

TABLE 3—(Continued)

	WEBB COUNTY—Continued									WILLACY COUNTY						
Min. Tech. Lab. No.	60169	60170	60171	60172	60173	60174	60175	60176	60177	60183	60184	60185	60306	60307	60308	60309
Field locality No. ^a	8	9	10	11	12	13	16	17	18	1A	1B	1C	2	3	4	5
Free lime (carbonates)	Positive	Positive	Negative	Positive	Positive	Positive	Negative	Positive	Negative	Positive	Positive	Positive	Positive	Negative	Positive	Positive
Benzidine test	Blue	Blue gray	Blue	Negative	Gray	Greenish gray	Greenish blue	Gray	Dark blue	Blue gray	Bluish	Blue gray	Blue	Dark blue	Slightly blue	Slightly blue
Color (air-dried)	Greenish light buff	Purplish and greenish gray	Greenish buff	Red-brown	Dark buff	Buff	Light buff	Dark buff	Tan	Dark buff	Pinkish tan	Tan	Gray	Dark gray	Tan	Tan
Oil absorption—																
Calcare 450° C	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Air-dried	Slow	Slow	Medium	Medium	Medium	Fast	Slow	Slow	Medium	Medium	Slow	Slow	Fast	Fast	Medium	Medium
Moisture (H ₂ O-) (%)	7.48	5.94	9.91	8.69	5.36	4.47	8.65	3.30	6.87	5.36	5.14	5.41	3.26	4.14	3.92	3.49
Ignition loss—																
300–600° C (%)	3.17	2.73	3.74	4.36	3.63	3.04	2.50	4.16	2.73	3.94	4.43	4.40	4.59	2.05	6.07	5.92
105–1050° C (%)	9.58	15.82	6.24	10.24	8.64	9.10	5.43	13.61	7.17	5.40	13.27	13.97	12.32	4.03	10.79	15.35
Water of plasticity																
(Atterberg test)—																
Average (%)	104	76	81	64	76	54	161	35	66	63	80	70	45	40	62	58
Difference (%)	105	74	64	34	72	25	197	14	45	57	89	65	49	40	79	68
Swelling test (percent increase in volume)—																
In distilled water	546	320	Dispersed	250	310	68	623	12	196	127	309	346	115	90	164	86
In salt water	59	42	82	50	75	45	91	9	61	71	77	95	80	80	64	61
Slaking test (–100 mesh) (%)	92	83	79	36	50	17	86	72	62	53	44	89	25	33	25	24
Bloating test: 10 minutes at—																
2000° F	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
2200° F	....	....	Negative	....	....	....	....	....	Negative	Negative	....	....	....	....	....	....
2400° F	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Yield of 15 cp. drilling mud (bbl. per ton)—																
Untreated	Low	....	Very low	....	....	....	55	....	....	....	Very low	....	....	....	....	....
Treated with soda ash	Low	Very low	Very low	Very low	Very low	....	55	....	Very low	....	51	45	....	....	....	....
pH value	9.6	8.5	8.9	9.4	9.5	8.3	9.1	8.5	6.8	8.0	8.8	9.0	9.1	8.0	9.4	9.0
Decolorizing efficiency compared to AOCS official clays—																
Natural with natural (%)	Very low	....	43	....	....	....	27	....	....	....	25	....	....	....	....	....
Activated with activated (%)	45	....	49	....	....	....	79	....	....	....	15	....	....	....	....	....
Firing test—																
Powder—2200° F (1204° C)	Dark brown Fused	Dark brown Fused	Light brown Vitrified	Red-brown Sintered	Light brown Fused	Light brown Fused	Dark brown Fused	Light brown Fused	Dark red-brown Steel hard Black Fused	Brown Fused	Buff Sintered Friable Dark brown Fused	Buff Sintered Friable Dark brown Fused	Buff Fused	Red-brown > Steel hard	Buff Fused	Brown Fused
2400° F (1316° C)	....	....	Dark gray Fused	Black Fused	....	....	....	....	....	....	....	....	....	Dark brown Vitrified	....	....
2600° F (1427° C)	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Disks, ½-inch diameter—																
(Approx. cone 02) 2000° F (1093° C)	....	....	....	Red brown > Steel hard	....	Buff > Steel hard	....	....	....	Red brown > Steel hard	....	....	....	....	....	....
(Approx. cone 7) 2200° F (1204° C)	....	....	....	Dark brown Fused	....	Greenish gray Fused	....	....	....	Dark brown Fused	....	....	....	....	....	....
(Approx. cone 15) 2600° F (1427° C)	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Loss on ignition at—																
105–300° C	0.66	0.99	1.49	1.23	0.90	1.94	1.53	1.05	1.64	1.97	1.39	1.32	1.48	1.63	1.73	1.65
300–450° C	0.19	0.45	1.01	1.04	0.87	0.91	1.04	1.86	1.09	0.91	0.77	0.79	1.15	0.83	1.27	1.31
450–600° C	2.98	2.28	2.71	3.32	2.76	2.13	1.46	2.30	1.64	3.03	3.66	3.61	3.44	1.22	4.80	4.61
600–900° C	5.55	11.88	0.92	4.51	3.92	4.04	1.12	8.16	1.05	2.43	7.44	8.24	} 6.25	} 0.35	} 2.99	} 7.78
900–1050° C	0.19	0.22	0.11	0.14	0.16	0.08	0.28	0.24	1.75	....	0.01	0.01				
Neutralization value as CaCO ₃	15.4	29.4	....	15.8	15.2	12.5	....	24.8	....	10.2	22.8	23.7	22.3	....	17.4	28.4

Remarks^b (samples arranged by Min. Tech. Lab. numbers)—

No. 60169 The oil decolorizing capacity of the acid activated clay is 45% compared to AOCS official activated earth.

No. 60170 NIIU as a clay. Contains 29.4% carbonates NV.

No. 60171 A subbentonite which, when acid-activated, is an oil decolorizer 49% as efficient as the AOCS official activated earth. FTR. Low yield of drilling mud even after treatment with sodium carbonate.

No. 60172 NIIU as a clay ECB. Contains 15.8% carbonates NV.

No. 60173 NIIU as a clay. Contains 15.2% carbonates NV.

No. 60174 NIIU as a clay. Contains 12.5% carbonates NV.

No. 60175 This bentonite is a premium drilling clay with a yield of 55 barrels of 15-cp mud per ton of air-dried clay. Treatment with 2.5% sodium carbonate did not increase this yield. It may be possible to increase this yield by varying the chemical treatment. FTR. The oil decolorizing capacity of this clay is high after acid activation (79% compared with the AOCS activated official earth).

No. 60176 NIIU as a clay. Contains appreciable amounts of silt and 24.8% carbonates NV.

No. 60177 Tested as a drilling mud, this clay shows very low yield even after treatment with sodium carbonate. NIIU.

No. 60183 NIIU as a clay. ECB. Contains 10.2% carbonates NV.

No. 60184 A bentonite capable of yielding 51 barrels of 15-cp drilling mud per ton of clay treated with sodium carbonate. It might be possible to increase this yield by varying the chemical treatment. FTR. The oil decolorizing capacity is very low (15%) even after acid-activation. Contains 22.8% carbonates NV.

No. 60185 A bentonite of low yield of drilling mud even after treatment with sodium carbonate (45 barrels/ton). Contains 23.7% carbonates NV.

No. 60306 NIIU as a clay. A silty calcareous clay containing 22.3% carbonates NV.

No. 60307 NIIU as a clay. A silty clay.

No. 60308 NIIU as a clay. A silty calcareous clay containing 17.4% carbonates NV.

No. 60309 NIIU as a clay. A silty calcareous clay containing 28.4% carbonates NV.

^a See Plate 2 for location.

^b The following abbreviations are used:

AOCS=American Oil Chemists' Society.

FTR=Further testing by a specialized laboratory is recommended.

NIIU=No important industrial (or commercial) use.

NV=Neutralization value expressed as calcium carbonate.

ECB=With the possible exception of common brick. Clays containing as high as 20% carbonates have been included in this classification because there are several plants in operation in Texas producing brick from such clays. Normally it is not desirable to use clays containing more than 3% carbonates (U.S. Bureau of Mines Bulletin 565). The presence of excessive carbonates (lime and magnesia) causes undue shrinkage and shortening of the firing range. Closely regulated firing is required to overcome the latter.

15-CF=15-centipoise.