

STATE OF KANSAS  
STATE CORPORATION COMMISSION  
200 Colorado Derby Building  
Wichita, Kansas 67202

WELL PLUGGING RECORD  
K.A.R.-82-3-117

API NUMBER <sup>15</sup>-083-21,262-0000

LEASE NAME Stueckemann

WELL NUMBER 42-19

3550 Ft. from S Section Line

810 Ft. from E Section Line

SEC. 19 TWP. 21 SRGE. 25 (E or W)

COUNTY Hodgeman

Date Well Completed 10/2/86

Plugging Commenced 10/2/86

Plugging Completed 10/2/86

TYPE OR PRINT  
NOTICE: Fill out completely  
and return to Cons. Div.  
office within 30 days.

LEASE OPERATOR True Oil Company

ADDRESS P. O. Box 2360 Casper, WY 82602

PHONE# (307) 237-9301 OPERATORS' LICENSE NO. 4704

Character of Well Oil

(Oil, Gas, D&A, SWD, Input, Water Supply Well)

Did you notify the KCC/KDHE Joint District Office prior to plugging this well? Yes

Which KCC/KDHE Joint Office did you notify? Dodge City

Is ACO-1 filed? Yes If not, is well log attached? \_\_\_\_\_

Producing Formation \_\_\_\_\_ Depth to Top \_\_\_\_\_ Bottom \_\_\_\_\_ T.D. 4500

Show depth and thickness of all water, oil and gas formations.

OIL, GAS OR WATER RECORDS

CASING RECORD

| Formation | Content | From | To | Size | Put in | Pulled out |
|-----------|---------|------|----|------|--------|------------|
|           |         |      |    |      |        |            |
|           |         |      |    |      |        |            |
|           |         |      |    |      |        |            |
|           |         |      |    |      |        |            |

Describe in detail the manner in which the well was plugged, indicating where the mud fluid was placed and the method or methods used in introducing it into the hole. If cement or other plugs were used, state the character of same and depth placed, from \_\_\_\_\_ feet to \_\_\_\_\_ feet each set.

P&A: Plugs: 1530, 50 sx; 750', 50 sx; 40', 10 sx; 10 sx @ mousehole; 10 sx @ rathole

(If additional description is necessary, use BACK of this form.)

Name of Plugging Contractor True Drilling Company License No. 4708

Address P. O. Box 2360 Casper, WY 82602

STATE OF WY COUNTY OF Natrona, ss.

C. F. Pickard (Employee of Operator) or (Operator) of above-described well, being first duly sworn on oath, says: That I have knowledge of the facts, statements, and matters herein contained and the log of the above-described well as filed that the same are true and correct, so help me God.

RECEIVED  
STATE CORPORATION COMMISSION  
CONS. DIV. WICHITA, KS

10-10-86

(Signature) C. F. Pickard

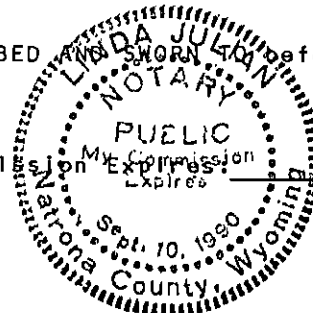
(Address) P. O. Box 2360

Casper, WY 82602

SUBSCRIBED Linda Julian before me this 7 day of October, 19 86

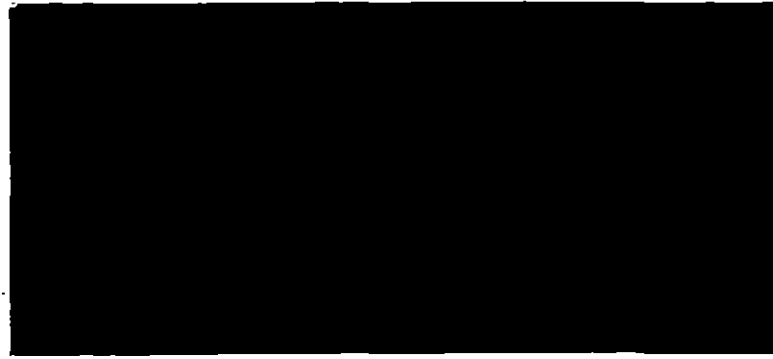
OCT. 10 1986

My Commission Expires \_\_\_\_\_



Linda Julian  
Notary Public

15-083-21262-0000



**Intermountain  
Wellsite Geologists**

P.O. Box 4007



Casper, Wyoming 82604



(307) 266-2009

TRUE OIL COMPANY  
STUECKEMANN #42-19  
SE, NE, SECTION 19, T21S, R25W  
HODGEMAN COUNTY, KANSAS

WELLSITE GEOLOGY: Ralph T. Earle  
Intermountain Wellsite Geologists  
P. O. Box 4007  
Casper, Wyoming 82604  
(307) 266-2009

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STATE GEOLOGICAL COMMISSION  
CONS. DIV. WICHITA, KS

OCT 24 1986

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WELL DATA

OPERATOR: True Oil Company  
P. O. Box 2360  
Casper, Wyoming 82602  
Geologist: Lowell Lischer

WELL: Stueckemann #42-19

LOCATION: 1730' FNL, 810' FE1, NW, SE, NE  
Section 19, T21S, R25W  
Hodgeman County, Kansas

ELEVATIONS: GL: 2321'  
KB: 2335.5'

SPUD DATE: September 23, 1986

DRILLING COMPLETED: September 29, 1986

TOTAL DEPTH: 4500' (driller)  
4497' (e-logs)

CONTRACTOR: True Drilling Company, Rit #18  
Toolpusher: A. Montgomery

SURFACE CASING: 8 5/8" set at 724' KB (driller)

HOLE SIZE: 7 7/8"

MUD PROGRAM: NL Baroid  
Great Bend, Kansas  
Engineer: Kenneth Dohm

DRILL STEM TESTS: None

MUDLOGGING: Tooke International (unmanned unit 2000'-T.D.)  
P. O. Box 3200  
Casper, Wyoming 82602

ELECTRIC LOGS: Dresser-Atlas  
Great Bend, Kansas  
--DIL w/GR, SP (2" B.S.C. - T.D.; 5" 2200' - T.D.)  
--CDL - CNL w/GR, Cal (5" 2200' - T.D.)

WELL STATUS: Plugged and Abandoned

## WELL CHRONOLOGY

Note: Depth shown below each date is T.D. at 12:00 A.M. C.D.T.

|                               |                                                                                                                                                                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| September 23, 1986<br>(0')    | Finished rig-up and spud surface hole at noon with bit #1A. Total time drilling (plus surveys) 10 hours. Drilling with native mud.                                                                                                  |
| September 24, 1986<br>(616')  | Drilled to 736', conditioned hole and ran 8 5/8" surface casing, landed at 724' K.B. Cemented and waited. Nipple-up and resumed drilling with bit #1 at 5:30 P.M. (WOB 20k, RPM 60, PP 925/1000, SPM 116). Total drilling 10 hours. |
| September 25, 1986<br>(1144') | Drilled (WOB 20/30k, RPM 60/110, PP 1000) to 2260', tripped for bit and strapped pipe. Ran in with bit #2, drilling at 7:30 P.M. Drilling 17 1/2 hours.                                                                             |
| September 26, 1986<br>(2400') | Drilling 19 1/2 hours (WOB 25/35k, RPM 70, PP 1250/1200). Shut down from 3:00 - 7:15 P.M. to change over to fresh mud system.                                                                                                       |
| September 27, 1986<br>(2992') | Drilling 23 3/4 hours (WOB 30k, RPM 70, PP 1250).                                                                                                                                                                                   |
| September 28, 1986<br>(3811') | Drilling 23 3/4 hours (WOB 35k, RPM 70, PP 1300). Violent thunderstorms washed out entrance road to location as Pawnee Creek flooded. Decided to drill to T.D.                                                                      |
| September 29, 1986<br>(4332') | Drilling 7 1/2 hours (WOB 35k, RPM 70, PP 1350). T.D. 4500' at 6:30 A.M. Circulated hole and short tripped. Waiting on location to dry out.                                                                                         |
| September 30, 1986<br>(4500') | Circulated hole throughout the day while entrance road to location was rebuilt. Loggers on location at 10:00 P.M., truck became stuck in mud. Called for bulldozer to assist.                                                       |
| October 1, 1986<br>(4500')    | Log runs completed by 8:00 A.M. Decision made to plug and abandon well.                                                                                                                                                             |

BIT RECORD

| <u>BIT NO.</u>        | <u>SIZE</u> | <u>MFGR</u> | <u>TYPE</u> | <u>T.D. OUT</u> | <u>FOOTAGE</u> | <u>HOURS</u> | <u>AVE. FT/HR</u> | <u>SURVEY</u> | <u>REMARKS</u> |
|-----------------------|-------------|-------------|-------------|-----------------|----------------|--------------|-------------------|---------------|----------------|
| 1A (RR)               | 12 1/4"     | STC         | FDS         | 736'            | 722            | 10.5         | 69                |               |                |
| 1                     | 7 7/8"      | Reed        | HP-11       | 2260'           | 1524           | 21           | 73                | 1°            | SLM - No Corr. |
| 2                     | 7 7/8"      | STC         | F-27        | 4500'           | 2240           | 78           | 29                |               |                |
| Total Rotating Hours: |             |             |             |                 |                | 109.5        |                   |               |                |

DEVIATION SURVEYS

| <u>DEPTH</u> | <u>DEVIATION</u> |
|--------------|------------------|
| 90'          | 1°               |
| 190'         | 1/4°             |
| 364'         | 3/4°             |
| 450'         | 1/2°             |
| 736'         | 1°               |
| 2260'        | 1°               |

DRILLING FLUID RECORD

| <u>DATE</u> | <u>DEPTH</u> | <u>WT</u> | <u>FV</u> | <u>PV</u> | <u>YP</u> | <u>WL</u> | <u>FC</u> | <u>pH</u> | <u>ppm</u><br><u>Ca</u> | <u>ppm</u><br><u>Cl</u> | <u>%</u><br><u>SOLIDS</u> | <u>REMARKS</u> |
|-------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------|-------------------------|---------------------------|----------------|
| 9/26/86     | 2840'        | 8.8       | 37        | 6         | 12        | 12.8      | 1/32      | 11.0      | --                      | 4000                    | 3.3                       |                |
| 9/27/86     | 3508'        | 9.2       | 36        | 8         | 6         | 15.2      | 2/32      | 10.0      | --                      | 3500                    | 6.0                       |                |
| 9/28/86     | 4087'        | 9.5       | 39        | 9         | 2         | 13.2      | 2/32      | 9.5       | --                      | 2000                    | 8.5                       |                |
| 9/29/86     | 4500'        | 9.5       | 38        | 9         | 11        | 20.8      | 2/32      | 9.5       | 120                     | 3500                    | 8.5                       | Circ (logs)    |



FORMATION TOPS

| <u>FORMATION</u> | <u>LOG TOP</u> | <u>SUBSEA (±)</u> | <u>h INTERVAL*</u> |
|------------------|----------------|-------------------|--------------------|
| Baine            | 893'           | +1442             | 644'               |
| Stone Corral     | 1537'          | +798              | 753'               |
| Herrington       | 2290'          | +45               | 534'               |
| Neva             | 2824'          | -489              | 438'               |
| Topeka           | 3262'          | -927              | 414'               |
| Heebner          | 3676'          | -1341             | 42'                |
| Lansing          | 3718'          | -1383             | 192'               |
| Kansas City      | 3910'          | -1575             | 235'               |
| Marmaton         | 4145'          | -1810             | 100'               |
| Cherokee         | 4245'          | -1910             | 105'               |
| (Mississippian)  | 4350'          | -2015             | --                 |

\* gross interval between formation tops

STRUCTURAL & STRATIGRAPHIC COMPARISON WITH OFFSET WELL

True Oil Co.  
 Stueckemann #42-19  
 SE, NE 19/T21S/R25W  
 K.B. 2335'

True Oil Co.  
 #22-19 Jackson Ranch  
 SE, NW 19/T21S/R25W  
 K.B. 2355'

| <u>FORMATION</u> | <u>SUBSEA</u> | <u>h</u> | <u>INTERVAL*</u> |  | <u>SUBSEA</u> | <u>h</u> | <u>INTERVAL*</u> |
|------------------|---------------|----------|------------------|--|---------------|----------|------------------|
| Baine            | +1442         | 644'     | (-3)             |  | +1445         | 638'     |                  |
| Stone Corral     | +798          | 753'     | (-9)             |  | +807          | 756'     |                  |
| Herrington       | +45           | 534'     | (-6)             |  | +51           | 540'     |                  |
| Neva             | -489          | 438'     | (--)             |  | -489          | 435'     |                  |
| Topeka           | -927          | 414'     | (-3)             |  | -924          | 419'     |                  |
| Heebner          | -1341         | 42'      | (+2)             |  | -1343         | 42'      |                  |
| Lansing          | -1383         | 192'     | (+2)             |  | -1385         | 183'     |                  |
| Kansas City      | -1575         | 235'     | (-7)             |  | -1568         | 212'     |                  |
| Marmaton         | -1810         | 100'     | (-30)            |  | -1780         | 121'     |                  |
| Cherokee         | -1910         | 105'     | (-9)             |  | -1901         | 100'     |                  |
| (Mississippian)  | -2015         | --       | (-14)            |  | -2001         | --       |                  |

\* gross interval

LOG CALCULATIONS

| <u>ZONE/<br/>DEPTH</u> | <u>(1) <math>R_t</math></u> | <u>(2) <math>\phi_D</math></u> | <u>(3) <math>\phi_N</math></u> | <u>(4) <math>\phi_X</math></u> | <u>(5) F</u> | <u>(6) <math>R_w</math></u> | <u>(7) <math>S_w</math></u> | <u>REMARKS</u> |
|------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|--------------|-----------------------------|-----------------------------|----------------|
| (Mississippian)        |                             |                                |                                |                                |              |                             |                             |                |
| 4340                   | 25                          | .14                            | .135                           | .13                            | 59           | .11                         | .51                         | Wet            |
| 4342                   | 20                          | .09                            | .18                            | .135                           | 55           | .11                         | .55                         |                |
| 4344                   | 18                          | .10                            | .18                            | .145                           | 48           | .11                         | .54                         |                |
| 4346                   | 13                          | (wash out)                     | .21                            | .245                           | 17           | .11                         | .38                         | (Wash out)     |
| 4348                   | 9.5                         | (wash out)                     | .29                            | .305                           | 11           | .11                         | .36                         | (Wash out)     |
| 4350                   | 8.5                         | .13                            | .22                            | .19                            | 28           | .11                         | .61                         | Wet            |
| 4352                   | 7                           | .03                            | .19                            | .13                            | 59           | .11                         | .96                         |                |
| 4354                   | 6.5                         | .14                            | .23                            | .185                           | 29           | .11                         | .70                         |                |
| 4356                   | 7                           | .11                            | .21                            | .16                            | 39           | .11                         | .78                         |                |
| 4358                   | 8                           | .05                            | .17                            | .11                            | 83           | .11                         | 1.0                         |                |
| 4360                   | 8                           | .05                            | .195                           | .125                           | 64           | .11                         | .94                         |                |
| 4362                   | 7                           | .05                            | .18                            | .12                            | 69           | .11                         | 1.0                         |                |
| 4364                   | 7                           | .06                            | .175                           | .125                           | 64           | .11                         | 1.0                         |                |
| 4366                   | 6                           | .05                            | .20                            | .14                            | 51           | .11                         | .97                         |                |
| 4368                   | 6                           | .07                            | .19                            | .14                            | 51           | .11                         | .97                         |                |
| 4370                   | 9.5                         | .05                            | .18                            | .13                            | 59           | .11                         | .83                         |                |

(1)  $R_t$  from  $IL_D$

(2)  $\phi_D$  from CDL

(3)  $\phi_N$  from CNL

(4)  $\phi_X$  = crossplot porosity

(5)  $F = 1/\phi_X^2$ , for clean carbonates

(6)  $R_w = .11$ , this value used in offset well calculations ( $R_{wa}$  from logs?)

(7)  $S_w = \left( \frac{F \cdot R_w}{R_t} \right)^{\frac{1}{2}}$

## SUMMARY

The #42-19 Stueckemann was drilled into the (Mississippian) carbonates, with this interval the primary objective, based on shows and production from an adjacent offset well. Log character indicates the probability of a more highly eroded upper Mississippian interval, as compared to the offset well (True, #22-19 Jackson Ranch). This chert and dolomite-dominated contact zone did produce some very spotty live oil shows, both on cuttings of chert (surficial staining), and in scattered cuttings of microcrystalline dolomite. The #42-19 Stueckemann lacks the good development of a dolomitic porosity, or the quality of sample shows seen in the offset Jackson Ranch well. There were no drilling breaks (indicating porosity), as were seen in the tested offset zone. Based on all of these indications and a structurally low position, the upper Mississippian interval was not tested.

Samples were examined from the Herrington (log 2290') to T.D. No other sample shows were noted in this well. There were two small gas shows produced in the top of the Herrington section, and several black shale intervals produced small gas kicks.

Sample quality was very good throughout drilling.

## LITHOLOGY

Note: Rig-caught samples lagged by geologist. "As above" refers to nearest preceding description of same lithology type.

(30' samples)

- 2120' - 2170' Abundant Shale - orange, red brown, blocky, moderately firm (cavings), with Shale - medium, dark gray, silty, very anhydritic in part, with Anhydrite (common) - white, translucent, mottled gray in part.
- 2170' - 2236' Anhydrite (abundant) - as above and gray, argillaceous in part, grading to anhydritic dark gray shale.
- 2236' - 2298' Anhydrite - generally as above, with Shale - gray, subplaty to subblocky, slightly dolomitic to anhydritic in part with (scattered) Dolomite - white-gray mottled, some white, microcrystalline with included gray shale of anhydrite clasts, dense, no visible shows, argillaceous in part.
- 2298' - 2325' Increasing Dolomite - as above, and tan-cream, microcrystalline to very fine granular, moderately firm, scattered vug porosity, anhydritic in part, yellow mineral fluorescence, no visible shows.
- 2325' - 2385' Dolomite - generally gray-white mottled, common shaly and anhydrite clasts generally dense, rare pin point vugs, no hydrocarbon shows, with Anhydrite - gray, translucent, and Shale - gray, subplaty, slightly dolomitic.
- 2385' - 2445' Dolomite - as above, and increasingly light to medium gray and granular to very fine crystalline, or silty in part, argillaceous, some anhydritic, some tan and microsugrosic, no shows; trace chert in samples.
- 2445' - 2503' Dolomite - as above, with increasing argillaceous, grading to shale, with common Chert - smoky gray to milky, shaly in part, with common anhydrite in samples.
- 2503' - 2595' Dolomite - as above, mottled gray-tan, white, microcrystalline to granular in part, rare vugs, no shows, with some Limestone - gray, mottled, microcrystalline, both lithologies shaly in part; with common anhydrite in samples, no visible shows.
- 2595' - 2625' Dolomite - tan to gray, generally microcrystalline, interbedded with medium to dark gray, anhydritic shale and anhydrite, very scattered pin-point vugs, no shows.
- 2625' - 2657' Increasing Anhydrite and Anhydritic Shale - as above, becoming moderately to very limy, with Limestone - medium to dark gray, microcrystalline, slightly argillaceous in part.

- 2657' - 2718' Limestone - cream, buff, white, microcrystalline with cryptocrystalline clasts in part, moderately firm, some pelletaloid to sub-dolitic, dense to scattered pin point vugs, bright mineral fluorescence, no visible shows.
- 2718' - 2770' Limestone - as above, increasingly white, with scattered translucent to orange chert, scattered Dolomite - light tan, microsucrosic, fair intercrystalline porosity, no shows.
- 2770' - 2835' Limestone - buff, white, as above, and increasingly tan-gray and mottled traces of oolites and fossil fragments, poor porosity, no shows, with rare Limestone - pale green, microsucrosic, moderately firm, no shows; with scattered anhydrite and traces of chert.
- 2835' - 2848' Limestone - cream to buff and gray, microcrystalline to very fine crystalline, moderately to very firm, anhydritic in part and anhydrite fills intercrystalline porosity in part, otherwise dense, no shows, traces fossil fragments.
- 2848' - 2882' Limestone - tan, gray, light brown, microcrystalline to silty and argillaceous, scattered fossil debris and carbonaceous grains, poor to fair intercrystalline porosity; with Siltstone - brown, limy, traces mica.
- 2882' - 2908' Limestone - cream to tan, some gray mottled, microcrystalline to very fine crystalline, moderately firm, poor intercrystalline to scattered pin point vug porosity, no shows.
- 2908' - 2945' Limestone - becoming increasingly gray and more fossiliferous, argillaceous in part, poor porosity and no visible shows.
- 2945' - 3005' Limestone - tan, cream and gray as above, some very dark gray and very shaly (with fossil fragments) grading to limy shale; no visible shows.
- 3005' - 3088' Limestone - cream, buff, tan, microcrystalline to very fine crystalline, fossiliferous, scattered interfragmental and intercrystalline porosity, rare pin point vugs, no fluorescence or shows.
- 3088' - 3150' Limestone - as above, slightly decreasing, with Sandstone - very pale greenish gray, very fine to fine, subangular to scattered subrounded quartz, common green glauconite grains, dark micas and scattered other dark grains, well sorted, generally friable, scattered calcareous cement, fair to good visible porosity, no hydrocarbon shows; with scattered platy, gray calcareous shale in samples.

- 3150' - 3210' Limestone - cream to tan, microcrystalline, argillaceous in part, no shows, with Shale - dark gray, platy and fissile to subblocky, soft, fossil traces, noncalcareous.
- 3210' - 3245' Limestone - cream to mostly buff, tan, gray, generally microcrystalline, moderately firm to firm, dense to poor intercrystalline porosity, no shows.
- 3245' - 3325' Limestone - increasingly tan to gray brown, microcrystalline, rare cryptocrystalline, shaly in part, firm, no shows, with Shale - dark gray, platy, moderately soft; common fossil fragments in limestones.
- 3325' - 3375' Limestone - increasingly cream, white and tan, microcrystalline, dense to rare intercrystalline and pin point vug porosity, some very fine to fine crystalline and fragmental, no visible shows.
- 3375' - 3440' Limestone - tan, buff, microcrystalline with scattered microsugrosic, moderately firm, fair to good intercrystalline and abundant pin point to fine vuggy porosity, no stain, fluorescence or cuts, becoming very fine crystalline and more fossiliferous (lower part of sample interval).
- 3440' - 3475' Limestone - tan, cream, light gray, microcrystalline to very fine crystalline, scattered pin point vug and intercrystalline porosity, no shows.
- (Begin 10' samples)
- 3475' - 3497' Limestone - tan, cream, generally microcrystalline, generally dense, moderately firm, scattered dark brown patches and zones of mineralization or possible dead oil stain in part, no visible shows.
- 3497' - 3545' Limestone - white to buff, increasingly cryptocrystalline to scattered microcrystalline (increasing in lower interval), firm, dense, anhydritic in part, scattered chert in samples.
- 3545' - 3555' Limestone - as above but increasingly microcrystalline to fine and coarse crystalline in part, sample contains abundant clear to translucent, calcite crystals, no visible shows.
- 3555' - 3562' Limestone - white to buff, microcrystalline, dense to poor intercrystalline porosity, cherty and hard in part, no shows.
- 3562' - 3568' Limestone - as above, and tan, no shows, with Shale - black, blocky - fissile, moderately firm to soft, possibly carbonaceous (checked for cut-fluorescence but none observed).

- 3568' - 3582' Limestone - generally as above, microcrystalline to very fine crystalline, some good visible intercrystalline porosity, no shows.
- 3582' - 3590' Limestone - tan, cream, microcrystalline and increasingly very fine crystalline, moderately firm, good visible vuggy porosity, no visible shows.
- 3590' - 3608' Limestone - as above, with scattered cryptocrystalline, with Chert - gray-white mottled and opaque, brittle, white, oolitic texture in part.
- 3608' - 3675' Limestone - tan to buff, very fine to fine and microcrystalline, common visible leached oolite and vug porosity (fair to good), no visible shows.
- 3675' - 3680' Shale - black to very dark brownish-black, moderately firm to moderately soft, blocky, no cut fluorescence, slightly calcareous.
- 3680' - 3688' Shale - black, as above, greatly decreasing, with Shale - medium gray, platy to fissile, noncalcareous, with Limestone - tan to buff, as above, no shows.
- 3688' - 3710' Limestone - white to buff, microcrystalline and cryptocrystalline, firm and brittle in part, scattered fossil fragments, generally dense, no visible shows.
- 3710' - 3735' Limestone - becoming more tan to buff, otherwise generally as above, but increasingly microcrystalline to very fine crystalline in lower part of interval, scattered pin point vugs, no shows.
- 3735' - 3748' Limestone - as above, and medium to dark gray brown, cryptocrystalline and slightly argillaceous in part, hard, dense, no shows, traces of limy shale with Shale - medium to dark gray, moderately firm.
- 3748' - 3772' Limestone - white, cream, buff, microcrystalline to very fine crystalline, cryptocrystalline in part, dense to scattered poor pin point porosity, no shows.
- 3772' - 3805' Limestone - generally as above, no shows, with fossil fragments, oolites and scattered Chert - clear, yellow-tan.
- 3805' - 3831' Limestone - increasingly tan and cryptocrystalline, generally dense but some poor to fair intercrystalline porosity in very fine fraction, slight increase in chert; no shows.
- 3831' - 3882' Limestone - cream, white, tan, generally microcrystalline, scattered very fine and cryptocrystalline, dense, firm, common Chert - pale orange, white, translucent.



- 3882' - 3935' Limestone - generally as above, but more tan, with abundant chert as above, with scattered Shale - black, moderately soft; no visible shows.
- 3935' - 3965' Limestone - as above, dense to poor intercrystalline porosity, no shows, with Chert - as above.
- 3965' - 3978' Limestone - as above and becoming medium to dark brown and gray brown, microcrystalline, dolomitic in part, dense to poor intercrystalline porosity, no shows, scattered oolites, argillaceous in part.
- 3978' - 4002' Limestone - buff, tan, some light gray, microcrystalline, well developed oolitic and pelletoidal limestone, fair to good leached oolite and vug porosity, bright yellow mineral fluorescence, no shows.
- 4002' - 4012' Limestone - tan, buff, much less oolitic than above, slight increase in chert, generally dense, no shows.
- 4012' - 4025' Limestone - gray brown, microcrystalline, argillaceous in part, with scattered light gray, oolitic chert; with Shale - gray, subplaty, dolomitic, carbonaceous in part, no shows.
- 4025' - 4040' Limestone - white to buff and light gray, cryptocrystalline and microcrystalline, dense, cherty, scattered pyrite.
- 4040' - 4054' Shale - black, blocky with fissile texture, moderately firm to some moderately soft, no cut-fluorescence.
- 4054' - 4095' Limestone - white, buff (becoming more tan in lower interval), microcrystalline to cryptocrystalline, firm, dense, with common Chert - tan, pale orange, translucent, rare white.
- 4095' - 4105' Limestone - white, cream, generally microcrystalline, dense, cherty.
- 4105' - 4113' Limestone - becoming gray brown, increasingly argillaceous in part, dense, no visible shows, with Shale - dark gray to greenish gray, dolomitic in part, with scattered Dolomite - dark brown, microcrystalline, poor visible porosity, no shows; scattered Shale - brown red and mottled green, soft.
- 4113' - 4134' Limestone - tan, cream, microcrystalline and cryptocrystalline, firm, dense, scattered very fine crystalline with poor to fair porosity, no visible shows.
- 4134' - 4152' Shale - medium gray, green gray, bright orange (+ anhydritic), brown, platy to blocky, moderately firm to moderately soft, slightly calcareous in part.

- 4152' - 4165' Limestone - white, buff, microcrystalline and cryptocrystalline, soft and chalky in part (anhydritic?).
- 4165' - 4175' Limestone - as above, no shows, decreasing, with Shale - varicolored gray, green gray, some red, orange, as above, with scattered pyrite; with common Chert - clear, very pale yellow.
- 4175' - 4216' Limestone - white, buff, tan, microcrystalline, cherty with Chert - tan, translucent; no visible stain or other shows, dense to poor porosity.
- 4216' - 4235' Cherty as above, more tan to light brown, dense, no shows, with scattered Shale - light to medium gray, some green gray, platy.
- 4235' - 4257' Decreasing Limestone as above, with increased gray to black Shale - blocky to platy, slightly calcareous, with Limestone - light brown, cryptocrystalline and cherty, dense, no shows.
- 4257' - 4267' Shale - black, subblocky to fissile, carbonaceous, moderately firm, with Limestone - as above, no shows.
- 4267' - 4285' Limestone - tan, light brown, microcrystalline, some cryptocrystalline, abundant tan chert; dense to very rare intercrystalline porosity, no shows.
- 4285' - 4325' Limestone - buff, cream and tan, microcrystalline to cryptocrystalline, generally dense, with rare pinpoint and intercrystalline porosity, no shows; with Shale - green gray, streaked gray maroon in part, platy, moderately soft.
- 4325' - 4335' Limestone - cream to white, otherwise generally as above without shows.
- 4335' - 4358' Limestone - becoming more white, mottled gray in part, microcrystalline, dense, with abundant Chert - white, orange, yellow, rare pink\*, some with very spotty dark brown to black surficial oil stain (fair streaming yellow cuts), with rare\* Dolomite - white, mottled gray to dark brown (oil stain) in part, microsucrosic to microcrystalline, moderately firm, patchy light to dark brown live stain showing some pale yellow fluorescence and good streaming cuts, very faint oil odor in wet samples, poor to fair intercrystalline and some vuggy porosity (scattered and fair show at best).
- 4358' - 4388' Dolomite - white with pale green cast, microcrystalline to microsucrosic, firm, generally dense, very rare pieces with patchy black dead stain, no fluorescence or cuts, with Limestone - white, microcrystalline, dense, no shows.

4388' - 4416'

Limestone - white, mottled tan and gray in part, very fine to fine crystalline and fragmental (interclastic) in part, firm, dense, no visible shows, rare dolomitic with some possible intercrystalline porosity, without shows.

4416' - 4436'

Limestone - as above, decreasing, with Dolomite - white, cream, buff, microcrystalline to microsucrosic, moderately firm to soft and friable in part, dense to some poor to fair intercrystalline porosity, no visible shows, very scattered bright green micro grains.

4436' - 4460'

Dolomite - as above, more tan to light brown, without shows, with abundant Chert - translucent, white, scattered dark inclusions.

4460' - 4500'

Decreasing Chert (slightly), with Dolomite - white, buff, tan, microsucrosic and microcrystalline, streaked black and green (mineralization) in part; some very fine to fine crystalline and grading to limestone; some fair intercrystalline porosity, no visible shows.

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