

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD-ARTES

MOOREHEAD
FEB - 5 2007
OCD-ARTES, NM

FORM APPROVED
OMB No. 1004-0137
Expires: March 31, 2007

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE- Other instructions on reverse side.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator
COG Operating LLC

3a. Address
550 W. Texas Ave., Suite 1300 Midland, TX 79701

3b. Phone No. (include area code)
432-685-4340

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
SURFACE LOCATION: 1090' FNL & 330' FWL, SEC. 12, T17S, R30E, Unit D
BTM HOLE LOCATION: 991' FNL & 346' FWL, SEC. 12, T17S, R30E, Unit D

5. Lease Serial No.
LC-029338B

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.
HARVARD FEDERAL #7

9. API Well No.
30-015-35055

10. Field and Pool, or Exploratory Area
LOCO HILLS; GLORIETA YESO

11. County or Parish, State
EDDY, NM

12. CHECK 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
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Completion
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

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 recompleat 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 shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

11-10-06 Perf Yeso w/ 2 SPF @ 5427' - 5629.5'. 56 holes.
11-13-06 Acidize w/ 3000 gals acid.
11-15-06 Frac perfs w/ 94,453 gals gel, 8017# LiteProp, & 90,200# 16/30 sand.
11-16-06 Perf Yeso w/ 2 SPF @ 5037.5' - 5335.5'. 56 holes. Acidize w/ 3000 gals acid.
11-18-06 RIH w/ 181 jts 2-7/8" tbg set @ 5646'. RIH w/ 2-1/2" x 2" x 24' pump. Turn to production.

**ENTERED
IN AFMSS**

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

Phyllis Edwards

Title **Regulatory Analyst**

Signature

Phyllis Edwards

Date

01/15/2007

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

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.

Title

Office

ACCEPTED FOR RECORD

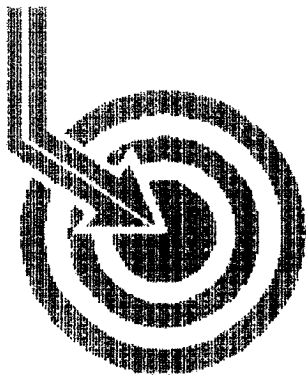
Date

FEB 2 2007

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)

**FREDERICK WRIGHT
PETROLEUM ENGINEER**



Scientific Drilling

MACK ENERGY

Field: Undes Loco Hills
Site: Eddy County, NM
Well: Harvard Federal #7
Wellpath: DH - Job #32D1006841
Survey: 10/17/06-10/29/06

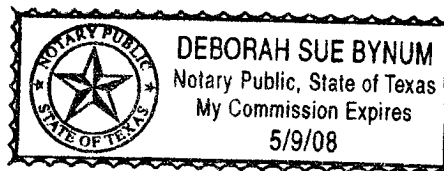
This survey is correct to the best of my knowledge
and is supported by actual field data.

.....*Deborah S. Bynum*.....Company Representative

Notorized this date 2nd of December, 2006.

Deborah S. Bynum
Notary Signature

County of Midland
State of Texas





Scientific Drilling International

Survey Report

Company: MACK ENERGY Date: 11/06/2006 Time: 21:09:28 Page: 1
Field: Undes Loco Hills Co-ordinate(NE) Reference: Site: Eddy County, NM, Grid North
Site: Eddy County, NM Vertical (TVD) Reference: SITE 0.0
Well: Harvard Federal #7 Section (VS) Reference: Well (0.00N,0.00E,5.19Azi)
Wellpath: VH - Job #32K1006842 Survey Calculation Method: Minimum Curvature Db: Sybase

Survey: 10/18/06 Start Date: 10/18/2006
KSRG 0'-1536'
Company: Scientific Drilling Internatio Engineer: Madrid/Rando
Tool: Keeper;Keeper Gyro Tied-to: From Surface

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
0.00	0.00	359.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.61	337.27	100.00	0.47	0.49	-0.21	0.61	0.53	337.27
200.00	0.76	27.08	199.99	1.56	1.57	-0.11	0.59	1.58	356.02
300.00	0.80	30.32	299.98	2.80	2.77	0.54	0.06	2.82	11.15
400.00	1.81	71.53	399.96	4.07	3.87	2.40	1.32	4.55	31.76
500.00	2.08	80.12	499.90	5.17	4.68	5.68	0.40	7.36	50.52
600.00	1.64	83.58	599.85	5.93	5.15	8.89	0.45	10.28	59.91
700.00	1.59	84.70	699.81	6.48	5.44	11.69	0.06	12.90	65.05
800.00	1.38	88.13	799.77	6.88	5.61	14.28	0.23	15.34	68.56
900.00	1.34	90.23	899.75	7.13	5.64	16.65	0.06	17.58	71.28
1000.00	1.48	86.38	999.71	7.42	5.72	19.11	0.17	19.95	73.34
1100.00	1.66	86.36	1099.68	7.84	5.89	21.84	0.18	22.63	74.90
1200.00	1.74	85.36	1199.63	8.33	6.11	24.80	0.09	25.54	76.17
1300.00	1.80	84.52	1299.59	8.88	6.38	27.88	0.07	28.60	77.11
1400.00	1.89	85.52	1399.53	9.44	6.66	31.09	0.10	31.79	77.91
1500.00	1.75	86.63	1499.48	9.95	6.88	34.26	0.14	34.94	78.65
1536.00	1.76	85.76	1535.47	10.12	6.95	35.36	0.08	36.03	78.88



Scientific Drilling International Survey Report

Company: MACK ENERGY	Date: 11/30/2006	Time: 14:49:18	Page: 1
Field: Undes Loco Hills	Co-ordinate(NE) Reference:	Site: Eddy County, NM, Grid North	
Site: Eddy County, NM	Vertical (TVD) Reference:	SITE 0.0	
Well: Harvard Federal #7	Section (VS) Reference:	Well (0.00N,0.00E,5.19Azi)	
Wellpath: DH - Job #32D1006841	Survey Calculation Method: Minimum Curvature	Db: Sybase	

Survey: 10/17/06-10/29/06	Start Date: 10/17/2006
MWD 1621'-5826'	
Company: Scientific Drilling Internatio	Engineer: Johns/Puntney/Lopez
Tool: MWD;MWD	Tied-to: From: Definitive Path

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
1536.00	1.76	85.76	1535.47	10.12	6.95	35.36	0.00	36.03	78.88
1621.00	1.95	98.11	1620.42	10.26	6.84	38.09	0.52	38.70	79.82
1652.00	1.95	98.11	1651.40	10.21	6.69	39.13	0.00	39.70	80.29
1683.00	2.00	73.85	1682.39	10.38	6.77	40.17	2.68	40.74	80.43
1714.00	2.15	60.75	1713.37	10.90	7.20	41.20	1.60	41.83	80.08
1746.00	3.04	27.92	1745.33	12.02	8.25	42.12	5.30	42.92	78.92
1777.00	4.16	8.68	1776.27	13.90	10.09	42.68	5.27	43.85	76.70
1809.00	4.70	1.10	1808.18	16.37	12.54	42.88	2.49	44.68	73.69
1840.00	5.89	354.20	1839.05	19.20	15.40	42.74	4.35	45.43	70.19
1871.00	7.43	345.20	1869.84	22.64	18.92	42.07	5.99	46.13	65.79
1903.00	8.07	341.50	1901.54	26.65	23.05	40.83	2.53	46.88	60.55
1933.00	7.92	340.80	1931.25	30.46	27.00	39.48	0.60	47.83	55.64
1965.00	7.84	340.20	1962.95	34.44	31.13	38.02	0.36	49.14	50.68
1996.00	7.75	339.50	1993.66	38.24	35.08	36.57	0.42	50.67	46.19
2027.00	7.41	338.60	2024.39	41.91	38.90	35.11	1.16	52.40	42.07
2059.00	8.13	340.30	2056.10	45.81	42.95	33.59	2.36	54.52	38.03
2089.00	8.35	339.90	2085.79	49.71	46.99	32.13	0.76	56.92	34.36
2121.00	8.19	340.10	2117.46	53.87	51.32	30.55	0.51	59.72	30.77
2152.00	7.96	339.20	2148.15	57.80	55.40	29.04	0.85	62.55	27.66
2184.00	7.88	339.00	2179.84	61.76	59.52	27.47	0.26	65.55	24.77
2216.00	8.38	338.60	2211.52	65.81	63.74	25.83	1.57	68.77	22.06
2247.00	8.30	339.80	2242.19	69.85	67.94	24.23	0.62	72.13	19.63
2278.00	8.27	342.90	2272.87	73.94	72.17	22.80	1.44	75.69	17.53
2310.00	8.27	344.60	2304.54	78.22	76.59	21.52	0.76	79.56	15.69
2342.00	8.08	344.50	2336.21	82.48	80.98	20.30	0.60	83.48	14.08
2373.00	8.09	344.30	2366.91	86.56	85.18	19.13	0.10	87.30	12.66
2405.00	7.11	343.10	2398.62	90.50	89.24	17.95	3.10	91.03	11.37
2436.00	5.59	340.90	2429.43	93.65	92.50	16.89	4.96	94.03	10.35
2467.00	5.51	338.50	2460.29	96.36	95.31	15.85	0.79	96.62	9.44
2498.00	5.50	339.50	2491.14	99.02	98.09	14.79	0.31	99.20	8.57
2529.00	5.44	343.52	2522.00	101.73	100.89	13.85	1.25	101.84	7.82
2560.00	4.43	340.42	2552.89	104.18	103.43	13.03	3.37	104.24	7.18
2592.00	3.40	337.93	2584.81	106.15	105.47	12.26	3.26	106.18	6.63
2623.00	2.52	333.09	2615.77	107.54	106.93	11.61	2.95	107.56	6.20
2655.00	1.58	318.92	2647.75	108.44	107.89	11.00	3.32	108.45	5.82
2686.00	0.90	280.50	2678.74	108.76	108.26	10.48	3.35	108.76	5.53
2717.00	0.83	240.19	2709.74	108.65	108.19	10.05	1.93	108.65	5.31
2748.00	1.05	240.15	2740.74	108.36	107.94	9.61	0.71	108.36	5.09
2779.00	0.81	217.10	2771.73	108.01	107.62	9.23	1.42	108.02	4.90
2810.00	0.69	215.40	2802.73	107.67	107.29	8.99	0.39	107.67	4.79
2841.00	0.38	220.20	2833.73	107.42	107.06	8.81	1.01	107.42	4.71
2873.00	0.61	212.18	2865.73	107.18	106.84	8.65	0.75	107.19	4.63
2904.00	0.69	208.30	2896.73	106.86	106.53	8.48	0.29	106.87	4.55
2936.00	0.74	208.50	2928.72	106.50	106.18	8.29	0.16	106.51	4.46
2967.00	0.58	183.50	2959.72	106.16	105.85	8.18	1.05	106.17	4.42
2998.00	0.23	179.70	2990.72	105.94	105.63	8.17	1.13	105.95	4.42
3030.00	0.26	117.80	3022.72	105.85	105.53	8.24	0.79	105.85	4.46
3059.00	0.35	168.00	3051.72	105.74	105.42	8.31	0.94	105.74	4.51
3091.00	0.20	203.20	3083.72	105.59	105.27	8.31	0.69	105.60	4.51



Scientific Drilling International

Survey Report

Company: MACK ENERGY
Field: Undes Loco Hills
Site: Eddy County, NM
Well: Harvard Federal #7
Wellpath: DH - Job #32D1006841

Date: 11/30/2006 **Time:** 14:49:18 **Page:** 2
Co-ordinate(NE) Reference: Site: Eddy County, NM, Grid North
Vertical (TVD) Reference: SITE 0.0
Section (VS) Reference: Well (0.00N,0.00E,5.19Azi)
Survey Calculation Method: Minimum Curvature **Db:** Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
3123.00	0.28	212.60	3115.72	105.47	105.15	8.25	0.28	105.47	4.48
3161.00	0.28	250.60	3153.72	105.35	105.04	8.11	0.48	105.35	4.41
3193.00	0.26	280.30	3185.72	105.32	105.03	7.96	0.44	105.33	4.34
3223.00	0.31	45.14	3215.72	105.39	105.10	7.95	1.69	105.40	4.33
3252.00	0.40	57.80	3244.72	105.51	105.21	8.10	0.41	105.52	4.40
3283.00	0.44	97.53	3275.72	105.57	105.25	8.31	0.93	105.58	4.51
3315.00	0.31	94.55	3307.72	105.57	105.23	8.51	0.41	105.57	4.63
3346.00	0.38	32.37	3338.72	105.66	105.31	8.65	1.17	105.66	4.70
3378.00	0.32	11.50	3370.71	105.84	105.48	8.73	0.44	105.84	4.73
3409.00	0.12	330.20	3401.71	105.95	105.60	8.73	0.78	105.96	4.73
3440.00	0.17	349.10	3432.71	106.02	105.67	8.70	0.22	106.03	4.71
3472.00	0.15	75.90	3464.71	106.08	105.73	8.74	0.69	106.09	4.72
3503.00	0.29	97.93	3495.71	106.09	105.73	8.85	0.52	106.10	4.79
3534.00	0.44	109.90	3526.71	106.06	105.68	9.04	0.54	106.06	4.89
3566.00	0.46	111.60	3558.71	105.99	105.59	9.28	0.08	105.99	5.02
3597.00	0.08	113.10	3589.71	105.95	105.53	9.41	1.23	105.95	5.10
3629.00	0.31	294.30	3621.71	105.97	105.56	9.35	1.22	105.97	5.06
3660.00	0.24	258.20	3652.71	105.98	105.58	9.21	0.59	105.98	4.99
3691.00	0.34	295.50	3683.71	105.99	105.61	9.07	0.67	105.99	4.91
3723.00	0.22	323.00	3715.71	106.07	105.70	8.94	0.55	106.07	4.84
3753.00	0.47	311.20	3745.71	106.19	105.82	8.82	0.86	106.19	4.76
3785.00	0.44	308.70	3777.71	106.33	105.99	8.62	0.11	106.34	4.65
3816.00	0.48	296.70	3808.71	106.45	106.12	8.41	0.34	106.45	4.53
3848.00	0.51	294.80	3840.71	106.54	106.24	8.17	0.11	106.55	4.39
3879.00	0.29	266.00	3871.71	106.58	106.29	7.96	0.94	106.59	4.28
3911.00	0.20	232.20	3903.71	106.53	106.25	7.84	0.52	106.54	4.22
3941.00	0.24	152.50	3933.71	106.44	106.16	7.82	0.95	106.45	4.22
3972.00	0.38	120.30	3964.71	106.34	106.05	7.94	0.70	106.35	4.28
4003.00	0.22	105.10	3995.71	106.28	105.99	8.09	0.57	106.30	4.36
4035.00	0.30	108.40	4027.70	106.25	105.94	8.23	0.25	106.26	4.44
4066.00	0.41	121.70	4058.70	106.19	105.86	8.40	0.44	106.19	4.54
4098.00	0.46	125.60	4090.70	106.07	105.73	8.60	0.18	106.08	4.65
4128.00	0.43	102.20	4120.70	106.00	105.63	8.81	0.61	106.00	4.77
4159.00	0.41	103.90	4151.70	105.96	105.58	9.03	0.08	105.97	4.89
4190.00	0.21	174.10	4182.70	105.89	105.50	9.14	1.27	105.89	4.95
4221.00	0.18	248.90	4213.70	105.81	105.42	9.10	0.77	105.82	4.94
4253.00	0.24	264.50	4245.70	105.78	105.40	8.99	0.26	105.78	4.88
4284.00	0.32	273.00	4276.70	105.76	105.40	8.84	0.29	105.77	4.79
4314.00	0.23	278.70	4306.70	105.77	105.41	8.70	0.31	105.77	4.72
4344.00	0.40	296.60	4336.70	105.81	105.47	8.54	0.65	105.81	4.63
4376.00	0.42	304.50	4368.70	105.91	105.58	8.35	0.19	105.91	4.52
4407.00	0.34	344.10	4399.70	106.05	105.74	8.23	0.87	106.06	4.45
4426.00	0.18	338.50	4418.70	106.13	105.82	8.20	0.85	106.14	4.43
4467.00	0.26	336.50	4459.70	106.27	105.96	8.14	0.20	106.28	4.39
4499.00	0.42	339.30	4491.70	106.43	106.14	8.07	0.50	106.45	4.35
4529.00	0.44	355.20	4521.70	106.65	106.36	8.02	0.40	106.66	4.31
4558.00	0.50	336.50	4550.70	106.87	106.58	7.96	0.56	106.88	4.27
4589.00	0.38	295.30	4581.69	107.02	106.75	7.82	1.06	107.04	4.19
4621.00	0.38	316.60	4613.69	107.13	106.87	7.65	0.44	107.15	4.09
4652.00	0.43	309.70	4644.69	107.26	107.02	7.49	0.23	107.29	4.00
4683.00	0.36	348.10	4675.69	107.42	107.19	7.38	0.86	107.45	3.94
4714.00	0.35	330.80	4706.69	107.59	107.37	7.31	0.35	107.62	3.90



Scientific Drilling International

Survey Report

Company: MACK ENERGY
Field: Undes Loco Hills
Site: Eddy County, NM
Well: Harvard Federal #7
Wellpath: DH - Job #32D1006841

Date: 11/30/2006 Time: 14:49:18 Page: 3
Co-ordinate(NE) Reference: Site: Eddy County, NM, Grid North
Vertical (TVD) Reference: SITE 0.0
Section (VS) Reference: Well (0.00N,0.00E,5.19Azi)
Survey Calculation Method: Minimum Curvature Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
4745.00	0.08	347.10	4737.69	107.69	107.47	7.26	0.88	107.72	3.86
4774.00	0.41	133.50	4766.69	107.65	107.42	7.33	1.65	107.67	3.90
4805.00	0.51	135.10	4797.69	107.49	107.25	7.51	0.33	107.51	4.00
4836.00	0.22	84.30	4828.69	107.41	107.16	7.66	1.32	107.43	4.09
4868.00	0.17	38.85	4860.69	107.46	107.20	7.76	0.49	107.48	4.14
4899.00	0.40	57.45	4891.69	107.57	107.29	7.88	0.79	107.58	4.20
4931.00	0.26	35.32	4923.69	107.70	107.41	8.01	0.58	107.71	4.27
4962.00	0.15	105.70	4954.69	107.75	107.46	8.09	0.82	107.76	4.31
4993.00	0.26	149.50	4985.69	107.69	107.39	8.17	0.59	107.70	4.35
5024.00	0.24	110.80	5016.69	107.61	107.30	8.26	0.54	107.62	4.40
5055.00	0.39	121.60	5047.69	107.55	107.23	8.41	0.52	107.56	4.49
5086.00	0.48	145.60	5078.69	107.40	107.06	8.58	0.65	107.41	4.58
5117.00	0.48	159.40	5109.69	107.18	106.84	8.70	0.37	107.19	4.65
5148.00	0.48	161.90	5140.68	106.95	106.59	8.78	0.07	106.95	4.71
5179.00	0.36	169.10	5171.68	106.74	106.37	8.84	0.42	106.74	4.75
5210.00	0.47	128.60	5202.68	106.57	106.20	8.96	0.98	106.57	4.82
5241.00	0.51	126.80	5233.68	106.43	106.03	9.17	0.14	106.43	4.94
5272.00	0.57	137.00	5264.68	106.25	105.84	9.38	0.36	106.25	5.07
5302.00	0.51	137.00	5294.68	106.07	105.63	9.58	0.20	106.07	5.18
5334.00	0.71	129.90	5326.68	105.86	105.40	9.83	0.67	105.86	5.33
5364.00	0.66	153.20	5356.68	105.61	105.13	10.05	0.94	105.61	5.46
5394.00	0.84	136.40	5386.67	105.31	104.81	10.28	0.94	105.32	5.60
5425.00	0.75	134.70	5417.67	105.04	104.51	10.58	0.30	105.04	5.78
5456.00	0.61	135.50	5448.67	104.80	104.25	10.84	0.45	104.81	5.93
5488.00	0.62	291.10	5480.67	104.74	104.19	10.79	3.76	104.74	5.92
5519.00	0.62	296.60	5511.66	104.84	104.32	10.49	0.19	104.85	5.74
5551.00	0.56	318.36	5543.66	105.01	104.52	10.23	0.72	105.02	5.59
5583.00	0.36	65.97	5575.66	105.17	104.67	10.22	2.35	105.17	5.57
5613.00	0.58	86.21	5605.66	105.24	104.72	10.45	0.91	105.24	5.70
5645.00	0.62	80.65	5637.66	105.31	104.76	10.79	0.22	105.32	5.88
5675.00	0.63	82.98	5667.66	105.38	104.81	11.11	0.09	105.40	6.05
5708.00	0.70	88.08	5700.66	105.45	104.84	11.49	0.28	105.47	6.26
5735.00	0.76	133.67	5727.65	105.36	104.72	11.79	2.10	105.38	6.42
5765.00	0.83	143.14	5757.65	105.07	104.41	12.06	0.50	105.10	6.59
5826.00	0.83	143.14	5818.64	104.42	103.70	12.59	0.00	104.46	6.92
6235	0.83	143.14	6227.64	100.42	98.96	16.15	0	100.27	9.27



Scientific
Drilling

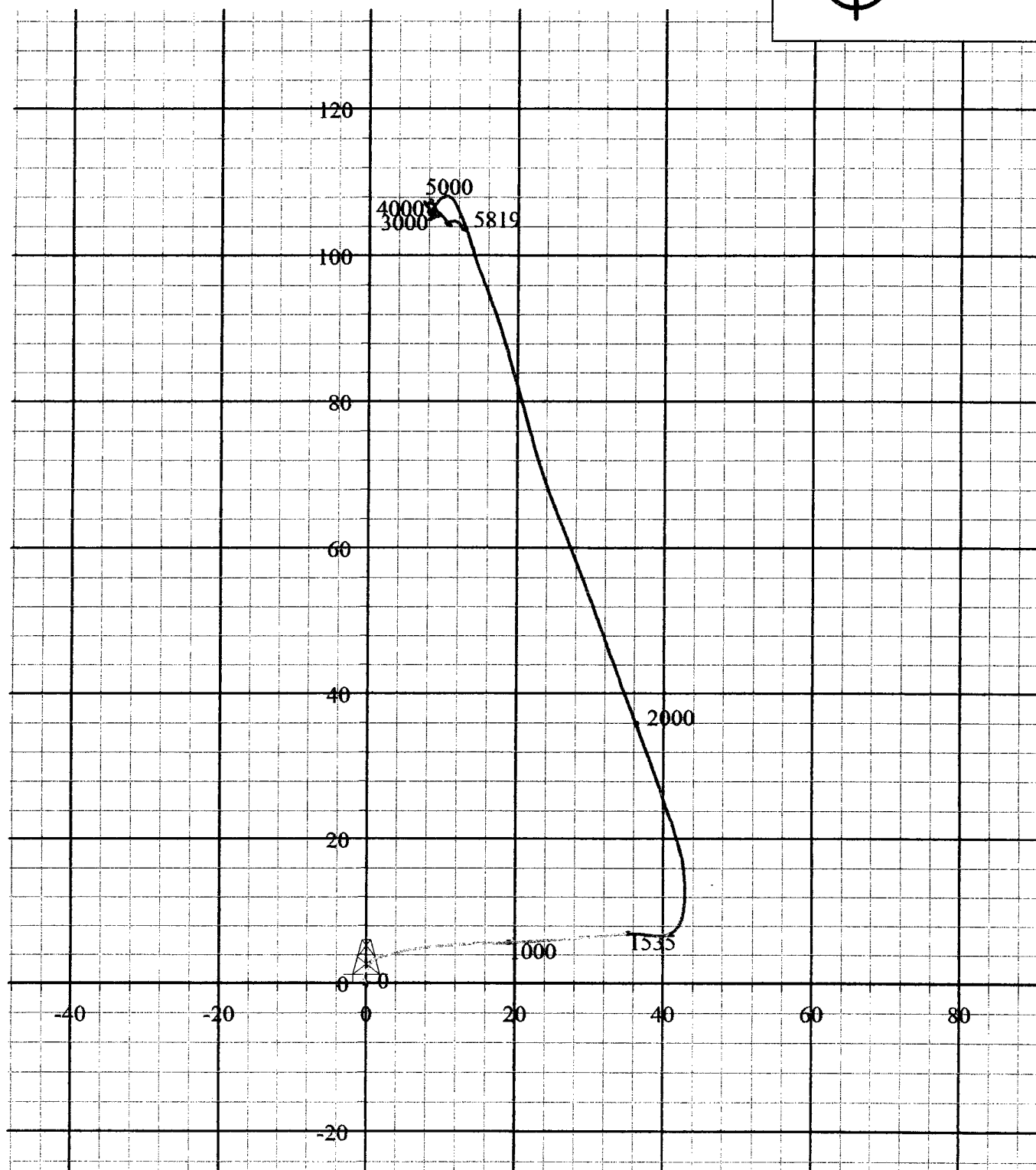
Field: Undes Loco Hills
Site: Eddy County, NM
Well: Harvard Federal #7
Wellpath: DH - Job #32D1006841
Survey: 10/17/06-10/29/06



Azimuths to Grid North
True North: 0.00°
Magnetic North: 0.00°

Magnetic Field
Strength: 0nT
Dip Angle: 0.00°
Date: 11/30/2006
Model: igrf2000

South(-)/North(+) [20ft/in]



West(-)/East(+) [20ft/in]

Scientific Drilling International
Survey Report

Company: MACK ENERGY
 Time: 14:39:58 Page: 1
 Field: Undesignated Loco Hills
 Reference Site: Eddy County, NM, Grid North
 Site: Eddy County, NM
 Reference: SITE 0.0
 Well: Harvard Federal #7
 Reference: well (0.00N,0.00E,5.19Azi)
 Wellpath: DH - Job #32D1006841
 Method: Minimum Curvature Db: Sybase

Date: 01/10/2007

Co-ordinate(NE)

Vertical (TVD)

Section (VS)

Survey Calculation

Survey: 10/17/06-10/29/06
 10/17/2006

Start Date:

MWD 1621'-5826' w/projection at 6235'MD

Company: Scientific Drilling Internatio
 Johns/Puntney/Lopez

Engineer:

Tool: MWD;MWD

Tied-to:

From: Definitive Path

Survey		Incl		Azim		TVD	VS	N/S
E/W	MD	DLS	ClsD	ClsA				
ft	ft	deg/100ft	deg	deg	deg	ft	ft	ft
	1536.00		1.76	85.76		1535.47	10.12	6.95
35.36	0.00		36.03	78.88				
	1621.00		1.95	98.11		1620.42	10.26	6.84
38.09	0.52		38.70	79.82				
	1652.00		1.95	98.11		1651.40	10.21	6.69
39.13	0.00		39.70	80.29				
	1683.00		2.00	73.85		1682.39	10.38	6.77
40.17	2.68		40.74	80.43				
	1714.00		2.15	60.75		1713.37	10.90	7.20
41.20	1.60		41.83	80.08				
	1746.00		3.04	27.92		1745.33	12.02	8.25
42.12	5.30		42.92	78.92				
	1777.00		4.16	8.68		1776.27	13.90	10.09
42.68	5.27		43.85	76.70				
	1809.00		4.70	1.10		1808.18	16.37	12.54
42.88	2.49		44.68	73.69				
	1840.00		5.89	354.20		1839.05	19.20	15.40
42.74	4.35		45.43	70.19				
	1871.00		7.43	345.20		1869.84	22.64	18.92
42.07	5.99		46.13	65.79				
	1903.00		8.07	341.50		1901.54	26.65	23.05
40.83	2.53		46.88	60.55				
	1933.00		7.92	340.80		1931.25	30.46	27.00
39.48	0.60		47.83	55.64				
	1965.00		7.84	340.20		1962.95	34.44	31.13
38.02	0.36		49.14	50.68				
	1996.00		7.75	339.50		1993.66	38.24	35.08
36.57	0.42		50.67	46.19				

HARVARD #7.TXT

35.11	2027.00 1.16	7.41 52.40	338.60 42.07	2024.39	41.91	38.90
33.59	2059.00 2.36	8.13 54.52	340.30 38.03	2056.10	45.81	42.95
32.13	2089.00 0.76	8.35 56.92	339.90 34.36	2085.79	49.71	46.99
30.55	2121.00 0.51	8.19 59.72	340.10 30.77	2117.46	53.87	51.32
29.04	2152.00 0.85	7.96 62.55	339.20 27.66	2148.15	57.80	55.40
27.47	2184.00 0.26	7.88 65.55	339.00 24.77	2179.84	61.76	59.52
25.83	2216.00 1.57	8.38 68.77	338.60 22.06	2211.52	65.81	63.74
24.23	2247.00 0.62	8.30 72.13	339.80 19.63	2242.19	69.85	67.94
22.80	2278.00 1.44	8.27 75.69	342.90 17.53	2272.87	73.94	72.17
21.52	2310.00 0.76	8.27 79.56	344.60 15.69	2304.54	78.22	76.59
20.30	2342.00 0.60	8.08 83.48	344.50 14.08	2336.21	82.48	80.98
19.13	2373.00 0.10	8.09 87.30	344.30 12.66	2366.91	86.56	85.18
17.95	2405.00 3.10	7.11 91.03	343.10 11.37	2398.62	90.50	89.24
16.89	2436.00 4.96	5.59 94.03	340.90 10.35	2429.43	93.65	92.50
15.85	2467.00 0.79	5.51 96.62	338.50 9.44	2460.29	96.36	95.31
14.79	2498.00 0.31	5.50 99.20	339.50 8.57	2491.14	99.02	98.09
13.85	2529.00 1.25	5.44 101.84	343.52 7.82	2522.00	101.73	100.89
13.03	2560.00 3.37	4.43 104.24	340.42 7.18	2552.89	104.18	103.43
12.26	2592.00 3.26	3.40 106.18	337.93 6.63	2584.81	106.15	105.47
11.61	2623.00 2.95	2.52 107.56	333.09 6.20	2615.77	107.54	106.93
11.00	2655.00 3.32	1.58 108.45	318.92 5.82	2647.75	108.44	107.89
10.48	2686.00 3.35	0.90 108.76	280.50 5.53	2678.74	108.76	108.26
10.05	2717.00 1.93	0.83 108.65	240.19 5.31	2709.74	108.65	108.19
9.61	2748.00 0.71	1.05 108.36	240.15 5.09	2740.74	108.36	107.94
9.23	2779.00 1.42	0.81 108.02	217.10 4.90	2771.73	108.01	107.62
8.99	2810.00 0.39	0.69 107.67	215.40 4.79	2802.73	107.67	107.29
8.81	2841.00 1.01	0.38 107.42	220.20 4.71	2833.73	107.42	107.06
8.65	2873.00 0.75	0.61 107.19	212.18 4.63	2865.73	107.18	106.84

HARVARD #7.TXT						
	2904.00	0.69	208.30	2896.73	106.86	106.53
8.48	0.29	106.87	4.55			
	2936.00	0.74	208.50	2928.72	106.50	106.18
8.29	0.16	106.51	4.46			
	2967.00	0.58	183.50	2959.72	106.16	105.85
8.18	1.05	106.17	4.42			
	2998.00	0.23	179.70	2990.72	105.94	105.63
8.17	1.13	105.95	4.42			
	3030.00	0.26	117.80	3022.72	105.85	105.53
8.24	0.79	105.85	4.46			
	3059.00	0.35	168.00	3051.72	105.74	105.42
8.31	0.94	105.74	4.51			
	3091.00	0.20	203.20	3083.72	105.59	105.27
8.31	0.69	105.60	4.51			

Scientific Drilling International Survey Report

Company: MACK ENERGY
Time: 14:39:58 Page: 2
Field: Undesignated Loco Hills
Reference: Site: Eddy County, NM, Grid North
Site: Eddy County, NM
Reference: SITE 0.0
Well: Harvard Federal #7
Reference: well (0.00N,0.00E,5.19Azi)
Wellpath: DH - Job #32D1006841
Method: Minimum Curvature Db: Sybase

Date: 01/10/2007
Co-ordinate(NE)
Vertical (TVD)
Section (VS)
Survey Calculation

Survey		Incl C/D deg	Azim C/A deg	TVD ft	VS ft	N/S ft
E/W	MD DLS ft deg/100ft					
8.25	3123.00 0.28	0.28 105.47	212.60 4.48	3115.72	105.47	105.15
8.11	3161.00 0.48	0.28 105.35	250.60 4.41	3153.72	105.35	105.04
7.96	3193.00 0.44	0.26 105.33	280.30 4.34	3185.72	105.32	105.03
7.95	3223.00 1.69	0.31 105.40	45.14 4.33	3215.72	105.39	105.10
8.10	3252.00 0.41	0.40 105.52	57.80 4.40	3244.72	105.51	105.21
8.31	3283.00 0.93	0.44 105.58	97.53 4.51	3275.72	105.57	105.25
8.51	3315.00 0.41	0.31 105.57	94.55 4.63	3307.72	105.57	105.23
	3346.00	0.38	32.37	3338.72	105.66	105.31

HARVARD #7.TXT

8.65	1.17	105.66	4.70			
	3378.00	0.32	11.50	3370.71	105.84	105.48
8.73	0.44	105.84	4.73			
	3409.00	0.12	330.20	3401.71	105.95	105.60
8.73	0.78	105.96	4.73			
	3440.00	0.17	349.10	3432.71	106.02	105.67
8.70	0.22	106.03	4.71			
	3472.00	0.15	75.90	3464.71	106.08	105.73
8.74	0.69	106.09	4.72			
	3503.00	0.29	97.93	3495.71	106.09	105.73
8.85	0.52	106.10	4.79			
	3534.00	0.44	109.90	3526.71	106.06	105.68
9.04	0.54	106.06	4.89			
	3566.00	0.46	111.60	3558.71	105.99	105.59
9.28	0.08	105.99	5.02			
	3597.00	0.08	113.10	3589.71	105.95	105.53
9.41	1.23	105.95	5.10			
	3629.00	0.31	294.30	3621.71	105.97	105.56
9.35	1.22	105.97	5.06			
	3660.00	0.24	258.20	3652.71	105.98	105.58
9.21	0.59	105.98	4.99			
	3691.00	0.34	295.50	3683.71	105.99	105.61
9.07	0.67	105.99	4.91			
	3723.00	0.22	323.00	3715.71	106.07	105.70
8.94	0.55	106.07	4.84			
	3753.00	0.47	311.20	3745.71	106.19	105.82
8.82	0.86	106.19	4.76			
	3785.00	0.44	308.70	3777.71	106.33	105.99
8.62	0.11	106.34	4.65			
	3816.00	0.48	296.70	3808.71	106.45	106.12
8.41	0.34	106.45	4.53			
	3848.00	0.51	294.80	3840.71	106.54	106.24
8.17	0.11	106.55	4.39			
	3879.00	0.29	266.00	3871.71	106.58	106.29
7.96	0.94	106.59	4.28			
	3911.00	0.20	232.20	3903.71	106.53	106.25
7.84	0.52	106.54	4.22			
	3941.00	0.24	152.50	3933.71	106.44	106.16
7.82	0.95	106.45	4.22			
	3972.00	0.38	120.30	3964.71	106.34	106.05
7.94	0.70	106.35	4.28			
	4003.00	0.22	105.10	3995.71	106.28	105.99
8.09	0.57	106.30	4.36			
	4035.00	0.30	108.40	4027.70	106.25	105.94
8.23	0.25	106.26	4.44			
	4066.00	0.41	121.70	4058.70	106.19	105.86
8.40	0.44	106.19	4.54			
	4098.00	0.46	125.60	4090.70	106.07	105.73
8.60	0.18	106.08	4.65			
	4128.00	0.43	102.20	4120.70	106.00	105.63
8.81	0.61	106.00	4.77			
	4159.00	0.41	103.90	4151.70	105.96	105.58
9.03	0.08	105.97	4.89			
	4190.00	0.21	174.10	4182.70	105.89	105.50
9.14	1.27	105.89	4.95			
	4221.00	0.18	248.90	4213.70	105.81	105.42
9.10	0.77	105.82	4.94			

			HARVARD #7.TXT			
8.99	4253.00 0.26	0.24 105.78	264.50 4.88	4245.70	105.78	105.40
8.84	4284.00 0.29	0.32 105.77	273.00 4.79	4276.70	105.76	105.40
8.70	4314.00 0.31	0.23 105.77	278.70 4.72	4306.70	105.77	105.41
8.54	4344.00 0.65	0.40 105.81	296.60 4.63	4336.70	105.81	105.47
8.35	4376.00 0.19	0.42 105.91	304.50 4.52	4368.70	105.91	105.58
8.23	4407.00 0.87	0.34 106.06	344.10 4.45	4399.70	106.05	105.74
8.20	4426.00 0.85	0.18 106.14	338.50 4.43	4418.70	106.13	105.82
8.14	4467.00 0.20	0.26 106.28	336.50 4.39	4459.70	106.27	105.96
8.07	4499.00 0.50	0.42 106.45	339.30 4.35	4491.70	106.43	106.14
8.02	4529.00 0.40	0.44 106.66	355.20 4.31	4521.70	106.65	106.36
7.96	4558.00 0.56	0.50 106.88	336.50 4.27	4550.70	106.87	106.58
7.82	4589.00 1.06	0.38 107.04	295.30 4.19	4581.69	107.02	106.75
7.65	4621.00 0.44	0.38 107.15	316.60 4.09	4613.69	107.13	106.87
7.49	4652.00 0.23	0.43 107.29	309.70 4.00	4644.69	107.26	107.02
7.38	4683.00 0.86	0.36 107.45	348.10 3.94	4675.69	107.42	107.19
7.31	4714.00 0.35	0.35 107.62	330.80 3.90	4706.69	107.59	107.37

Scientific Drilling International Survey Report

Company: MACK ENERGY
Time: 14:39:58
Field: Undesignated Loco Hills
Reference Site: Eddy County, NM, Grid North
Site: Eddy County, NM
Reference: SITE 0.0
Well: Harvard Federal #7
Reference: Well (0.00N,0.00E,5.19Azi)
Wellpath: DH - Job #32D1006841
Method: Minimum Curvature Db: Sybase

Date: 01/10/2007
Co-ordinate(NE)
Vertical (TVD)
Section (VS)
Survey Calculation

Survey	MD	Incl	Azim	TVD	VS	N/S
--------	----	------	------	-----	----	-----

HARVARD #7.TXT

E/W	DLS	ClsD	ClsA			
ft	ft	deg	deg	ft	ft	ft
	deg/100ft	ft	deg			
	4745.00	0.08	347.10	4737.69	107.69	107.47
7.26	0.88	107.72	3.86			
	4774.00	0.41	133.50	4766.69	107.65	107.42
7.33	1.65	107.67	3.90			
	4805.00	0.51	135.10	4797.69	107.49	107.25
7.51	0.33	107.51	4.00			
	4836.00	0.22	84.30	4828.69	107.41	107.16
7.66	1.32	107.43	4.09			
	4868.00	0.17	38.85	4860.69	107.46	107.20
7.76	0.49	107.48	4.14			
	4899.00	0.40	57.45	4891.69	107.57	107.29
7.88	0.79	107.58	4.20			
	4931.00	0.26	35.32	4923.69	107.70	107.41
8.01	0.58	107.71	4.27			
	4962.00	0.15	105.70	4954.69	107.75	107.46
8.09	0.82	107.76	4.31			
	4993.00	0.26	149.50	4985.69	107.69	107.39
8.17	0.59	107.70	4.35			
	5024.00	0.24	110.80	5016.69	107.61	107.30
8.26	0.54	107.62	4.40			
	5055.00	0.39	121.60	5047.69	107.55	107.23
8.41	0.52	107.56	4.49			
	5086.00	0.48	145.60	5078.69	107.40	107.06
8.58	0.65	107.41	4.58			
	5117.00	0.48	159.40	5109.69	107.18	106.84
8.70	0.37	107.19	4.65			
	5148.00	0.48	161.90	5140.68	106.95	106.59
8.78	0.07	106.95	4.71			
	5179.00	0.36	169.10	5171.68	106.74	106.37
8.84	0.42	106.74	4.75			
	5210.00	0.47	128.60	5202.68	106.57	106.20
8.96	0.98	106.57	4.82			
	5241.00	0.51	126.80	5233.68	106.43	106.03
9.17	0.14	106.43	4.94			
	5272.00	0.57	137.00	5264.68	106.25	105.84
9.38	0.36	106.25	5.07			
	5302.00	0.51	137.00	5294.68	106.07	105.63
9.58	0.20	106.07	5.18			
	5334.00	0.71	129.90	5326.68	105.86	105.40
9.83	0.67	105.86	5.33			
	5364.00	0.66	153.20	5356.68	105.61	105.13
10.05	0.94	105.61	5.46			
	5394.00	0.84	136.40	5386.67	105.31	104.81
10.28	0.94	105.32	5.60			
	5425.00	0.75	134.70	5417.67	105.04	104.51
10.58	0.30	105.04	5.78			
	5456.00	0.61	135.50	5448.67	104.80	104.25
10.84	0.45	104.81	5.93			
	5488.00	0.62	291.10	5480.67	104.74	104.19
10.79	3.76	104.74	5.92			
	5519.00	0.62	296.60	5511.66	104.84	104.32
10.49	0.19	104.85	5.74			
	5551.00	0.56	318.36	5543.66	105.01	104.52
10.23	0.72	105.02	5.59			

			HARVARD #7.TXT			
	5583.00	0.36	65.97	5575.66	105.17	104.67
10.22	2.35	105.17	5.57			
	5613.00	0.58	86.21	5605.66	105.24	104.72
10.45	0.91	105.24	5.70			
	5645.00	0.62	80.65	5637.66	105.31	104.76
10.79	0.22	105.32	5.88			
	5675.00	0.63	82.98	5667.66	105.38	104.81
11.11	0.09	105.40	6.05			
	5708.00	0.70	88.08	5700.66	105.45	104.84
11.49	0.28	105.47	6.26			
	5735.00	0.76	133.67	5727.65	105.36	104.72
11.79	2.10	105.38	6.42			
	5765.00	0.83	143.14	5757.65	105.07	104.41
12.06	0.50	105.10	6.59			
	5826.00	0.83	143.14	5818.64	104.42	103.70
12.59	0.00	104.46	6.92			
	6235.00	0.83	143.14	6227.60	100.02	98.96
16.15	0.00	100.27	9.27			