



00523174

UNION PACIFIC RESOURCES COMPANY
UPRC NO.2 MOCKELMAN 31-19
NW NE SEC.19-T15S-R46W
CHEYENNE COUNTY, COLORADO

WELLSITE GEOLOGY
by
RSAY ENTERPRISES
RANDY SAY-INDEPENDENT GEOLOGIST
WHEAT RIDGE, COLORADO

DECEMBER 20, 1992

ALL

TABLE OF CONTENTS

WELL DATA.....	PAGE 1.
BIT RECORD.....	PAGE 2.
ELECTRIC LOG FORMATION AND ZONE TOPS.....	PAGE 2.
DAILY DRILLING CHRONOLOGY.....	PAGES 3.
DAILY DRILLING CHRONOLOGY..DEPTH VERSUS DATE.....	PAGE 4.
ELECTRIC LOG OFFSET/CONTROL WELL CORRELATION CHART.....	PAGE 5.
SHOW EVALUATION.....	PAGES 6-7.
LITHOLOGY.....	PAGES 8-11.

WELL DATA

OPERATOR: Union Pacific Resources Company, Fort Worth, TX.

WELL NAME: UPRC NO.2 Mockelman 31-19.

FIELD NAME/PROSPECT: Wildcat- Ute Prospect.

LOCATION: 600'fnl 1980'fel NW NE SEC.19-T15S-R46W,
Cheyenne Co., CO.

ELEVATION: 4281'-Ground; 4294'-KB.

SPUD DATE: 12/11/92

COMPLETION DATE: 12/20/92/

STATUS: Production casing run 12/20/92.

HOLE SIZE: 12.250'- 521'(Surface); 7.825"-TD[5415'].

CASING: 8.625"- 521'-Surface; Production casing run to TD.

DRILL COLLARS/PIPE: 6.25"/4.50".

TOTAL DEPTH: 5470'(-1175')-Driller; 5415'(-1121')-Electric Log.

CONTRACTOR: Cheyenne Drilling Co., RIG NO.7, Wichita, KS.

GEOLOGIST: Randy Say-RSay Enterprises.

ENGINEER: Ed Martin, Consultant, Englewood, CO.

MUD COMPANY: Davis Mud and Chemical Company, Colby, KS.

MUD TYPE: NATIVE (SURFACE-4000'); GEL-CHEM{4000'TD(5415')}]

MUDLOGGING: Hotwire manned by wellsite geologist.

DRILL STEM TEST: None.

CORE: None.

ELECTRIC LOGS: Schlumberger Well Services, Inc., Fort Morgan, CO.
Engineer: Mark Johnson.

LOGS RUN	INTERVAL
DIL-SFL-GR-SP	521'-5406'
LDL-CNL-GR-CAL	3900'-5412'
BHC-SONIC-GR	521'-5408'
MICROLOG	3900'-5387'

BIT RECORD

NO	MAKE	TYPE	SIZE	DEPTH OUT	FOOTAGE	HOURS	FT/HR	DEVIATION/DEPTH
1	HTC	Y-11	12.250	521	521	6.50	80.15	1.00-521'
2	HTC	J-22	7.825	1652	1131	11.75	96.26	0.75-1652'
3	HTC	J-11	"	4195	2543	45.00	56.51	0.25-4195'
4	HTC	J-22	"	5470	1275	41.00	31.10	1.00-5470'

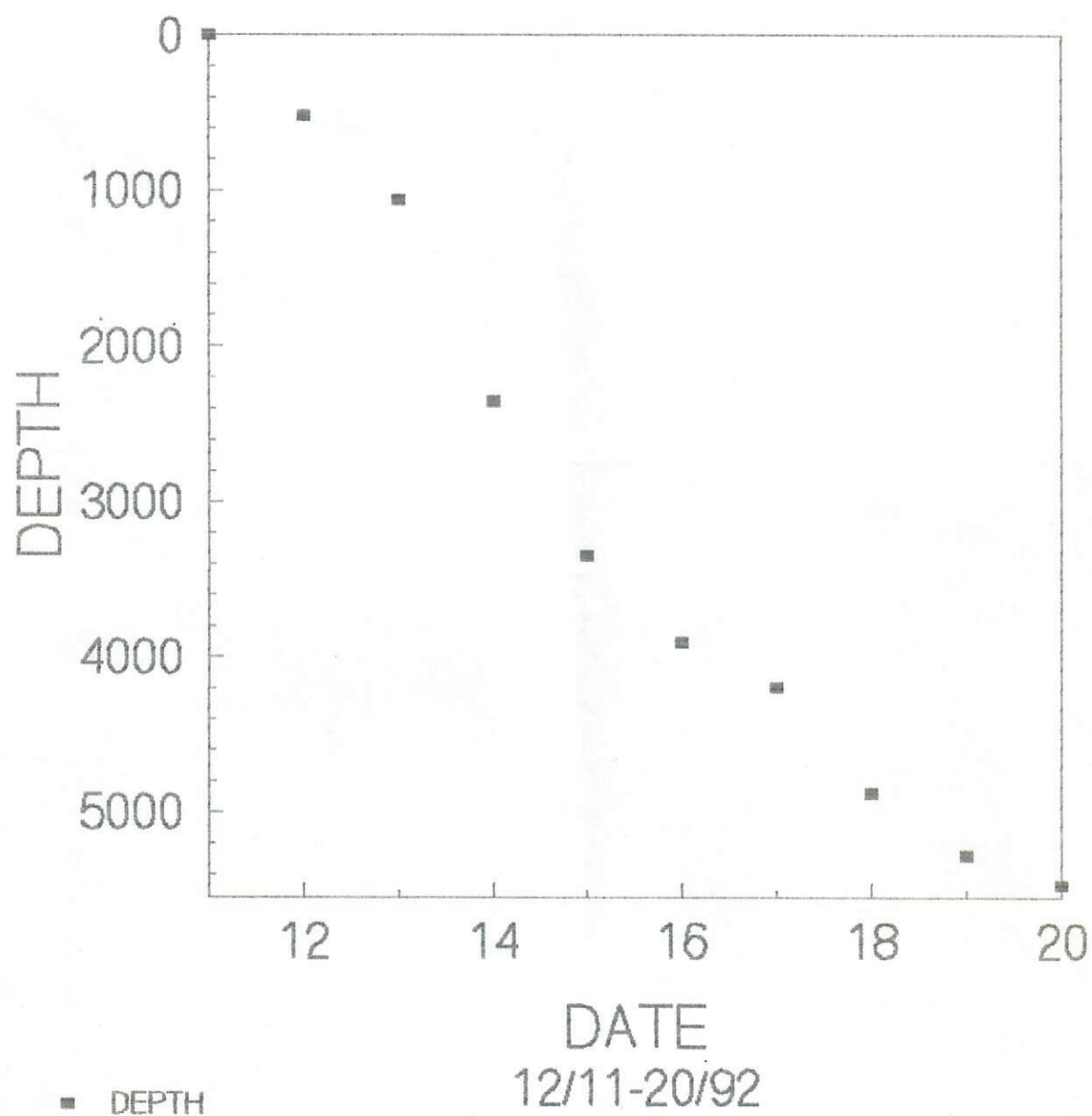
ELECTRIC LOG FORMATION AND ZONE TOPS

FORMATION/ZONE	DEPTH (FEET)	DATUM (KB-4294')
Fort Hays	1042	+3252
Dakota	1490	+3188
Morrison	2166	+2128
PERMIAN	2400	+1894
Blaine	2696	+1598
Stone Corral	2872	+1422
Stone Corral-BASE	2906	+1388
Neva	3520	+ 774
Foraker	3598	+ 696
Virgil	3813	+ 481
Shawnee/Topeka	3960	+ 334
Heebner Shale	4158	+ 136
Toronto Limestone	4188	+ 106
Lansing Kansas City	4212	+ 82
Marmaton	4572	- 278
-Fort Scott Member	4682	- 338
Cherokee	4732	- 438
Atoka	4962	- 668
Morrow Shale (SONIC)	5092	- 798
Morrow Shale (STRAT)	5104	- 810
Morrow SS V7 SAND	5212	- 918
Morrow SS "A"-BASE	5232	- 938
Lower Morrow	5290	- 996
MISSISSIPPIAN-St.Louis	5320	-1026
-Spergen	5356	-1062
TOTAL DEPTH(DRILLER)	5470	-1114
TOTAL DEPTH(ELECTRIC LOG)	5415	-1121

DAILY DRILLING CHRONOLOGY

DATE	DEPTH	24HR FOOTAGE	DRILLING ACTIVITIES
12/ 11	0000	0000	RIG Up, Spud well w/NB1[12.250"], Drlq surf hole to 521', Circ and Cond hole, Run surf csq 8.625" to 521', Cmt csq, W.O.C.
12	521	521	Drlq cmt w/NB2[7.825"], Drlq, Lost circ @1057' Regain Circ, Drlq.
13	1060	539	Drql, DS, Drlq.
14	2360	1300	Drlq, TOOH for NB3 @ 1652, TIH, Drlq, Lost Circ @ 1903', Drlq, Lost circ @ 2123, Drlq.
15	3346	986	Drlq, Lost circ @ 2904, Drlq, Stuck pipe @3346 Wait on oil, Spot 65BBLS of oil, Free pipe, Drlq, Lost circ @ 3722, Drlq.
16	3904	558	Drlq, DS, Drlq.
17	4195	291	Drlq, Lost circ @ 4012, Mud up @ 4012, Drlq, Lost circ @ 4141 & 4157, Drlq, TOOH for NB4 @ 4195, DS, TIH w/NB4, Drlq.
18	4880	685	Drlq, Lost circ @ 4269, Drlq, DS, Drlq.
19	5280	400	Drlq, DS, Drlq, CFS @ 5170, Drlq, CFS @ 5280, TOOH for DST NO.1, Losing circ[100BBLS], abandon DST NO.1, TIH & return to Drlq.
20	5470	190	Drlq, reach TD[5470'] @ 3:00PM, Circ & cond hole, TOOH for ELOGS, Run ELOGS, W.O.O., Run production casing to TD. Note:ELOG TD= 5415'.

UPRC NO.2 MOCKLEMAN 31-19



The Union Pacific Resources Company UPRC NO.2 Mockelman 31-19 [NW NE SEC.19-T15S-R46W, Cheyenne Co., CO] was drilled as a wildcat well [Ute Prospect] west of the Grouse Field Area in the Las Animas Arch, Colorado.. The nearest offset/control well was the UPRC NO.1 Mockelman 21D-19 [NW NW SEC.19-T15S-R46W], a dry hole. The primary objectives were the Pennsylvanian Morrow Valley Fills and the Mississippian Spergen dolomites, which produce in the Grouse Field to the east of the Mockelman wells. A 20 foot V7 Sand developed at 5212'-5232' and production casing was run on the strength of good shows and a gas kick, and good to fair electric log porosity. Samples were circulated at 5280'-Sample Depth [5225'-ELOG Depth] and a decision to test the V7 Sand was made. The drill stem test could not be run due to the loss of circulation on the DST preparation trip. Loss of circulation and stuck pipe problems had plagued the NO.2 Mockelman 31-19 throughout the well. Instead of risking a possible stuck drill stem, the decision was made to drill to total depth [5470'-DRILLER/5415'-ELOG] and evaluate the V7 Sand zone from electric logs and samples. From the V7 Sand evaluation, the decision was made to run production casing after electric logs were run. It should be noted that there is a 55 foot uphole depth correction from sample depth to electric log depth. No shows were found in the Spergen [5358'(-1062')-ELOG/ 5313'-SAMPLE] samples and porosity was poor. Only 57 feet of Spergen section was cut instead of the planned 70 feet because new bit number 4 [in at 5195'] stopped drilling at 5470' [DRILLER]. The electric log total depth was 5415'.

The UPRC NO.2 Mockelman 31-19 developed a 20 foot V7 Sand [5212'(-918') to 5232'(-938')-ELOG DEPTH], with good sample shows, a gas kick, and good to fair porosity development. Samples were circulated at 5280'-DRILLER/5225'-ELOG. As was stated above, a drill stem test could not be run due to loss of circulation problems. There was good recovery of cuttings from the circulation samples. A 10 unit gas kick came up with the bottom up sample at 5280'/5225', versus a 4 unit background gas. The V7 Sand was predominately a transparent to white, fine to very fine grained [top], to coarse grained [base], moderately sorted, subangular sand. The cement was siliceous with an increase in quartz overgrowths toward the base. The V7 Sand was clean at the top with an increase in kaolinite, pyrite, and shale partings with depth. No live oil was found in the samples, although a trace to 2 percent dead oil stain was found within the larger clusters. Porosity was variable, ranging from fair to good, depending upon the amount of cementation. The electric logs showed the sand porosity to range from 6 to 18 percent, with the highest porosity at the top of the zone. Sample shows were as high as 40 percent fluorescence and cut in the larger clusters. The clusters to unconsolidated grains ratio was 80 percent to 20 percent. For a more detailed sample description, see SHOW NO.4 below.

Structurally, the UPRC NO.2 Mockelman 31-19 [NW SE SEC.19] was 1 foot low at the top of the Morrow Shale(SONIC) [5092'(-798')], to the nearest offset/control well, the UPRC NO.1 Mockelman 21D-19 [5069'(-797')]. The total Morrow Shale thickness was 198 feet.

The other potential productive zones, the Pennsylvanian Topeka, Lansing Kansas City, and Marmaton, and the Mississippian St. Louis and Spergen, did not develop any zone that warranted testing after electric logs. See SHOW NO.1-3 listed below.

SHOW EVALUATION

LANSING KANSAS CITY 4212'(+82')-ELOG; 4267'-DRILLER.

SHOW NO.1 4600'-4610'(10')-DRILLER; 4545'-4555'(10')(-251')-ELOG.

LITHOLOGY:LS mot bf-crm & occ mgy litho-xfxl vfri slty slfos pyr.

POROSITY: P-occ FR(intergran).

OIL STAIN:None.

FLOR: 10% mot myel.

CUT: 10% slow mlky diffuse cut.

RESIDUE: None.

MARMATON 4572'(-278')-ELOG; 4627'-DRILLER.

SHOW NO.2 4644'-4658'(14')-DRILLER; 4589'-4603'(14')(-295')-ELOG.

LITHOLOGY:LS tan-ltgy-occ ltbrn xfxl-occ gran fri-firm mfos w/chk mtrx
sldolo & carb occ pyr occ gran text.

POROSITY: P-occ G(gran-oomold).

OIL STAIN:None.

FLOR: 10% mot dull gold-pale yel.

CUT: TR-10% weak pale yel crush cut.

RESIDUE: None.

PAWNEE MEMBER 4628'(-334')-ELOG; 4683'-DRILLER.

SHOW NO.3 4680'-4690'(10')-DRILLER; 4625'-4635'(10')(-331').

LITHOLOGY:LS tan-mgy-occ wh gran-litho wvfri-mfirm slfos occ tr ool
w/slty & chky mtrx slpyr and w/intbd dolo strgs.

POROSITY: Fr-occ G(pred intergran-ocastic).

OIL STAIN:None.

FLOR: 20% mot pale yel.

CUT: 10-20% slow weak diffuse residual cut.

RESIDUE: None.

MORROW SHALE(SONIC) 5092'(-798')-ELOG; 5147'-DRILLER.

V7 SAND 5212'-5232'(20')(-918')-ELOG; 5266'-5286'-DRILLER.

SHOW NO.4

LITHOLOGY:SS trans-wh fg-vfg(top) to incr m-vfg @ base of zone with
incr in c-vcg base zone; uncon(20%)-vfg @ top, incr to 80%
cmted clus(cg) @ base; wsrt(top) to prt(base); shrd-incr
vang-sbang; silcmt w/qtz ovrghs @ base; MTRX(cln @ top(vfg)
incr amt carb mar & sh prtgs, pyr vf dissem, kao cly infill.

POROSITY: PRED FR-G(15-20%) in m-cg w/decr Ø-TT from cmt.

OIL STAIN:TR of dead oilstn(top) with incr amt-2%-dkbrn oil stn in clus
No "live" oilstn.

FLOR: 5% in vfg(top) pale yel; incr to 40% m-briyel w/depth in
c-vcg clus.

CUT: 5% slow weak mlky cut-top; incr to 40% myel strm in m-cg clus
with depth.

RESIDUE: Pale yel flor.

LITHOLOGY

SAMPLE INTERVAL
ELOG INTERVAL

LITHOLOGY

3900-3940 LS tan-qy litho fri vchky arq w/SH mqy-mar & ltqy sft plty arq
3845-3885 slcarb; abnt cavings 30-40% redbeds.

3940-3990 LS bf-tan xfxl fri slty slpyr w/SH aa , tr pyr.
3885-3935 30-40% redbeds.

3990-4015 LS wh-crm lithofri arq & chky slty sldolo ø-p nsfoc w/SH aa.
3935-3960

SHAWNEE/TOPEKA 3960'(+334')-ELOG/ 4015'-SAMPLE.

4015-4060 LS bf-ltqy litho-gran vvfri chky occ slfos sldolo & gran øp-tt
3960-4005 nsfoc w/SH strqs lt-mqy-bf sft plty slcarb slty; abnt cavings.

4060-4140 LS mot lttan-bf litho-occ xfxl fri slsly & chky pyr ø-p nsfoc
4005-4085 w/SH mot dkqy-mqy sft plty arq vvcarb slcalc; abnt cavings.

4140-4180 LS aa incr chky sldolo ø-p nsfoc w/SH strqs aa; abnt cavings.
4085-4125

4180-4213 LS mot bf-ltqy-tan xfxl-litho fri-firm vchky pyr & dolo ø-nsfoc
4125-4158 W/SH aa, abnt cavings.

HEEBNER SHALE 4158'(+136')-ELOG/ 4213'-SAMPLE.

4213-4243 SH bk-dkqy-qybrn sft carb w/LS aa nsfoc w/tr pyr & abnt cavings.
4158-4188

TORONTO LIMESTONE 4188'(+106')-ELOG/ 4243'-SAMPLE.

4243-4267 LS tan-bf & occ mqy gran-litho fri-mfirm fos w/chk mtrx slty
4188-4212 slpyr & occ dolo & gran ø-p nsfoc w/SH aa, abnt cavings.

LANSING KANSAS CITY 4212'(+82')-ELOG/ 4267'-SAMPLE.

4267-4320 LS aa incr fos w/chk mtrx slty sldolo ø-p-tt nsfoc w/SH bk-mqy
4212-4265 sft blk-pty arq vcarb slcalc, tr calc; abnt cavings.

4320-4370 LS mot tan-qy xfxl-gran fri-firm mfos w/chk mtrx sldolo ø-p
4265-4315 nsfoc w/SH bk-ltqy sft carb, abnt cavings [30%].

4370-4430 LS mot bf-ltqy-tan xfxl-litho fri-firm mfos w/calc infill slpyr
4315-4375 dolo ø-p nsfoc w/SH aa, abnt cavings.

4430-4490 LS aa incr slty sldolo nsfoc w/intbd SH aa, tr pyr; abnt cavings.
4375-4435

4490-4520 LS tan-crm xfxl-litho vfri chky pyr slty sldolo ø-p nsfoc.
4435-4465

LITHOLOGY

SAMPLE INTERVAL
ELOG INTERVAL

LITHOLOGY

4520-4580 LS ltqy-fri slty & occ chky ϕ -p nsfoc w/SH bk-ltqy sft vcarb
4465-4525 w/SH aa, tr pyr & calc; abnt cavings [30%].

4580-4600 LS aa nsfoc w/intbd SH aa; abnt cavings aa.
4525-4545

4600-4610 SHOW NO.1 LS mot bf-crm & occ mqy litho-xfxl vfri slty slfos
4545-4555 pyr ϕ -P-occ FR(intergran); OILSTN-None; FLOR-10% myel mot; CUT-
10% slow mlky diffuse cut; RES-None.

4610-4627 LS aa incr fos w/chk mtrx sldolo ϕ -p-occ fr nsfoc w/SH strqs
4555-4572 dkqy-ltqy-bf-tan sft vcarb, tr pyr; abnt cavings.

MARMATON 4572'(-278')-ELOG/ 4627'-SAMPLE.

4627-4644 LS mot tan-qy xfxl-gran fri-firm mfos chky dolo ϕ -p-fr nsfoc w/
4572-4589 SH bk-ltqy sft carb, tr pyr; abnt cavings.

4644-4658 SHOW NO.2 LS tan-ltqy-occ lthrn xfxl-occ gran fri-firm mfos w/
4589-4603 chk mtrx sldolo & carb occ pyr occ gran text; ϕ -p-occ q(gran-
oomold); OILSTN-None; FLOR-10% mot dull gold-pale yel; CUT-TR-
10% weak pale yel crush cut; RES-None.

4658-4680 LS aa nsfoc w/SH ltqy-qybrn-bk sft vcarb slty slcalc, tr pyr
4603-4625 abnt cavings.

PAWNEE 4628'(-334')-ELOG/ 4683'-SAMPLE.

4680-4690 SHOW NO.3 LS tan-mqy-occ wh gran-litho vvfri-firm slfos occ
4625-4635 tr ool w/slty & chky mtrx slpyr w/intbd dolo strqs; ϕ -FR-occ
G(pred intergran-oocastic); OILSTN-None; FLOR-20% mot pale yel
CUT-10-20% slow weak mlky diffuse cut; RES-None.

4690-4737 LS mot tan-mqy-occ dkqy litho-microxl firm-mfri fos w/chk mtrx
4635-4682 occ sldolo & carb ϕ -p-fr nsfoc w/SH aa, abnt cavings.

FORT SCOTT 4682'(-388')-ELOG/ 4737'-SAMPLE.

4737-4787 LS aa fos sldolo ϕ -p-tt nsfoc w/intbd SH aa and DOL tan-bf
4682-4732 microxl slty pyr occ arq w/in LS aa nsfoc, abnt cavings [30%].

CHEROKEE 4732'(-438')-ELOG/ 4787'-SAMPLE.

4787-4830 LS mot tan-bf-ltqy xfxl-gran firm-fri slty slpyr occ fos sldolo
4732-4775 carb w/occ sh strqs intbd; SH bk-mot qybrn-lttan msft blk
vvcarb slcalc, tr pyr & occ tr cht; abnt cavings [30%].

4830-4900 LS aa incr dolo microxl mhd dns vfos w/calc infill slpyr w/SH
4775-4845 bk-dkqy-qybrn sft plty carb arq slcalc, tr pyr & cht; cavings aa.

LITHOLOGY

SAMPLE INTERVAL ELOG INTERVAL	LITHOLOGY
4900-4950	LS tan-dkgy-bf xfxl-occ microxl fri-mfirm fos w/calc infill slpyr
4845-4895	ø-p-tt nsfoc w/intbd DOL strqs and SH bk-qybrn sft plty arq carb slpyr, tr pyr & cht; abnt cavings.
4950-5017	LS mqy-tan xfxl firm slty & dolo pyr w/DOL tan-bf xfxl firm
4895-4962	gran & arq ø-tt nsfoc w/SH aa, tr pyr & cht.
ATOKA 4962'(-668')-ELOG/ 5017'-SAMPLE.	
5017-5090	LS aa incr fos w/calc infill mhd dns øtt nsfoc w/intbd DOL &
4962-5035	SH strqs aa.
5090-5147	LS ltqy-mot brn & dkgy microxl-xfxl firm mfos w/calc infill
5035-5092	slsly pyr occ dolo w/intbd SH bk-qybrn-mqy sft fis slty & pyr slcalc, tr pyr; abnt cavings.
MORROW SHALE(SONIC) 5092'(-798')-ELOG/ 5147'-SAMPLE.	
5147-5159	LS aa w/SH aa incr vcarb slty slpyr in fis lams, abnt pyr.
5092-5104	
MORROW SHALE(STRAT) 5104'(-810')-ELOG/ 5159'-SAMPLE.	
5159-5220	SH mot bk-dkgy-occ ltqy-pale tan vvsft plty-blky carb arq w/
5104-5165	intbd LS tan-qy-bf litho-xfxl firm-fri w/occ tr sltst arq ltqy abnt pyr; abnt cavings.
5220-5267	SH bk-ltqy-qybrn sft-firm plty arq vcarb occ pyr in fis lams
5165-5212	w/intbd LS strqs tan chky slty, no SS dev, tr sltst, abnt pyr.
5267-5287	SHOW NO.1/ V7 SAND SS trans-wh fq-vfq(top) to incr m-vfq(base)
5212-5232	of zone with incr in c-vcq in base zone; uncon(20%)-vfq @ top incr to 80% cmted clus(cq) @ base; wsrt(top) to psrt(base); sbrd-sbanq; silcmt w/qtz ovrqths @ base; MTRX(cln @ top(vcq) w/incr amt carb mat & sh prtqs; pyr vf dissem, kao cly infill ø-pred FR-G(15-20%) in m-cq w/decr ø-TT from cmt; OILSTN-TR-2% of dead oilstn(top) w/incr amt dkbrn oilstn in clus, no "live" oil in smpls; FLOR-5% in vfq clus top incr to 40% m-briyel w/ depth in c-vcq clus; CUT-5% slow weak mlky cut @ top, incr to 40% myel strm in m-cq clus w/depth; RES-pale yel flor; w/intbd SH mot bk-dkgy-occ pale qyqn-ltqy-mqy sft plty-occ splin fis carb vsly slpyr occ mica slcalc, abnt pyr; decr amt cavings.
V7 SAND 5212'(-918') TO 5232'(-938') [20']-ELOG/ 5267-5287'-SAMPLE.	
5287-5310	SH bk-ltqy-qybrn-occ mot qyqn sft plty-occ fis slty vcarb mpyr
5232-5255	occ slty w/LS strqs tan-qy litho fri vchky slfos and rare tr thin intbd slty vfq ss strqs nsfoc ø-tt, abnt pyr.

LITHOLOGY

SAMPLE INTERVAL
ELOG INTERVAL

LITHOLOGY

5310-5345 SH bk-ltgy-occ qyqn-ltgy-mgy sft-firm plty-blky arq vvcarb occ
5255-5290 slty w/intbd sltst strqs no SS DEV, oc LS strqs, abnt pyr.

LOWER MORROW/KEYES 5290' (995')-ELOG/ 5345'-SAMPLE.

5345-5377 LS mot bf-tan & ltgy xfxl-gran fri-mfirm fos w/chk mtrx pyr
5290-5320 intbd w/SH strqs aa decr amt, abnt pyr.

MISSISSIPPIAN-ST. LOUIS 5320' (-1026')-ELOG/ 5377'-SAMPLE.

5377-5400 LS aa nsfoc incr fos vchky w/intbd thin strqs SH mot ltgy-dkgy
5320-5345 plty arq vcarb slsly slcalc, abnt pyr; DOL strqs incr ltgy-tan
'gran-xfxl fri ø-fr-p nsfoc.

5400-5413 LS ltbrn-tan-qy gran-xfxl fri-firm fos w/calc infill slpyr ø-p
5345-5358 nsfoc w/intbd SH strqs and incr amt DOL ltgy-tan ø-p-tt nsfoc.

SPERGEN 5358' (-1062')-ELOG/ 5413'-SAMPLE.

5413-5440 DOL mot tan-bf suc-xfxl fri-firm arq & pyr ø-p-tt nsfoc w/intbd
5358-5385 LS strsq thin fos chky slty, abnt pyr, tr cht.

5440-5470 DOL mot brn-mgy-tan microxl-gran & suc text slty w/LS strqs tan
5385-5415 qy vchky slty pyr; DOL ø-p-occ fr nsfoc; abnt pyr, tr cht.

TOTAL DEPTH ELECTRIC LOG 5415' (-1176'); 5470'-SAMPLE/DRILLER TOTAL DEPTH.

UPRC9211 RWSG 1992-11		Union Pacific Resources Company UPRC NO.2 Mockelman 31-19 650' fml 1980' fml NW SE SEC.19-T15S-R46W Cheyenne Co., CO Wildcat-Lite Prospect				12/20/92				Union Pacific Resources UPRC NO.1 Mockelman 21D-1 1200' fml 1600' fml NW NW SEC.19-T15S-R46W Cheyenne Co., CO Wildcat 7/7/90		
TIME STRAT	ROCK STRATIGRAPHIC	PROG	SMPL	DATUM-RB 4294	ELCG	DATUM-RB 4294	THICK	ELEV NO.1	DIFF. NO.2	E-LOG	DATUM-RB 4272	THICK
CRETACEOUS	Neogene Loess				SURF					SURF		
	FORT HAYS				1042	3252						
	CODELL				1106	3188						
	DAKOTA	1479			1490	2807						
	CHEYENNE SAND	1846			1932	2352						
JURASSIC	MORRISON				2166	2108						
PERMIAN	PERMIAN				2400	1894						
	BLAINE SALT	2432			2606	1808						
	CEDAR HILLS				2770	1594						
	STONE CORRAL	2868			2972	1422	34					
	STONE CORRAL (BASE)				2986	1388						
	NEVA				3020	774				3438	774	
	FORAKER				3068	606				3574	606	
PENNSYLVANIAN	VIRGIL (STAGE)				3816	481				3756	481	
	SHAWNEE/TOPEKA	3868			3906	334				4054	196	
	HEEBNER (SH)				4158	186				4157	186	
	TORONTO (LS)				4168	186				4154	186	
	LANSING KANSAS CITY	4206			4212	62				4168	64	
	MARMATON	4571			4572	-236				4554	-262	
	-PANNEE MEMBER				4608	-334				4616	-336	
	-FORT SCOTT MEMBER				4608	-308				4652	-356	
	CHEROKEE	4735			4738	-438				4716	-447	
	ATORA	4908			4908	-608		-608		4836	-616	
	MORROW SHALE (SONIC)	5068			5092	-798	198	-1		5059	-797	191
	MORROW SHALE (STRAT)				5104	-810	186	-6		5076	-864	184
	MORROW SS US											
	MORROW SS US-BASE											
	MORROW OY	5136			5212	-916	26					
	MORROW OY-BASE				5202	-926		2		5212	-946	
	MORROW OS											
	MORROW OS-BASE											
	MORROW SS											
	MORROW SS-BASE											
	LOWER MORROW/REYES	5265			5290	-996		-8		5266	-968	
MISSISSIPPIAN	ST. LOUIS				5308	-1026		-12		5298	-1014	
	SPERGEN	5362			5366	-1082		-48		5396	-1114	
	TOTAL DEPTH (DRILLER)	5462			5478	-1178				5510	-1208	
	TOTAL DEPTH (STRAT)				5488	-1114						
	TOTAL DEPTH (ELECTRIC LOG)				5416	-1121				5538	-1236	