

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HOBBS OGDs
OCD-460s

JUN 09 2011

FORM APPROVED
OMB No. 1004-0137
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter
abandoned well. Use Form 3160-3 (APD) for such proposals.

5. Lease Serial No.
NMNM-053434 *SH NM06531 A*

6. If Indian, Allottee or Tribe Name
BH NM080262

SUBMIT IN TRIPLICATE - Other instructions on page 2.

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

LEGACY RESERVES OPERATING LP

3a. Address

P.O. BOX 10848
MIDLAND, TX 79702

3b. Phone No. (include area code)

432-689-5237

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
SHL: 1980' FNL & 660' FEL, SEC 11, T20S, R34E
PBHL: 1980' FNL & 660' FEL, SEC 14, T20S, R34E
Unit A
Unit H

7. If Unit of CA/Agreement, Name and/or No.

NM70976B

8. Well Name and No.
LEA UNIT #4H

9. API Well No.
30-025-02424

10. Field and Pool or Exploratory Area
LEA; BONE SPRING

11. Country or Parish, State
LEA COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other <u>Drill Horizontal</u>
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	<u>Lateral out of Existing</u>
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	<u>Wellbore</u>

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomple horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recomple in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

--- SEE ATTACHED FOR DETAILS ---

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**



14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)

D. PATRICK DARDEN, P.E.

Title SENIOR ENGINEER

Signature

D. Patrick Darden

Date 04/27/2011

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

PETROLEUM ENGINEER

Date JUN 13 2011

Conditions of approval, if any, are attached. Approval of this notice 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.

Office

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.

(Instructions on page 2)

OK



Certified Return Receipt #7008 3230 0001 9262 8748

United States Department of the Interior

Bureau of Land Management

Carlsbad Field Office

620 E. Greene St.

Carlsbad, New Mexico 88230

Attn: Ed Fernandez

HOBBS OCD

May 11, 2011

JUN 09 2011

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SUBJECT: Lea Unit #4

Additional information requested for approval of drilling horizontal lateral out of existing wellbore.

Lea County, New Mexico

Please find attached additional information as requested by the BLM on the application to drill a horizontal lateral in the 3rd Bone Spring Sand out of the existing wellbore in the Lea Unit #4. Attached to this letter is the following:

- Updated and revised wellbore diagram on the current condition of the Lea Unit #4 and the proposed wellbore configuration upon completion of the project. CIBPs and cement caps were verified.
- Confirmation of TOC on the 7" casing. Determined by temperature survey performed by Worth Well Service on 3/27/61 (no attachment).
- BOP diagram, manifold diagram, and equipment diagram.
- Confirmation of use of a Mud Gas Separator (see diagram).
- Location site diagram (160' x 230' currently, 220' x 230' – needed, plan on extending location to the north where drilling reserve pit was during original drilling of well).
- Backup information on joint strength on 4-1/2", 13.5#, P-110 liner and 5-1/2", 17#, N-80 liner (see information provided by manufacturer).
- Form 3160-5 Sundry Notice: Requesting approval to extend current pad to the North for a location pad size of 220' x 230'. This is necessary to fit the closed loop system in the proper place on location.

If you should need any other supporting data on this please let me know.

Sincerely,

D. Patrick Darden, P.E.

Senior Engineer

432-689-5237

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL**

Bureau of Land Management
RECEIVED

MAY 16 2011
Carlsbad Field Office
Carlsbad, N.M.

dpd

attachments

Legacy Reserves

303 West Wall, Suite 1400 • Midland, Texas 79701 • P.O. Box 10848 • Midland, Texas 79702

OFFICE 432-689-5200 • FAX 432-684-3774

APPLICATION TO DRILL (HORIZONTAL LATERAL)

LEA UNIT #4H

LEGACY RESERVES OPERATING, L.P.

SHL: Unit H, Section 11

T20S-R34E, Lea County New Mexico

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To satisfy requirements as stated under Section II B of Bulletin NTL-6, Legacy Reserves Operating, L.P. submits the following for your consideration:

1. **Location:** SHL: 1980' FNL & 660' FEL, Sec 11, T20S-R34E
BHL: 1980' FNL & 660' FEL, Sec 14, T20S-R34E
2. **Elevations:** 3,655' GL
3,677' KB
3. **Geological Name of Surface Formation:** Quaternary Alluvium Deposits
4. **Drilling Tools and Associated Eqpt:** Rotary Drilling Rig using fluid as a means for removal of solid cuttings from the well.
5. **Proposed Drilling Depth:** 16,096' MD 10,873' TVD
6. **Tops of Geological Markers:**

Yates	3,427'	Strawn	11,992'
Queen	4,618'	Bend	12,347'
Bone Spring	8,194'	Mississippian	13,575'
Basal Leonard	10,694'	Woodford	14,185'
Wolfcamp	10,991'	Devonian	14,355'
- Note: This well was drilled to a TD of 14,492' in April of 1961. H/Z lateral in Bone Spring Formation is to be drilled out of existing wellbore.
7. **Possible mineral bearing formation:**

Bone Spring	Oil.
-------------	------
8. **Proposed Mud System:**
10,670' MD (KOP) to 16,096' MD (TD): 9 ppg mud weight, 28-29 visc, NC fluid loss, brine mud.
Sufficient mud materials will be kept on location at all times in readiness to control lost

APPLICATION TO DRILL (HORIZONTAL LATERAL)

LEA UNIT #4H

LEGACY RESERVES OPERATING, L.P.

SHL: Unit H, Section 11

T20S-R34E, Lea County New Mexico

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circulation or unexpected kicks. To prepare to run any test, logs and casing, the viscosity and water loss may be adjusted to meet those needs.

9. Proposed Drilling Plan:

After squeezing off all existing perforations in the Bone Spring zone set a CIBP and whipstock @ ~10,671' MD. Cut window in 7", 29# csg and drill 5-7/8" or 6" curve section to ~11,075' MD. Continue drilling 5-7/8" or 6" horizontal lateral to TD @ ~16,096' MD. Set tapered liner string comprised of 10,500' new 5-1/2", 17#, Ultra-FJ pipe and new 4-1/2", 13.5#, Ultra-FJ pipe from 10,500' MD to 16,096' MD (10,873' TVD), attempting to cement to surface with DVT set @ ~9,400 in 5-1/2" pipe section. Will perforate and treat well in stages with acid and sand frac as needed. Legacy Reserves Operating, L.P. is requesting a variance on the clearance of the 5-1/2" liner it will be setting from the standard 0.422 inches per side to 0.342 inches per side, as the 7" csg already set in the well prohibits this clearance being obtained. It is necessary to run the 5-1/2" pipe in order to install the proper sized pumping equipment upon completion of the well.

10. Casing and Cementing Information:

* See COA

String	Hole size	Depth	Casing OD	Collar	Weight	Grade
Prod-Liner	7", 26# & 29# csg	0' to 9,400' MD	New 5-1/2"	Ultra-FJ	17#	N-80
Prod-Liner DVT	7", 26# & 29# csg	9,400' MD	New 5-1/2"	NA	NA	NA
Prod-Liner	7", 26# & 29# csg	9,400' to 10,500' MD	New 5-1/2"	Ultra-FJ	17#	N-80
Prod-Liner XO	7", 26# & 29# csg	10,500' MD	New	Ultra-FJ	NA	NA
Prod-Liner	7", 26# & 29# csg	10,500' to 10,670' MD	New 4-1/2"	Ultra-FJ	13.5#	P-110
Prod-Liner	5-7/8" or 6" OH	10,670' to 16,096' MD	New 4-1/2"	Ultra-FJ	13.5#	P-110

11. Cementing:

Prod-Liner 1st Stage: 540 sxs (50:50) poz (fly ash) – Class H cmt + 0.1% CD-32 + 0.3% R-3 + 2% Bentonite + 0.5% FL-52A + 56.5% FW (14.20 ppg, 1.26 cf/sx, 5.69 gps wtr).

* See COA

2nd Stage Lead: 205 sxs (50:50) poz (fly ash) – Class H cmt + 10% Bentonite + 130.4% FW (11.80 ppg, 2.29 cf/sx, 13.14 gps wtr).

2nd Stage Tail: 100sxs – Class H cmt + 0.1% R-3 + 46.4% FW (15.60 ppg, 1.18 cf/sx, 5.23 gps wtr).

5-1/2", N-80, Ultra-FJ:

Collapse Factor: 1.125
Burst Factor: 1.125
Tension Factor: 1.50

4-1/2", P-110 Ultra-FJ:

Collapse Factor: 1.125
Burst Factor: 1.125
Tension Factor: 1.50

APPLICATION TO DRILL (HORIZONTAL LATERAL)

LEA UNIT #4H

LEGACY RESERVES OPERATING, L.P.

SHL: Unit H, Section 11

T20S-R34E, Lea County New Mexico

12. **Pressure Control Eqpt/BOP:**

** See COA*
A 3000 psi working pressure BOP tested to 3000 psi consisting of one set of blind rams and one set of pipe rams and a 5000 psi annular type preventer. A choke manifold and 60 gallon accumulator with floor and remote operating stations and auxiliary power system. Rotating head as needed. a kelly cock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

BOP unit will be hydraulically operated. BOP will be operated at least once a day while drilling and the blind rams will be operated when pipe is out of the hole during trips. No abnormal pressure or temperature is expected while drilling of this well. From the cutting of the window out of the existing casing to the running of the production liner the well will be equipped with a 3000 psi BOP system tested to 3000 psi.

13. **Testing, Logging, and Coring Program:**

- A. Mud logging program: 2 man unit from EOC to TD.
- B. No Electric logging is planned.
- C. No DST's or cores are planned.

14. **Potential Hazards:**

No abnormal pressures or temperatures are expected in the drilling of this lateral. In accordance with Onshore Order 6, Legacy Reserves Operating, LP does not anticipate that there will be enough H2S from the cutting of the window in the existing casing to the end of the lateral to meet the BLM's minimum requirements for the submission of an H2S Drilling Operation Plan" or "Public Protection Plan" for the drilling and completion of this lateral. Since there will be an H2s Safety package on location, attached is an "H2S Drilling Operations Plan". Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely. All personnel will be familiar with all aspects of safe operations of equipment being used.

Estimated BHP: 2500 psi

Estimated BHT: 130°F

15. **Road and Location:**

As this project originates in an existing wellbore, the well already has roads and a location. If needed some top dressing may occur on existing roads and the location. This will occur upon BLM approval of the APD. Anticipated spud date is middle to late June 2011. The drill of the horizontal lateral is expected to take 14 days and an additional 7 for the completion.

16. **Additional Requirements of Project:**

Completion: The targeted Bone Spring pay zone will be perforated and stimulated by means of acid and hydraulic fracturing in multiple stages. As the well will be treated in stages, which requires a sizable amount of fresh water, it will be necessary to construct a lined pit to hold fresh water that can be supplied rapidly to the well during stimulation. As additional projects similar in scope are planned for the Lea Unit, it is likely that this pit will be placed in a centrally located spot within the Lea Unit.



LEA UNIT #4

LOCATION: 1980' FNL & 660' FEL, Sec 11, T20S, R34E

Current Wellbore Condition

FIELD: Lea (Bone Spring)

COUNTY: Lea

STATE: New Mexico

GL: 3655'

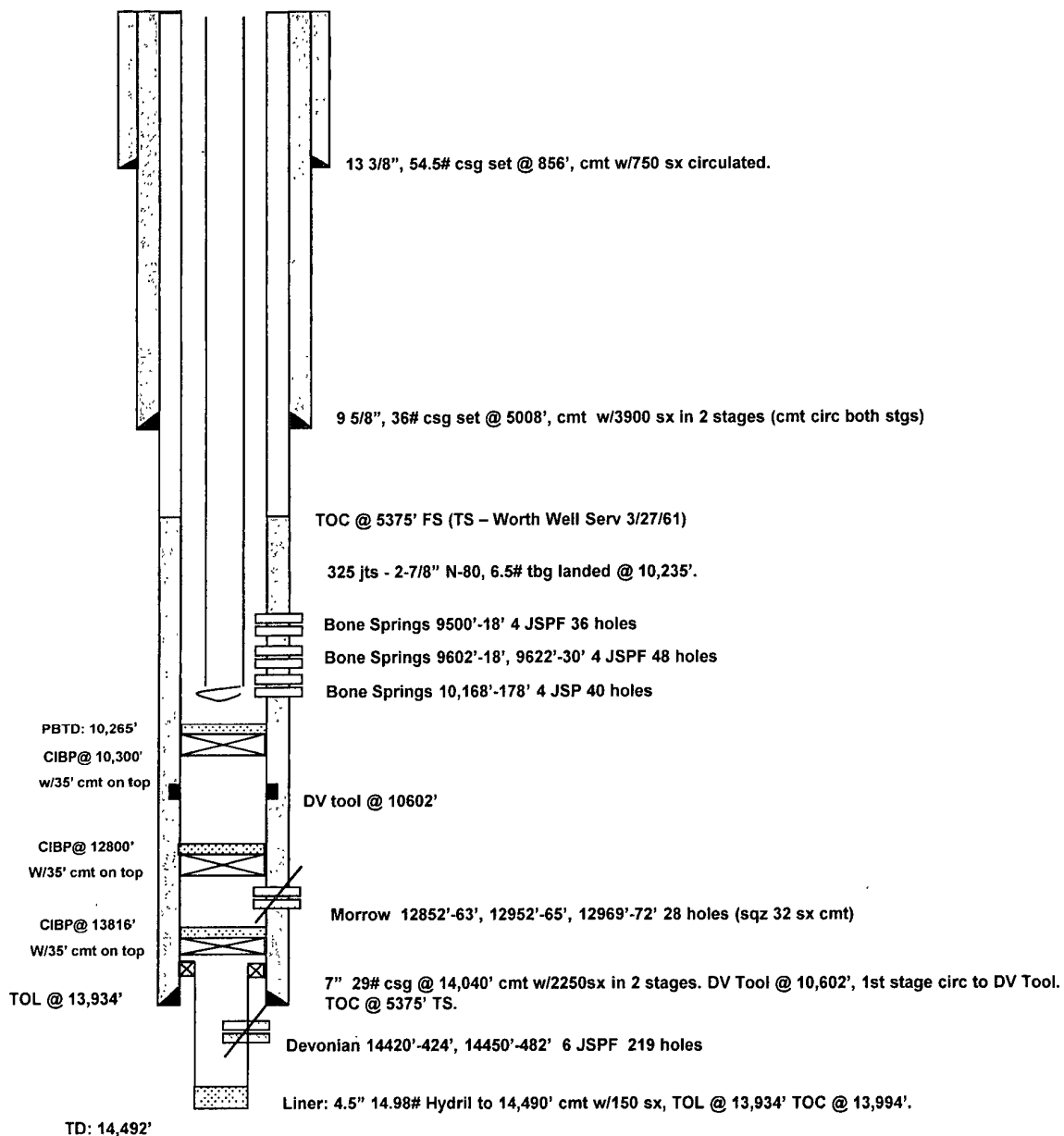
KB: 3677'

SPUD DATE: 12/06/60

LATEST UPDATE: 05/06/2011

BY: DP Darden

API No: 30-025-02424





LEA UNIT #4H

LOCATION: See Below for SHL & PBHL.

Proposed Wellbore Configuration

FIELD: Lea (Bone Spring)
COUNTY: Lea
STATE: New Mexico

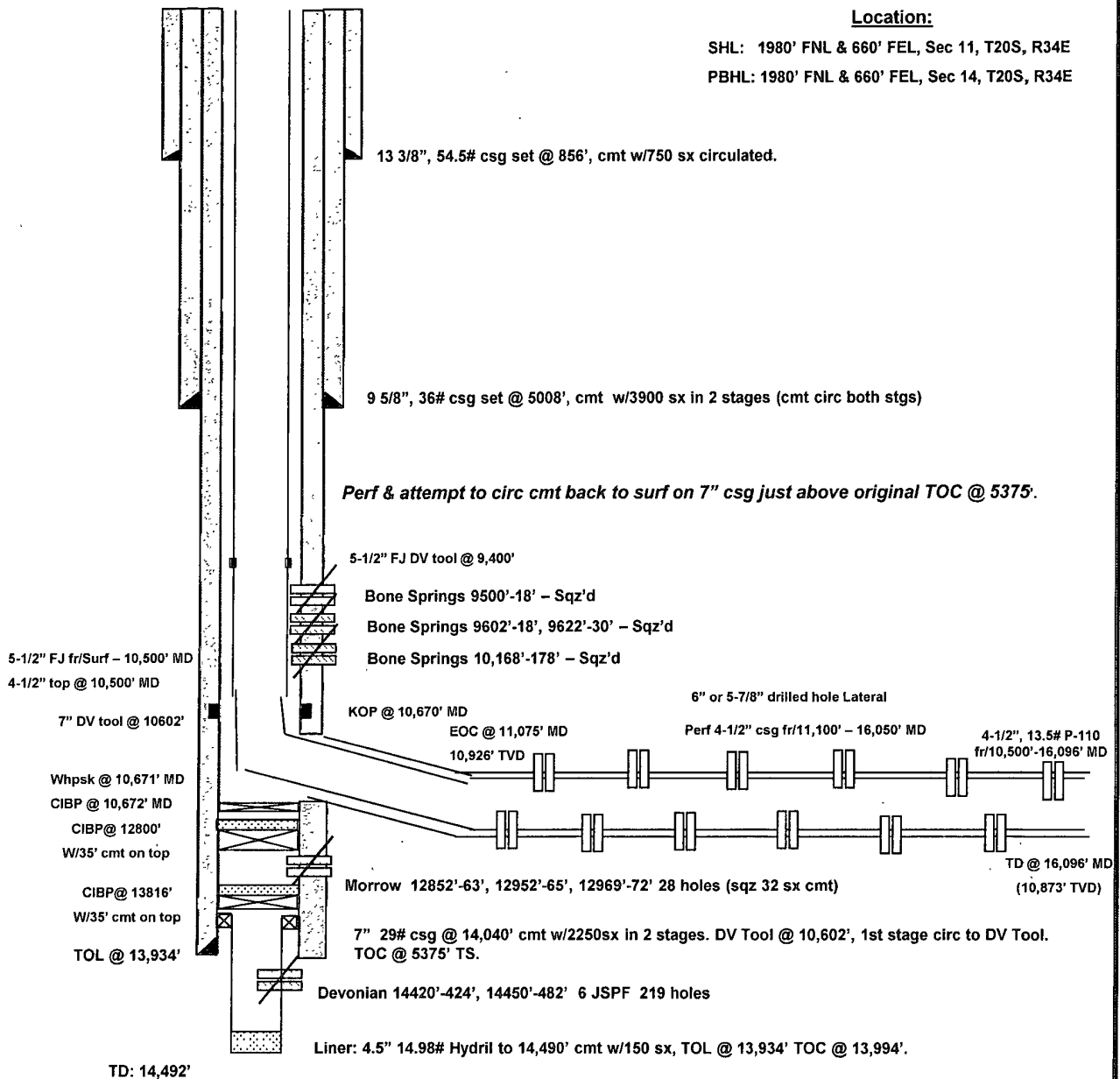
GL: 3655'
KB: 3677'
SPUD DATE: 12/06/60

LATEST UPDATE: 05/06/2011
BY: DP Darden
API No: 30-025-02424

Location:

SHL: 1980' FNL & 660' FEL, Sec 11, T20S, R34E

PBHL: 1980' FNL & 660' FEL, Sec 14, T20S, R34E





Legacy Reserves Operating LP

Lea County, NM (NAD27 NME)

Lea Unit #4

Lea Unit #4

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Plan: Plan #1

Standard Planning Report

17 March, 2011



Scientific Drilling
Directional Drilling Operations



Scientific Drilling Planning Report



Database:	EDM-Julio	Local Co-ordinate Reference:	Well Lea Unit #4
Company:	Legacy Reserves Operating LP	TVD Reference:	KB Elev (22') @ 3677.00usft
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB Elev (22') @ 3677.00usft
Site:	Lea Unit #4	North Reference:	Grid
Well:	Lea Unit #4	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project:	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site:	Lea Unit #4		
Site Position:		Northing:	0 00 usft
From:	None	Easting:	0 00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	0° 0' 0.000 N
		Longitude:	0° 0' 0.000 E
		Grid Convergence:	0 00 °

Well:	Lea Unit #4		
Well Position	+N-S	0 00 usft	Northing:
	+E-W	0 00 usft	Easting:
Position Uncertainty	0 00 usft	Wellhead Elevation:	Ground Level:
			3,655.00 usft

Wellbore:	OH		
Magnetics	Model Name	Sample Date	Declination
	User Defined	2011/03/17	0 00
			Dip Angle
			0 00
			Field Strength
			0

Design:	Plan #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0 00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0 00	0 00	0 00
			Direction
			180.00

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0.00	
10,670.00	0 00	0 00	10,670.00	0 00	0.00	0 00	0 00	0 00	0 00	
11,074.86	90 61	180.00	10,926.00	-258.73	0.00	22.38	22.38	0 00	180 00	
16,096.41	90 61	180 00	10,872.80	-5,280.00	0.00	0.00	0 00	0.00	0.00	



Scientific Drilling Planning Report



Database: EDM-Julio
Company: Legacy Reserves Operating LP
Project: Lea County, NM (NAD27 NME)
Site: Lea Unit #4
Well: Lea Unit #4
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference:
TVD Reference: KB Elev (22') @ 3677.00usft
MD Reference: KB Elev (22') @ 3677.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Well Lea Unit #4

KB Elev (22') @ 3677.00usft

KB Elev (22') @ 3677.00usft

Grid

Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10,670.00	0.00	0.00	10,670.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP Start Build 22.38°/100'									
10,700.00	6.71	180.00	10,699.93	-1.76	0.00	1.76	22.38	22.38	0.00
10,800.00	29.09	180.00	10,794.49	-32.30	0.00	32.30	22.38	22.38	0.00
10,900.00	51.47	180.00	10,870.29	-96.55	0.00	96.55	22.38	22.38	0.00
11,000.00	73.85	180.00	10,915.92	-184.82	0.00	184.82	22.38	22.38	0.00
11,074.86	90.61	180.00	10,926.00	-258.73	0.00	258.73	22.38	22.38	0.00
Land EOC hold 90.61°									
11,100.00	90.61	180.00	10,925.73	-283.87	0.00	283.87	0.00	0.00	0.00
11,200.00	90.61	180.00	10,924.67	-383.86	0.00	383.86	0.00	0.00	0.00
11,300.00	90.61	180.00	10,923.62	-483.86	0.00	483.86	0.00	0.00	0.00
11,400.00	90.61	180.00	10,922.56	-583.85	0.00	583.85	0.00	0.00	0.00
11,500.00	90.61	180.00	10,921.50	-683.84	0.00	683.84	0.00	0.00	0.00
11,600.00	90.61	180.00	10,920.44	-783.84	0.00	783.84	0.00	0.00	0.00
11,700.00	90.61	180.00	10,919.38	-883.83	0.00	883.83	0.00	0.00	0.00
11,800.00	90.61	180.00	10,918.32	-983.83	0.00	983.83	0.00	0.00	0.00
11,900.00	90.61	180.00	10,917.26	-1,083.82	0.00	1,083.82	0.00	0.00	0.00
12,000.00	90.61	180.00	10,916.20	-1,183.82	0.00	1,183.82	0.00	0.00	0.00
12,100.00	90.61	180.00	10,915.14	-1,283.81	0.00	1,283.81	0.00	0.00	0.00
12,200.00	90.61	180.00	10,914.08	-1,383.80	0.00	1,383.80	0.00	0.00	0.00
12,300.00	90.61	180.00	10,913.02	-1,483.80	0.00	1,483.80	0.00	0.00	0.00
12,400.00	90.61	180.00	10,911.96	-1,583.79	0.00	1,583.79	0.00	0.00	0.00
12,500.00	90.61	180.00	10,910.90	-1,683.79	0.00	1,683.79	0.00	0.00	0.00
12,600.00	90.61	180.00	10,909.84	-1,783.78	0.00	1,783.78	0.00	0.00	0.00
12,700.00	90.61	180.00	10,908.78	-1,883.78	0.00	1,883.78	0.00	0.00	0.00
12,800.00	90.61	180.00	10,907.72	-1,983.77	0.00	1,983.77	0.00	0.00	0.00
12,900.00	90.61	180.00	10,906.66	-2,083.77	0.00	2,083.77	0.00	0.00	0.00
13,000.00	90.61	180.00	10,905.61	-2,183.76	0.00	2,183.76	0.00	0.00	0.00
13,100.00	90.61	180.00	10,904.55	-2,283.75	0.00	2,283.75	0.00	0.00	0.00
13,200.00	90.61	180.00	10,903.49	-2,383.75	0.00	2,383.75	0.00	0.00	0.00
13,300.00	90.61	180.00	10,902.43	-2,483.74	0.00	2,483.74	0.00	0.00	0.00
13,400.00	90.61	180.00	10,901.37	-2,583.74	0.00	2,583.74	0.00	0.00	0.00
13,500.00	90.61	180.00	10,900.31	-2,683.73	0.00	2,683.73	0.00	0.00	0.00
13,600.00	90.61	180.00	10,899.25	-2,783.73	0.00	2,783.73	0.00	0.00	0.00
13,700.00	90.61	180.00	10,898.19	-2,883.72	0.00	2,883.72	0.00	0.00	0.00
13,800.00	90.61	180.00	10,897.13	-2,983.72	0.00	2,983.72	0.00	0.00	0.00
13,900.00	90.61	180.00	10,896.07	-3,083.71	0.00	3,083.71	0.00	0.00	0.00
14,000.00	90.61	180.00	10,895.01	-3,183.70	0.00	3,183.70	0.00	0.00	0.00
14,100.00	90.61	180.00	10,893.95	-3,283.70	0.00	3,283.70	0.00	0.00	0.00
14,200.00	90.61	180.00	10,892.89	-3,383.69	0.00	3,383.69	0.00	0.00	0.00
14,300.00	90.61	180.00	10,891.83	-3,483.69	0.00	3,483.69	0.00	0.00	0.00
14,400.00	90.61	180.00	10,890.77	-3,583.68	0.00	3,583.68	0.00	0.00	0.00
14,500.00	90.61	180.00	10,889.71	-3,683.68	0.00	3,683.68	0.00	0.00	0.00
14,600.00	90.61	180.00	10,888.66	-3,783.67	0.00	3,783.67	0.00	0.00	0.00
14,700.00	90.61	180.00	10,887.60	-3,883.66	0.00	3,883.66	0.00	0.00	0.00
14,800.00	90.61	180.00	10,886.54	-3,983.66	0.00	3,983.66	0.00	0.00	0.00
14,900.00	90.61	180.00	10,885.48	-4,083.65	0.00	4,083.65	0.00	0.00	0.00
15,000.00	90.61	180.00	10,884.42	-4,183.65	0.00	4,183.65	0.00	0.00	0.00
15,100.00	90.61	180.00	10,883.36	-4,283.64	0.00	4,283.64	0.00	0.00	0.00
15,200.00	90.61	180.00	10,882.30	-4,383.64	0.00	4,383.64	0.00	0.00	0.00
15,300.00	90.61	180.00	10,881.24	-4,483.63	0.00	4,483.63	0.00	0.00	0.00
15,400.00	90.61	180.00	10,880.18	-4,583.63	0.00	4,583.63	0.00	0.00	0.00
15,500.00	90.61	180.00	10,879.12	-4,683.62	0.00	4,683.62	0.00	0.00	0.00

Database: EDM:Julio
Company: Legacy Reserves Operating LP
Project: Lea County, NM (NAD27 NME)
Site: Lea Unit #4
Well: Lea Unit #4
Wellbore: OH
Design: Plan #1

Local Co-ordinate Reference: Well Lea Unit #4
TVD Reference: KB Elev (22') @ 3677.00usft
MD Reference: KB Elev (22') @ 3677.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
15,600.00	90.61	180.00	10,878.06	-4,783.61	0.00	4,783.61	0.00	0.00	0.00
15,700.00	90.61	180.00	10,877.00	-4,883.61	0.00	4,883.61	0.00	0.00	0.00
15,800.00	90.61	180.00	10,875.94	-4,983.60	0.00	4,983.60	0.00	0.00	0.00
15,900.00	90.61	180.00	10,874.88	-5,083.60	0.00	5,083.60	0.00	0.00	0.00
16,000.00	90.61	180.00	10,873.82	-5,183.59	0.00	5,183.59	0.00	0.00	0.00
16,096.41	90.61	180.00	10,872.80	-5,280.00	0.00	5,280.00	0.00	0.00	0.00

PBHL-Lea #4

Design Targets

Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N-S (usft)	+E-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
hit/miss target									
Shape									
PBHL-Lea #4	0.00	360.00	10,870.00	-5,280.00	0.00	-5,280.00	0.00	30° 58' 32.269 N	105° 55' 43.268 W
- plan misses target center by 2.80usft at 16096.41usft MD (10872.80 TVD, -5280.00 N, 0.00 E)									
- Point									

Plan Annotations

Measured: Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/S (usft)	+E/W (usft)	
10,670.00	10,670.00	0.00	0.00	KOP Start Build 22.38°/100'
11,074.86	10,926.00	-258.73	0.00	Land EOC hold 90.61°



Scientific Drilling for Legacy Reserves Operating LP
Site: Lea County, NM (NAD27 NME)
Well: Lea Unit #4
Wellbore: OH
Design: Plan #1



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	10670.00	0.00	0.00	10670.00	0.00	0.00	0.00	0.00	0.00	
3	11074.86	90.61	180.00	10926.00	-258.73	0.00	22.38	180.00	258.73	
4	16096.41	90.61	180.00	10872.80	-5280.00	0.00	0.00	0.00	5280.00	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL-Lea #4	10870.00	-5280.00	0.00	-5280.00	0.00	30°58' 32.269 N 105°55' 43.268 W		Point

WELL DETAILS. Lea Unit #4

+N/-S	+E/-W	Northing	Ground Level:	3655.00	Latitude	Longitude	Spot
0.00	0.00	0.00	Easting	0.00	30°59' 24.512 N	105°55' 44.137 W	

PROJECT DETAILS. Lea County, NM (NAD27 NME)

Plan: Plan #1 (Lea Unit #4/OH)

Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

Created By: Julio Pina

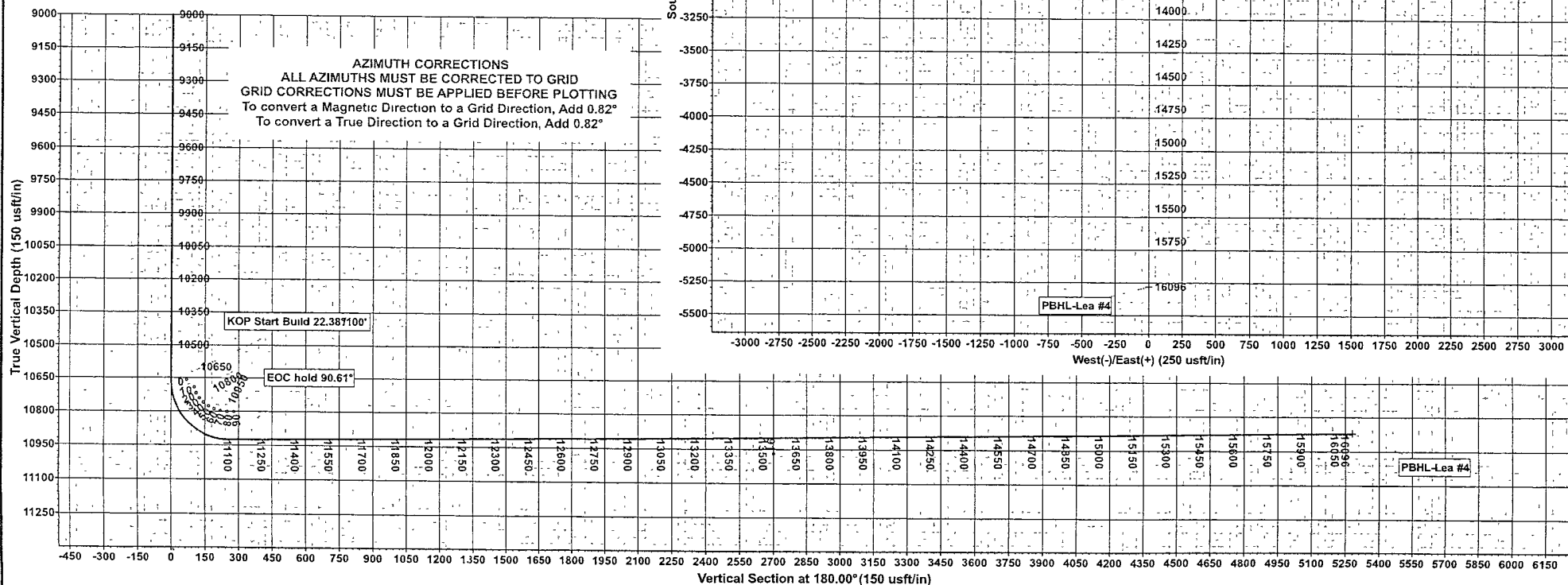
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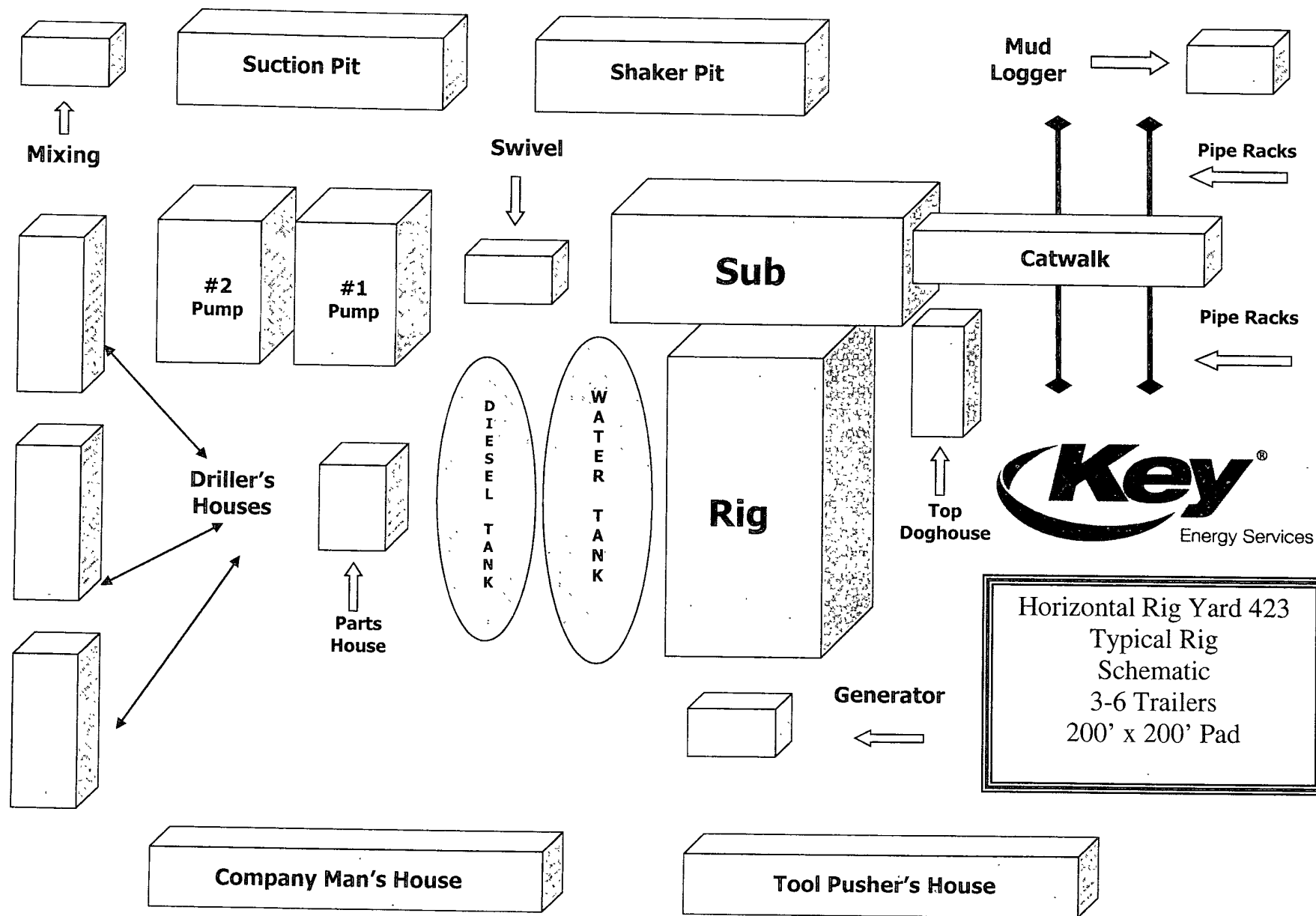
Checked: _____

Date: _____

Reviewed: _____

Date: _____







Key Energy Services, Inc.

Horizontal Re-Entry Packages

Date 4/5/2011

Company Legacy Attention Pat Darden

Office No. Fax No.

Information/Comments Rig 115

~ General Equipment List ~

- | | | | |
|---|---|---|--|
| 1 | 500/700 Series work-over unit | 1 | 3.5 Power swivel |
| 2 | Steel foundation mats | 1 | Gardner Denver PZ-7 Pump (triplex) |
| 1 | Substructure (14' x 8' floor)(Ht 9' - 16') | 1 | Equivalent to Gardner Denver(triplex) |
| 1 | Top Doghouse /w auto-driller & recorder | 1 | Pump manifold, hoses, lines |
| 1 | Oil Country CH 58-5 hydraulic tongs | 1 | Mud-hopper w/ centrifugal |
| 1 | Cavins "C-H D" slips (2 3/8" - 3 1/2") bodies | 2 | 180 / 200 BBL Steel pits |
| 1 | H2S monitor-sesnors at floor & pits | 1 | Flow line & bell nipple (above BOP) |
| 1 | Hydromatic tank w/ centrifugal pump | 1 | 42" catwalk & 2 sets of pipe racks, V-door |
| 1 | Tool pusher quarters | 1 | MQ Power Generator |
| 1 | 7 1/16 3000 psi BOP W/ Closing Unit | 1 | Shale shaker (linear motion) |

Key does not furnish drill pipe or work string tubing

Rigs are not equipped with sand-line

Gregg Munger

Horizontal Yard Manager
Office: 432-580-3062
Fax: 432-580-3066
Cell: 432-638-3895

Bobby Vaughn

Horizontal Rig Supervisor
Office: 432-580-3062
Fax: 432-580-3066
Cell: 432-638-2046

Deshler Jarnigan

Horizontal Rig Supervisor
Office: 432-580-3062
Fax: 432-580-3066
Cell: 432-208-7208

Mark Walters

Horizontal Rig Supervisor
Office: 432-580-3062
Fax: 432-580-3066
Cell: 432-557-2520

Home

Company
Information

Manual
BOP

Annular
BOP

Spherical
BOP

Closing Unit

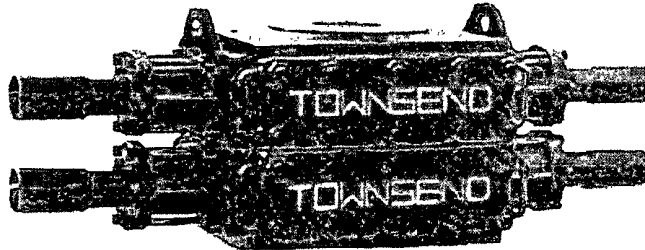
Fluid
Containment
Systems

Tubing Data

Wellhead
Data

Type 81 Ram Type BOP

HYDRAULIC & MANUAL DIMENSIONS & SPECIFICATION DATA



DIMENSIONS					
DESCRIPTION	STYLE	7-1/16 x 3M	7-1/16 x 5M	9 x 3M	9 X 5M
Overall Height Studded (Less Studs)	Single	13"	13- 1/4"	13- 1/4"	13- 1/4"
	Double	20- 1/2"	20- 1/2"	22- 1/2"	22- 1/2"
	Triple	30"	31"	31"	31"
Overall Height Flanged	Single	21- 3/8"	26- 1/2"	23- 3/4"	23- 3/4"
	Double	30- 3/8"	36- 3/4"	33"	33"
	Triple	38- 3/8"	45- 1/4"	41- 1/2"	41- 1/2"
Overall Length		63"	65"	70"	70"
Overall Width		22"	25"	25"	25"
Through Bore		7- 1/16"	7- 1/16"	9"	9"
Working Pressure (lbs)		3,000	5,000	3,000	5,000
Test Pressure (lbs)		6,000	10,000	6,000	10,000

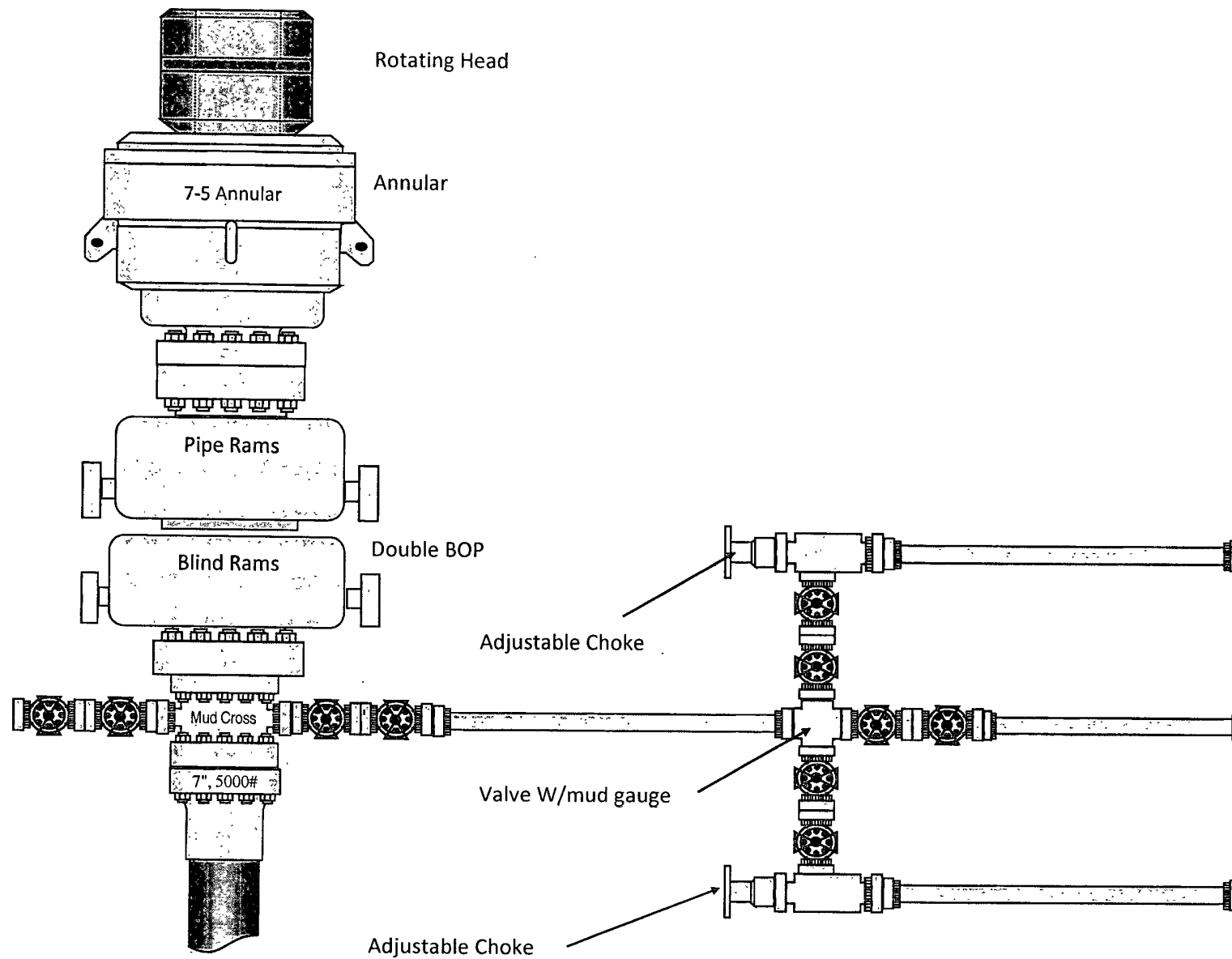
BOP CAPACITIES				
DESCRIPTION	7-1/16 x 3M	7-1/16 x 5M	9 x 3M	9 X 5M
Maximum Operating Pressure/PSI (to open & close)	1,500	1,500	1,500	1,500

Recommended Operating Pressure/PSI (to open & close)	1,500	1,500	1,500	1,500
Ratio to Close	4.1:1	4.5:1	4.5:1	4.5:1
Volume of Fluid to Open (U.S.Gallons)	.55	.60	.62	.62
Volume of Fluid to Close (U.S. Gallons)	.68	.73	.75	.75
Piston Stroke/Inches (to open & close)	4-1/8"	4-1/4"	5-1/8"	5-1/8"

WEIGHTS					
DESCRIPTION		7-1/16 x 3M	7-1/16 x 5M	9 x 3M	9 X 5M
Single	Studded	1,250	1,600	1,550	1,650
	Flanged	1,520	1,800	1,810	1,910
Double	Studded	2,100	2,800	2,750	2,850
	Flanged	2,370	3,000	3,010	3,110
Triple	Studded	2,750	3,600	3,550	3,660
	Flanged	3,145	3,800	3,810	3,910

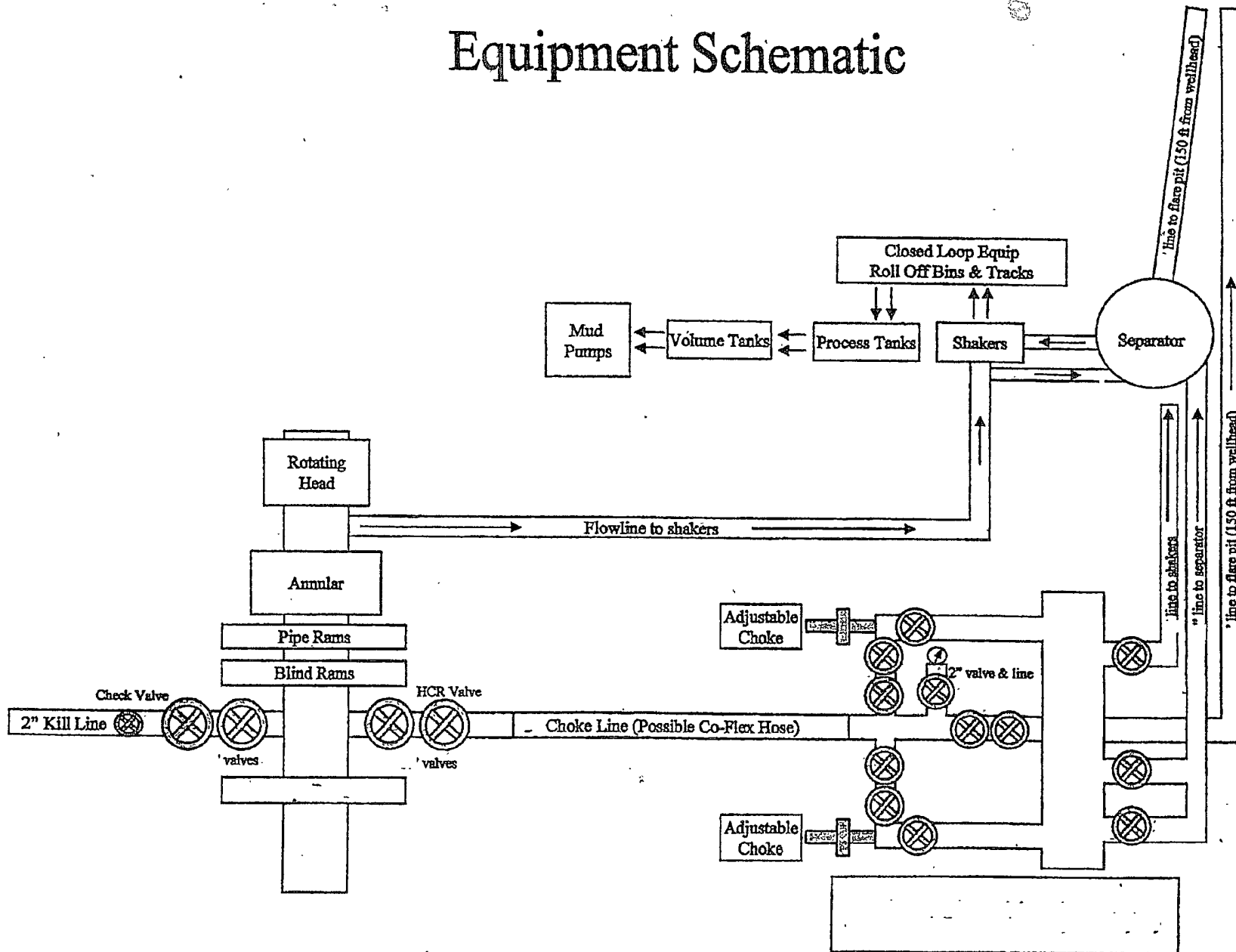
BOP and Choke Manifold Diagrams

Lea Unit #4H

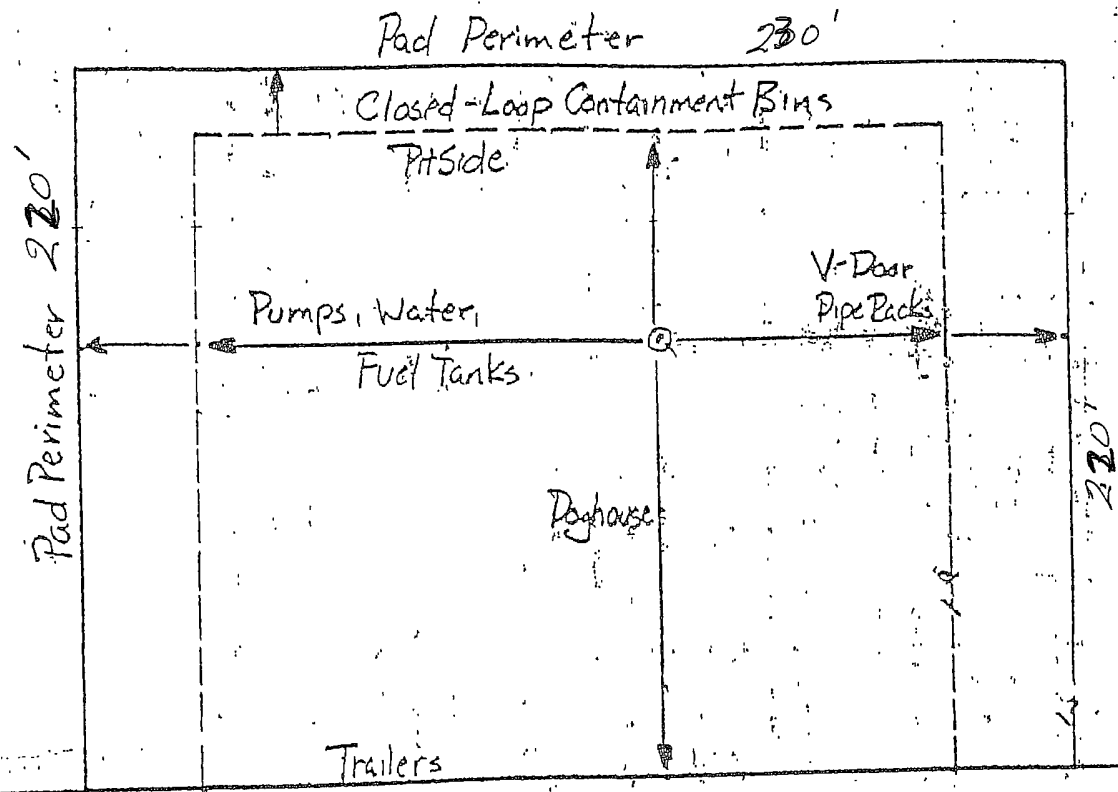
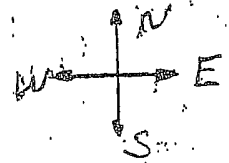


LEA UNIT #4 H

Equipment Schematic



LEA UNIT #4H
SITE DIAGRAM



Access — Existing Lease Road

TECHNICAL DATA SHEET

4 1/2" • 13.50# • P-110

ULTRA-FJ™ Premium Connection

ULTRA Premium Oilfield Services is one of North America's leading manufacturers of Premium threaded connections for the global exploration and recovery of Oil and Gas. ULTRA connections date back to the early 1990's when two engineers, the late Bruce J. Klementich, PE and ULTRA's Ted Banker, PE, designed a unique full contact thread form with run-in and flange to produce the strongest connection in the industry today.

The ULTRA FJ Flare-joint casing connection has the highest tensile efficiency of any true flare joint connection. The connection's compression efficiency is equal to or greater than it's tensile efficiency.

Connection Parameters

Efficiency - Tension:	66.0%	%
Efficiency - Compression:	68.0%	%
Optimum Torque:	5,500	ft-lb
Yield Torque:	8,800	ft-lb
Max. Uniaxial Bend:	73	deg/100ft
Minimum Internal Yield Pressure:	100%	psi
Collapse Pressure:	100%	psi

Maximum uniaxial bending is the calculated value at which the connection would yield in simple 2-dimensional bending.

Note:

The information in this Technical Data Sheet is for general information only. It should not be used as a specification for any specific application. It should be independently verified by competent professionals and is not a warranty of accuracy, suitability and applicability. Anyone using the information contained herein does so at their own risk.

Tel: 281-949-1023

Toll free: 888-258-2000



TECHNICAL DATA SHEET

4 1/2 " • 13.50 # • P-110

ULTRA FJ™ Premium Connection

Pipe Dimensions

Size:	4.500	inches
Nom Wt-ft:	13.50	lb/ft
Grade	P-110	
PE Weight:	13.04	lbs/ft
Wall Thickness:	0.290	inches
Nominal OD:	4.500	inches
Nominal ID:	3.92	inches
Drift Diameter:	3.795	inches
Avg. Pipe Body Area:	3.856	sq inches

Pipe Parameters

Min. Yield:	110,000	psi
Min. Tensile:	125,000	psi

Pipe Body Performance

Yield Load:	424,200	lbs
Tensile Load:	482,000	lbs
Min. Internal Yield Pressure:	12,410	psi
Collapse Pressure:	10,690	psi

Connection Parameters

Connection OD:	4.523	inches
Pin ID (bored):	3.913	inches
Critical Section Area:	2.545	sq inches
Yield Load in Tension:	279,900	lbs
Fracture Load:	309,500	lbs
Yield Load in Compression:	288,200	lbs
Make-Up Loss:	4.179	inches
Max. Uniaxial Bend Rating:	73	deg/100ft
Min. Internal Yield Pressure:	12,410	psi
Collapse Pressure:	10,690	psi
Minimum Make-Up Torque:	4,950	ft-lb
Optimum Make-Up Torque:	5,500	ft-lb
Maximum Make-Up Torque:	6,050	ft-lb
Yield Torque:	8,800	ft-lb
Efficiency-Tension:	66.0%	%
Efficiency-Compression:	68.0%	%

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TECHNICAL DATA SHEET

4 1/2" • 13.50# • P-110

ULTRA FET™ Premium Connection

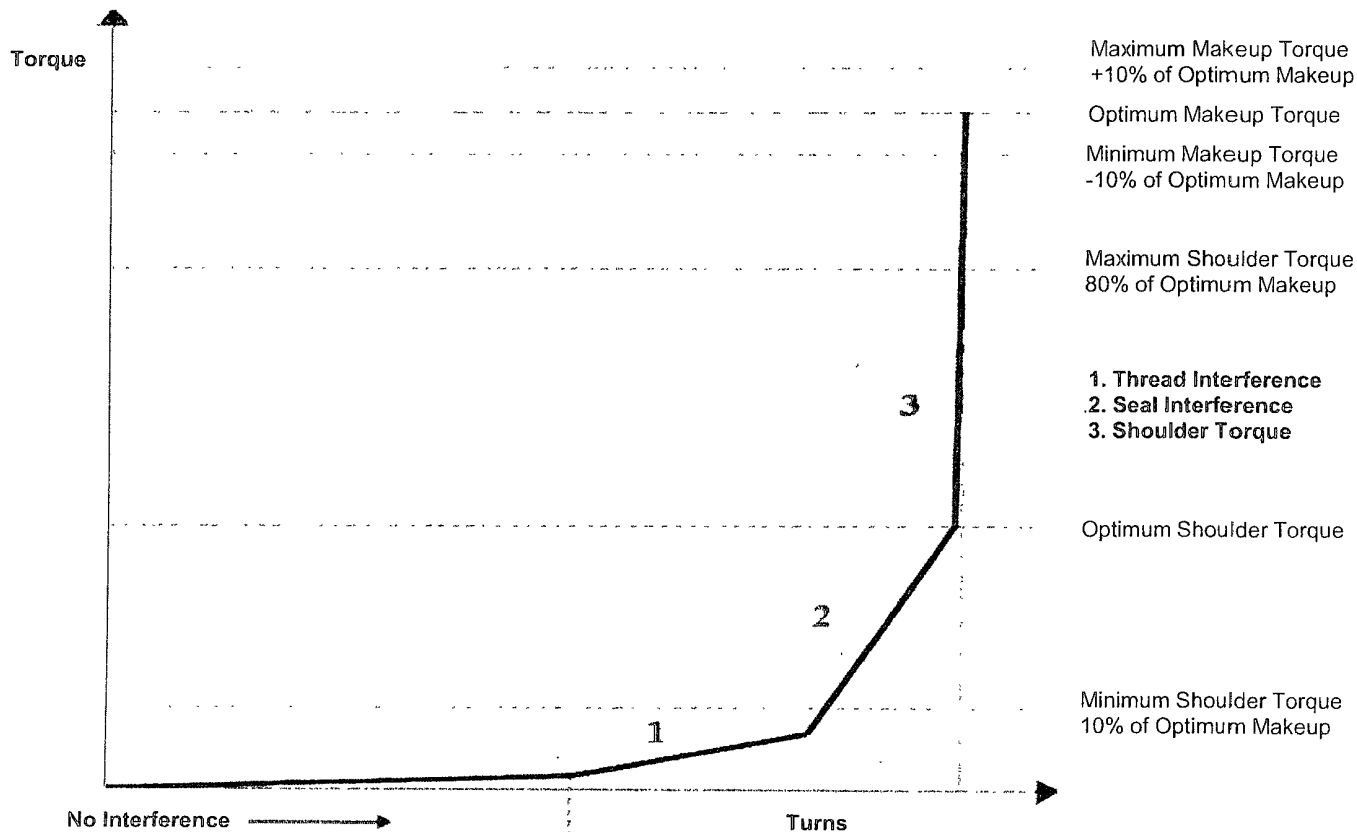
Makeup Torque (Ft-Lbs)

Minimum
4,950

Optimum
5,500

Maximum
6,050

Yield
8,800



For Help Please Call Our ULTRA Field Service Manager:

Mobile (432) 557-1916

Office (432) 367-3201

Fax (432) 332-5019

NOTE:
This information is for informational purposes only. It should not be used as a basis for any specific application without independent verification by a competent professional engineer or other qualified personnel. Anyone utilizing this information does so at their own risk.

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TECHNICAL DATA SHEET

ULTRA FJ™ Premium Connection

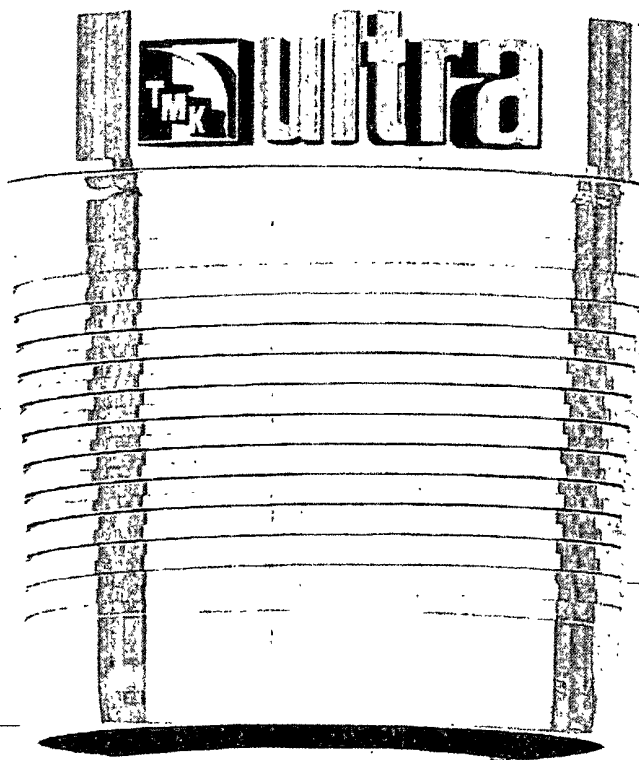
The Strongest Flush-Joint Connection

FullContact™ Threads

- Compression Efficiency
- High tension and bending capacity
- Deep, easy stabbing and quick, easy make-up with no cross threading risk

Sphere-and-Cone Internal Metal Seal

- External factors (axial loads, temperature, dope, make-up torque) do not affect seal performance
- Connection can be tripped multiple times



Positive Torque Stop

- Reliability and connection performance

External Metal Seal

- Pressure Integrity

Run-in/Run-out Threads

- Maximum critical section area
- Increases overall connection strength

Note:

The information in this Technical Data Sheet is for general information only. It should not be used or relied upon for any specific application without being independently verified by a competent professional engineer for accuracy, suitability and applicability. Anyone utilizing this information contained herein does so at their own risk.

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Toll free: 888-258-2000



TECHNICAL DATA SHEET

5 1/2" • 17.00# • N-80

ULTRA-FJ™ Flush-Joint Connection

ULTRA Petroleum Offshore Services is one of North America's leading manufacturers of Premium bonded connections for the global exploration and recovery of Oil and Gas. ULTRA connections date back to the early 1930's when two engineers, who later formed the predecessor PE and ULTRA's Ltd. Partner, PE designed a precision full contact thread form with run in on all threads to produce the strongest connections in the industry today.

The ULTRA FJ Flush-joint casing connection has the highest tensile efficiency of any true flush-joint connection. The connection's compression efficiency is equal to or greater than it's tensile efficiency.

Connection Parameters

Efficiency - Tension:	65.0%	%
Efficiency - Compression:	66.9%	%
Optimum Torque:	6,500	ft-lb
Yield Torque:	10,400	ft-lb
Max. Uniaxial Bend:	43	deg./100ft
Minimum Internal Yield Pressure:	100%	psi
Collapse Pressure:	100%	psi

Maximum uni-axial bending is the calculated value at which the connection would yield in simple 2 dimensional bending.

Notes:
The information in this Technical Data Sheet is for general information only. It should not be used or relied upon for any specific application without first being independently verified by a competent professional and modified for accuracy, suitability and applicability. Anyone utilizing this information is advised to seek a detailed engineering review.

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Tel: 281-949-1023
Toll free: 888-258-2000



TECHNICAL DATA SHEET

5 1/2 " • 17.00 # • N-80

ULTRA 5J™ Premium Connection

Pipe Dimensions

Size:	5.500	inches
Nom Wt-ft:	17.00	lbs/ft
Grade	N-80	
PE Weight:	16.87	lbs/ft
Wall Thickness:	0.304	inches
Nominal OD:	5.500	inches
Nominal ID:	4.892	inches
Drift Diameter:	4.767	inches
Avg. Pipe Body Area:	4.989	sq-inches

Pipe Parameters

Min. Yield:	80,000	psi
Min. Tensile:	100,000	psi

Pipe Body Performance

Yield Load:	399,100	lbs
Tensile Load::	498,900	lbs
Min. Internal Yield Pressure:	7,740	psi
Collapse Pressure:	6,290	psi

Connection Parameters

Connection OD:	5.528	inches
Pin ID (bored):	4.889	inches
Critical Section Area:	3.241	sq-inches
Yield Load in Tension:	259,200	lbs
Fracture Load:	307,400	lbs
Yield Load in Compression:	266,900	lbs
Make-Up Loss:	4.102	inches
Max. Uniaxial Bend Rating:	43	deg/100ft
Min. Internal Yield Pressure:	7,740	psi
Collapse Pressure:	6,290	psi
Minimum Make-Up Torque:	5,850	ft-lb
Optimum Make-Up Torque:	6,500	ft-lb
Maximum Make-Up Torque:	7,150	ft-lb
Yield Torque:	10,400	ft-lb
Efficiency-Tension:	65.0%	%
Efficiency-Compression:	66.9%	%

Note:

This information is provided for general information only. It should not be used as a basis for design or specification without being independently verified. Load ratings are based on standard conditions and may vary due to manufacturing tolerances. Always consult the manufacturer's specifications for detailed information.

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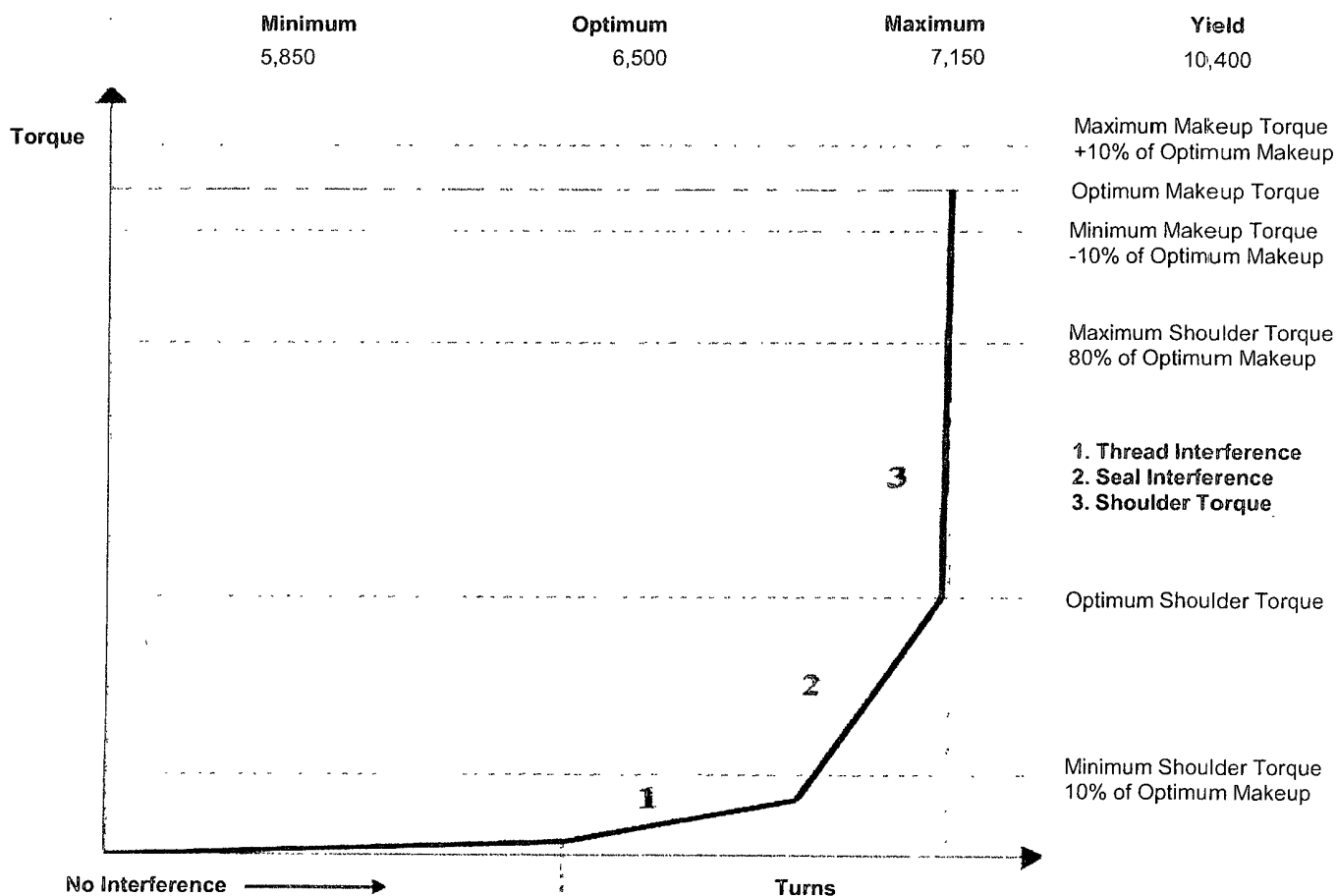


TECHNICAL DATA SHEET

5 1/2" ○ 17.00# ○ N-80

ULTRA FJ™ Premium Connection

Make-Up Torque (Ft-Lbs)



For Help Please Call Our ULTRA Field Service Manager:

Mobile (432) 557-1916

Office (432) 367-3201

Fax (432) 332-5019

state.
 The information in this Technical Data Sheet is for general information only. It should not be used or relied upon for any specific application without being independently verified by competent professional examination for accuracy, suitability and applicability. Anyone utilizing the information contained herein does so at their own risk.

5 1/2" x 17 N-80 UL Data June 2010 Rev. 1

Tel: 281-949-1023

Toll free: 888-258-2000



IPSCO

TECHNICAL DATA SHEET

ULTRA FJ™ Premium Connection

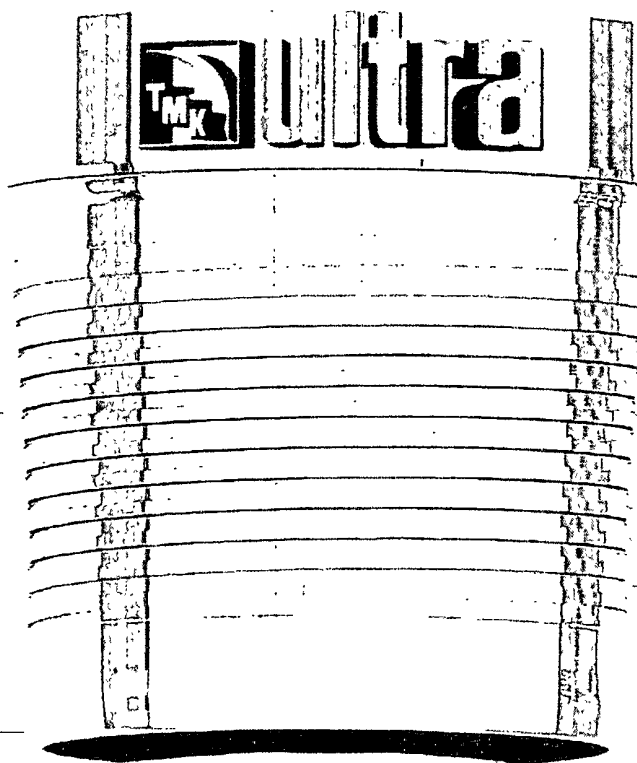
The Strongest Flush-Joint Connection

FullContact™ Threads

- Compression Efficiency
- High tension and bending capacity
- Deep, easy stabbing and quick, easy make-up with no cross threading risk

Sphere-and-Cone Internal Metal Seal

- External factors (axial loads, temperature, dope, make-up torque) do not affect seal performance
- Connection can be tripped multiple times



Positive Torque Stop

- Reliability and connection performance

External Metal Seal

- Pressure Integrity

Run-in/Run-out Threads

- Maximum critical section area
- Increases overall connection strength

Note

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6-12 x 17 1/2-90 To Date June 2012 Rev 1

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