L 3564-915 pf: 3633-3647 · 114 BO + tr wtr.
DST 3614-65 30606060 · 2014' GCO (33°)
SIP 1243-1243, FP 87-415, 459-761
HP 1804-1783#

conf: to #1 Elvin in NWSESE 14-3-27w Sec. 24-35-27w
SE 1/4
Decatur Co.

Murfin Drlg. Co. #2 Elvin
spud 11/6/78 temp. compl. 12/18/78 2656 KB
conf. Gillespie SE Oread 3500 LANS 3574
TD 4009 ∈ Or-Tor-LAC Toronto 3559 BHC 3778
Arbuckle 3982
P-∈ 4008

DST 3481-3520 45 45 45 45 Rec 260' HOCM
SIP 1158/1111 FP 69-115

DST 3528-90 ↗ ↖ Rec 250' HO & GCM
1970' GCO, SIP 1251/1251 FP 138-295

DST 3548-3627 ↗ ↖ Rec GTS/55,
2450 GOC, 42°, SIP 1251/1251 FP 230-925

DST 3619-3700 30/60/60/60 720' GIP + 270' HOCM
+1014' fluid, 240' wtr SIP 1181/1158
FP 92-670

DST 3696-3760 30/30/30/30 60' M SIP 437/138
FP 92-92

pf: 3593-95½ 100 GA Swbd 180 BO/9 hrs.
152 BOPD + 8 BW

MURFIN DRILLING COMPANY

CHEMICAL RESEARCH AND DEVELOPMENT DEPARTMENT

HALLIBURTON SERVICES
DUNCAN, OKLAHOMA

LABORATORY REPORT

No. F11-T213-78

Mr. Marvin Klein

Date December 15, 1978

Halliburton Services

Wichita, Kansas

below results of our examination of the submitted core samples.

d by Murfin Drilling Company

Well: Elvin No. 2
Location: Sec. 14, T3S, R27W

Formation	Depth
Toronto	3,561 feet
Kansas City "A"	3,575 and 3,579 feet
Kansas City "B"	3,595 feet

Purpose

These formation cores were submitted for the following tests: x-ray diffraction, acid solubility, rock properties, scanning electron microscope (SEM), petrographic, regained permeability, and immersion.

Conclusions

The requested laboratory tests were performed and the results are presented in the Data Section of this report.

Data

Core Analysis

Sample No.	Depth (feet)	Porosity (%)	Air Permeability (md)	Solubility* (%)
1	3,561	7.12	2.55	91.8
2	3,575	5.35	0.58	79.5
3	3,579	10.24	15.79	96.5
4	3,595	14.81	434.67	96.8

* This is solubility in dilute hydrochloric acid as calcium carbonate only.

Immersion Tests

Effects of immersion under vacuum at 110°F (est. BHT) for one hour in the following:

Sample No.	Depth (feet)	Fresh Water	2% KCl	2% KCl*	7 1/2% MCA	6% HF	Kerosene
1	3,561	V-SAF	NFR	NFR	**	**	NFR
2	3,575	MAF	SAF	NFR	**	**	NFR
4	3,595	NFR	NFR	NFR	**	**	NFR

NFR = No fines released.
V-SAF = Very small amount fines.
SAF = Small amount fines.
MAF = Moderate amount fines.

* 0.5 gal. CLA-STA II compound per 1,000 gallons.

** Tests were not conducted in acid base fluids due to the high solubility of the submitted sample.

Data (Cont'd)

Qualitative X-ray Diffraction

Sample No.	1	2	3
Depth (ft)	3,561	3,575	3,579
Quartz	SM	SM	VS
Feldspar	VS	SM	TR
Calcite	MJ	MJ	MJ
Dolomite	SM	--	TR
Kaolinite	--	--	--
Illite	--	--	--
Smectite	--	--	--
Mixed Layer Clay	TR	VS	--
Chlorite	--	--	--

Sample No.	4	Blue Shale
Depth (ft)	3,595	3,575
Quartz	VS	MJ
Feldspar	VS	SM-MD
Calcite	MJ	SM
Dolomite	TR	--
Kaolinite	--	SM
Illite	--	SM-MD
Smectite	--	--
Mixed Layer Clay	--	MD-LG
Chlorite	--	SM

Coding	Reported Amount	Approximate Percentage Range
TR	Trace	0.1 to 1.0
VS	Very Small	1.0 to 3.0
SM	Small	3.0 to 10.0
MD	Moderate	10.0 to 20.0
LG	Large	15.0 to 40.0
MJ	Major	40.0 to 100.0

Data (Cont'd)

Petrographic Examination

Sample No.	Depth (feet)	Description
1	3,561 (Toronto)	FORAMINIFERID LIMESTONE - Variety of fusulinids and other fossils in a medium to fine grained carbonate matrix; trace of mixed layer clay coating localized areas of carbonate cement; stylolitic seam observed; some visible porosity.
2	3,575 (Kansas City "A")	FORAMINIFERID LIMESTONE - Large, prolific fusulinids in a very fine grained carbonate matrix; stylolitic seam observed.
3	3,579 (Kansas City "A")	SLIGHTLY FOSSILIFEROUS LIMESTONE - Interlayered fine and coarse grained carbonate matrix interspersed with foraminifera and brachiopods; naturally fractured.
4	3,595 (Kansas City "B")	FORAMINIFERID LIMESTONE - Similar to Sample No. 1 with no visible clays.

Data (Cont'd)

Scanning Electron Microscope Examination

Fig. 1; Neg. No. 21805-2675; Sample No. 1; Depth: 3,561 ft; 200X. General view of fine-grained limestone and clean pore space.

Fig. 2; Neg. No. 21805-2676; Sample No. 1; Depth: 3,561 ft; 1,000X. Closer view of carbonate matrix.

Data (Cont'd)

Scanning Electron Microscope Examination

Fig. 1; Neg. No. 21805-2675; Sample No. 1; Depth: 3,561 ft; 200X. General view of fine-grained limestone and clean pore space.

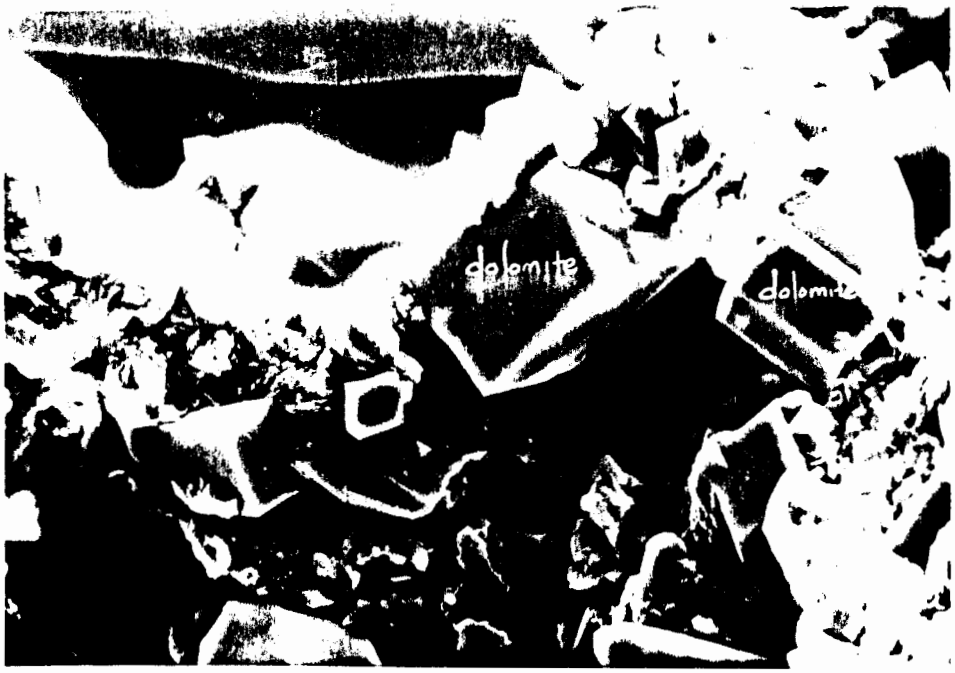


Fig. 2; Neg. No. 21805-2676; Sample No. 1; Depth: 3,561 ft; 1,000X. Closer view of carbonate matrix.

Data (Cont'd)

SEM (Cont'd)

Fig. 3; Neg. No. 21805-2677; Sample No. 2; Depth: 3,575 ft; 50X. General view of Foraminiferid Limestone (structure in center is a fusulinid).

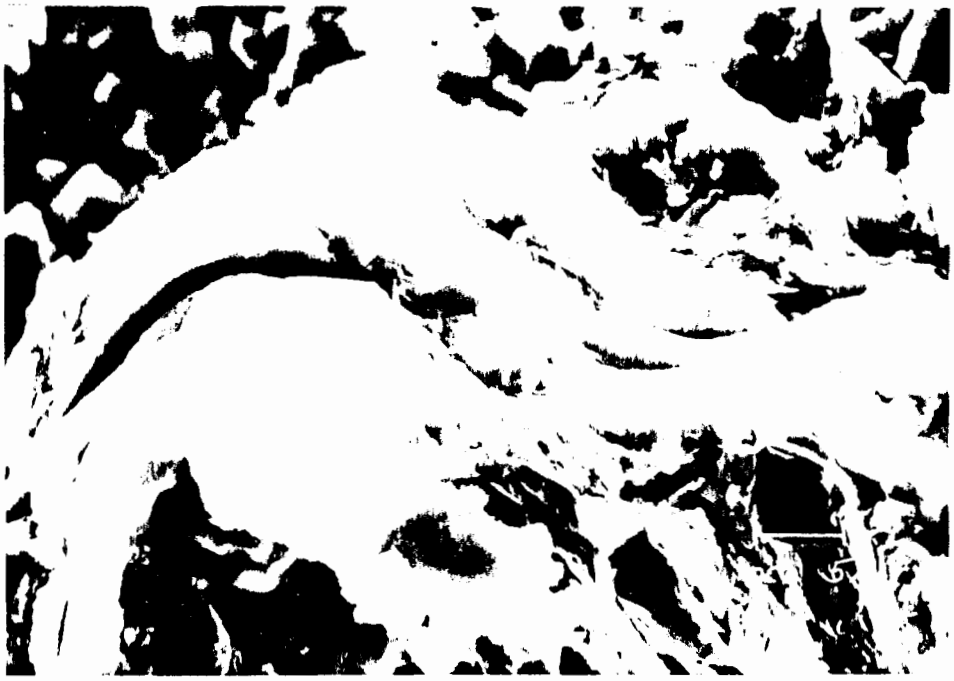


Fig. 4; Neg. No. 21805-2678; Sample No. 2; Depth: 3,575 ft; 2,000X. Close-up view of mixed layer clay coating a quartz grain.

Data (Cont'd)

SEM (Cont'd)

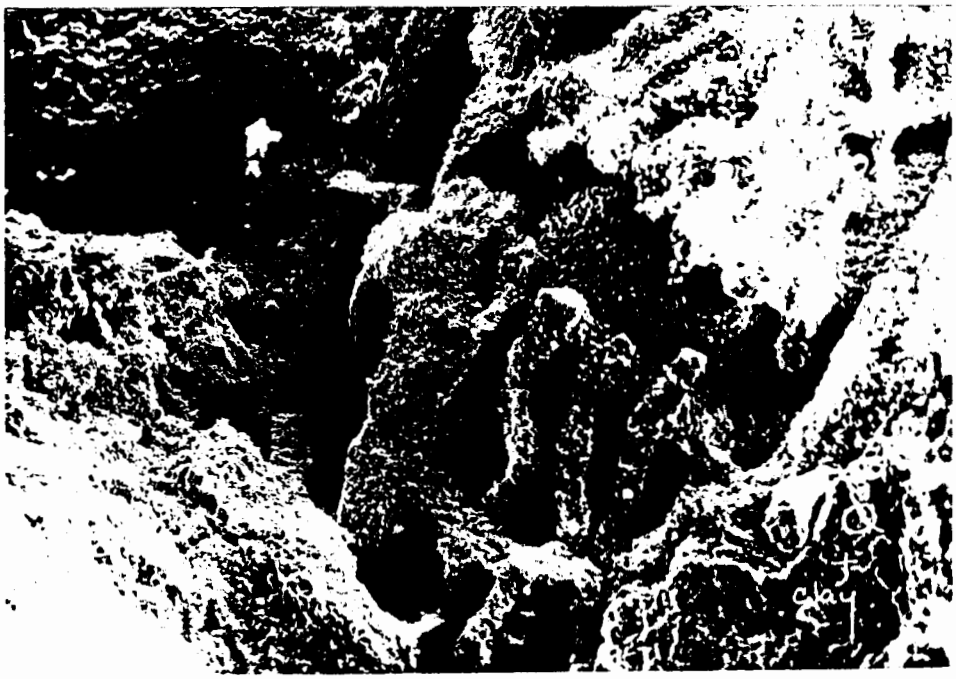


Fig. 3; Neg. No. 21805-2677; Sample No. 2; Depth: 3,575 ft; 50X. General view of Foraminiferid Limestone (structure in center is a fusulinid).

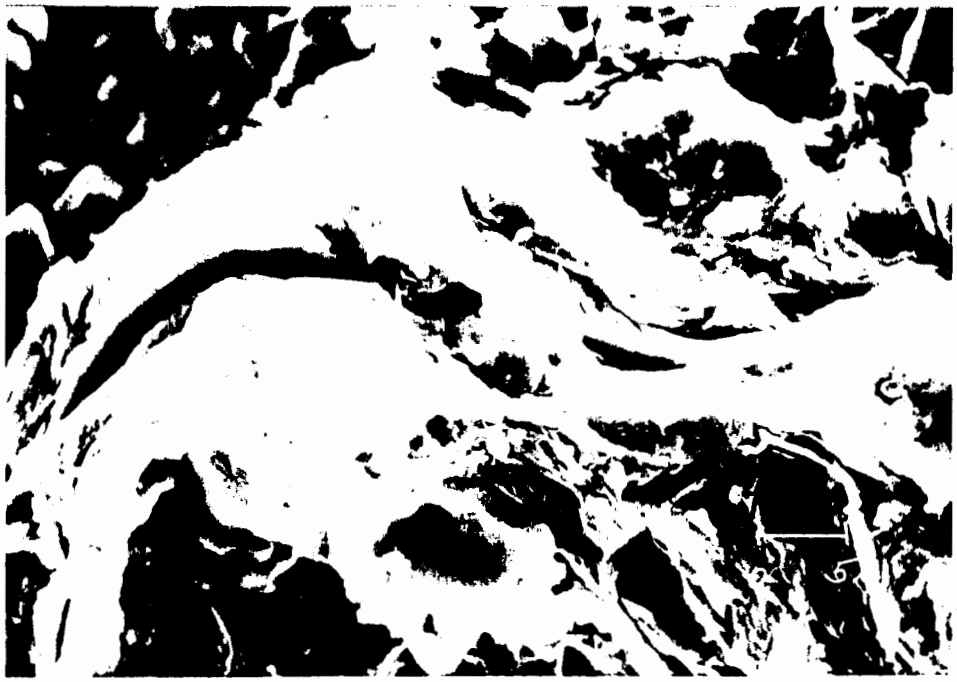


Fig. 4; Neg. No. 21805-2678; Sample No. 2; Depth: 3,575 ft; 2,000X. Close-up view of mixed layer clay coating a quartz grain.

Data (Cont'd)

SEM (Cont'd)

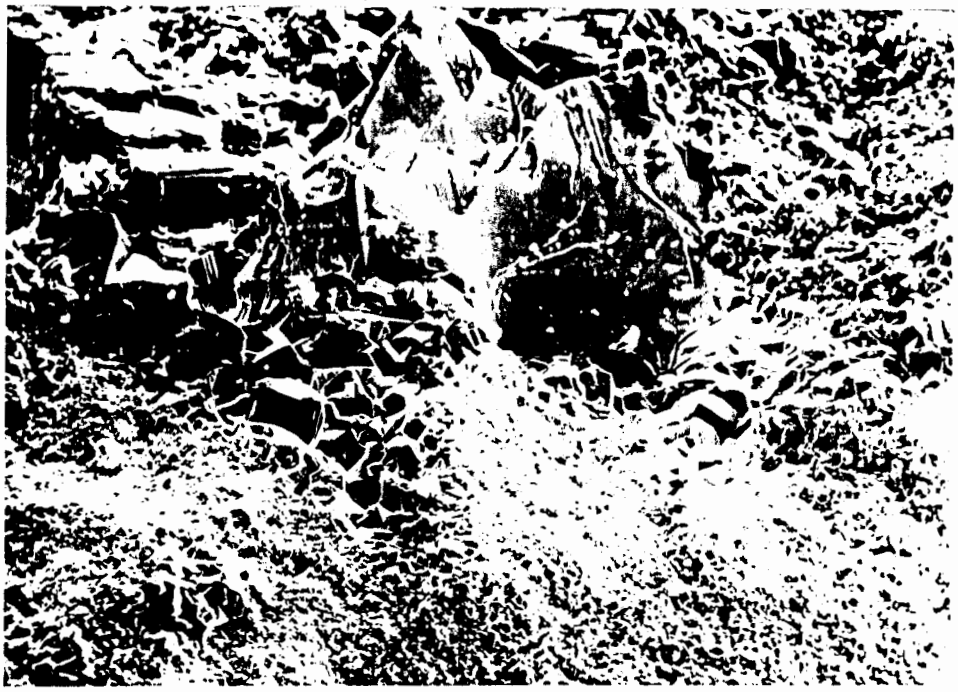


Fig. 5; Neg. No. 21805-2679; Sample No. 3; Depth: 3,579 ft; 2,000X. Close-up view of a tight interlayered fine and coarse grained limestone.

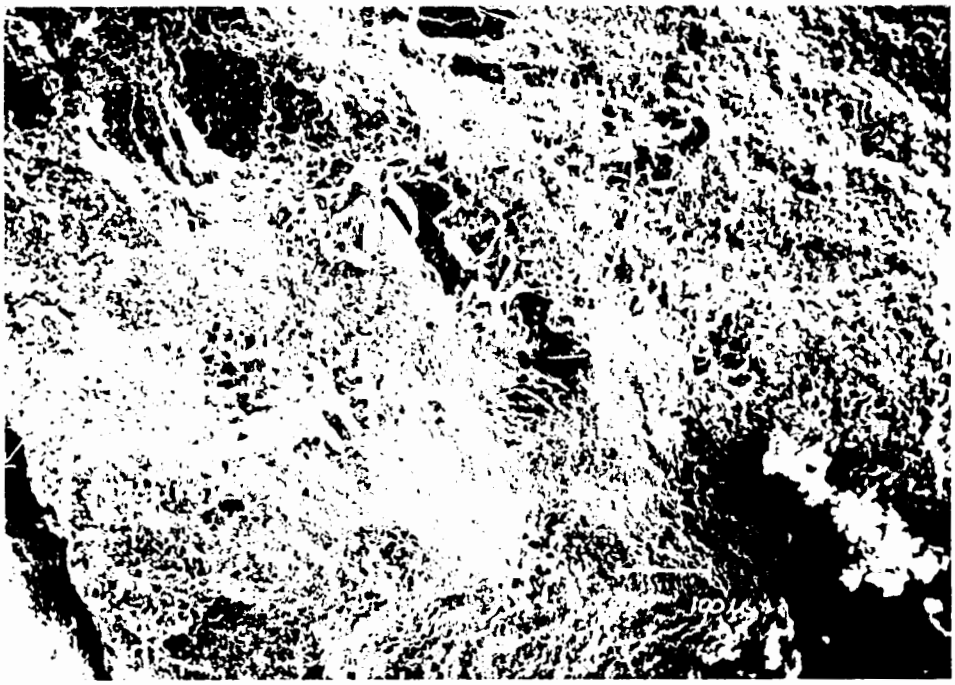


Fig. 6; Neg. No. 21805-2680; Sample No. 4; Depth: 3,595 ft; 100X. General view of fine grained limestone; note natural fracture in lower left hand corner and clean pore in lower right hand corner.

Data (Cont'd)

SEM (Cont'd)

Fig. 5; Neg. No. 21805-2679; Sample No. 3; Depth: 3,579 ft; 2,000X. Close-up view of a tight interlayered fine and coarse grained limestone.

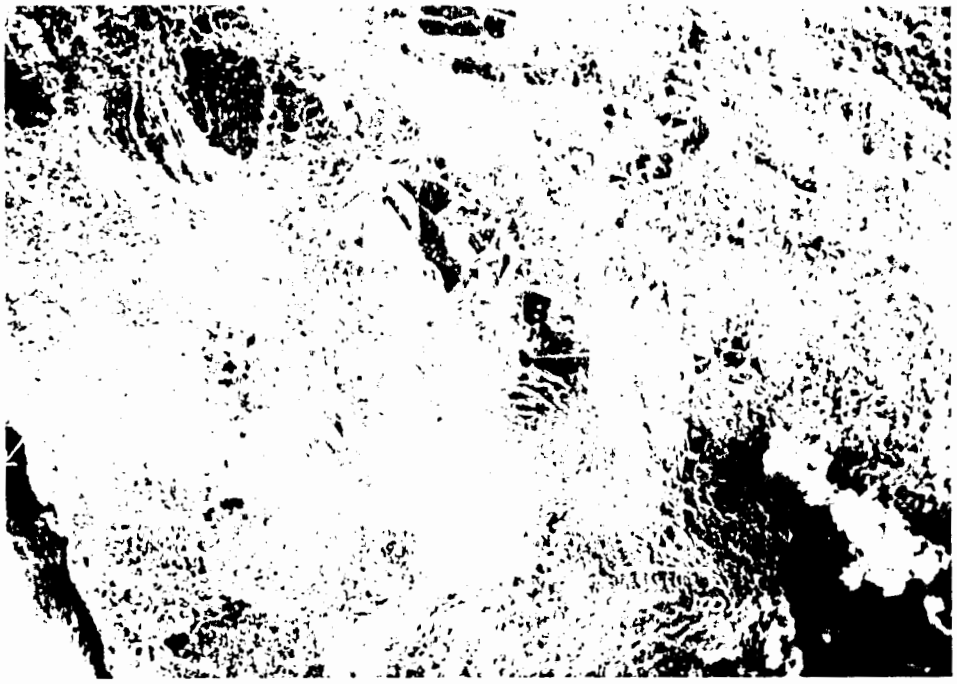


Fig. 6; Neg. No. 21805-2680; Sample No. 4; Depth: 3,595 ft; 100X. General view of fine grained limestone; note natural fracture in lower left hand corner and clean pore in lower right hand corner.

Data (Cont'd)

SEM (Cont'd)

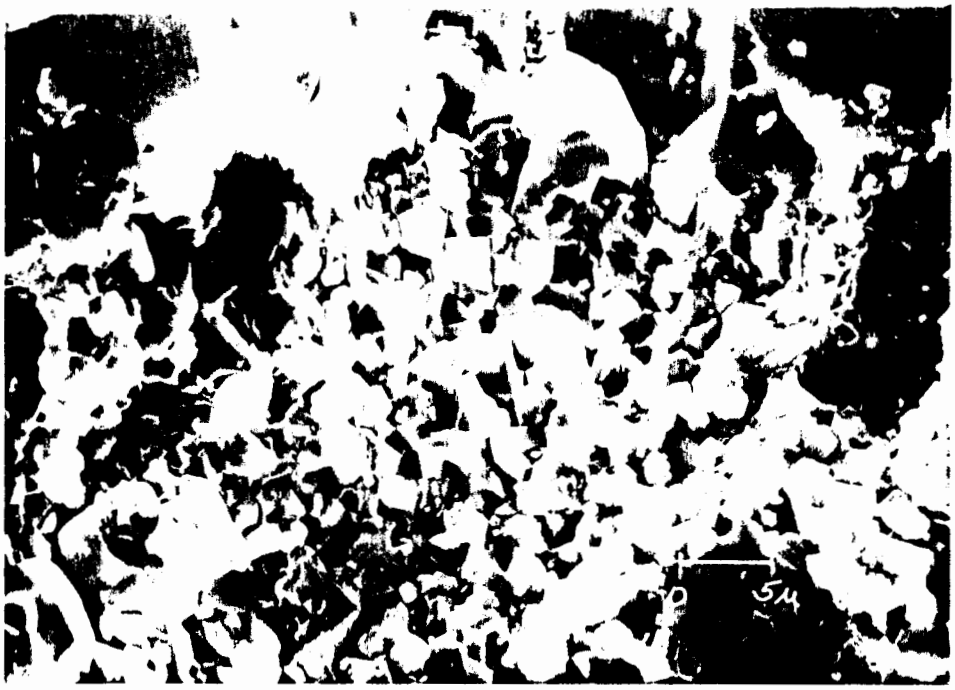


Fig. 7; Neg. No. 21805-2681; Sample No. 4; Depth: 3,595 ft; 2,000X. Close-up view of fine grained carbonate matrix.

Data (Cont'd)

SEM (Cont'd)

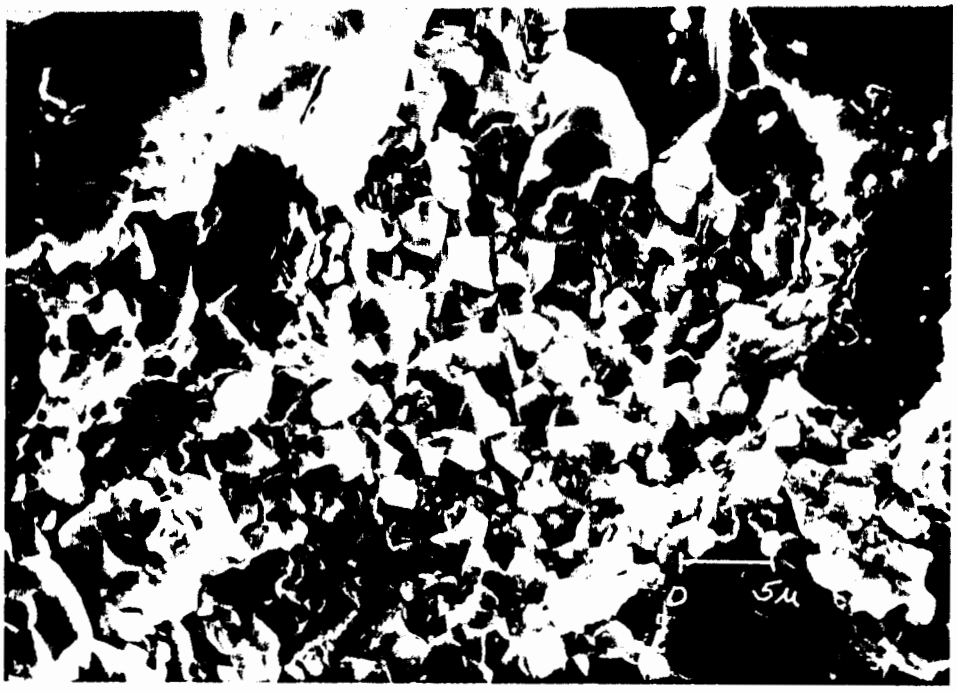
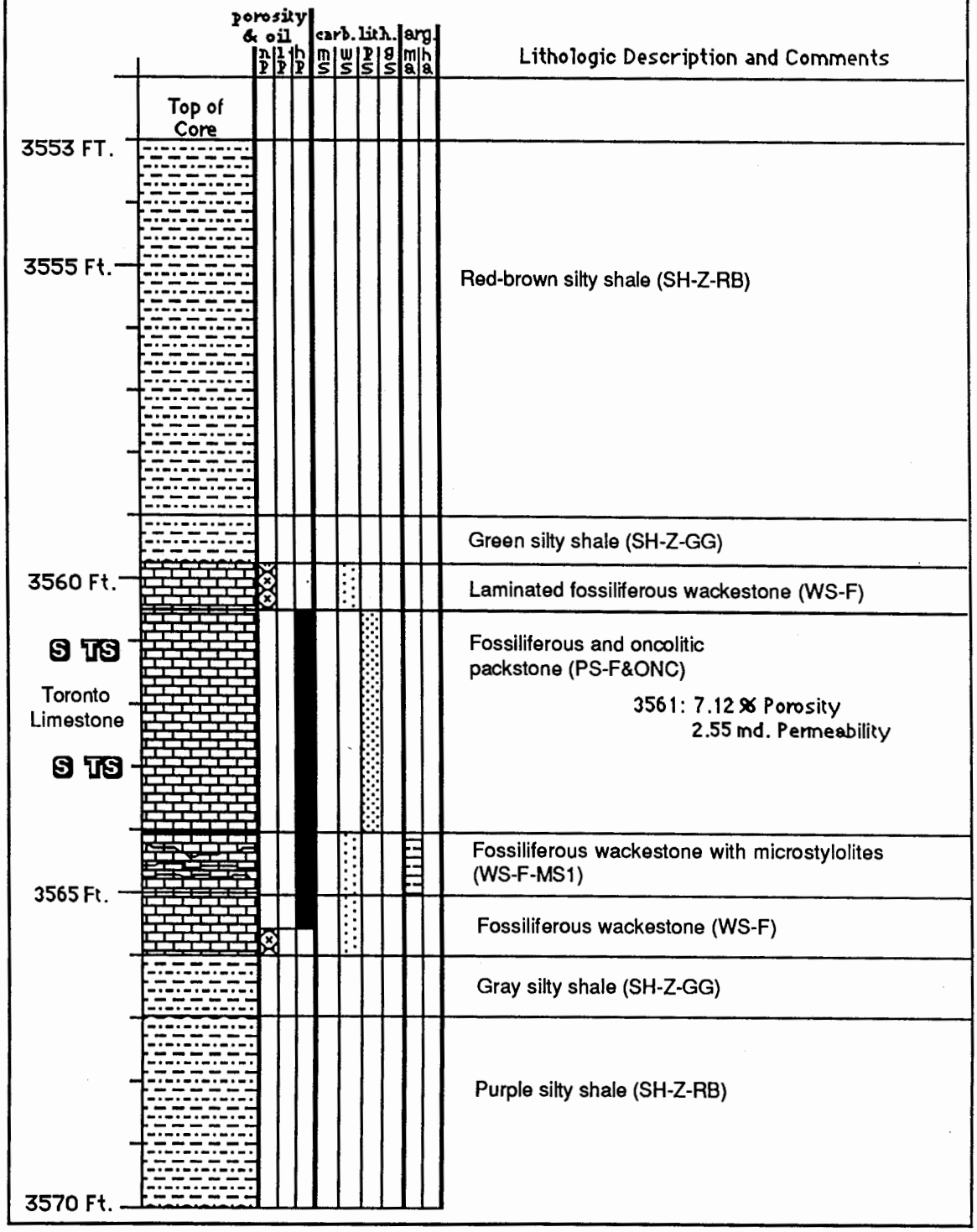


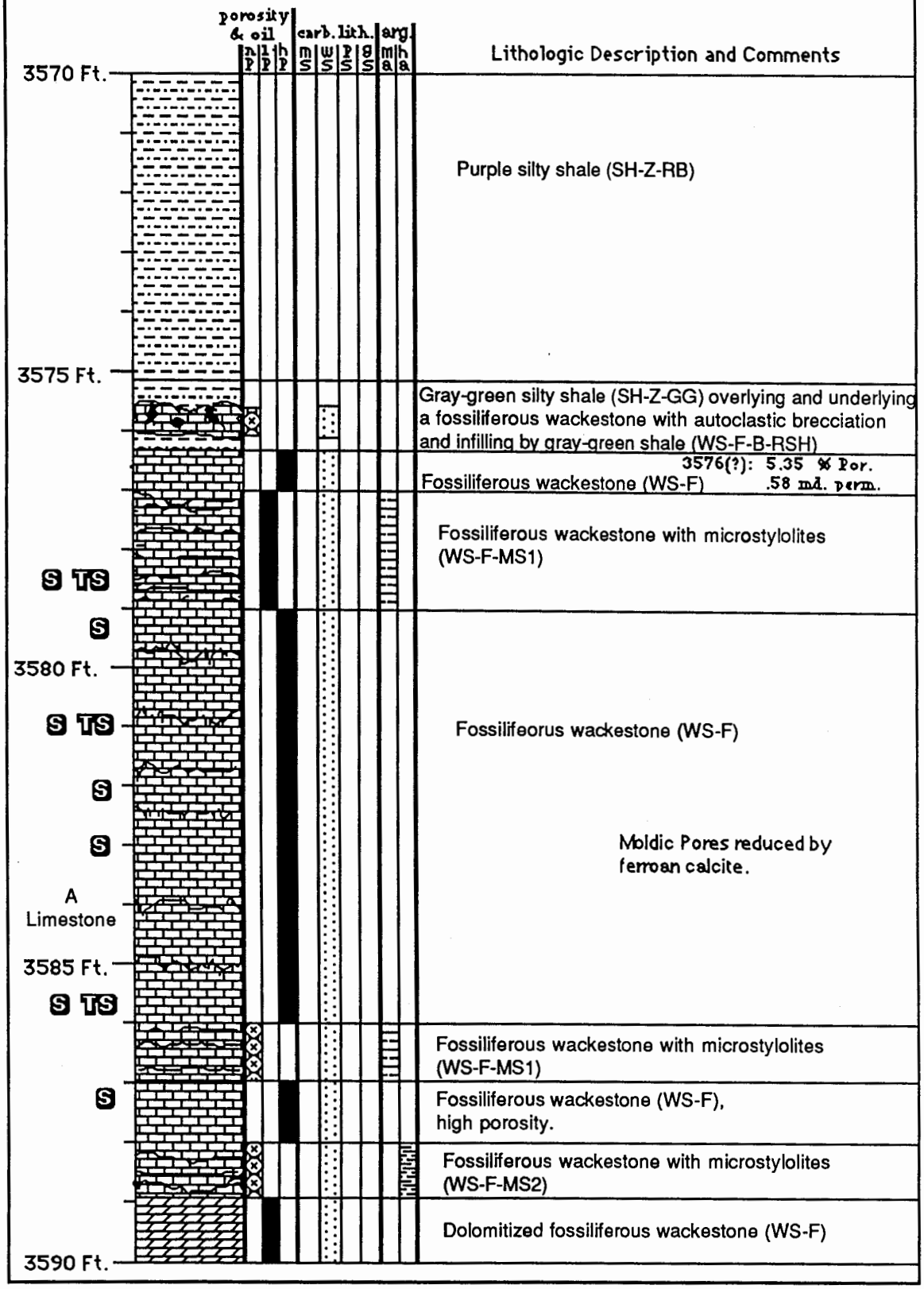
Fig. 7; Neg. No. 21805-2681; Sample No. 4; Depth: 3,595 ft; 2,000X. Close-up view of fine grained carbonate matrix.

Murfin Drilling Co. #2 Elvin

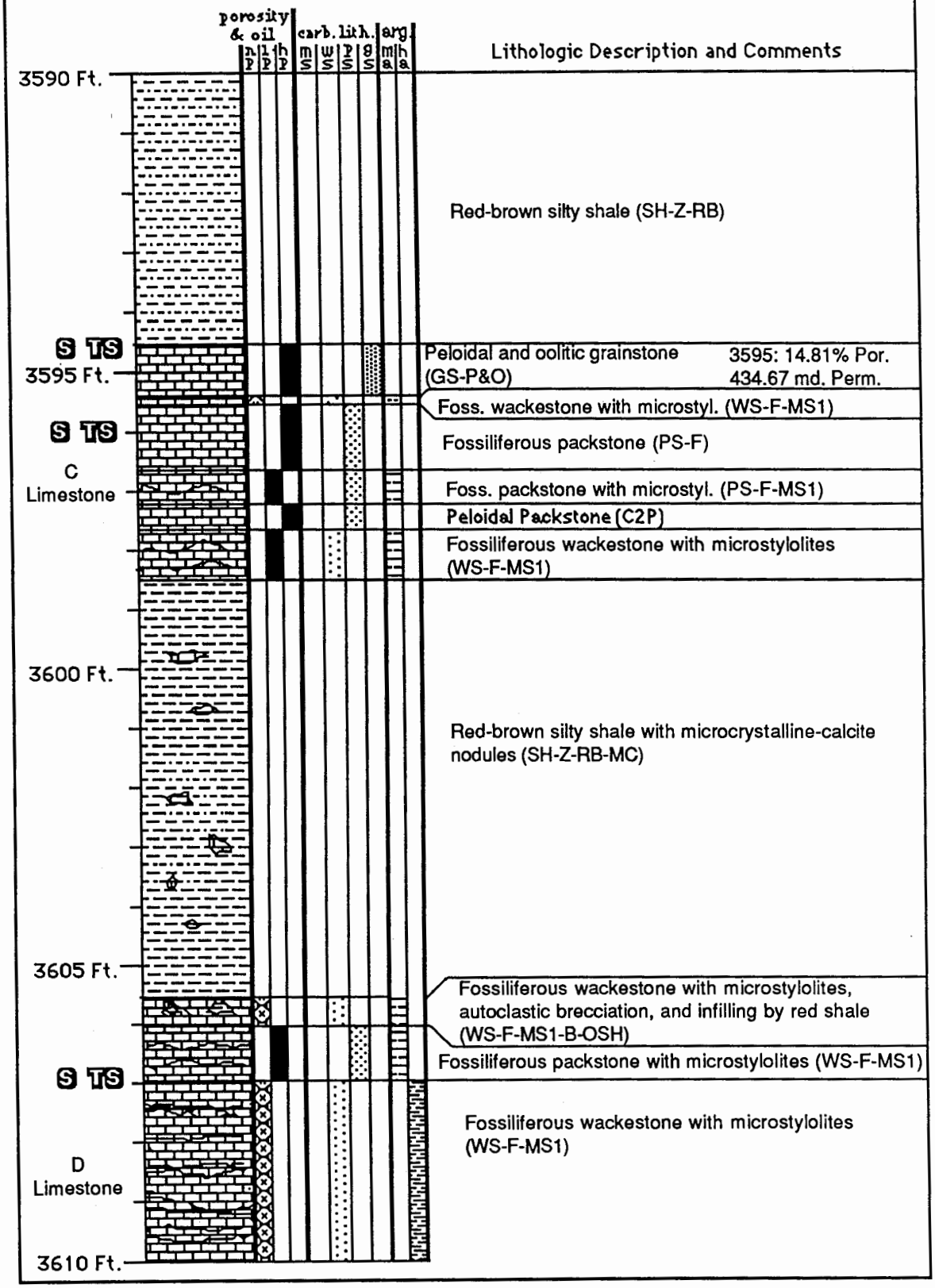
SE NW SE 14-3S-27W, Decatur Co., Kansas
Drilled and completed for oil prod. in 1978.
Perf. 3593-95.5 (3594.5-97 in Core Descr.),
IPP 152 BOPD + 8 BWPD.



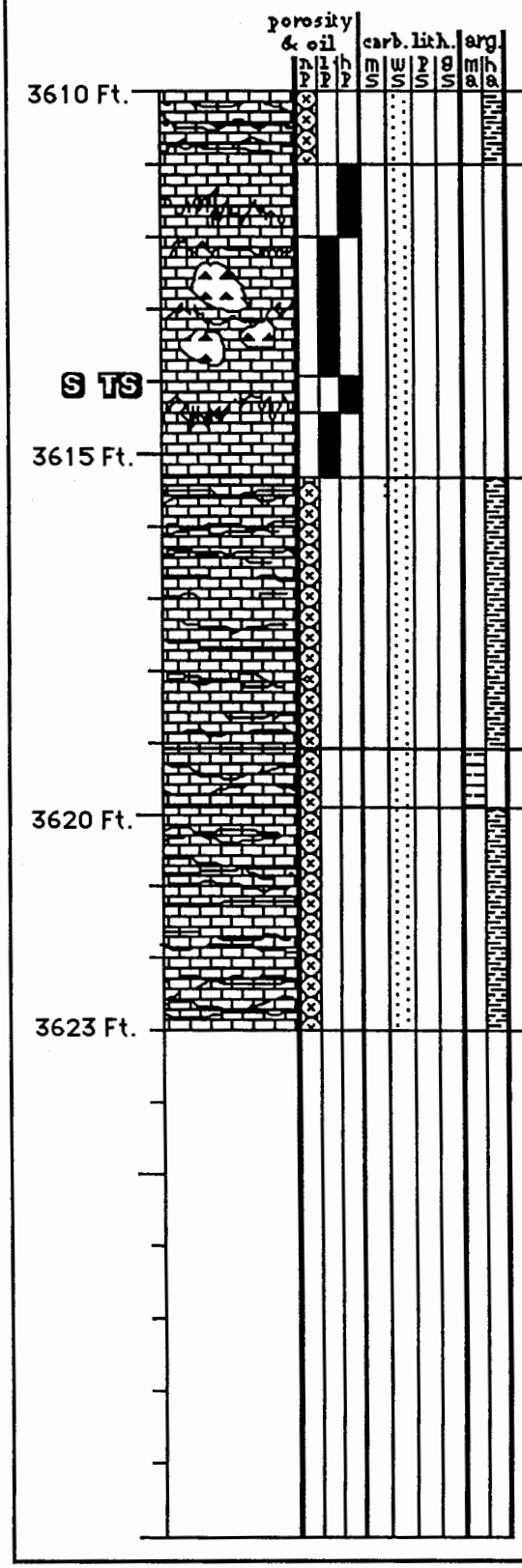
Murfin Drilling Co. #2 Elvin



Murfin Drilling Co. #2 Elvin

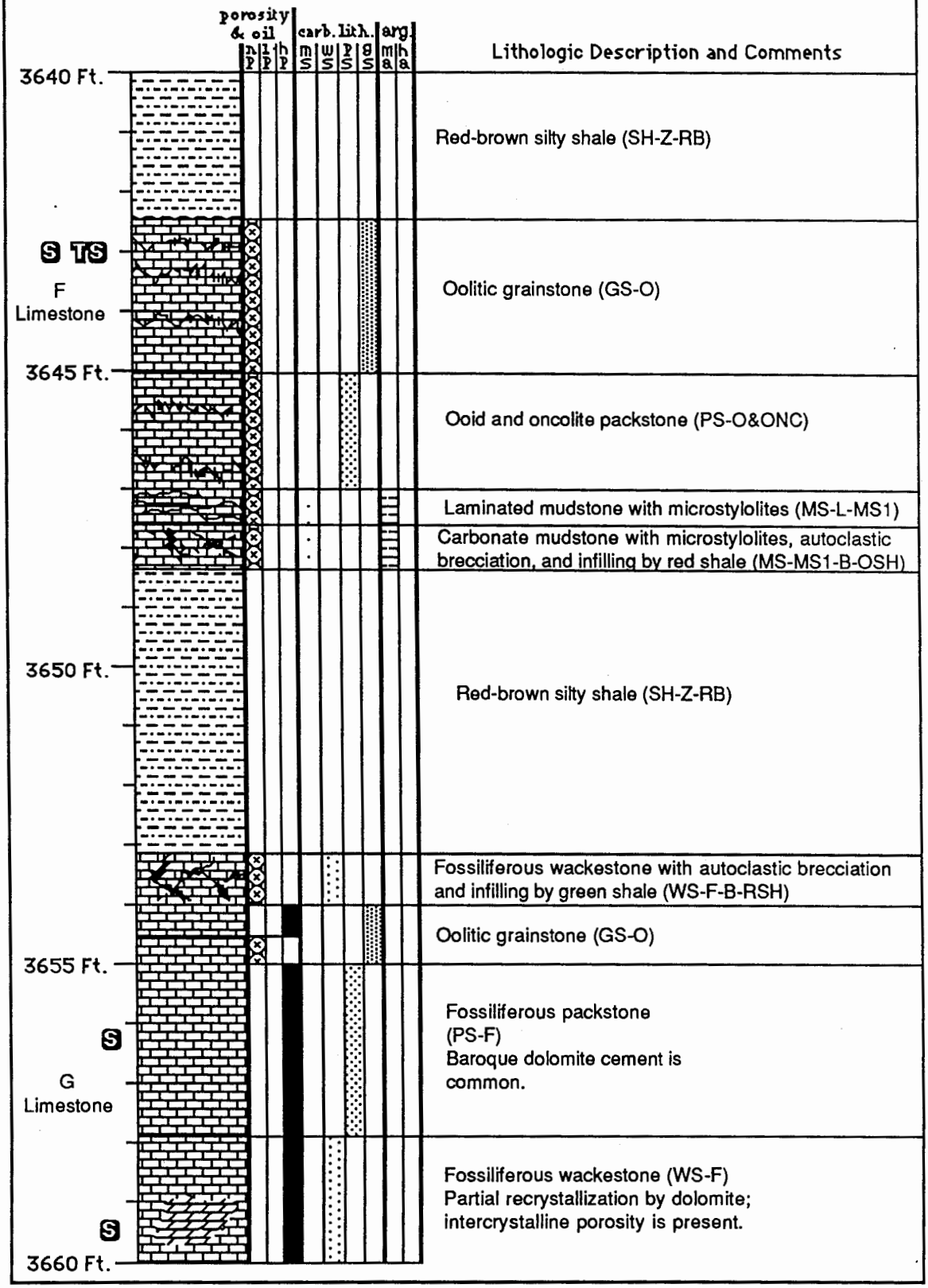


Murfin Drilling Co. #2 Elvin

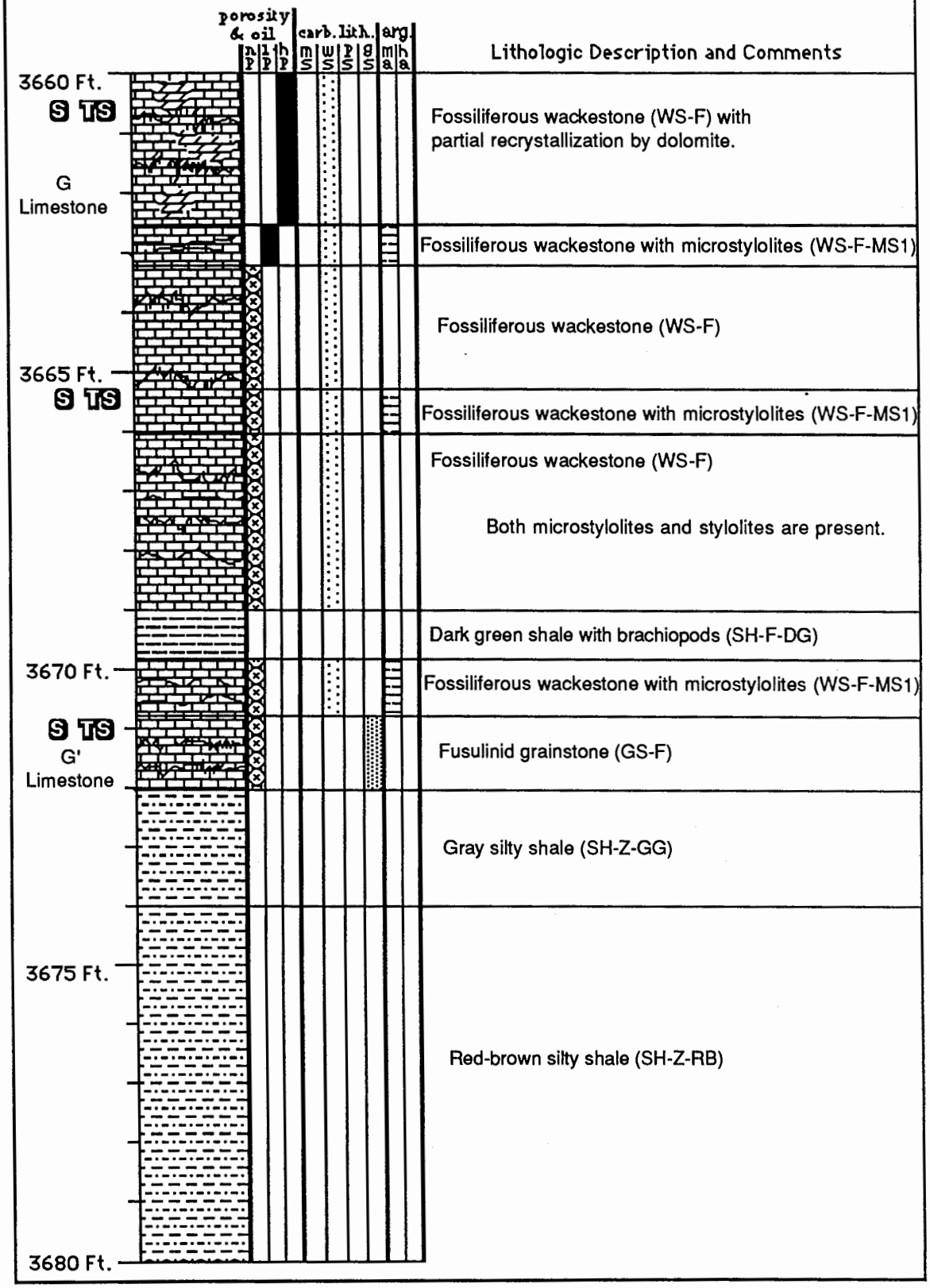


Lithologic Description and Comments
Fossiliferous wackestone with microstylolites (WS-F-MS2)
Fossiliferous wackestone (WS-F) Chert nodules and possible post-stylolite dissolution are present.
Fossiliferous wackestone with microstylolites (WS-F-MS2)
Fossiliferous wackestone with microstylolites (WS-F-MS1)
Fossiliferous wackestone with microstylolites (WS-F-MS2)
3623 Ft. to 3640 Ft. not cored

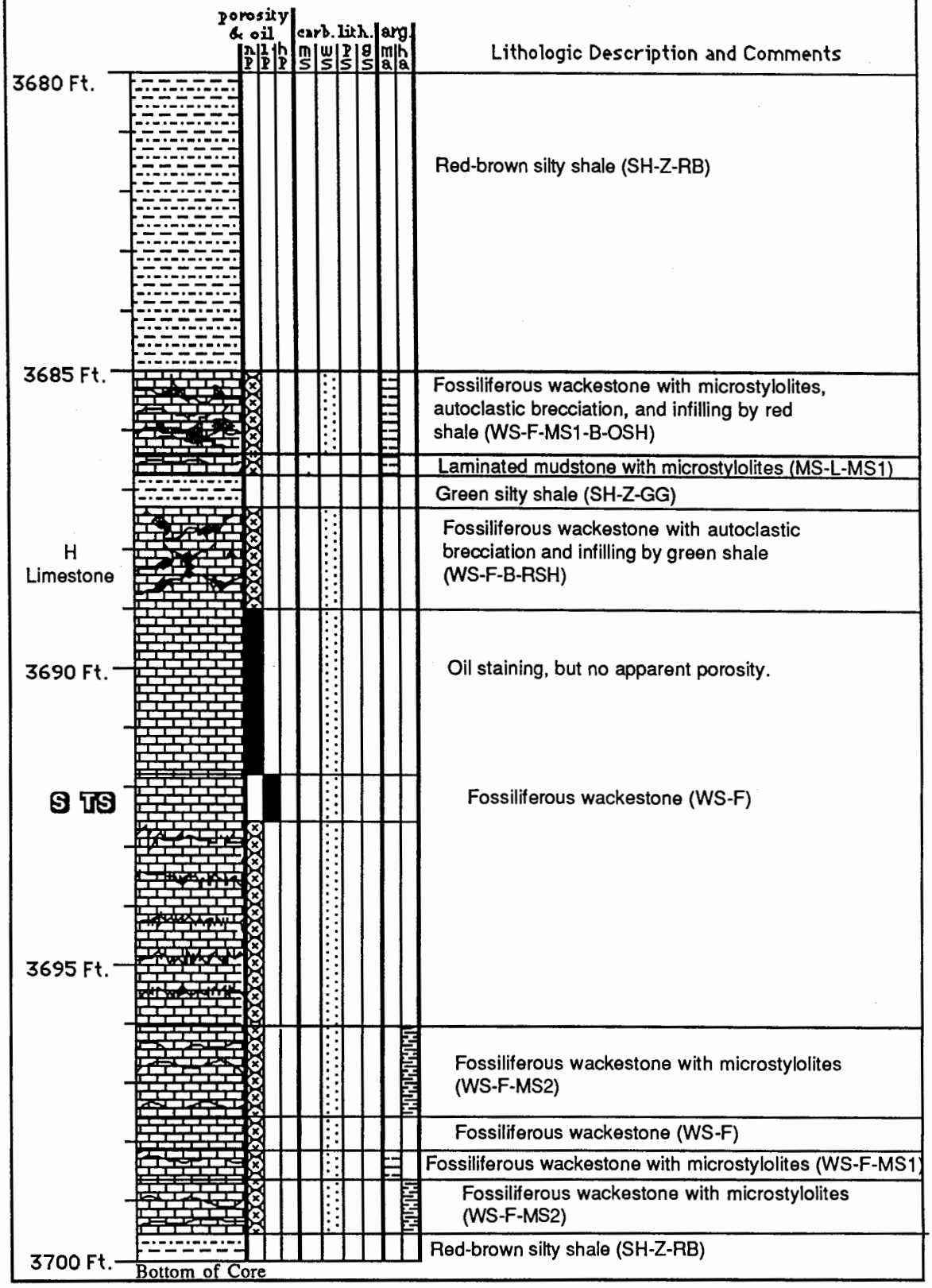
Murfin Drilling Co. #2 Elvin



Murfin Drilling Co. #2 Elvin

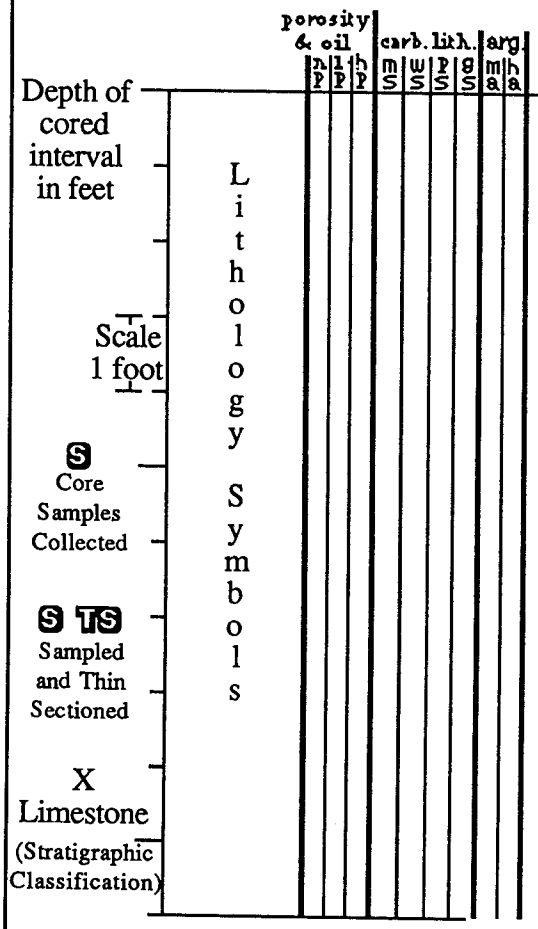


Murfin Drilling Co. #2 Elvin



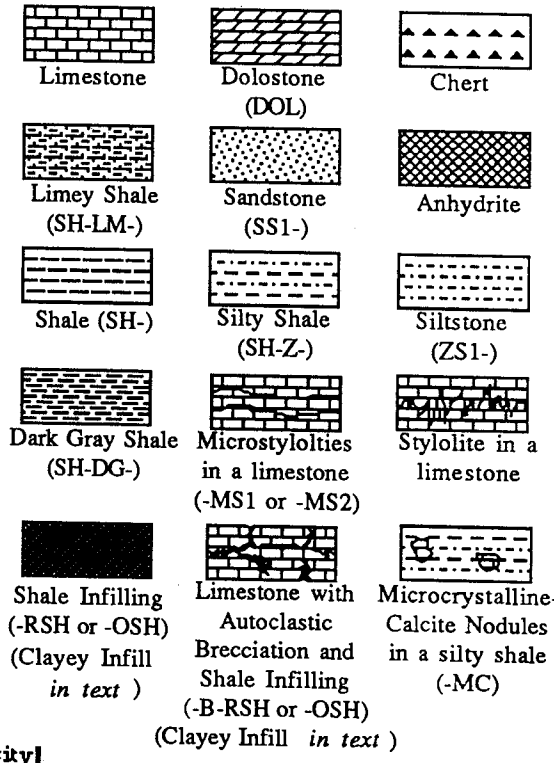
Operator, Well #, Lease Name of Core

Page # of core description

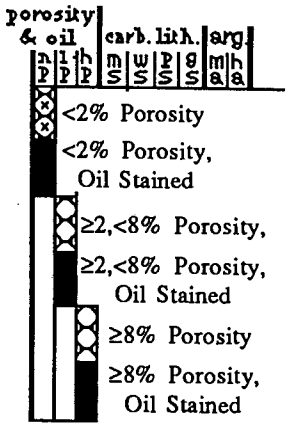


Lithologic Description and Comments

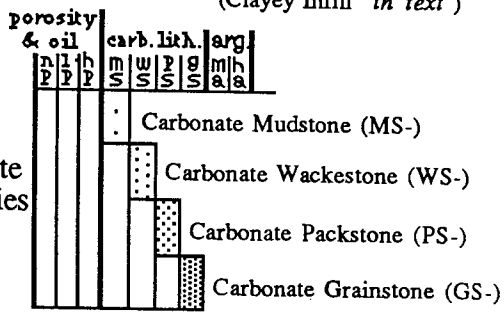
Lithology Symbols
(Abbreviated Classification)



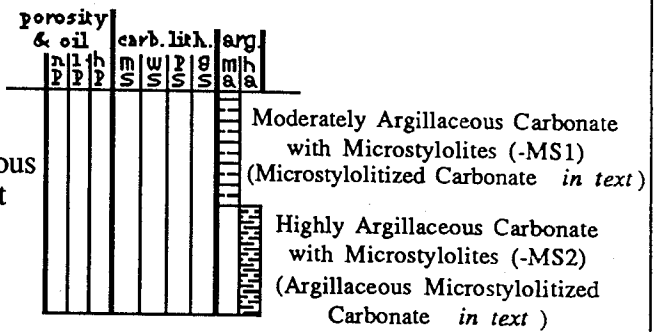
Porosity ranges based on visual estimates during core description

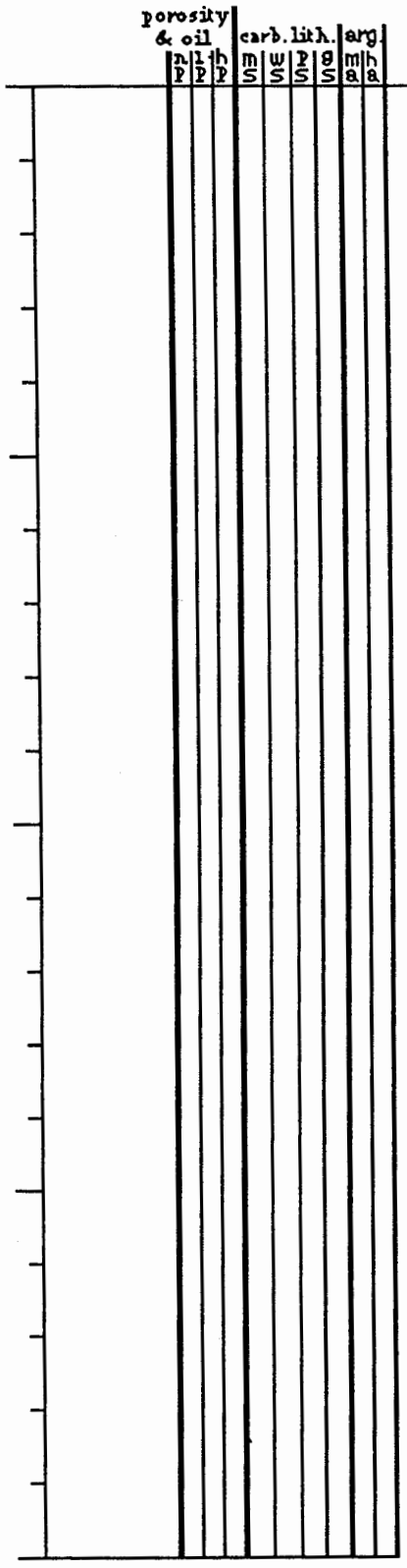


Carbonate Lithologies



Argillaceous Content





Lithologic Description and Comments

LITHOLOGY CLASSIFICATION

After the written description of each stratum, the lithology is classified by an abbreviated classification in parenthesis.

Carbonate Lithologies

(MS-) Carbonate Mudstone

(PS-) Carbonate Packstone

(WS-) Carbonate Wackestone

(GS-) Carbonate Grainstone

(DOL-) Dolostone

(LM-SH-) Limey Shale (Highly argillaceous microstylolitized carbonate *in text*)

Modifiers to Carbonate Lithologies

(-F) Fossiliferous

(-P) Peloidal

(-LM) Laminated

(-O) Oolitic

(-ONC) Oncolitic

(-FR) Fractured

(-MS1) Microstylolites (less argillaceous) (microstylolitized carbonate *in text*)

(-MS2) Microstylolites (more argillaceous) (argillaceous microstylolitized carbonate *in text*)

(-B) Autoclastic Brecciation

(-RSH) Infilling by Gray-Colored Shale

(-OSH) Infilling by Red-Colored Shale

} Clayey infill *in text*

Shales

(SH-) Shale

Modifiers to Shales

(-Z) Silty

(-F) Fossiliferous

(-RB) Red-Brown

(-GG) Gray-Green

(-DG) Dark Gray

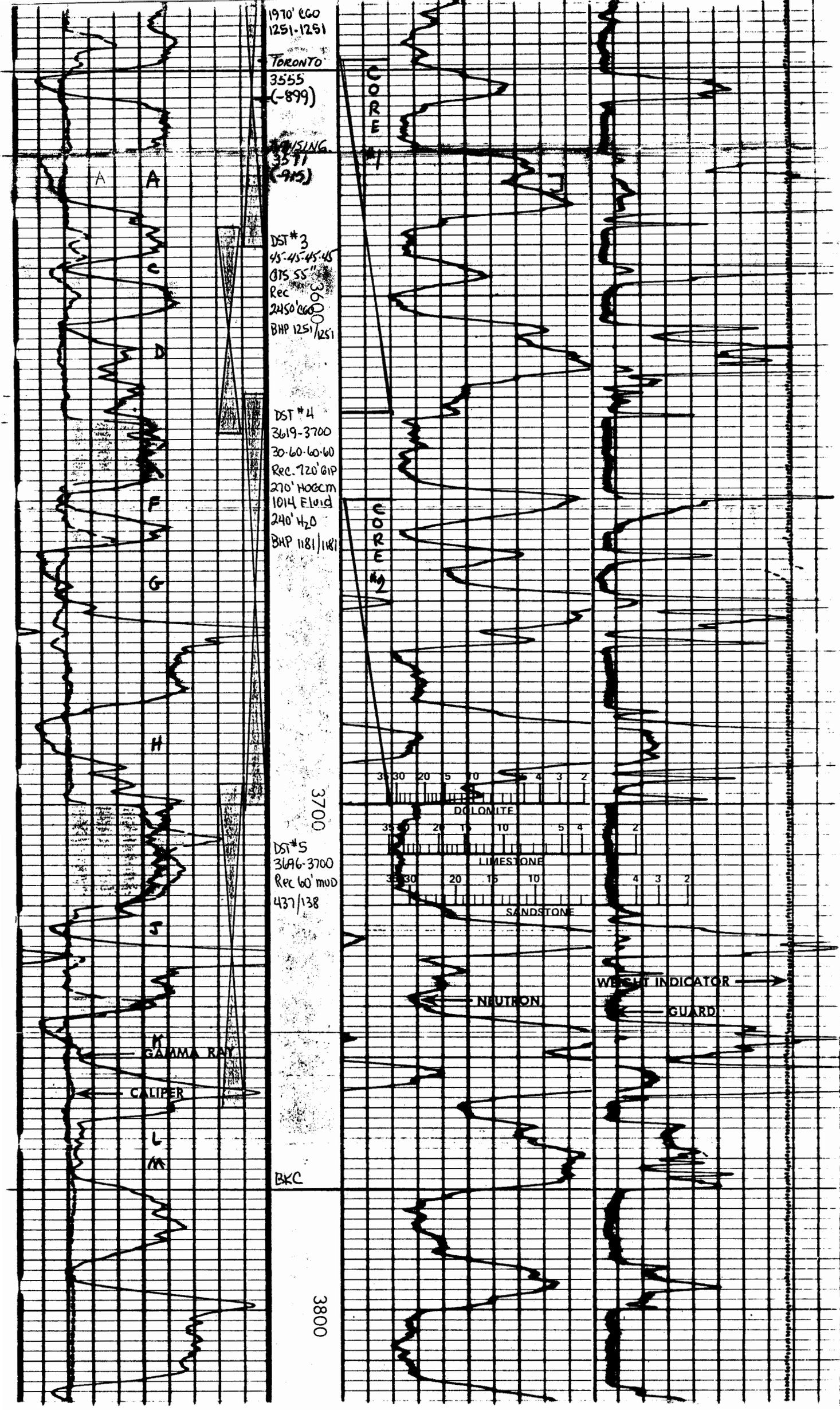
(-BL) Black

(-MC) Contains Microcrystalline-Calcite Nodules

Other Lithologies

(SS1-) Very-fine grained Sandstone

(ZS-) Siltstone


1970' CGO
1251-1251
TORONTO
3555
(-899)
MISSING
3571
(-915)
DST*3
45-45-45-45
GTS 55"
Rec
2450' CGO
BHP 1251/1251
DST*4
3619-3700
30-60-60-60
Rec. 720' GIP
270' HOCM
1014 Fluid
240' H2O
BHP 1181/1181
DST*5
3696-3700
Rec 60' mud
437/138
BKC
CORE #1
CORE #2
3600
3700
3800
A
C
D
F
G
H
J
K
L
M
GAMMA RAY
CALIPER
DOLOMITE
LIMESTONE
SANDSTONE
WEIGHT INDICATOR
NEUTRON
GUARD