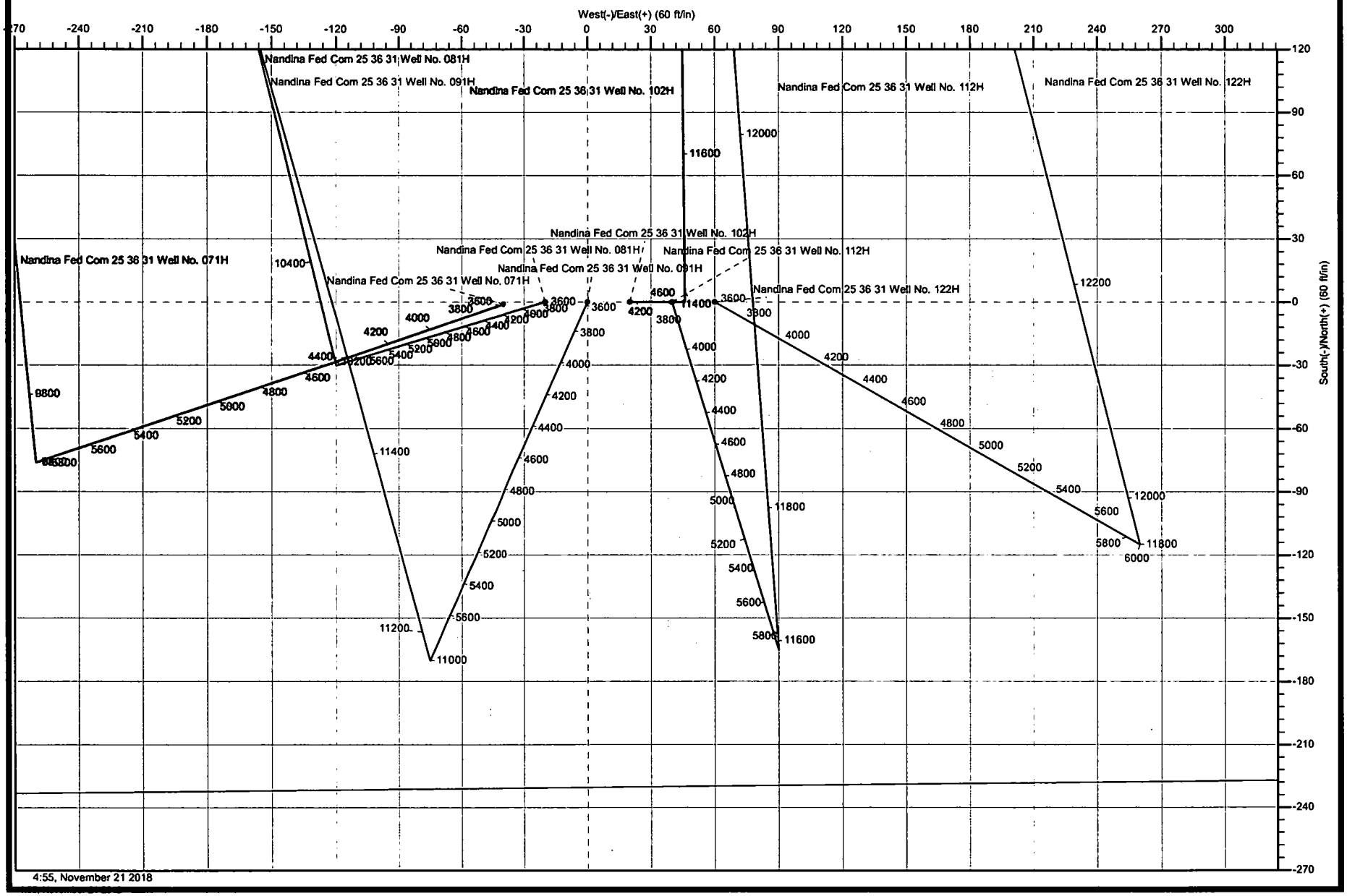
Ameredev Operating LLC – Emergency Phone 737-300-4799			
Key Personnel:			
Name	Title	Office	Mobile
Floyd Hammond	Chief Operating officer	737-300-4724	512-783-6810
Zachary Boyd	Operations Superintendent	737-300-4725	432-385-6996
Blake Estrada	Construction Foreman		432-385-5831

Artesia	
Ambulance	911
State Police	575-746-2703
City Police	575-746-2703
Sheriff's Office	575-746-9888
Fire Department	575-746-2701
Local Emergency Planning Committee	575-746-2122
New Mexico Oil Conservation Division	575-748-1283
Carlsbad	
Ambulance	911
State Police	575-885-3137
City Police	575-885-2111
Sheriff's Office	575-887-7551
Fire Department	575-887-3798
Local Emergency Planning Committee	575-887-6544
US Bureau of Land Management	575-887-6544
Santa Fe	
New Mexico Emergency Response Commission (Santa Fe)	505-476-9600
New Mexico Emergency Response Commission (Santa Fe) 24 Hrs	505-827-9126
New Mexico State Emergency Operations Center	505-476-9635
National	
National Emergency Response Center (Washington, D.C.)	800-424-8802
Medical	
Flight for Life - 4000 24th St.; Lubbock, TX	806-743-9911
Aerocare - R3, Box 49F; Lubbock, TX	806-747-8923
Med Flight Air Amb - 2301 Yale Blvd S.E., #D3; Albuquerque, NM	505-842-4433
.'SB Air Med Service - 2505 Clark Carr Loop S.E.; Albuquerque, NM	505-842-4949


AMEREDEV
Well: Nandina Fed Com 25 36 31 Well No. 091H
Site: Section 31-T25S-R36E
Project: Lea County, New Mexico NAD83 NM E
Design: rev1
Rig:
Section Details
Sec MD Inc Azi TVD +N/-S +E/-W Dleg TFace VSect Annotation
1 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
2 3500.00 0.00 0.00 3500.00 0.00 0.00 0.00 0.00 0.00 KOP Begin 2°/100' build
3 3734.44 4.69 203.81 3734.18 -8.77 -3.87 2.00 203.81 -8.73 Begin 4.69° tangent section
4 5772.90 4.69 203.81 5765.82 -161.23 -71.13 0.00 0.00 -160.53 Begin 2°/100' drop
5 6007.35 0.00 0.00 6000.00 -170.00 -75.00 2.00 180.00 -169.26 Begin vertical hold
6 11081.39 0.00 0.00 11074.04 -170.00 -75.00 0.00 0.00 -169.26 Begin 10°/100' build
7 11981.39 90.00 344.55 11647.00 382.25 -227.63 10.00 344.55 384.46 Begin 2°/100' turn
8 12725.76 90.00 359.44 11647.00 1117.30 -331.02 2.00 90.00 1120.48 Begin 90.00° lateral
9 21889.92 90.00 359.44 11647.00 10281.02 -421.00 0.00 0.00 10284.64 PBHL/TD 21889.92 MD 11647.00 TVD
DESIGN TARGET DETAILS
Name TVD +N/-S +E/-W Northing Easting Latitude Longitude
Nandina 25 36 31 KOP 853 FWL 101 FSL 11074.00 -170.00 -75.00 394251.00 858351.00 32.07974134 -103.30980685
Nandina 25 36 31 2640 FSL 662 FWL 11647.00 7688.44 -395.15 402109.42 858030.85 32.10134877 -103.31059976
Nandina 25 36 31 Cr 30/31 0 FSL 664 FWL 11647.00 5042.28 -369.56 399463.27 858056.44 32.09407509 -103.31059818
Nandina 25 36 31 FTP 100 FSL 660 FWL r1 11647.00 -133.00 -318.00 394288.00 858108.00 32.07984937 -103.31059017
Nandina 25 36 31 PBHL 50 FNL 660 FWL r1 11647.00 10281.02 -421.00 404702.00 858005.00 32.10847519 -103.31060381
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Depth Reference: GL @ 3023.00ft
Surf loc: 230 FSL 980 FWL Section 31-T25S-R36E
Northing Easting Latitude Longitude
394421.00 858426.00 32.08020664 -103.30955952
T G M
Azimuths to Grid North
True North: -0.54°
Magnetic North: 6.13°
Magnetic Field
Strength: 47743.6snT
Dip Angle: 59.95°
Date: 10/25/2018
Model: IGRF2015
FORMATION TOP DETAILS
TVDPath MDPath Formation
984.00 984.00 Rustler
1413.00 1413.00 Salado
3382.00 3382.00 Tansil
3755.00 3755.33 Capitan Reef
5027.00 5031.60 Lamar
5116.00 5120.90 Bell Canyon
7299.00 7306.35 Brushy Canyon
8441.00 8448.35 Bone Spring Lime
9799.00 9806.35 First Bone Spring
10284.00 10291.35 Second Bone Spring
10839.00 10846.35 Third Bone Spring Upper
11471.00 11519.93 Third Bone Spring
11647.00 11981.39 Target
True Vertical Depth (1200 ft/in)
Vertical Section at 359.44° (1200 ft/in)
West(-)/East(+) (2800 ft/in)
South(-)/North(+) (2800 ft/in)
Tansil
Capitan Reef
Lamar
Bell Canyon
Brushy Canyon
Bone Spring Lime
First Bone Spring
Second Bone Spring
Third Bone Spring Upper
Third Bone Spring
Target
7 5/8 Csg
9 5/8 Csg
KOP Begin 2°/100' build
Begin 4.69° tangent
Begin 2°/100' drop
Begin vertical hold
Begin 10°/100' build
Begin 2°/100' turn
Begin 90.00° lateral
Nandina 25 36 31 KOP 853 FWL 101 FSL
Nandina 25 36 31 FTP 100 FSL 660 FWL r1
Nandina 25 36 31 Cr 30/31 0 FSL 664 FWL
Nandina 25 36 31 2640 FSL 662 FWL
Nandina 25 36 31 PBHL 50 FNL 660 FWL r1

AMEREDEV

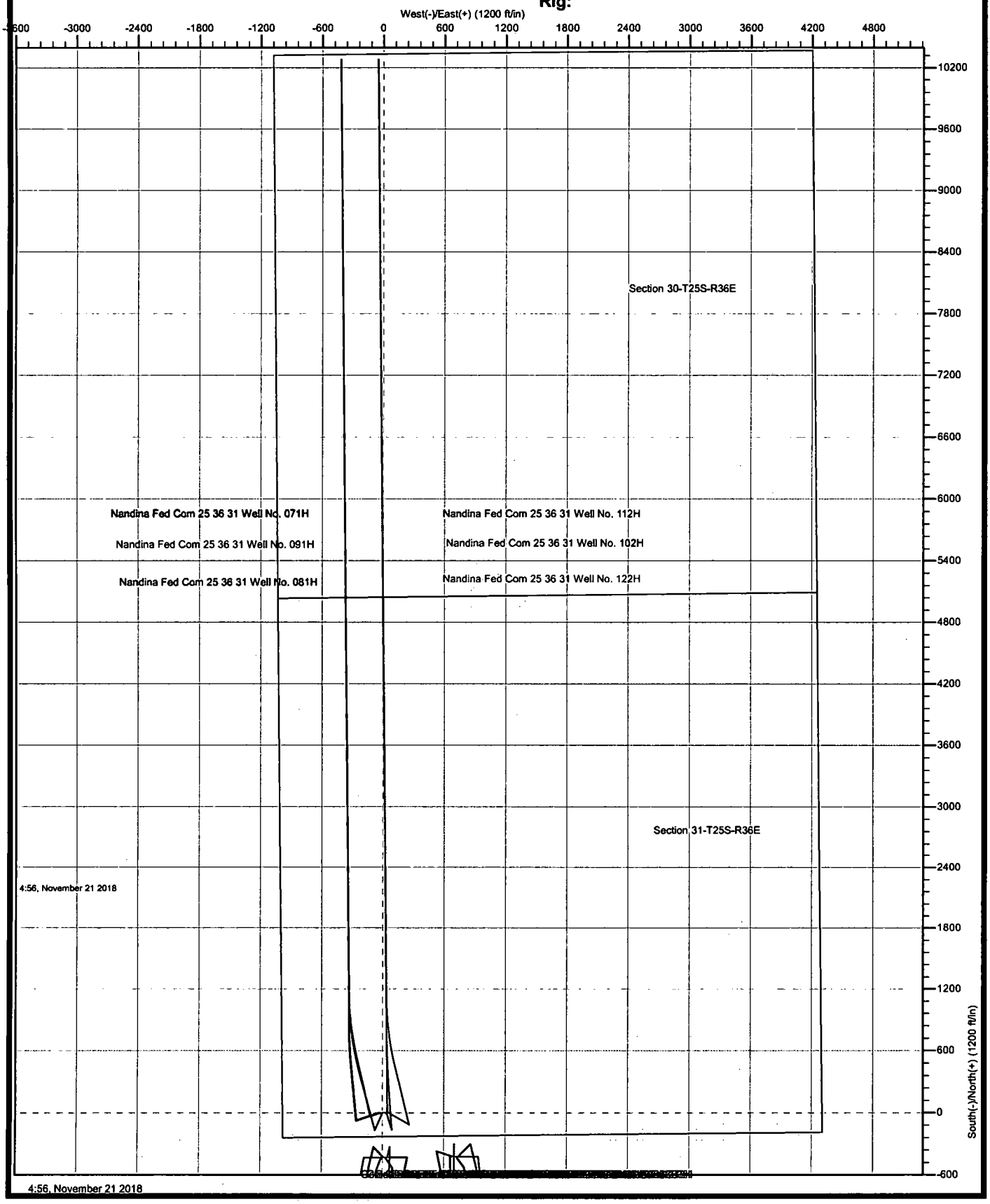
Well: Nandina Fed Com 25 36 31 Well No. 091H
Site: Section 31-T25S-R36E
Project: Lea County, New Mexico NAD83 NM E
Design: rev1
Rig:



4:55, November 21 2018

AMEREDEV

Well: Nandina Fed Com 25 36 31 Well No. 091H
Site: Section 31-T25S-R36E
Project: Lea County, New Mexico NAD83 NM E
Design: rev1
Rig:



4:56, November 21 2018

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Project	Lea County, New Mexico NAD83 NM E		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Section 31-T25S-R36E				
Site Position:		**Northing:**	396,845.47 usft	**Latitude:**	32.08682761
From:	Map	**Easting:**	860,060.12 usft	**Longitude:**	-103.30420954
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.55 °

Well	Nandina Fed Com 25 36 31 Well No. 091H, Surf loc: 230 FSL 980 FWL Section 31-T25S-R36E					
Well Position	**+N/-S**	-2,424.47 ft	**Northing:**	394,421.00 usft	**Latitude:**	32.08020664
	+E/-W	-1,634.12 ft	**Easting:**	858,426.00 usft	**Longitude:**	-103.30955952
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	3,023.00 ft

Wellbore	Original Hole				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	10/25/2018	6.67	59.95	47,743.61890849

Design	rev1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.00	0.00	0.00	359.44	

Plan Survey Tool Program **Date** 11/21/2018

	Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	21,889.71	rev1 (Original Hole)	MWD	
				OWSG MWD - Standard	

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,734.44	4.69	203.81	3,734.18	-8.77	-3.87	2.00	2.00	0.00	203.81	
5,772.90	4.69	203.81	5,765.82	-161.23	-71.13	0.00	0.00	0.00	0.00	
6,007.35	0.00	0.00	6,000.00	-170.00	-75.00	2.00	-2.00	0.00	180.00	
11,081.39	0.00	0.00	11,074.04	-170.00	-75.00	0.00	0.00	0.00	0.00	
11,981.39	90.00	344.55	11,647.00	382.25	-227.63	10.00	10.00	0.00	344.55	
12,725.76	90.00	359.44	11,647.00	1,117.30	-331.02	2.00	0.00	2.00	90.00	
21,889.92	90.00	359.44	11,647.00	10,281.02	-421.00	0.00	0.00	0.00	0.00	Nandina 25 36 31 PB

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
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
200.00	0.00	0.00	200.00	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
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
984.00	0.00	0.00	984.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,109.00	0.00	0.00	1,109.00	0.00	0.00	0.00	0.00	0.00	0.00
13 3/8Csg									
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,413.00	0.00	0.00	1,413.00	0.00	0.00	0.00	0.00	0.00	0.00
Salado									
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,382.00	0.00	0.00	3,382.00	0.00	0.00	0.00	0.00	0.00	0.00
Tansil									
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP Begin 2°/100' build									
3,600.00	2.00	203.81	3,599.98	-1.60	-0.70	-1.59	2.00	2.00	0.00
3,700.00	4.00	203.81	3,699.84	-6.38	-2.82	-6.36	2.00	2.00	0.00
3,734.44	4.69	203.81	3,734.18	-8.77	-3.87	-8.73	2.00	2.00	0.00
Begin 4.69° tangent section									
3,755.33	4.69	203.81	3,755.00	-10.33	-4.56	-10.29	0.00	0.00	0.00
Capitan Reef									
3,800.00	4.69	203.81	3,799.52	-13.67	-6.03	-13.62	0.00	0.00	0.00

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,900.00	4.69	203.81	3,899.18	-21.15	-9.33	-21.06	0.00	0.00	0.00
4,000.00	4.69	203.81	3,998.85	-28.63	-12.63	-28.51	0.00	0.00	0.00
4,100.00	4.69	203.81	4,098.52	-36.11	-15.93	-35.95	0.00	0.00	0.00
4,200.00	4.69	203.81	4,198.18	-43.59	-19.23	-43.40	0.00	0.00	0.00
4,300.00	4.69	203.81	4,297.85	-51.07	-22.53	-50.85	0.00	0.00	0.00
4,400.00	4.69	203.81	4,397.51	-58.55	-25.83	-58.29	0.00	0.00	0.00
4,500.00	4.69	203.81	4,497.18	-66.03	-29.13	-65.74	0.00	0.00	0.00
4,600.00	4.69	203.81	4,596.84	-73.51	-32.43	-73.19	0.00	0.00	0.00
4,700.00	4.69	203.81	4,696.51	-80.99	-35.73	-80.63	0.00	0.00	0.00
4,800.00	4.69	203.81	4,796.17	-88.46	-39.03	-88.08	0.00	0.00	0.00
4,900.00	4.69	203.81	4,895.84	-95.94	-42.33	-95.53	0.00	0.00	0.00
5,000.00	4.69	203.81	4,995.50	-103.42	-45.63	-102.97	0.00	0.00	0.00
5,031.60	4.69	203.81	5,027.00	-105.79	-46.67	-105.33	0.00	0.00	0.00
Lamar									
5,081.77	4.69	203.81	5,077.00	-109.54	-48.33	-109.06	0.00	0.00	0.00
9 5/8 Csg									
5,100.00	4.69	203.81	5,095.17	-110.90	-48.93	-110.42	0.00	0.00	0.00
5,120.90	4.69	203.81	5,116.00	-112.47	-49.62	-111.97	0.00	0.00	0.00
Bell Canyon									
5,200.00	4.69	203.81	5,194.83	-118.38	-52.23	-117.86	0.00	0.00	0.00
5,300.00	4.69	203.81	5,294.50	-125.86	-55.53	-125.31	0.00	0.00	0.00
5,400.00	4.69	203.81	5,394.16	-133.34	-58.83	-132.76	0.00	0.00	0.00
5,500.00	4.69	203.81	5,493.83	-140.82	-62.13	-140.20	0.00	0.00	0.00
5,600.00	4.69	203.81	5,593.50	-148.30	-65.43	-147.65	0.00	0.00	0.00
5,700.00	4.69	203.81	5,693.16	-155.78	-68.72	-155.10	0.00	0.00	0.00
5,772.90	4.69	203.81	5,765.82	-161.23	-71.13	-160.53	0.00	0.00	0.00
Begin 2°/100' drop									
5,800.00	4.15	203.81	5,792.84	-163.14	-71.97	-162.43	2.00	-2.00	0.00
5,900.00	2.15	203.81	5,892.68	-168.16	-74.19	-167.43	2.00	-2.00	0.00
6,000.00	0.15	203.81	5,992.65	-169.99	-75.00	-169.25	2.00	-2.00	0.00
6,007.35	0.00	0.00	6,000.00	-170.00	-75.00	-169.26	2.00	-2.00	0.00
Begin vertical hold									
6,100.00	0.00	0.00	6,092.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,200.00	0.00	0.00	6,192.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,300.00	0.00	0.00	6,292.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,400.00	0.00	0.00	6,392.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,500.00	0.00	0.00	6,492.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,600.00	0.00	0.00	6,592.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,700.00	0.00	0.00	6,692.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,800.00	0.00	0.00	6,792.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
6,900.00	0.00	0.00	6,892.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,000.00	0.00	0.00	6,992.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,100.00	0.00	0.00	7,092.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,200.00	0.00	0.00	7,192.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,300.00	0.00	0.00	7,292.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,306.35	0.00	0.00	7,299.00	-170.00	-75.00	-169.26	0.00	0.00	0.00
Brushy Canyon									
7,400.00	0.00	0.00	7,392.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,500.00	0.00	0.00	7,492.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,600.00	0.00	0.00	7,592.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,700.00	0.00	0.00	7,692.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
7,800.00	0.00	0.00	7,792.65	-170.00	-75.00	-169.26	0.00	0.00	0.00

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,900.00	0.00	0.00	7,892.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,000.00	0.00	0.00	7,992.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,100.00	0.00	0.00	8,092.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,200.00	0.00	0.00	8,192.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,300.00	0.00	0.00	8,292.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,400.00	0.00	0.00	8,392.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,448.35	0.00	0.00	8,441.00	-170.00	-75.00	-169.26	0.00	0.00	0.00
Bone Spring Lime									
8,500.00	0.00	0.00	8,492.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,600.00	0.00	0.00	8,592.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,700.00	0.00	0.00	8,692.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,800.00	0.00	0.00	8,792.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
8,900.00	0.00	0.00	8,892.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,000.00	0.00	0.00	8,992.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,100.00	0.00	0.00	9,092.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,200.00	0.00	0.00	9,192.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,300.00	0.00	0.00	9,292.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,400.00	0.00	0.00	9,392.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,500.00	0.00	0.00	9,492.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,600.00	0.00	0.00	9,592.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,700.00	0.00	0.00	9,692.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,800.00	0.00	0.00	9,792.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
9,806.35	0.00	0.00	9,799.00	-170.00	-75.00	-169.26	0.00	0.00	0.00
First Bone Spring									
9,900.00	0.00	0.00	9,892.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,000.00	0.00	0.00	9,992.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,100.00	0.00	0.00	10,092.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,200.00	0.00	0.00	10,192.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,291.35	0.00	0.00	10,284.00	-170.00	-75.00	-169.26	0.00	0.00	0.00
Second Bone Spring									
10,300.00	0.00	0.00	10,292.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,400.00	0.00	0.00	10,392.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,500.00	0.00	0.00	10,492.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,600.00	0.00	0.00	10,592.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,700.00	0.00	0.00	10,692.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,800.00	0.00	0.00	10,792.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
10,846.35	0.00	0.00	10,839.00	-170.00	-75.00	-169.26	0.00	0.00	0.00
Third Bone Spring Upper									
10,900.00	0.00	0.00	10,892.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
11,000.00	0.00	0.00	10,992.65	-170.00	-75.00	-169.26	0.00	0.00	0.00
11,081.35	0.00	0.00	11,074.00	-170.00	-75.00	-169.26	0.00	0.00	0.00
7 5/8 Csg - Nandina 25 36 31 KOP 853 FWL 101 FSL									
11,081.39	0.00	0.00	11,074.04	-170.00	-75.00	-169.26	0.00	0.00	0.00
Begin 10°/100' build									
11,100.00	1.86	344.55	11,092.65	-169.71	-75.08	-168.97	10.00	10.00	0.00
11,200.00	11.86	344.55	11,191.81	-158.21	-78.26	-157.44	10.00	10.00	0.00
11,300.00	21.86	344.55	11,287.39	-130.29	-85.98	-129.44	10.00	10.00	0.00
11,400.00	31.86	344.55	11,376.49	-86.79	-98.00	-85.83	10.00	10.00	0.00
11,500.00	41.86	344.55	11,456.39	-29.04	-113.96	-27.93	10.00	10.00	0.00
11,519.93	43.85	344.55	11,471.00	-15.98	-117.57	-14.83	10.00	10.00	0.00
Third Bone Spring									
11,594.04	51.27	344.55	11,520.98	36.70	-132.13	37.99	10.00	10.00	0.00

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
Nandina 25 36 31 FTP 100 FSL 660 FWL r1									
11,600.00	51.86	344.55	11,524.68	41.20	-133.37	42.50	10.00	10.00	0.00
11,700.00	61.86	344.55	11,579.28	121.81	-155.65	123.32	10.00	10.00	0.00
11,745.19	66.38	344.55	11,599.00	160.98	-166.48	162.60	10.00	10.00	0.00
Nandina 25 36 31 FTP 330 FSL 660 FWL									
11,800.00	71.86	344.55	11,618.53	210.33	-180.12	212.08	10.00	10.00	0.00
11,900.00	81.86	344.55	11,641.23	304.07	-206.03	306.07	10.00	10.00	0.00
11,981.39	90.00	344.55	11,647.00	382.25	-227.63	384.46	10.00	10.00	0.00
Begin 2°/100' turn - Target									
12,000.00	90.00	344.92	11,647.00	400.21	-232.54	402.46	2.00	0.00	2.00
12,100.00	90.00	346.92	11,647.00	497.20	-256.86	499.69	2.00	0.00	2.00
12,200.00	90.00	348.92	11,647.00	594.98	-277.78	597.67	2.00	0.00	2.00
12,300.00	90.00	350.92	11,647.00	693.44	-295.28	696.29	2.00	0.00	2.00
12,400.00	90.00	352.92	11,647.00	792.44	-309.33	795.42	2.00	0.00	2.00
12,500.00	90.00	354.92	11,647.00	891.87	-319.92	894.96	2.00	0.00	2.00
12,600.00	90.00	356.92	11,647.00	991.61	-327.03	994.76	2.00	0.00	2.00
12,700.00	90.00	358.92	11,647.00	1,091.54	-330.65	1,094.72	2.00	0.00	2.00
12,725.76	90.00	359.44	11,647.00	1,117.30	-331.02	1,120.48	2.00	0.00	2.00
Begin 90.00° lateral									
12,800.00	90.00	359.44	11,647.00	1,191.54	-331.75	1,194.72	0.00	0.00	0.00
12,900.00	90.00	359.44	11,647.00	1,291.53	-332.73	1,294.72	0.00	0.00	0.00
13,000.00	90.00	359.44	11,647.00	1,391.53	-333.71	1,394.72	0.00	0.00	0.00
13,100.00	90.00	359.44	11,647.00	1,491.52	-334.69	1,494.72	0.00	0.00	0.00
13,200.00	90.00	359.44	11,647.00	1,591.52	-335.68	1,594.72	0.00	0.00	0.00
13,300.00	90.00	359.44	11,647.00	1,691.51	-336.66	1,694.72	0.00	0.00	0.00
13,400.00	90.00	359.44	11,647.00	1,791.51	-337.64	1,794.72	0.00	0.00	0.00
13,500.00	90.00	359.44	11,647.00	1,891.50	-338.62	1,894.72	0.00	0.00	0.00
13,600.00	90.00	359.44	11,647.00	1,991.50	-339.60	1,994.72	0.00	0.00	0.00
13,700.00	90.00	359.44	11,647.00	2,091.49	-340.59	2,094.72	0.00	0.00	0.00
13,800.00	90.00	359.44	11,647.00	2,191.49	-341.57	2,194.72	0.00	0.00	0.00
13,900.00	90.00	359.44	11,647.00	2,291.48	-342.55	2,294.72	0.00	0.00	0.00
14,000.00	90.00	359.44	11,647.00	2,391.48	-343.53	2,394.72	0.00	0.00	0.00
14,100.00	90.00	359.44	11,647.00	2,491.47	-344.51	2,494.72	0.00	0.00	0.00
14,200.00	90.00	359.44	11,647.00	2,591.47	-345.50	2,594.72	0.00	0.00	0.00
14,300.00	90.00	359.44	11,647.00	2,691.46	-346.48	2,694.72	0.00	0.00	0.00
14,400.00	90.00	359.44	11,647.00	2,791.46	-347.46	2,794.72	0.00	0.00	0.00
14,500.00	90.00	359.44	11,647.00	2,891.45	-348.44	2,894.72	0.00	0.00	0.00
14,600.00	90.00	359.44	11,647.00	2,991.45	-349.42	2,994.72	0.00	0.00	0.00
14,700.00	90.00	359.44	11,647.00	3,091.45	-350.40	3,094.72	0.00	0.00	0.00
14,800.00	90.00	359.44	11,647.00	3,191.44	-351.39	3,194.72	0.00	0.00	0.00
14,900.00	90.00	359.44	11,647.00	3,291.44	-352.37	3,294.72	0.00	0.00	0.00
15,000.00	90.00	359.44	11,647.00	3,391.43	-353.35	3,394.72	0.00	0.00	0.00
15,100.00	90.00	359.44	11,647.00	3,491.43	-354.33	3,494.72	0.00	0.00	0.00
15,200.00	90.00	359.44	11,647.00	3,591.42	-355.31	3,594.72	0.00	0.00	0.00
15,300.00	90.00	359.44	11,647.00	3,691.42	-356.30	3,694.72	0.00	0.00	0.00
15,400.00	90.00	359.44	11,647.00	3,791.41	-357.28	3,794.72	0.00	0.00	0.00
15,500.00	90.00	359.44	11,647.00	3,891.41	-358.26	3,894.72	0.00	0.00	0.00
15,600.00	90.00	359.44	11,647.00	3,991.40	-359.24	3,994.72	0.00	0.00	0.00
15,700.00	90.00	359.44	11,647.00	4,091.40	-360.22	4,094.72	0.00	0.00	0.00
15,800.00	90.00	359.44	11,647.00	4,191.39	-361.21	4,194.72	0.00	0.00	0.00
15,900.00	90.00	359.44	11,647.00	4,291.39	-362.19	4,294.72	0.00	0.00	0.00
16,000.00	90.00	359.44	11,647.00	4,391.38	-363.17	4,394.72	0.00	0.00	0.00
16,100.00	90.00	359.44	11,647.00	4,491.38	-364.15	4,494.72	0.00	0.00	0.00

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
16,200.00	90.00	359.44	11,647.00	4,591.37	-365.13	4,594.72	0.00	0.00	0.00
16,300.00	90.00	359.44	11,647.00	4,691.37	-366.11	4,694.72	0.00	0.00	0.00
16,400.00	90.00	359.44	11,647.00	4,791.36	-367.10	4,794.72	0.00	0.00	0.00
16,500.00	90.00	359.44	11,647.00	4,891.36	-368.08	4,894.72	0.00	0.00	0.00
16,600.00	90.00	359.44	11,647.00	4,991.35	-369.06	4,994.72	0.00	0.00	0.00
16,650.93	90.00	359.44	11,647.00	5,042.28	-369.56	5,045.65	0.00	0.00	0.00
Nandina 25 36 31 Cr 30/31 0 FSL 664 FWL									
16,700.00	90.00	359.44	11,647.00	5,091.35	-370.04	5,094.72	0.00	0.00	0.00
16,800.00	90.00	359.44	11,647.00	5,191.34	-371.02	5,194.72	0.00	0.00	0.00
16,900.00	90.00	359.44	11,647.00	5,291.34	-372.01	5,294.72	0.00	0.00	0.00
17,000.00	90.00	359.44	11,647.00	5,391.33	-372.99	5,394.72	0.00	0.00	0.00
17,100.00	90.00	359.44	11,647.00	5,491.33	-373.97	5,494.72	0.00	0.00	0.00
17,200.00	90.00	359.44	11,647.00	5,591.32	-374.95	5,594.72	0.00	0.00	0.00
17,300.00	90.00	359.44	11,647.00	5,691.32	-375.93	5,694.72	0.00	0.00	0.00
17,400.00	90.00	359.44	11,647.00	5,791.32	-376.92	5,794.72	0.00	0.00	0.00
17,500.00	90.00	359.44	11,647.00	5,891.31	-377.90	5,894.72	0.00	0.00	0.00
17,600.00	90.00	359.44	11,647.00	5,991.31	-378.88	5,994.72	0.00	0.00	0.00
17,700.00	90.00	359.44	11,647.00	6,091.30	-379.86	6,094.72	0.00	0.00	0.00
17,800.00	90.00	359.44	11,647.00	6,191.30	-380.84	6,194.72	0.00	0.00	0.00
17,900.00	90.00	359.44	11,647.00	6,291.29	-381.82	6,294.72	0.00	0.00	0.00
18,000.00	90.00	359.44	11,647.00	6,391.29	-382.81	6,394.72	0.00	0.00	0.00
18,100.00	90.00	359.44	11,647.00	6,491.28	-383.79	6,494.72	0.00	0.00	0.00
18,200.00	90.00	359.44	11,647.00	6,591.28	-384.77	6,594.72	0.00	0.00	0.00
18,300.00	90.00	359.44	11,647.00	6,691.27	-385.75	6,694.72	0.00	0.00	0.00
18,400.00	90.00	359.44	11,647.00	6,791.27	-386.73	6,794.72	0.00	0.00	0.00
18,500.00	90.00	359.44	11,647.00	6,891.26	-387.72	6,894.72	0.00	0.00	0.00
18,600.00	90.00	359.44	11,647.00	6,991.26	-388.70	6,994.72	0.00	0.00	0.00
18,700.00	90.00	359.44	11,647.00	7,091.25	-389.68	7,094.72	0.00	0.00	0.00
18,800.00	90.00	359.44	11,647.00	7,191.25	-390.66	7,194.72	0.00	0.00	0.00
18,900.00	90.00	359.44	11,647.00	7,291.24	-391.64	7,294.72	0.00	0.00	0.00
19,000.00	90.00	359.44	11,647.00	7,391.24	-392.63	7,394.72	0.00	0.00	0.00
19,100.00	90.00	359.44	11,647.00	7,491.23	-393.61	7,494.72	0.00	0.00	0.00
19,200.00	90.00	359.44	11,647.00	7,591.23	-394.59	7,594.72	0.00	0.00	0.00
19,297.21	90.00	359.44	11,647.00	7,688.44	-395.54	7,691.93	0.00	0.00	0.00
Nandina 25 36 31 2640 FSL 662 FWL									
19,300.00	90.00	359.44	11,647.00	7,691.22	-395.57	7,694.72	0.00	0.00	0.00
19,400.00	90.00	359.44	11,647.00	7,791.22	-396.55	7,794.72	0.00	0.00	0.00
19,500.00	90.00	359.44	11,647.00	7,891.21	-397.53	7,894.72	0.00	0.00	0.00
19,600.00	90.00	359.44	11,647.00	7,991.21	-398.52	7,994.72	0.00	0.00	0.00
19,700.00	90.00	359.44	11,647.00	8,091.20	-399.50	8,094.72	0.00	0.00	0.00
19,800.00	90.00	359.44	11,647.00	8,191.20	-400.48	8,194.72	0.00	0.00	0.00
19,900.00	90.00	359.44	11,647.00	8,291.19	-401.46	8,294.72	0.00	0.00	0.00
20,000.00	90.00	359.44	11,647.00	8,391.19	-402.44	8,394.72	0.00	0.00	0.00
20,100.00	90.00	359.44	11,647.00	8,491.18	-403.43	8,494.72	0.00	0.00	0.00
20,200.00	90.00	359.44	11,647.00	8,591.18	-404.41	8,594.72	0.00	0.00	0.00
20,300.00	90.00	359.44	11,647.00	8,691.18	-405.39	8,694.72	0.00	0.00	0.00
20,400.00	90.00	359.44	11,647.00	8,791.17	-406.37	8,794.72	0.00	0.00	0.00
20,500.00	90.00	359.44	11,647.00	8,891.17	-407.35	8,894.72	0.00	0.00	0.00
20,600.00	90.00	359.44	11,647.00	8,991.16	-408.34	8,994.72	0.00	0.00	0.00
20,700.00	90.00	359.44	11,647.00	9,091.16	-409.32	9,094.72	0.00	0.00	0.00
20,800.00	90.00	359.44	11,647.00	9,191.15	-410.30	9,194.72	0.00	0.00	0.00
20,900.00	90.00	359.44	11,647.00	9,291.15	-411.28	9,294.72	0.00	0.00	0.00

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
21,000.00	90.00	359.44	11,647.00	9,391.14	-412.26	9,394.72	0.00	0.00	0.00
21,100.00	90.00	359.44	11,647.00	9,491.14	-413.24	9,494.72	0.00	0.00	0.00
21,200.00	90.00	359.44	11,647.00	9,591.13	-414.23	9,594.72	0.00	0.00	0.00
21,300.00	90.00	359.44	11,647.00	9,691.13	-415.21	9,694.72	0.00	0.00	0.00
21,400.00	90.00	359.44	11,647.00	9,791.12	-416.19	9,794.72	0.00	0.00	0.00
21,500.00	90.00	359.44	11,647.00	9,891.12	-417.17	9,894.72	0.00	0.00	0.00
21,600.00	90.00	359.44	11,647.00	9,991.11	-418.15	9,994.72	0.00	0.00	0.00
21,700.00	90.00	359.44	11,647.00	10,091.11	-419.14	10,094.72	0.00	0.00	0.00
21,739.91	90.00	359.44	11,647.00	10,131.02	-419.53	10,134.63	0.00	0.00	0.00
Nandina 25 36 31 PBHL 200 FNL 660 FWL									
21,800.00	90.00	359.44	11,647.00	10,191.10	-420.12	10,194.72	0.00	0.00	0.00
21,889.92	90.00	359.44	11,647.00	10,281.02	-421.00	10,284.64	0.00	0.00	0.00
PBHL/TD 21889.92 MD 11647.00 TVD - Nandina 25 36 31 PBHL 50 FNL 660 FWL r1									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Nandina 25 36 31 KOP r - plan hits target center - Point	0.00	0.00	11,074.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Nandina 25 36 31 FTP 1 - plan misses target center by 281.48ft at 11594.04ft MD (11520.98 TVD, 36.70 N, -132.13 E) - Point	0.00	0.00	11,647.00	-133.00	-318.00	394,288.00	858,108.00	32.07984938	-103.31059017
Nandina 25 36 31 Cr 30 - plan hits target center - Point	0.00	0.00	11,647.00	5,042.28	-369.56	399,463.27	858,056.44	32.09407508	-103.31059818
Nandina 25 36 31 PBHL - plan hits target center - Point	0.00	0.00	11,647.00	10,281.02	-421.00	404,702.00	858,005.00	32.10847518	-103.31060380
Nandina 25 36 31 2640 - plan misses target center by 0.39ft at 19297.21ft MD (11647.00 TVD, 7688.44 N, -395.54 E) - Point	0.00	0.00	11,647.00	7,688.44	-395.15	402,109.42	858,030.85	32.10134876	-103.31059976

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,109.00	1,109.00	13 3/8Csg	13-3/8	17-1/2
5,081.77	5,077.00	9 5/8 Csg	9-5/8	12-1/4
11,081.35	11,074.00	7 5/8 Csg	7-5/8	8-3/4

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
984.00	984.00	Rustler		0.00	
1,413.00	1,413.00	Salado		0.00	
3,382.00	3,382.00	Tansil		0.00	
3,755.33	3,755.00	Capitan Reef		0.00	
5,031.60	5,027.00	Lamar		0.00	
5,120.90	5,116.00	Bell Canyon		0.00	
7,306.35	7,299.00	Brushy Canyon		0.00	
8,448.35	8,441.00	Bone Spring Lime		0.00	
9,806.35	9,799.00	First Bone Spring		0.00	
10,291.35	10,284.00	Second Bone Spring		0.00	
10,846.35	10,839.00	Third Bone Spring Upper		0.00	
11,519.93	11,471.00	Third Bone Spring		0.00	
11,981.39	11,647.00	Target		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
3,500.00	3,500.00	0.00	0.00	KOP Begin 2°/100' build
3,734.44	3,734.18	-8.77	-3.87	Begin 4.69° tangent section
5,772.90	5,765.82	-161.23	-71.13	Begin 2°/100' drop
6,007.35	6,000.00	-170.00	-75.00	Begin vertical hold
11,081.39	11,074.04	-170.00	-75.00	Begin 10°/100' build
11,981.39	11,647.00	382.26	-227.64	Begin 2°/100' turn
12,725.76	11,647.00	1,117.30	-331.02	Begin 90.00° lateral
21,889.92	11,647.00	10,281.02	-421.00	PBHL/TD 21889.92 MD 11647.00 TVD

AMEREDEV

Planning Report - Geographic

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Project	Lea County, New Mexico NAD83 NM E		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Section 31-T25S-R36E				
Site Position:		**Northing:**	396,845.47 usft	**Latitude:**	32.08682761
From:	Map	**Easting:**	860,060.12 usft	**Longitude:**	-103.30420954
Position Uncertainty:	0.00 ft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.55 °

Well	Nandina Fed Com 25 36 31 Well No. 091H, Surf loc: 230 FSL 980 FWL Section 31-T25S-R36E				
Well Position	**+N/-S**	0.00 ft	**Northing:**	394,421.00 usft	**Latitude:**	32.08020664
	+E/-W	0.00 ft	**Easting:**	858,426.00 usft	**Longitude:**	-103.30955952
Position Uncertainty		0.00 ft	**Wellhead Elevation:**		**Ground Level:**	3,023.00 ft

Wellbore	Original Hole			
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	10/25/2018	6.67	59.95	47,743.61890849

Design	rev1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.00	0.00	0.00	359.44	

Plan Survey Tool Program	**Date** 11/21/2018			
	Depth From (ft)	**Depth To (ft)**	**Survey (Wellbore)**	**Tool Name**	**Remarks**
1	0.00	21,889.71	rev1 (Original Hole)	MWD OWSG MWD - Standard	

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,734.44	4.69	203.81	3,734.18	-8.77	-3.87	2.00	2.00	0.00	203.81	
5,772.90	4.69	203.81	5,765.82	-161.23	-71.13	0.00	0.00	0.00	0.00	
6,007.35	0.00	0.00	6,000.00	-170.00	-75.00	2.00	-2.00	0.00	180.00	
11,081.39	0.00	0.00	11,074.04	-170.00	-75.00	0.00	0.00	0.00	0.00	
11,981.39	90.00	344.55	11,647.00	382.25	-227.63	10.00	10.00	0.00	344.55	
12,725.76	90.00	359.44	11,647.00	1,117.30	-331.02	2.00	0.00	2.00	90.00	
21,889.92	90.00	359.44	11,647.00	10,281.02	-421.00	0.00	0.00	0.00	0.00	Nandina 25 36 31 PB

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
100.00	0.00	0.00	100.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
200.00	0.00	0.00	200.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
300.00	0.00	0.00	300.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
400.00	0.00	0.00	400.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
500.00	0.00	0.00	500.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
600.00	0.00	0.00	600.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
700.00	0.00	0.00	700.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
800.00	0.00	0.00	800.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
900.00	0.00	0.00	900.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
984.00	0.00	0.00	984.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
Rustler									
1,000.00	0.00	0.00	1,000.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,100.00	0.00	0.00	1,100.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,109.00	0.00	0.00	1,109.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
13 3/8Csg									
1,200.00	0.00	0.00	1,200.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,300.00	0.00	0.00	1,300.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,400.00	0.00	0.00	1,400.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,413.00	0.00	0.00	1,413.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
Salado									
1,500.00	0.00	0.00	1,500.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,600.00	0.00	0.00	1,600.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,700.00	0.00	0.00	1,700.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,800.00	0.00	0.00	1,800.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
1,900.00	0.00	0.00	1,900.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,000.00	0.00	0.00	2,000.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,100.00	0.00	0.00	2,100.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,200.00	0.00	0.00	2,200.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,300.00	0.00	0.00	2,300.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,400.00	0.00	0.00	2,400.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,500.00	0.00	0.00	2,500.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,600.00	0.00	0.00	2,600.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,700.00	0.00	0.00	2,700.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,800.00	0.00	0.00	2,800.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
2,900.00	0.00	0.00	2,900.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
3,000.00	0.00	0.00	3,000.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
3,100.00	0.00	0.00	3,100.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
3,200.00	0.00	0.00	3,200.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
3,300.00	0.00	0.00	3,300.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
3,382.00	0.00	0.00	3,382.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
Tansil									
3,400.00	0.00	0.00	3,400.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
3,500.00	0.00	0.00	3,500.00	0.00	0.00	394,421.00	858,426.00	32.08020664	-103.30955952
KOP Begin 2°/100' build									
3,600.00	2.00	203.81	3,599.98	-1.60	-0.70	394,419.40	858,425.29	32.08020227	-103.30956184
3,700.00	4.00	203.81	3,699.84	-6.38	-2.82	394,414.61	858,423.18	32.08018917	-103.30956881
3,734.44	4.69	203.81	3,734.18	-8.77	-3.87	394,412.23	858,422.13	32.08018263	-103.30957228
Begin 4.69° tangent section									
3,755.33	4.69	203.81	3,755.00	-10.33	-4.56	394,410.66	858,421.44	32.08017836	-103.30957455
Capitan Reef									
3,800.00	4.69	203.81	3,799.52	-13.67	-6.03	394,407.32	858,419.97	32.08016921	-103.30957942
3,900.00	4.69	203.81	3,899.18	-21.15	-9.33	394,399.84	858,416.67	32.08014874	-103.30959030

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Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,000.00	4.69	203.81	3,998.85	-28.63	-12.63	394,392.37	858,413.37	32.08012827	-103.30960118
4,100.00	4.69	203.81	4,098.52	-36.11	-15.93	394,384.89	858,410.07	32.08010780	-103.30961206
4,200.00	4.69	203.81	4,198.18	-43.59	-19.23	394,377.41	858,406.77	32.08008733	-103.30962294
4,300.00	4.69	203.81	4,297.85	-51.07	-22.53	394,369.93	858,403.47	32.08006686	-103.30963382
4,400.00	4.69	203.81	4,397.51	-58.55	-25.83	394,362.45	858,400.17	32.08004639	-103.30964470
4,500.00	4.69	203.81	4,497.18	-66.03	-29.13	394,354.97	858,396.87	32.08002592	-103.30965558
4,600.00	4.69	203.81	4,596.84	-73.51	-32.43	394,347.49	858,393.57	32.08000545	-103.30966646
4,700.00	4.69	203.81	4,696.51	-80.99	-35.73	394,340.01	858,390.27	32.07998498	-103.30967734
4,800.00	4.69	203.81	4,796.17	-88.46	-39.03	394,332.53	858,386.97	32.07996451	-103.30968822
4,900.00	4.69	203.81	4,895.84	-95.94	-42.33	394,325.06	858,383.67	32.07994404	-103.30969910
5,000.00	4.69	203.81	4,995.50	-103.42	-45.63	394,317.58	858,380.37	32.07992357	-103.30970998
5,031.60	4.69	203.81	5,027.00	-105.79	-46.67	394,315.21	858,379.33	32.07991710	-103.30971342
Lamar									
5,081.77	4.69	203.81	5,077.00	-109.54	-48.33	394,311.46	858,377.67	32.07990683	-103.30971888
9 5/8 Csg									
5,100.00	4.69	203.81	5,095.17	-110.90	-48.93	394,310.10	858,377.07	32.07990310	-103.30972087
5,120.90	4.69	203.81	5,116.00	-112.47	-49.62	394,308.53	858,376.38	32.07989882	-103.30972314
Bell Canyon									
5,200.00	4.69	203.81	5,194.83	-118.38	-52.23	394,302.62	858,373.77	32.07988263	-103.30973175
5,300.00	4.69	203.81	5,294.50	-125.86	-55.53	394,295.14	858,370.47	32.07986216	-103.30974263
5,400.00	4.69	203.81	5,394.16	-133.34	-58.83	394,287.66	858,367.17	32.07984169	-103.30975351
5,500.00	4.69	203.81	5,493.83	-140.82	-62.13	394,280.18	858,363.87	32.07982122	-103.30976439
5,600.00	4.69	203.81	5,593.50	-148.30	-65.43	394,272.70	858,360.57	32.07980075	-103.30977527
5,700.00	4.69	203.81	5,693.16	-155.78	-68.72	394,265.22	858,357.27	32.07978028	-103.30978615
5,772.90	4.69	203.81	5,765.82	-161.23	-71.13	394,259.77	858,354.87	32.07976536	-103.30979408
Begin 2°/100' drop									
5,800.00	4.15	203.81	5,792.84	-163.14	-71.97	394,257.86	858,354.03	32.07976013	-103.30979686
5,900.00	2.15	203.81	5,892.68	-168.16	-74.19	394,252.84	858,351.81	32.07974638	-103.30980417
6,000.00	0.15	203.81	5,992.65	-169.99	-75.00	394,251.01	858,351.00	32.07974137	-103.30980683
6,007.35	0.00	0.00	6,000.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Begin vertical hold									
6,100.00	0.00	0.00	6,092.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,200.00	0.00	0.00	6,192.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,300.00	0.00	0.00	6,292.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,400.00	0.00	0.00	6,392.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,500.00	0.00	0.00	6,492.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,600.00	0.00	0.00	6,592.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,700.00	0.00	0.00	6,692.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,800.00	0.00	0.00	6,792.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
6,900.00	0.00	0.00	6,892.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,000.00	0.00	0.00	6,992.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,100.00	0.00	0.00	7,092.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,200.00	0.00	0.00	7,192.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,300.00	0.00	0.00	7,292.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,306.35	0.00	0.00	7,299.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Brushy Canyon									
7,400.00	0.00	0.00	7,392.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,500.00	0.00	0.00	7,492.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,600.00	0.00	0.00	7,592.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,700.00	0.00	0.00	7,692.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,800.00	0.00	0.00	7,792.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
7,900.00	0.00	0.00	7,892.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,000.00	0.00	0.00	7,992.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,100.00	0.00	0.00	8,092.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,200.00	0.00	0.00	8,192.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,300.00	0.00	0.00	8,292.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,400.00	0.00	0.00	8,392.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,448.35	0.00	0.00	8,441.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Bone Spring Lime									
8,500.00	0.00	0.00	8,492.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,600.00	0.00	0.00	8,592.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,700.00	0.00	0.00	8,692.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,800.00	0.00	0.00	8,792.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
8,900.00	0.00	0.00	8,892.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,000.00	0.00	0.00	8,992.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,100.00	0.00	0.00	9,092.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,200.00	0.00	0.00	9,192.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,300.00	0.00	0.00	9,292.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,400.00	0.00	0.00	9,392.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,500.00	0.00	0.00	9,492.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,600.00	0.00	0.00	9,592.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,700.00	0.00	0.00	9,692.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,800.00	0.00	0.00	9,792.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
9,806.35	0.00	0.00	9,799.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
First Bone Spring									
9,900.00	0.00	0.00	9,892.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,000.00	0.00	0.00	9,992.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,100.00	0.00	0.00	10,092.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,200.00	0.00	0.00	10,192.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,291.35	0.00	0.00	10,284.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Second Bone Spring									
10,300.00	0.00	0.00	10,292.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,400.00	0.00	0.00	10,392.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,500.00	0.00	0.00	10,492.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,600.00	0.00	0.00	10,592.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,700.00	0.00	0.00	10,692.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,800.00	0.00	0.00	10,792.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
10,846.35	0.00	0.00	10,839.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Third Bone Spring Upper									
10,900.00	0.00	0.00	10,892.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
11,000.00	0.00	0.00	10,992.65	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
[redacted]									
11,081.39	0.00	0.00	11,074.04	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Begin 10°/100' build									
11,100.00	1.86	344.55	11,092.65	-169.71	-75.08	394,251.29	858,350.92	32.07974215	-103.30980710
11,200.00	11.86	344.55	11,191.81	-158.21	-78.26	394,262.79	858,347.74	32.07977384	-103.30981700
11,300.00	21.86	344.55	11,287.39	-130.29	-85.98	394,290.71	858,340.02	32.07985079	-103.30984106
11,400.00	31.86	344.55	11,376.49	-86.79	-98.00	394,334.21	858,328.00	32.07997065	-103.30987854
11,500.00	41.86	344.55	11,456.39	-29.04	-113.96	394,391.96	858,312.04	32.08012979	-103.30992829
11,519.93	43.85	344.55	11,471.00	-15.98	-117.57	394,405.02	858,308.43	32.08016579	-103.30993955
Third Bone Spring									
11,594.04	51.27	344.55	11,520.98	36.70	-132.13	394,457.70	858,293.87	32.08031095	-103.30998494
Nandina 25 36 31 FTP 100 FSL 660 FWL r1									
11,600.00	51.86	344.55	11,524.68	41.20	-133.37	394,462.20	858,292.63	32.08032336	-103.30998882
11,700.00	61.86	344.55	11,579.28	121.81	-155.65	394,542.81	858,270.35	32.08054549	-103.31005827

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,745.19	66.38	344.55	11,599.00	160.98	-166.48	394,581.98	858,259.52	32.08065345	-103.31009202
Nandina 25 36 31 FTP 330 FSL 660 FWL									
11,800.00	71.86	344.55	11,618.53	210.33	-180.12	394,631.33	858,245.88	32.08078943	-103.31013454
11,900.00	81.86	344.55	11,641.23	304.07	-206.03	394,725.07	858,219.97	32.08104776	-103.31021531
11,981.39	90.00	344.55	11,647.00	382.25	-227.63	394,803.25	858,198.37	32.08126321	-103.31028267
Begin 2°/100' turn - Target									
12,000.00	90.00	344.92	11,647.00	400.21	-232.54	394,821.21	858,193.46	32.08131269	-103.31029794
12,100.00	90.00	346.92	11,647.00	497.20	-256.86	394,918.20	858,169.14	32.08157991	-103.31037349
12,200.00	90.00	348.92	11,647.00	594.98	-277.78	395,015.98	858,148.22	32.08184921	-103.31043804
12,300.00	90.00	350.92	11,647.00	693.44	-295.28	395,114.43	858,130.72	32.08212027	-103.31049151
12,400.00	90.00	352.92	11,647.00	792.44	-309.33	395,213.44	858,116.67	32.08239274	-103.31053384
12,500.00	90.00	354.92	11,647.00	891.87	-319.92	395,312.87	858,106.08	32.08266631	-103.31056498
12,600.00	90.00	356.92	11,647.00	991.61	-327.03	395,412.61	858,098.97	32.08294064	-103.31058488
12,700.00	90.00	358.92	11,647.00	1,091.54	-330.65	395,512.54	858,095.35	32.08321539	-103.31059353
12,725.76	90.00	359.44	11,647.00	1,117.30	-331.02	395,538.30	858,094.98	32.08328620	-103.31059393
Begin 90.00° lateral									
12,800.00	90.00	359.44	11,647.00	1,191.54	-331.75	395,612.53	858,094.25	32.08349026	-103.31059401
12,900.00	90.00	359.44	11,647.00	1,291.53	-332.73	395,712.53	858,093.27	32.08376512	-103.31059412
13,000.00	90.00	359.44	11,647.00	1,391.53	-333.71	395,812.52	858,092.29	32.08403999	-103.31059423
13,100.00	90.00	359.44	11,647.00	1,491.52	-334.69	395,912.52	858,091.30	32.08431485	-103.31059433
13,200.00	90.00	359.44	11,647.00	1,591.52	-335.68	396,012.51	858,090.32	32.08458972	-103.31059444
13,300.00	90.00	359.44	11,647.00	1,691.51	-336.66	396,112.51	858,089.34	32.08486458	-103.31059455
13,400.00	90.00	359.44	11,647.00	1,791.51	-337.64	396,212.50	858,088.36	32.08513945	-103.31059466
13,500.00	90.00	359.44	11,647.00	1,891.50	-338.62	396,312.50	858,087.38	32.08541431	-103.31059477
13,600.00	90.00	359.44	11,647.00	1,991.50	-339.60	396,412.49	858,086.40	32.08568917	-103.31059488
13,700.00	90.00	359.44	11,647.00	2,091.49	-340.59	396,512.49	858,085.41	32.08596403	-103.31059499
13,800.00	90.00	359.44	11,647.00	2,191.49	-341.57	396,612.48	858,084.43	32.08623889	-103.31059510
13,900.00	90.00	359.44	11,647.00	2,291.48	-342.55	396,712.48	858,083.45	32.08651376	-103.31059520
14,000.00	90.00	359.44	11,647.00	2,391.48	-343.53	396,812.47	858,082.47	32.08678862	-103.31059531
14,100.00	90.00	359.44	11,647.00	2,491.47	-344.51	396,912.47	858,081.49	32.08706349	-103.31059542
14,200.00	90.00	359.44	11,647.00	2,591.47	-345.50	397,012.46	858,080.50	32.08733835	-103.31059553
14,300.00	90.00	359.44	11,647.00	2,691.46	-346.48	397,112.46	858,079.52	32.08761322	-103.31059564
14,400.00	90.00	359.44	11,647.00	2,791.46	-347.46	397,212.45	858,078.54	32.08788808	-103.31059575
14,500.00	90.00	359.44	11,647.00	2,891.45	-348.44	397,312.45	858,077.56	32.08816295	-103.31059585
14,600.00	90.00	359.44	11,647.00	2,991.45	-349.42	397,412.44	858,076.58	32.08843781	-103.31059596
14,700.00	90.00	359.44	11,647.00	3,091.45	-350.40	397,512.44	858,075.59	32.08871267	-103.31059607
14,800.00	90.00	359.44	11,647.00	3,191.44	-351.39	397,612.43	858,074.61	32.08898754	-103.31059618
14,900.00	90.00	359.44	11,647.00	3,291.44	-352.37	397,712.43	858,073.63	32.08926240	-103.31059629
15,000.00	90.00	359.44	11,647.00	3,391.43	-353.35	397,812.42	858,072.65	32.08953727	-103.31059640
15,100.00	90.00	359.44	11,647.00	3,491.43	-354.33	397,912.42	858,071.67	32.08981213	-103.31059650
15,200.00	90.00	359.44	11,647.00	3,591.42	-355.31	398,012.41	858,070.69	32.09008700	-103.31059661
15,300.00	90.00	359.44	11,647.00	3,691.42	-356.30	398,112.41	858,069.70	32.09036186	-103.31059672
15,400.00	90.00	359.44	11,647.00	3,791.41	-357.28	398,212.40	858,068.72	32.09063673	-103.31059683
15,500.00	90.00	359.44	11,647.00	3,891.41	-358.26	398,312.40	858,067.74	32.09091159	-103.31059694
15,600.00	90.00	359.44	11,647.00	3,991.40	-359.24	398,412.39	858,066.76	32.09118645	-103.31059705
15,700.00	90.00	359.44	11,647.00	4,091.40	-360.22	398,512.39	858,065.78	32.09146132	-103.31059715
15,800.00	90.00	359.44	11,647.00	4,191.39	-361.21	398,612.38	858,064.79	32.09173618	-103.31059726
15,900.00	90.00	359.44	11,647.00	4,291.39	-362.19	398,712.38	858,063.81	32.09201105	-103.31059737
16,000.00	90.00	359.44	11,647.00	4,391.38	-363.17	398,812.37	858,062.83	32.09228591	-103.31059748
16,100.00	90.00	359.44	11,647.00	4,491.38	-364.15	398,912.37	858,061.85	32.09256078	-103.31059759
16,200.00	90.00	359.44	11,647.00	4,591.37	-365.13	399,012.36	858,060.87	32.09283564	-103.31059769
16,300.00	90.00	359.44	11,647.00	4,691.37	-366.11	399,112.36	858,059.89	32.09311050	-103.31059780
16,400.00	90.00	359.44	11,647.00	4,791.36	-367.10	399,212.35	858,058.90	32.09338537	-103.31059791

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
16,500.00	90.00	359.44	11,647.00	4,891.36	-368.08	399,312.35	858,057.92	32.09366023	-103.31059802
16,600.00	90.00	359.44	11,647.00	4,991.35	-369.06	399,412.34	858,056.94	32.09393510	-103.31059813
[redacted]									
16,700.00	90.00	359.44	11,647.00	5,091.35	-370.04	399,512.34	858,055.96	32.09420996	-103.31059823
16,800.00	90.00	359.44	11,647.00	5,191.34	-371.02	399,612.33	858,054.98	32.09448482	-103.31059834
16,900.00	90.00	359.44	11,647.00	5,291.34	-372.01	399,712.33	858,053.99	32.09475969	-103.31059845
17,000.00	90.00	359.44	11,647.00	5,391.33	-372.99	399,812.32	858,053.01	32.09503455	-103.31059856
17,100.00	90.00	359.44	11,647.00	5,491.33	-373.97	399,912.32	858,052.03	32.09530942	-103.31059867
17,200.00	90.00	359.44	11,647.00	5,591.32	-374.95	400,012.31	858,051.05	32.09558428	-103.31059877
17,300.00	90.00	359.44	11,647.00	5,691.32	-375.93	400,112.31	858,050.07	32.09585915	-103.31059888
17,400.00	90.00	359.44	11,647.00	5,791.32	-376.92	400,212.30	858,049.08	32.09613401	-103.31059899
17,500.00	90.00	359.44	11,647.00	5,891.31	-377.90	400,312.30	858,048.10	32.09640887	-103.31059910
17,600.00	90.00	359.44	11,647.00	5,991.31	-378.88	400,412.29	858,047.12	32.09668374	-103.31059920
17,700.00	90.00	359.44	11,647.00	6,091.30	-379.86	400,512.29	858,046.14	32.09695860	-103.31059931
17,800.00	90.00	359.44	11,647.00	6,191.30	-380.84	400,612.28	858,045.16	32.09723347	-103.31059942
17,900.00	90.00	359.44	11,647.00	6,291.29	-381.82	400,712.28	858,044.18	32.09750833	-103.31059953
18,000.00	90.00	359.44	11,647.00	6,391.29	-382.81	400,812.27	858,043.19	32.09778319	-103.31059963
18,100.00	90.00	359.44	11,647.00	6,491.28	-383.79	400,912.27	858,042.21	32.09805806	-103.31059974
18,200.00	90.00	359.44	11,647.00	6,591.28	-384.77	401,012.26	858,041.23	32.09833292	-103.31059985
18,300.00	90.00	359.44	11,647.00	6,691.27	-385.75	401,112.26	858,040.25	32.09860779	-103.31059996
18,400.00	90.00	359.44	11,647.00	6,791.27	-386.73	401,212.25	858,039.27	32.09888265	-103.31060006
18,500.00	90.00	359.44	11,647.00	6,891.26	-387.72	401,312.25	858,038.28	32.09915751	-103.31060017
18,600.00	90.00	359.44	11,647.00	6,991.26	-388.70	401,412.24	858,037.30	32.09943238	-103.31060028
18,700.00	90.00	359.44	11,647.00	7,091.25	-389.68	401,512.24	858,036.32	32.09970724	-103.31060039
18,800.00	90.00	359.44	11,647.00	7,191.25	-390.66	401,612.23	858,035.34	32.09998211	-103.31060049
18,900.00	90.00	359.44	11,647.00	7,291.24	-391.64	401,712.23	858,034.36	32.10025697	-103.31060060
19,000.00	90.00	359.44	11,647.00	7,391.24	-392.63	401,812.22	858,033.37	32.10053183	-103.31060071
19,100.00	90.00	359.44	11,647.00	7,491.23	-393.61	401,912.22	858,032.39	32.10080670	-103.31060082
19,200.00	90.00	359.44	11,647.00	7,591.23	-394.59	402,012.21	858,031.41	32.10108156	-103.31060092
19,297.21	90.00	359.44	11,647.00	7,688.44	-395.54	402,109.42	858,030.46	32.10134876	-103.31060103
Nandina 25 36 31 2640 FSL 662 FWL									
19,300.00	90.00	359.44	11,647.00	7,691.22	-395.57	402,112.21	858,030.43	32.10135643	-103.31060103
19,400.00	90.00	359.44	11,647.00	7,791.22	-396.55	402,212.20	858,029.45	32.10163129	-103.31060114
19,500.00	90.00	359.44	11,647.00	7,891.21	-397.53	402,312.20	858,028.47	32.10190615	-103.31060125
19,600.00	90.00	359.44	11,647.00	7,991.21	-398.52	402,412.19	858,027.48	32.10218102	-103.31060135
19,700.00	90.00	359.44	11,647.00	8,091.20	-399.50	402,512.19	858,026.50	32.10245588	-103.31060146
19,800.00	90.00	359.44	11,647.00	8,191.20	-400.48	402,612.18	858,025.52	32.10273075	-103.31060157
19,900.00	90.00	359.44	11,647.00	8,291.19	-401.46	402,712.18	858,024.54	32.10300561	-103.31060167
20,000.00	90.00	359.44	11,647.00	8,391.19	-402.44	402,812.17	858,023.56	32.10328047	-103.31060178
20,100.00	90.00	359.44	11,647.00	8,491.18	-403.43	402,912.17	858,022.57	32.10355534	-103.31060189
20,200.00	90.00	359.44	11,647.00	8,591.18	-404.41	403,012.16	858,021.59	32.10383020	-103.31060200
20,300.00	90.00	359.44	11,647.00	8,691.18	-405.39	403,112.16	858,020.61	32.10410506	-103.31060210
20,400.00	90.00	359.44	11,647.00	8,791.17	-406.37	403,212.15	858,019.63	32.10437993	-103.31060221
20,500.00	90.00	359.44	11,647.00	8,891.17	-407.35	403,312.15	858,018.65	32.10465479	-103.31060232
20,600.00	90.00	359.44	11,647.00	8,991.16	-408.34	403,412.14	858,017.66	32.10492966	-103.31060242
20,700.00	90.00	359.44	11,647.00	9,091.16	-409.32	403,512.14	858,016.68	32.10520452	-103.31060253
20,800.00	90.00	359.44	11,647.00	9,191.15	-410.30	403,612.13	858,015.70	32.10547938	-103.31060264
20,900.00	90.00	359.44	11,647.00	9,291.15	-411.28	403,712.13	858,014.72	32.10575425	-103.31060275
21,000.00	90.00	359.44	11,647.00	9,391.14	-412.26	403,812.12	858,013.74	32.10602911	-103.31060285
21,100.00	90.00	359.44	11,647.00	9,491.14	-413.24	403,912.12	858,012.76	32.10630397	-103.31060296
21,200.00	90.00	359.44	11,647.00	9,591.13	-414.23	404,012.11	858,011.77	32.10657884	-103.31060307
21,300.00	90.00	359.44	11,647.00	9,691.13	-415.21	404,112.11	858,010.79	32.10685370	-103.31060317

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
21,400.00	90.00	359.44	11,647.00	9,791.12	-416.19	404,212.10	858,009.81	32.10712857	-103.31060328
21,500.00	90.00	359.44	11,647.00	9,891.12	-417.17	404,312.10	858,008.83	32.10740343	-103.31060339
21,600.00	90.00	359.44	11,647.00	9,991.11	-418.15	404,412.09	858,007.85	32.10767829	-103.31060349
21,700.00	90.00	359.44	11,647.00	10,091.11	-419.14	404,512.09	858,006.86	32.10795316	-103.31060360
21,739.91	90.00	359.44	11,647.00	10,131.02	-419.53	404,551.99	858,006.47	32.10806285	-103.31060364
Nandina 25 36 31 PBHL 200 FNL 660 FWL									
21,800.00	90.00	359.44	11,647.00	10,191.10	-420.12	404,612.08	858,005.88	32.10822802	-103.31060371
[redacted]									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Nandina 25 36 31 KOP I - plan hits target center - Point	0.00	0.00	11,074.00	-170.00	-75.00	394,251.00	858,351.00	32.07974135	-103.30980684
Nandina 25 36 31 FTP 1 - plan misses target center by 281.48ft at 11594.04ft MD (11520.98 TVD, 36.70 N, -132.13 E) - Point	0.00	0.00	11,647.00	-133.00	-318.00	394,288.00	858,108.00	32.07984938	-103.31059017
Nandina 25 36 31 Cr 30 - plan hits target center - Point	0.00	0.00	11,647.00	5,042.28	-369.56	399,463.27	858,056.44	32.09407508	-103.31059818
Nandina 25 36 31 PBHL - plan hits target center - Point	0.00	0.00	11,647.00	10,281.02	-421.00	404,702.00	858,005.00	32.10847518	-103.31060380
Nandina 25 36 31 2640 - plan misses target center by 0.39ft at 19297.21ft MD (11647.00 TVD, 7688.44 N, -395.54 E) - Point	0.00	0.00	11,647.00	7,688.44	-395.15	402,109.42	858,030.85	32.10134876	-103.31059976

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,109.00	1,109.00	13 3/8Csg	13-3/8	17-1/2
5,081.77	5,077.00	9 5/8 Csg	9-5/8	12-1/4
11,081.35	11,074.00	7 5/8 Csg	7-5/8	8-3/4

Database:	DB_Aug0116_LT_v14	**Local Co-ordinate Reference:**	Well Nandina Fed Com 25 36 31 Well No. 091H
Company:	American Resource Developement LLC	**TVD Reference:**	GL @ 3023.00ft
Project:	Lea County, New Mexico NAD83 NM E	**MD Reference:**	GL @ 3023.00ft
Site:	Section 31-T25S-R36E	**North Reference:**	Grid
Well:	Nandina Fed Com 25 36 31 Well No. 091H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Original Hole		
Design:	rev1		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
984.00	984.00	Rustler		0.00	
1,413.00	1,413.00	Salado		0.00	
3,382.00	3,382.00	Tansil		0.00	
3,755.33	3,755.00	Capitan Reef		0.00	
5,031.60	5,027.00	Lamar		0.00	
5,120.90	5,116.00	Bell Canyon		0.00	
7,306.35	7,299.00	Brushy Canyon		0.00	
8,448.35	8,441.00	Bone Spring Lime		0.00	
9,806.35	9,799.00	First Bone Spring		0.00	
10,291.35	10,284.00	Second Bone Spring		0.00	
10,846.35	10,839.00	Third Bone Spring Upper		0.00	
11,519.93	11,471.00	Third Bone Spring		0.00	
11,981.39	11,647.00	Target		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
3,500.00	3,500.00	0.00	0.00	KOP Begin 2°/100' build
3,734.44	3,734.18	-8.77	-3.87	Begin 4.69° tangent section
5,772.90	5,765.82	-161.23	-71.13	Begin 2°/100' drop
6,007.35	6,000.00	-170.00	-75.00	Begin vertical hold
11,081.39	11,074.04	-170.00	-75.00	Begin 10°/100' build
11,981.39	11,647.00	382.26	-227.64	Begin 2°/100' turn
12,725.76	11,647.00	1,117.30	-331.02	Begin 90.00° lateral
21,889.92	11,647.00	10,281.02	-421.00	PBHL/TD 21889.92 MD 11647.00 TVD

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5M Annular Preventer Variance Request and Well Control Procedures

Note: A copy of the Well Control Plan must be available at multiple locations on the rig for review by rig personnel, as well as review by the BLM PET/PE, and a copy must be maintained on the rig floor.

Dual Isolation Design for 5M Annular Exception

Ameredev will utilize 13-5/8" 10M (5M Annular) BOPE System consisting of:

- 13-5/8" 5M Annular
- 13-5/8" 10M Upper Pipe Rams
  - 3-1/2" – 5-1/2" Variable Bore Ram
- 13-5/8" 10M Blind Rams
- 13-5/8" 10M Drilling Spool /w 2 - 4" 10M Outlets Double 10M Isolation Valves
- 13-5/8" 10M Lower Blind Rams
  - 3-1/2" – 5-1/2" Variable Bore Ram

All drilling components and casing associated to exposure > 5000 psi BHP requiring a 10M system will have a double isolation (secondary barrier) below the 5M Annular that would provide a barrier to flow. The mud system will always be primary barrier, it will be maintained by adjusting values based on tourly mud tests and monitoring a PVT System to maintain static wellbore conditions, displacement procedures will be followed and recorded on daily drilling reports during tripping operations. Surge and swab pressure values will be calculated and maintained and static flow check will be monitored at previous casing shoe and verified static well conditions prior to tripping out of hole and again prior to pulling last joint of drill pipe through BOPE. The below table, documents that two barriers to flow can be maintained at all times, independent of the rating of the annular preventer.

Drill Components	Size	Primary Barrier	Secondary Barrier	Third Barrier
Drillpipe	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
HWDP Drillpipe	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Drill Collars	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Production Casing	3-1/2"-5-1/2"	Drilling Fluid	Upper Pipe Rams	Lower Pipe Rams
Open Hole	13-5/8	Drilling Fluid	Blind Rams	
All Drilling Components in 10M Environment will have OD that will allow full Operational RATED WORKING PRESSURE for system design. Kill line with minimum 2" ID will be available outside substructure with 10M Check Valve for OOH Kill Operations				

Well Control Procedures

Proper well control procedures are dependent to differentiating well conditions, to cover the basic well control operations there are will be standard drilling ahead, tripping pipe, tripping BHA, running casing, and pipe out of the hole/open hole scenarios that will be defined by procedures below. Initial Shut In Pressure can be taken against the Uppermost BOPE component the 5M Annular, pressure control can be transferred from the lesser 5M Annular to the 10M Upper Pipe Rams if needed. Shut In Pressures may be equal to or less than the Rated Working Pressure but at no time will the pressure on the annular preventer exceed the Rated Working Pressure of the annular. The annular will be tested to 5,000 psi. This will be the Rated Working Pressure of the annular preventer. All scenarios will be written such as shut in will be performed by closing the 10,000 psi Upper Pipe Rams for faster Accumulator pressure recovery to allow safer reaction to controlling wellbore pressure.

Shutting In While Drilling

1. Sound alarm signaling well control event to Rig Crew
2. Space out drill string to allow FOSV installation
3. Shut down pumps
4. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
5. Install open, full open safety valve and close valve, Close Chokes
6. Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

Shutting In While Tripping

1. Sound alarm signaling well control event to Rig Crew
2. Space out drill string to allow FOSV installation
3. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install open, full open safety valve and close valve, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

Shutting In While Running Casing

1. Sound alarm signaling well control event to Rig Crew
2. Space out casing to allow circulating swedge installation
3. Shut in Upper Pipe Rams and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install circulating swedge, Close high pressure, low torque valves, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold Pre-job safety meeting and discuss kill procedure

Shutting in while out of hole

1. Sound alarm signaling well control event to Rig Crew
2. Shut-in well: close blind rams and open HCR against Open Chokes and Valves Open to working pressure gauge
3. Close Chokes, Verify well is shut-in and monitor pressures
4. Notify supervisory personnel
5. Record data (SIDP, SICP, Pit Gain, and Time)
6. Hold Pre-job safety meeting and discuss kill procedure

Shutting in prior to pulling BHA through stack

Prior to pulling last joint of drill pipe thru the stack space out and check flow
If flowing see steps below.

1. Sound alarm signaling well control event to Rig Crew
2. Shut in upper pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
3. Install open, full open safety valve and close valve, Close Chokes
4. Verify well is shut-in and flow has stopped
5. Notify supervisory personnel
6. Record data (SIDP, SICP, Pit Gain, and Time)
7. Hold pre-job safety meeting and discuss kill procedure

Shutting in while BHA is in the stack and ram preventer and combo immediately available

1. Sound alarm signaling well control event to Rig Crew
2. Space out BHA with upset just beneath the compatible pipe ram
3. Shut in upper compatible pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
4. Install open, full open safety valve and close valve, Close Chokes
5. Verify well is shut-in and flow has stopped
6. Notify supervisory personnel
7. Record data (SIDP, SICP, Pit Gain, and Time)
8. Hold pre-job safety meeting and discuss kill procedure

*FOSV will be on rig floor in open position with operating handle for each type of connection utilized and tested to 10,000 psi

Shutting in while BHA is in the stack and no ram preventer or combo immediately available

1. Sound alarm signaling well control event to Rig Crew
2. If possible pick up high enough, to pull string clear and follow "Open Hole" scenario

If not possible to pick up high enough:

3. Stab Crossover, make up one joint/stand of drill pipe, and install open, full open safety valve (Leave Open)
4. Space out drill string with upset just beneath the compatible pipe ram.
5. Shut in upper compatible pipe ram and open HCR against Open Chokes and Valves Open to working pressure gauge
6. Close FOSV, Close Chokes, Verify well is shut-in and flow has stopped
7. Notify supervisory personnel
8. Record data (SIDP, SICP, Pit Gain, and Time)
9. Hold pre-job safety meeting and discuss kill procedure

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Pressure Control Plan

Pressure Control Equipment

- Following setting of 13-3/8" Surface Casing Ameredev will install 13-5/8 MB4 Multi Bowl Casing Head by welding on a 13-5/8 SOW x 13-5/8" 5M in combination with 13-5/8 5M x 13-5/8 10M B-Sec to Land Intm #1 and a 13-5/8 10M x 13-5/8 10M shouldered to land C-Sec to Land Intm #2 (Installation procedure witnessed and verified by a manufacturer's representative).

- Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Ameredev will install a 5M System Blowout Preventer (BOPE) with a 5M Annular Preventer and related equipment (BOPE). Full testing will be performed utilizing a full isolation test plug and limited to 5,000 psi MOP of MB4 Multi Bowl Casing Head. Pressure will be held for 10 min or until provisions of test are met on all valves and rams. The 5M Annular Preventer will be tested to 50% of approved working pressure (2,500 psi). Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Setting of 9-5/8" Intermediate will be done by landing a wellhead hanger in the 13-5/8" 5M Bowl, Cementing and setting Well Head Packing seals and testing same. (Installation procedure witnessed and verified by a manufacturer's representative) Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- Full testing will be performed utilizing a full isolation test plug to 10,000 psi MOP of MB4 Multi Bowl B-Section. Pressure will be held for 10 min or until provisions of test are met on all valves and rams. The 5M Annular Preventer will be tested to 100% of approved working pressure (5,000 psi).

- Before drilling >20ft of new formation under the 9-5/8" Casing Shoe a pressure integrity test of the Casing Shoe will be performed to minimum of the MWE anticipated to control formation pressure to the next casing depth.

- Following setting of 5-1/2" Production Casing and adequate WOC time Ameredev will break 10M System Blowout Preventer (BOP) from 10M DOL-2 Casing Head, install annulus casing slips and test same (Installation procedure witnessed and verified by a manufacturer's representative) and install 11" 10M x 5-1/8" 15M Tubing Head (Installation procedure witnessed and verified by a manufacturer's representative). Ameredev will test head to 70% casing design and install Dry Hole cap with needle valve and pressure gauge to monitor well awaiting completion.

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Pressure Control Plan

- Slow pump speeds will be taken daily by each crew and recorded on Daily Drilling Report after mudding up.

- A choke manifold and accumulator with floor and remote operating stations will be functional and in place after installation of BOPE, as well as full functioning mud gas separator.

- Weekly BOPE pit level drills will be conducted by each crew and recorded on Daily Drilling Report.

- BOP will be fully operated when out of hole and will be documented on the daily drilling log.

- All B.O.P.s and associated equipment will be tested in accordance with Onshore Order #2

- All B.O.P. testing will be done by an independent service company.

- The B.O.P. will be tested within 21 days of the original test if drilling takes more time than planned.

- Ameredev requests a variance to connect the B.O.P. choke outlet to the choke manifold using a co-flex hose with a 10,000 psi working pressure that has been tested to 15,000psi and is built to API Spec 16C. Once the flex line is installed it will be tied down with safety clamps. (certifications will be sent to Carlsbad BLM Office prior to install)

- Ameredev requests a variance to install a 5M Annular Preventer on the 10M System to drill the Production Hole below the 9-5/8" Intermediate Section. 5M Annular will be tested to 100% working pressure (5,000 psi). A full well control procedure will be included to isolate well bore.

Ameredev Drilling Plan: 3 String with 4 String Contingency

- Contingency Plan If Losses Exceed 50% in Intermediate Interval
  - We will utilize a MB4 wellhead that will enable us to convert a 3 string design to a 4 string design. (Schematic Attached)
  - We will displace well with FW and drill or condition to run 9-5/8" Casing at the Lamar Limestone, we will utilize DV Tool w/ ACP @ the Tansill to Isolate Capitan Reef and cement to surface.
  - Casing will be tested to 1500 psi or .22 psi/ft whichever is greater for 30 minutes with <10% leak off, but will not exceed 70% of the burst rating per Onshore Order No. 2.

- 7.625 Casing will be Additional 4th String
  - Drill remaining hole section to 10,670'
  - Run 7.625 29.7# HCL80 FJM Casing

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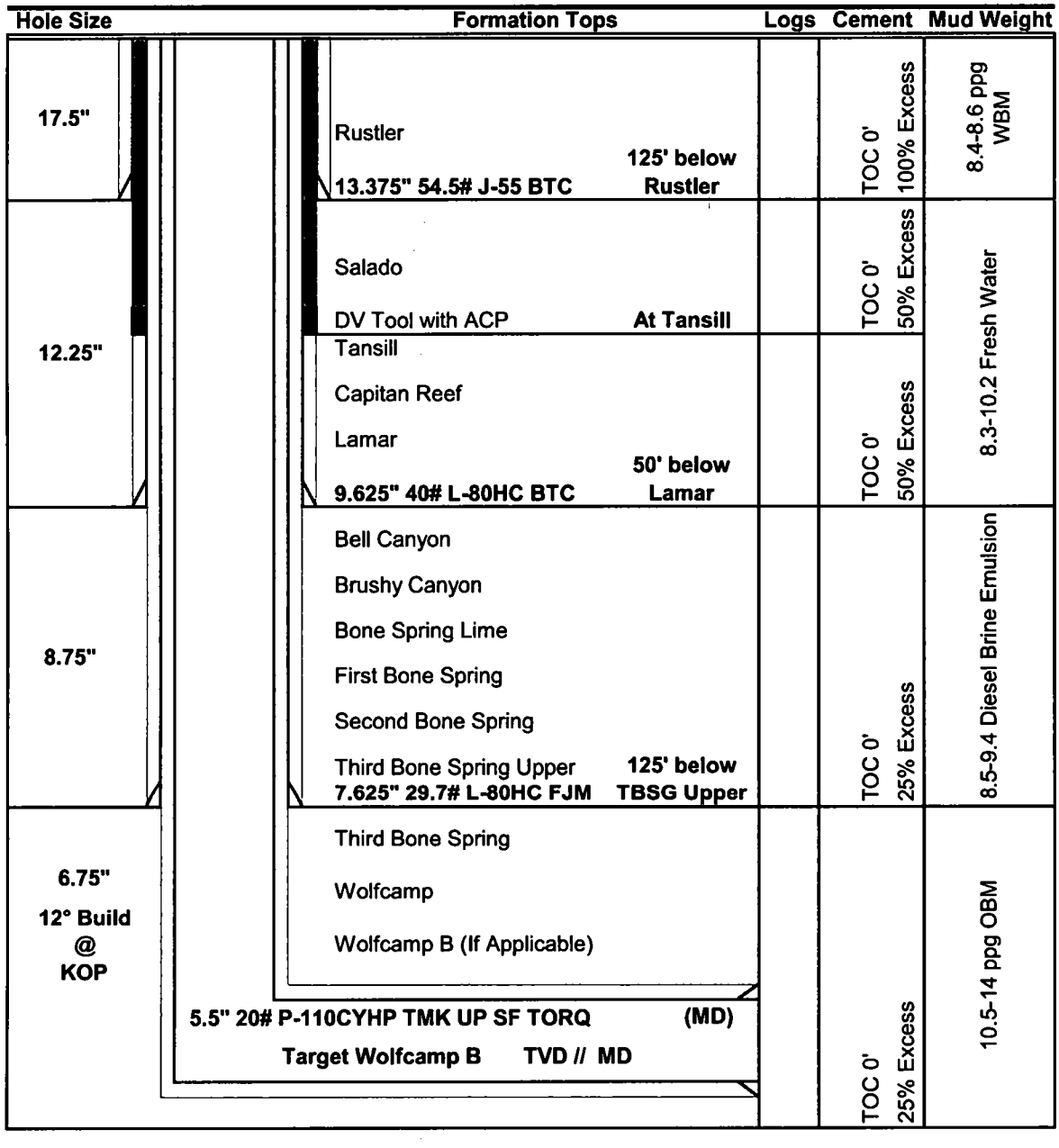
4-String Contingency Wellbore Schematic

Well:	(Well Name)	**Co. Well ID:**	xxxxxx
SHL:	(SHL)	**AFE No.:**	xxxx-xxx
BHL:	(BHL)	**API No.:**	xxxxxxxxxx
	Lea, NM	**GL:**	(Elevation)'
Wellhead:	A - 13-5/8" 10M x 13-5/8" SOW	**Field:**	Delaware
	B - 13-5/8" 10M x 13-5/8" 10M	**Objective:**	Wolfcamp B
	C - 13-5/8" 10M x 13-5/8" 10M	**TVD:**	(TVD)'
	Tubing Spool - 5-1/8" 15M x 13-3/8" 10M	**MD:**	(MD)'
Xmas Tree:	2-9/16" 10M	**Rig:**	TBD **KB** 27'
Tubing:	2-7/8" L-80 6.5# 8rd EUE	**E-Mail:**	Wellsite2@ameredev.com

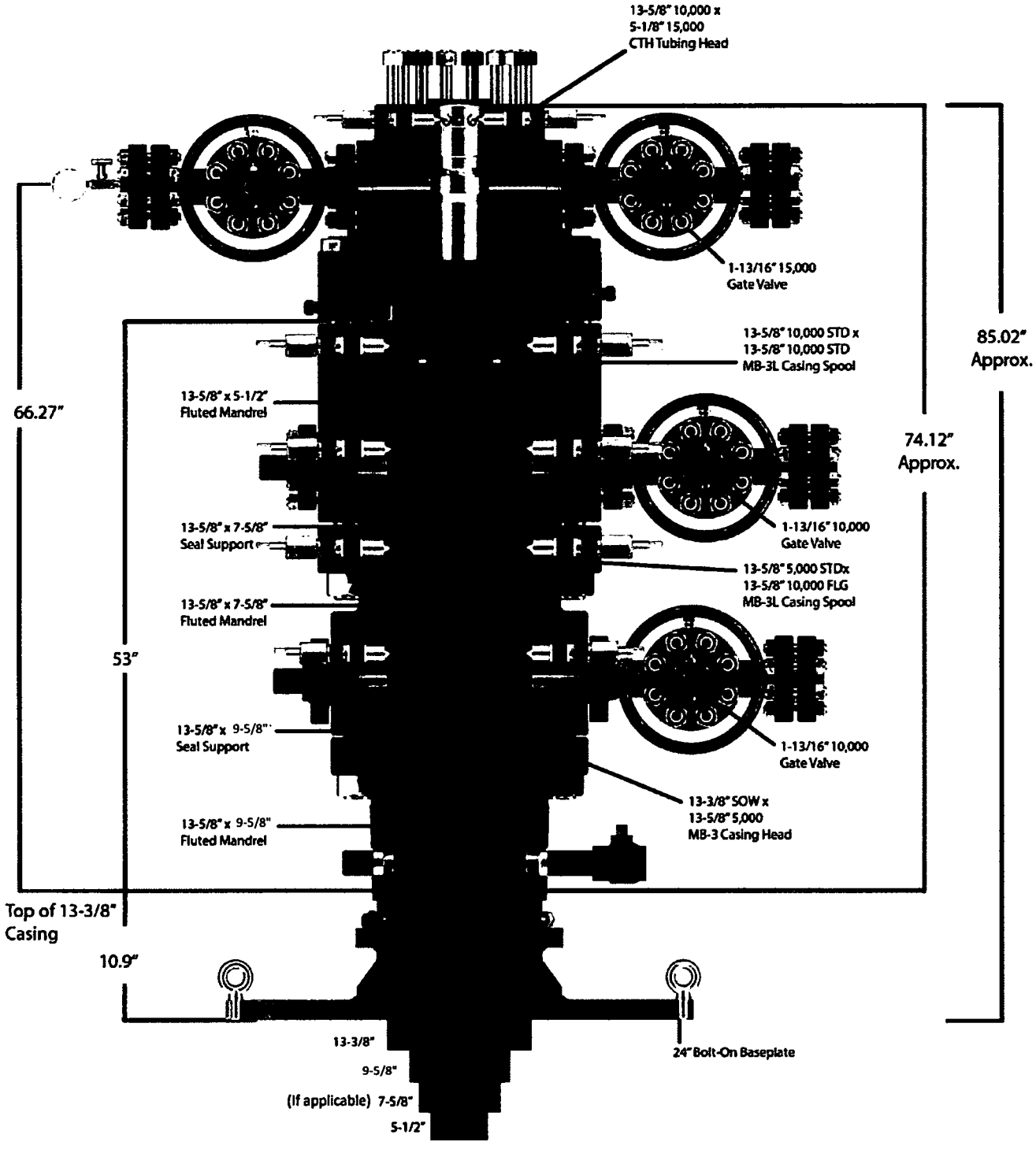


EXAMPLE ONLY - NOT FOR CONSTRUCTION

Contingency Casing Design and Safety Factor Check

Casing Specifications						
Segment	**Hole ID**	**Depth**	**OD**	**Weight**	**Grade**	**Coupling**
Surface	17.5	1,888'	13.375	54.5	J-55	BTC
Int #1	12.25	5,013'	9.625	40	HCL-80	BTC
Int #2	8.75	11,147'	7.625	29.7	HCL-80	FJM
Prod Segment A	6.75	11,147'	5.5	20	CYHP-110	TMK UPSF
Prod Segment B	6.75	22,496'	5.5	20	CYHP-110	TMK UPSF

Check Surface Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
14.38	853	909	1,130	2,730
Safety Factors				
1.56	8.29	8.83	1.15	0.91
Check Int #1 Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
10.625	916	1042	4230	5750
Safety Factors				
0.81	4.57	5.20	1.41	0.95
Check Int #2 Casing				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
7.625	940	558	6700	9460
Safety Factors				
0.56	2.84	1.96	1.10	1.24
Check Prod Casing, Segment A				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
0.49	3.11	2.79	1.77	1.89
Check Prod Casing, Segment B				
OD Cplg	Body	Joint	Collapse	Burst
inches	*1000 lbs*	*1000 lbs*	*psi*	*psi*
5.777	728	655	12780	14360
Safety Factors				
0.49	63.53	57.16	1.68	1.89



Quotation

Downing Wellhead Equipment

Oklahoma City,
Oklahoma - USA

Reference Data:

16925 AMEREDEV

TITLE:

AMEREDEV

DRAWN			SIZE	DWG. NO.	REV.
CHECKED			A		
APPROVED			Scale:	Weight:	Sheet:

EXAMPLE ONLY - NOT FOR CONSTRUCTION

Stage 1 Lead

Hole Size	Casing Size	Depth	Sacks	Yield	Density
17.5	13.375	1888	[redacted]	1.76	13.5

Bbl/Sk	0.31372549
bbls	419.402246
Stage Tool Depth	N/A
Top MD of Segment	0
Bottom MD of Segment	1502
Cement Type	C
Additves	Bentonite, Accelerator, Kolseal, Defoamer, Celloflake
Quantity (sks)	1,337
Yield (cu ft/sk)	1.76
Density (lbs/gal)	13.5
Volume (cu ft)	2,352.85
Percent Excess	100%
Column Height	3,389.88

Target % 100% [redacted]

Target TOC	0			
Calc TOC	-1888	bbl	25% Excess	100%
calc vol	0.12372195	233.587041	291.9838012	467.174082

Stage 1 Tail

Hole Size	Casing Size	Depth	Sacks	Yield	Density
17.5	13.375	1888	[redacted]	1.34	14.8

Bbl/Sk	0.23885918
bbls	47.77183601
Top MD of Segment	1502
Bottom MD of Segment	1888
Cement Type	C
Additives	
Quantity (sks)	200
Yield (cu ft/sk)	1.34
Density (lbs/gal)	14.8
Volume (cu ft)	268
Percent Excess	100%
Column Height	386.1225606

SURFACE CEMENT

EXAMPLE ONLY - NOT FOR CONSTRUCTION

Stage 1 Lead

Hole Size	Casing Size	Depth	Sacks	Yield	Density
12.25	9.625	5013	[redacted]	3.5	9

Bbl/Sk		0.623885918	
bbls		372.0365733	
Stage Tool Depth		N/A	
Top MD of Segment		0	
Bottom MD of Segment		4163	
Cement Type		C	
Additves	Bentonite,Salt,Kolseal,Defoamer,Celloclake		
Quantity (sks)		596	
Yield (cu ft/sk)		3.5	
Density (lbs/gal)		9	
Volume (cu ft)		2,087.13	
Percent Excess		50%	Target % 50%
Column Height		6,669.49	

Target TOC	0			
Calc TOC	-2506.5	bbl	25% Excess	50%
calc vol	0.055781888	279.6346021	349.5432526	419.4519031

Stage 1 Tail

Hole Size	Casing Size	Depth	Sacks	Yield	Density
12.25	9.625	5013	[redacted]	1.33	14.8

Bbl/Sk		0.237076649
bbls		47.41532977
Top MD of Segment		4163
Bottom MD of Segment		5013
Cement Type		C
Additives		
Quantity (sks)		200
Yield (cu ft/sk)		1.33
Density (lbs/gal)		14.8
Volume (cu ft)		266
Percent Excess		25%
Column Height		850.013004

INTERMEDIATE 1 CEMENT - STAGE 1

EXAMPLE ONLY - NOT FOR CONSTRUCTION

Stage 2 Lead

Hole Size	Casing Size	Depth	Sacks	Yield	Density
12.25	9.625	3262	[redacted]	3.5	9

Bbl/Sk		0.623885918	
bbls		225.5254458	
Stage Tool Depth		N/A	
Top MD of Segment		0	
Bottom MD of Segment		2412	
Cement Type		C	
Additves	Bentonite,Salt,Kolseal,Defoamer,Celloclake		
Quantity (sks)		361	
Yield (cu ft/sk)		3.5	
Density (lbs/gal)		9	
Volume (cu ft)		1,265.20	
Percent Excess		50%	Target % 50% [redacted]
Column Height		4,042.99	

Target TOC	0			
Calc TOC	-1631	bbl	25% Excess	50%
calc vol	0.055781888	181.960517	227.4506463	272.9407756

Stage 2 Tail

Hole Size	Casing Size	Depth	Sacks	Yield	Density
12.25	9.625	3262	[redacted]	1.33	14.8

Bbl/Sk		0.237076649
bbls		47.41532977
Top MD of Segment		2412
Bottom MD of Segment		3262
Cement Type		C
Additives		
Quantity (sks)		200
Yield (cu ft/sk)		1.33
Density (lbs/gal)		14.8
Volume (cu ft)		266
Percent Excess		25%
Column Height		850.013004

INTERMEDIATE 1 CEMENT - STAGE 2

EXAMPLE ONLY - NOT FOR CONSTRUCTION

Stage 1 Lead

Hole Size	Casing Size	Depth	Sacks	Yield	Density
8.75	7.625	10670	[redacted]	2.47	9

Bbl/Sk	0.440285205
bbls	168.6309595
Stage Tool Depth	N/A
Top MD of Segment	0
Bottom MD of Segment	6755
Cement Type	H
Additves	Bentonite,Retarder,Kolseal,Defoamer,Celloflake, Anti-Settling
Expansion Additive	
Quantity (sks)	383
Yield (cu ft/sk)	2.47
Density (lbs/gal)	9
Volume (cu ft)	946.02
Percent Excess	25%
Column Height	9,422.97

Target % 25% [redacted]

Target TOC	0			
Calc TOC	-2667.5	bbl	25% Excess	25%
calc vol	0.01789574	190.9475483	238.6844354	238.6844354

Stage 1 Tail

Hole Size	Casing Size	Depth	Sacks	Yield	Density
8.75	7.625	10670	[redacted]	1.31	14.2

Bbl/Sk	0.233511586
bbls	70.05347594
Top MD of Segment	6755
Bottom MD of Segment	10670
Cement Type	H
Additves	Salt,Bentonite,Retarder,Dispersant,Fluid Loss
Quantity (sks)	300
Yield (cu ft/sk)	1.31
Density (lbs/gal)	14.2
Volume (cu ft)	393
Percent Excess	25%
Column Height	3914.533571

INTERMEDIATE 2 CEMENT

EXAMPLE ONLY - NOT FOR CONSTRUCTION

Stage 1 Lead

Hole Size	Casing Size	Depth	Sacks	Yield	Density
6.75	5.5	22496	[redacted]	1.34	14.2

Bbl/Sk	0.23885918
bbls	418.2897805
Stage Tool Depth	N/A
Top MD of Segment	0
Bottom MD of Segment	22496
Cement Type	H
Additves	Salt, Bentonite, Fluid Loss, Dispersant, Retarder, Defoamer
Quantity (sks)	1,751
Yield (cu ft/sk)	1.34
Density (lbs/gal)	14.2
Volume (cu ft)	2,346.61
Percent Excess	25%
Column Height	28,120.00

Target % 25% [redacted]

Target TOC 0

Calc TOC	-5624	bbl	25% Excess	25%
calc vol	0.01487517	334.6318244	418.2897805	418.2897805

Stage 1 Tail

Hole Size	Casing Size	Depth	Sacks	Yield	Density
6.75	5.5	22496	0	0	0

Bbl/Sk	0
bbls	0
Top MD of Segment	22496
Bottom MD of Segment	22496
Cement Type	H
Additives	
Quantity (sks)	0
Yield (cu ft/sk)	0
Density (lbs/gal)	0
Volume (cu ft)	0
Percent Excess	
Column Height	0

PRODUCTION CEMENT

HALLIBURTON

Permian Basin, Ft Stockton

Lab Results- Lead

Job Information

Request/Slurry	2488456/2	**Rig Name**		**Date**	18/DEC/2018
Submitted By	Dillon Briers	**Job Type**	Intermediate Casing	**Bulk Plant**	
Customer	Ameredev	**Location**	Lea	**Well**	

Well Information

Casing/Liner Size	7.625 in	**Depth MD**	5013 ft	**BHST**	165°F
Hole Size	8.75 in	**Depth TVD**	5013 ft	**BHCT**	130°F

Cement Information - Lead Design

Conc	UOM	Cement/Additive
100	% BWOC	NeoCem
14.68	gal/sack	Heated Fresh Water

Cement Properties		
Slurry Density	9	lbm/gal
Slurry Yield	3.5	ft3/sack
Water Requirement	14.68	gal/sack

Pilot Test Results Request ID 2488456/1

API Rheology, Request Test ID:35665340

Temp (degF)	300	200	100	60	30	6	3	Cond Time (min)
80 (up)	82	67	49	42	39	36	28	0
80 (down)	82	59	35	26	18	10	9	0
80 (avg.)	82	63	42	34	29	23	19	0

PV (cP) & YP (lbs/100ft2): 61.73 22.32 (Least-squares method)

PV (cP) & YP (lbs/100ft2): 60 22 (Traditional method (300 & 100 rpm based))

Generalized Herschel-Bulkley 4: YP(lbf/100ft2)=20.33 MuInf(cP)=52.39 m=0.81 n=0.81

API Rheology, Request Test ID:35665341

Temp (degF)	300	200	100	60	30	6	3	Cond Time (min)	Cond Temp (degF)
134 (up)	63	47	29	21	15	7	6	30	134
134 (down)	63	46	29	21	14	7	4	30	134
134 (avg.)	63	47	29	21	15	7	5	30	134

PV (cP) & YP (lbs/100ft2): 57.12 7.98 (Least-squares method)

PV (cP) & YP (lbs/100ft2): 51 12 (Traditional method (300 & 100 rpm based))

Generalized Herschel-Bulkley 4: YP(lbf/100ft2)=2.26 MuInf(cP)=30.64 m=0.41 n=0.41

API Fluid Loss, Request Test ID:35665342

Test Temp (degF)	Test Pressure (psi)	Test Time (min)	Meas. Vol.	Calculated FL (<30 min)	Conditioning time (min)	Conditioning Temp (degF)
134	1000	9.12	52	189	30	134

Free Fluid API 10B-2, Request Test ID:35665343

Con. Temp (degF)	Cond. Time (min)	Static T. (F)	Static time (min)	Incl. (deg)	% Fluid
134	30	80	120	0	0

Pilot Test Results Request ID 2504116/5

Thickening Time - ON-OFF-ON, Request Test ID:35852392

Test Temp (degF)	Pressure (psi)	Reached in (min)	70 Bc (hh:min)	Start Bc
126	5800	40	6:18	16

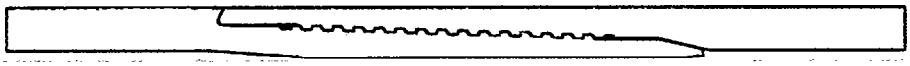
UCA Comp. Strength, Request Test ID:35852394

End Temp (degF)	Pressure (psi)	50 psi (hh:mm)	500 psi (hh:mm)	12 hr CS (psi)	24 hr CS (psi)	48 hr CS (psi)
159	4000	8:55	12:23	456	749	681

U. S. Steel Tubular Products

6/6/2017 6:18:53 PM

7.625" 29.70lbs/ft (0.375" Wall) HCL80 USS-LIBERTY FJM®



MECHANICAL PROPERTIES	Pipe	USS-LIBERTY FJM®	
Minimum Yield Strength	110,000	--	psi
Maximum Yield Strength	140,000	--	psi
Minimum Tensile Strength	125,000	--	psi
DIMENSIONS	**Pipe**	**USS-LIBERTY FJM®**	
Outside Diameter	7.625	7.625	in.
Wall Thickness	0.375	--	in.
Inside Diameter	6.875	6.789	in.
Standard Drift	6.750	6.750	in.
Alternate Drift	--	--	in.
Nominal Linear Weight, T&C	29.70	--	lbs/ft
Plain End Weight	29.06	--	lbs/ft
SECTION AREA	**Pipe**	**USS-LIBERTY FJM®**	
Critical Area	8.541	5.074	sq. in.
Joint Efficiency	--	59.4	%
PERFORMANCE	**Pipe**	**USS-LIBERTY FJM®**	
Minimum Collapse Pressure	6,700	6,700	psi
Minimum Internal Yield Pressure	9,460	9,460	psi
Minimum Pipe Body Yield Strength	940,000	--	lbs
Joint Strength	--	558,000	lbs
Compression Rating	--	558,000	lbs
Reference Length	--	12,810	ft
Maximum Uniaxial Bend Rating	--	39.3	deg/100 ft
Make-Up Loss	--	3.92	in.
Minimum Make-Up Torque	--	10,800	ft-lbs
Maximum Make-Up Torque	--	15,250	ft-lbs

1. Other than proprietary collapse and connection values, performance properties have been calculated using standard equations defined by API 5C3 and do not incorporate any additional design or safety factors. Calculations assume nominal pipe OD, nominal wall thickness and Specified Minimum Yield Strength (SMYS).
2. Compressive & Tensile Connection Efficiencies are calculated by dividing the connection critical area by the pipe body area.
3. Uniaxial bending rating shown is structural only, and equal to compression efficiency.
4. USS-LIBERTY FJM™ connections are optimized for each combination of OD and wall thickness and cannot be interchanged.
5. Torques have been calculated assuming a thread compound friction factor of 1.0 and are recommended only. Field make-up torques may require adjustment based on actual field conditions (e.g. make-up speed, temperature, thread compound, etc.).
6. Reference length is calculated by joint strength divided by nominal plain end weight with 1.5 safety factor.
7. Connection external pressure leak resistance has been verified to 100% API pipe body collapse pressure following the guidelines of API 5C5 Cal III.

U. S. Steel Tubular Products
10343 Sam Houston Park Dr., #120
Houston, TX 77064

1-877-893-9461
connections@uss.com
www.usstubular.com

U. S. Steel Tubular Products

5 1/2 20.00 lb (0.361) P110 HP — USS-EAGLE SFH™

	PIPE	CONNECTION	
MECHANICAL PROPERTIES			
Minimum Yield Strength	**125,000**	**125,000**	*psi*
Maximum Yield Strength	**140,000**	**140,000**	*psi*
Minimum Tensile Strength	**130,000**	**130,000**	*psi*
DIMENSIONS			
Outside Diameter	**5.500**	**5.830**	*in.*
Wall Thickness	0.361		*in.*
Inside Diameter	4.778	4.693	*in.*
Drift - API	4.653	4.653	*in.*
Nominal Linear Weight, T&C	**19.83**		*lbs/ft*
Plain End Weight	19.83	19.83	*lbs/ft*
SECTION AREA			
Cross Sectional Area | Critical Area	5.828	5.054	*sq. in.*
Joint Efficiency		86.25	%
PERFORMANCE			
Minimum Collapse Pressure	13,150	13,150	*psi*
External Pressure Leak Resistance		10,000	*psi*
Minimum Internal Yield Pressure	14,360	14,360	*psi*
Minimum Pipe Body Yield Strength	729,000		*lbs*
Joint Strength		631,750	*lbs*
Compression Rating		631,750	*lbs*
Reference Length		21,240	*ft*
Maximum Uniaxial Bend Rating		89.9	*deg/100 ft*
Minimum Make-Up Torque		14,000	*ft-lbs*
Maximum Make-Up Torque		16,900	*ft-lbs*
Maximum Operating Torque		25,000	*ft-lbs*
Make-Up Loss		5.92	*in.*

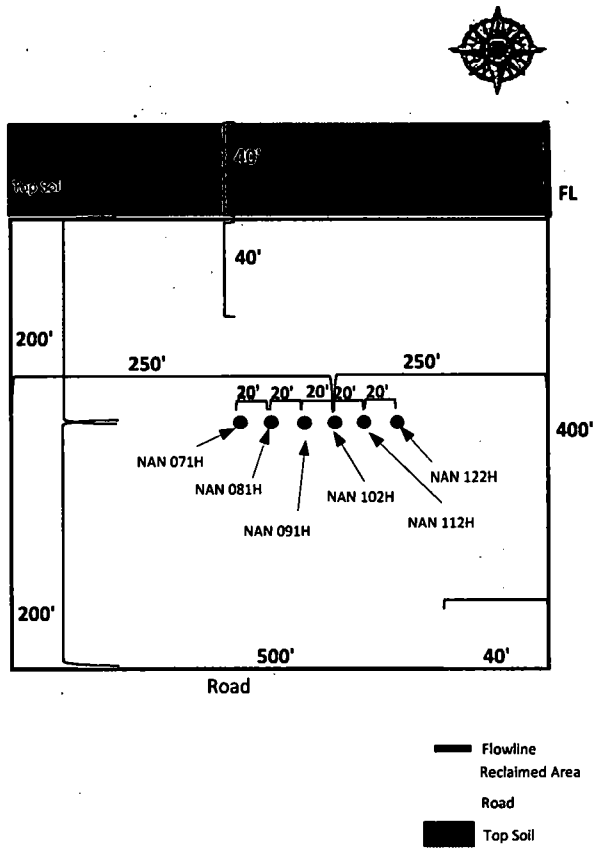
Notes:

1) Other than proprietary collapse and connection values, performance properties have been calculated using standard equations defined by API 5C3 and do not incorporate any additional design or safety factors. Calculations assume nominal pipe OD, nominal wall thickness, and Specified Minimum Yield Strength (SMYS).
2) Compressive & Tensile Connection Efficiencies are calculated by dividing the connection critical area by the pipe body area.
3) Uniaxial bending rating shown is structural only, and equal to compression efficiency.
4) Torques have been calculated assuming a thread compound friction factor of 1.0 and are recommended only. Field make-up torques may require adjustment based on actual field conditions (e.g. make-up speed, temperature, thread compound, etc.).
5) Reference length is calculated by joint strength divided by plain end weight with 1.5 safety factor.
6) Connection external pressure resistance has been verified to 10,000 psi (Application specific testing).

U. S. Steel Tubular Products
10343 Sam Houston Park Dr., #120
Houston, TX 77064
1-877-893-9461
connections@uss.com
www.usstubular.com

Ameredev Operating, LLC
Nandina Fed Com 25 36 31 091H
Section 31, Township 25S, Range 36E
Lea County, New Mexico

AMEREDEV



Nandina Fed Com 25 36 31 071H	SHL: 25S 36E	230'	FSL	940'	FWL
Nandina Fed Com 25 36 31 081H	SHL: 25S 36E	230'	FSL	960'	FWL
Nandina Fed Com 25 36 31 091H	SHL: 25S 36E	230'	FSL	980'	FWL
Nandina Fed Com 25 36 31 102H	SHL: 25S 36E	230'	FSL	1000'	FWL
Nandina Fed Com 25 36 31 112H	SHL: 25S 36E	230'	FSL	1020'	FWL
Nandina Fed Com 25 36 31 122H	SHL: 25S 36E	230'	FSL	1040'	FWL

Exhibit 3 – Well Site Diagram

Ameredev Operating, LLC
Nandina Fed Com 25 36 31 091H
Section 31, Township 25S, Range 36E
Lea County, New Mexico

Surface Use Plan of Operations

Introduction

The following Surface Use Plan of Operations will be implemented by Ameredev Operating, LLC (Ameredev), after APD approval. No disturbance will be created other than those described in this surface use plan. If any additional surface disturbance becomes necessary after APD approval, the appropriate BLM approved sundry notice or right of way application will be acquired prior to such disturbance. This Surface Use Plan includes Ameredev's well pad, battery site, electrical, water, crude and flow lines, and access roads.

Before any surface disturbance is created, stakes or flagging will be installed to mark boundaries of permitted areas of disturbance, including soil storage areas. As necessary, slope, grade, and other construction control stakes will be placed to ensure construction is in accordance with the surface use plan. All boundary markers will be maintained in place until final construction cleanup is completed. If disturbance boundary markers are displaced, they will be replaced before construction proceeds. Adjacent operators will be contacted before construction starts to mark adjacent pipelines.

Directions to proposed pad:

At the intersection of NM-205 & 3rd St/NM-128/Frying Pan Rd, Head south on 3rd St/NM-128/Frying Pan Road approximately 5.6 miles. Turn west (right) on Anthony Road and proceed approximately 3.4 miles. Turn North (right) on unnamed road and proceed approximately .3 miles. Turn east (right) on Pipeline Road and proceed approximately .3 miles. Turn north (left) on unnamed road and proceed approximately 1 mile. Turn west (left) on unnamed lease road and proceed approximately 8,787'. Location is on the North side of the road. See *Exhibit 1 – Well Pad Access* for a map of the route.

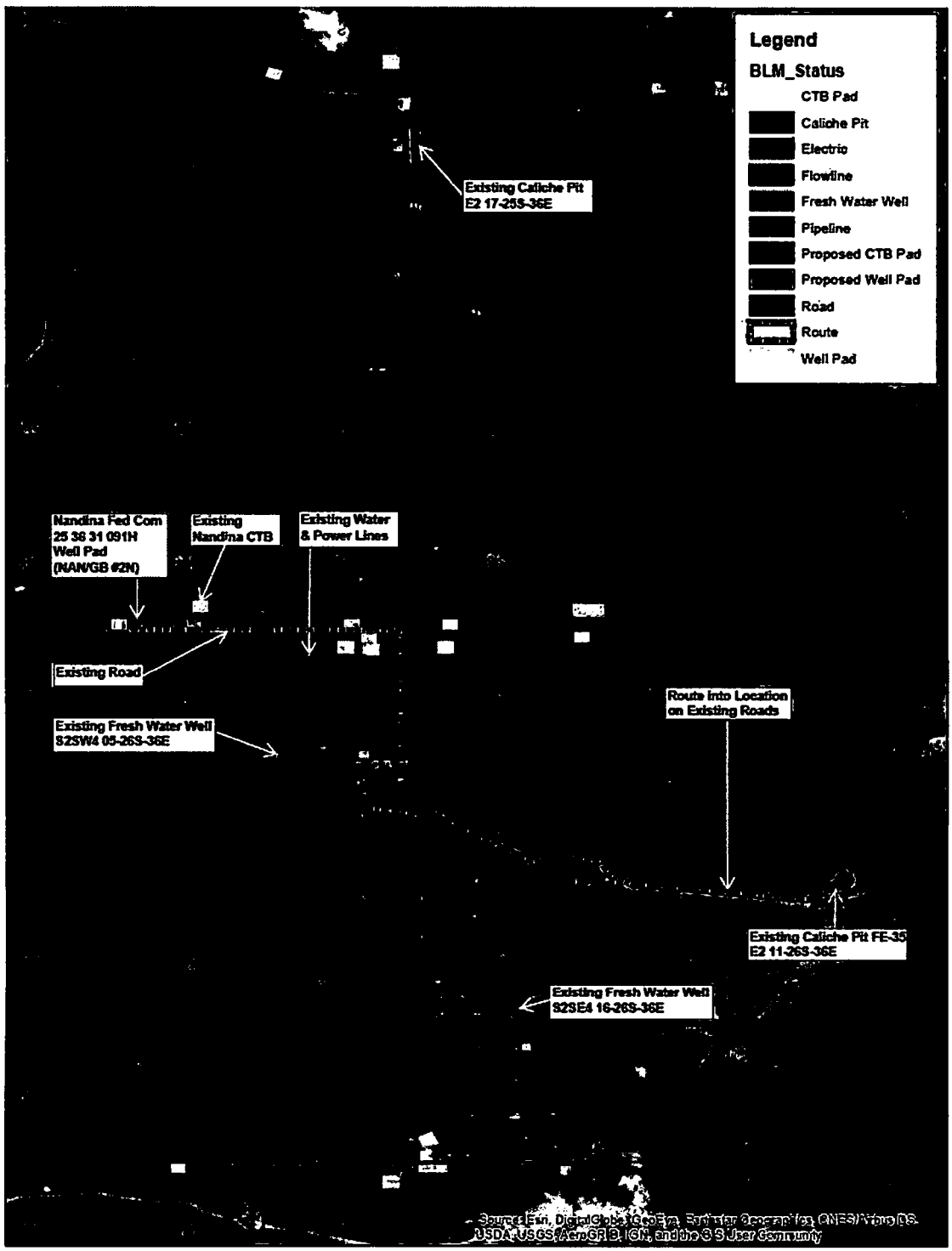


Exhibit 1 – Well Pad Access

Section 1 – Existing Roads

A. The existing access road route to the proposed project is depicted on *Exhibit 1 – Well Pad Access*. Improvements to the driving surface will be done where necessary. No new surface disturbance will be done, unless otherwise noted in the New or Reconstructed Access Roads section of this surface use plan.

B. Right-Of-Way will be acquired before construction begins.

C. The operator will improve or maintain existing roads in a condition the same as or better than before operations begin. The operator will repair pot holes, clear ditches, repair the crown, etc. All existing structures on the entire access route such as cattle guards, other range improvement projects, culverts, etc. will be properly repaired or replaced if they are damaged or have deteriorated beyond practical use.

D. Operator will prevent and abate fugitive dust as needed, whether created by vehicular traffic, equipment operations, or wind events. BLM written approval will be acquired before application of surfactants, binding agents, or other dust suppression chemicals on roadways.

Section 2 – New or Reconstructed Access Roads

A. No new access road will be needed for this proposed project. See *Exhibit 1 – Well Pad Access*.

Section 3 – Location of Existing Wells

Exhibit 2 – One Mile Radius Existing Wells depicts all known wells within a one mile radius of the Nandina Fed Com 25 36 31 091H. See *Exhibit 2a – One Mile Radius Wells List* for a list of wells depicted.

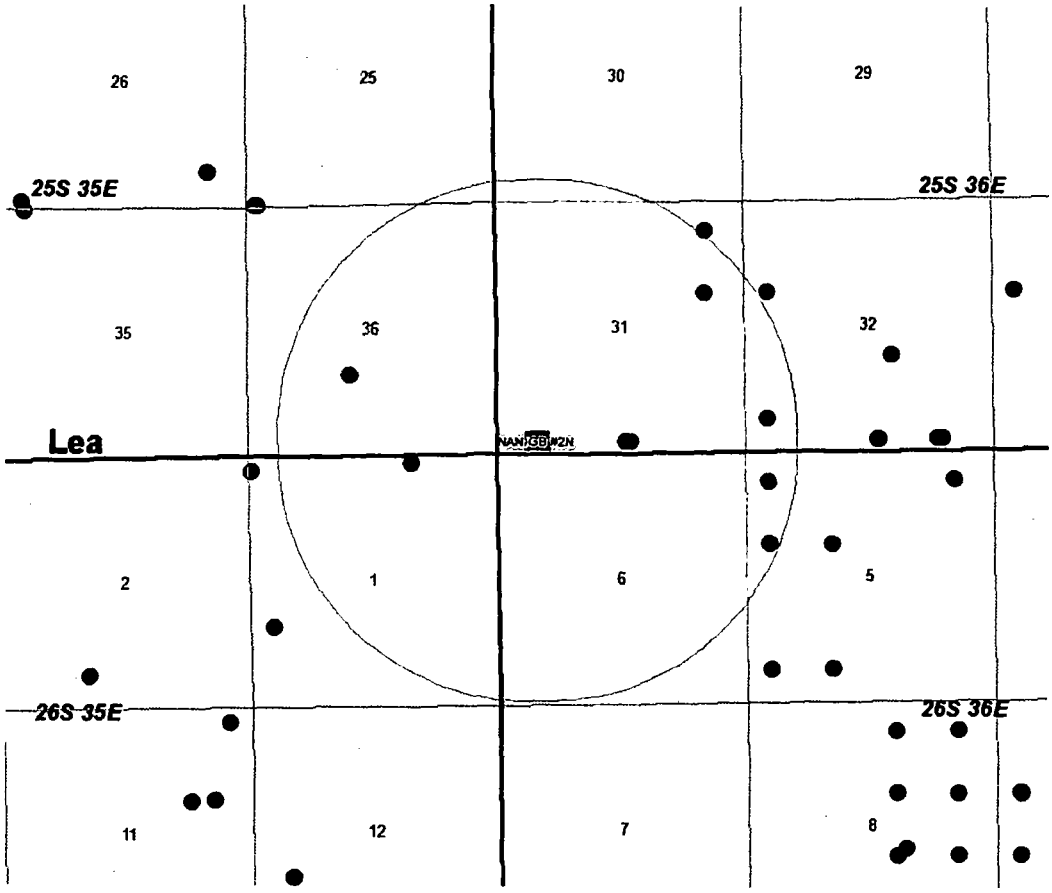


Exhibit 2 – One Mile Radius Existing Wells

API	WELL NAME	STATUS	TD
30025375170000	MOMENTUM 36 STATE #1	D&A-OG	9702
30025260100000	SPOTTED TAIL FED #1	OIL	3336
30025260170000	SITTING BULL #1	OIL	3379
30025260090000	STANDING BEAR #1	ABD-OW	3280
30025268760000	STANDING BEAR FED #2	ABD-OW	3311
30025375170001	MOMENTUM 36 STATE #1	SWD-WO	9702
30025452430000	NANDINA 25 36 31 FEDERAL COM #105H	PERMIT	
30025452440000	NANDINA 25 36 31 FED COM #125H	PERMIT	
30025452460000	NANDINA 25 36 31 FEDERAL COM #115H	PERMIT	
30025445050000	USHANKA FEDERAL COM #023H	PILOT	12500
30025445050100	USHANKA FEDERAL COM #023H	OIL	19335
30025453100000	GOLDEN BELL 26 36 06 FED COM #105H	PERMIT	
30025453110000	GOLDEN BELL 26 36 06 FED COM #115H	PERMIT	

Exhibit 2a – One Mile Radius Existing Wells List

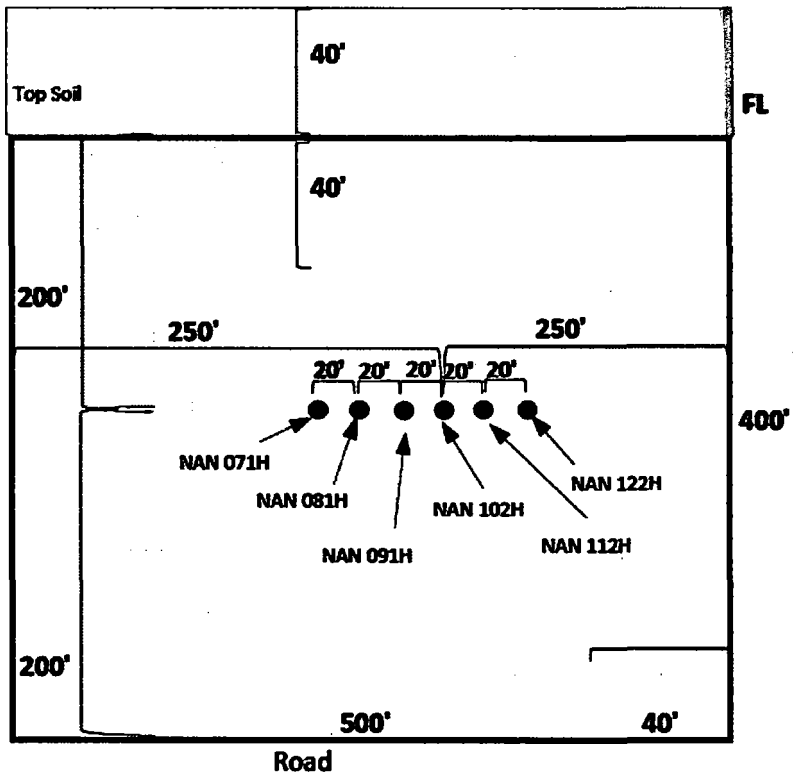
Section 4 - Location of Existing and/or Proposed Production Facilities

A. The multiple well pad will be located on Section 31, and will measure 400'x500'. The top 6" of soil and brush will be stockpiled north of the well pad. Should any type of production facilities be located on the well pad, they will be strategically placed to allow for maximum interim reclamation, re-contouring, and revegetation of the well location.

B. Production from the proposed well will be transported to an existing production facility named Nandina CTB, northeast of the well pad, via a buried 4" poly flowline that runs approximately 2,249'.

C. All permanent (lasting more than six months) above ground structures including but not limited to pump jacks, storage tanks, barrels, pipeline risers, meter housing, etc., that are not subject to safety requirements will be painted a non-reflective paint color, Shale Green, from the BLM Standard Environmental Colors chart, unless another color is required in the APD Conditions of Approval.

D. If any plans change regarding the production facility or other infrastructure (pipeline, electrical lines, etc.), Ameredev will submit a sundry notice or right-of-way (if applicable) prior to installation or construction.



Flowline
Reclaimed Area
Road
Top Soil

Nandina Fed Com 25 36 31 071H SHL: 25S 36E 230' FSL 940' FWL
Nandina Fed Com 25 36 31 081H SHL: 25S 36E 230' FSL 960' FWL
Nandina Fed Com 25 36 31 091H SHL: 25S 36E 230' FSL 980' FWL
Nandina Fed Com 25 36 31 102H SHL: 25S 36E 230' FSL 1000' FWL
Nandina Fed Com 25 36 31 112H SHL: 25S 36E 230' FSL 1020' FWL
Nandina Fed Com 25 36 31 122H SHL: 25S 36E 230' FSL 1040' FWL

Exhibit 3 – Well Site Diagram

Section 5 - Location and Types of Water Supply

A. This location will be drilled using a combination of water and mud systems (outlined in the Drilling Program). The water will be obtained from preexisting water wells, by running a pump directly to the drilling rig. See *Exhibit 4 - Water Wells*, for a list of available water wells. In cases where a polyline is used to transport water for drilling or completion purposes, the existing and proposed roads into location will be utilized.

Permit #	Well Name	Location (Lat/Lon)
CP 1049 POD 2	Bennett	32°04'14.32" N, 103°12'32.30" W
CP 1378	S. Eppenour	32°05'40.62" N, 103°13' 35.26" W
CP 1285	Sec. 5	32°03'56.50" N, 103°17'37.04" W
CP 857	Capped	32°04'39.70" N, 103°16'51.13" W
C 2287	#1	32°03'59.0" N, 103°33'16.8" W
C 2286	#2	32°03'59.2" N, 103°33'15.2" W
C 2290	#3	32°04'1.0" N, 103°33' 12.6" W
C 2285	#4	32°04'3.7" N, 103°33'9.7" W
C 2288	#5	32°04'0.5" N, 103°33'8.4" W
C 2294	Garden	32°03'3.2" N, 103°32'38.1" W
C 2293	House	32°03'2.3" N, 103°32'36.8" W
J-11-S-3	Farm Well #2	32°03'08.4" N, 103°16'35.2" W
J-11-S-2	Farm Well #3	32°03'11.5" N, 103°17'02.0" W
J-11-S	Farm Well #4	32°03'24.6" N, 103°17'02.1" W
CP 1170 POD 1	CB 1	32°03'57.2" N, 103°18'45.3" W
CP 1170 POD 5		32°07'17.1" N, 103°17'48.0" W
CP 1263 POD 5	CB 2	32°03'56.27" N, 103°18'27.4" W
CP 1263 POD 3	CB 3	32°03'54.90" N, 103°18'16.74" W
CP 1351 POD 1	CB 4	32°03'57.16" N, 103°17'45.13" W
CP 1351 POD 2	CB 5	32°03'30.70" N, 103°17'45.70" W
J 26	Ryan	32°01'20.41" N, 103°15'49.46" W
J 3		32°02'41.5" N, 103°18'55.8" W

Exhibit 4 – Water Wells

Section 6 – Construction/Construction Materials

A. Caliche will be obtained from the caliche pit located at Lat: 32° 6'28.78"N, Long: 103°16'58.77"Wor the caliche pit at Lat: 32° 6'33.14"N, Long: 103°18'44.16"Wor the caliche pit at Lat: 32° 3'8.30"N, Long: 103°13'57.00"W.

B. Caliche utilized for the drilling pad will be obtained either from the locations listed above, an existing approved mineral pit, or by benching into a hill, which will allow the pad to be level with existing caliche from the cut, or extracted by "flipping" the well location. A mineral material permit will be obtained from the BLM prior to excavating any caliche on Federal Lands. Amount will vary for each pad. The procedure for "flipping" a well location is as follows:

1. An adequate amount of topsoil/root zone (usually top 6 inches of soil) will be stripped from the proposed well location and stockpiled along the side of the well location as depicted on the *Exhibit 3 - Well Site Diagram*.
2. An area will be used within the proposed well site dimensions to excavate caliche.
3. Subsoil will be removed and stockpiled within the surveyed well pad dimensions.
4. Once caliche/surfacing mineral is found, the mineral material will be excavated and stock piled within the approved drilling pad dimensions.
5. Subsoil will then be pushed back in the excavated hole and caliche will be spread accordingly across the entire well pad and road (if available).
6. Neither caliche, nor subsoil will be stockpiled outside of the well pad dimensions. Topsoil will be stockpiled along the edge of the pad as depicted in *Exhibit 3 – Well Site Diagram.*
7. In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit or other established mineral pit. A BLM mineral material permit will be acquired prior to obtaining any mineral material from BLM pits or federal land.

Section 7 - Methods of Handling Waste

A. Drill cuttings, mud, salts and other chemicals will be properly disposed of into steel tanks on site and hauled to a State approved commercial disposal facility.

B. Garbage and trash produced during drilling and completion operations will be collected in a portable metal trash container and disposed of properly at a state approved disposal facility. All trash on and around the well site will be collected for disposal.

C. Human waste and grey water will be properly contained and disposed of properly at a state approved disposal facility.

D. After drilling and completion operations, trash, chemicals, salts, frac sand and other waste material will be removed and disposed of properly at a state approved disposal facility.

Section 8 - Ancillary Facilities

A. No ancillary facilities will be needed for the proposed project.

Section 9 - Well Site Layout

A. See *Exhibit 3.* The following information is presented:
1. Reasonable scale
2. Well pad dimensions/orientation
3. Proposed access road
4. Topsoil stockpile

B. The proposed drilling pad was staked and surveyed by a professional surveyor. The attached survey plat of the well site depicts the drilling pad layout as staked.

C. Topsoil salvaging
1. Grass, forbs, and small woody vegetation such as mesquite will be excavated as the topsoil is removed. Large woody vegetation will be stripped and stored separately and re-spread evenly on the site following topsoil re-spreading. Topsoil depth is defined as the top layer of soil that contains 80% of the roots. In areas to be heavily disturbed, the top 6 inches of soil material will be stripped and stockpiled on the perimeter of the well location and along the perimeter of the access road to control run-on and run-off, to keep topsoil viable, and to make redistribution of topsoil more efficient during interim reclamation. Stockpiled topsoil should include vegetative material. Topsoil will be clearly segregated and stored separately from subsoils. Contaminated soil will not be stockpiled, but properly treated and handled prior to topsoil salvaging.

Section 10 - Plans for Final Surface Reclamation

Reclamation Objectives

A. The objective of interim reclamation is to restore vegetative cover and a portion of the landform sufficient to maintain healthy, biologically active topsoil, to control erosion, and to minimize habitat and forage loss, visual impact, and weed infestation during the life of the well or facilities.

B. The long-term objective of final reclamation is to return the land to a condition similar to what existed prior to disturbance. This includes restoration of the landform and natural vegetative community, hydrologic systems, visual resources, and wildlife habitats. To ensure that the long-term objective will be reached through human and natural processes, actions will be taken to ensure standards are met for site stability, visual quality, hydrological functioning, and vegetative productivity.

C. The BLM will be notified at least 3 days prior to the commencement of any reclamation procedures.

D. If circumstances allow, interim reclamation and/or final reclamation actions will be completed no later than 6 months from when the final well on location has been completed or plugged. Ameredev will gain written permission from the BLM if more time is needed.
E. Interim reclamation will be performed on the well site after the well is drilled and completed. *Exhibit 3 – Well Site Diagram* depicts the location and dimension of the planned interim reclamation for the well site.

Interim Reclamation Procedures (if performed)

A. Within 30 days of well completion, the well location and surrounding areas will be cleared of, and maintained free of, all materials, trash, and equipment not required for production.
B. In areas planned for interim reclamation, all the surfacing material will be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
C. The areas planned for interim reclamation will then be contoured to the original contour if feasible, or if not feasible, to an interim contour that blends with the surrounding topography as much as possible. Where applicable, the fill material of the well pad will be backfilled into the cut to bring the area back to the original contour. The interim cut and fill slopes prior to re-seeding will not be steeper than a 3:1 Ratio, unless the adjacent native topography is steeper. Note: Constructed slopes may be much steeper during drilling, but will be re-contoured to the above ratios during interim reclamation.
D. Topsoil will be evenly re-spread and aggressively revegetated over the entire disturbed area not needed for all-weather operations, including cuts and fills. To seed the area, the proper BLM mixture, free of noxious weeds, will be used. Final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting, in order to break the soil crust and create seed germination micro-sites.
E. Proper erosion control methods will be used on the area to control erosion, runoff, and siltation of the surrounding area.
F. The interim reclamation will be monitored periodically to ensure that vegetation has reestablished and that erosion is controlled.

Final Reclamation Procedures (well pad, buried pipelines, etc.)

A. Prior to final reclamation procedures, the well pad, road, and surrounding area will be cleared of material, trash, and equipment.
B. All surfacing material will be removed and returned to the original mineral pit or recycled to repair or build roads and well pads.
C. All disturbed areas, including roads, pipelines, pads, production facilities, and interim reclaimed areas will be re-contoured to the contour existing prior to initial construction or a contour that blends indistinguishably with the surrounding landscape. Topsoil that was spread over the interim reclamation areas will be stockpiled prior to re-contouring. The topsoil will be redistributed evenly over the entire disturbed site to ensure successful revegetation.
D. After all the disturbed areas have been properly prepared, the areas will be seeded with the proper BLM seed mixture, free of noxious weeds. Final seedbed preparation will consist of

contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting, in order to break the soil crust and create seed germination micro-sites.

E. Proper erosion control methods will be used on the area to control erosion, runoff, and siltation of the surrounding area.

F. All unused equipment and structures including pipelines, electric line poles, tanks, etc. that serviced the well will be removed.

G. All reclaimed areas will be monitored periodically to ensure that revegetation occurs, that the area is not re-disturbed, and that erosion is controlled.

Section 11 - Surface Ownership

A. BLM has surface ownership for proposed project area.

Section 12 - Other Information

A. There are no dwellings within 1 mile of this location.

B. An on-site meeting for Ameredev's Nandina Fed Com 25 36 31 091H well was held on July 23, 2018 (NOS ID#: 10400034666). Attendees included Jeff Robertson (BLM), Shane McNeely (Ameredev), and Ged Adams (Topographic).

C. The well pad described in this document - Nandina/Golden Bell (NAN/GB #2N) - will contain 6 wells that produce into an existing central tank battery (CTB) located northeast of the well pad. The wells share a common pad access road, pipeline easement, and electrical corridor. The six flowlines from the individual wells will share a common corridor that will terminate into the CTB. The wells that share the pad are:

- Nandina Fed Com 25 36 31 102H
- Nandina Fed Com 25 36 31 112H
- Nandina Fed Com 25 36 31 122H
- Nandina Fed Com 25 36 31 071H
- Nandina Fed Com 25 36 31 081H
- Nandina Fed Com 25 36 31 091H

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Section 1 - General

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

Section 2 - Lined Pits

Would you like to utilize Lined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

PWD surface owner:

PWD disturbance (acres):

Lined pit PWD on or off channel:

Lined pit PWD discharge volume (bbl/day):

Lined pit specifications:

Pit liner description:

Pit liner manufacturers information:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Lined pit precipitated solids disposal schedule:

Lined pit precipitated solids disposal schedule attachment:

Lined pit reclamation description:

Lined pit reclamation attachment:

Leak detection system description:

Leak detection system attachment:

Lined pit Monitor description:

Lined pit Monitor attachment:

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

Is the reclamation bond a rider under the BLM bond?

Lined pit bond number:

Lined pit bond amount:

Additional bond information attachment:

Section 3 - Unlined Pits

Would you like to utilize Unlined Pit PWD options? NO

Produced Water Disposal (PWD) Location:

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

Unlined pit PWD on or off channel:

Unlined pit PWD discharge volume (bbl/day):

Unlined pit specifications:

Precipitated solids disposal:

Decribe precipitated solids disposal:

Precipitated solids disposal permit:

Unlined pit precipitated solids disposal schedule:

Unlined pit precipitated solids disposal schedule attachment:

Unlined pit reclamation description:

Unlined pit reclamation attachment:

Unlined pit Monitor description:

Unlined pit Monitor attachment:

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

Beneficial use user confirmation:

Estimated depth of the shallowest aquifer (feet):

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

TDS lab results:

Geologic and hydrologic evidence:

State authorization:

Unlined Produced Water Pit Estimated percolation:

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

Is the reclamation bond a rider under the BLM bond?

Unlined pit bond number:

Unlined pit bond amount:

Additional bond information attachment:

Section 4 - Injection

Would you like to utilize Injection PWD options? NO

Produced Water Disposal (PWD) Location:

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

Injection PWD discharge volume (bbl/day):

Injection well mineral owner:

Injection well type:

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

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

Injection well new surface disturbance (acres):

Minerals protection information:

Mineral protection attachment:

Underground Injection Control (UIC) Permit?

UIC Permit attachment:

Section 5 - Surface Discharge

Would you like to utilize Surface Discharge PWD options? NO

Produced Water Disposal (PWD) Location:

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

Surface discharge PWD discharge volume (bbl/day):

Surface Discharge NPDES Permit?

Surface Discharge NPDES Permit attachment:

Surface Discharge site facilities information:

Surface discharge site facilities map:

Section 6 - Other

Would you like to utilize Other PWD options? NO

Produced Water Disposal (PWD) Location:

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

Other PWD discharge volume (bbl/day):

Other PWD type description:

Other PWD type attachment:

Have other regulatory requirements been met?

Other regulatory requirements attachment:

AFMSS

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

Bond Info Data Report

06/28/2019

Bond Information

Federal/Indian APD: FED

BLM Bond number: NMB001478

BIA Bond number:

Do you have a reclamation bond? NO

Is the reclamation bond a rider under the BLM bond?

Is the reclamation bond BLM or Forest Service?

BLM reclamation bond number:

Forest Service reclamation bond number:

Forest Service reclamation bond attachment:

Reclamation bond number:

Reclamation bond amount:

Reclamation bond rider amount:

Additional reclamation bond information attachment: