

**MUD LOG**  
**WellSight Systems**  
Scale 1:240 (5"=100') Imperial  
Measured Depth Log

Well Name: Zerger A-2  
Location: E/2 NE NE Sec. 21 ;Twnsp. 8 s.; Rge. 19 w.  
License Number: 34110  
Spud Date: 9-10-2013  
Surface Coordinates: 660' FNL 330' FEL  
Region: Rooks County, KS  
Drilling Completed: 9-17-2013

Bottom Hole  
Coordinates:  
Ground Elevation (ft): 2006  
Logged Interval (ft): 2700 To: TD  
Formation: Arbuckle  
Type of Drilling Fluid: Chemical  
K.B. Elevation (ft): 2013  
Total Depth (ft): RTD 3555

Printed by MUD.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

**OPERATOR**

Company: TENGASCO, INC.  
Address: 1327 Noose Rd.  
Hays, KS. 67601

**GEOLOGIST**

Name: Mike Bair  
Company: Basin Resources L.L.C.  
Address: Longmont, CO.

**FORMATION TOPS**

Formation	Sample	Log
Anhy	1460 (+523)	1458 (+525)
Topeka	2961 (-948)	2955 (-942)
Heebner	3168 (-1155)	3162 (-1149)
Toronto	3189 (-1176)	3188 (-1175)
Lansing	3206 (-1193)	3203 (-1190)
BKC	3429 (-1416)	3423 (-1410)
Arbuckle	3455 (-1442)	3446 (-1433)
TD	3555 (-1542)	3550 (-1537)

**DSTs**

DST #1 3418-3465 Misrun  
DST #2 3410-3465 45-45-30-30  
IFP: weak blow through out ISIP: No blow back  
FFP: No blow FSIP: No blow back  
Rec: 5' socm (5% oil, 95% m)  
FP (18-19)(20-21) SIP: 172-119

**Comments**

Based on relative structural position, log analysis and sample shows; it was decided by all parties to run production casing to further test the economic potential of the Arbuckle formation.

### ROCK TYPES

- Anhy
- Bent
- Brec
- Cht

- Clyst
- Coal
- Congl
- Dol

- Gyp
- Igne
- Lmst
- Meta

- Mrlst
- Salt
- Shale
- Shcol

- Shgy
- Sltst
- Ss
- Till

### 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

- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst

- Sltstrg
- Ssstrg

#### TEXTURE

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

### OTHER SYMBOLS

#### POROSITY

- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint

- Vuggy

#### SORTING

- Well
- Moderate
- Poor

#### ROUNDING

- Rounded
- Subrnd
- Subang
- Angular

- Spotted
- Ques
- Dead

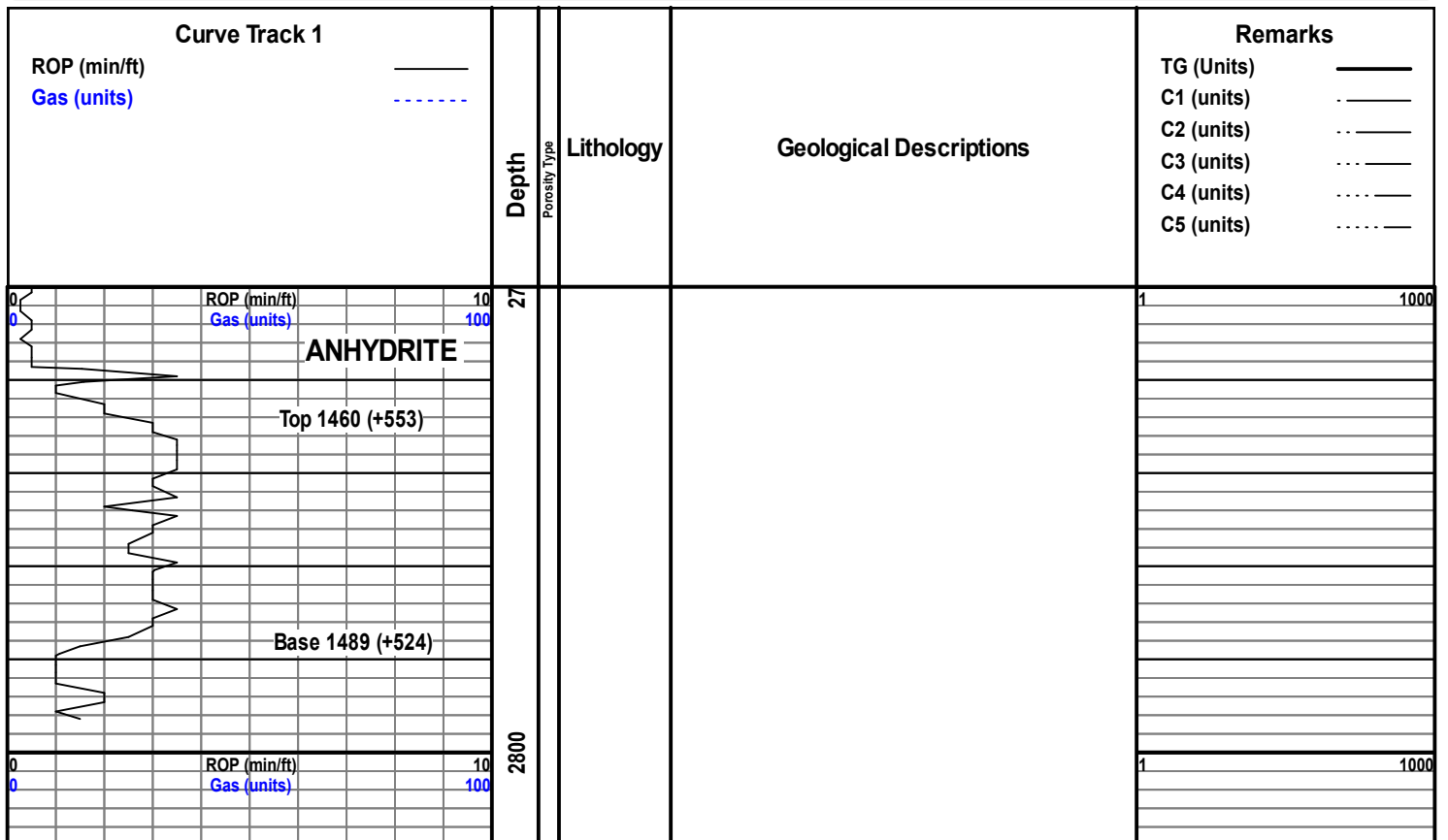
#### INTERVAL

- Core
- Dst

#### EVENT

- Rft
- Sidewall

- OIL SHOW Even



Strap at 2739'  
short to Board  
2.58'

MudCo 2847  
Wt. 8.7  
Vis 51  
LCM 2#  
Chr 1000

2850

2900

2950

3000

**TOPEKA**  
2961 (-948)

Sh, gry; Ls, tan-gry, foss frags, ns, n/o

Ls, crm-gry, wkstn, some shly; Sh, gry, ns, n/o

Ls, crm-wh, wkstn-pkstn, ool; Slst, gry, mica, ns, n/o

a/a; Sh, gry-blk, ns, n/o

Slst to v f grn SS, argil to Ls, crm-tan, wkstn-pkstn, ns, n/o

a/a

Ls, crm-gry; slst-sh, gry, ns, n/o

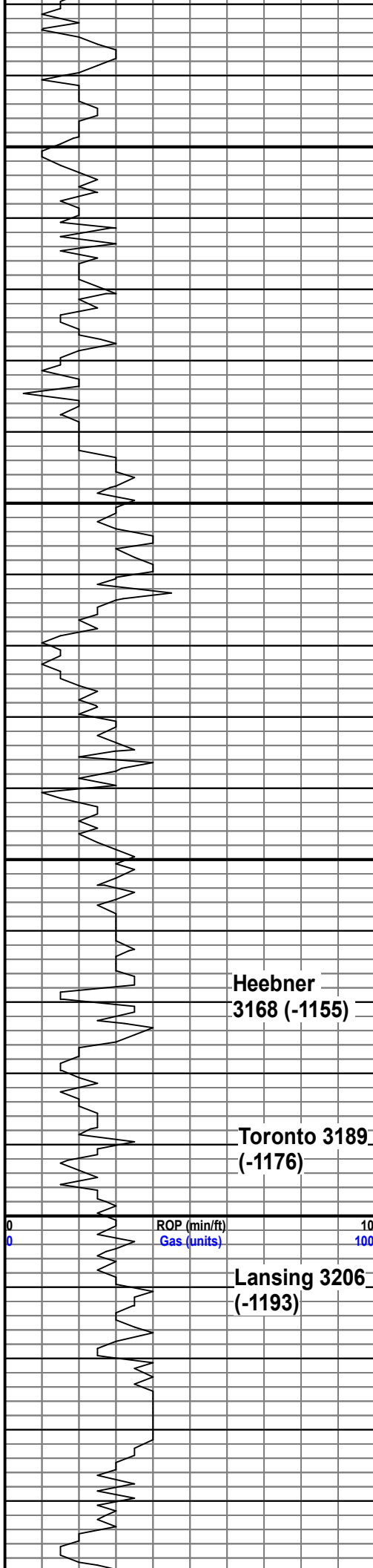
R pc Ls, wh, f gran, sl ixgran por, poss gil stn, nsfo, n/o

ROP (min/ft)  
Gas (units)

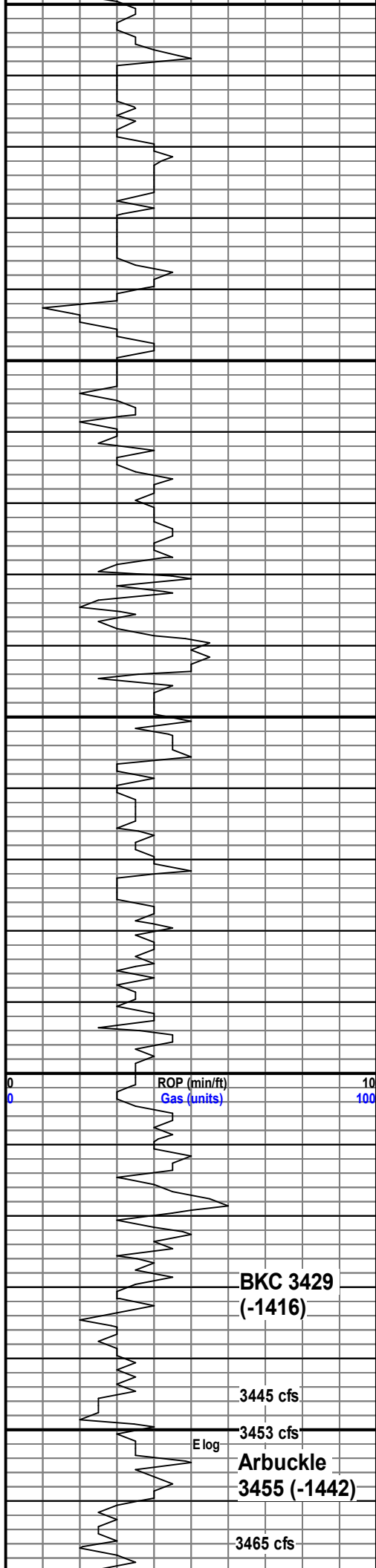
10  
100

1

1000



3050	SH, blk; Ls, crm-gry, sn, n/o	
	Ls, crm-gry, some sl ixl por, sct'd foss frags, ns, n/o	
	Sh, gry-blk; Ls, crm-tan, mdstn-pkstn, spty ixgran por, ns, n/o	
	Ls, tan, gran, foss frags, some shly; Chert, crm-tan, fresh, dse, ns, n/o	
	a/a, sct'd cky, ns, n/o	
	Ls, tan, gran, poss ixgran por, ns, n/o 3100	
3100	Sh, gry, mrm, grn: Ls, crm-wh, fxl to ool, pr vis por, ns, n/o	
	Sh, blk; Ls, crm, shly to mot'd, ns, n/o	
	a/a to Ls, crm-tan, fxl to xl gran, ns, n/o	
	Ls, tan, wkstn, poss ixgran por, ns, n/o	
	Ls, gry-tan, fxl, fxl to gran, foss frags, some cky, ns, n/o	
	Chert, brn to op; Ls, of wh, fiseh, pr vis to sl pp por, cal rexln, poss frac, sl-fr sfo in few rx wh bxn, fr rep, some cky, v sl odor 3160	
3150	Chert, tan; Ls, crm-tan, fxl, nvp, ns, n/o	
	SH, BLK, platy, sl carb 3180	
	Ls, crm-tan, fxl to R pc Ls, gry, mot'd, pr vis por, sfo on frac plane, n/o	
	Ls, tan, fxl to ool, pr to sl vis por, r pc Ls, flesh, v sl pp por, sl sfowh bxn; R pc Ls, gry, mot'd, lt sfo, sl ixl por, n/o 3200	
	Ls, crm-gry, some foss frags, mst pr vis por; Slst, argil, gry-grn, ns, n/o	
3200	Ls, wh, ool, sl ixool por, spt'd surf stn, sl sfo wh bxn, low rep, no odor 3220	1
	Ls, wh, few pc a/a to Ls, crm, fxl, v spt'd vg por to pr vis por, oil stn in vg; Ls, v f gran, lt surf stn to spty sat'd stn, v sl sfo, pr-sl por; abd't chert, crm, lt to lt fr odor 3230	
	Ls, wh, fxl, nvp, few pc a/a wk dor	
	Ls, wh, fxl, some cal rexln, ns, n/o 3250	
	Ls, wh, ool, spt'd surf stn, sl ixool to few fr ixool por; Dolo, tan, suc, small rhom xls on edges, few vgs, even sat'd stn, sl sfo, fr rep, fr - L gd odor 3260	
30	Ls, a/a, lt sct'd stn, fr no por, lt sfo to Dolo, a/a fr	1000



3200  
3300  
3350  
3400  
3450

Ls, a/a, lt sat'd stn, fr pp por, lt sfo to Dolo, a/a, fr  
suc por, occasional vg, v wk odor  
Ls, crm, fxl, ns, n/o; few sluff fr above  
Ls, wh-crm, fxl, some cky, poss v lt surf stn,  
nsfo, n/o; R pc Ls, wh, ool, v sl ixool por, spt'd  
surf stn  
Ls, wh, ool, mst pr vis por, spt'd surf stn, v sl sfo  
wh bxn, med rep 3300, poss v wk odor  
Ls, tna, fxl to gran, ool, few fr ixool-ixgran por to  
sct'd vg, lt sfo in few rx wh bxn, poss v wk odor  
3310  
Ls, wh, fxl, sl cky, ns; Chert, wh, op to wh ool, ns  
abt'd chert, tan - op, n/o  
Sh, blk; Ls, gry, shly-mot'd, ns, n/o  
Ls, brn, wkstn, ns, n/o pr vis por r pc Ls, wh, ool,  
pr-sl ixool por, spt'd surf stn, v sl sfo wh bxn,  
poss v wk odor 3350  
Ls, crm-tan, fxl, cky in pt, ns, n/o; some Chert  
Ls, crm, fxl, fxl, ns, n/o; chert  
Ls, wh, fxl, ns, r pc Dolo, brn, dse, few vy, sat'd  
stn, sl sfo in vg, lt odor 3380  
Ls, wh-crm, fxl to m gran, ns, n/o  
Ls, crm, v f gran, spt'd to sat'd stn, pr vis por, v sl  
sfo, low rep 3410  
Ls, wh, fxl, r pc ool, spt'd sl por, v sl sfo, n/o;  
Chert, tan to crm, fresh, dse, ns  
Ls, crm-tan, gran, r pc ool, ns; 1 pc Ls, v f gran, lt  
surf stn, nsfo, some weathered Ls; Chert, wh, ool,  
fresh, dse, ns  
Ls, wh-crm, fxl, ns, n/o  
Wash red; Sh, red soft, sct'd Ss, qtz, v fgrn, fri,  
ns; Slst, gry-grn, ns, n/o 3435 60 min  
a/a; Ls, wh, wkstn to pkst, some cky, ns, n/o 1 pc  
Dolo, brn, dse, sm vg w oil stn (sluff?)  
Dolo, wh, mxl, nvp, ns; 1 pc Dolo, wh, mxl, hvy  
blk oil stn on edge, nsfo, n/o 3461 20 min  
Dolo, crm, f-mxl, tight, sct'd fr-gd vy por, few rx w  
xl growth on frac face, spt'd surf stn, hvy blk oil  
stn on edge of some rx. L-fr sfo in few rx. mst

MudCo 3291  
Wt. 9.15  
Vis 48  
LCM 1.5#  
Chlr 1700

MudCo 3465  
Wt. 9.4  
Vis 64  
LCM 3#  
Chlr 1700

Dolo, a/a, few rx w  
spt'y gd vy por,  
hvy blk oil stn,  
mxl in vgs, L-fr sfo  
wh bxn, low rep, lt  
odor, mst barren  
3465

**BKC 3429**  
**(-1416)**

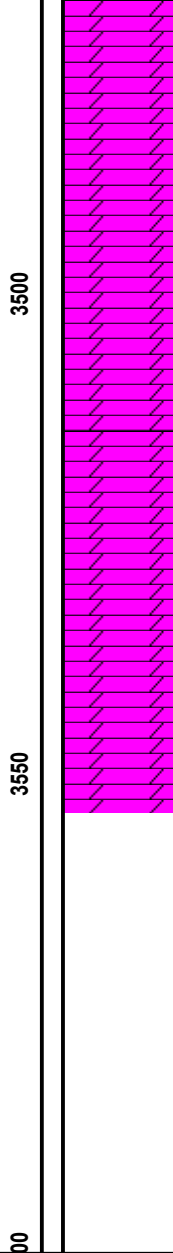
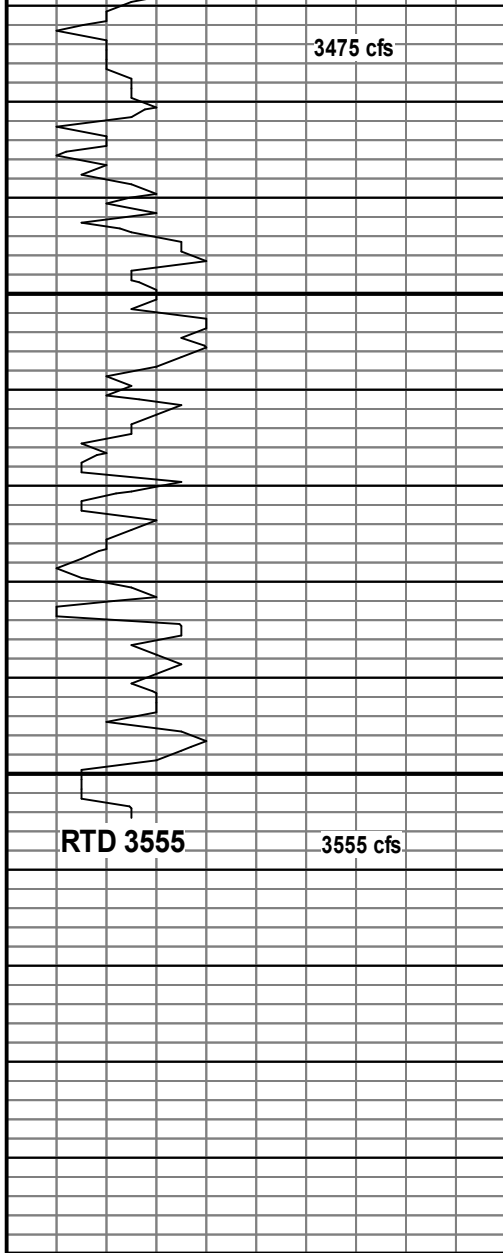
3445 cfs

E log  
**Arbuckle**  
**3455 (-1442)**

3465 cfs

ROP (min/ft)  
Gas (units)

E log



barren 3465 30 min

Dolo, wh, m-lg xls, fr-gd ixl por, fr-L gd sfo, sct'd gd vg por, sat'd stn, fr-L gd odor 3475

Dolo, wh, m-lg xls, fr-gd ixl por, fr-gd sfo, sat'd stn, poss v sl dec in odor, gd rep 3475 20 min

a/a, sl dec in show rx 40 min

Dolo, wh, mxl, fr-gd ixl por, gd vg por, sat'd stn, fr-L gd sfo, sl decr in odor, incr in barren; Sh, gry-grn 3475 60 min

Dolo, wh, decr in odor, decr in ixl por, sct'd gd vg por, fr-gd sfo, many rx tight, dense, fr odor, incr in barren rx 3490

Dolo, tan, f-mxl, tight, dse, pr-sl ixl por, r pc w fr vg por, sl-fr sfo in few rx, hvy blk oil stn, incr barren; washed white, soft wh chalk, wk-lt odor 3500

Dolo, crm-tan, fxl, pr vis por, sct'd sl surf stn, nsfo, gil stn?, mst barren, no odor 3510

a/a to Dolo, tan, cherty, nvp, r qtz xl, nsfo, gil stn, n/o 3520

a/a

Dolo, wh-crm, fxl to few lg xl, spt'd surf stn, gil stn to few pc w v sl show tarry oil, n/o, pr vis por, mst barren 3540

Dolo, crm, f-fmxl, nvp, ns, n/o

Strap 3.16' short to Bd 3465

3480 Incr. in odor, Dolo, wh, m-lg xl, good to vy gd ixl por, sct'd good vg por, good sfo, good rep, good odor; sh, mrn, gry. Free oil on top of smpl cup

qtz

Vis 69  
Wt. 9.4