

Arden Ratliff

PETROLEUM GEOLOGIST

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107 N. Market 808 Biting Bldg. Wichita, KS 67202

DRILLING TIME

AND

SAMPLE LOG

COMPANY **CHIEFTAIN OIL CO. INC.**

LEASE **MOLZ FAMILY SWD No. 1**

FIELD **STRANATHAN**

LOCATION **NW SE SW SE**

SECTION **2** TOWNSHIP **35S** RANGE **12W**

COUNTY **BARBER** STATE **KANSAS**

CONTRACTOR **FOSSIL DRILLING** RIG NO. **3**

COMMENCED DRILLING **7-23-13**

COMPLETED DRILLING **8-06-13**

RTD **5560** FEET **1460** LTD **6658** FEET

MUD UP AT **3300** FEET MUD TYPE **CHEMICAL**

ELEVATIONS

KB **1424**

IF **1422**

Q **1411**

Measurements Are All From **K.B.**

CASING

13 3/8 @ 327' W. 350 ST.

8 1/2 @ 912' W. 370 ST.

5 1/2 @ 5596' W. 250 ST.

ELECTRICAL SURVEYS

LOGS - COMPENSATED NEUTRON & DENSITY, PE LOG, DUAL INDUCTION & MICROLOG

FORMATION TOPS

SAMPLE

ELECTRIC LOG

HEAVER
KANSAS CITY
CHENOKEE
MISSISSIPPIAN
CHATTANOOGA
VIOLA
SIMPSON
SIMPSON SST
ANNUCKLE
TOTAL DEPTH

3841 (-2714)
4384 (-2960)
4756 (-3392)
4808 (-3384)
5145 (-3721)
5229 (-3805)
5321 (-3887)
5337 (-3913)
5552 (-4118)
6460 (-5056)

3838 (-2414)
4380 (-2956)
4750 (-3526)
4804 (-3580)
5140 (-3716)
5224 (-3800)
5319 (-3895)
5354 (-3910)
5541 (-4123)
6458 (-5034)

REMARKS AFTER ANALYZING ALL OF THE CAPTIONED WELL INFO & BEING KNOWLEDGEABLE OF SWD WELLS IN THE AREA PLUS DRILLING A VERY LARGE AMOUNT OF THE DISPOSAL FORMATION, AN EXTRA GOOD DISPOSAL RATE (INJECTION RATE) IS EXPECTED.

Arden Ratliff, Petroleum Geologist

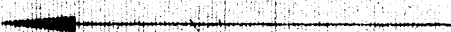
NOTE: BARCAS FURNISHED THE MUD & SAMPLES DEPOSITED AT THE K.G.S. SURVEY.

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'

LITHOLOGY

DEPTH

SAMPLE DESCRIPTIONS

REMARKS

3700

SH-MED LDK GRX, SN GRX-CBN
 1 BLK CARB IN PART W V SCAT
 TAN-CBN-BRN IN XLN-DENSE
 HARD LM.

20

SH-FRED MED GRX SILTY IN PART, PLUS
 LT GRX & TAN, FN SILT (SH IN PART)

40

SH & SILT AS ABOVE W. INCL. BLK
 CARB, SN & V. SCAT LM AS ABOVE.

60

SH-MED DL GRX SILTY IN PART TO V. FN
 1 SNLY SILT, TR BLK CARB SH & BRN
 LM AS ABOVE

80

SH & SILT AS ABOVE 1 SCAT BLK
 CARB SH

5000

SILT SILTY SH AS ABOVE W. V. SCAT
 SILT 1 TR BLK CARB SH.

20

SH-MED TO DL GRX & BLK CARB, SN
 V. SCAT W. GRN-BUFF & GRX IN YLN
 SUB-CHLY TO DENSE, HARD LM.

40

NEEDLER

3041

2417

LM W. GRN-BUFF, GRX, TAN & BRN
 IN YLN, SUB-CHLY TO DENSE, HARD
 W. CONS SH AS ABOVE, STILL BLK
 CARB SH

60

LM AS ABOVE W. V. SCAT SH AS
 ABOVE

80

SH-MED GRX, GRX-BRN, SCAT BLK GRX
 1 BLK (PART CARB, SN & CONS LM AS
 ABOVE (APPROX 50%)

3000

FRED SH AS ABOVE

20

SH-LT & MED GRY GRN GRNLY
 SH-SILTY PLUS V SCAT DK GRN &
 SCAT BLK COAR SH. TO LTH SILT
 AS ABOVE (LIMEST)

40

SH-MED TO DK GRY. BDR-GRN V
 SCAT LT GRY-SILT & BDR. GRN VLN
 DENSE. HARD LIM.

60

SH-LT & MED GRY-FR SILTY V
 SCAT DK GRY & BLK PLUS BUFF
 PLUS BDR-FN VLN. SUB-CHALKY
 TO DENSE. HARD LIM.

80

SH-MED GRY GRN GRNLY V SCAT
 DK GRY & BLK W. SCAT LIM AS BONE

4000

SAME AS ABOVE PRD MED-GRY &
 GRY-GRN GRN SH. SCAT LIM AS
 ABOVE

20

SH-MED & GRY-GRN SILTY TO V-FN
 GRAINED SILTY SILT.

40

SH AS ABOVE

60

SAME W. RARE BLK-FN & RARE TRAIL
 BDR DENSE. HARD LIM.

80

SAME AS ABOVE

4100

SH-MED GRY-FR GRN GRNLY BDR
 PLUS SILT & DENSE LIM AS ABOVE

20

SAME AS ABOVE

40

SH. MED GRY. GRX. GEN. (TO BLK
CARD SH

60

SAME AS ABOVE SLT MORE SLTLY
SLT MORE BLK BK

80

SH. AS ABOVE IN V. SCAT. ONLY BLK

4200

SAME W. SCAT. BLUFF. FN. VLN. REDD
DENSE. HARD LM

20

SAME W. POSE INCR IN LM

40

SH. MED TO BK GRX & SCAT BLK

60

SH. AS ABOVE IN POSE INCR IN BLK
(CARB IN PART) & HARD BLK. GRX.
FN. & SPAL. FN. VLN. SUB. BLK. TO
FRED. HARD LM. (TO BLK. FN.
DENSE. SLT. BLUFF)

80

LM & SH AS ABOVE

4300

SH. LT GRX. SCAT & BLK IN W. REDD
TO BK GRX & BLK SLT SCAT BLK. FN.
& BK. FN. VLN. DENSE. HARD LM.

20

SH. MED TO BK GRX & SCAT BLK

40

60

SAME IN TAN & BROWN YIN. DENSE,
HARD-LM

80

L. R. M. M. G.

4384

2960

SH. MED. GRAY, GRAY-GRAN. MED. GRAY.
TR. TAN (CHRY. IN PART) W. SCOT.
LM AS ABOVE

SH. BLK (PRED. CORN) W. CORN. BLUFF.
GRY. TAN (BROWN. TAN YIN. SUB-CULKY
TR. BLK. YIN TO DENSE. HARD-LM

4400

LM. TAN. BROWN. BLUFF. GRAY. TAN. BROWN.
YIN. SUB-CULKY. TR. CHRY. TO
DENSE & HARD. STILL CONS. IN-23
ABOVE.

20

LM AS ABOVE. MED. TO DENSE
GRY. GRN. BLK. SUB (PART CORN)

40

LM. TAN. CORN. BLUFF. GRAY. TAN.
YIN. SUB-CULKY. TR. CHRY. TO
DENSE & HARD

60

LM AS ABOVE. IN SCOT. LT. GRAY.
GREEN. SUB-TRANS. CHRY. TR. TAN.
CORN. IN

80

LM. BLUFF. GRAY. TAN. BROWN. BROWN.
DENSE. HARD. W. TR. CHRY. BLK.
CORN. IN. AS ABOVE.

4500

LM. BLUFF. GRAY. TAN. TR. TAN. CORN.
SUB-CULKY. TR. CHRY. TO DENSE.
DENSE. BLK. TR. GRAY. IN. TR. GRAY.
CHRY. AS ABOVE.

20

LM. CORN. BLUFF. GRAY. TAN. BROWN.
& HARD. W. SCOT. MED. GRAY. GRN. IN.

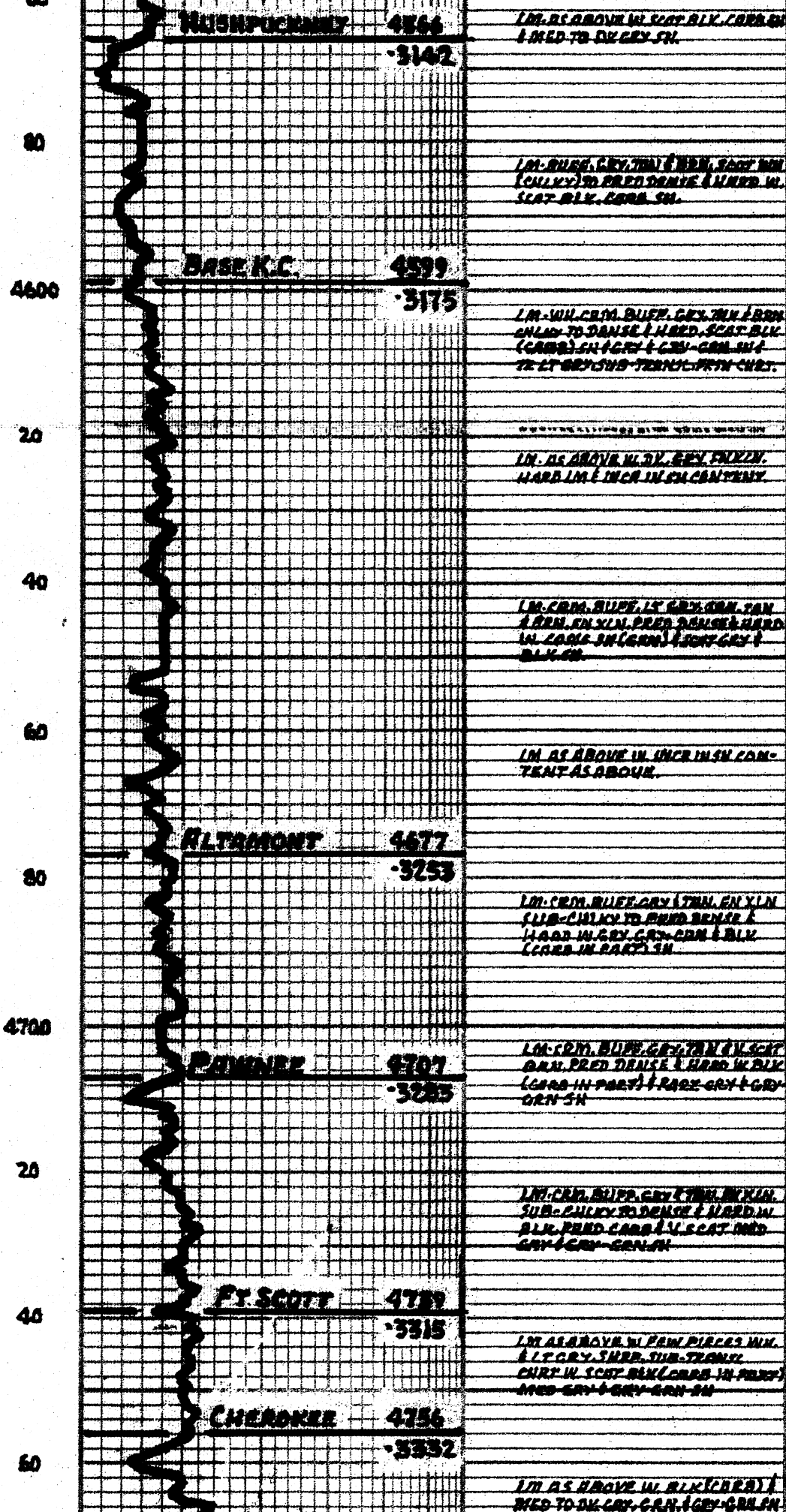
STARK

4384

3012

LM. TAN. CORN. BLUFF. LT. GRAY. TAN. BROWN.
CHRY. TO DENSE & HARD. CHRY. TR.
BLK. CORN. IN (STARK?)

40



80
4800
20
40
60
80
4900
20
40
60
80

MISSISSIPPIAN 4000

20 LAMITE

20 LAMITE

20 LAMITE

1M AS ABOVE IN COME MIN 2 CM
EN YIN CHICKY SUB-CHICKY BULL
COAS IN AS ABOVE

SHOULD TO BE CRY CRY-CRY I AM
SCAT CRY BULL CHICKY TO DANCE,
HARD LM AS ABOVE

MARIS FERT. IT CRY FERTILE SUB-TRAIL W.
IN SAY PIECE IN ROAD SPOTTY BENT
FOR IN BEN STN PLUS IN CAN A WH
ROAD CARR. WORTH 12 VUGAY FOR
BEN STN. IT TINY ON BEN ON BROTHERS
PLUS CRY PIECES COMA WORTH FOR
BEN STN TINY ON BEN ON BROTHERS
LY HARD ROCKS - WERE GOOD.

SHOULD TO BE CRY CRY CRY TO BEAT DE-
VITY. TINY BEN STN IN FOR CARRIAGE TO
PIECES IN ROAD WORTH 12 VUGAY FOR
FOR BEN STN. HARD OIL & CRY OIL
SCAT CRY IN SCAT WORTH IN STN BEN
STN CRY BULL BULL ON BROTHERS IF
BROTHERS OR BROTHERS OIL FLOTTING
ON HARD ROAD BULL CRY

(LAME) CRY IT CRY IT WINE BULL FERTILE
SCAT CRY TINY WINE SCAT CRY BENT
FOR ON BULL BULL IN ROAD GOOD
WORTH BENT. BULL CRY WINE BULL OIL
FOR TINY BULL STN. BULL CRY BULL
CRY BULL OIL BULL CRY BULL CRY
BULL CRY ON BULL CRY BULL CRY
V. GOOD RICH GOOD

CHIT AS ABOVE - AFTER CRY CRY BULL
STILL AND CRY IN GOOD BULL CRY AS
BULL CRY BULL CRY BULL CRY BULL CRY
ON CRY BULL CRY BULL CRY BULL CRY
BULL CRY BULL CRY BULL CRY BULL CRY
EN YIN BULL. HARD LM - STILL GOOD
GOOD.

SH AS ABOVE & COME CHIT AS ABOVE
STILL STRAIN SCAT CRY BULL CRY OIL,
(LAME) PLUS BULL CRY BULL CRY BULL CRY
YIN BULL. HARD LM - BULL CRY

1M DOLLO IM. IT CRY BULL BULL BULL
BULL BULL BULL BULL BULL BULL BULL
(LAME) - FERTILE BULL

DOLLO IM. V. EN YIN V. HARD (BULL)
BULL BULL CRY BULL CRY BULL CRY
PLUS MED CRY V. BULL DOLLO - IN BULL
ON CRY BULL CRY

SH DOLLO. MED TO BE CRY BULL BULL
IN SCAT CRY DOLLO AS ABOVE
BULL V. SCAT CRY BULL CRY BULL BULL

SHLY DOLLO OR DOLLO - EN MED CRY
CRY BULL CRY BULL CRY BULL CRY BULL CRY
HARD BULL CRY BULL CRY BULL CRY BULL CRY
BULL BULL BULL CRY BULL BULL BULL
HARD IM

SHLY DOLLO BULL DOLLO. SH MED TO
BULL CRY BULL CRY BULL CRY BULL CRY
BULL CRY BULL CRY BULL CRY BULL CRY

CAME AS ABOVE - MED SHLY DOLLO

5000

20

40

60

80

5100

20

40

CPS

CPS

CPS

80

5200

SHAY-DOLA-MED 1 TR DR CRV 1 CRV
 DRN. IN VIAL. MED DENSE & HARD

SHAY-DOLA AS ABOVE

SAME IN SCOT. MED. CRV. MED. 1
 1 TR CRV. MED. 1 TR MED. 1 TR MED. 1 TR
 DENSE. HARD LM.

LM AS ABOVE IN SCOT. SHAY-DOLA
 AS ABOVE. MED. 1 TR MED. 1 TR MED. 1 TR
 DRN. (TR. CRV) IN

SH. MED. 1 TR CRV. MED. 1 TR CRV
 IN. LM AS ABOVE

SAME AS ABOVE - MED. 1 TR

SH AS ABOVE. IN SCOT. ALK. MED. 1 TR
 DRN. (TR. CRV) IN

SHAY-DOLA-MED. 1 TR DR. 1 TR DR. 1 TR DR.
 CRV. 1 TR CRV. 1 TR CRV. 1 TR CRV.
 MED. 1 TR MED. 1 TR MED. 1 TR MED.
 DRN. 1 TR DRN. 1 TR DRN. 1 TR DRN.

CHATTANOOGA 5145

3721

100% UNIT

100% UNIT

MISNER

5166

3742

100% UNIT

(1162) SH AS ABOVE - MED. 1 TR

(1170) SHAY-DOLA-MED. 1 TR DR. 1 TR DR. 1 TR DR.
 CRV. 1 TR CRV. 1 TR CRV. 1 TR CRV.
 MED. 1 TR MED. 1 TR MED. 1 TR MED.
 DRN. 1 TR DRN. 1 TR DRN. 1 TR DRN.
 (1171) SHAY-DOLA-MED. 1 TR DR. 1 TR DR. 1 TR DR.
 CRV. 1 TR CRV. 1 TR CRV. 1 TR CRV.
 MED. 1 TR MED. 1 TR MED. 1 TR MED.
 DRN. 1 TR DRN. 1 TR DRN. 1 TR DRN.
 (1172) SHAY-DOLA-MED. 1 TR DR. 1 TR DR. 1 TR DR.
 CRV. 1 TR CRV. 1 TR CRV. 1 TR CRV.
 MED. 1 TR MED. 1 TR MED. 1 TR MED.
 DRN. 1 TR DRN. 1 TR DRN. 1 TR DRN.

SH. MED. 1 TR CRV. MED. 1 TR CRV
 IN. LM. MED. 1 TR MED. 1 TR MED. 1 TR
 (ASPER. D. S. T.)

SH AS ABOVE IN. MED. 1 TR CRV. MED. 1 TR CRV
 CRV. 1 TR CRV. 1 TR CRV. 1 TR CRV.
 MED. 1 TR MED. 1 TR MED. 1 TR MED.
 DRN. 1 TR DRN. 1 TR DRN. 1 TR DRN.

DST No. 1 (5145-5170)

50-45-60-90

STRONG BLOW 4 MIN
 (FIRST OPEN)

STRONG BLOW 7 MIN.
 (2ND OPEN)

REC: 360' MID CUT WTR.
 1385' MUDDY GAS CUT

WTR (6% G. 89% W. 5% M.)

IS (1/1931) F. 1/1931 F. 1/1931 F.
 (FP/82-452) F. 1/1931 F. 1/1931 F.

TEMP: 139°F

20

VIOLA

E220
3405

SAME AS ABOVE IN COR. BULK & LT
CRY. ENYIN. SUB-CULIN. TO DENSE
HARD IN. STILL V. SOFT. SOFT AS
HARD & SM. SOFT. LT. CRY. & GEL-
TAN. SOFT TO SM. FIRM SH.

40

FM. TR. DOLD. WH. COR. BULK. CRY
TO TAN. & BULK. EN. YIN. CRY. & CRY
CRY. TO DENSE & HARD IN. SOFT
SOFT SH. DE. OOL. B.

60

FM. WH. COR. BULK. CRY. TAN. EN
YIN. SLIP. CRY. TO DENSE & HARD
HARD IN. SOFT. CRY. & TAN. BULK.
SM. COR. SUB-TAN. CRY.

80

FM. (CRY. AS ABOVE) - FRY. OF
FM. (CRY. CRY. & TAN) BULK IN. BULK.

5300

FM. WH. COR. CRY. & CRY. CRY
TO DENSE & BULK. EN. YIN. YIN
YIN. BULK. FRY. SH. CRY. TAN. CRY.

20

SIMPSON

E221
3407

SAME AS ABOVE

FM. AS ABOVE. CRY. TO DENSE &
HARD IN. BULK. TO BULK. CRY. CRY.
BULK. & SOFT. BULK. CRY.

SIMPSON SAND 3407

3413

(E220) SOFT. LT. CRY. & COR. TAN. V. BULK
HARD IN. BULK. SUB. BULK. TO WELL
HARD. CRY. BULK. BULK. BULK.
HARD. FM. BULK. BULK. BULK. BULK.
BULK. BULK.

40

SOFT. LT. CRY. COR. & BULK. CRY. CRY
IN. BULK. BULK. BULK. BULK. BULK.
BULK. & BULK. BULK. CRY. CRY. BULK.
BULK. BULK. CRY. CRY. BULK. BULK.
CRY. TO DENSE. HARD IN.

60

SOFT. CRY. BULK. BULK. BULK. BULK.
CRY. BULK. CRY. CRY. BULK. BULK.
BULK. BULK. BULK. BULK. BULK. BULK.
BULK. BULK. BULK. BULK. BULK. BULK.

80

SOFT AS ABOVE. BULK. CRY. CRY. LT
CRY. BULK. BULK. BULK. BULK. BULK.
BULK. BULK. BULK. BULK. BULK. BULK.

5400

SOFT. WH. & COR. BULK. BULK. BULK.
BULK. BULK. BULK. BULK. BULK. BULK.
BULK. BULK. BULK. BULK. BULK. BULK.

20

SAME AS ABOVE



40

60

80

5500

20

40

60

80

5600

20

40

SH. MED TO BK. CRY. CRY. CRY. CRY.
ACQU. 1 BK. IN SH. SHT. AS ABOVE

SH. MED TO BK. CRY. CRY. CRY. CRY.
IN SHT. AS ABOVE. SHT. CRY. CRY. CRY.
THE SHT. TO MED. CRY. CRY. CRY.
INTER. FROM FOR. N.C.

SH. MED. SHT. IN. MED TO BK. CRY.
CRY. CRY. CRY. IN SHT. SHT. AS
ABOVE. 1 CRY. CRY.

SH. AS ABOVE. IN. MED. SHT. CRY. CRY.
CRY. CRY. CRY. SHT. SHT. SHT. SHT.
SHT. SHT. SHT. SHT. SHT. SHT. SHT.

LOWER SAND 5521

4097

SHT. LT. SAND. CRY. CRY. CRY. CRY.
MED. SHT. SHT. SHT. SHT. SHT. SHT.
SHT. SHT. SHT. SHT. SHT. SHT. SHT.

SHT. AS ABOVE. IN. MED. SHT. CRY. CRY.

ARBUCKLE 5552

4126

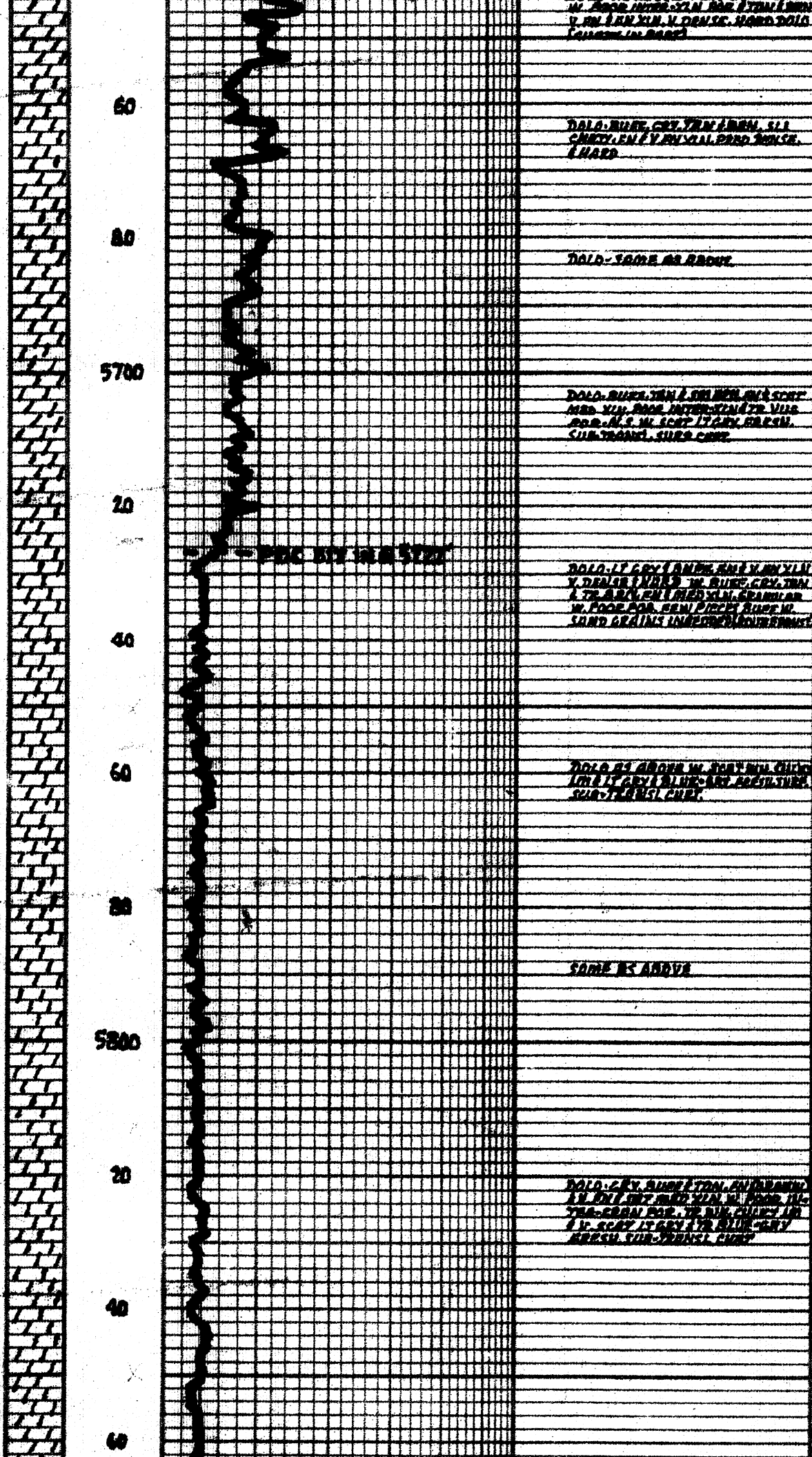
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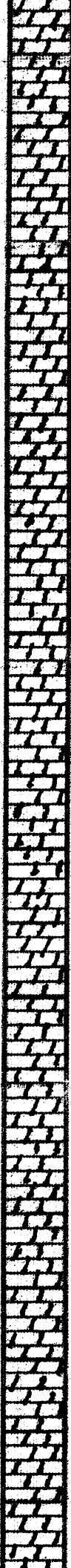
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SHT. SHT. SHT. SHT. SHT. SHT. SHT.

SHT. AS ABOVE. SHT. SHT. CRY. CRY. CRY.





20
5900
20
40
60
80
6000
20
40
60

SOME W. SL. INCR IN NO. SLT. GRY.
CHALKY LTH. & V. DENSE. HARD. TO CLINKY HARD.
FRESH. HARD. 2010

DOLD. BLUE. CRY. TAN. EN. MED. XIN.
FRESH. V. DENSE. HARD. TO CLINKY HARD.

DOLD. W. LT. GRY. & BLUE-GRY.
FRESH. SUB. SUB. TRANSL. CHRT.

DOLD. COM. BLUE. TAN. EN. MED. XIN.
TO CHRT. V. DENSE. HARD. IN SCOT.
CRY. & TAN. EN. XIN. GRAN. TO EN.
MED. XIN. W. V. DENSE. INTER. GRAN.
FOR. V. HARD. & DENSE.

DOLD. BLUE. CRY. TAN. EN. MED. XIN.
FRESH. DENSE. HARD. IN SCOT. INCL.
FRESH. DENSE. CHRT. V. DENSE. HARD.
BLUE. W. CHALKY LTH.

DOLD. AS ABOVE W. COM. (S&T 9%)
FRESH. SUB. LT. GRY. & BLUE-GRY.
SUB-TRANSL. V. HARD. CHRT.

DOLD. CHRT. AS ABOVE. SFLR.
FRESH. FRESH. CHRT.

DOLD. BLUE. GRY. & TAN. EN. MED. XIN.
FRESH. XIN. GRAN. IN PART. TO V. MED.

6100

20

40

60

80

6200

20

40

60

80

TOLO AS ABOVE IN INT. BIRD XIN.
TOLO W. BOOP INTER-YEAR FOR
BUT MEDIAN IN TR. BIC PAP.
STILL CHY AS ABOVE.

TOLO AS ABOVE. STILL IN INTER-
XIN. GRANULAR & VING FOR SCOT
CHY AS ABOVE. W. TR. W. APP.

TOLO. BURE. CHY. 1. TAN. EN XIN.
GRANULAR IN PART TO SCOT FOR
XIN. CHY. INTER-YEAR. VING FOR
BOO SCOT CHY AS ABOVE.

TOLO AS ABOVE W. BURE. CHY. 1.
TAN. EN XIN. CHY. IN PART.
V. HARD. V. DENSE. W. SCOT. LT. CHY.
1. BURE. FRESH. SUB-TRANS. TO
CHY.

TOLO. CHY. TOLO. 1. CHY. AS ABOVE.
V. V. DENSE. 1. HARD.

TOLO. CHY. BURE. 1. TAN. EN XIN.
XIN. SUPP. GRANULAR IN SCOT.
FRESH INTER-YEAR. BOO. BURE. 1. BURE.
IN XIN. DENSE. 1. HARD. BOO. CHY.
W. BURE. FRESH. SUB-TRANS. TO
CHY.

6700

20

40

60

80

6400

20

40

60

CHPT. IMM. LT. GRAY. DENSE. SHARP.
SUB-TRANS. TO SCAT. OP. 900. IN. CANS.
DOLD. 45. GRAVE.

DOLD. CANS. DENSE. LT. GRAY. DENSE. DENSE.
VIN. 5. IN. 100. VIN. 100. 10. 10.
CHPT. 100. 10. 10. 10. 10. 10. 10. 10.
IN. 10. 10. 10. 10. 10. 10. 10. 10.

DOLD. 1. CHPT. 10. 10. 10. 10. 10. 10. 10. 10.

DOLD. 10. 10. 10. 10. 10. 10. 10. 10.
DENSE. VIN. 10. 10. 10. 10. 10. 10. 10. 10.
1. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.
ATION. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.
V. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.

DOLD. 10. 10. 10. 10. 10. 10. 10. 10.
10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.
10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.
10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.
10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.
10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10.

TOTAL DENSITY 6460
-5004

LOST CIRC. 6. 6460