



RESUME

Operator: Union Pacific Resources Company

Well Name and Number: #1 Zuni 14-31

Prospect: Zuni

Location: C SW SW Section 31 (660' FSL, 660' FWL); T-16S, R-49W

County and State: Cheyenne County, Colorado

Elevation: GL: 4466'; KB: 4479'

Spud Date: January 25, 1992

Completion Date:

Hole Sizes: 12 1/4": 0-508', 7 7/8": 508-TD

Casing Data: 8 5/8" set at 506'

Logging Data: HLS,

Exploration Geologist: Mark P. Germinario

Drilling Foreman: Jack Parrott

Wellsite Geologist: John C. Lamb

Contractor: Cheyenne, Rig 7

Tool Pusher: Phil Loyd

Mud Type: Chem-Gel

Mud Company: Bariod, Rich Steinbrink

Drilling Days: 12

Rotating Hours: 161 1/2

Bottom Formation:

Status: Dry and Abandoned

FORMATION TOPS AND CORRELATION

	UPRC #1 Zuni 14-31 SW SW 31-16S-49W Cheyenne Co., Colo. KB 4479	Mull Drilling #1 United Bank SW SW 14-17S-50W Kiowa Co., Colo. KB 4474
DAKOTA	1366(3113)	1338(3136)
CHEYENNE	1618(2861)	1680(2794)
BLAINE SALT	2478(2001)	2465(2009)
STONE CORRAL	2734(1745)	2721(1753)
NEVA	3408(1071)	3390(1084)
FORAKER	3486(993)	3466(1008)
SHAWNEE	3892(587)	3878(596)
HEEBNER	4079(400)	4061(413)
TORONTO	4107(372)	4092(382)
LANSING	4137(342)	4121(353)
MARMATON	4525(-46)	4527(-53)
Pawnee Member	4580(-101)	4573(-94)
Fort Scott Member	4621(-142)	4618(-139)
CHEROKEE	4673(-194)	4675(-201)
ATOKA	4891(-412)	4903(-429)
MORROW	5148(-669)	5183(-709)
V7 MARKER	5285(-806)	5316(-842)
LOWER MORROW LIMESTONE	5333(-854)	5365(-891)
SPERGEN	5508(-1129)	5580(-1106)
TOTAL DEPTH	5600	5638

BIT RECORD

BIT #	SIZE	TYPE	IN	OUT	FOOTAGE	HOURS
1	12 1/4"	J11 (RT)	0'	508'	508'	4
2	7 7/8"	FDS	508'	1712'	1204'	12 1/2
3	7 7/8"	ATJ11H	1712'	4512'	2800'	90
4	7 7/8"	ATJ22S	4512'	5600'	1088'	57

SURVEYS

128 1/2	508 1	2804 3/4	4054 3/4	5600 1
247 1/2	1180 3/4	3332 3/4	4512 1	
366 3/4	2397 3/4	3866 1	5021 1	

DAILY CHRONOLOGY

DAYS OVER HOLE	DATE	8AM CST DEPTH	24 HOUR FOOTAGE	DAILY ACTIVITY
1	January 25	0'	0'	MIRU, spud, drlg, prep for & run surf csg
2	January 26	508'	508'	run & cem csg, WOC, NU, drlg
3	January 27	1712'	1204'	drlg, TFB, drlg, LC, drlg
4	January 28	2785'	1073'	drlg
5	January 29	3480'	695'	drlg
6	January 30	4035'	555'	drlg
7	January 31	4470'	435'	drlg, TFB, drlg
8	February 1	4750'	280'	drlg
9	February 2	5195'	445'	drlg
10	February 3	5600'	405'	drlg, TD, prep for & run logs, WOO, PB to DST Cedar Hills
11	February 4	5600'	0'	PB, WOC, prep for DST #1
12	February 5	5600'	0'	DST #1, P&A

LOST CIRCULATION INTERVALS

1023', 100 bbl 1816', 50 bbl 5600', 90 bbl

MUD REPORTS

Date	1-30	1-31	2-1	2-2	2-3
Depth	3970	4380	4695	5135	5600
Weight	9.1	9.0	9.2	9.2	9.3
Funnel Viscosity	40	45	39	49	51
Plastic Viscosity	16	18	17	22	23
Yield Point	10	12	11	16	17
Gel Strengths	4/12	4/14	4/13	5/19	5/20
Water Loss	16.8	18.2	8.0	8.8	6.8
Filter Cake	2/32	2/32	2/32	2/32	2/32
Solids	5 1/4	5	6	6	6 3/4
Sand	1/4	1/4	1/2	1/2	1/4
pH	9.5	9.5	9.0	9.0	9.5
Alkalinity Pf/Mf	.25/.50	.20/.30	.10/.30	.05/.15	.25/.40
Calcium	100	100	120	80	80
Chlorides	400	300	350	350	350
LCM	1	1 1/2	2	1	4

DRILL STEM TESTS

Drill Stem Test #1
Valid Bottom Hole Test
Cedar Hills Ss

2580-2700

Times: 15-30-30-30 minutes

BHT 117 F

PRESSURES:

IHP 1221
IFP 563-568
ISIP 591-605
FFP 600-606
FSIP 610-612
FHP 1209

REMARKS:

Tool set & opened OK
Opened with strong blow, BOB in 1 min., incr to 100" at SI
Dead
Opened with strong blow, BOB in 1 min., 29" at 10 min., deid to 1/2" at SI
Dead
Pulled loose OK

RECOVERY:

Drill Pipe: 1323' Water, Chlorides 800 ppm, RW 2.0 ohms at 52 F
Sampler: 3100 cc Water, 100 psi

SUMMARY

The #1 Zuni 14-31 was drilled on the Zuni Prospect. The location was picked upon the basis of seismic interpretation, which indicated a possible thickening in the Morrow Clastic Interval. The Zuni Prospect is located some 3 miles north and east of the Armadillo Field, which is a one well field that produces oil from the Lansing-Kansas City Formation.

The primary objectives were Morrow V7 and V9 Channel Sand development and porosity development within the Pennsylvanian Marmaton and Lansing Formations. No Morrow Sands were encountered. Total Morrow Clastic Interval was 185'.

A significant show was recorded in the Permian Cedar Hills Formation (Log Top 2562'). Due to possible discrepancies in the depths at which the 30' samples over the interval were caught, the exact depth of the show is unknown, but is most certainly between 2562' and 2620'. Description: Sandstone white to reddish white to translucent, upper to lower fine grain, sub round, fair sorted, very friable to soft, poorly to very poorly consolidated, clean appearing to slightly to moderately clay filled in part with white clay, slightly calcareous, generally tight with poor to fair visible porosity, frequently with good to excellent visible porosity, spotty black live (or free and movable) to tarry appearing oil stain, very dull even to pin point gold to greenish gold fluorescence, excellent very fast heavy streaming to sub streaming green cut. Successive samples showed the Sandstone to becoming increasingly red and argillaceous, finally grading into sandy shales.

After logging was completed, the hole was plugged back to below the Cedar Hills and a conventional bottom hole drill stem test was run. The drill pipe recovery was 1323' of slightly brackish water (800 ppm Chlorides) with no hydrocarbons.

Minor hydrocarbon shows were recorded in the Lansing, Marmaton, Cherokee, and Lower Morrow Limestone.

SAMPLE DESCRIPTIONS

Unlagged Sample Depths

1430 Ls wh chky bnsh vfxl Sh bn /chky incl
1460 Ls incr wh-off wh chky Sh AA
1490 Ls & Sh AA
1520 Ls incr lt bnsh vfxl dns Ss sli tr clr fg uncon
1550 Ss clus uncon trnsd u.-l.fg sb rnd fr srted vfri vprly cons gen cln lrg'r clus gysh wh vfg-fg cly fld all NSFOC
1580 Ss incr amts AA /sli incr grn size
1610 Ss incr chng: bec gysh arg mltigr clus
1640 Ss cont'd Sh chng: pred gy blkly sli slty /hvy tr rd FE stn Paleosol?
1670 Sh m gy blkly slty Ss sli decr
1700 Ss decr Sh gy
1730 Sh chng: freq purple gn wxy sdy /fr freq Ss uncon trnsd l.mg w rnd Pyr hvy amt chnks
1760 Pyr incr amt Ss cont'd amt uncon /tr 3-5 gr clus

1790 Cont'd AA
 1820 Ss incr uncon clr u.fg-l.mg w-sb rnd
 1850 Ss AA Sh bec pred purple wxy sli sdy-sdy
 1880 Sh chng: bec rdsh plty-blky fn txt Ss cont'd
 1910 Sh varicol fn-wxy sdy i.p. Ss cont'd
 1940 Ss decr Sh varicol-pred lt gn
 1970 Ss cont'd decr Sh varicol
 2000 Cyst hvy amt lt gn-off wh frm-vfrm calc sdy-vsdy grds to Ss
 2030 No Sample
 2060 Cyst decr Sh lt gn-gy-purple
 2090 Anhy clr dns mass cxl Sh AA
 2120 Sh varicol wxy-fn txt Anhy cont'd
 2150 Sh & Anhy AA
 2180 Cont'd
 2210 Sh rdsh orng blky slty-sdy
 2240 Sh rdsh orng slty fn txt
 2270 Sh AA /incr lt gn wxy
 2300 Dol off wh-wh vfxl-micxl vdns hd-brit
 2330 Sh & Dol AA
 2360 Sh rdsh orng blky slty-fn txt gyp i.p.
 2390 Sh AA Dol cont'd amt
 2420 Sh & Dol AA /incr Anhy wh-trnsl cxl-mass
 2450 Sh rdsh orng /sme lt gn
 2480 Sh rdsh orng-lt gn-olive-gy-dk gy
 2510 Sh AA /occ purple

BLAINE 2478'

2540 Dol incr off wh-lav wh micxl dns Anhy sm incr wh cxl-mass
 2570 Dol & Sh & Anhy AA Ls tr bn vfxl arg

CEDAR HILLS 2562'

2600 Ss wh-rdsh wh-trnsl u.-l.fg sb rnd fr srted vfri-sft pr-vpr cons sli-mod cly fld i.p. sli calc gen tight with pr vis poro sme /g vis poro spotty blk live oil stn vdull even to pin point gnsh gd flor exc hvy vf stmg-sb stmg gn ct
 2630 Ss chng: bec rd & incrlly arg /sli decr cln'r clus /show
 2660 Ss pred rdsh orng fg varg pos grds to Sh
 2690 Sh incr rdsh orng vfn-vsdy
 2720 Sh cont'd rdsh orng Anhy incr wh-lav cxl-mass Ss cont'd freq amt
 2750 Sh AA

STONE CORRAL 2734'

2780 Anhy incr lav-lt gysh wh cxl-mass
 2810 Anhy incr amt Sh cont'd rdsh orng
 2840 Anhy sli decrdecr
 2870 Anhy Ss Sh cont'd AA
 2800 Sh purple-rdsh orng-lav-gy Anhy decr Ss cont'd
 2820 Sh rd & gy sme /calc incl Bent off wh flky mica

2840 Sh rd & gy Ss freq uncon rdsh-clr fg-cg w-sb rnd
 2860 Sh rd gy gn wxy & sdy i.p. Ss decr uncon /tr clus lt bnsh trnsf fg fr srted fr vis poro
 2880 Ss decr Sh rd gy gn sdy i.p.
 2900 Ss sm incr clus: trnsf fg fr srted Sh AA
 2920 Sh rd gy purple gn Ls lt bnsh vsparry fos
 2940 Ls decr Sh rd gy purple gn Ss tr wh fg hvy cem
 2960 Sh AA Ss sm amt bnsh wh fg cln'r /less hvy cem
 2980 Sh rd gy purple gn AA fn txt Ss sm amt gen /hvy cem
 3000 Sh incr rd's
 3020 Sh cont'd AA
 3040 Ss pos incr uncon /sli tr clus trnsf l.fg /spotty oil show no flor hvy f yel stmg ct cvngs!
 3060 Sh rd gy purple gn Ss tr uncon & clus /hvy cem NSFOC
 3080 Ls sm incr buf-off wh vfxl dns brit
 3100 Sh AA Ls decr
 3120 Sh rd gy purple bn wxy-fn txt loc sdy Ls cont'd sm amt /tr bn fxl fos
 3140 Sh incr wxy & sdy Ss incr clus wh fg hvy cem
 3160 Sh gy rd gn purple incrlly sdy Ss cont'd
 3180 Sh rd gy bn gn
 3200 Sh cont'd /incr vdk gy flky carb
 3220 Sh rd gy gn wxy sdy sme blk vcarb
 3240 Sh AA Ls tr buf vfxl dns sparry
 3260 Sh & Ls cont'd AA
 3280 Sh rd gy gn Ls decr
 3300 Sh AA
 3320 Sh gy gn rd loc sdy
 3340 Sh rd gy gn Bent tr's lt gn
 3360 Sh AA
 3380 Sh gn rd gy
 3400 Sh gn rd gy bn fn-wxy txt loc sdy
 3420 Sh rd gn gy fn-wxy Ls tr buf vfxl fos
 3440 Sh gn gy rd

NEVA 3408'

3460 Sh gn gy rd Ls lt gysh vfxl dns sli arg
 3480 Sh AA

FORAKER 3486'

3500 Ls def incr bnsh buf-wh vfxl dns brit
 3520 Sh gn gy rd purple pred sli sdy-sdy
 3540 Sh AA Ls decr
 3560 Sh gy gn rd bn
 3580 Sh gn rd gy purple fn-slty & sdy
 3600 Ls pos incr wh chky frm-sft
 3620 Ss sm amt clus wh vfg calc cem Sh rd gn gy bn
 3640 Ss incr amt wh-vlt gy vfg-l.fg calc cem NSFOC Ls tr amt buf micxl vdns brit
 3660 Ls sm incr amt AA Ss decr
 3680 Sh rd gn gy purple Ls decr

3700 Sh AA
 3720 Sh gy rd gn purple Ls sli tr wh micxl fos
 3740 Ls tr buf micxl vdns brit Sh gy rd gn purple AA
 3760 Sh cont'd AA
 3780 Ls buf-lt tn sparry fos
 3800 Ls buf-off wh-rose micxl-vfxl gen cln sparry loc sli arg
 3810 Sh rd gy gn Ls vsm amt buf vfxl dns brit sli-mod sparry sli fos
 3820 Sh gy gn rd
 3830 Sh gy gn purple rd
 3840 Sh cont'd Cret-Perm Ls tr
 3850 Ls tr Sh AA Ss tr trns l.mg-fg sb rnd pr-vpr srted vfri poorly cons good vis poro spotty
 live oil stn very dull gd flor hvy vf bri yel stmg ct
 3860 Ls def incr buf-lt bnsh trns vfxl-fxl vsparry & fos i.p. Sh AA
 3870 Ls cont'd sm amt AA
 3880 Ls sm amt lt gysh fxl-Mdst lt'r col fos AA
 3890 Ls cont'd sm amt lt gysh-wh vfxl sli-mod sparry sli fos loc vfos gen cln app
 3900 Sh gy gn rd Ls tr crs fos frag Pkst vsparry
 3910 Sh pred rd blk Ls sm amt buf vfxl sparry fos cln app

SHAWNEE 3892'

3920 Ls lrg incr gysh wh-rdsh wh fxl-vfxl dns rthy txt sli arg loc sparry & fos cln'r app
 3930 Ls cont'd
 3940 Ls rdsh wh-gysh wh fxl-vfxl dns less rthy txt incrly sparry indist fos
 3950 Ls gysh wh vfxl-Mdst vfos i.p. gen dns sli arg
 3960 Ls lrg incr mot gysh wh fxl-vfxl sli arg indist fos i.p.
 3970 Ls lt gysh wh-lt bnsh vfxl arg-sli arg fos-vfos
 3980 No Sample mudding up
 3990 Sh gy gn rd tr SS /show AA
 4000 Sh gy gn rd SS AA
 4010 Ls sli mot gysh-bnsh wh vfxl dns-fxl /rthy txt Sh incr blk carb
 4020 Ls tn-off wh vfxl dns Sh decr
 4030 Ls tn-lt bn vfxl dns fos i.p. sli arg
 4040 Ls chng: tn-off wh-vlt gysh wh fxl-vfxl pred /rthy txt occ sparry /indist fos
 4050 Sh incr gy /sme blk vcarb Ls off wh-lt tn vfxl-fxl incrly cln mod sparry & fos i.p.
 4060 Sh incr gy & rd /sme blk carb
 4070 Sh cont'd blk Ls gen cln mod-vsparry fos
 4080 Ls incr lt gysh-bnsh wh vfxl-fxl dns
 4090 Ls & Sh cont'd AA

HEEBNER 4079'

4100 Sh incr gy purple rd
 4110 Sh cont'd
 4120 Sh decr /cont'd sm amt blk carb Ls wh-gysh wh vfxl-fxl gen dns freq sparry & fos

TORONTO 4107'

4130 Ls incrly sparry & cln app
 4140 Ls off wh-lt gysh wh vfxl vsparry fos /fxl rthy txt Sh cont'd

- 4150 Sh cont'd incr Ls AA bec sdy i.p.
 4160 Ls off wh fxl-vfxl sparry & fos i.p. sdy i.p. Sh blk-rd

LANSING 4137'

- 4170 Ls chng: off wh-gysh wh vfxl sparry bec ool
 4180 Ls off wh-wh vfxl bec gen ool cont'd sparry Sh sm amt gy slty grds to Slst
 4190 Ss vsm amt wh vfg calc cem Ls decrly ool incrly fos gen sparry Sh pos incr blk vcarb
 4200 Sh decr Ls gysh wh-off wh vfxl dns freq sli arg gen decrly sparry
 4210 Ls off wh-gysh wh vfxl-fxl dns ool i.p. arg & sdy i.p. Sh sme blk carb
 4220 Ls off wh vfxl incrly cln app bec fos
 4230 Ls buf-off wh bec incrly dns
 4240 Sh def sm incr blk vcarb Ls lt gysh vfxl incrly arg i.p.
 4250 Ls gysh-off wh vfxl-fxl gen dns brit occ vsparry & fos mod arg i.p.
 4260 Ls gysh wh-wh vfxl-micxl-fxl loc sdy fos & sparry i.p.
 4270 Ls off wh-gysh wh vfxl-micxl dns freq vsparry mod-vfos
 4280 Ls cont'd wh-off wh AA
 4290 Sh sm incr blk vcarb Ls cont'd wh cln app
 4300 Sh cont'd incr blk vcarb Ls chng: sme lt bn-lt bnsh gy micxl vdns brit-hd
 4310 Ls pos chng: lt bnsh vfxl-micxl ool Wkst-Pkst freq /blky spar xl infill gen vbrit-fri
 Sh cont'd
 4320 Ls chng sli mot gysh bn fos arg mnrlly app sparry i.p.
 4330 Ls lt tn-sli mot gysh wh cont'd vfos bec gen cln'r app
 4340 Ls gysh-bnsh rgh txt i.p. bec gen ool-vooll sli arg Sh sme gy-dk gy
 4350 Ls bn-gy-off wh vfxl ool i.p. fos i.p. loc sdy gen sli arg Sh sm incr gy & blk
 4360 Ls gysh rgh txt gen fos sli sparry
 4370 Ls sli mot lt gy-lt bnsh vfxl sli arg fos
 4380 Ls chng sme lt gy sli arg vslty & sdy /off wh chky-fxl /rthy txt
 4390 No Sample
 4400 Ls cont'd Sh incr blk & gy's
 4410 Ls tn vfxl ool off wh-lt gysh wh vfxl-fxl gen fos vsparry i.p.
 4420 Ls chng: bnsh gy fxl-vfxl dns spotty carb stn dolic /dk gy micxl vdns arg Sh sm amt blk
 & dk gy
 4430 Ls bnsh-gysh vfxl-fxl dns pred indist frag Pkst-Wkst dolic i.p. tr Dol
 4440 Dol lt gysh-off wh mxl fri-sli fri sli carb pr-fr intxl poro tr only /dull spotty gn flor wk
 mlky gn ct
 4450 Ls chng: sli mot gysh bn fxl rthy vfxl mod sparry pred vooll grdg to Wkst-Pkst gysh tn
 vfxl vfos sli arg sme /vspotty dull gn flor wk mlky gn ct Sh def incr blk vcarb
 4460 Ls tn-off wh fxl rthy txt occ grds to mxl fri pr intxl poro NSOC gysh bn vfxl-fxl sdy sli
 arg indist fos Sh cont'd blk Dol cont'd
 4470 Ls pos chng bec dk tn-gy-bn vfxl-micxl dns mod arg spotty dull gn flor
 4480 Ls bn-gysh bn micxl-vfxl dns-vdns brit sli fos wh-off wh fxl-sb chky cln gen rthy txt
 4490 Ls lt & dk AA /pos incr wn cln AA Sh cont'd decr
 4500 Cht tr wh smi trnsl fos Ls off wh fxl-vfxl rthy-dns bn-gysh bn vfxl dns bec sli-mod carb
 4510 Ls off wh fxl-mxl-vfxl dns-fri cln-vsli arg pr-vpr intxl poro scat dull gn flor wk mlky gn
 ct Sh incr blk & gy vcarb i.p.

Note bit trip at 4512'

- 4512 Sh cont'd amt AA Ls chng m-dk bn sli mot i.p. vfxl-micxl dns-vdns carb pos vsli oil stn

- spotty dull gn flor gn ring ct
- 4520 Ss fr amt wh vfg w srted fri-hd hvy calc cem Ls off wh-wh fxl-chky rthy txt fos i.p. loc vsdy
- 4530 Ss cont'd /pos sli decr amt AA Ls cont' lt'r col loc sdy cln sli arg i.p.
- 4540 Ls incr wh-off wh micxl-fxl frm-fri vsli arg i.p. loc sdy sme chky & sft
- 4550 Sh def incr lt gnsh gy-vlt gn blkx wxy-sb wxy fnly pyr vsm incr blk vcarb

MARMATON 4525'

- 4560 Ls off wh-lt gy-tn gen rgh txt vfxl-mxl sft-hd sm amt vsparry ool Wkst fos i.p. sli arg i.p. Sh & Ss decr
- 4570 Sltst/Ss lt gnsh gy vfg-slt arg calc Sh sm amt lt gnsh blkx wxy pyr Ls incrly dns sparry arg i.p.
- 4580 Sh def incr blk vcarb Ls chng bec bn-bnsh gy vfxl-micxl dns hd pred fos-vfos mod arg
- 4590 Ss def incr wh vfg fr srted fri prly cons /calc cem
- 4600 Ss AA Ls pred bn-tn micxl-vfxl dns vfos sli-mod arg

Pawnee Member 4580'

- 4610 Ss decr Ls incr & chng: hvy tr fos ool Pkst vfri mod sparry /fr moldic poro Sh hvy tr blk
- 4620 Sh cont'd incr tr's blk Ls gen rgh txt wh-off wh fxl-mxl mod sparry i.p. /sme ool Wkst pr oolm poro
- 4630 Ls lt tn-lt gysh wh vfxl-micxl incrly dns sparry Sh cont'd incr rd's
- 4640 Sh def incr blk vcarb

Ft. Scott Member 4621

- 4650 Sh blk vcarb Ls chng bnsh-lt gy vfxl dns arg-sli arg
- 4660 Ls off wh-lt gysh wh vfxl-micxl dns hd-brit tr mxl /? amt vug gy poro spotty gn flor mlky gn ct Sh cont'd
- 4670 Ls off wh-lt bnsh wh vfxl-micxl dns brit sli-loc vfos sparry Sh decr blk /cont'd rd's
- 4680 Sh cont'd blk Ls off wh-lt gysh wh vfxl pred /rthy txt occ indist fos
- 4690 Dol lt bn-lt bnsh gy mxl-fxl-cxl brit-vfri sme / pr intxl poro lt bn oil stn vspotty bri gn flor f sb stmg gn ct

CHEROKEE 4673'

- 4700 Sh abdt blk vcarb dism pyr
- 4710 Sh decr Ls bnsh tn-lt gy vfxl vfos gen /rgh txt sli arg
- 4720 Sh def incr blk-bnsh blk vcarb
- 4730 Sh decr Ls dk tn-lt bn vfxl gen sli sparry vfos occ vsparry ool Pkst indist i.p. pr-vpr intxl poro rrlly /pos vlt bn oil stn gen /dull spotty gn flor fr sb stmg gn ct
- 4740 Ls chng gysh bn-lt gy vfxl-fxl occ mxl gen dns /rthy txt fos-vfos /decr amt show AA Sh cont'd amt blk
- 4750 Ls gy-bn vfxl-micxl dns brit-hd sparry i.p. gen fos Sh cont'd
- 4760 Sh blk vcarb dism pyr Ls lt-m gy bnsh gy vfxll-micxl dns brit-hd fos i.p. loc grds to Mdst
- 4770 Sh blk gy Ls pos chng wh fxl-sb chky sft vcln app
- 4780 Sh decr Ls sme off wh vfxl fos cln app /m-dk gy & bn vfxl-micxl sme /spotty gn flor slo wk sb stmg-mlky gn ct

- 4790 Ls cont'd lt & dk cols AA /tr stks trnsf suc fos fill NSOC sme lt gy vfxl sli fos spotty
dull-mod bri gn flor slo wk sb stmg gn ct
- 4800 Sh incr rd-orng cvng pos sm incr blk vcarb Ls cont'd cln'r app sli fos AA
- 4810 Sh hvy amt rd cvgs /incr blk vcarb
- 4820 Ls lt gy-off wh vfxl-fxl-micxl dns brit-hd arg i.p. fos thru out
- 4830 Ls & Sh AA Ss tr clus wh vfg calc cem
- 4840 Sh incr blk vcarb Ls off wh-gysh wh-lt gy vfxl-micxl gen dns freq fos
- 4850 Sh cont'd blk /incr m-dk gy flky fn txt Ls pos chng sm incr bnsh sli-mod arg
- 4860 Ls gy-bn-off wh vfxl-fxl-micxl dns gen less cln'r app thru out
- 4870 Sh m-dk-vdk gy-blk vcarb i.p. Ls AA
- 4880 Sh incr blk vcarb Ls gy-tn-bn vfxl-micxl occ grds to Mdst
- 4890 Sh pos chng incr gn's flky vfn txt sli pyr /dk'r col carb AA incr rd cvgs
- 4900 Ls cont'd less cln-arg app Sh incr rd /def incr gn gy dk gy
- 4910 Sh hvy amt blk gn & dk gy mod-vcarb i.p. Ls lt gysh bn-bn-gy vfxl-micxl gen sli arg
& fos

ATOKA 4891'

- 4920 Ls chng: lt gy vfxl dns frm gen /dull gnsh gd flor vwk fnt resid gd ct
- 4930 Ls chng: decr lt'r col cln app AA /incr lt-dk gy micxl arg-mrly grds to Mdst i.p.
- 4940 Ls lt-dk gy vfxl arg fos-micxl vdns Sh blk & dk gy
- 4950 Sh lrg incr rd cvgs Ls incr off wh fxl rthy app wh sb chky
- 4960 Sh rd-gy Permian-Cret cvgs
- 4970 Ls pred dk gy micxl vdns /sme wh vfxl vsdy
- 4980 Ls chng: lt tn vfxl-fxl dns-vdns gen rthy txt vsli arg Sh blk gy purple rd
- 4990 Ls def chng: m gy Mdst-vfxl loc fos Sh incr m-dk-vdk gy-blk mod-vcarb
- 5000 Ls lt-dk gy vfxl-Mdst Sh cont'd
- 5010 Ls & Sh AA
- 5020 Sh decr Ls incr lt-m-dk gy vfxl-Mdst
- 5030 Ls cont'd amt AA
- 5040 Sh incr vdk gy-blk carb
- 5050 Sh cont'd Ls chng: sm amt lt gy vfxl cln'r app
- 5060 Sh blk carb
- 5070 Ls chng: incr bn micxl dns-vdns brit sli arg
- 5080 Ls sli decr /chng: tr wh sb chky cln Sh prob incr blk vcarb
- 5090 Ls incr bn-lt gy vfxl-micxl-Mdst Sh AA
- 5100 Sh incr blk vcarb Ls cont'd lt'r col sli arg
- 5110 Ls incr m-dk gy sli mot i.p. gen Mdst
- 5120 Ls lt-m gy Mdst dk gy dk bn micxl vdns brit-hd
- 5130 Ls vlt-lt gy fxl-Mdst bec incr xl'n sli fos
- 5140 Ls AA Sh AA /pos chng: vsm amt vlt gy lt gn bn flky-splty wxy sli pyr
- 5150 Sh pos incr blk & bnsh blk vcarb Ls cont'd /chng: bec incrly Mdst
- 5160 Ls lt-dk-vdk gy micxl-Mdst arg carb Sh blk-vdk gy tr lt gn

MORROW 5148'

- 5170 Sh tr lt bn blkgy wxy carb debr
- 5180 Ls cont'd lt'r col bec bn micxl dns brit loc fos Sh decr
- 5174 Ls off wh-lt-m gy fxl-micxl frm-hd dns Sh decr amt /incr lt gn blkgy wxy pyr

- 5181 Coal tr glos /plnt txt Ls cont'd hvy amt Sh sm amt bn blkx wxy carb debr lt gn wxy pyr
- 5185 Sh incr dk gy & mot gy-gn /lt bn blkx vcrs carb debr Coal tr amt
- 5197 Sh cont'd incr amt /gen incr lt gn flky-sb plty vfn txt sli mot i.p.
- 5202 Sh lt-dk gy
- 5206 Sh def chng bec incrly pyr /incr bn-buf wxy-rgh slty hvy tr coaly plnt debr bldg gas sli tr Paleosol rdsh bn
- 5208 Sh hvy tr lav-bn & rdsh bn flky Paleosol /hvy amt lt'r col pos incr vdk gy fn txt
- 5212 Sh chng: incr to hvy amt vlt bn-lt bnsh gy wxy-loc slty freq carb debr /lt gn flky wxy-sb wxy /fos & carb debr Ls sm incr gnsh gy arg fos Slst lt gy blkx sdy Ss tr lam wh vfg w srt
- 5216 Sh cont'd hvy amt lt'r col wxy /carb debr loc sdy & grds to Ss clis lt gy vfg varg
- 5222 Sh cont'd /chng: incr amts rdsh Paleosol freq amt vdk gy blkx slty-sdy Ss sm amt lt gy vfg-fg arg
- 5227 Ss incr tr lt gysh wh fg sb rnd fr srt arg glau Sh vhy amt lt'r col Ls buf vfxl glau arg tr vcrs coaly carb debr bldg gas
- 5230 Ls def incr bnsh-buf gran-rgh txt glau fos occ sdy sme tn chky fos Sh chng: incr vari col Paleosol
- 5234 Sh hvy amt varicol /lust decr lt'r col Ls cont'd
- 5241 Sh cont'd varicol /incr gy's fn txt
- 5245 Sh incr gy's Ls sli incr trnsf-buf fos glau
- 5249 Sh lt-dk gy lt gn flky fn txt decr varicol /lust Ls cont'd
- 5254 Sh lt-dk gy & gn /freq varicol lt'r col
- 5258 Sh lt-m-dk gy flky-plty fn txt
- 5262 Sh cont'd
- 5267 Sh dk gy fn txt
- 5274 Sh m-dk gy lt gn fn txt
- 5280 Sh m-dk gy fn txt lt gn vfn txt

V7 INTERVAL 5285'

- 5286 Sh pos chng: bec pyr /tr blk blkx carb tr vitr stks
- 5290 Sh def chng freq lt gn-buf blkx wxy occ carb debr freq rdsh mot Paleosol Ls sm amt gysh vfos glau frag
- 5296 Ls sm incr gysh AA Sh admixture lt & dk col's bec pyr i.p.
- 5301 Sh lt gn-vlt gy wxy-rgh txt tr sdy loc vpyr /dk gy fn txt
- 5304 Sh incr m-dk gy vlt gn
- 5310 Sh m-dk gy fn to rgh txt fos i.p. freq wthd app
- 5316 Sh lt-m-dk gy fn txt loc sli fos
- 5323 Sh lt-m-dk gy occ fos Ls tr amts off wh-buf fxl-vfxl sli fos
- 5328 Ls vsm incr tn-lt bnsh vfxl vfos sparry i.p. tr lse fos frag Sh cont'd lt-m-dk gy

LOWER MORROW LIMESTONE 5333'

- 5335 Pyr vfreq lse chks Sh m-dk gy fn txt Ls buf-lt bnsh buf vfxl-fxl sparry-rthy glau & fos i.p.
- 5340 Ls lrg incr wh-buf vfxl sli sparry fxl rthy chky sft
- 5346 Ls wh-buf gen vcln app fos frag Pkst vfxl /occ mxl-cxl infill dns brit-hd
- 5354 Ls AA Sh dk gy fn txt

- 5361 Sh sli incr amt dk gy fn txt plty
- 5370 Sh cont'd incr /rd bds
- 5383 Ls incr off wh-buf micxl sparry fos-fxl sb chky rthy txt frm-sft
- 5392 Ls lt gy-off wh vfxl gen sli fos vsli tr amt /dull-mod bri gn flor pr f sb stmg gn ct
- 5398 Ls chng: lt gy-lt tn-off wh vfxl incrly sparry fos

MISSISSIPPIAN 5392'

- 5412 Sh incr m-dk gy flky Ls decr wh fxl-vfxl vool grds to Wkst sdy
- 5422 Ls sm amt vool & sdy /cont'd amt /fos frag AA
- 5431 Ls AA
- 5444 Ls off wh-lt tn fxl-vfxl frm indist ool non sdy
- 5456 Ls buf-off wh gen /indist ool
- 5470 Ls chng: buf micxl-lith vdns brit fos i.p.
- 5475 Ls cont'd
- 5485 Ls chng: tn-lt bn micxl-lith vdns brit
- 5494 Ls lt bn-tn lith vdns brit Dol sm amt trnsl-bnsh cxl cln bri yel mnrl flor
- 5503 Ls cont'd bec sli arg i.p.

SPERGEN 5508'

- 5515 Cht hvy tr smi trnsl wh fos Dol tr buf-vlt bnsh fxl-mxl sft-fri brit cln sli arg tr hd vsil
- 5522 Dol incr to hvy tr buf-lt bnsh fxl-mxl gen vfri-brit
- 5530 Dol chng: sli mot gysh bn vfxl-Mdst fos arg
- 5547 Dol chng lt bnsh trnsl mxl-cxl-sli gran fri-dns lt gysh sli mot arg i.p. tite app
- 5552 Dol cont'd lt bnsh-lt gysh AA
- 5563 Dol incr gysh-bnsh mxl-Mdst indist fos & arg i.p.
- 5576 Dol AA Sh gnsh gy flky fos
- 5587 Dol AA Sh cont'd vhvy amt Morow cvgs Dol gysh-bnsh fxl-mxl-vfxl arg fos