

Arden Ratzlaff

PETROLEUM GEOLOGIST

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DRILLING TIME AND SAMPLE LOG

COMPANY CHIEFTAIN OIL CO., INC.

LEASE KILMER No. 1

FIELD HARDTNER

LOCATION NE SW SE SE

SECTION 3 TOWNSHIP 35S RANGE 11W 18W

COUNTY BARBER STATE KANSAS

CONTRACTOR TOMCAT DRILLING RIG NO. 3

COMMENCED DRILLING 11-24-10

COMPLETED DRILLING 12-10-10

RTD 5446 FEET LTD 5454 FEET

MUD UP AT 3400 FEET MUD TYPE CHEMICAL

ELEVATIONS

KB 1345

DF 1348

GL 1335

Measurements Are All
From K. B.

CASING

13 5/8" @ 301' w 300 SX.

5 1/2" @ 5442' w 225 SX.

ELECTRICAL SURVEYS

LOG-TECH ~ GAMMA RAY, DUAL
INDUCTION COMPENSATED DENSITY
& NEUTRON, S.P. & CALIPER

FORMATION TOPS

SAMPLE

ELECTRIC LOG

| | | |
|---------------|--------------|--------------|
| HEEBNER | 3722 (-2877) | 3689 (-2344) |
| LANSING | 4294 (-2949) | 4270 (-2925) |
| CHEAOKER | 4687 (-3348) | 4659 (-3314) |
| MISSISSIPPIAN | 4774 (-3429) | 4764 (-3419) |
| KINDERHOOK | 4933 (-3588) | 4934 (-3589) |
| VIOLA | 5143 (-3798) | 5145 (-3800) |
| SIMPSON | 5241 (-3896) | 5237 (-3892) |
| SIMPSON SAND | 5262 (-3917) | 5267 (-3922) |
| ARBUCKLE | 5439 (-4094) | N.L. |
| TOTAL DEPTH | 5446 (-4101) | 5454 (-4109) |

REMARKS AFTER ANALYZING ALL OF THE PERTINENT INFORMATION (SAMPLES, ELECTRICAL, PRODUCTION IN THE WELLS, ETC.) IT WAS THE DECISION THAT PRODUCTION TESTING BE SET EXPECTING A SUBMERGED WELL.

Arden Ratzlaff, Petroleum Geologist

NOTE: SAMPLES DEPOSITED AT THE K.G.S. LIBRARY ~ NATIVE MUD FURNISHED THE MUD - TRILGATE THE DRILL SYN TEST.

LEGEND

| | |
|--|--------------------|
| | Anhydrite |
| | Salt |
| | Sandstone |
| | Shale |
| | Carb sh |
| | Limestone Dol.Lime |
| | Chert |
| | Dolomite |

DRILLING TIME IN MINUTES
PER FOOT

Rate of Penetration Increases

5' 10' 15' 20' 25'

DEPTH

3400

20

40

LITHOLOGY

SAMPLE DESCRIPTIONS

REMARKS

NOTE: CHECK AT
4442'



60
80
3500
20
40
60
80
3600
20
40
60
80

1M. FROM BLUE GRAY & TAN ENY IN PROD
DENSE & HARD W/ MOTTLED DK GRAY BLK
SCAT GRN-GRN & SM RED SH

SILT AS GRAY W/ BLK SPY: PALE & RED IN
IN PART DOGS INTER-GRAPE IN S
PLUS SM / MRS ABOVE & SCAT BLK
CORR. IN

SILT AS ABOVE W/ TAN & BRN ENY IN
DENSE & HARD W/ MOTTLED GRAY
& SM BLK (CONG IN PART) GRN ABOVE

SILT AS GRAY & BLK SPY: TRDIA W/
SCAT GRN & BLK SH

SILT AS ABOVE W/ MICA IN MDR IN CH
AS ABOVE & SCAT GRY TAN & BRN EN
Y IN PROD DENSE & HARD LM

SILT AS ABOVE W/ FEW PIECES W/
CLEAR WEL' ANDRA ENGRAINED GET
SD UNBEDDED - ALL

SILT AS ABOVE SILT SILTY PLNG MED TO
DUSKY GR-GRN & BLK SH PLUS BLUE
TAN GRY & BRN ENY IN SILT-SILTY TO PROD
DENSE & HARD LM

SILT LM & SILT AS ABOVE

SILT MED TO DUSK GRY GRN-GRN BLK & V
SCAT BRN IN V SCAT SILT & SM LM AS
ABOVE

SH & ABOVE W/ RED SH & SM LM & SILT
AS ABOVE

3700

20

40

60

80

3800

20

40

60

80

3900

20

40

HEEBNER

3722

-2377

LM. CRM. BLUE TAN & GRN. BED DENSE
& HARD. IN SUBS. TO CR. & MED. TO DK
GRY & GRN. GRN. SU

SH. BLK. CR. IN PART W. MED. TO DK. GRN.
GRY. GRN. SU. SCAT. RED. SH. PLUS CR. BLUE
GRY & TAN. FINE YIN. SUB. CHYVY TO DENSE.
HARD. LM

LM AS ABOVE W. MED. TO DK. GRN.
GRY. GRN. SU. SCAT. RED. W. BLUE. GRN.
TAN. FINE YIN. BED DENSE. HARD. LM

LM & SH AS ABOVE

SH AS ABOVE W. SCAT. LM AS ABOVE

SH. MED. TO DK. GRN. TO DK. GRN. GRN.
TAN. Y. SH. W. GRY. GRN. BLK. W. CONG.
RED. SH

SAME AS ABOVE

SH. MED. GRY. GRN. GRN. & SM. GRN. V. SILTY
IN PART W. SCAT. BLUE & TAN. FINE YIN. BED
DENSE. HARD. LM

SU & LM AS ABOVE - FINE RED SU

SH. MED. GRY. SU. SILTY. TO DK. GRN. GRN.
GRN. PLUS SCAT. CRM. BLUE. GRY. TAN &
BRN. FINE YIN. BED DENSE. HARD. LM

SH AS ABOVE W. V. SCAT. GR. V. EN
YIN. HARD. SU. SILTY. SU. & V. SCAT. LM
AS ABOVE

SH. MED. GRY. GRN. GRN. (SM. GR. GRN. / SM
CALC. INCLUSIONS) & V. SCAT. GRN. SU.
BRITTLE. SU & TR. BLK. SU

SH. MED. GRY. GRN. GRN. SCAT. GR. GRN.

60
80
4000
20
40
60
80
4100
20
40
60
80

SAME AS ABOVE

SH. MED. GRAY GRAY-GRN. SCOT. DK GRAY TAN
L. TR. SP. & RED. W. SCOT. GRM. BUPE. L. TAN
BY YIN. PRE. DENSE. HARD. IM.

SAME AS ABOVE

SILT. LT. GRAY W. BLK. SP. - V. F. W.
S.M.S. ABOVE

SILT. AS ABOVE W. TH. AS ABOVE - SM
GRY. SH. W. MICA. IN PART

SH. MED. TO DK. GRAY GRAY-GRN. W. SILTY
L. MICA. W. SCOT. SILT. AS ABOVE

SH. MED. TO DK. GRAY GRAY-GRN. AS ABOVE
W. COVE. LT. GRAY L. TAN. W. EN. GRAINED. AT
SP. GR. BY HARD. SILT. GR. FOL. W.
DENSE. HARD. - V. S.

SILT. LT. GRAY W. SM. BLK. SP. W. V. SCOT.
SOY. SILT. AS ABOVE W. SCOT. MED. TO DK.
GRY. GRAY-GRN. SH.

SILT. LT. GRAY L. GRAY L. BUPE. W. EN. GRAINED
PARTY. AT. SD. SILTY MICA. PRE. HARD.
L. HARD. SP. L. PIECES. W. HARD. INTER-
FOL. GR. - V. S. MUCH. SCOT. SH. AS ABOVE.

SILT. SCOT. L. TH. AS ABOVE.

TR. MED. GRAY L. GRAY-GRN. W. SILT. L. SCOT.
AS ABOVE

SILT. SCOT. SILT. AS ABOVE

4200

20

40

60

80

4300

20

40

60

80

4400

20

40

SH. MED GRAY & TAN GRAY-GRN W SCOT SILST
HT ABOVE

SAME AS ABOVE

SAME AS ABOVE W TP BLV SH

SH AS ABOVE - SCOT SILST AS ABOVE

SH. BLV CARB IN PORT & SH AS ABOVE W
CRD. BUFE. GR. TAN & BRN EN VIN. SUB-
CHLY TO DENSE & HARD

LANSING

4294

2949

1M. WH. CRD. BUFE GR. TAN & BRN EN
VIN. SUB-CHLY TO DENSE & HARD W
MED TO DK GR. GR. GREEN BLV CARB
SH

1M. WH. CRD. BUFE GR. TAN & BRN EN VIN
CHLY & SUB-CHLY TO DENSE & HARD
W SCOT SH AT ABOVE. WASHES W/HT

1M. BUFE & GR. EN VIN. BRD. DENSE
& HARD W SCOT W/HT ENLY. NICHLY
1M & V SCOT W/HT & GR. BRN.
SUB-TRANSL. CURT

1M. WH. CRD. BUFE GR. TAN & BRN EN VIN
CHLY & SUB-CHLY TO DENSE & HARD.
TO CURT AS ABOVE

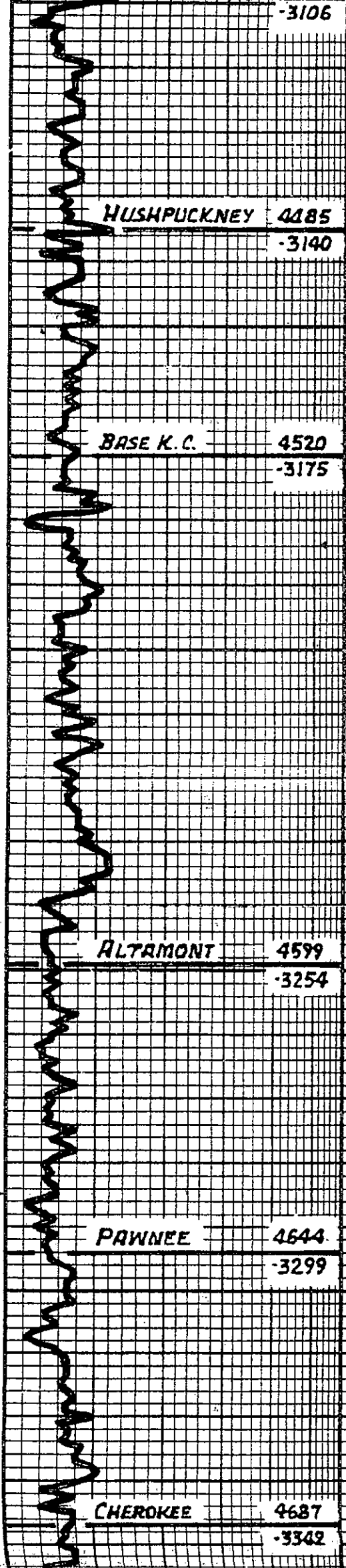
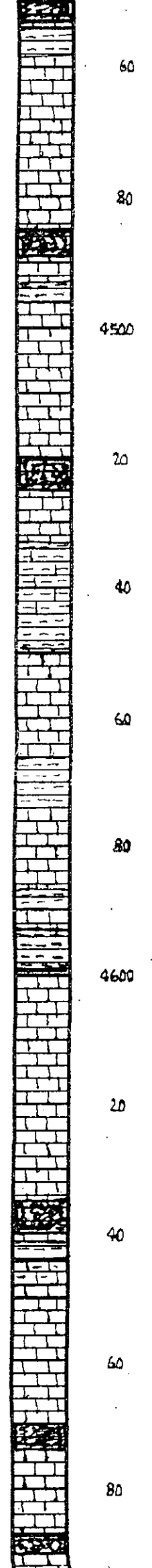
1M. BLV ABOVE W GR. & BRN EN VIN.
SUB. SUB-TRANSL. CURT

1M. & SH CURT AS ABOVE W SCOT DV
GR. BLV & SH GR. GRN SH

1M. WH. CRD. BUFE GR. TAN & BRN EN VIN
CHLY & SUB-CHLY TO DENSE & HARD

1M. WH. CRD. BUFE GR. TAN & BRN EN VIN

SURVEY @ 4442' SHOWED
7° DEVIATION - CEMENTED
BACK 600' - REDRILLED -
NONE EXTRACTION



-3106

SH. BLK. CORR. W. SM. DK. GRAY. GRAY. GRN. W. IM. AS ABOVE

HUSHPUCKNEY 4485

-3140

SH. BLK. CORR. W. SURF. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. HARD. W. MED. TO DK. GRAY. GRAY. SCOT. GRAY. DK. GRAY. & BK. SH.

IM. COM. BLUE. LT. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. TO DENSE. & HARD.

BASE K.C. 4520

-3175

SH. BLK. CORR. W. IM. AS ABOVE. PINK. GRN. SL. ONLY. IN XIN. IM. PRAD. DENSE. HARD. BLUE. MED. TO DK. GRAY. & BLK. SH.

IM. W. COM. BLUE. GRAY. TAN. & GRN. (SL. OR SL. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. & HARD. W. MED. TO DK. GRAY. GRAY. & BLK. SH.

IM. COM. BLUE. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. HARD. W. MED. TO DK. GRAY. GRAY. & BLK. SH. (PART. SH.)

IM. W. COM. BLUE. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. & HARD. W. MED. TO DK. GRAY. GRAY. & BLK. SH.

ALTRAMONT 4599

-3254

IM. AS ABOVE. W. MED. TO DK. GRAY. GRAY. GRN. & BLK. SH.

IM. W. COM. BLUE. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. HARD. W. MED. TO DK. GRAY. GRAY. GRN. & BLK. SH.

PAWNEE 4644

-3299

SH. BLK. CORR. W. IM. AS ABOVE.

IM. W. COM. BLUE. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. HARD. W. MED. GRAY. GRAY. GRN. & BLK. CORR. IN PART. SH.

SH. AS ABOVE. W. CONC. W. COM. BLUE. GRAY. TAN. & GRN. IN XIN. SUB. CHALKY. & TO CHALKY. TO DENSE. HARD. IM.

-3342

CHEROKEE 4687

GEOL. TOPS 302' LOW IN THE CROOKED HOLE (ABOVE 4442?) & CORRELATE CLOSELY WITH THE ELECTRIC LOG AT T.D. ~

4700

20

40

50

80

4800

20

40

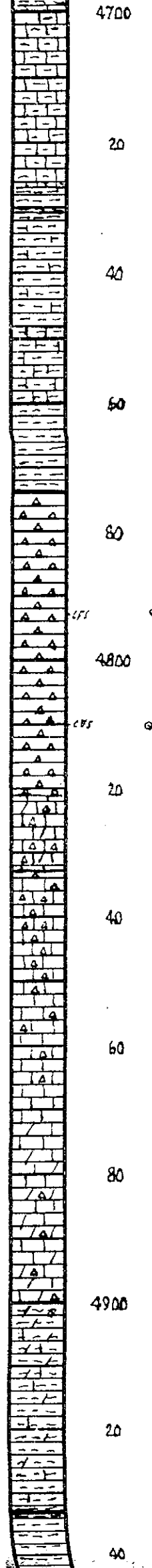
60

80

4900

20

40



**MISSISSIPPIAN 4774
-3429**

250' UNITS

100' UNITS

**KINDERHOOK 4933
-3588**

SH. MED. GR. GRN. GRN. BLK (CRAB) SM
DR. GR. & GRN. W. LM AS ABOVE

SOME W. SCAT. DR. GR. & BDL. EN. YLN
DENSE. HARD. LM. BLUS. V. SCAT. BLK
CRAB. SH.

SH. MED. GR. GRN. GRN. V. SCAT. BLK &
TO MAR. V. SCAT. LM. AS ABOVE.

SH. AS ABOVE W. CONC. CRAB. BLUES & TAN
EN. YLN. SUB. CHUXY. TO DENSE. HARD. LM.

SH. GR. RED. GRN. BLK. GR. GRN. LTR
YELLOW. W. SM. ADAM. TO YLN. TAN. SH. DR.
FR. SH. SUB. TRAN. CURT. W. SCAT.
PIECES. CURT. WOULD. BL. HOR. OR. NON
FLUOR.

GRY. CURT. LTR. GR. DR. SUB. TRAN. & FRESH
YLN. DENTON. EDGES & SIDES. SM. TAN. BRN.
CRAB. W. YLN. GR. DR. CRAB. S. LTR.
WEATHERED. W. SM. DR. P. DR. TAN. BRN. &
SM. BLK. STAIN. DR. GAS. BUBBLES. SM.
OIL. LIVE. OIL. DROPLETS. DR. BUBBLES
(GAS) MANGING. DR. SIDES. OF CURT. OIL
DROPLETS. IN. SM. W. GR. LTR. DR.
GOOD. DR. DR.

GRY. CURT. W. GR. CRAB. TAN. IN. DR. W. GR. IN
SCAT. CRAB. V. GR. GRN. BLK. STAIN. DR. GAS
BUBBLES & CLEAR. OIL. DROPLETS. FLOATING
ON. WATER. PLUS. TINY. BLK. OIL. DROPLETS /
SCAT. BRN. LIVE. DROPLETS. W. GR. DR.

CURT. LTR. GR. FRESH. W. W. GR. LTR. GR. GR.
W. GR. LTR. DR. DR. DR. SM. GR. DR.
GRN. & GR. STAIN. GR. STAIN. DR. GR. W.
DROPLETS. DR. BRN. DR. NO. FLUOR. NO. DR.

CURT. AS ABOVE. STILL. DR. GAS. BUBBLES
IN. DR. DR. GR. TINY. BLK. TO. LARGER. BRN.
OIL. DROPLETS. PLUS. SCAT. BLK. & TAN.
EN. YLN. V. GR. DR. DR. DENSE & HARD.

CURT. AS ABOVE. - LTR. SM. GR. DR. W.
W. SM. SHOW. PIECES & LM. AS ABOVE.

CURT. AS ABOVE. W. ABSENCE. OF. SHOWS.
& ALL. IN. DR. W. GR. DR.

LM. DR. DR. DR. DR. LM. SH. CURT. W. DR.
GR. & TAN. EN. YLN. DR. DENSE & HARD.
W. SCAT. PIECES. TAN. DR. GR. EN. YLN.
DR. GR. LM. W. SCAT. CURT. AS ABOVE.

LM. & CURT. DR. DR. MED. GR. BRN. &
GR. BRN. EN. YLN. CURT. & DR. W. IN
DR. DR. DENSE & HARD.

SH. MED. & DR. GR. GR. GRN. DR. & V.
SCAT. BLK. SALINITY. IN. DR. W. SCAT.
CURT. LM. & DR. DR. AS ABOVE.

60
80
5000
20
40
60
80
100
20
40
60
80

CHAS ABOVE

SH-MED GRY GRN GRN SM BLK MAP

SH AS ABOVE

SH-MED GRY W SCOT GRN GRN GRN
BLK MAP

SH-MED GRY SILTY IN PART W GRN
GRN SM MAP GRN BLK (GARB)

CHATTANOOGA 5061

-3716

SH-FLY L GRN SH-BLK V GARB AND
GAS BUBBLES TO DIOCTIC PLUS GARB
SCOT

26 UNITS

SH AS ABOVE - AND GAS BUBBLES

40 UNITS

MAQUOKETA 5092

-3747

SH-MED GRY GRN YLN SCOT
MUSKY W SCOT BLUE & TAN LM

CFS # 100

LM AS ABOVE W MED GRY BLK DV
GRY L GRN SH

LM-M GRY L GRN EN YLN SILTY & SUB
MUSKY SCOT (GARB) TO SCOT DEVY &
HARD BLK MED TO SCOT DVY & MED GRY
GRN SH

VIOLA 5143

-3798

LM-WN CRIST GRY EN YLN MUSKY & SUB
TO DENSE & HARD W MED GRY BLK GRN
GRN SH

LM AS ABOVE W GRY L TAN SILTY & PPT
DENSE & HARD LM

LM-SH GRN TAN L GRN EN YLN PPT
DENSE & HARD W SCOT W CRIST GRY
EN YLN PPT & SUB MUSKY LM

5200

20

40

60

80

5300

20

40

60

80

5400

20

40

SIMPSON 5241

3896

SIMPSON SAND 5262

3917

ARBUCKLE 5439

4094

1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

(5241) 1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

SILT. BLUE. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

PART. OF. ABOVE. IN. BLUE. EN. CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

SILT. BLUE. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

SILT. AS. ABOVE. IN. MED. TO. DUL. SOY. SOY. CON. BLUE. & BLUE. SH.

SH. MED. TO. DUL. SOY. CON. BLUE. & BLUE. SH. PLUS. SOST. AS. ABOVE.

SH. MED. & DY. SOY. CON. BLUE. & BLUE. SH. PLUS. SOST. AS. ABOVE.

SH. AS. ABOVE. & PRED. AQUA.

SH. AQUA. BLUE. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

(5410) SILT. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

(5406) SILT. BLUE. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

SILT. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

(5426) DUL. BLUE. (1.00-1.50 CM. OF CRISTAL. EN. YEN. CRISTAL. & SUB. CRISTAL. TO BESE. (H. 100) IN THE SOY. FRESH. TO. 1.00-1.50 CM. SUB. TRANS. DULL. GUST.

TOTAL DEPTH 5439



4104

