UNITED STATES
DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

MORGANTOWN PETROLEUM RESEARCH LABORATORY
MORGANTOWN, WEST VIRGINIA

P#256

CORE ANALYSIS

Belden and Blake and Company - Limited Partnership, No. 15,
R. P. Smith and S. T. Evans Lease Well No. 4
S. S. Fry South Field, Rose Township, Sec 30
Carroll County, Ohio

SAND CORED: Clinton

INTERVAL CORED: 4882.5 to 4999.9 feet

CORE RECEIVED: 112.5 feet

DATE CORED: September 28 to October 6, 1966

DATE ANALYZED: October 4 to October 17, 1966

DATUM: Kelly Bushing

ELEVATION OF DATUM: 952.1 feet above sea level

TYPE OF CORE: 3-1/2-inch rotary

CORING FLUID: Salt-water base mud

CONDITION OF CORE: Sealed in plastic bags

CLAY STAINING TEST: Indicated no presence of montmorillonite clay

BUREAU'S WELL NOMENCLATURE: Reservoir Evaluation well No. 22

CORE DATA

Sample No.	Depth, ft	Air permeability, md	Porosity, pct 1/	Saturation, pct pore vol Oil	Saturation, pct pore vol Water	Oil content, bbl/acre ft	Bulk density, gm/cc 1/	Sand grain density, gm/cc 1/
			Clinton Stray Sand					
2750	4,888.9	2/ <0.1	0	0	100.0	0	2.69	2.69
2751	4,890.0	<.1	0.7	0	100.0	0	2.64	2.65
2752	4,891.0	<.1	2.3	0	66.7	0	2.59	2.66
2753	4,892.0	<.1	2.0	0	100.0	0	2.58	2.64
2754	4,893.0	<.1	.4	0	100.0	0	2.60	2.61
2755	4,894.0	<.1	3.6	0	91.7	0	2.56	2.65
2756	4,895.0	<.1	2.1	0	100.0	0	2.59	2.65
2757	4,896.0	<.1	.2	0	100.0	0	2.68	2.68
2758	4,897.0	<.1	2.6	0	100.0	0	2.56	2.63
2759	4,898.0	<.1	0	-	3/-	-	2.60	2.60
2760	4,899.0	.3	0	-	-	-	2.60	2.60
2761	4,900.0	<.1	.4	0	100.0	0	2.60	2.61
2762	4,901.0	<.1	.2	0	100.0	0	2.63	2.63
Average		<.1	1.1	0	96.2	0	2.61	2.64
			Red Clinton Sand					
2763	4,902.0	<.1	.1	0	100.0	0	2.70	2.70
2764	4,903.0	<.1	.6	0	100.0	0	2.59	2.61
2765	4,904.0	<.1	3.0	0	76.4	0	2.55	2.62
2766	4,905.0	<.1	1.3	0	100.0	0	2.73	2.77
2767	4,906.0	<.1	3.7	0	100.0	0	2.57	2.66
2768	4,907.1	<.1	1.2	0	100.0	0	2.59	2.62
2769	4,908.0	<.1	0	-	-	-	2.67	2.67
2770	4,909.0	<.1	0	-	-	-	2.62	2.62
2771	4,910.0	<.1	.4	0	100.0	0	2.60	2.61
2772	4,911.0	<.1	3.6	0	100.0	0	2.53	2.63
2773	4,912.0	<.1	3.5	0	100.0	0	2.54	2.63
2774	4,913.0	<.1	0	-	-	-	2.74	2.74
2775	4,914.0	<.1	0	-	-	-	2.60	2.60

1/ Porosity = $\frac{\text{Bulk volume - Sand grain volume}}{\text{Bulk volume}} \times 100$

As a result of rounding off numbers, in some instances slightly different porosity values would be obtained if density values were used in computing porosity.

2/ < less than.

3/ - no test run.

Sample No.	Depth, ft	Air perme-ability, md	Porosity, pct 1/	Saturation pct pore vol Oil	Saturation pct pore vol Water	Oil content, bbl/acre ft	Bulk density, gm/cc 1/	Sand grain density, gm/cc 1/
			Red Clinton Sand--(cont.)					
2776	4,915.0	2/ <0.1	4.5	0	92.6	0	2.53	2.65
2777	4,916.0	<.1	2.1	0	100.0	0	2.57	2.62
2778	4,917.0	<.1	3.9	5.1	87.0	15	2.55	2.66
2779	4,919.0	<.1	2.6	3.9	94.3	8	2.58	2.64
2780	4,920.0	<.1	2.8	3/ -	-	-	2.56	2.63
2781	4,921.0	<.1	3.0	3.4	65.5	8	2.56	2.64
2782	4,922.0	<.1	4.3	3.0	77.3	10	2.55	2.66
2783	4,923.0	<.1	4.6	0	67.0	0	2.53	2.65
2784	4,924.0	.1	6.8	.5	47.9	3	2.46	2.64
2785	4,925.0	<.1	5.5	0	45.4	0	2.50	2.65
2786	4,926.1	<.1	4.3	3.7	54.5	12	2.54	2.65
2787	4,927.0	<.1	4.5	0	46.1	0	2.53	2.65
2788	4,928.0	<.1	3.2	5.6	54.0	14	2.55	2.64
2789	4,929.0	<.1	1.3	0	100.0	0	2.61	2.64
2790	4,930.0	<.1	3.4	7.0	40.8	18	2.55	2.64
2791	4,931.0	<.1	3.5	0	44.0	0	2.55	2.65
2792	4,932.0	<.1	4.0	4.7	38.4	15	2.53	2.64
2793	4,933.0	<.1	4.1	6.5	35.7	21	2.54	2.65
2794	4,934.0	<.1	.6	0	100.0	0	2.59	2.61
2795	4,935.0	<.1	3.7	1.0	86.7	3	2.55	2.65
2796	4,936.0	<.1	4.2	0	42.0	0	2.59	2.70
2797	4,937.0	<.1	2.6	0	49.6	0	2.58	2.65
2798	4,938.0	<.1	2.4	14.0	72.1	26	2.58	2.64
2799	4,939.0	<.1	1.8	.8	83.6	1	2.60	2.64
2800	4,940.0	<.1	1.8	0	100.0	0	2.58	2.63
Average		<.1	2.7	1.8	75.8	5	2.58	2.65

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Sample No.	Depth, ft	Air permeability, md	Porosity, pct 1/	Saturation, pct pore vol Oil	Saturation, pct pore vol Water	Oil content, bbl/acre ft	Bulk density, gm/cc 1/	Sand grain density, gm/cc 1/
			First White Clinton Sand					
2801	4,941.0	2/ <0.1	3.0	3.3	86.0	8	2.56	2.64
2802	4,942.0	<.1	3.9	5.6	62.2	17	2.54	2.64
2803	4,943.0	<.1	5.9	22.0	23.8	101	2.48	2.64
2804	4,944.0	.2	5.8	20.0	29.4	90	2.49	2.63
2805	4,945.0	3/ -	5.0	15.7	34.3	61	2.51	2.64
2806	4,946.2	.1	5.8	7.0	35.5	32	2.50	2.66
2807	4,947.0	.3	5.5	14.7	26.7	63	2.49	2.64
2808	4,948.0	-	6.3	17.3	19.5	85	2.48	2.65
2809	4,949.0	-	5.9	17.0	22.0	78	2.49	2.65
2810	4,950.0	1.7	7.2	-	-	-	2.46	2.65
2811	4,951.0	.5	8.7	14.9	10.6	101	2.41	2.64
2812	4,952.0	.2	4.7	14.6	17.5	53	2.52	2.65
2813	4,953.0	.2	4.4	14.0	23.6	48	2.52	2.64
2814	4,954.0	.1	4.4	4.0	36.9	14	2.53	2.64
2815	4,956.2	.3	6.0	16.7	27.1	78	2.48	2.64
2816	4,957.0	.3	5.7	19.8	19.3	88	2.49	2.64
2817	4,958.0	.1	4.3	15.3	28.1	51	2.52	2.63
2818	4,959.0	.1	4.1	9.4	41.2	30	2.53	2.64
2819	4,960.0	.2	5.1	9.0	29.1	36	2.50	2.64
2820	4,961.0	-	5.4	18.0	21.7	75	2.50	2.64
2821	4,962.0	.2	4.9	.4	40.0	2	2.51	2.64
2822	4,963.0	.2	5.8	15.0	21.6	68	2.49	2.64
2823	4,964.0	.2	5.5	25.2	14.4	108	2.50	2.65
2824	4,966.4	.1	4.5	4.3	55.4	15	2.52	2.63
2825	4,967.0	.2	5.2	19.7	28.6	79	2.50	2.64
2826	4,968.0	2.4	7.4	20.6	15.8	118	2.46	2.65
2827	4,969.0	3.1	7.3	27.9	20.1	158	2.45	2.65
Average		.5	5.5	14.3	30.4	64	2.50	2.64

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Sample No.	Depth, ft	Air permeability, md	Porosity, pct 1/	Saturation, pct pore vol Oil	Saturation, pct pore vol Water	Oil content, bbl/acre ft	Bulk density, gm/cc 1/	Sand grain density, gm/cc 1/
			Second White Clinton Sand					
2828	4,982.4	2/0.2	1.7	3/-	-	-	2.62	2.67
2829	4,983.0	<.1	1.9	-	-	-	2.61	2.66
2830	4,984.0	<.1	5.4	-	-	-	2.51	2.65
2831	4,985.0	.1	2.0	-	-	-	2.72	2.78
2832	4,986.0	<.1	5.2	18.0	35.9	73	2.52	2.65
2833	4,987.0	.1	6.2	30.4	53.1	146	2.53	2.70
2834	4,987.9	<.1	2.0	53.9	31.4	84	2.60	2.65
2835	4,989.0	<.1	.8	0	100.0	0	2.83	2.85
2836	4,990.0	<.1	4.5	32.4	23.2	113	2.55	2.67
2837	4,991.0	.1	3.2	4.6	69.4	11	2.63	2.72
2838	4,992.0	<.1	4.4	24.8	25.0	85	2.54	2.66
2839	4,993.3	<.1	4.4	21.1	26.1	72	2.53	2.65
2840	4,994.0	.1	5.9	28.1	19.5	129	2.50	2.66
2841	4,995.0	-	1.5	0	100.0	0	2.70	2.74
2842	4,999.3	<.1	1.2	-	-	-	2.62	2.65
Average		<.1	3.4	21.3	48.4	71	2.60	2.69

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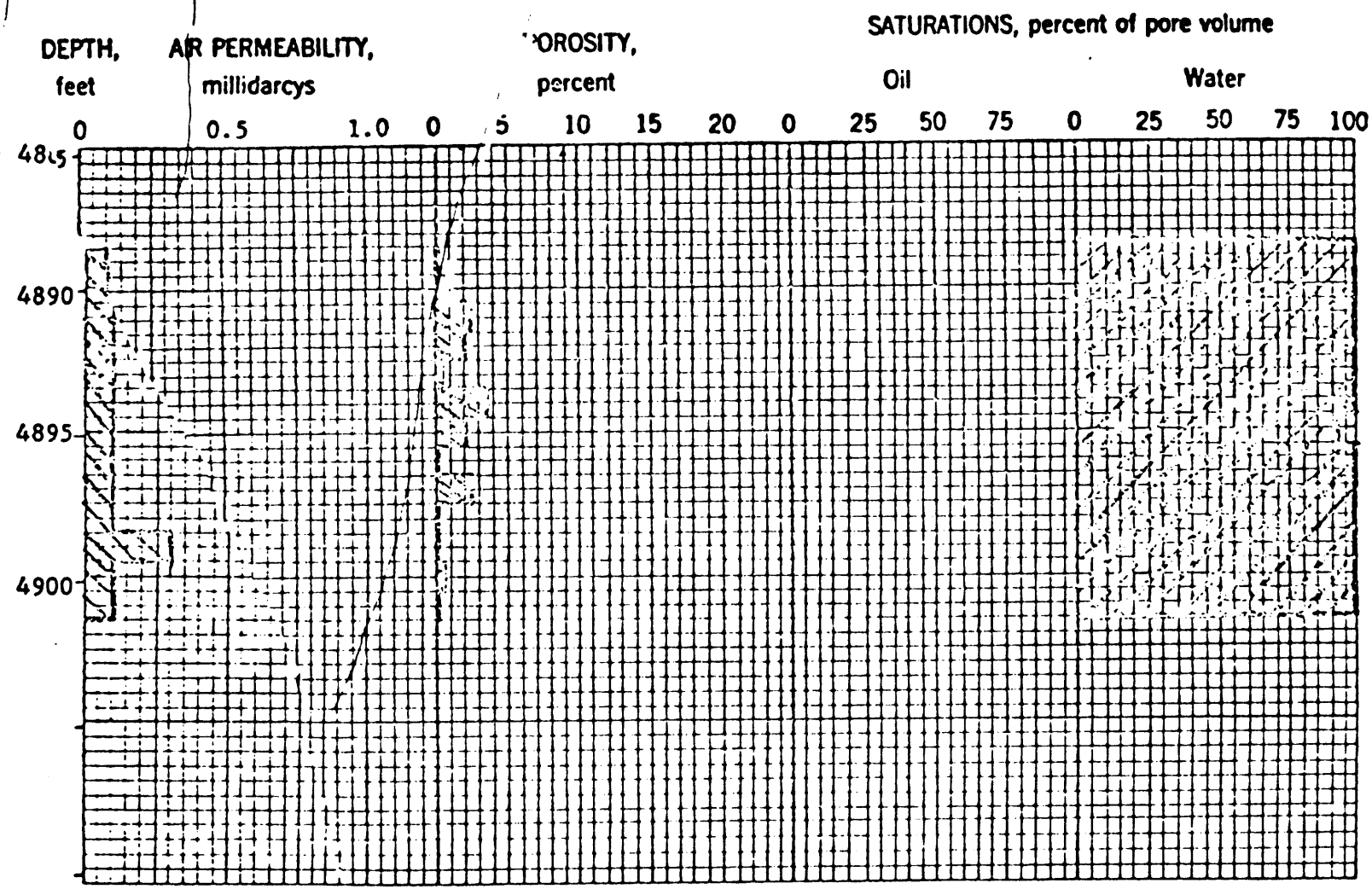
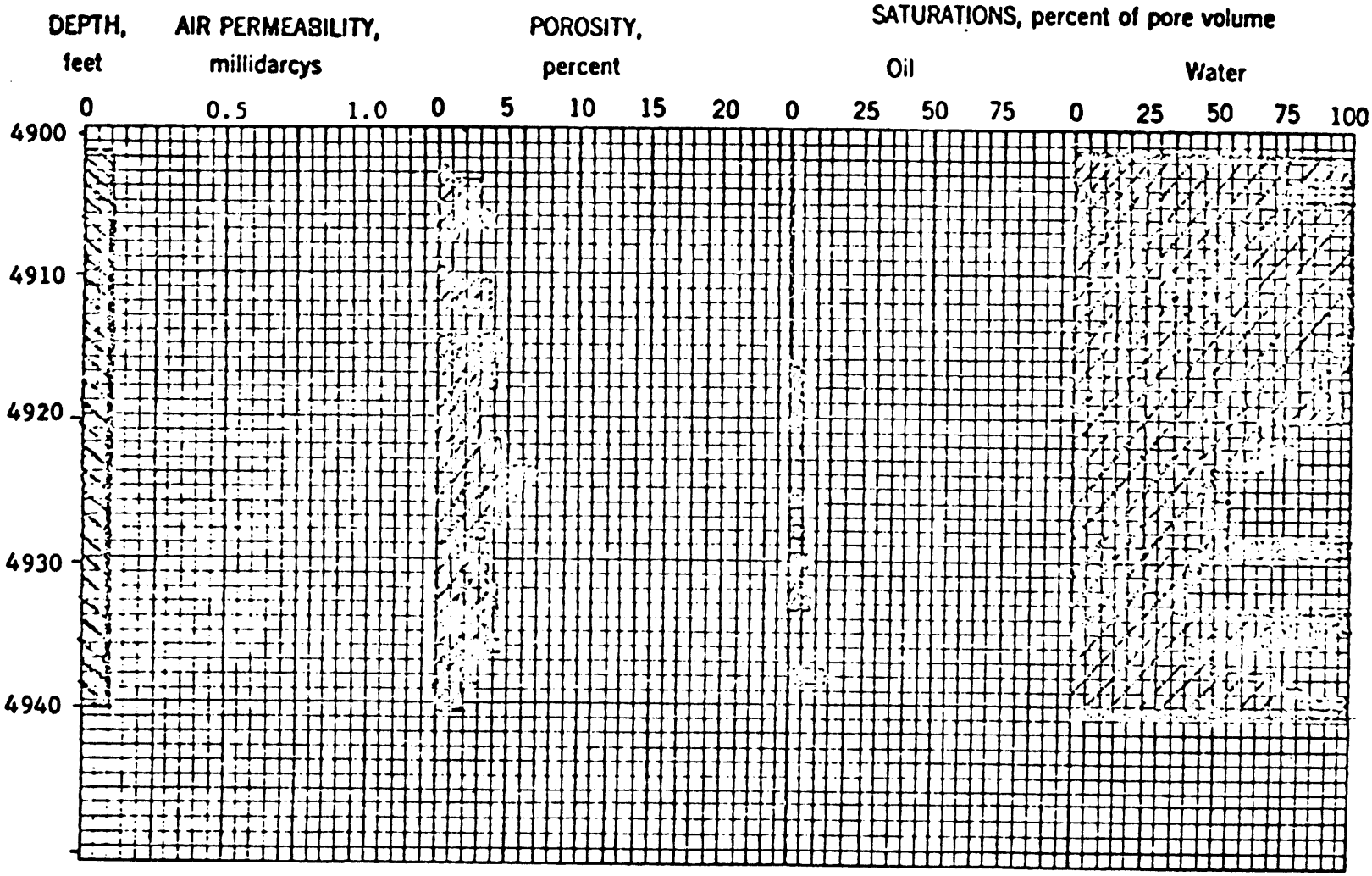
Clinton Stray Sand

PERMEABILITY, POROSITY AND SATURATION PROFILE



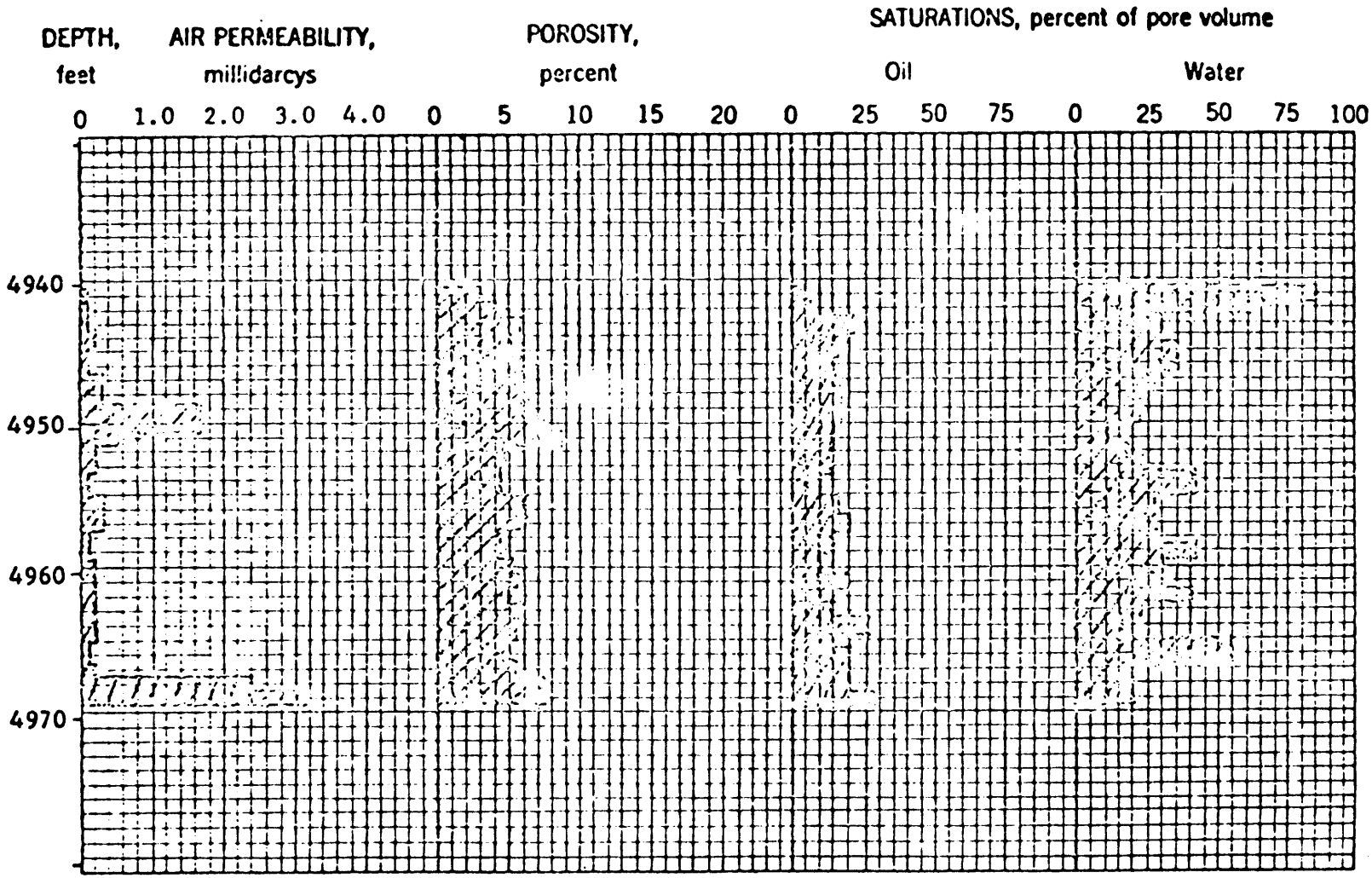
Red Clinton Sand

PERMEABILITY, POROSITY AND SATURATION PROFILE



First Clinton Sand

PERMEABILITY, POROSITY AND SATURATION PROFILE



WELL NAME Belden & Blake Smith-Evans No. 4 (DOE Code RE-22)

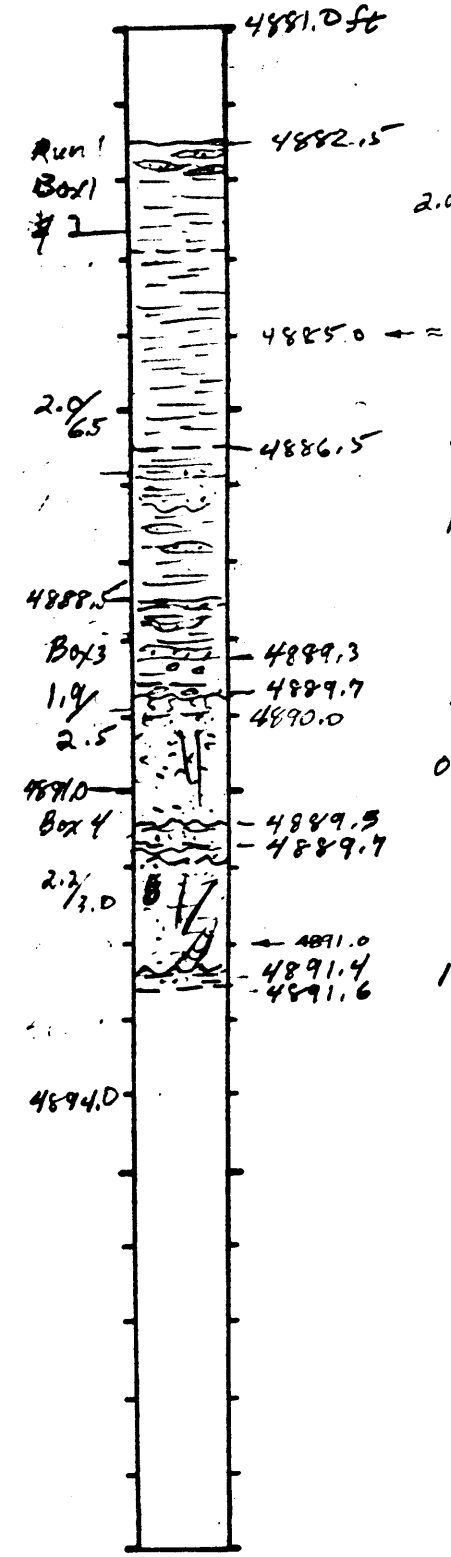
LOCATION 460 ft NL & 1800 ft EL of SW1/4 sec 30 S.S. Fry South Field, Rose Twp. COUNTY Carroll STATE Ohio

CORE NO. DOE RE-22 CORED INTERVAL 4882.5 — 4993.5 ft Clinton CUT _____ RECOVERED _____

DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

Arrows indicate samples taken for thin sections, etc.

INTERVAL ~~MIN~~/FT.



4882.5 — 4886.5?' Sh, MGy, Slightly STy; thin lam, flaggy partings S VF ss lam < 1cm thick in top 0.3 ft; Lt Gy, horiz thin lam & lenticular to flazer lam S burrows, 3mm diam & 1cm long; horiz or inclined to vertical. Grades into next below.

2.0?

4886.5 — 4889.3' Sh/ST-VF Sh MGy, STy, thin lam — lam; S shaly partings ST-VF as lam < 1cm thick composed of thin lam; contorted lenticular bedding, wavy, undulose; burrowed, load casts. Burrows < 1cm in diam; length < 1.5cm? Scattered burrows ≤ 3mm in diam, subhoriz in shalier parts; ST more abundant downward. Lower contact erosional, only slightly undulose.

1.8

4889.3 — 4889.7 Sh; STy; MGy w/ Gn Overtone; thin lam; parts on lam. Burrowed; ≤ 2mm diam; subhoriz. Lower contact irregular; contains < 1cm clasts of BrGy Cbnaceous material from below.

0.4

4889.7 to 4891.4 Ss; VF-F; mostly Lt GnGy — GnGy mottled by PGy DvPk/Mod BrGy. Mottled sand-size texture apparently a cementation effect. May contain interstitial clay. A qtz overgrowths. S lenticular to wavy lam in top 0.1 ft; no obvious bedding below but A burrows; differential cementation along burrows. Scattered Py blebs. Top 0.1 ft is sandy cbnaceous clay; contorted; contains Cbn fragments & Cbnized elliptic pellets ≤ 2mm long. Py blebs & flecks.

1.3

Burrow size increases downward?, or at least blebs from diff. cem. do. Fractures inclined 80° to vert, annealed by SiO_2? Lower contact irregular, sharp, erosional.

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4891.4 — 4891.6 SS//Sh; 80° ss [illegible] lam; Sh thin lam. Ss shows mottling from diff cementation, chiefly toward base; S load casts?; S burrows, 2-3 mm in diam, horiz. Qtz overg; dissem Py; lim speckles; S Bk Op. S vert fracs. Lower contact wavy, sharply gradational. A hairy salt on core, probably from salt-base drilling mud.

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460 ft NL & 1800 ft EL of SW 1/4 sec 30
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Clinton
CORE NO. RE-22 CORED INTERVAL 4882.5 – 4993.5 ft CUT _____ RECOVERED _____

DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

INTERVAL MIN/FT.

4891.0 4891.6 – 4893.8 ss. VF, Lt-Med Gy w/ lim stain. Contorted bedding & intense small-scale burrows in upper ft.
← 4892.0 2.4 Indistinct horiz bedding below. Burrowed throughout w/ diff cementation in lower half ft. Vert annealed fracs in three sets. Clay associated w/ contorted to brecciated parts. S large burrows, 1.5 cm diam, 6 cm long w/ concave up Spreite. Dissem Py blebs & along bedding. Lower contact irregular & molded to deformation structures in top of next below.
4892.8 ← 4894.0
4894 Box 5 4894.7
4895.0 4893.8 – 4894.7 ss. VF. VLt Gy – Lt Gy w/ lim stain w/ S Lt Gy Sh lam, horiz & contorted. Thin lam contorted by A burrowing. Burrows
3/2.5 0.9 ≤ 2 cm, inclined to vert, ≤ 15 cm long, Spreite concave up; contain Py blebs; blebs elsewhere ~~too~~ along lam. A SiO_2 Overg.
4896.5 Box 6 ← 4897.0 Annealed Vert fracs. Lower contact erosional, irregular, molded to contorted bedding below; burrows cross contact.
2.5/3.0 4894.7 – 4901.0 SS// Sh; 80% SS; VF// STy Sh; Lt Gy// Med Gn Gy.
6.3 SS mainly as beds ≤ 0.4 ft thick; Sh as beds & lams ≤ 0.1 ft thick w/ gradational contacts. In SS, lam to wavy lam & contorted; rip ups from sh. Wavy to flaser & lenticular bedding in shaly gradations.
4899.5 S rip-up clasts of ss along gradations to sh & vice versa.
Box 7 4900.0 ← A contorted bedding near base. Base ss at ~~4900~~ 0.9 ft layer showing horiz thin lam & diff cementation on horiz burrows
1.7/2.5 4901.0 ≤ 1 cm diam; clay poor w/ A SiO_2 cem; annealed Vert fracs.
4901.7 A contorted bedding near base. Lower contact sharp, irregular, erosional.
4902.0
Box 8 4901.0 – 4902.0 STy Sh; GyR// Gn Gy; thin lam but w/ flattened clay clasts
1.6/2.8 1.0 at top. Alternating color bands ≤ 0.1 ft thick; small slick fracs where clay clasts common. Grades sharply into below?
4902.0 – 4907.9 Ss. VF; GyR// GnGy – Lt OlGy. Bedding masked by GyR Fe oxide
4904.5 locally; elsewhere horiz to inclined & wavy lam; wavy concentrated toward
Box 9 4905.0 5.9 base. A Int clay; A Fe oxide & A SiO_2 cem, S Ss clasts w/ clay-rich
1.9/2.0 contorted lam; lenticular bedding near base; S burrows near base, 2 cm diam, ≤ 10 cm long; Spreite concave & convex up. Lower contact
4906.5 irregular, wavy, rip-up clasts of next below. Vert fracs throughout, some not annealed.
4907.9

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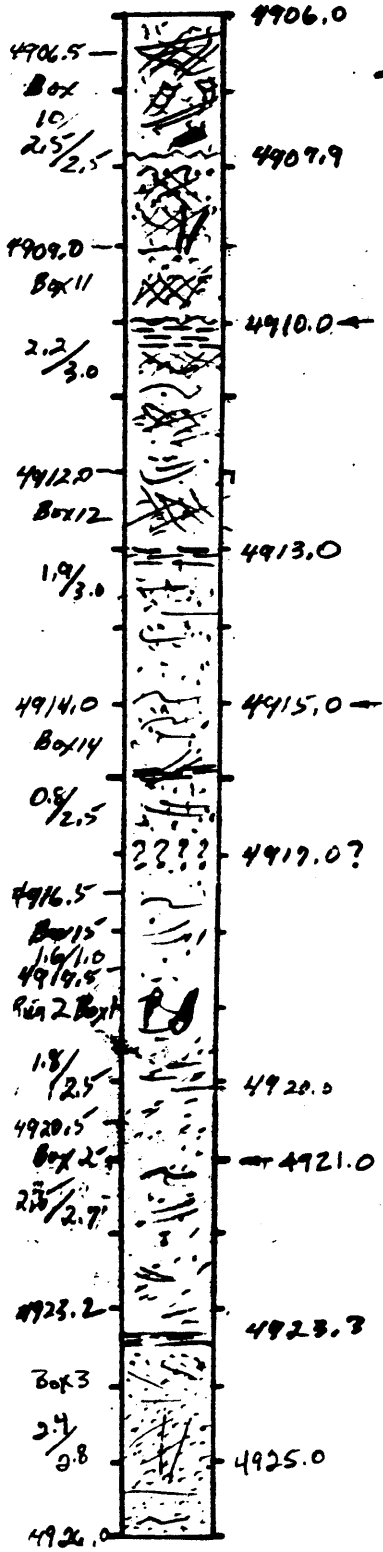
WELL NAME Belden & Blake Smith-Evans No. 4 (DOE Code RE-22)
460 ft NL & 1800 ft EL of SW 1/4 sec 30
LOCATION S.S. Fry South Field, Rose Twp. COUNTY Carroll STATE Ohio
CORE NO. RE-22 CORED INTERVAL Clinton 4882.5 — 4993.5 ft CUT _____ RECOVERED _____
DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

INTERVAL ~~MM~~/FT.



4907.9 — 4910.0 SS. VF; Gy R/Lt Ol Gy/Gy R & Lt Br Gy; Chiefly horiz lam. Top 0.1 ft contorted w/ Sty thin lam.
2.1 S mica flks; A qtz overg; A hematite w/ Int clay (?) except in Ol Gy parts. Vert & Ind fracs & some horiz fracs annealed w/ SiO_2 & salt. Much salt on core (heavy). Basal 0.1 ft has A sh pebbles & clasts of Gy R sh.

4910.0 — 4913.0 Sh/SS. Clayey/VF. Mod Gy R/LBr Gy — Lt Gy. Horiz lam/ripple lam & lenticular ripple lam, including
4910.0 — 3.0 small-scale trough. Variable int clay & Fe oxide; S clay fms along lam. A SiO_2 overg. A salt on core. S BR Op. Grades sharply into below. S mica flks, 2 burrows, 3mm diam, 2cm long, vert, at 4912.5.

4913.0 — 4917? Much core missing toward base. Sh/ss. Sh < 0.2 ft thick. Mod Gy R/LBr Gy — Lt Gy. SS as above except for
4.0? S DKG Gy lam & paler Fe-oxide stain. S Vert fracs at 4914; S RBr Sh lam near 4916.0

4917? — 4923.3 SS. VF; Alternating Lt Gy R — Lt Br Gy & Lt Ol Gy; Lenticular to wavy lam & lo ∠ X-lam; S horiz lam; S clay
4915.0 — 6.3? fms on some lam. Vert fracs, not annealed but coated by qtz overg & S gyp Xls < 1cm long. S poikiloblastic non-calc cement ≤ 1cm diam. S burrows w/ differential cementation at 4919. Lower contact sharply gradational to sh next below

4923.3 — 4923.4 Sh, Br Bk — Br Gy, Thin lam, silty. S mica flks. w/ S Bk Op. S Gyp or Anhydrite. Int hem.

4923.4 — 4926.0 SS. VF/VF-F. Gy R to Gn Gy & Lt Ol Gy.
1.6 Planar X-lam / horiz lam; X-lam. ∠ 20°, set boundaries almost horizontal. S. ilmi. specks; A. silica overgrowths; S. Bk Op; S. clay fms on bedding. Subvertical fractures, partly annealed, partly open. Basal 0.1 ft has lenticular lam and sharp contact with next below.

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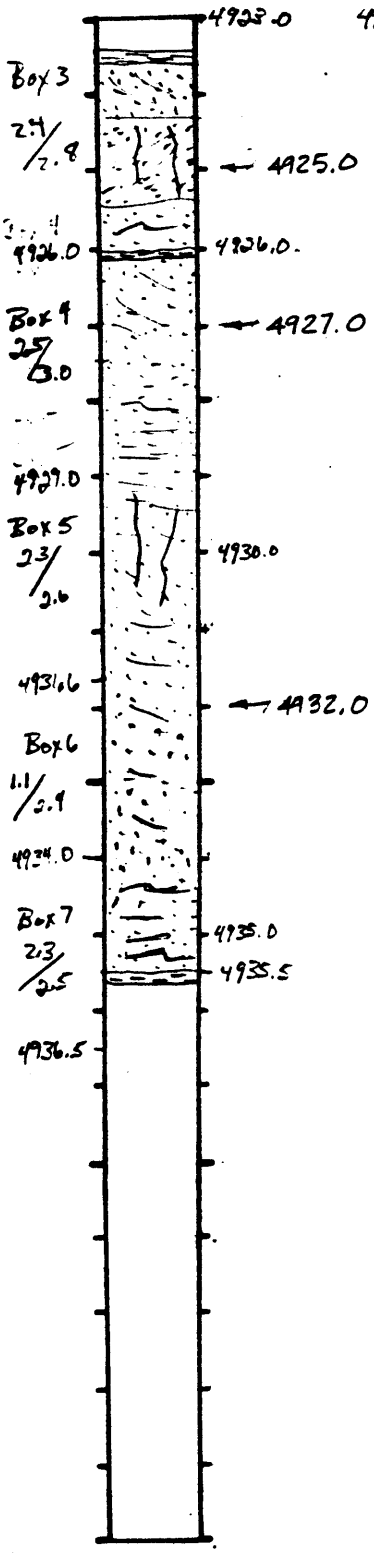
CORE NO. RE-22 CORED INTERVAL Clinton 4882.5 - 4993.5 ft CUT _____ RECOVERED _____

DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

INTERVAL ~~MPH~~/FT.



4926.0 - 4935.5? Sty Sh (0.2 ft)/Ss. Med Gy/Pk Gy - Gy Or Pk & PR⊙ VF-1% Sh has thin wavy lam⊙ Ss X-lam with Med Gy clay fms along lams; sets ≤ 1 ft thick w/ subhorizontal boundaries⊙ S horizontally lam Ss in sets < 1.0 ft. thick; indistinct lam near 4932.5 ft⊙ $ASiO_2$ overg; S interstitial clay locally; 1-2% Bk. Op; S. lim speckles (probably from core aging); S subvertical fracs, partly open & partly annealed⊙ Tr Sh pebble 1.5 ft above base⊙ Basal 0.6 ft thin lam showing lenticular bedding⊙ Sharp contact w/ next below⊙

9.5?

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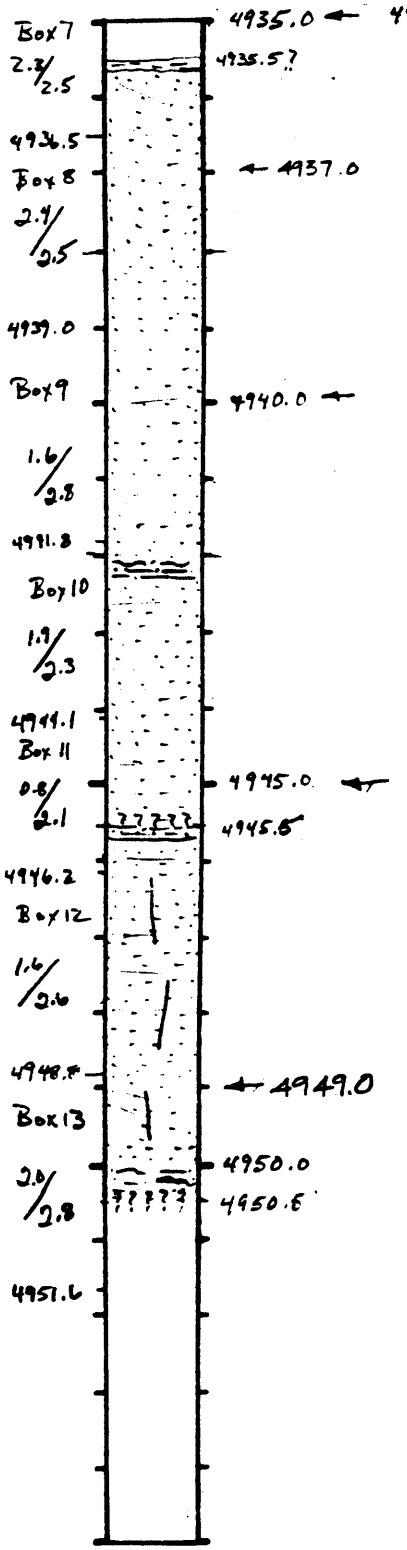
DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

INTERVAL MM/FT.



4935.5? – 4945.5? Sty Sh/Ss⊙ Med Gy/Pk Gy/Pk Gy – PR & PGy R/VLt Dl Gy – Gy Or Pk Sh – indistinct lam; S mica flakes⊙ Ss – VF/VF – F⊙ Bedding in SS most indistinct; low ∠ x-lam; S Med Gy clay fms; horizontal lam; Interbedded Sh at 4942.0, Dl Gy, sty, grades to Ss up and down, 0.2 ft thick⊙ thin lam and lenticular bedding in Ss⊙ A SiO_2 cem; S lim flecks; Tr Bk Op; S Int clay; S hem stain in Gy R parts; TR glauconite? S subvert fracs near 4930.0 and 4945.0; fracs at 4941.0 show calcite fms (later) and qtz overgrowths (earlier)⊙ Lower contact is sharp with next below, non-gradational.

10.0?

4945.5? – 4950.5? STy Sh/? Ss⊙ Med to Med Dk Gy/Lt Gy/VLt Gy – PR⊙ Sh, thin lam non-fissil; Ss, horizontally lam to thin lam and low ∠ planar lam⊙ S med Gy clay fms along lam, commonly slightly sty to lit; VF – F. S Int clay; S Bk Op; A silica overg; Tr Py. A Vert fracs near 4950.0. Lower boundary missing from core.

5.5

THE DIVISION OF GEOLOGICAL SURVEY MAKES NO AFFIRMATION CONCERNING THE COMPLETENESS AND ACCURACY OF THIS INFORMATION.

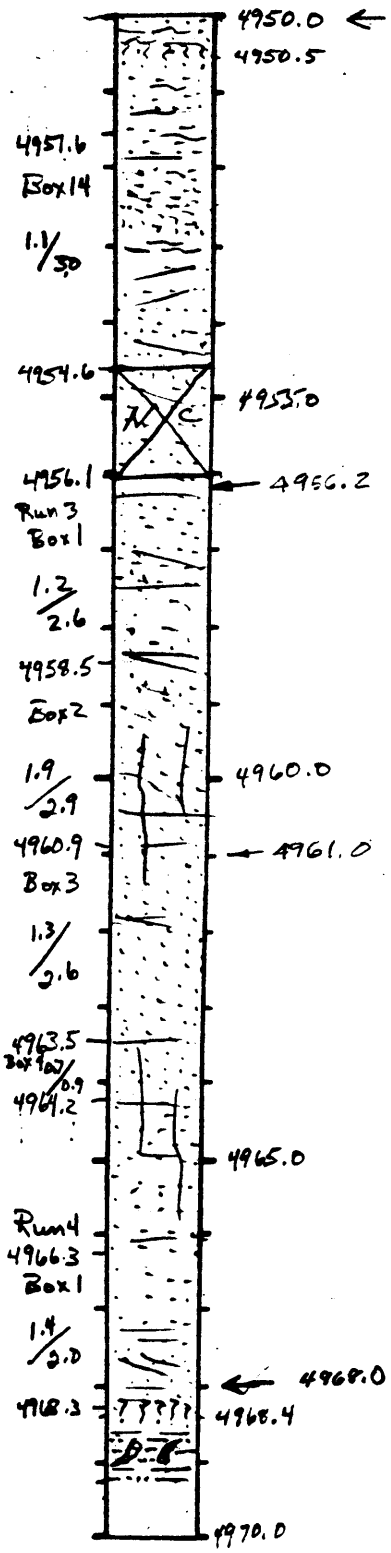
WELL NAME Belden and Blake Smith - Evans No. 4

LOCATION 460 ft NL & 1800 EL SW 1/4 sec 30 S.S. Fry south field, Rose Twp. COUNTY Carroll STATE Ohio

CORE NO. DOE RE-22 CORED INTERVAL Clinton 4882.5 - 4993.5 ft CUT _____ RECOVERED _____

DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

INTERVAL ~~MIN~~/FT.



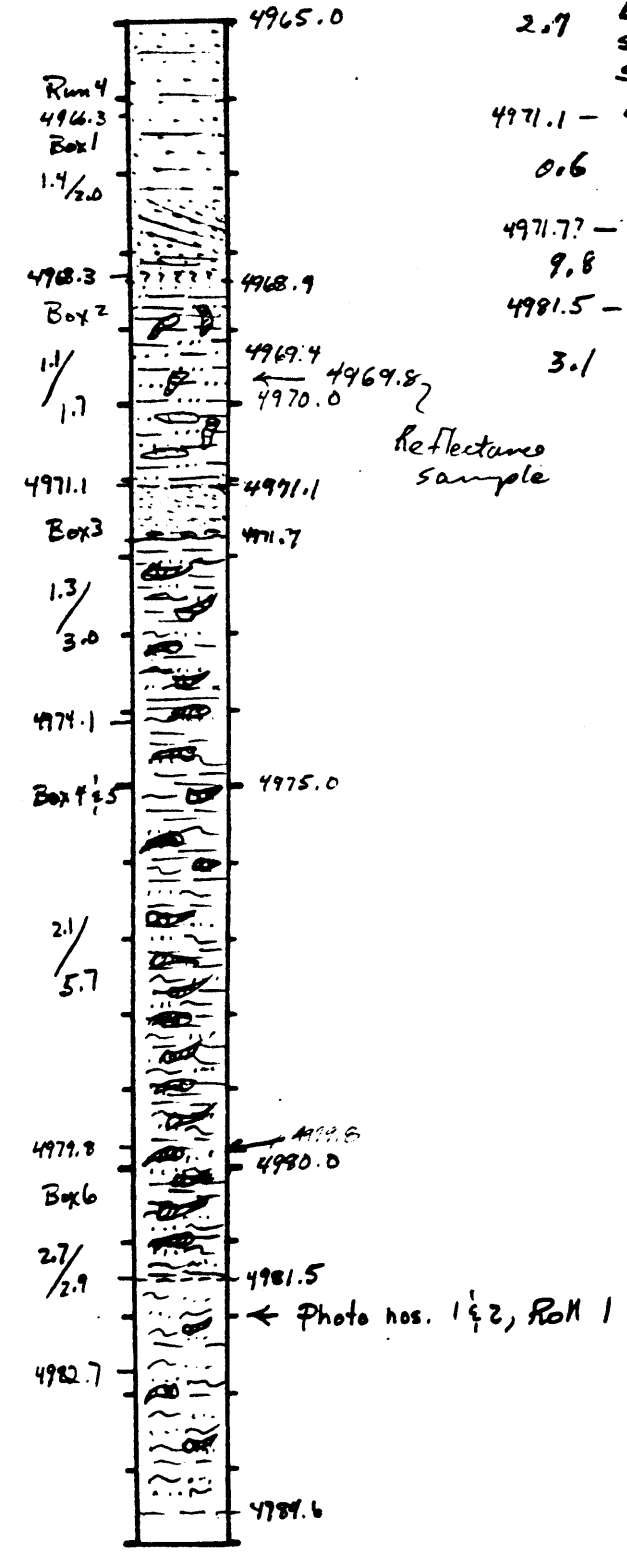
4950.5? – 4968.4? Ss; v Lt Gy – Gy; Vf – f. Subhorizontal, wavy lam and thin beds / low ∠ x-lam and high ∠ x-lam; mostly planar x-lam but S trough near 4954.0; sets ≤ 1 ft thick. Sh parting near 4953.0?, Med Gy; wavy lam; lenticular bedding where // ss. Scattered clay fms show stylolitic shapes. S dissem Cbnaceous flecks and fragments. A silica overg; TR BK Op; TR lim specks. S vertical fractures near 4960.0 and 4963.0 to 4964.0? No lower contact in core, probably sharp w/ Sh next below.

7.9

THE DIVISION OF GEOLOGICAL SURVEY MAKES NO AFFIRMATION CONCERNING THE COMPLETENESS AND ACCURACY OF THIS INFORMATION.

WELL NAME Beldon and Blake Smith - Evans No. 4
460 ft NL & 1800 ft EL SW 1/4 sec 30
LOCATION S.S. Fry South Field, Rose Twp. Clinton COUNTY Carroll STATE Ohio
CORE NO. DOE RE-22 CORED INTERVAL 4882.5 - 4993.5 ft CUT _____ RECOVERED _____
DESCRIPTION BY P.E. Franks, K.R. Frech, Kathy Brauer DATE May 19, 1981

INTERVAL	FEET/FT.	
4968.4 - 4971.1	2.7	Sh // ST. Med Dk Gy // Lt Gy; thin lam to lenticular bedding. Intensly burrowed; burrows ≤ 3mm diam, sub horiz, SH filled; S chitin? fms along lam (trilobite debris:). Contact w/ Ss below, not in core.
4971.1 - 4971.7?	0.6	ss. VF-F; VLt Gy; No obvious bedding; V well sorted. A SiO_2 Orang; S Bk Op; sharp, irregular contact with Sh next below; basal few mm contain sh clasts ≤ 1cm long.
4971.7? - 4981.5	9.8	Sh // ST as above (4968.4 - 4971.1). S. lim stain after Ry?; S pellets. Grades into next below.
4981.5 - 4984.6	3.1	ST // Sh, Lt Gy // Med Dk Gy. Lam - thin lam; lenticular bedding; suggestion of flazer bedding (?). S burrows, mostly horiz, < 3mm diam; ST filled. S sh clasts in some ST; S Vert burrows near top. S pellets. Grades into ss next below.



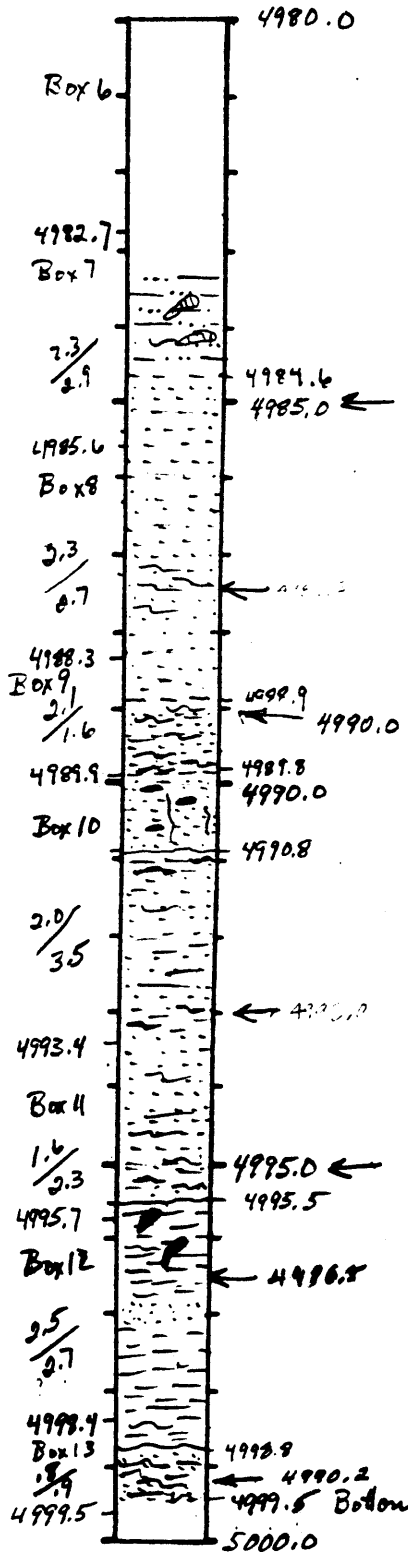
Reflectance sample

THE DIVISION OF GEOLOGICAL SURVEY MAKES NO AFFIRMATION CONCERNING THE COMPLETENESS AND ACCURACY OF THIS INFORMATION.

WELL NAME Belden and Blake Smith-Evans No. 4
460 ft NL & 1800 ft EL SW 1/4 sec 30
LOCATION S.S. Fry South Field, Rose Twp. COUNTY Carroll STATE Ohio
DOE Clinton
CORE NO. RE-22 CORED INTERVAL 4882.5 - 4993.5 ft CUT _____ RECOVERED _____

DESCRIPTION BY P.C. Franks, K.R. Frech, Kathy Bruner DATE May 19, 1981

INTERVAL ~~MIN~~/FT.



4984.6 - 4988.9 Ss, VF - F; VLt Gy - Med Lt. Gy; wavy - horiz & 1° ∠ X-lam; dominantly wavy. Scattered med. Dk Gy sh partings
4.3 and frasp A sh clasts and flecks; chitinous? or phosphatic shell debris on bedding surfaces. Contact w/ next below not preserved.

4988.9 - 4989.8 Ss, VF - F; Gy R - PR; scattered Dk Gy sh lam; Bedding is mostly wavy. X Scattered Gy R sh clasts &
0.9 pellets; A interstitial clay & lam; locally calc; Mod SiO_2 overg; contorted and lenticular bedding. lower contact missing from core.

4989.9 - 4990.8 Ss, Lt. Gy; VF; Thin lam - lam; S clay frms, slightly crenulated. S pellets strung out on bedding & S Clay
0.9 flags strung out on bedding. A gtz overg; S Bk. Op. S fractures, annealed and non-annealed. Contact with next below sharp and planar.

4990.8 - 4995.5 SS // Sh; VF SS // SiTy Sh; VLt Gy // Med Dk Gy Thin lam to indist' lam; wavy to crenulated to lenticular; Ss
4.7 as beds ≤ 0.6 ft thick - 1 cm thick. 75% Ss; Sh most abund near top and bottom. S vugs filled - partly filled with Pk xystalline non-carbonate. S scattered lim blebs; S scattered chitinous frags; S sub horiz burrows. Lower contact is sharp and planar. Sparse annealed subvertical fractures near 4998.0.

4995.5 - 4998.8 Sh (SiTy). Med Dk Gy; thin lam, fissile.
3.3 Bioturb with SiT filled burrows < 3mm diam, chiefly horiz. S SiTy lam. contorted VF ss bed near 4997.0. wavy contact with next below.

4998.8 - 4999.5 (bottom of core) SS // Sh; VF // SiTy; Med Lt Gy // Med Dk Gy. Like Ss and Sh up hole (4990.8 - 4995.5).

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ABBREVIATIONS USED IN CORE LOGS

Dr. Paul C. Franks, University of Tulsa

/	grades down into	—	to, ranges
//	interbedded or interlaminated with		

A	abundant	M, med	medium, medium-grained
Bk	black(ish)	Mod	moderate
Bl	blue, bluish	Op	opaque grains
Br	brown(ish)	Or	orange
C	coarse, coarse-grained	Overg	overgrowths
Calc	calcareous	P	pale
Cbn	carbon	Pk	pink(ish)
Cbnaceous	carbonaceous	Pp	purple, purplish
Cbnized	carbonized	Py	pyrite
Cem	cement(ed)	Qtz	quartz
Cly	clayey	R	red(dish)
Conc	concretion(s)	S	sparse
dissem	disseminated	Sid	siderite
Dk	dark	Sdy	sandy
F	fine, fine-grained	Sh(y)	shale, shaly
fks	flakes	slick	slickensided
fms	films	Ss	sandstone
frac	fracture	ST(y)	silt, siltstone, silty
ft	foot, feet	Tab	tabular
Gn	green(ish)	TR	trace
Gy	gray(ish)	Vert	vertical
Hem	hematite	Wh	white
horiz	horizontal	w/	with
incl	inclined	X-	cross-, as cross-laminated
lam	lamina(e), laminated	Xl	crystal
lim	"limonite"	Yw	yellow(ish)
Lt	light		

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