

NMOCDA

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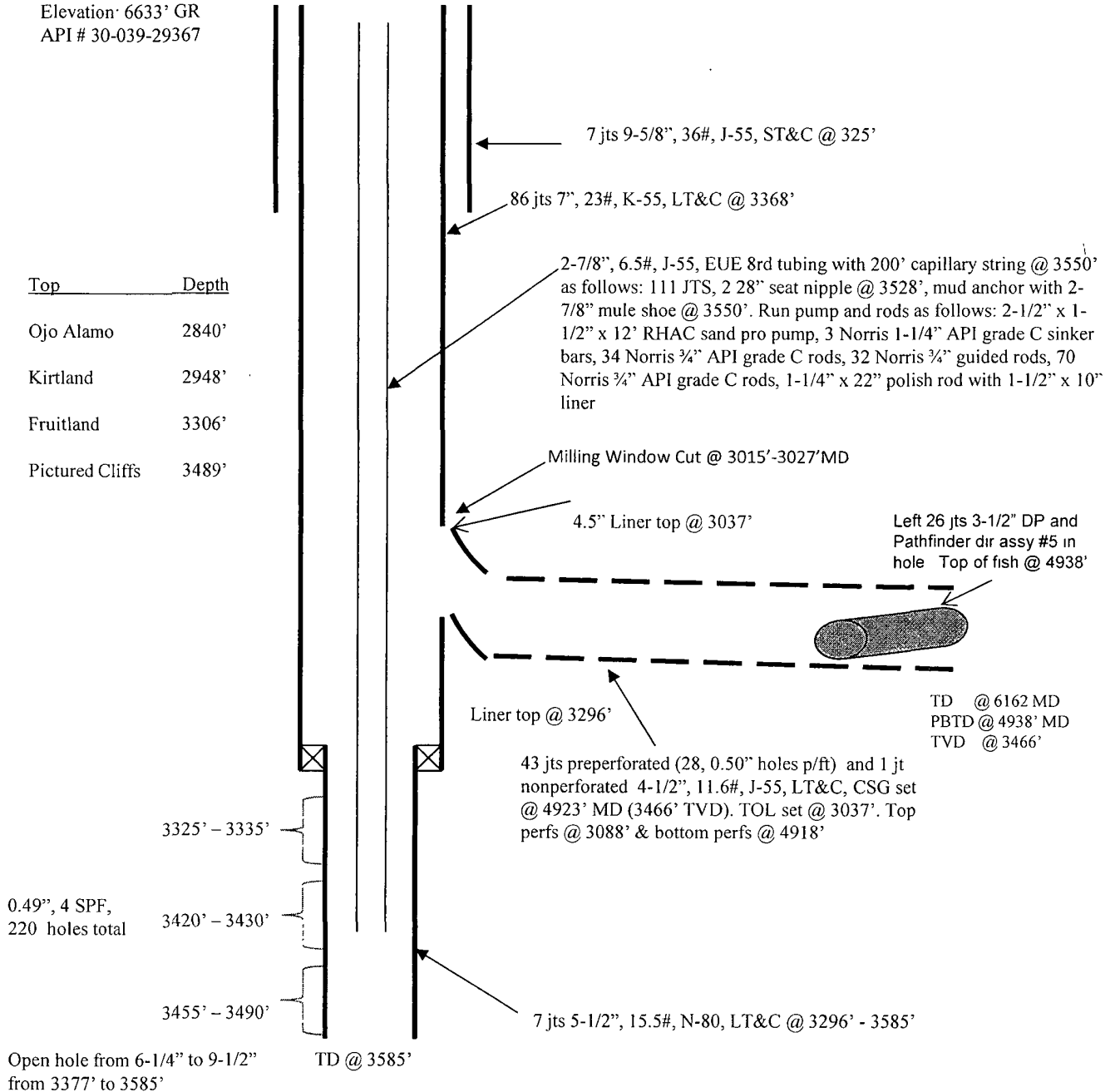
Location:

SHL: 1031' FSL & 1107' FEL
SE/SE Sec 29 31N 4W
BHL: 1270' FNL & 912' FEL
NE/NE Sec 29 31N 4W
Rio Arriba, New Mexico

ROSA UNIT #383
BASIN FRUITLAND COAL
HORIZONTAL-REENTRY

Spud date: 05/26/06
Completed: 08/24/06
1st Delivery: 08/31/06
Cavitation: 11/04/06

Elevation: 6633' GR
API # 30-039-29367



Hole Size	Casing	Cement	Volume	Top of Cmt
12-1/4"	9-5/8", 36#	190 sxs	264 cu.ft.	Surface
8-3/4"	7", 23#	510 sxs	1036 cu.ft.	Surface
6-1/4"	5-1/2", 17#	Did Not Cmt		
6-1/4"	4-1/2", 11.6#	Did Not Cmt		

LG 9/14/11



Williams Energy

Rosa Unit #383 Stk-2
Sec29 T31N-R4W - 383
Rio Arriba Co. NM
GL: 6633' KB: 14'

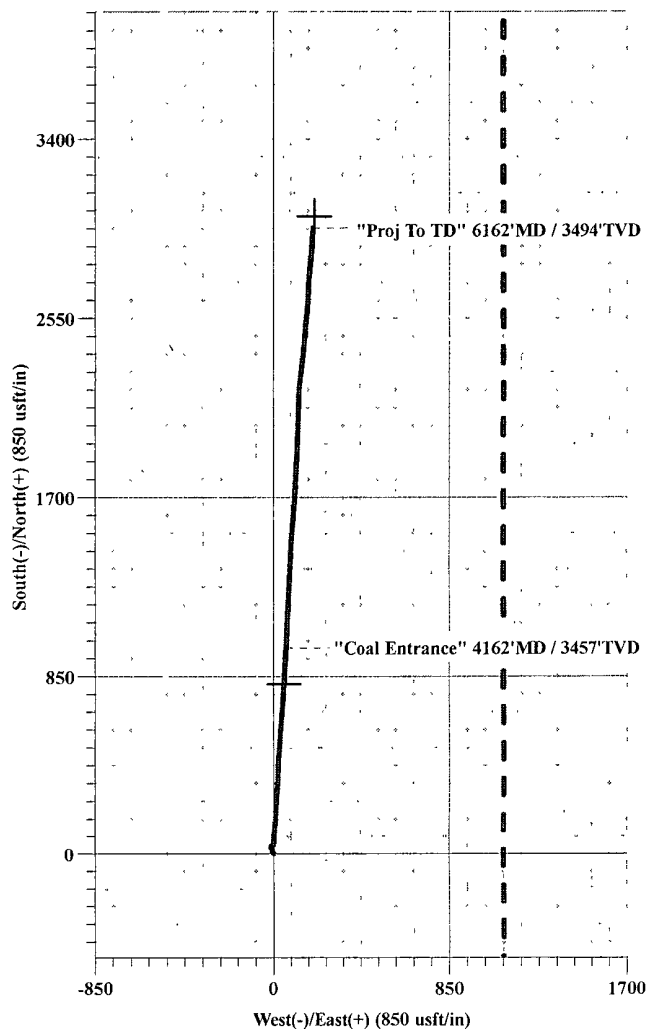
PATHFINDER®

A Schlumberger Company

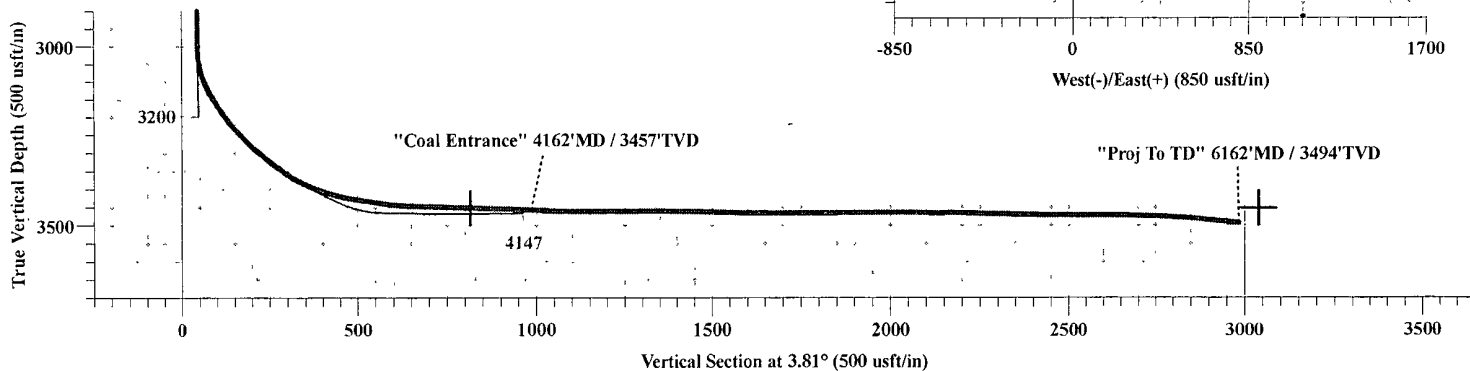
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
Land-383	3453.0	814.2	54.2	2136941.76	200970.17	Point
TD-383	3453.0	3032.8	201.8	2139158.67	201141.54	Point

EOW
No Hardline Crossed



WELL DETAILS Rosa Unit #383 Stk				
		6633.0		
Northing	Easting	Latitude	Longitude	
2136128.19	200907.24	36° 51' 58.356 N	107° 16' 20.820 W	



SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
3400.0	53.06	4.14	3325.3	250.7	13.8	0.00	0.00	251.1	
3640.4	79.50	4.26	3421.1	468.2	29.8	11.00	0.25	469.2	
3989.1	90.00	3.81	3453.0	814.2	54.2	3.01	-2.48	816.0	Land-383
6212.6	90.00	3.81	3453.0	3032.8	201.8	0.00	0.00	3039.5	

Plan: Design #2 (Rosa Unit #383 Stk/STK-2)

Created By: Frank C. Scardino

Date: 8/18/2011

Williams Energy

Rio Arriba Co. NM

Sec29 T31N-R4W - 383

Rosa Unit #383 Stk

STK-2

Design: STK-2

Standard Survey Report

30 August, 2011

Survey Report

Company:	Williams Energy	Local Co-ordinate Reference:	Site Sec29.T31N-R4W - 383
Project:	Rio Arriba Co. NM	TVD Reference:	WELL @ 6647.0usft (Original Well Elev)
Site:	Sec29 T31N-R4W- 383	MD Reference:	WELL @ 6647.0usft (Original Well Elev)
Well:	Rosa Unit #383 Stk	North Reference:	True
Wellbore:	STK-2	Survey Calculation Method:	Minimum Curvature
Design:	STK-2	Database:	EDM 5000' 1: Single User Db

Project:	Rio Arriba Co. NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico Central 3002		

Site		Sec29 T31N-R4W - 383			
Site Position:		Northing:	2,136,128 18 usft	Latitude:	36° 51' 58.356 N
From:	Lat/Long	Easting:	200,907 24 usft	Longitude:	107° 16' 20.820 W
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.61 °

Well	Rosa Unit #383 Stk					
Well Position	+N/-S	0 0 usft	Northing:	2,136,128 18 usft	Latitude:	36° 51' 58.356 N
	+E/-W	0 0 usft	Easting:	200,907 24 usft	Longitude:	107° 16' 20.820 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	6,633 0 usft

Wellbore	STK-2				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	08/22/11	9.68	63.66	50,852

Design:	STK-2				
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	3.81	

Survey Program		Date	08/30/11		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
200.0	6,162.0	Survey #1 (STK-2)	MWD	MWD - Standard	

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
200 0	0.68	334.78	200 0	1 1	-0.5	1 0	0.34	0.34	0.00
400 0	1.64	336.70	400 0	4 8	-2.1	4 6	0.48	0.48	0.96
600 0	1.90	337.98	599 9	10 5	-4.5	10 2	0.13	0.13	0.64
800 0	1.33	337.98	799 8	15 7	-6.6	15 2	0.29	-0.29	0.00
1,000 0	0.85	341.05	999 7	19 3	-8.0	18 7	0.24	-0.24	1.54
1,200 0	0.69	350.88	1,199 7	21 9	-8.7	21 2	0.10	-0.08	4.92
1,400 0	0.59	319.89	1,399.7	23.8	-9.5	23 1	0.18	-0.05	-15.50
1,600 0	0.64	348.14	1,599 7	25 7	-10.4	25.0	0.15	0.03	14.13
1,800 0	0.80	322.78	1,799 7	27 9	-11.5	27 1	0.18	0.08	-12.68

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Site:	Sec29 T31N-R4W - 383	MD Reference:	WELL @ 6647 0usft (Original Well Elev)
Well:	Rosa Unit #383 Stk	North Reference:	True
Wellbore:	STK-2	Survey Calculation Method:	Minimum Curvature
Design:	STK-2	Database:	EDM 5000.1 Single User Db

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)
2,000 0	0 84	287 26	1,999 7	29 5	-13 7	28 5	0 25	0 02	-17 76
2,200 0	0 65	28 34	2,199 7	30 9	-14 6	29 9	0 58	-0 10	50 54
2,400 0	2 20	49 03	2,399 6	34 4	-11 1	33 6	0 80	0 78	10 35
2,600 0	1 60	44 14	2,599 5	38 9	-6 3	38 4	0 31	-0 30	-2 45
2,800 0	1 19	50 58	2,799 4	42 3	-2 8	42 0	0 22	-0 21	3 22
3,000 0	0 44	64 31	2,999 4	43 9	-0 5	43 8	0 38	-0 38	6 87
3,099 0	20 75	3 77	3,096 2	61 8	1 1	61 7	20 74	20 52	-61 15
3,131 0	27 08	3 25	3,125 5	74 7	1 8	74 7	19 79	19 78	-1 63
3,163 0	31 13	5 44	3,153 4	90 2	3 0	90 2	13 08	12 66	6 84
3,195 0	34 82	4 32	3,180 3	107 6	4 5	107 6	11 69	11 53	-3 50
3,226 0	37 46	4 15	3,205 3	125 8	5 9	125 9	8 52	8 52	-0 55
3,258 0	40 80	4 12	3,230 1	145 9	7 3	146 1	10 44	10 44	-0 09
3,290 0	44 67	3 21	3,253 6	167 6	8 7	167 8	12 25	12 09	-2 84
3,321 0	47 40	3 00	3,275 1	189 9	9 9	190 1	8 82	8 81	-0 68
3,353 0	49 77	3 24	3,296 3	213 8	11 2	214 1	7 43	7 41	0 75
3,385 0	52 94	4 60	3,316 3	238 8	12 9	239 1	10 45	9 91	4 25
3,417 0	53 20	3 63	3,335 5	264 3	14 8	264 7	2 56	0 81	-3 03
3,449 0	55 49	3 69	3,354 2	290 2	16 4	290 7	7 16	7 16	0 19
3,480 0	58 04	4 64	3,371 1	316 1	18 3	316 6	8 62	8 23	3 06
3,514 0	65 60	3 84	3,387 2	346 0	20 5	346 6	22 33	22 24	-2 35
3,546 0	71 05	1 35	3,399 0	375 6	21 8	376 3	18 50	17 03	-7 78
3,578 0	72 90	0 98	3,408 9	406 1	22 5	406 7	5 88	5 78	-1 16
3,610 0	76 24	2 19	3,417 4	436 9	23 3	437 5	11 06	10 44	3 78
3,640 0	78 00	5 51	3,424 1	466 1	25 3	466 7	12 28	5 87	11 07
3,672 0	80 37	6 23	3,430 1	497 3	28 5	498 1	7 73	7 41	2 25
3,704 0	82 66	4 48	3,434 8	528 8	31 5	529 8	8 97	7 16	-5 47
3,736 0	82 57	2 95	3,438 9	560 5	33 5	561 5	4 75	-0 28	-4 78
3,768 0	84 06	4 91	3,442 7	592 2	35 7	593 3	7 66	4 66	6 13
3,832 0	88 02	4 77	3,447 1	655 8	41 1	657 1	6 19	6 19	-0 22
3,896 0	88 02	4 35	3,449 3	719 6	46 2	721 1	0 66	0 00	-0 66
3,960 0	88 55	4 58	3,451 2	783 4	51 1	785 0	0 90	0 83	0 36
4,024 0	88 11	4 17	3,453 1	847 1	56 0	849 0	0 94	-0 69	-0 64
4,088 0	88 29	2 00	3,455 1	911 0	59 5	913 0	3 40	0 28	-3 39
4,152 0	87 67	2 30	3,457 3	974 9	61 9	976 9	1 08	-0 97	0 47
4,162 0	87 63	2 42	3,457 8	984 9	62 3	986 9	1 29	-0 40	1 23
"Coal Entrance" 4162 MD / 3457 TVD									
4,217 0	87 41	3 10	3,460 1	1,039 8	64 9	1,041 8	1 29	-0 40	1 23
4,281 0	89 34	1 46	3,462 0	1,103 7	67 5	1,105 8	3 96	3 02	-2 56
4,345 0	90 75	4 07	3,461 9	1,167 6	70 6	1,169 7	4 64	2 20	4 08
4,409 0	89 96	3 36	3,461 5	1,231 5	74 7	1,233 7	1 66	-1 23	-1 11
4,473 0	91 10	2 79	3,460 9	1,295 4	78 1	1,297 7	1 99	1 78	-0 89
4,537 0	89 78	2 80	3,460 4	1,359 3	81 3	1,361 7	2 06	-2 06	0 02
4,601 0	88 81	3 72	3,461 2	1,423 2	84 9	1,425 7	2 09	-1 52	1 44
4,665 0	88 29	2 91	3,462 8	1,487 1	88 6	1,489 7	1 50	-0 81	-1 27

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Wellbore:	STK-2	Survey Calculation Method:	Minimum Curvature
Design:	STK-2	Database:	EDM 5000-1 Single User Db

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)
4,729.0	88.11	6.06	3,464.8	1,550.9	93.6	1,553.6	4.93	-0.28	4.92
4,791.0	89.43	3.29	3,466.2	1,612.6	98.6	1,615.6	4.95	2.13	-4.47
4,855.0	89.60	5.50	3,466.7	1,676.4	103.5	1,679.6	3.46	0.27	3.45
4,919.0	89.96	1.59	3,467.0	1,740.3	107.5	1,743.6	6.14	0.56	-6.11
4,983.0	90.48	3.35	3,466.7	1,804.2	110.3	1,807.6	2.87	0.81	2.75
5,047.0	90.66	3.88	3,466.1	1,868.1	114.3	1,871.6	0.87	0.28	0.83
5,111.0	91.10	3.12	3,465.1	1,932.0	118.2	1,935.6	1.37	0.69	-1.19
5,173.0	90.22	0.33	3,464.4	1,993.9	120.1	1,997.5	4.72	-1.42	-4.50
5,236.0	89.43	2.66	3,464.6	2,056.9	121.7	2,060.4	3.91	-1.25	3.70
5,300.0	88.81	1.52	3,465.6	2,120.9	124.0	2,124.4	2.03	-0.97	-1.78
5,364.0	90.40	2.78	3,466.0	2,184.8	126.4	2,188.4	3.17	2.48	1.97
5,428.0	88.55	7.08	3,466.6	2,248.5	131.9	2,252.3	7.31	-2.89	6.72
5,492.0	87.32	7.76	3,468.9	2,312.0	140.2	2,316.2	2.20	-1.92	1.06
5,556.0	88.72	5.87	3,471.1	2,375.5	147.8	2,380.0	3.67	2.19	-2.95
5,620.0	90.22	4.16	3,471.7	2,439.2	153.4	2,444.0	3.55	2.34	-2.67
5,684.0	89.34	3.98	3,471.9	2,503.1	157.9	2,508.0	1.40	-1.38	-0.28
5,748.0	89.25	7.14	3,472.7	2,566.7	164.1	2,572.0	4.94	-0.14	4.94
5,811.0	89.69	2.32	3,473.3	2,629.5	169.3	2,635.0	7.68	0.70	-7.65
5,875.0	88.99	4.24	3,474.0	2,693.4	173.0	2,698.9	3.19	-1.09	3.00
5,940.0	88.20	3.41	3,475.6	2,758.2	177.3	2,763.9	1.76	-1.22	-1.28
6,004.0	86.00	6.62	3,478.9	2,821.9	182.9	2,827.8	6.07	-3.44	5.02
6,067.0	84.33	4.08	3,484.2	2,884.4	188.8	2,890.6	4.81	-2.65	-4.03
6,111.0	84.15	3.64	3,488.6	2,928.1	191.7	2,934.3	1.08	-0.41	-1.00
6,162.0	84.15	3.64	3,493.8	2,978.7	194.9	2,985.1	0.00	0.00	0.00

"Proj To TD" 6162'MD / 3494'TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
4,162.0	3,457.8	984.9	62.3	"Coal Entrance" 4162'MD / 3457'TVD
6,162.0	3,493.8	2,978.7	194.9	"Proj To TD" 6162'MD / 3494'TVD

Checked By

Approved By

Date: