



Directional Survey

ARTESIA DISTRICT
DELAWARE BASIN WEST UNRESTRICTED
MAR 07 2016

Well Name: COTTON DRAW UNIT 290H

RECEIVED

Sub-Division DELAWARE BASIN WEST		Region BASIN WEST		Field Name PADUCA		County EDDY		State/Province NM					
Surface Legal Location SEC 36 24S R31E		API/UWI 3001543265		Latitude (") 32° 10' 49.94" N		Longitude (") 103° 43' 33.034" W		Orig KB Elevation (ft) 3,541.00		Ground Elev MSL (ft) 3,514.00		KB - GL (ft) 27.00	
Wellbores													
Wellbore Name OH		Parent Wellbore				SAP Well ID 39043				Vertical Section Direction (")			
Kick Offs & Key Depths													
Date 11/5/2015				Type CURVE				Top Depth (ftKB) 9,970.0					
Actual Deviation Survey EXTREME, Proposed? No				Definitive? No		Proposed? No		Proposed Deviation Survey EXTREME, Proposed? No					
Deviation Survey													
Date 10/18/2015		Description EXTREME											
MD Tie In (ftKB)		TVD Tie In (ftKB)		Inclination Tie In (")		Azimuth Tie In (")		NSTie In (ft)		EWTie In (ft)			
Survey Data													
Date	MD (ftKB)	Incl (")	Azm (")	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS ("/100ft)	Survey Tool	Survey Company			
10/18/2...	205.00	0.70	167.49	204.99	1.23	-1.22	0.27	0.34	MWD	EXTREME			
10/18/2...	267.00	0.79	153.21	266.99	2.00	-1.97	0.55	0.33	MWD	EXTREME			
10/18/2...	330.00	0.79	151.18	329.98	2.79	-2.74	0.95	0.04	MWD	EXTREME			
10/18/2...	392.00	0.79	158.22	391.98	3.58	-3.51	1.32	0.16	MWD	EXTREME			
10/18/2...	457.00	0.62	161.91	456.97	4.34	-4.26	1.59	0.27	MWD	EXTREME			
10/18/2...	519.00	0.62	164.02	518.97	4.99	-4.91	1.79	0.04	MWD	EXTREME			
10/18/2...	584.00	0.62	162.39	583.97	5.67	-5.58	1.99	0.03	MWD	EXTREME			
10/18/2...	646.00	0.62	159.09	645.96	6.31	-6.21	2.21	0.06	MWD	EXTREME			
10/18/2...	709.00	0.48	159.09	708.96	6.89	-6.78	2.43	0.22	MWD	EXTREME			
10/18/2...	740.00	0.48	153.82	739.96	7.13	-7.01	2.53	0.14	MWD	EXTREME			
10/21/2...	956.00	0.40	132.90	955.95	8.50	-8.34	3.48	0.08	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	1,142.00	0.30	116.30	1,141.95	9.21	-9.00	4.40	0.08	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	1,332.00	0.20	125.10	1,331.95	9.65	-9.41	5.11	0.06	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	1,522.00	0.30	97.40	1,521.94	9.95	-9.66	5.88	0.08	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	1,712.00	0.20	175.80	1,711.94	10.37	-10.06	6.39	0.17	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	1,902.00	0.40	109.30	1,901.94	10.95	-10.61	7.04	0.19	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	2,092.00	0.20	167.10	2,091.94	11.53	-11.15	7.74	0.18	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	2,282.00	0.20	189.30	2,281.94	12.18	-11.80	7.77	0.04	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	2,473.00	0.10	100.50	2,472.94	12.54	-12.16	7.88	0.12	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	2,663.00	0.40	144.60	2,662.94	13.14	-12.73	8.42	0.18	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	2,852.00	0.70	126.90	2,851.93	14.43	-13.96	9.73	0.18	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	3,042.00	0.50	139.90	3,041.92	15.84	-15.29	11.19	0.13	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	3,233.00	0.50	122.00	3,232.91	16.98	-16.37	12.43	0.08	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	3,423.00	0.40	106.80	3,422.90	17.67	-17.00	13.77	0.08	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	3,613.00	0.40	127.60	3,612.90	18.33	-17.60	14.93	0.08	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	3,803.00	0.40	164.30	3,802.89	19.40	-18.64	15.64	0.13	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	3,993.00	0.60	124.10	3,992.89	20.65	-19.84	16.64	0.21	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	4,183.00	0.80	125.10	4,182.87	22.06	-21.16	18.55	0.11	MWD	LEAM DRILLING SYSTEMS			
10/21/2...	4,267.00	0.80	130.80	4,266.86	22.83	-21.88	19.47	0.09	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	4,489.00	0.80	148.00	4,488.84	25.25	-24.21	21.47	0.11	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	4,680.00	0.70	149.20	4,679.83	27.45	-26.34	22.77	0.05	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	4,870.00	0.80	132.30	4,869.81	29.42	-28.23	24.35	0.13	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	5,060.00	0.70	121.40	5,059.79	31.01	-29.73	26.32	0.09	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	5,250.00	1.20	59.40	5,249.77	30.74	-29.32	29.02	0.56	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	5,440.00	2.60	48.80	5,439.66	27.14	-25.47	33.98	0.76	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	5,630.00	4.10	36.40	5,629.34	19.21	-17.16	41.25	0.87	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	5,820.00	5.70	42.90	5,818.64	7.37	-4.78	51.70	0.89	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	6,010.00	5.40	44.30	6,007.75	-5.28	8.53	64.37	0.17	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	6,200.00	5.80	46.40	6,196.84	-17.62	21.55	77.57	0.24	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	6,390.00	6.40	49.20	6,385.76	-30.39	35.09	92.54	0.35	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	6,580.00	6.80	50.80	6,574.50	-43.56	49.12	109.27	0.23	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	6,771.00	6.10	52.70	6,764.29	-56.00	62.41	126.11	0.38	MWD	LEAM DRILLING SYSTEMS			
10/24/2...	6,961.00	5.30	52.90	6,953.35	-66.64	73.83	141.14	0.42	MWD	LEAM DRILLING SYSTEMS			
10/25/2...	7,152.00	4.70	51.60	7,143.62	-76.15	84.01	154.30	0.32	MWD	LEAM DRILLING SYSTEMS			
10/25/2...	7,342.00	7.30	59.40	7,332.57	-86.28	94.99	170.80	1.43	MWD	LEAM DRILLING SYSTEMS			
10/25/2...	7,532.00	7.30	62.40	7,521.03	-96.95	106.73	191.88	0.20	MWD	LEAM DRILLING SYSTEMS			
10/25/2...	7,722.00	6.90	67.60	7,709.58	-105.81	116.67	213.13	0.40	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	7,912.00	5.30	73.80	7,898.50	-111.64	123.47	232.11	0.91	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	8,000.00	4.90	70.12	7,986.15	-113.68	125.88	239.55	0.59	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	8,100.00	4.88	68.03	8,085.78	-116.32	128.92	247.51	0.18	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	8,200.00	5.39	62.44	8,185.38	-119.67	132.69	255.62	0.71	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	8,300.00	4.71	67.72	8,284.99	-122.99	136.42	263.58	0.82	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	8,400.00	3.96	72.30	8,384.71	-125.24	139.02	270.67	0.83	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	8,500.00	3.22	80.20	8,484.51	-126.46	140.55	276.73	0.89	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	8,600.00	2.42	91.20	8,584.39	-126.65	140.98	281.61	0.96	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	8,700.00	1.71	92.88	8,684.33	-126.35	140.86	285.21	0.71	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	8,800.00	1.67	117.78	8,784.28	-125.46	140.11	287.99	0.73	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	8,900.00	1.66	131.33	8,884.24	-123.71	138.47	290.37	0.39	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	9,000.00	1.39	134.32	8,984.21	-121.81	136.67	292.32	0.28	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,100.00	0.87	140.29	9,084.19	-120.31	135.24	293.67	0.53	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,200.00	0.90	140.81	9,184.17	-119.07	134.05	294.66	0.03	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,300.00	0.83	150.05	9,284.16	-117.79	132.81	295.51	0.16	GYRO	GYRODATA SERVICES CA...			

Provide signature page for Survey



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Sub-Division		Region		Field Name			County		State/Province				
DELAWARE BASIN WEST		BASIN WEST		PADUCA			EDDY		NM				
Surface Legal Location		API/UWI		Latitude (°)		Longitude (°)		Orig KB Elevation (ft)		Ground Elev MSL (ft)		KB - GL (ft)	
SEC 36 24S R31E		3001543265		32° 10' 49.94" N		103° 43' 33.034" W		3,541.00		3,514.00		27.00	
Survey Data													
Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company			
10/26/2...	9,400.00	1.13	161.68	9,384.15	-116.19	131.25	296.18	0.36	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,500.00	1.29	180.01	9,484.13	-114.12	129.19	296.49	0.42	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,600.00	1.45	187.91	9,584.10	-111.75	126.81	296.32	0.25	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,700.00	1.32	178.36	9,684.07	-109.36	124.40	296.18	0.26	GYRO	GYRODATA SERVICES CA...			
10/26/2...	9,750.00	1.13	177.64	9,734.06	-108.29	123.33	296.22	0.38	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	9,902.00	1.70	175.60	9,886.01	-104.54	119.59	296.45	0.38	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	9,997.00	4.70	183.00	9,980.85	-99.25	114.29	296.35	3.18	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,044.00	8.90	178.90	10,027.51	-93.70	108.73	296.32	8.99	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,092.00	13.50	179.40	10,074.58	-84.39	99.41	296.45	9.59	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,139.00	17.40	187.50	10,119.88	-71.99	86.96	295.59	9.46	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,187.00	20.80	189.10	10,165.23	-56.59	71.42	293.31	7.17	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,234.00	23.80	186.50	10,208.71	-39.06	53.75	290.91	6.72	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,283.00	27.80	184.50	10,252.82	-17.97	32.53	288.90	8.35	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,330.00	31.80	184.00	10,293.60	5.21	9.24	287.17	8.53	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,377.00	34.30	184.00	10,332.99	30.65	-16.33	285.39	5.32	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,424.00	38.30	185.80	10,370.86	58.21	-44.04	282.99	8.81	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,473.00	42.80	185.60	10,408.09	89.70	-75.73	279.83	9.19	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,520.00	45.70	185.10	10,441.75	122.15	-108.38	276.77	6.21	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,567.00	49.10	185.10	10,473.56	156.41	-142.83	273.70	7.23	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,599.00	55.10	184.70	10,493.20	181.42	-167.98	271.55	18.78	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,631.00	61.60	184.20	10,509.99	208.42	-195.13	269.44	20.36	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,662.00	67.20	183.50	10,523.38	236.18	-223.01	267.57	18.18	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,694.00	70.30	182.80	10,534.97	265.83	-252.78	265.93	9.90	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,726.00	73.60	182.80	10,544.89	296.10	-283.17	264.44	10.31	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,758.00	76.30	182.80	10,553.20	326.85	-314.03	262.93	8.44	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,790.00	80.10	182.60	10,559.74	358.02	-345.31	261.46	11.89	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,821.00	86.20	182.60	10,563.43	388.64	-376.05	260.06	19.68	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,853.00	87.10	182.60	10,565.30	420.44	-407.96	258.61	2.81	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,885.00	87.90	181.90	10,566.70	452.28	-439.90	257.36	3.32	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	10,948.00	89.40	180.30	10,568.18	515.11	-502.87	256.15	3.48	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,043.00	89.30	180.70	10,569.26	609.94	-597.86	255.32	0.43	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,138.00	89.70	179.40	10,570.09	704.81	-692.86	255.24	1.43	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,234.00	90.10	179.30	10,570.26	800.74	-788.85	256.33	0.43	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,329.00	89.40	180.70	10,570.67	895.61	-883.84	256.33	1.65	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,424.00	92.10	179.40	10,569.43	990.47	-978.83	256.24	3.15	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,519.00	92.20	180.00	10,565.86	1,085.30	-1,073.76	256.74	0.64	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,614.00	91.50	180.80	10,562.80	1,180.10	-1,168.70	256.08	1.12	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,709.00	90.60	181.90	10,561.06	1,274.82	-1,263.66	253.84	1.50	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,804.00	89.50	182.60	10,560.97	1,369.44	-1,358.58	250.11	1.37	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,899.00	90.60	183.50	10,560.89	1,463.93	-1,453.45	245.06	1.50	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	11,994.00	91.60	182.10	10,559.07	1,558.44	-1,548.31	240.42	1.81	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,089.00	90.70	181.40	10,557.16	1,653.11	-1,643.25	237.52	1.20	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,184.00	90.60	180.10	10,556.08	1,747.91	-1,738.23	236.27	1.37	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,279.00	91.50	178.20	10,554.34	1,842.83	-1,833.20	237.68	2.21	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,374.00	90.90	177.30	10,552.35	1,937.80	-1,928.10	241.41	1.14	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,470.00	90.00	177.70	10,551.60	2,033.79	-2,024.01	245.60	1.03	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,565.00	90.70	178.20	10,551.02	2,128.78	-2,118.94	249.00	0.91	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,660.00	89.60	178.90	10,550.77	2,223.75	-2,213.91	251.40	1.37	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,755.00	90.70	178.60	10,550.52	2,318.71	-2,308.89	253.47	1.20	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,850.00	91.40	178.40	10,548.78	2,413.67	-2,403.84	255.96	0.77	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	12,945.00	90.80	178.60	10,546.96	2,508.62	-2,498.79	258.45	0.67	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,040.00	91.70	177.00	10,544.88	2,603.59	-2,593.69	262.09	1.93	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,135.00	91.50	178.00	10,542.23	2,698.55	-2,688.56	266.23	1.07	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,230.00	91.50	177.70	10,539.74	2,793.51	-2,783.46	269.80	0.32	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,325.00	90.70	177.70	10,537.92	2,888.48	-2,878.37	273.61	0.84	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,420.00	89.40	177.70	10,537.84	2,983.48	-2,973.29	277.42	1.37	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,515.00	91.50	178.60	10,537.09	3,078.45	-3,068.23	280.49	2.40	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,610.00	91.80	179.10	10,534.36	3,173.37	-3,163.17	282.39	0.61	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,705.00	91.70	177.90	10,531.45	3,268.29	-3,258.09	284.88	1.27	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,801.00	92.30	178.40	10,528.10	3,364.22	-3,353.98	287.98	0.81	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,896.00	92.80	180.70	10,523.88	3,459.03	-3,448.88	288.72	2.48	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	13,991.00	91.30	181.20	10,520.48	3,553.76	-3,543.80	287.15	1.66	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	14,086.00	91.10	182.10	10,518.49	3,648.44	-3,638.74	284.41	0.97	MWD	LEAM DRILLING SYSTEMS			
10/26/2...	14,181.00	91.50	183.50	10,516.33	3,742.94	-3,733.60	279.77	1.53	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,276.00	88.90	182.60	10,516.00	3,837.43	-3,828.46	274.72	2.90	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,371.00	87.90	182.80	10,518.65	3,931.94	-3,923.31	270.25	1.07	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,466.00	88.10	181.70	10,521.97	4,026.50	-4,018.18	266.52	1.18	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,561.00	88.60	180.80	10,524.71	4,121.21	-4,113.12	264.45	1.08	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,656.00	90.70	180.80	10,525.29	4,216.01	-4,208.10	263.12	2.21	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,751.00	92.90	182.10	10,522.30	4,310.68	-4,303.02	260.72	2.69	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,846.00	92.60	183.10	10,517.74	4,405.14	-4,397.81	256.41	1.10	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	14,941.00	91.90	183.00	10,514.01	4,499.56	-4,492.60	251.36	0.74	MWD	LEAM DRILLING SYSTEMS			
11/13/2...	15,036.00	90.90	182.40	10,511.69	4,594.08	-4,587.46	246.89	1.23	MWD	LEAM DRILLING SYSTEMS			
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Well Name: COTTON DRAW UNIT 290H

Sub-Division DELAWARE BASIN WEST		Region BASIN WEST		Field Name PADUCA		County EDDY		State/Province NM		
Surface Legal Location SEC 36 24S R31E		API/UWI 3001543265		Latitude (°) 32° 10' 49.94" N	Longitude (°) 103° 43' 33.034" W	Orig KB Elevation (ft) 3,541.00	Ground Elev MSL (ft) 3,514.00	KB - GL (ft) 27.00		
Survey Data										
Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
11/13/2...	15,131.00	90.90	183.30	10,510.20	4,688.59	-4,682.33	242.17	0.95	MWD	LEAM DRILLING SYSTEMS
11/13/2...	15,191.00	90.90	183.00	10,509.26	4,748.25	-4,742.24	238.87	0.50	BIT	LEAM DRILLING SYSTEMS