

30-015-38642

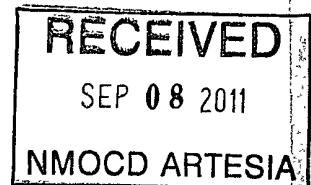
COG OPERATING

Hackberry
Eddy County, NM
Super Fortress "29" #3H
VH - Job #32K0411355

Survey: Actual

SDI Standard Survey Report

13 May, 2011



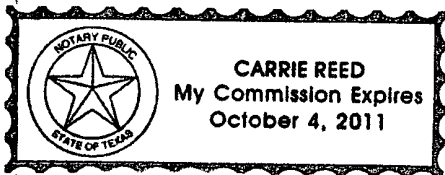
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 17th of May, 2011.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Super Fortress "29" #3H
Project:	Hackberry	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Super Fortress "29" #3H	North Reference:	Grid
Wellbore:	VH - Job #32K0411355	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0411355	Database:	EDM-Regulatory

Project:	Hackberry		
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:	Eddy County, NM				
Site Position:		Northing:	585,914 14 usft	Latitude:	32° 36' 36 000 N
From:	Lat/Long	Easting:	636,513 95 usft	Longitude:	103° 53' 24 000 W
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0 24 °

Well	Super Fortress "29" #3H, Directional (Pathfinder)					
Well Position	+N/-S	0 0 usft	Northing:	596,005 39 usft	Latitude:	32° 38' 15 895 N
	+E/-W	0 0 usft	Easting:	635,602 80 usft	Longitude:	103° 53' 34 163 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	0 0 usft

Wellbore	VH - Job #32K0411355				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/20/2011	7 79	60 52	48,872

Design	VH - Job #32K0411355				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0 0	0 0	0 0	180 91	

Survey Program		Date 5/13/2011		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	9,000 0	Actual (VH - Job #32K0411355)	Keeper	Keeper Gyro

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)		
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0		
100 0	0 29	268 60	100 0	0 0	-0 3	268 60	0 3		
200 0	0 35	229 48	200 0	-0 2	-0 7	254 06	0 8		
300 0	0 69	230 90	300 0	-0 8	-1 4	241 24	1 6		
400 0	0 93	252 96	400 0	-1 4	-2 7	242 32	3 0		
500 0	1 03	253 96	500 0	-1 9	-4 3	246 34	4 7		
600 0	0 88	262 34	600 0	-2 2	-5 9	249 33	6 4		
700 0	0 92	261 26	699 9	-2 5	-7 5	251.79	7 9		
800 0	0 58	252 10	799 9	-2 7	-8 8	252 63	9 2		
900 0	0 44	235 56	899 9	-3 1	-9 6	251 96	10 1		
1,000 0	0 21	175 37	999 9	-3 5	-9 9	250 39	10 5		
1,100 0	0 26	79 44	1,099 9	-3 7	-9 6	249 21	10 3		

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Super Fortress "29" #3H
Project:	Hackberry	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Super Fortress "29" #3H	North Reference:	Grid
Wellbore:	VH - Job #32K0411355	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0411355	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200 0	0 27	93 50	1,199 9	-3 6	-9 2	248 41	9 9	
1,300 0	0 93	64 49	1,299 9	-3 3	-8 2	248 13	8 8	
1,400 0	2 21	67 29	1,399 9	-2 2	-5 7	248 87	6 1	
1,500 0	2 95	62 51	1,499 8	-0 3	-1 6	260 63	1 7	
1,600 0	3 12	62 71	1,599 6	2 2	3 1	54 74	3 8	
1,700 0	3 11	62 43	1,699 5	4 7	7 9	59 37	9 2	
1,800 0	2 54	76 64	1,799 4	6 4	12 4	62 66	14 0	
1,900 0	2 52	77 82	1,899 3	7 4	16 8	66 13	18 3	
2,000 0	2 07	76 25	1,999 2	8 3	20 7	68 10	22 3	
2,100 0	1 14	60 22	2,099 2	9 2	23 3	68 37	25 0	
2,200 0	1 09	69 91	2,199 1	10 0	25 0	68 12	27 0	
2,300 0	0 78	48 37	2,299 1	10 8	26 4	67 72	28 6	
2,400 0	0 95	45 88	2,399 1	11 9	27 5	66 70	30 0	
2,500 0	0 64	28 00	2,499 1	12 9	28 4	65 52	31 2	
2,600 0	0 78	39 37	2,599 1	13 9	29 1	64 38	32 3	
2,700 0	0 69	31 05	2,699 1	15 0	29 8	63 32	33 4	
2,800 0	0 80	76 95	2,799 1	15 7	30 8	63 06	34 6	
2,900 0	0 63	117 84	2,899 1	15 6	32 0	64 05	35 6	
3,000 0	0 78	133 33	2,999 1	14 8	33 0	65 77	36 2	
3,100 0	0 62	163 27	3,099 1	13 9	33 6	67 60	36 4	
3,200 0	0 06	129 95	3,199 1	13 3	33 8	68 52	36 3	
3,300 0	0 42	323 32	3,299 1	13 6	33 6	68 04	36 3	
3,400 0	0 28	341 03	3,399 1	14 1	33 3	67 09	36 2	
3,500 0	0 56	305 40	3,499 0	14 6	32 9	66 04	36 0	
3,600 0	0 61	276 12	3,599 0	14 9	31 9	64 92	35 3	
3,700 0	0 89	284 95	3,699 0	15 2	30 7	63 62	34 2	
3,800 0	0 84	286 40	3,799 0	15 6	29 2	61 88	33 1	
3,900 0	0 84	285 89	3,899 0	16 0	27 8	60 05	32 1	
4,000 0	0 92	274 77	3,999 0	16 3	26 3	58 22	30 9	
4,100 0	1 16	279 59	4,099 0	16 5	24 5	56 00	29 5	
4,200 0	1 33	284 53	4,199 0	17 0	22 4	52 80	28 1	
4,300 0	1 36	291 20	4,298 9	17 7	20 1	48 69	26 8	
4,400 0	1 28	290 55	4,398 9	18 5	18 0	44 16	25 8	
4,500 0	1 24	290 36	4,498 9	19 3	15 9	39 54	25 0	
4,600 0	1 22	281 65	4,598 9	19 9	13 9	34 90	24 2	
4,700 0	1 33	278 45	4,698 8	20 3	11 7	29 95	23 4	
4,800 0	1 31	273 06	4,798 8	20 5	9 4	24 60	22 5	
4,900 0	1 27	272 73	4,898 8	20 6	7 1	19 10	21 8	
5,000 0	1 12	266 05	4,998 8	20 6	5 1	13 79	21 2	
5,100 0	1 13	265 18	5,098 7	20 4	3 1	8 61	20 7	
5,200 0	1 11	270 56	5,198 7	20 4	1 1	3 22	20 4	
5,300 0	0 65	283 74	5,298 7	20 5	-0 4	358 96	20 5	
5,400 0	0 48	268 88	5,398 7	20 6	-1 3	356 28	20 7	
5,500 0	0 19	241 19	5,498 7	20 6	-1 9	354 70	20 6	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Super Fortress "29" #3H
Project:	Hackberry	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Super Fortress "29" #3H	North Reference:	Grid
Wellbore:	VH - Job #32K0411355	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0411355	Database:	EDM-Regulatory

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600 0	0 27	139 26	5,598 7	20 3	-1 9	354 65	20 4
5,700 0	0 55	133 22	5,698 7	19 8	-1 4	355 97	19 8
5,800 0	0 86	134 92	5,798 7	18 9	-0 5	358 44	18 9
5,900 0	1 02	131 10	5,898 7	17 8	0 7	2 21	17 8
6,000 0	0 94	131 07	5,998 7	16 7	2 0	6 75	16 8
6,100 0	0 92	120 71	6,098 7	15 7	3 3	11 79	16 1
6,200 0	1 04	118 12	6,198 6	14 9	4 8	17 77	15 6
6,300 0	1 22	120 45	6,298 6	13 9	6 5	24 98	15 4
6,400 0	1 09	124 61	6,398 6	12 9	8 2	32 51	15 2
6,500 0	0 82	128 07	6,498 6	11 9	9 5	38 78	15 2
6,600 0	0 57	157 49	6,598 6	11 0	10 3	43 17	15 0
6,700 0	0 38	221 31	6,698 6	10 3	10 3	45 00	14 5
6,800 0	0 48	240 22	6,798 6	9 8	9 7	44 63	13 8
6,900 0	0 52	258 88	6,898 6	9 5	8 9	43 01	13 0
7,000 0	0 71	268 93	6,998 6	9 4	7 8	39 68	12 2
7,100 0	0 53	284 08	7,098 6	9 5	6 7	35 32	11 7
7,200 0	0 42	255 20	7,198 6	9 5	5 9	31 92	11 2
7,300 0	0 77	240 22	7,298 5	9 1	5 0	28 78	10 4
7,400 0	1 38	228 78	7,398 5	8 0	3 5	23 76	8 7
7,500 0	1 80	217 90	7,498 5	5 9	1 6	15 44	6 2
7,600 0	1 60	232 79	7,598 4	3 9	-0 4	353 58	3 9
7,700 0	1 02	240 42	7,698 4	2 6	-2 3	318 02	3 5
7,800 0	0 61	219 84	7,798 4	1 7	-3 4	296 74	3 8
7,900 0	0 44	229 80	7,898 4	1 1	-4 1	284 79	4 2
8,000 0	0 49	252 39	7,998 4	0 7	-4 8	278 31	4 8
8,100 0	0 24	261 06	8,098 4	0 5	-5 4	275 68	5 4
8,200 0	0 52	261 80	8,198 4	0 4	-6 0	274 15	6 1
8,300 0	0 41	268 13	8,298 4	0 4	-6 8	273 02	6 9
8,400 0	0 47	273 58	8,398 4	0 4	-7 6	272 82	7 6
8,500 0	0 40	235 71	8,498 4	0 2	-8 3	271 41	8 3
8,600 0	0 21	205 65	8,598 4	-0 2	-8 7	268 96	8 7
8,700 0	0 42	277 66	8,698 4	-0 3	-9 1	268 28	9 1
8,800 0	0 86	247 38	8,798 4	-0 5	-10 2	267 11	10 2
8,900 0	0 98	243 64	8,898 4	-1 2	-11 6	264 20	11 7
9,000 0	0 98	243 95	8,998 4	-1 9	-13 2	261 63	13 3



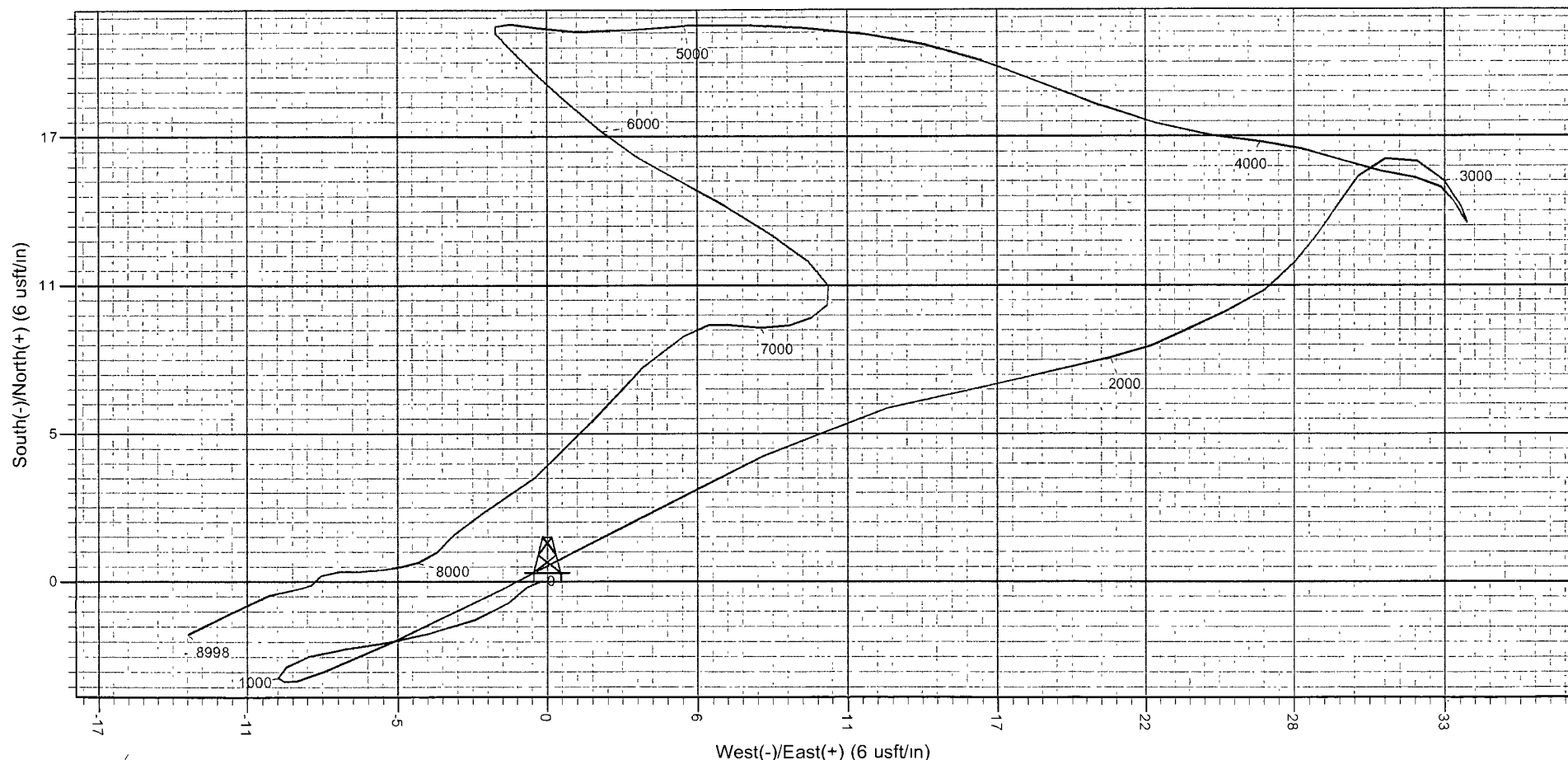
Project: Hackberry
Eddy County, NM
Well: Super Fortress "29" #3H
Wellbore: VH - Job #32K0411355
Design: VH - Job #32K0411355



Azimuths to Grid North
True North -0 24°
Magnetic North 7 55°
Magnetic Field
Strength 48871 6snT
Dip Angle 60 52°
Date 4/20/2011
Model IGRF2010

WELL DETAILS: Super Fortress "29" #3H
WELL @ 0.0usft (Original Well Elev)
Ground Level 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	506005.39	635602.80	32° 38' 15.895 N	103° 53' 34.163 W	



PROJECT DETAILS: Hackberry
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

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 32° 36' 36.000 N
Longitude: 103° 53' 24.000 W
Positional Uncertainty: 0.0
Convergence: 0.24
Local North: Grid