

Oilfield Services, Corp. (U.S. Land)

Schlumberger Drilling and Measurements

Drilling Group

Geo Market Area: South West Texas Basin

7220 W I-H 20

Midland, Texas 79706

Phone : (432) 742-5400 (Main)

Fax : (432) 742-5606 (Shared)

Schlumberger

Well Reference:

20, 25S, 33E, Lea Tx

32.10973 103.60062

I, J. Vargas certify that; I am employed by Drilling & Measurements, a division of Schlumberger Technology Corporation; that I did on the day(s) of April 02, 2018 through April 23, 2018, conduct or supervise the taking of the SlimPulse & Third Party Corrected surveys from a depth of 200.00 feet to a depth of 18883.00 feet referenced to driller's depth; that the data is true, correct, complete and within the limitations of the tool as set forth by Drilling & Measurements, a division of Schlumberger Technology Corporation; that I am authorized and qualified to make this report; that this survey was conducted at the request of Cimarex Energy Company for the Vaca Draw 20-17 Fed #6H Well (Original Hole) API No. 30-025-44151-00-X1 in New Mexico; and that I have reviewed this report and find that it conforms to the principals and procedures as set forth by Drilling & Measurements, a division of Schlumberger Technology Corporation.

By
J. Vargas
FE

J. Vargas

Subscribed and Sworn to before me this 23rd day of JULY (month) 2018 (yr)

My Commission expires:

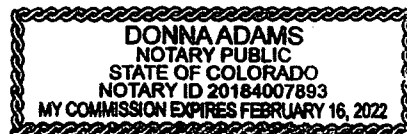
2-16-2022

D. Adams

Notary Public

Adams County Colorado
(County State)

(signature)



Oilfield Services, Central U.S. Land
Schlumberger Drilling and Measurements
Drilling Group
Geo Market Area: South West Texas Basin
7220 W I-H 20
Midland, Texas 79706
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Schlumberger

July 23, 2018

Cimarex Energy Company
202 S Cheyenne Ave, Ste 1000
Tulsa OK

Re:

20, 25S, 33E, Lea Tx
32.10973 103.60062

CLIENT: Cimarex Energy Company
WELL: Vaca Draw 20-17 Fed #6H
FIELD: Bone-Springs

RIG: H&P 380
COUNTY: Lea
API NO: 30-025-44151-00-X1
JOB NO: 18MLD2302

Enclosed, please find the original copy of the survey performed on the referenced well by Drilling & Measurements, a division of Schlumberger Technology Corporation (P-5 No. 754900).
Other information required by your office is as follows.

<u>Name & Title of Surveyor</u>	<u>Drainhole Number</u>	<u>Surveyed Depths</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
J.Vargas FE	Vaca Draw 20-17 Fed #6H Original Hole	200.00 Ft to 18883.00 Ft	April 2, 2018 to April 23, 2018	SlimPulse Third Party Corrected

If any other information is required, please contact the undersigned at the above letterhead and phone number.
Sincerely,

Field Service Manager

Borehole:	Original Borehole	Well:	Cimarex Vaca Draw 20-17 Federal #6H	Field:	NM Lea County (NAD 83)	Structure:	Cimarex Vaca Draw 20-17 Federal #6H
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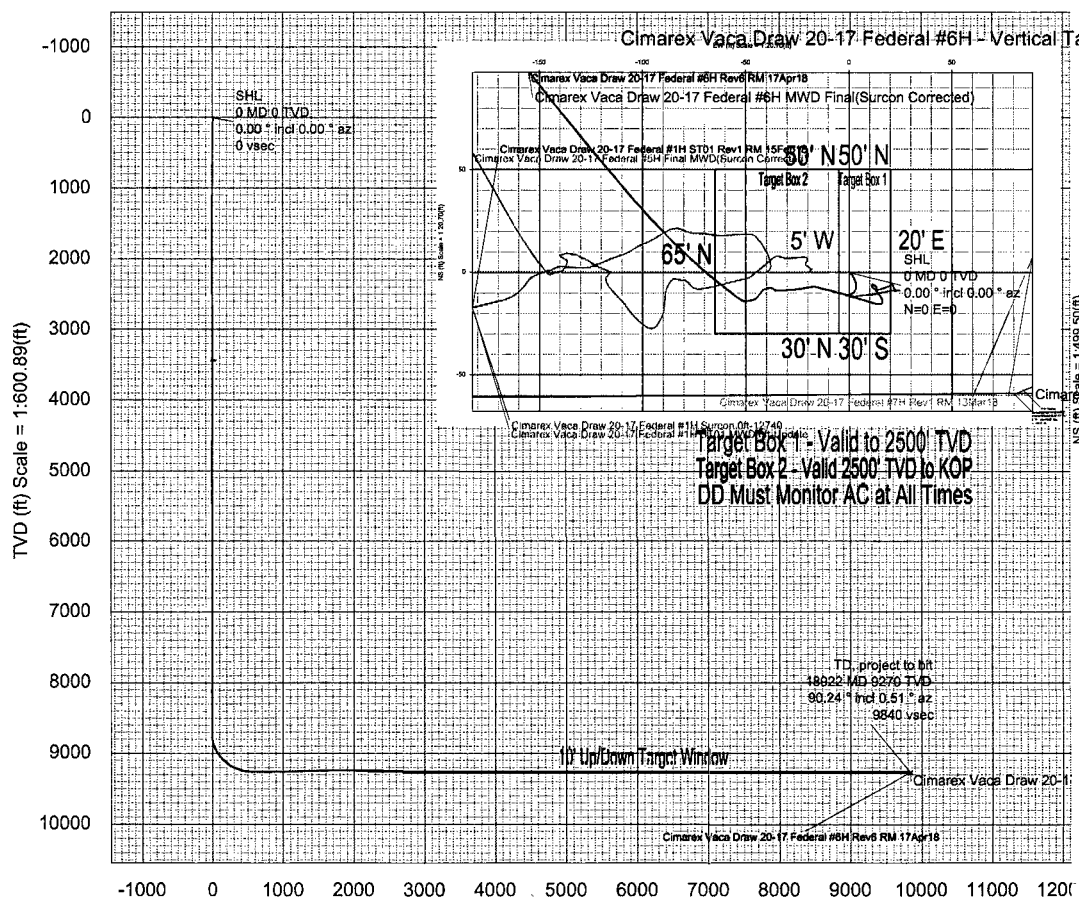
Gravity & Magnetic Parameters	Surface Location	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Miscellaneous Cimarex Vaca Draw
Model: HDGM 2018	Lat: N 32 6 35.65	Northings: 404490.08RUS	Slot: 20-17 Federal #
MagDec: 6.768°	Lon: W 103 36 2.93	Easting: 768141.44RUS	Plan: Cimarex Vaca Draw 20-17 Federal #6H MWD Final(Surcon Corrected)
Dip: 59.775°			TVD Ref: RKB(3447.4ft above MSL)
FS: 47896.539nT			
Date: 17-Apr-2018			
Gravity FS: 998.429mgN (9.80665 Based)			

Critical Points							
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(+)/S(-)	E(+)/W(-)
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TD, project to bit	18922.00	90.24	0.51	9269.60	9839.79	9838.08	-308.50

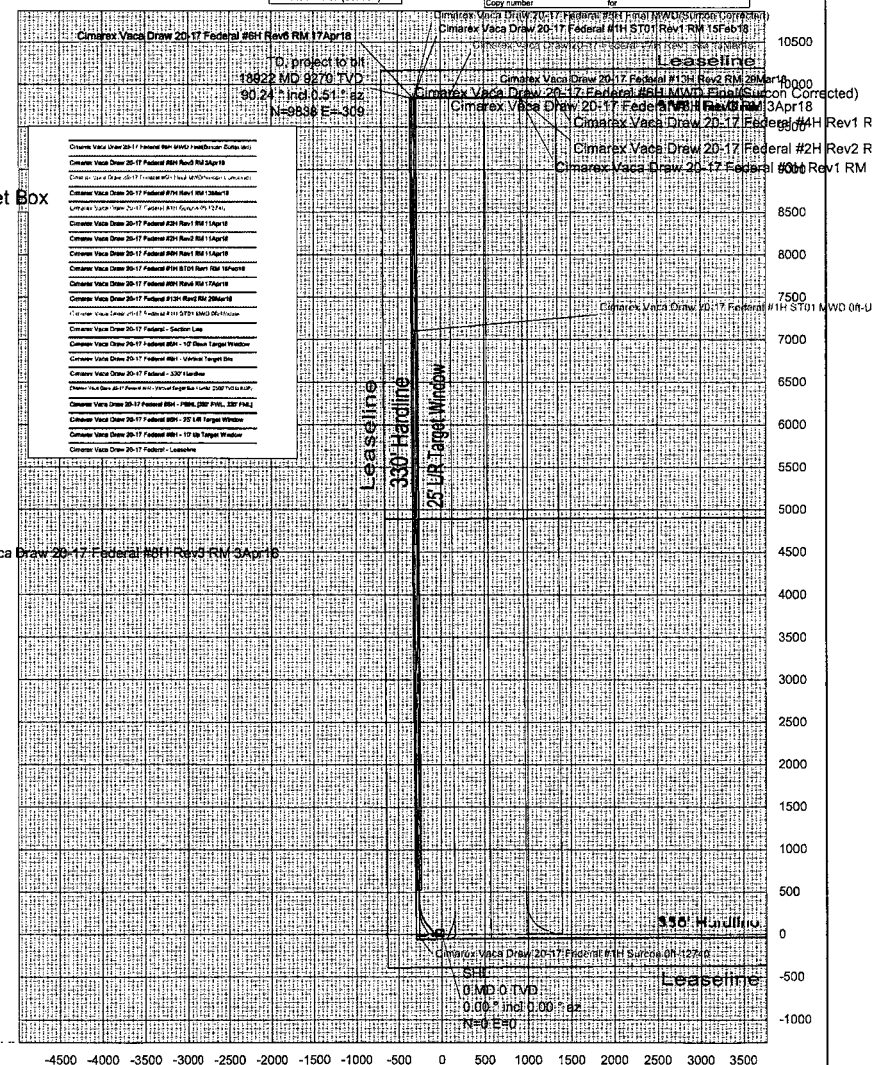


Grid North
Tot Corr (M→G 6.378°)
Mag Dec (6.768°)
Grid Conv (0.389°)

CONTROLLED	
Plan ref	Cimarex Vaca Draw 20-17 Federal #6H MWD Final(Surcon Corrected)
Drawing ref	
Copy number	of 3
Date	24-Apr-2018
1 Client	
2 Client	
3 Office	
4 Office	
5	



Vertical Section (ft) Azim = 359.65° Scale = 1:600.89(ft) Orig



EW (ft) Scale = 1:499.50(ft)

Cimarex Vaca Draw 20-17 Federal #6H MWD Final(Surcon Corrected)
Survey Geodetic Report
 (Def Survey)



Report Date:	April 24, 2018 - 09:10 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Cimarex	Vertical Section Azimuth:	359.650 ° (Grid North)
Field:	NM Lea County (NAD 83)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Cimarex Vaca Draw 20-17 Federal #6H / Cimarex Vaca Draw 20-17 Federal #6H	TVD Reference Datum:	RKB
Well:	Cimarex Vaca Draw 20-17 Federal #6H	TVD Reference Elevation:	3447.400 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	3423.400 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	6.768 °
Survey Name:	Cimarex Vaca Draw 20-17 Federal #6H MWD Final(Surcon Corrected)	Total Gravity Field Strength:	998.4293mgn (9.80665 Based)
Survey Date:	April 01, 2018	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	227.242 ° / 10061.575 ft / 6.669 / 1.085	Total Magnetic Field Strength:	47896.539 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Magnetic Dip Angle:	59.775 °
Location Lat / Long:	N 32° 6' 35.85400", W 103° 36' 2.92741"	Declination Date:	April 17, 2018
Location Grid N/E Y/X:	N 404490.080 ftUS, E 768141.440 ftUS	Magnetic Declination Model:	HDGM 2018
CRS Grid Convergence Angle:	0.3894 °	North Reference:	Grid North
Grid Scale Factor:	0.99996801	Grid Convergence Used:	0.3894 °
Version / Patch:	2.10.696.0	Total Corr Mag North->Grid North:	6.3785 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	404490.08	768141.44	N 32° 6' 35.85"	W 103° 36' 2.93"
	200.00	0.85	133.92	199.99	-1.04	-1.03	1.07	0.43	404489.05	768142.51	N 32° 6' 35.84"	W 103° 36' 2.92"
	306.00	0.67	159.74	305.98	-2.17	-2.16	1.85	0.36	404487.92	768143.29	N 32° 6' 35.83"	W 103° 36' 2.91"
	396.00	0.80	148.47	395.98	-3.20	-3.19	2.36	0.22	404486.90	768143.80	N 32° 6' 35.82"	W 103° 36' 2.90"
	487.00	0.82	157.39	486.97	-4.35	-4.33	2.94	0.14	404485.75	768144.38	N 32° 6' 35.81"	W 103° 36' 2.89"
	578.00	0.61	176.11	577.96	-5.43	-5.41	3.23	0.34	404484.67	768144.67	N 32° 6' 35.80"	W 103° 36' 2.89"
	669.00	0.79	171.17	668.95	-6.54	-6.52	3.36	0.21	404483.56	768144.80	N 32° 6' 35.79"	W 103° 36' 2.89"
	760.00	0.71	189.52	759.95	-7.71	-7.69	3.36	0.28	404482.39	768144.80	N 32° 6' 35.78"	W 103° 36' 2.89"
	852.00	0.32	222.46	851.94	-8.46	-8.44	3.09	0.52	404481.64	768144.53	N 32° 6' 35.77"	W 103° 36' 2.89"
	946.00	0.57	208.55	945.94	-9.06	-9.05	2.69	0.29	404481.03	768144.13	N 32° 6' 35.76"	W 103° 36' 2.90"
	1130.00	0.41	234.00	1129.93	-10.25	-10.24	1.72	0.14	404479.84	768143.16	N 32° 6' 35.75"	W 103° 36' 2.91"
	1225.00	0.55	243.35	1224.93	-10.65	-10.64	1.04	0.17	404479.44	768142.48	N 32° 6' 35.75"	W 103° 36' 2.92"
	1319.00	0.38	214.72	1318.93	-11.10	-11.10	0.46	0.30	404478.98	768141.90	N 32° 6' 35.74"	W 103° 36' 2.92"
	1413.00	0.26	210.63	1412.92	-11.54	-11.54	0.17	0.13	404478.54	768141.61	N 32° 6' 35.74"	W 103° 36' 2.93"
	1507.00	0.25	142.64	1506.92	-11.89	-11.89	0.19	0.30	404478.19	768141.63	N 32° 6' 35.74"	W 103° 36' 2.93"
	1602.00	0.26	81.47	1601.92	-12.02	-12.02	0.53	0.27	404478.06	768141.97	N 32° 6' 35.74"	W 103° 36' 2.92"
	1696.00	0.39	83.50	1695.92	-11.96	-11.95	1.05	0.14	404478.13	768142.49	N 32° 6' 35.74"	W 103° 36' 2.92"
	1790.00	0.51	98.21	1789.92	-11.99	-11.98	1.79	0.18	404478.10	768143.23	N 32° 6' 35.74"	W 103° 36' 2.91"
	1884.00	0.55	83.92	1883.91	-12.00	-11.99	2.65	0.15	404478.09	768144.09	N 32° 6' 35.74"	W 103° 36' 2.90"
	1978.00	0.60	79.58	1977.91	-11.87	-11.85	3.58	0.07	404478.23	768145.02	N 32° 6' 35.74"	W 103° 36' 2.89"
	2073.00	0.76	79.49	2072.90	-11.67	-11.65	4.69	0.17	404478.43	768146.13	N 32° 6' 35.74"	W 103° 36' 2.87"
	2167.00	0.88	83.19	2166.89	-11.46	-11.45	6.02	0.14	404478.63	768147.46	N 32° 6' 35.74"	W 103° 36' 2.86"
	2261.00	1.18	83.81	2260.88	-11.30	-11.26	7.70	0.32	404478.82	768149.14	N 32° 6' 35.74"	W 103° 36' 2.84"
	2355.00	1.58	85.08	2354.85	-11.10	-11.04	9.95	0.43	404478.04	768151.39	N 32° 6' 35.74"	W 103° 36' 2.81"
	2450.00	2.26	78.65	2449.80	-10.64	-10.56	13.09	0.75	404478.52	768154.53	N 32° 6' 35.75"	W 103° 36' 2.78"
	2544.00	2.74	76.67	2543.71	-9.78	-9.68	17.10	0.52	404480.40	768158.54	N 32° 6' 35.76"	W 103° 36' 2.73"
	2638.00	1.54	88.13	2637.64	-9.24	-9.12	20.55	1.35	404480.96	768161.98	N 32° 6' 35.76"	W 103° 36' 2.69"
	2733.00	1.51	83.94	2732.61	-9.09	-8.94	23.07	0.12	404481.14	768164.51	N 32° 6' 35.76"	W 103° 36' 2.66"
	2827.00	0.46	108.34	2826.59	-9.08	-8.93	24.66	1.18	404481.15	768166.10	N 32° 6' 35.76"	W 103° 36' 2.64"
	2921.00	1.08	276.48	2920.59	-9.10	-8.95	24.13	1.63	404481.13	768165.57	N 32° 6' 35.76"	W 103° 36' 2.65"
	3016.00	0.93	295.42	3015.57	-8.66	-8.52	22.55	0.38	404481.56	768163.99	N 32° 6' 35.77"	W 103° 36' 2.67"
	3110.00	0.60	335.89	3109.57	-7.87	-7.74	21.66	0.65	404482.34	768163.10	N 32° 6' 35.78"	W 103° 36' 2.68"
	3205.00	0.61	345.12	3204.56	-6.93	-6.80	21.32	0.10	404483.28	768162.76	N 32° 6' 35.79"	W 103° 36' 2.68"
	3299.00	0.40	291.86	3298.56	-6.32	-6.19	20.89	0.52	404483.89	768162.33	N 32° 6' 35.79"	W 103° 36' 2.69"
	3393.00	1.00	242.29	3392.55	-6.57	-6.45	19.85	0.85	404483.63	768161.30	N 32° 6' 35.79"	W 103° 36' 2.70"
	3487.00	0.98	243.35	3486.54	-7.31	-7.20	18.42	0.03	404482.89	768159.86	N 32° 6' 35.78"	W 103° 36' 2.71"
	3581.00	1.17	253.20	3580.52	-7.94	-7.83	16.78	0.28	404482.25	768158.22	N 32° 6' 35.78"	W 103° 36' 2.73"
	3675.00	1.39	256.25	3674.50	-8.47	-8.38	14.75	0.24	404481.70	768156.19	N 32° 6' 35.77"	W 103° 36' 2.76"
	3770.00	0.56	271.82	3769.48	-8.72	-8.64	13.17	0.91	404481.44	768154.61	N 32° 6' 35.77"	W 103° 36' 2.77"
	3864.00	0.47	18.47	3863.48	-8.34	-8.26	12.83	0.88	404481.82	768154.27	N 32° 6' 35.77"	W 103° 36' 2.78"
	3959.00	0.45	32.12	3958.48	-7.66	-7.57	13.15	0.12	404482.51	768154.59	N 32° 6' 35.78"	W 103° 36' 2.78"
	4053.00	0.11	317.19	4052.48	-7.28	-7.20	13.29	0.46	404482.88	768154.73	N 32° 6' 35.78"	W 103° 36' 2.77"
	4147.00	0.82	306.48	4146.47	-6.81	-6.73	12.69	0.76	404483.35	768154.13	N 32° 6' 35.79"	W 103° 36' 2.78"
	4241.00	0.67	293.22	4240.46	-6.18	-6.11	11.64	0.24	404483.97	768153.08	N 32° 6' 35.79"	W 103° 36' 2.79"
	4336.00	0.43	208.56	4335.46	-6.27	-6.21	10.96	0.80	404483.87	768152.40	N 32° 6' 35.79"	W 103° 36' 2.80"
	4430.00	0.73	145.90	4429.46	-7.08	-7.01	11.13	0.70	404483.07	768152.57	N 32° 6' 35.78"	W 103° 36' 2.80"
	4524.00	2.02	133.23	4523.43	-8.72	-8.64	12.67	1.40	404481.44	768154.11	N 32° 6' 35.77"	W 103° 36' 2.78"
	4618.00	2.32	145.72	4617.36	-11.44	-11.35	14.95	0.59	404478.73	768156.39	N 32° 6' 35.74"	W 103° 36' 2.75"
	4712.00	1.59	178.19	4711.31	-14.32	-14.23	16.06	1.38	404475.85	768157.50	N 32° 6' 35.71"	W 103° 36' 2.74"
	4806.00	1.28	270.06	4805.29	-15.62	-15.53	15.05	2.21	404474.55	768156.49	N 32° 6' 35.70"	W 103° 36' 2.75"
	4900.00	1.71	289.08	4899.23	-14.69	-14.63	10.40	0.35	404475.45	768151.84	N 32° 6' 35.71"	W 103° 36' 2.81"
	5085.00	1.83	286.03	5084.18	-13.79	-13.75	7.61	0.16	404476.33	768149.05	N 32° 6' 35.72"	W 103° 36' 2.84"
	5179.00	1.72	284.47	5178.14	-13.01	-12.98	4.80	0.13	404477.10	768146.24	N 32° 6' 35.73"	W 103° 36' 2.87"
	5273.00	1.60	291.32	5272.10	-12.16	-12.15	2.21	0.25	404477.93	768143.65	N 32° 6' 35.73"	W 103° 36' 2.90"
	5367.00	1.72	285.87	5366.06	-11.28	-11.29	-0.37	0.21	404478.79	768141.07	N 32° 6' 35.74"	W 103° 36' 2.93"
	5462.00	1.73	286.07	5461.01	-10.48	-10.50	-3.12	0.01	404479.58	768138.32	N 32° 6' 35.75"	W 103° 36' 2.96"
	5556.00	1.79	281.45	5554.97	-9.78	-9.82	-5.92	0.16	404480.26	768135.52	N 32° 6' 35.76"	W 103° 36' 3.00"
	5650.00	1.87	287.11	5648.92	-9.02	-9.07	-8.83	0.21	404481.01	768132.61	N 32° 6' 35.76"	W 103° 36' 3.03"
	5744.00	1.88	281.08	5742.87	-8.25	-8.33	-11.81	0.21	404481.75	768129.63	N 32° 6' 35.77"	W 103° 36' 3.07"
	5839.00	1.86	288.48	5837.82	-7.45	-7.54	-14.80	0.25	404482.54	768126.64	N 32° 6' 35.78"	W 103° 36' 3.10"
	5933.00	1.49	265.19	5931.78	-7.05	-7.16	-17.46	0.82	404482.92	768123.98	N 32° 6' 35.78"	W 103° 36' 3.13"
	6027.00	1.24	260.25	6025.73	-7.31	-7.43	-19.68	0.29	404482.65	768121.76	N 32° 6' 35.78"	W 103° 36' 3.16"
	6122.00	1.43	257.04	6120.73	-7.74	-7.87	-21.85	0.21	404482.21	768119.59	N 32° 6' 35.78"	W 103° 36' 3.18"
	6216.00	1.52	262.96	6214.70	-8.14	-8.29	-24.23	0.19	404481.79	768117.21	N 32° 6' 35.77"	W 103° 36' 3.21"
	6310.00	1.11	263.38	6308.67	-8.38	-8.55	-26.37	0.44	404481.54	768115.07	N 32° 6' 35.77"	W 103° 36' 3.23"
	6404.00	0.82	265.27	6402.66	-8.53	-8.71	-27.95	0.31	404481.37	768113.49	N 32° 6' 35.77"	W 103° 36' 3.25"

[illegible]

[illegible]