GOLSBY BROTHERS
WELL SERVICE INC.

P.O. Box 1011, Hwy 34E
Wiggins, Colorado 80654
970-483-7514

Geological Website
www.golsbybros.com

www.coalseamtracker.com

Scale 1:240 (5"=100') Imperial
Measured Depth Log

Well Name: Howard 24C-17H3
Location: SW SE 17-2N-66W, 6TH PM, Weld County, CO.
License Number: API: No CO 05055-00
Spud Date: 2nd Qtr 2013 Drilling Completed: 3rd Qtr 2013
Surface Coordinates: 341 FSL X 2140 FEL SWSE
Bottom Hole Coordinates: 2140 FSL X 2140 FEL SWSE(Proposed)
Ground Elevation: 4,767 Elev. Reference: KB 14 Above Ground Level
Logged Interval: 0 To: 14870 Total Depth (ft): 14870
Formation: Codell
Type of Drilling Fluid: Polymer Gel
Operator: Kerr-McGee Oil & Gas Onshore LP
Address: Oxbow Tower - 1099 18th St, Ste 1800
Denver, CO 80202
CO Geologist, Tom Birmingham

Surface Location Data: Range: 66W Township: 2N Section: 17 County: Weld State: Colorado
Well Name: Howard 24C-17H3
Operator: Kerr-McGee Oil & Gas Onshore LP
Spud Date: 2nd Qtr 2013
Total Depth: 14870
Rig Release Date: 3rd Qtr 2013
Ground Elevation: 4,767
Elevation Reference: KB 14 Above Ground Level
Logged Interval: 0 To: 14870
Total Depth (ft): 14870
Type of Drilling Fluid: Polymer Gel
Logging Company: Weatherford Laboratories
Contact: Jeff Ryan
Phone: 970-506-9250
Email: Jeff.Ryan@weatherfordlabs.com
Mud Company: National Oilwell Varco
Contact: Jeff Ryan
Phone: 970-506-9250
Email: Jeff.Ryan@weatherfordlabs.com
Drilling Company: Nabors Drilling USA
Rig Number: 27
Contact: Tim Birmingham
Phone: 970-506-9250
Email: Tim.Birmingham@nabors.com
Directional Company: Scientific Drilling
Contact: Jeff Ryan
Phone: 970-506-9250
Email: Jeff.Ryan@weatherfordlabs.com

OPERATOR

Company: Kerr-McGee Oil & Gas Onshore LP
Address: Oxbow Tower - 1099 18th St, Ste 1800
Denver, CO 80202
CO Geologist, Tom Birmingham

GEOLOGIST

Name: John Adams & Tom Kelly
Company: Gunnison Energy & Anadarko (GMX), Inc. (www.gcoilsfyldrillers.com)
Address: 1001 17th St
Suite 2000
Lakewood CO. 80228

E-logs

WIND GR - TEMP - HRVF

Casing

8 5/8" Surface Casing set @ 1550'
12 & Cement set @ 8101' MD, left on 30 Nov 2013.
Cement set on 12 Dec 2013

Comments

1) Drilling Contractor: Greene Drilling Rig # 22
2) Directional Drilling: Weather Ford Drilling Services
    MWD/LWD: WeatherFord
3) Mud Logging Services: Mudlogging Systems Inc.
    In Tank Services Rotation # 90, 732, 335 & Rain55 Agitator

ROCK TYPES

Anhy	Oil sst	Meta	Tar		
Bnsd	Oil sh	Mrbl	Tuff		
Brec	Oolite	Mud	Vol		
Chert	Pelet	Salt	Wbd		
Chgr	Sphe	Shcl	Zone sh		
Coal	Lmst	Shsd	Zone ss		

ACCESSORIES

MINERAL
- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol
- Feldspar
- Ferrpel
- Ferr
- Glau
- Gyp
- Hvymin
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr
- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff

FOSSIL
- Algae
- Amph
- Belm
- Bioclst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram
- Fossil
- Gastro
- Oolite
- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom

STRINGER
- Chlkstg
- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst
- Sltstrg
- Ssstrg

TEXTURE
- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest

OTHER SYMBOLS

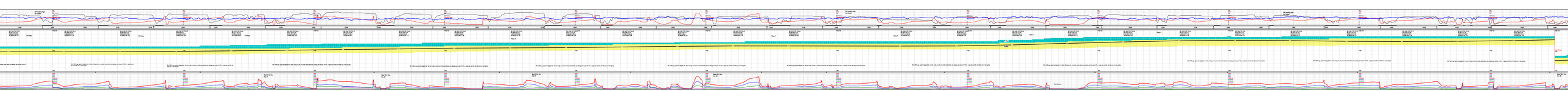
OIL SHOWS
- Even
- Spotted
- Ques
- Dead
- Vspotty
- near even

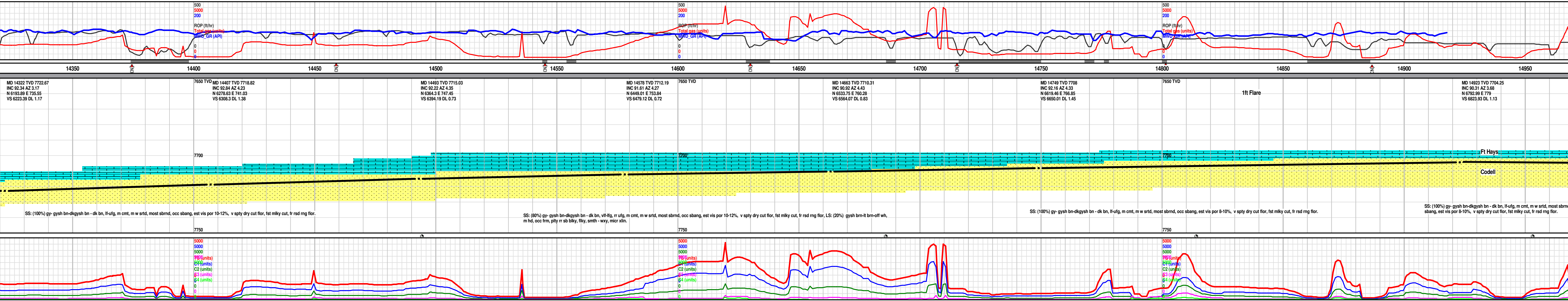
POROSITY TYPE
- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint
- Vuggy

ROUNDING
- Rounded
- Subrnd
- Subang
- Angular

SORTING
- Well
- Moderate
- Poor

Data Curves
ROP (ft/hr)
Total gas (units)
MWD_GR (API)
Slide/Rotate
Depth
Buster
Well Bore Cross Section
Oil Shows
Total Gas, C1-C5
TG (units)
C1 (units)
C2 (units)
C3 (units)
C4 (units)
Bit #2 8.75" Security MMD64, 6X18'S JETS; MWD GR/Survey BHA w/ Directional Mud Motor; In @ 1230'.
GBA two man crew start on 11/26/13 using Striplog and ML-326 TGC Gas detector.
MD 7188 TVD 7112.56 INC 2.16 AZ 242.75 N -526.29 E 360.47 VS -507.18 DL 0.72
KOP 7209' MD
Scale Change
SH: (100%), gy - drk gry, rr blk, v rthy, v slty, rr smth & wxy, rr flk, spircl, occ blky, SS intbd, non calc, tr bent & cly, NFSOC.
Mud @ 7219' MW 9.5 ppg VIS 30 sec/qt PV/YP 2/2 cp / lbs/100ft^2 Gels 1/2/3 lbs/100ft^2 FIL 20 ml/30min SOL 5.2% PH 8.0 Cl 2000 mg/l
GAS BUSTER ON.
SH: (100%), gy - drk gry, v rr blk, v rthy, v slty, rr smth & wxy, rr flk, spircl, occ blky, SS intbd, non calc, tr bent & cly, NFSOC.
Mud Wt & Vis; 9.9, 34
MD 7274 TVD 7198.51 INC 2.91 AZ 344.4 N -524.93 E 358.44 VS -505.92 DL 4.6
TOOH FOR NEW MM ON 11/26/13 @ 23:00 HR.
DTG 1132 u
SH: (100%), gy - drk gry, v rr blk, v rthy, v slty, rr smth & wxy, rr flk, spircl, occ blky, SS intbd, non calc, tr bent & cly, NFSOC.
Mud @ 7341' MW 10 ppg VIS 38 sec/qt PV/YP 10/10 cp / lbs/100ft^2 Gels 2/4/5 lbs/100ft^2 FIL 5.6 ml/30min SOL 7.7 % PH 9.0 Cl 2000 mg/l
ROP 30.3 FT/HR WOB 8.9 KLBS SPP 3060 PSI STRK 85/85 SPM
TOOH FOR NEW MM ON 11/27/13 @ 15:30 HR.
DTG 452 u
Bit #3 8.75" HUGHES DP406, 3X18 3X16 JETS; MWD GR/Survey BHA w/ Directional Mud Motor; In @ 7342'.
MD 7359 TVD 7282.95 INC 9.69 AZ 359.55 N -515.69 E 357.81 VS -496.72 DL 8.14
SH: (100%) lgy - gry, occ dkgy - blk, m rthy - smth, occ mldsh, rr slty, & wxy, occ flk, plty - occ blky, calc, tr bent & cly, NFSOC.
Mud Wt & Vis; 10, 38
Sharon Springs top @ 7392' MD, 7315' TVD.
Niobrara "A" top, 7411' MD, 7334' TVD
SH: (100%) lgy - gry, occ dkgy - blk, m rthy - smth, occ mldsh, rr slty, & wxy, occ flk, plty - occ blky, calc, tr bent & cly, occ chlky, NFSOC.
Mud Wt & Vis; 10, 40
MD 7444 TVD 7364.9 INC 20.52 AZ 4.9 N -493.62 E 359.03 VS -474.62 DL 12.83
SH: (100%) lgy - gry, occ dkgy - blk, m rthy - smth, occ mldsh, rr slty, & wxy, occ flk, plty - occ blky, calc, tr bent & cly, marly, occ chlky, no dry cut flor, slw mlky cut flor, no res rng.
SH: (50%) v dk gy-blk, frm, plty, fiss, sb wxy-wxy, n slty, carb, v calc. MRLST: (50%) m gy brn, m sft, blky, flky, rthy, m hi arg cont / shly, ip chlky, sl mttld.
MD 7529 TVD 7442.13 INC 28.63 AZ 4.77 N -458.43 E 362 VS -439.32 DL 9.54
SH: (50%) v dk gy-blk, frm, plty, fiss, sb wxy-wxy, n slty, carb, v calc. MRLST: (50%) m gy brn, m sft, blky, flky, rthy, m hi arg cont / shly, ip chlky, sl mttld.
Mud Wt & Vis; 10, 40
MD 7615 TVD 7514.6 INC 36.4 AZ 2.19 N -412.32 E 364.69 VS -393.14 DL 9.18
Niobrara B chalk: 7622' MD; 7520' TVD
CHLK: (40%) blk-dk brnsh gy, sl mot-mot, sb plty-sb blky, v carb, v calc, v arg, MRLST (40%) m gy brn, m sft, blky, flky, rthy, m hi arg, chlky, sl mttld,SH (20%) v dk gy-blk, frm, plty, fiss, sb wxy-wxy, n slty, carb, v calc, v spty fair dry cut flor, wk slw mlky cut & fnt dl yl resid ring flor.
MRLST (80%) m gy brn, m sft, blky, flky, rthy, m hi arg, chlky, sl mttld, SH (20%) v dk gy-blk, frm, plty, fiss, sb wxy-wxy, n slty, carb, v calc.
Mud Wt & Vis; 10, 39
MD 7700 TVD 7579.56 INC 43.82 AZ 0.92 N -357.62 E 366.13 VS -338.44 DL 8.78
Niobrara B chalk: 7738' MD; 7606' TVD
SH (50%) v dk gy-blk, frm, plty, fiss, sb wxy-wxy, n slty, carb, v calc, MRLST (40%) m gy brn, m sft, blky, flky, rthy, m hi arg, chlky, sl mttld, CHLK: (10%) blk-dk brnsh gy, sl mot-mot, sb plty-sb blky, v carb, v calc, v arg.
SH (60%) v dk gy-blk, frm, plty, fiss, sb wxy-wxy, n slty, carb, v calc, MRLST (30%) m gy brn, m sft, blky, flky, rthy, m hi arg, chlky, sl mttld, CHLK: (10%) blk-dk brnsh gy, sl mot-mot, sb plty-sb blky, arg, carb, v calc, v spty dry cut flor, m fst cut mlky cut, no res rng.
MD 7785 TVD 7636.39 INC 52.2 AZ 4.48 N -294.6 E 369.23 VS -275.34 DL 10.34
SH (100%) gy- dkgy, frm, blky, occ plty, mldish, sb wxy-wxy, occ carb, arg, calc, MRLST & CHLK stngr, LS intbs, min flor, NFSOC
Mud Wt & Vis; 10.1, 41
Mud @ 7850' MW 10 ppg VIS 38 sec/qt PV/YP 12/10 cp / lbs/100ft^2 Gels 4/8/11 lbs/100ft^2 FIL 4 ml/30min SOL 9.2 % PH 9.3 Cl 2000 mg/l
MD 7870 TVD 7684 INC 59.62 AZ 7.22 N -224.64 E 376.47 VS -205.1 DL 9.13
SH (100%) gy- dkgy, frm, blky, occ plty, mldish, sb wxy-wxy, occ carb, arg, calc, MRLST & CHLK stngr, LS intbs, min flor, NFSOC
ROP 24.8 FT/HR WOB 48 KLBS SPP 3383 PSI STRK 85/85 SPM
SH (100%) gy- dkgy, frm, blky, occ plty, mldish, sb wxy-wxy, occ carb, arg, calc, MRLST & CHLK stngr, LS intbs, min flor, NFSOC
MD 7956 TVD 7721.27 INC 68.96 AZ 7.24 N -147.85 E 386.21 VS -127.92 DL 10.86
SH (100%) gy- dkgy, frm, blky, occ plty, mldish, sb wxy-wxy, occ carb, arg, calc, MRLST & CHLK stngr, LS intbs, min flor, NFSOC
Mud Wt & Vis; 10, 40
LS: (100%) gysh brn-lt brn-off wh, m hd, occ frm, plty rr sb blky, flky, smth - wxy, micr xlin
LS: (100%) gysh brn-lt brn-off wh, m hd, occ frm, plty rr sb blky, flky, smth - wxy, micr xlin
MD 8041 TVD 7744.33 INC 79.51 AZ 7.33 N -66.82 E 396.57 VS -46.47 DL 12.41
LS: (100%) gysh brn-lt brn-off wh, m hd, occ frm, plty rr sb blky, flky, smth - wxy, micr xlin
LS: (100%) gysh brn-lt brn-off wh, m hd, occ frm, plty rr sb blky, flky, smth - wxy, micr xlin, SH intbds & few SS stngr.
MD 8126 TVD 7759.28 INC 80.23 AZ 9 N 16 E 408.46 VS 36.86 DL 2.11
Weighted Sweep
MD 8159 TVD 7763.6 INC 84.74 AZ 12.11 N 48.15 E 414.45 VS 69.27 DL 16.55
SS: (90%) gy- gysh bn-dkgysh bn - dk bn, vlf-lfg, rr ufg, m cmt, m w srtd, most sbrnd, occ sbang, est vis por 8-10%, v spty dry cut flor, fst mlky cut, fr rsd rng flor, LS: (10%) gysh brn-lt brn-off wh, m hd, occ frm, plty rr sb blky, flky, smth - wxy, micr xlin.
IC SET @ 8215' MD on 30 Nov 2013
Mud Wt & Vis; 10.1, 40
Bit #4 6.125" Security SN 11269393; MWD GR/Survey BHA w/ Directional Mud Motor; In @ 8224'.
Mud @ 8224' MW 9.0 ppg VIS 37 sec/qt PV/YP 9/9 cp / lbs/100ft^2 Gels 4/6/8 lbs/100ft^2 FIL 8 ml/30min SOL 3.7 % PH 8.0 Cl 1800 mg/l
MD 8234 TVD 7766.76 INC 90.43 AZ 15.99 N 120.8 E 432.64 VS 142.75 DL 9.18
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, grnsh ylw mlky cut, fr rsd rng flor.
MD 8287 TVD 7765.9 INC 91.42 AZ 14.7 N 171.9 E 446.66 VS 194.5 DL 3.07
Mud Wt & Vis; 9.4, 37
MD 8353 TVD 7764.59 INC 90.86 AZ 12.11 N 236.08 E 461.96 VS 259.39 DL 4.01
ROP 396 FT/HR WOB 12.5 KLBS SPP 3159 PSI STRK 0/86 SPM
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, grnsh ylw mlky cut, fr rsd rng flor.
MD 8424 TVD 7763.94 INC 90.19 AZ 10.52 N 305.7 E 475.89 VS 329.62 DL 2.43
Mud Wt & Vis; 9.2, 37
1 ft Flare
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, grnsh ylw mlky cut, fr rsd rng flor.
ROP 519 FT/HR WOB 12.7 KLBS SPP 3236 PSI STRK 0/86 SPM
MD 8538 TVD 7764.67 INC 89.07 AZ 7.91 N 418.21 E 494.14 VS 442.92 DL 2.49
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, grnsh ylw mlky cut, fr rsd rng flor.
Mud Wt & Vis; 9.2, 37
MD 8631 TVD 7766.48 INC 88.71 AZ 5.14 N 510.58 E 504.71 VS 535.71 DL 3
1 ft Flare
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, grnsh ylw mlky cut, fr rsd rng flor.
MD 8724 TVD 7767.13 INC 90.49 AZ 4.06 N 603.27 E 512.16 VS 628.67 DL 2.24
Ft Hays
Codell
MD 8815 TVD 7766.44 INC 90.37 AZ 4.02 N 694.05 E 518.57 VS 719.65 DL 0.14
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, grnsh ylw mlky cut, fr rsd rng flor.
ROP 551 FT/HR WOB 15.3 KLBS SPP 3507 PSI STRK 85 SPM
MD 8908 TVD 7765.39 INC 90.93 AZ 2.48 N 786.89 E 523.85 VS 812.64 DL 1.76
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, fst mlky cut, fr rsd rng flor.
MD 9001 TVD 7763.83 INC 90.99 AZ 2.06 N 879.8 E 527.53 VS 905.62 DL 0.46
Mud Wt & Vis; 9.6, 36
MD 9094 TVD 7762.22 INC 90.99 AZ 1.36 N 972.75 E 530.3 VS 998.58 DL 0.75
2' Flare
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, fst mlky cut, fr rsd rng flor.
MD 9186 TVD 7762.27 INC 88.95 AZ 359.47 N 1064.73 E 530.97 VS 1090.48 DL 3.02
MD 9279 TVD 7764.78 INC 87.96 AZ 357.99 N 1157.67 E 528.91 VS 1183.2 DL 1.91
2' Flare
Mud Wt & Vis; 9.2, 37
MD 9371 TVD 7766.91 INC 89.38 AZ 359.26 N 1249.62 E 526.7 VS 1274.91 DL 2.07
SS: (100%) gysh bn-dkgysh bn, lfg, occ ufg, m w cmt, m w srtd, most sbrnd, occ sbang, est vis por 10-12%, v spty dry cut flor, fst mlky cut, fr rsd rng flor.
MD 9456 TVD 7766.96 INC 90.56 AZ 1.3 N 1334.61 E 527.12 VS 1359.81 DL 2.77
1' Flare


OP-Leading Trail
OP-Trailer
Flow 1
Flow 2
Flow 3
Flow 4
Flow 5
Flow 6
Flow 7
Flow 8
Flow 9
Flow 10
Flow 11
Flow 12
Flow 13
Flow 14
Flow 15
Flow 16
Flow 17
Flow 18
Flow 19
Flow 20
Flow



Formation's	SSD	TVD	MD
Sharon Springs	-2266	7315	7392
Niobrara A	-2285	7334	7411
Niobrara B chalk	-2471	7520	7622
Niobrara C	-2557	7606	7738
Fort Hays	-2689	7738	8010
Codell	-2710	7759	8127

Target Line (Heel)	-2717	7766	8224
Target Line (Toe)	-2655	7704	14975

Thank You
Goolsby Brothers & Assoc.
Tekabe Gedamu & John Adams