NM OIL CONSERVATION
ARTESIA DISTRICT
FEB 27 2015
NMOCD Artesia
RECEIVED

Form 3160-3
(March 2012)

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.: NMNM-121950

6. If Indian, Allotee or Tribe Name:

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

1a. Type of work: ☒ DRILL ☐ REENTER

1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.: Waterloo Federal #2 (314204?)

2. Name of Operator: Mack Energy Corporation

9. API Well No.: 30-005-64238

3a. Address: PO Box 960 Artesia, NM 88211-0960

3b. Phone No. *(include area code)*: (575)748-1288

10. Field and Pool, or Exploratory: Round Tank; San Andres

4. Location of Well *(Report location clearly and in accordance with any State requirements. *)*

At surface: 990 FNL & 480 FWL

At proposed prod. zone: 965 FNL & 355 FWL

11. Sec., T. R. M. or Blk, and Survey or Area: Sec. 20 T15S R29E

14. Distance in miles and direction from nearest town or post office*: 12 miles northwest of Loco Hills, NM

12. County or Parish: Chaves

13. State: NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any): 480'

16. No. of acres in lease: 240

17. Spacing Unit dedicated to this well: 40

18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.: 1320'

19. Proposed Depth: TD 3500'

20. BLM/BIA Bond No. on file: NMB000286

21. Elevations (Show whether DF, KDB, RT, GL, etc.): 3760.1' GR

22. Approximate date work will start*: 11/1/2014

23. Estimated duration: 7 days

24. Attachments

ROSWELL CONTROLLED WATER BASIN

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, must be attached to this form:

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 required by the BLM.

25. Signature: Jerry W. Sherrell — Name *(Printed/Typed)*: Jerry W. Sherrell — Date: 8-25-2014

Title: Production Clerk

APPROVED FOR 2 YEARS

Approved by (Signature): /s/ Al Collar — Name *(Printed/Typed)*: /s/ Al Collar — Date: FEB 26 2015

Title: Assistant Field Manager, Lands And Minerals — Office: Roswell Field Office

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

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

(Continued on page 2)

*(Instructions on page 2)

DECLARED WATER BASIN

CEMENT BEHIND THE 8 5/8" CASING MUST BE CIRCULATED

WITNESS

APPROVAL SUBJECT TO
GENERAL REQUIREMENTS AND
SPECIAL STIPULATIONS ATTACHED

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

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-005-64238	52770	Round Tank; San Andres

[4] Property Code	[5] Property Name	[6] Well Number
314204	WATERLOO FEDERAL	2

[7] OGRID No.	[8] Operator Name	[9] Elevation
13837	MACK ENERGY CORPORATION	3760.1

[10] Surface Location

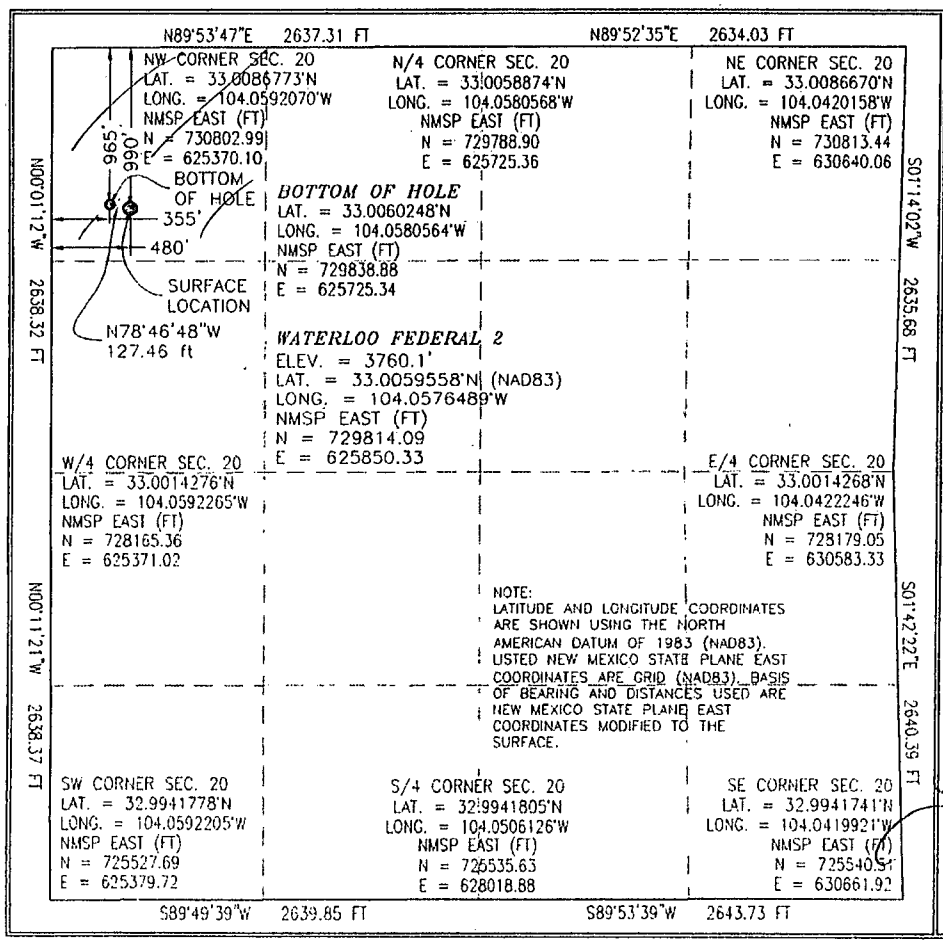
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	20	15 S	29 E		990	NORTH	480	WEST	CHAVES

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	20	15 S	29 E		965	NORTH	355	WEST	CHAVES

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
40			

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



[17] OPERATOR CERTIFICATION

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

Jerry W. Sherrell 8-25-14
Signature Date

Jerry W. Sherrell
Printed Name

jerrys@mec.com
E-mail Address

[18] SURVEYOR CERTIFICATION

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

JULY 28, 2014
Date of Survey

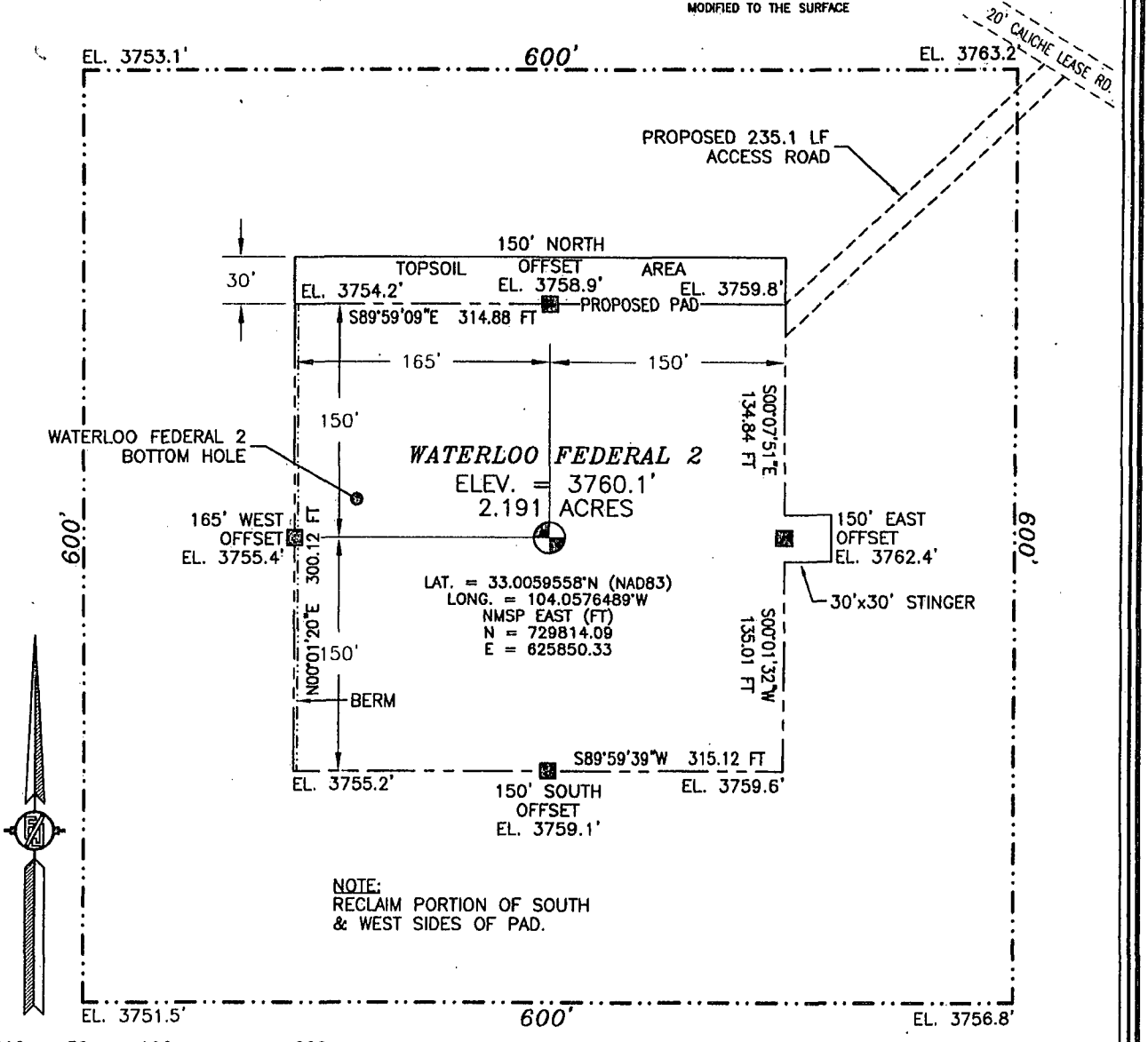
Signature and Seal of Professional Surveyor

Certificate Number ELIJIO F. JARAMILLO, PLS 12797

SURVEY NO. 2883C

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO
SITE MAP

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



010 50 100 200

SCALE 1" = 100'

DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF STATE HIGHWAY 249 AND CR 30 (JEMINA) GO NORTHWEST ON STATE HIGHWAY 249 FOR APPROX. 2.1 MILES. GO SOUTH ON CALICHE LEASE ROAD APPROX. 4.4 MILES. GO SOUTHEAST APPROX. 0.2 OF A MILE. LOCATION IS APPROX. 475' SOUTHWEST.

MACK ENERGY CORPORATION

WATERLOO FEDERAL 2

LOCATED 990 FT. FROM THE NORTH LINE AND 480 FT. FROM THE WEST LINE OF SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M. CHAVES COUNTY, STATE OF NEW MEXICO

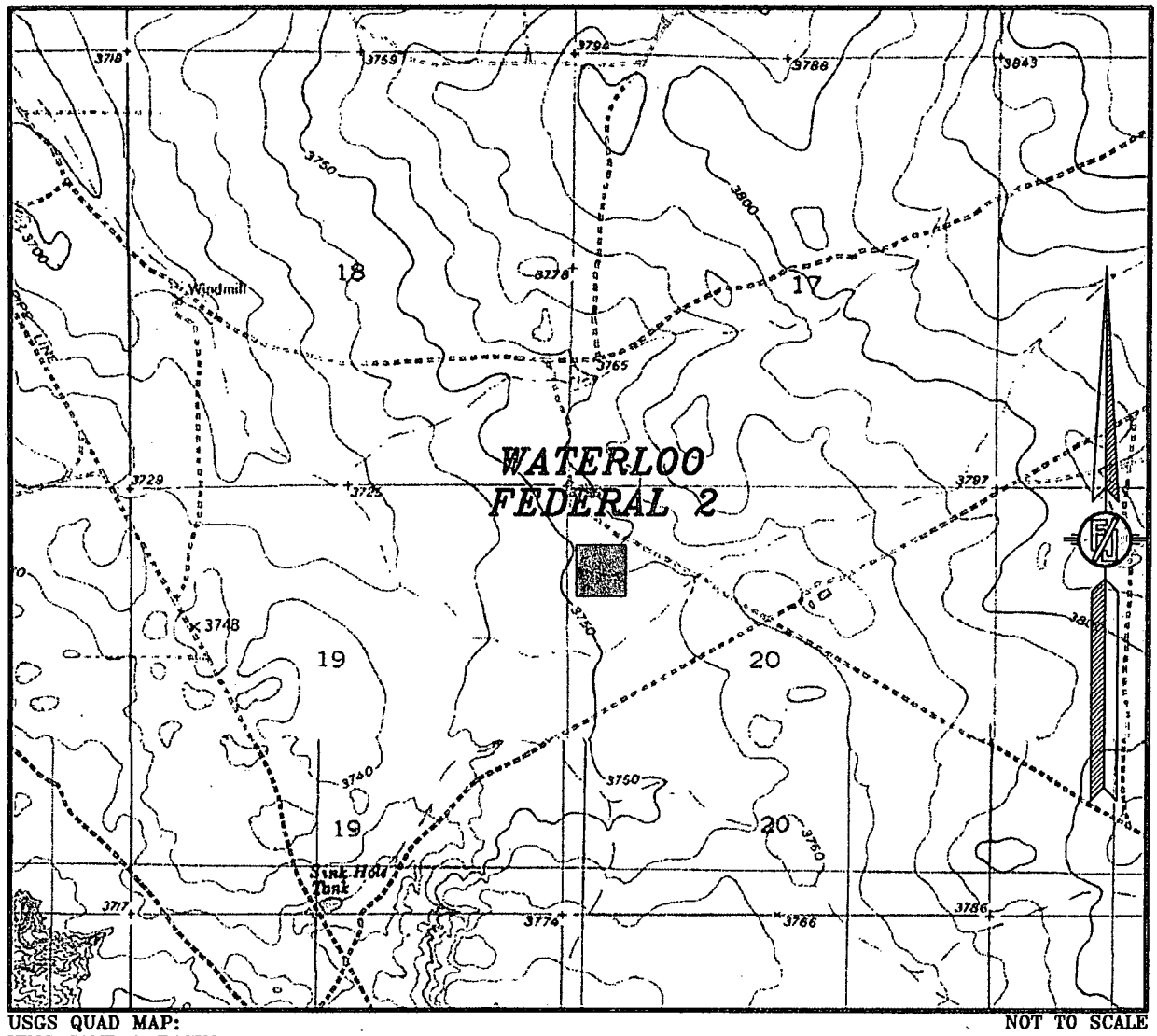
JULY 28, 2014

SURVEY NO. 2883C

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

LOCATION VERIFICATION MAP



USGS QUAD MAP:
KING CAMP & BASIN
WELL

NOT TO SCALE

MACK ENERGY CORPORATION
WATERLOO FEDERAL 2
LOCATED 990 FT. FROM THE NORTH LINE
AND 480 FT. FROM THE WEST LINE OF
SECTION 20, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

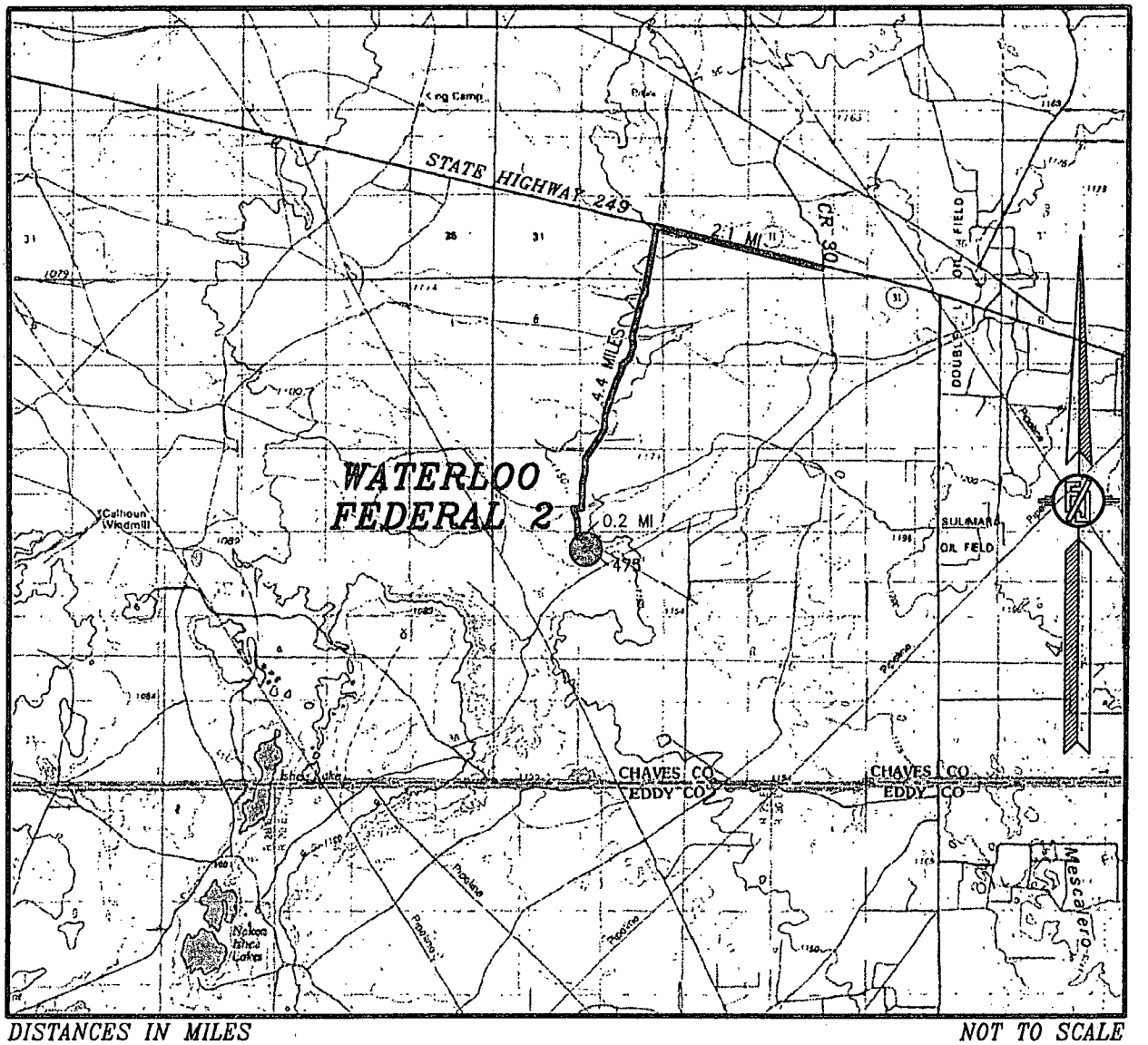
JULY 28, 2014

SURVEY NO. 2883C

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

VICINITY MAP



DISTANCES IN MILES *NOT TO SCALE*

DIRECTIONS TO LOCATION
FROM THE INTERSECTION OF STATE HIGHWAY 249 AND CR 30 (JEMINA) GO NORTHWEST ON STATE HIGHWAY 249 FOR APPROX. 2.1 MILES. GO SOUTH ON CALICHE LEASE ROAD APPROX. 4.4 MILES. GO SOUTHEAST APPROX. 0.2 OF A MILE. LOCATION IS APPROX. 475' SOUTHWEST.

MACK ENERGY CORPORATION
WATERLOO FEDERAL 2
LOCATED 990 FT. FROM THE NORTH LINE AND 480 FT. FROM THE WEST LINE OF SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

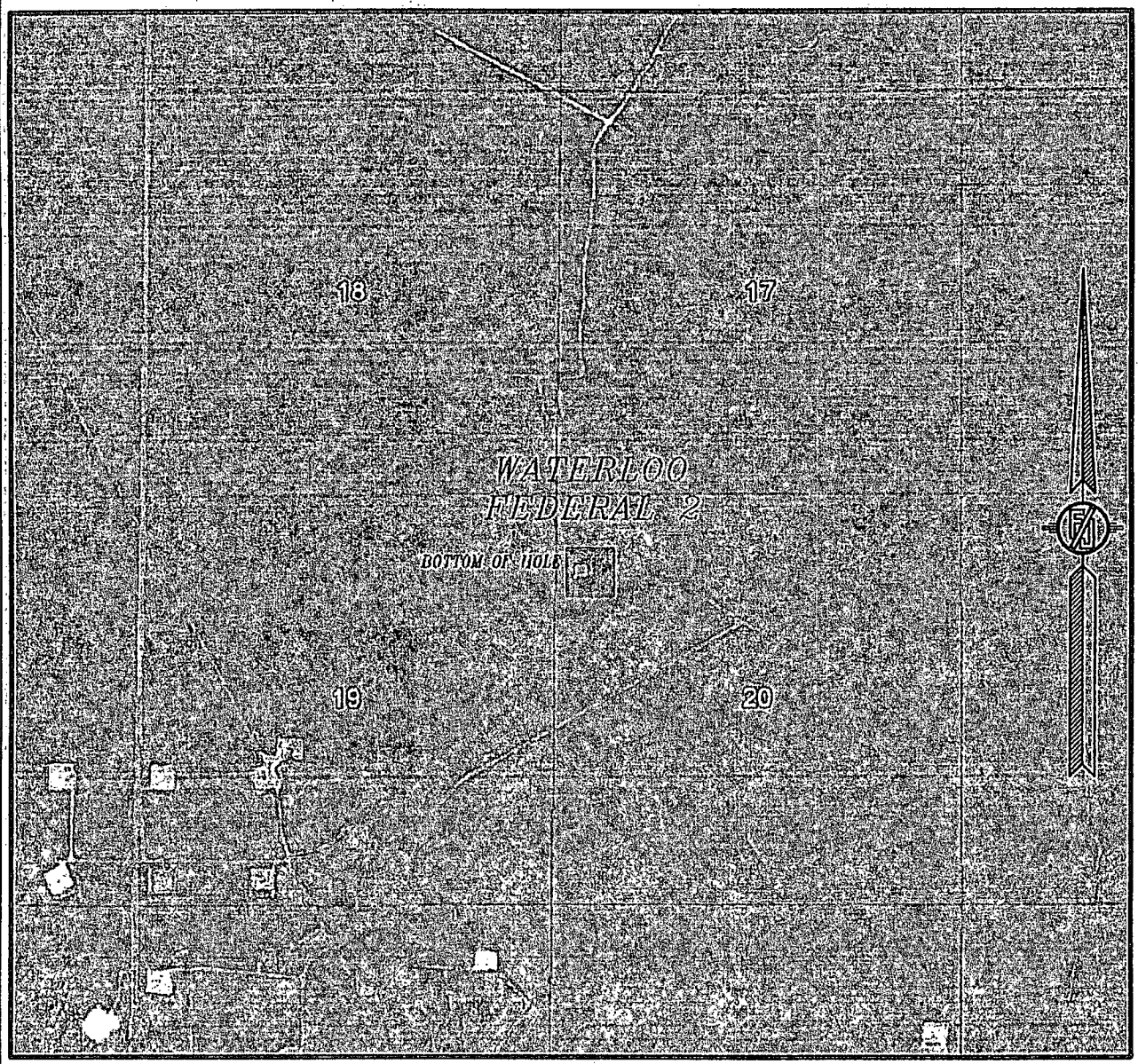
JULY 28, 2014

SURVEY NO. 2883C

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 *CARLSBAD, NEW MEXICO*

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

AERIAL PHOTO



NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
APRIL 2013

MACK ENERGY CORPORATION
WATERLOO FEDERAL 2
LOCATED 990 FT. FROM THE NORTH LINE
AND 480 FT. FROM THE WEST LINE OF
SECTION 20, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

JULY 28, 2014

SURVEY NO. 2883C

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

SECTION 20, TOWNSHIP 15 SOUTH, RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

ACCESS AERIAL ROUTE MAP

NOT TO SCALE
AERIAL PHOTO:
GOOGLE EARTH
FEBRUARY 2014

MACK ENERGY CORPORATION

WATERLOO FEDERAL 2

LOCATED 990 FT. FROM THE NORTH LINE
AND 480 FT. FROM THE WEST LINE OF
SECTION 20, TOWNSHIP 15 SOUTH,
RANGE 29 EAST, N.M.P.M.
CHAVES COUNTY, STATE OF NEW MEXICO

JULY 28, 2014

SURVEY NO. 2883C

MADRON SURVEYING, INC. 301 SOUTH CANAL (575) 234-3341 CARLSBAD, NEW MEXICO

Mack Energy

Chavez County
Waterloo Federal
#2

OH

Plan: Design #1

Standard Planning Report

27 August, 2014

Wellplanning

Planning Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #2
Company:	Mack Energy	**TVD Reference:**	WELL @ 3777.1usft (Original Well Elev)
Project:	Chavez County	**MD Reference:**	WELL @ 3777.1usft (Original Well Elev)
Site:	Waterloo Federal	**North Reference:**	Grid
Well:	#2	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project Chavez County

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site Waterloo Federal

Site Position:		**Northing:**	729,814.09 usft	**Latitude:**	33° 0' 20.342 N
From:	Map	**Easting:**	625,850.33 usft	**Longitude:**	103° 55' 22.136 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.22 °

Well #2

Well Position	**+N/-S**	0.0 usft	**Northing:**	729,814.09 usft	**Latitude:**	33° 0' 20.342 N
	+E/-W	0.0 usft	**Easting:**	625,850.33 usft	**Longitude:**	103° 55' 22.136 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**		**Ground Level:**	3,760.1 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/27/2014	7.41	60.77	48,724

Design Design #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	281.22

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
550.0	0.00	0.00	550.0	0.0	0.0	0.00	0.00	0.00	0.00	
812.4	5.25	281.22	812.0	2.3	-11.8	2.00	2.00	0.00	281.22	
1,943.1	5.25	281.22	1,938.0	22.5	-113.2	0.00	0.00	0.00	0.00	
2,205.5	0.00	0.00	2,200.0	24.8	-125.0	2.00	-2.00	0.00	180.00	VERT PT(WF#2)
3,505.5	0.00	0.00	3,500.0	24.8	-125.0	0.00	0.00	0.00	0.00	

Wellplanning

Planning Report

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #2
Company:	Mack Energy	**TVD Reference:**	WELL @ 3777.1usft (Original Well Elev)
Project:	Chavez County	**MD Reference:**	WELL @ 3777.1usft (Original Well Elev)
Site:	Waterloo Federal	**North Reference:**	Grid
Well:	#2	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

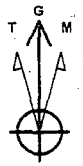
Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
550.0	0.00	0.00	550.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	1.00	281.22	600.0	0.1	-0.4	0.4	2.00	2.00	0.00
700.0	3.00	281.22	699.9	0.8	-3.9	3.9	2.00	2.00	0.00
800.0	5.00	281.22	799.7	2.1	-10.7	10.9	2.00	2.00	0.00
812.4	5.25	281.22	812.0	2.3	-11.8	12.0	2.00	2.00	0.00
900.0	5.25	281.22	899.3	3.9	-19.6	20.0	0.00	0.00	0.00
1,000.0	5.25	281.22	998.8	5.7	-28.6	29.2	0.00	0.00	0.00
1,100.0	5.25	281.22	1,098.4	7.5	-37.6	38.3	0.00	0.00	0.00
1,200.0	5.25	281.22	1,198.0	9.2	-46.6	47.5	0.00	0.00	0.00
1,300.0	5.25	281.22	1,297.6	11.0	-55.5	56.6	0.00	0.00	0.00
1,400.0	5.25	281.22	1,397.2	12.8	-64.5	65.7	0.00	0.00	0.00
1,500.0	5.25	281.22	1,496.8	14.6	-73.5	74.9	0.00	0.00	0.00
1,600.0	5.25	281.22	1,596.3	16.3	-82.4	84.0	0.00	0.00	0.00
1,700.0	5.25	281.22	1,695.9	18.1	-91.4	93.2	0.00	0.00	0.00
1,800.0	5.25	281.22	1,795.5	19.9	-100.4	102.3	0.00	0.00	0.00
1,900.0	5.25	281.22	1,895.1	21.7	-109.3	111.5	0.00	0.00	0.00
1,943.1	5.25	281.22	1,938.0	22.5	-113.2	115.4	0.00	0.00	0.00
2,000.0	4.11	281.22	1,994.7	23.4	-117.8	120.1	2.00	-2.00	0.00
2,100.0	2.11	281.22	2,094.6	24.4	-123.1	125.5	2.00	-2.00	0.00
2,205.5	0.00	0.00	2,200.0	24.8	-125.0	127.4	2.00	-2.00	0.00
VERT PT(WF#2)									
2,300.0	0.00	0.00	2,294.5	24.8	-125.0	127.4	0.00	0.00	0.00
2,400.0	0.00	0.00	2,394.5	24.8	-125.0	127.4	0.00	0.00	0.00
2,500.0	0.00	0.00	2,494.5	24.8	-125.0	127.4	0.00	0.00	0.00
2,600.0	0.00	0.00	2,594.5	24.8	-125.0	127.4	0.00	0.00	0.00
2,700.0	0.00	0.00	2,694.5	24.8	-125.0	127.4	0.00	0.00	0.00
2,800.0	0.00	0.00	2,794.5	24.8	-125.0	127.4	0.00	0.00	0.00
2,900.0	0.00	0.00	2,894.5	24.8	-125.0	127.4	0.00	0.00	0.00
3,000.0	0.00	0.00	2,994.5	24.8	-125.0	127.4	0.00	0.00	0.00
3,100.0	0.00	0.00	3,094.5	24.8	-125.0	127.4	0.00	0.00	0.00
3,200.0	0.00	0.00	3,194.5	24.8	-125.0	127.4	0.00	0.00	0.00
3,300.0	0.00	0.00	3,294.5	24.8	-125.0	127.4	0.00	0.00	0.00
3,400.0	0.00	0.00	3,394.5	24.8	-125.0	127.4	0.00	0.00	0.00
3,505.5	0.00	0.00	3,500.0	24.8	-125.0	127.4	0.00	0.00	0.00

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
VERT PT(WF#2) - plan hits target center - Point	0.00	0.01	2,200.0	24.8	-125.0	729,838.88	625,725.34	33° 0' 20.592 N	103° 55' 23.602 W

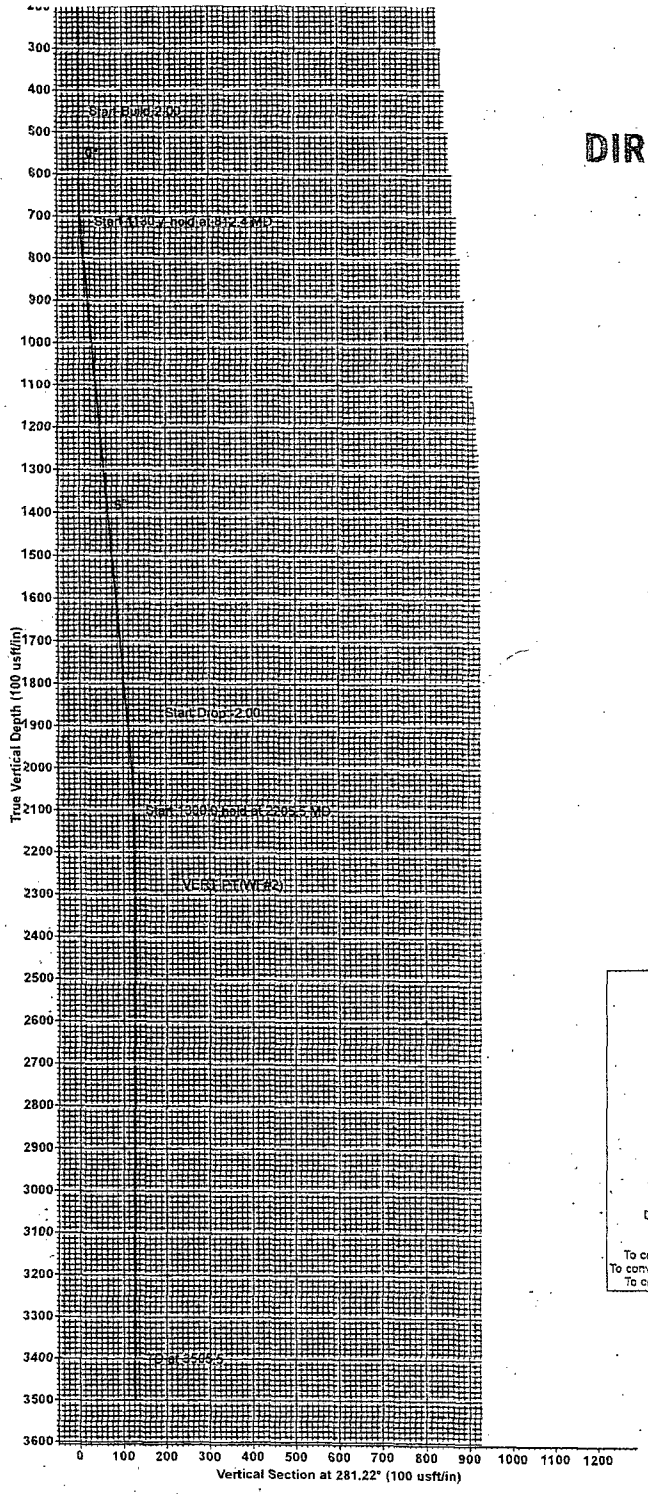
NEXUS DIRECTIONAL SOLUTIONS, L.P.

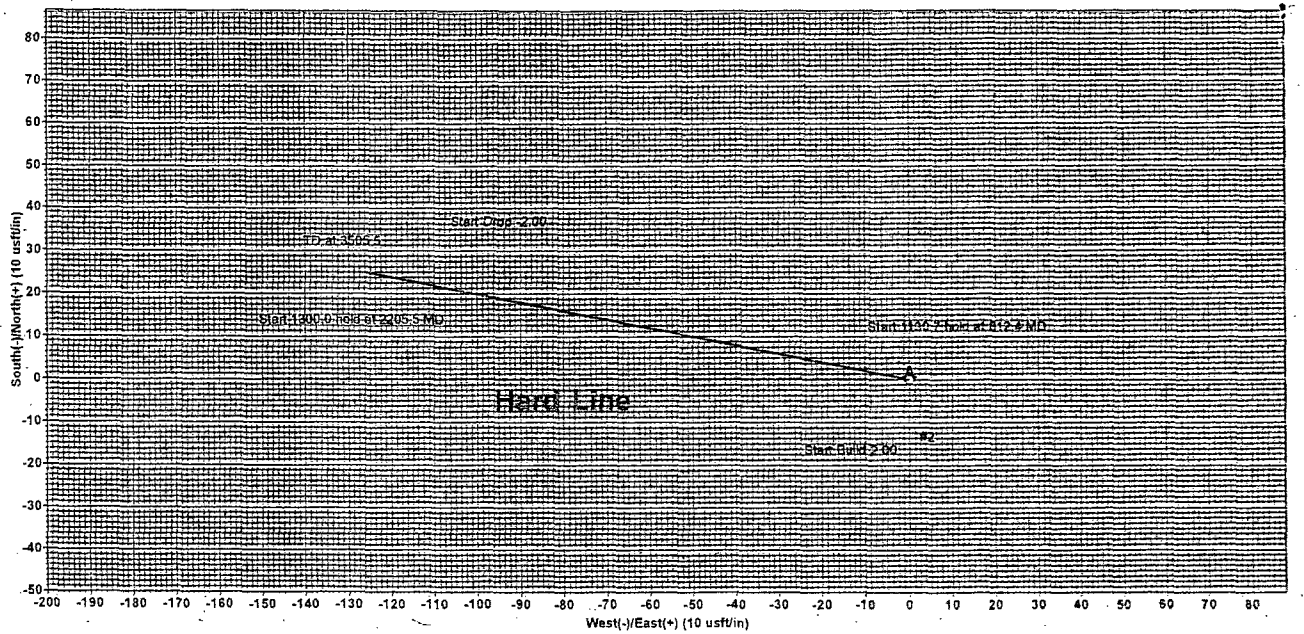


Azimuths to Grid North
True North: -0.22°
Magnetic North: 7.19°

Magnetic Field
Strength: 48724 nsnT
Dip Angle: 60.77°
Date: 8/27/2014
Model: IGRF2010

To convert a Magnetic Direction to a Grid Direction, Add 7.19°
To convert a True Direction to a Grid Direction, Subtract 0.22°





Waterloo Federal #2
Chavez County
Northing: (Y) 729814.09
Easting: (X) 625850.33
Design #1

Map System:	US State Plane 1927 (Exact solution)
Datum:	NAD 1927 (NADCON CONUS)
Ellipsoid:	Clarke 1866
Zone Name:	New Mexico East 3001
Local Origin:	Well #2, Grid North
Latitude:	33° 0' 20.342 N
Longitude:	103° 55' 22.136 W
Grid East:	625850.33
Grid North:	729814.09
Scale Factor:	1.000
Geomagnetic Model:	IGRF2010
Sample Date:	27-Aug-14
Magnetic Declination:	7.41°
Dip Angle from Horizontal:	60.77°
Magnetic Field Strength:	48724

To convert a Magnetic Direction to a Grid Direction, Add 7.19°
To convert a Magnetic Direction to a True Direction, Add 7.41° East
To convert a True Direction to a Grid Direction, Subtract 0.22°

WELL DETAILS:

WELL @ 3777.1usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	729814.09	625850.33	33° 0' 20.342 N	103° 55' 22.136 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
550.0	0.00	0.00	550.0	0.0	0.0	0.00	0.00	0.0	
812.4	5.25	281.22	812.0	2.3	-11.8	2.00	281.22	12.0	
1943.1	5.25	281.22	1938.0	22.5	-113.2	0.00	0.00	115.4	
2205.5	0.00	0.00	2200.0	24.8	-125.0	2.00	180.00	127.4	VERT PT(WF#2)
3505.5	0.00	0.00	3500.0	24.8	-125.0	0.00	0.00	127.4	

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
VERT PT(WF#2)	2200.0	24.8	-125.0	729838.88	625725.34

LEGEND

+ Design #1

Lease Lines Subject to Customer Approval

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Mack Energy Corporation - Sherrell, Jerry
LEASE NO.:	NMNM121950
WELL NAME & NO.:	WATERLOO FEDERAL - 2
SURFACE HOLE FOOTAGE:	[990] ' F [N] L [480] ' F [W] L
BOTTOM HOLE FOOTAGE:	[990] ' F [N] L [480] ' F [W] L
LOCATION:	Section 020, T015. S., R 029 E., NMPM
COUNTY:	Chaves County, New Mexico

1. All construction, operation and reclamation actions shall follow the regulations found at 43 CFR 3160, the Onshore Oil and Gas Orders, the Notices to Lessees (NTLs), and the Conditions of Approval (COAs).

2. A complete copy of the approved APD and the COAs shall be kept on location for reference by inspectors.

3. CONTAINMENT DIKES:

All production facilities shall have a lined containment structure large enough to contain 110% of the largest Tank plus 24 hours of production, unless more stringent protective requirements are deemed necessary by the Authorized Officer. (43 CFR 3162.5-1)

4. WELL PAD SURFACING:

Surfacing of the well pad is not required. If the operator elects to surface the well pad, final reclamation will include removal of all the surfacing material. The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational need.

5. ROAD 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, final reclamation will include removal of the surfacing material. 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 contain 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.

6. PIPELINE PROTECTION REQUIREMENT:

Precautionary measures shall be taken by the operator during construction of the access road to protect existing pipelines that the access road will cross over. An earthen berm; 2 feet high by 3 feet wide and 14 feet across the access road travelway (2' X 3' X 14'), shall be constructed over existing pipelines. The operator shall be held responsible for any damage to existing pipelines. If the pipeline is ruptured and/or damaged the operator shall immediately cease construction operations and repair the pipeline. The operator shall be held liable for any unsafe construction operations that threaten human life and/or cause the destruction of equipment.

7. 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 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.

8. VISUAL RESOURCE MANAGEMENT (VRM):

Through color manipulation, by painting well facilities to blend with the rolling to flat vegetative and/or landform setting with a gray-green color, the view is expected to favorably blend with the form, line, color and texture of the existing landscape. The flat color Oil Green from the Standard Environmental Supplemental Colors (March 2007) also closely approximates the grey to grey-green setting. All facilities, including the meter building, would be painted this color. The paint formula is 17-0115 TPX (Pantone for Architecture and Interior Colors Guide 2003).

9. CAVE AND KARST RESOURCES:

Any Cave or Karst feature discovered by the operator or by any person working on the operator's behalf shall immediately report the feature to the Authorized Officer. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. To mitigate or lessen the probability of impacts associated with the drilling and production of oil and gas wells in karst areas, the operator will follow the guidelines listed in Appendix 3 of the 1997 Roswell Resource Management Plan, as amended, Practices for Oil and Gas Drilling and Production in Cave and Karst Areas.

A more complete discussion of the impacts of oil and gas drilling can be found in the Dark Canyon Environmental Impact Statement of 1993, published by the U.S. Department of the Interior, Bureau of Land Management.

More information regarding protections to cave and karst resources can be found in the Federal Cave Resources Protection Act of 1988.

10. WASTES, HAZARDOUS AND SOLID:
Waste materials produced during all phases of operation will be disposed of promptly in an approved manner so it will not impact the air, soil, water, vegetation or animals. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes and equipment. All liquid waste, completion fluids and drilling products associated with oil and gas operations will be contained and then removed and deposited in an approved disposal facility. Portable toilets will remain on site throughout well pad construction, drilling and reclamation.

The operator and contractors shall ensure that all use, production, storage, transportation and disposal of hazardous materials, solid wastes and hazardous wastes associated with the drilling, completion and production of this well will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project related activities involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. A file will be maintained onsite containing current Safety Data Sheets (SDS) for all chemicals, compounds and/or substances which are used in the course of construction, drilling, completion and production operations.

11. DRILLING:
DRILLING OPERATIONS REQUIREMENTS:

A. The BLM is to be notified a minimum of 24 hours in advance for a representative to witness:
   - Spudding well,
   - Setting and/or Cementing of all casing strings,
   - BOPE tests.

The Roswell Field Office Engineer on-call phone number is: (575) 627-0205.

B. A Hydrogen Sulfide (H2S) Drilling Operation Contingency Plan shall be activated prior to drilling into the Queen formation. A copy of the plan shall be posted at the drilling site.

C. 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.

D. Include the API Number assigned to well by NMOCD on the subsequent report of setting the first casing string.

E. The operator will accurately measure the drilling rate in feet/min to set the base of the usable water protection casing string(s) opposite competent rock. The record of the drilling rate along with the caliper-gamma ray-neutron well log run to surface will be

submitted to this office as well as all other logs run on the borehole 30 days from completion.

F. Air, air-mist or fresh water and nontoxic drilling mud shall be used to drill to the base of the usable water protection casing string(s). Any polymers used will be water based and non-toxic.

CASING:

A. Deepest depth of usable water occurs at an approximate depth of 83 feet. The operator will run 40 feet of conductor pipe and ready mix cement to the surface. The 8-5/8 inch usable water protection casing string(s) shall be set in competent bedrock at the top of the salt between 180 feet and 200 feet.
   - If cement does not circulate to the surface, the Roswell Field Office shall be notified and a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.
   - Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours or 500 pounds compression strength, whichever is greater. (This is to include the lead cement).
   - Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compression strength, whichever is greater.
   - If cement falls back, remedial action will be done prior to drilling out that string.

B. The minimum required fill of cement behind the 5-1/2 inch production casing is sufficient to circulate to the surface. If cement does not circulate, a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.

C. 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.

D. All casing shall be new or reconditioned and tested casing and meet API standards for new casing. The use of reconditioned and tested casing shall be subject to approval by the Authorized Officer. Approval will be contingent upon the wall thickness of any casing being verified to be at least 87-1/2 per cent of the nominal wall thickness of new casing.

PRESSURE CONTROL:

A. Prior to drilling below the 8-5/8 inch surface casing shoe, the blowout preventer assembly (BOP/BOPE) shall be installed. The BOP/BOPE shall consist of a minimum of One Annular Preventer or Two Ram-Type Preventers and a Kelly Cock/Stabbing Valve.

B. Before drilling below the 8-5/8 inch surface casing shoe, minimum working pressure of the blowout preventer and related equipment (BOPE) shall be 2000 psi. If operator chooses to use a control device greater than the minimum stand they will have to follow all guidelines as stated within Bureau of Land Management 43 CFR part 3160 and Onshore Oil and Gas Order No. 2 - Drilling Operations.

C. The BOPE shall be installed before drilling below the 8-5/8 inch surface casing shoe and shall be tested as described in Onshore Oil and Gas Order No. 2. Any equipment failing to test satisfactorily shall be repaired or replaced.

- The BLM Roswell Field Office shall be notified a minimum of 24 hours in advance for a representative to witness the tests.
- The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.
- All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test will be submitted to the BLM Roswell Field Office at 2909 West Second Street, Roswell, New Mexico 88201.
- Testing fluid must be water or an appropriate clear liquid suitable for sub-freezing temperatures. Use of drilling mud for testing is not permitted since it can mask small leaks.
- Testing must be done in a safe workman like manner. Hard line connections shall be required.
- The requested variance to test the BOPE prior to drilling below the 8-5/8 inch surface casing to the reduced pressure of 2000 psi by a third party is approved.

12. RECLAMATION:

Reclamation earthwork for interim and final reclamation shall be completed within 6 months of well completion or well plugging (weather permitting), and shall consit of:

A. Backfilling pits,
B. Re-contouring and stabilizing the well site, access road, cut/fill slopes, drainage channels, utility and pipeline corridors, and all other disturbed areas, to the original contour, shape, function, and configuration.

C. Surface ripping to a depth of 18-24 inches deep on 18-24 inch centers to reduce compaction (prior to topsoil placement),
D. Final grading and replacement of all topsoil,
E. Seeding in accordance with reclamation portions of the APD and these COA's.

Any subsequent disturbance of interim reclamation shall be reclaimed within six (6) months by the same means described herein.

Prior to conducting interim reclamation, the operator is required to:

- Submit a Sundry Notice and Reports on Wells (Notice of Intent), Form 3160-5, prior to conducting interim reclamation.

- Contact BLM at least three (3) working days prior to conducting any interim reclamation activities and prior to seeding.

The removal of caliche is important to the success of re-vegetating the site. Removed caliche may be used in road repairs, fire walls or for building other roads and locations. In addition, in order to operate the well or complete work-over operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing re-vegetated areas for production or work-over operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be re-vegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

Use a certified noxious weed-free seed mixture. Use seed tested for viability and purity in accordance with State law(s) within nine months of purchase. Use a commercial seed mixture certified or registered and tagged in accordance with State law(s). Make the seed mixture labels available for BLM inspection.

13. SEE ATTACHED SEED MIX: The Ecological Site Description for the well pad and access road is as follows:

Well Name	Ecosite well pad	Ecosite Access Rd
Waterloo Fed 2	Shallow SD-3	Shallow SD-3

14. FINAL ABANDONMENT:

A. Upon abandonment of the well a Notice of Intent for Plug and Abandonment describing plugging procedures is required. Within 30 days of approval of the Notice you shall file with this office a Subsequent Report of Abandonment (Form 3160-5). To be included with this report is where the plugs were placed, volumes of cement used, and the well bore schematic as plugged.
B. On private surface/federal mineral estate land the reclamation procedures on the road and well pad shall be accomplished in accordance with the Private Surface Land Owner agreements and a copy of the release is to be submitted upon abandonment.

C. Upon abandonment of the well, all casing shall be cut-off at the base of the cellar or 3-feet below final restored ground level (whichever is deeper). The well bore shall then be covered with a metal plate at least ¼ inch thick and welded in place. The following information shall be permanently inscribed on the dry hole marker: Well name and number, the name of the operator, the lease serial number, the surveyed location (the quarter-quarter section, section, township and range or other authorized survey designation acceptable to the Authorized Officer; such as metes and bounds).

D. The operator shall promptly plug and abandon each newly completed, re-completed or producing well which is not capable of producing in paying quantities. No well may be temporarily abandoned for more than 30 days without prior approval from this office. When justified by the operator, BLM may authorize additional delays, no one of which may exceed an additional 12 months. Upon removal of drilling or producing equipment from the site of a well which is to be permanently abandoned, the surface of the lands disturbed shall be reclaimed in accordance with an approved Notice of Intent for reclamation.

15. CLOSED LOOP SYSTEMS:

No reserve pit will be used. Steel tanks are required for drilling operations. The operator shall properly dispose of drilling contents at an authorized disposal facility. No open top tanks are permitted.

16. TOPSOIL:

A. Construction:

When saturated soil conditions exist on access roads or location, construction shall be halted until soil material dries out or is frozen sufficiently for construction to proceed without undue damage and erosion to soils, roads and locations. The topsoil will not be used to construct the containment structures or earthen dikes that are on the outside boundaries of the constructed well pad, tanks, and storage facilities.

B. Topsoil Stripping and Vegetation Removal:

Topsoil shall be stripped and vegetation shall be removed during construction of well pads, pipelines, roads, or other surface facilities. This shall include all growth medium and at a minimum, the upper two to six inches of soil (if that depth of topsoil is present), but shall also include stripping of any additional topsoil present at a site, such as indicated by color or texture. No topsoil shall be stripped when soils are moisture-saturated or frozen below the stripping depth.

C. Topsoil Storage:

Topsoil and vegetation shall be stored separately from subsoil, spoils pile, or other excavated material. It is the operator's responsibility to ensure that topsoil, caliche, spoils, or other surfacing materials are not mixed together. Topsoil, spoil materials, and other excavated material may be stored on opposite or adjacent sides of the well pad. If topsoil and spoils are stored on the same well pad side, they will be no closer than toe to toe. Overlapping of material is not permitted. Each material pile will be within 30 feet of the pad's side.

D. Topsoil Replacement

All topsoil will be used for reclamation. Any other use of topsoil is not permitted.

17. ON LEASE ACCESS ROADS:

The operator agrees to comply with the following conditions of approval to the satisfaction of the Authorized Officer, BLM.

The operator shall construct, operate, maintain, and terminate the facilities, improvements, and structures within the access road in strict conformity with the stipulations which are made part of the permit. Any relocation, additional construction, or use that is not in accord with the approved stipulations, shall not be initiated without the prior written approval of the Authorized Officer.

The operator shall conduct all activities associated with the construction, operation, and termination of the right-of-way within the authorized limits of the access road.

The operator shall permit free and unrestricted access for all lawful purposes except for those specific areas designated as restricted by the Authorized Officer to protect the public, wildlife, livestock, or facilities constructed within the access road.

The Authorized Officer reserves the right to administrative access to public lands involved and operator may provide Authorized Officer with keys or combinations to locked gates on private property needed to access involved public lands.

Construction-related traffic shall be restricted to routes approved by the Authorized Officer. New access roads or cross-country vehicle travel will not be permitted unless prior written approval is given by the Authorized Officer.

No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of three inches deep, the soil shall be deemed too wet to adequately support construction equipment.

The operator shall maintain the access road in a safe, usable condition, as directed by the Authorized Officer. (A regular maintenance program shall include, but is not limited to, blading, ditching, culvert installation and surfacing).

Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

The operator(s) shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the operator(s) shall comply with (40 CFR, Part 702-799), (40 CFR 761.1-761.193), (40 CFR, Part 117), Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b, the Comprehensive

Environmental Response, Compensation and Liability Act of 1980, (42 U.S.C. 9601, et seq.) and the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq.) Prior to termination, the operator shall contact the Authorized Officer to arrange a joint inspection of the access road. This inspection will be held to agree to an acceptable termination (and rehabilitation) plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, or surface material, re-contouring, top soiling, or seeding. The Authorized Officer must approve the plan in writing prior to the operator's commencement of any termination activities.

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

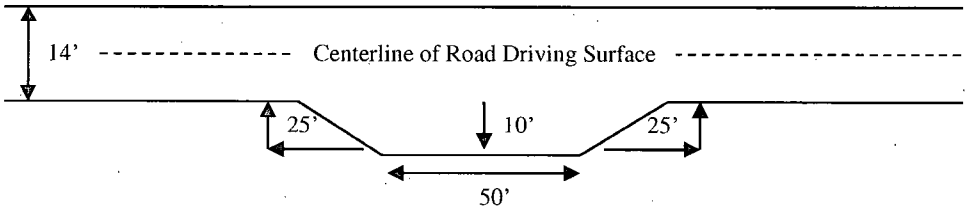
The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing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

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

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.

Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:

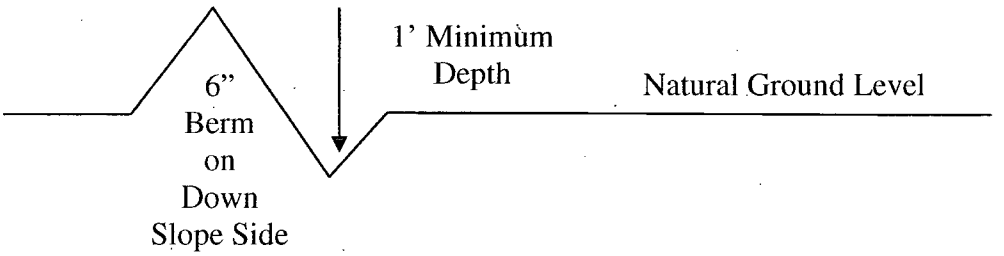
Standard Turnout – Plan View



Drainage control systems shall be constructed on the entire length of road (e.g. ditches, side-hill, out-sloping and in-sloping, 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 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

Appropriately sized culvert(s) shall be installed at the deep waterway channel flow crossing.

Dust Abatement: The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The BLM may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient to prevent fugitive dust. All agents other than water must be approved by the Authorized Officer prior to use.

Erosion Control: Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the BLM. Cut-and-fill slopes along drainages or in areas with high erosion potential shall also be protected from erosion using hydro-mulch designed specifically for erosion control or biodegradable blankets/matting, bales, or wattles of weed-free straw or weed-free native grass hay. A well-anchored fabric silt fence shall also be placed at the toe of cut-and-fill slopes along drainages or to protect other sensitive areas from deposition of soils eroded off the slopes. Additional Best Management Practices (BMPs) shall be employed as necessary to reduce soil erosion and offsite transport of sediments.

Seeding Procedures: Seeding shall be conducted no more than 24 hours following completion of final seedbed preparation. Where conditions allow, seed shall be installed by drill-seeding

to a depth of 0.25 to 0.5 inch. If interim re-vegetation is unsuccessful, the operator shall implement subsequent reseedings until interim reclamation standards are met.

SEED MIX FOR

ECTOR VERY COBBLY LOAM, 3-15% SLOPE (Very Shallow, CP-4 Ecological Site)

AND

ECTOR VERY COBBLY LOAM, DRY, 3-15% SLOPE (Shallow SD-3 Ecological Site)

MARCH 18, 1998

Common Name and Preferred Variety	Scientific Name	Pounds of Pure Live Seed Per Acre
Black grama,var. Nogal	*(Bouteloua eriopoda)*	2.00
Blue grama, var. Lovington	*(Bouteloua gracilis)*	1.00
Sideoats grama, var. Vaughn or El Reno	*(Bouteloua curtipendula)*	2.00
New Mexico Feathergrass	*(Stipa neomexicana)*	1.00
Desert of Scarlet Globemallow	*(Sphaeralcea ambigua)* or *(S. coccinea)*	1.00
Buckwheat	*(Eriogonum* spp.*)*	1.00
TOTAL POUNDS PURE LIVE SEED PER ACRE		8.00

CERTIFIED WEED FREE SEED

IF ONE SPECIES IS NOT AVAILABLE,
INCREASE ALL OTHERS PROPORTIONATELY.