

Boring B-4

Lemon Lane (cont.)

0000004

EPA Region 5 Records Ctr.



224138

Q#	Box #	Row #	Top	Bottom	Recovery	Description
7	2+3	2	<del>55.7</del> 60.2	<del>64.5</del> 65.3±	<del>4.0</del> 4.5	

limestone, same, ~~ends of close~~  
 solution in vug &  
 solution .6 to 1.0 from top, see  
 high angle breaks. (60.5-61.7)

limestone fine grain, brown (sil  
 appearance) medium hardness -  
 solution at base of unit (61.7-62)

limestone, very fine grain, sub-  
 lithographic, light brown,  
 numerous high angle joints with  
 solution along joints in upper 1.1  
 lower 1.0 grades to softer stone  
 (possible loss in upper part 62.2-65.2)

end of run 68.7  
 loss of 1.6 from mud at top  
 run

3 3 65.3± 68.7  $\frac{1.6}{3.4}$

mud-silt, tan to yellow, cave fl  
 (65.3± - 66.8)

limestone, fine grain, crystalline,  
 brown soft (66.8-66.85)

(, 85-67.4) limestone, breccia, annealed caliche

file #	Box #	Row #	Top Bottom	Bottom
12	3+4	5+1	80.3	

Shale, black, organic (core broken) (84.65-84.75)

limestone, gray, hard (84.75-85.0)

shale, hard, black to olive (core intact) (85.05-85.35)

limestone, fine grain, hard, grey to shale top + bottom (85.35-85.75)

shale, hard, black, organic, ? (broken core) (85.75-85.95)

limestone, fine grain, hard, grey - dark grey, (85.95 - 86.55)

1 5.8' well screen

1 30' pc 2" pipe

1 26.3' " " "

1 21.4' " " "

1 4.25' " " "

Stick-up 3.1'

bottom of screen at 84.6'

well to 74.6± (from bottom)  
 bridge at ≈ 20" - bentonite seal at ≈ 19"

Box #	Row #	Top	Bottom	Sec.	Description
3+4	5, 1	80.3	86.2		lime, redullid fragment loss (80.3-80.4)

limestone, fine grained  
matrix with clasts,  
fine to med. bedded?,  
hard, grey (80.4-80.8)

limestone, fine grain, fine  
bedded or laminated, grey  
with light grey streaks,  
argillaceous in part (80.8-8)

limestone, fine grained, hard, grey  
green spots, badly broken  
core (loss? estimated at  
in upper .5) (82.55-83.4)

shale, black, laminae,  
(83.40-83.50)

limestone, fine grained,  
grey-base weather  
(83.50-84.05)  
VOID (84.05-84.2)

limestone, fine grai

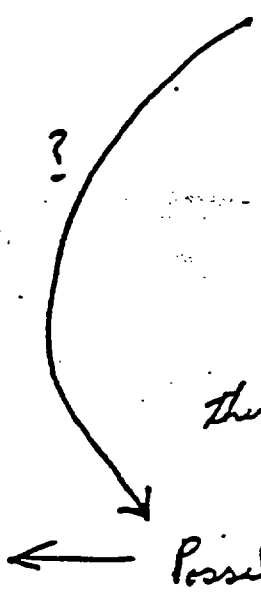
Core Box Row Top Bottom

3 4,5

76.3-80.3  $\frac{2.65}{4.0}$

limestone, very fine grain, hard, light brown to gray. (76.1-77.1)

Void (76.3-~~77.1~~<sup>77.65</sup>) - possible at a few inches lower - top of next unit recovered as ceiling had fallen into void



Limestone, fine grained, crystalline, hard, dark grey to brown, some thin glauconite layers at base - top recovered (~~77.5-78.95~~) (77.65-77.80)

Limestone, fine grained, hard, light brown & gray - top of unit gone away (~~77.75-78.50~~) (77.80-78.35)

Shale, organic, black (~~77.5-78.5~~) (78.35-78.4)

Limestone, fine to med. grain, hard (78.40-~~80.0~~) (79.25)

Limestone, very fine grain (most vent joints filled with very thick calcite, possible "eyes" of calcite dark green in lower part (~~79.5-80.5~~) (79.25-80.3)

Box	TO ELEV. Rem.	SAND LIMITS		NUMBER OF BLOWS	MOISTURE CONTENT	Lemon Lane Location of Boring On Sargent's property west of Fence (100 yds) south of the pond (50 yds) COLOR MOISTURE COMPACTNESS CONSIS
		TOP	BOTTOM			
		0'	1'	4 1/4		took split spoon - Red clayey silt residuum - Traced down to 22 <sup>2</sup> in core bedrock
1		22 <sup>2</sup>	29 <sup>6</sup>	1 1/2		Gray, fine crys Ls from 22 <sup>2</sup> to 23 <sup>2</sup> ; from 25 <sup>2</sup> 25 <sup>2</sup> leave fill and traced from 25 <sup>2</sup> to 25 <sup>2</sup> from 25 <sup>2</sup> to 29 <sup>6</sup>
12		29 <sup>6</sup>	32 <sup>4</sup>	3 1/2		Gray, fine mod crys Ls, w/ calcite & glauconite top (calcite crystallizing in brach shells), chert @ 31 <sup>2</sup>
2:3		32 <sup>4</sup>	36 <sup>2</sup>	3 3/4		Gray, fine crys Ls w/ calcite crystallizing in craters; glauconite thinly laminated carbonaceous shale @ 34 <sup>2</sup> , vertical fracture w/ calcite crystallized throughout from 33 <sup>2</sup> to 35 <sup>2</sup>
3:4		36 <sup>2</sup>	49 <sup>2</sup>	7 1/3	40% 41%	Gray, fine crys Ls, fairly well indurated with phenocrysts of calcite & glauconite; shale @ 38 <sup>2</sup> & 49 <sup>2</sup> (bottom); poorly indurated. Muddy carbonate above the (38 <sup>2</sup> ) shale
2:45-1		49 <sup>2</sup>	59 <sup>2</sup>	7 1/4		brown dolostone to 52 <sup>2</sup> , thinly bedded shale from 52 <sup>2</sup> to 52 <sup>2</sup> . 52 <sup>2</sup> & 53 <sup>2</sup> is gray fine mod L. w/ phenocrysts; 53 <sup>2</sup> to 55 <sup>2</sup> was gray clay/cav L. 55 <sup>2</sup> to 59 <sup>2</sup> is brown dolostone
						1-10" sec well screen & pipe 1-26" sec pipe 1-73" sec pipe put 5 gal of ls well packing down 2 gal bentonite plug 3-74 lb cement grout to surface 1-casing protector

Box# Row#  
3 3

limestone, med. grey-brn, s  
to hard bands, vuggy in pla  
(67.4-68.15)

#9 3 3

68.7-71.4  $\frac{2.2}{2.7}$

limestone, hard, micro-crystalline  
grey-brn, small calcite open  
places (68.15-69.1)

3 3

limestone, very fine grain, hard  
dark gray, lower .10 shaley  
(69.1-70.50)

3 3

shale, soft, black, calcareous (l  
(70.50-70.60)

3 3

limestone, hard, dark gray  
brownish cast (70.60-70.75)

3 3

shale, soft, laminated dark  
gray with some black lamin  
(70.75-~~71.4~~)

(loss in next run  
71.4-72.85)

3 4

71.4 76.3  $\frac{3.5}{4.9}$

← limestone, fine grain, hard  
dark gray, vuggy in places  
fractured from 73.5 - base  
of unit (76.1) fracture may  
have taken

Core #      Box #      Row #      Top      Bottom  
 2      3+4      5+1      80.3     

Shale, black, organic (broken) (84.65-84.75)

limestone, gray, hard (84.75-85.05)

shale, hard, black to blue (intact) (85.05-85.35)

limestone, fine grain, hard, gray to shale top + bottom (85.35-85.75)

shale, hard, black, organic? (broken core) (85.75-85.95)

limestone, fine grain, hard, gray - dark gray (85.95 - 86.55)

- 1 5.8' well seen
- 1 30' pc 2" pipe
- 1 26.3' " " "
- 1 21.4' " " "
- 1 4.25' " " "

Stuck-up 3.1'  
 bottom of screen at 84.6'

el To 74.6± (from bottom)  
 top at ≈ 20' - bentonite seal at ≈ 19'

Box

Row

Top Bottom

limestone, very fine grain, light brown to gray. (76.1-

3

4,5

76.3-80.3 <sup>2.65</sup>/<sub>4.0</sub>

Void (76.3-~~76.8~~<sup>77.65</sup>) - possible at a few inches lower - of next unit recovered as ceiling had fallen into void

?

Limestone, fine grained, crystalline, hard, dark grey to brown, with thin glauconite layers at base - recovered (~~77.5-78.75~~) (77.65-77.80)

← Possible Loss →

Limestone, fine grained, hard, brown & gray - top of unit gone away (~~77.75-78.50~~) (77.80-78.35)

Shale, organic, black (~~77.5-78.5~~) (78.35-78.75)

Limestone, fine to med. grain, (78.40-~~80.0~~) (79.25)

Limestone, very fine grain (pore vent joints filled with very calcite, possible "eyes" of calcite, dark green in lower part (80.0-80.3))

D

File  
Box= 3 Row# 3

limestone, med. grey-brown, to hard bands, vuggy in places (67.4-68.15)

9  
3 3

68.7-71.4  $\frac{2.2}{2.7}$

limestone, hard, micro-crystalline grey-brown, small calcite green places (68.15-69.1)

3 3

limestone, very fine grain, hard dark gray, lower .10 shaley (69.1-70.50)

3 3

shale, soft, black, calcareous (70.50-70.60)

3 3

limestone, hard, dark gray, brownish cast (70.60-70.75)

3 3

shale, soft, laminated dark gray with some black laminae (70.75-~~71.4~~) less in next run 71.4-72.85

5 4

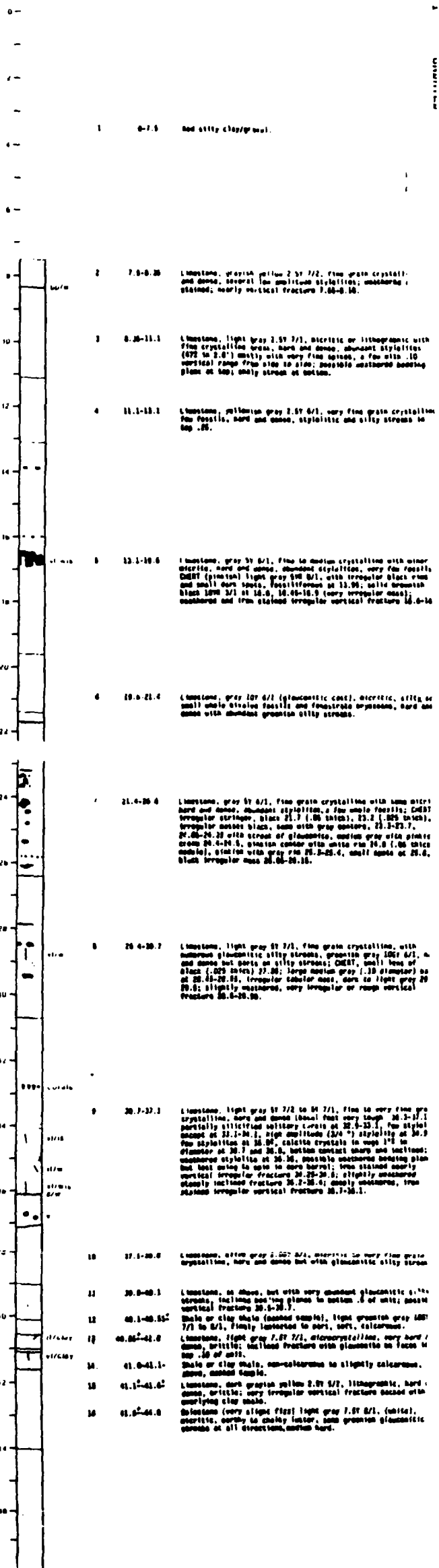
71.4 76.3  $\frac{3.5}{4.9}$

← limestone, fine grain, hard dark gray, vuggy in places fractured from 73.5 - base of unit (76.1) fracture ma

## Lemon Lane Landfill Boring 2

Monroe County, Indiana Bloomington Quadrangle  
SW corner, SW<sup>1</sup>/<sub>4</sub>, SE<sup>1</sup>/<sub>4</sub>, NE<sup>1</sup>/<sub>4</sub>, Sec. 31, T. 9 N., R. 1 W., Second Principal Meridian  
S80 EL, 2680 St., Sec. 31, T. 9 N., R. 1 W.  
Lat. 39° 10' 18" N., Long. 120° 33' 29" W.

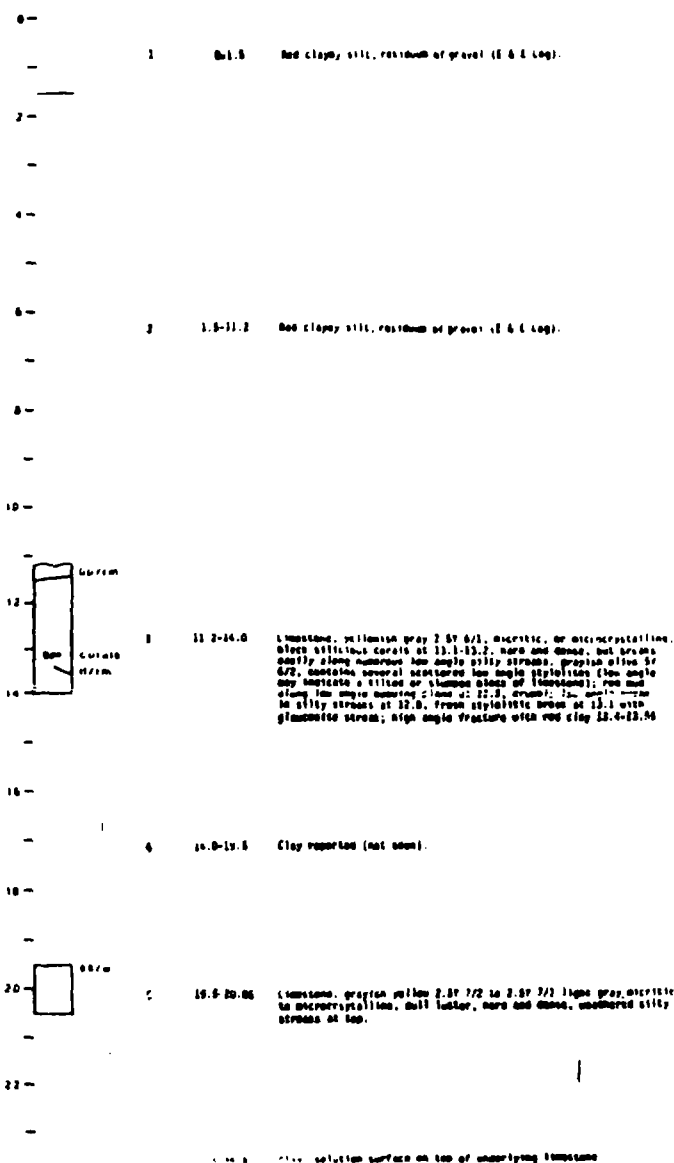
Altitude (topographic) 865 corrected to 887  
Ground level 117.07  
Top inner casing -  
Top outer casing 118.27  
Total depth 80.0



## Lemon Lane Landfill Boring 1

Monroe County, Indiana Bloomington Quadrangle  
SW<sup>1</sup>/<sub>4</sub>, SE<sup>1</sup>/<sub>4</sub>, NE<sup>1</sup>/<sub>4</sub>, Sec. 31, T. 9 N., R. 1 W., Second Principal Meridian  
111 EL, 2760 St., Sec. 31, T. 9 N., R. 1 W.  
Lat. 39° 10' 19" N., Long. 120° 33' 36.5" W.

Altitude (topographic) 866 corrected to 863  
Ground level 92.83  
Top inner casing 94.84  
Top outer casing 101.2  
Total depth 101.2

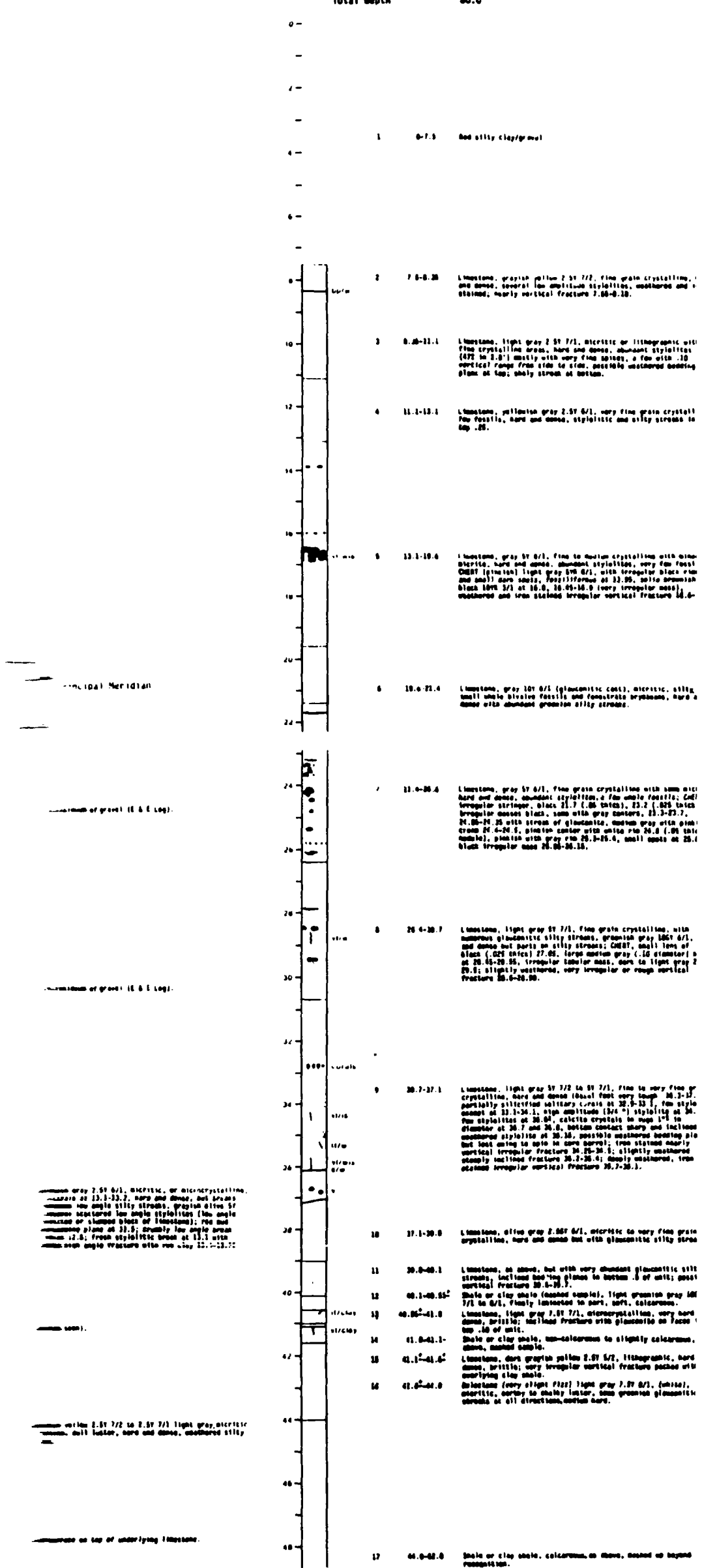


... solution surface on top of underlying limestone

# Lemon Lane Landfill Boring 2

Monroe County, Indiana Bloomington Quadrangle  
SW corner, SE4, SE4, Sec. 31, T. 9 N., R. 1 W., Second Principle  
580 El. 2580 Sl., Sec. 31, T. 9 N., R. 1 W.  
Lat. 39° 10' 18" N., Long. 82° 33' 29" W.

Altitude (topographic) 885 corrected to 887  
Ground level 117.07  
Top inner casing -  
Top outer casing 118.27  
Total depth 80.0



Principal Meridian

Continuation of gravel (E & E Log).

Continuation of gravel (E & E Log).

massive gray 2.57 6/1, micritic, or microcrystalline, layers at 13.1-13.2, hard and dense, but breaks into low angle silty streaks, grayish olive 57 weathered low angle stylolites (low angle weathered or stamped block of limestone); few low angle planes at 11.5; crumbly low angle areas above 12.8; from stylolitic break at 13.1 with some low angle fracture with red clay 12.1-12.72

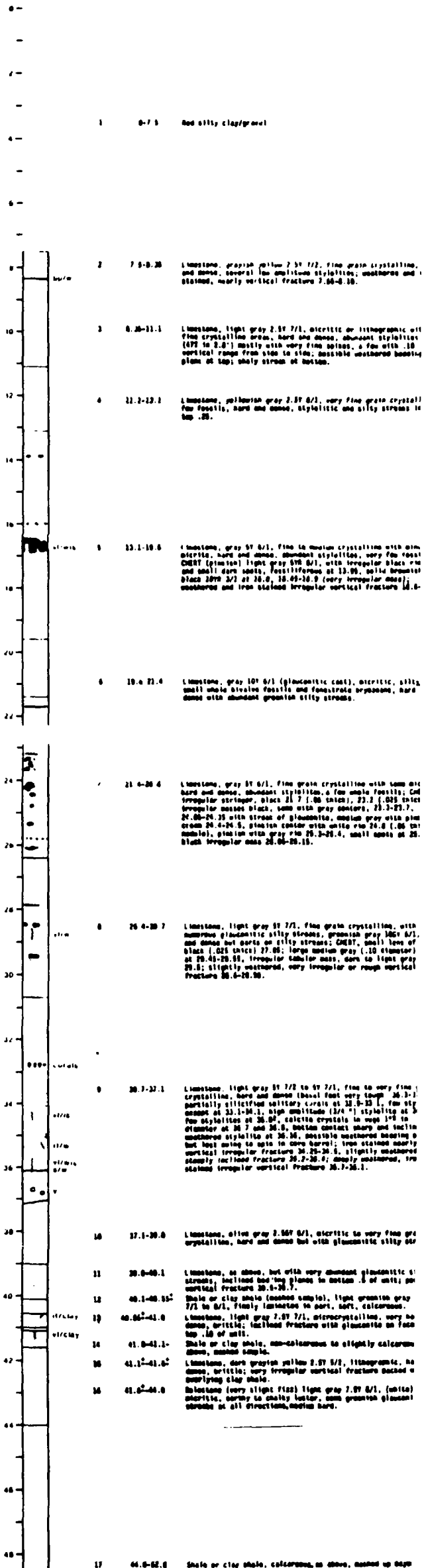
mass seen.

mass with 2.57 7/2 to 2.57 7/1 light gray, micritic, shaly luster, hard and dense, weathered silty

massive as top of underlying limestone.

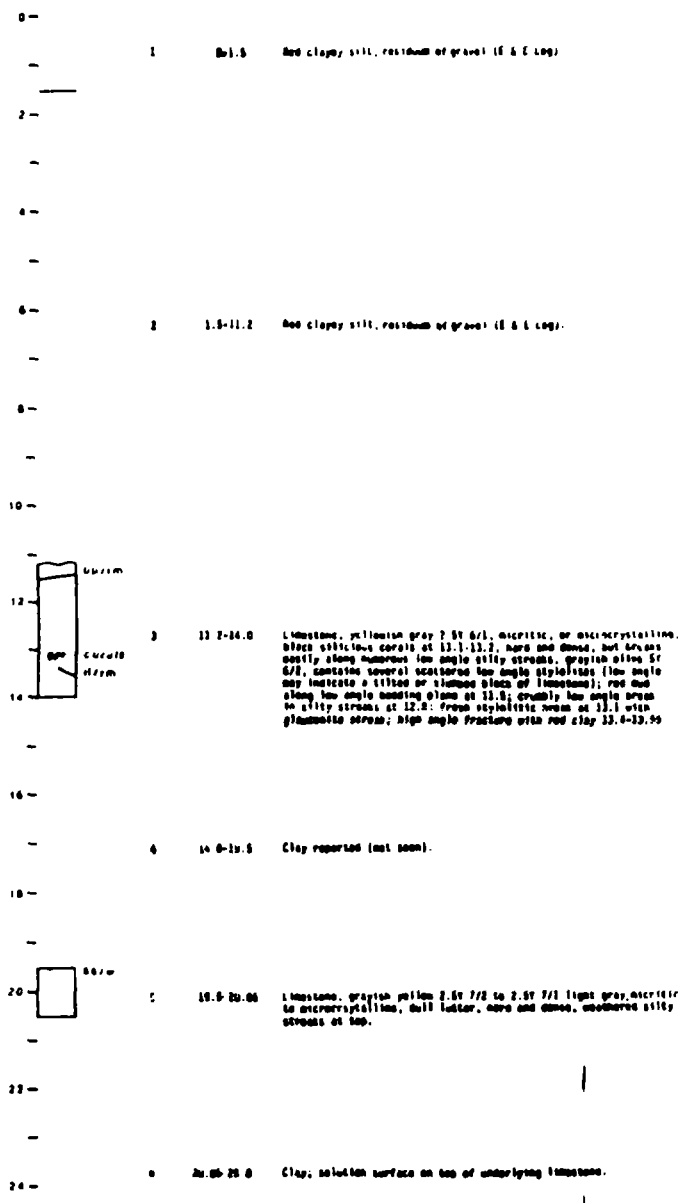
**Lemon Lane Landfill Boring 2**

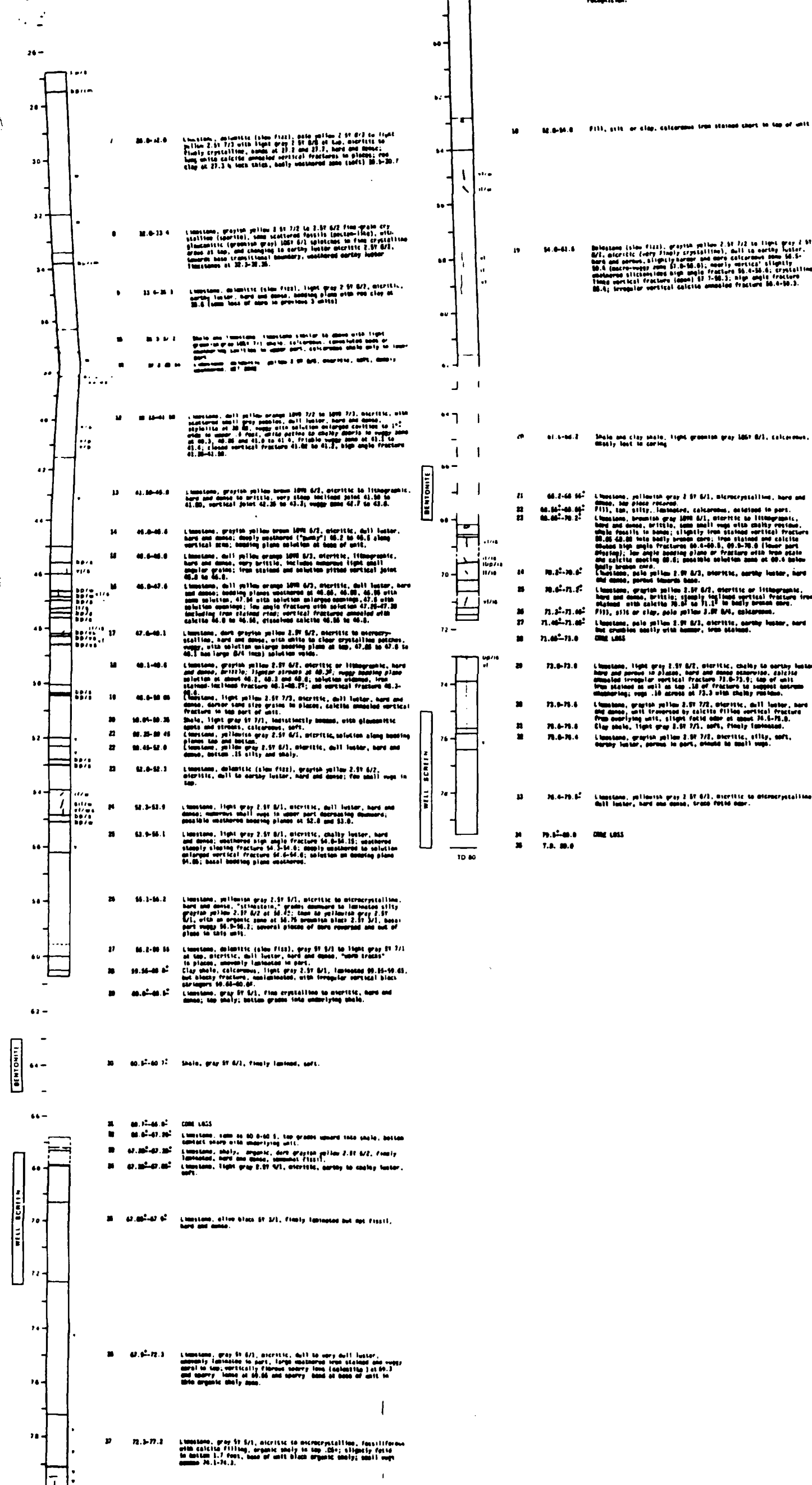
Monroe County, Indiana Bloomington Quadrangle  
 SW corner, SE4, NE4, Sec. 31, T. 9 N., R. 1 W., Second Principal  
 550 EL, 2680 St., Sec. 31, T. 9 N., R. 1 W.  
 Lat. 39° 10' 18" N., Long. 82° 33' 29" W.  
 Altitude (topographic) 885 corrected to 887  
 Ground level 117.07  
 Top inner casing -  
 Top outer casing 118.27  
 Total depth 80.0



**Lemon Lane Landfill Boring 1**

Monroe County, Indiana Bloomington Quadrangle  
 SW, SE4, NE4, Sec. 31, T. 9 N., R. 1 W., Second Principal Meridian  
 111 EL, 2760 St., Sec. 31, T. 9 N., R. 1 W.  
 Lat. 39° 10' 19" N., Long. 82° 33' 36.5" W.  
 Altitude (topographic) 866 corrected to 863  
 Ground level 92.83  
 Top inner casing -  
 Top outer casing 94.84  
 Total depth 101.2





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1 28.0-42.0 Limestone, dolomitic (slaw fiss), pale yellow 2.57 G/2 to light yellow 2.57 G/2 with light gray 2.57 G/2 at top, micritic to finely crystalline, bands of 2.2 and 2.7, hard and dense; very fine white calcite amorphous vertical fractures in 2.57 G/2; clay at 27.3 1/2 inch thick, badly weathered zone (soft) 28.0-28.7

2 28.0-33.4 Limestone, grayish yellow 2.57 G/2 to 2.57 G/2 fine grain dry shaly (partially), some scattered fossils (bryozoa-like), with glauconitic (greenish gray) 1.65 G/1 spots to fine crystalline druse at top, and changing to earthy luster micritic 2.57 G/2. Transition zone transitional boundary, weathered earthy luster limestone at 32.5-32.25.

3 33.4-38.2 Limestone, dolomitic (slaw fiss), light gray 2.57 G/2, micritic, earthy luster, hard and dense, bedding plane with red clay at 33.4 (same level of zone as previous 2 units)

4 38.2-40.0 Shale and limestone Limestone similar to above with light gray 1.65 G/1 shale, calcareous, laminated zone of weathered limestone in upper part, calcareous shale only in lower part

5 38.2-40.0 Shale and limestone Limestone similar to above with light gray 1.65 G/1 shale, calcareous, laminated zone of weathered limestone in upper part, calcareous shale only in lower part

6 40.0-41.0 Limestone, dull yellow orange 1.65 G/2 to 1.65 G/2, micritic, with scattered small gray pebbles, dull luster, hard and dense, micritic at 40.0, 40.2, 40.3 and 40.4, micritic to shaly druse to waxy zone at 40.3, 40.35 and 41.0 to 41.0, friable waxy zone at 41.1 to 41.2, closed vertical fracture 41.05 to 41.2, high angle fracture 41.25-41.25.

7 41.05-46.0 Limestone, grayish yellow brown 1.65 G/2, micritic to lithographic, hard and dense to brittle, very strong inclined joint 41.55 to 41.85, vertical joint 42.25 to 43.3, waxy zone 42.7 to 43.6.

8 46.0-46.6 Limestone, grayish yellow brown 1.65 G/2, micritic, dull luster, hard and dense; deeply weathered ("mushy") 46.2 to 46.5 along vertical zone; bedding plane solution at base of unit.

9 46.6-46.8 Limestone, dull yellow orange 1.65 G/2, micritic, lithographic, hard and dense, very brittle, includes numerous light small angular grains; iron stained and solution pitted vertical joint 46.8 to 46.8.

10 46.8-47.6 Limestone, dull yellow orange 1.65 G/2, micritic, dull luster, hard and dense; bedding planes weathered at 46.85, 46.85, 46.95 with some solution, 47.34 with solution enlarged openings, 47.8 with solution openings; low angle fracture with solution at 47.25-47.35 including iron stained rim; vertical fracture amorphous with calcite 46.8 to 46.85, etched calcite 46.85 to 46.8.

11 47.6-48.1 Limestone, dark grayish yellow 2.57 G/2, micritic to microcrystalline, hard and dense, with white to clear crystalline patches, waxy, with solution enlarge bedding plane at top, 47.85 to 47.8 to 48.1 has large (2 1/4 inch) solution voids.

12 48.1-48.6 Limestone, grayish yellow 2.57 G/2, micritic or lithographic, hard and dense, brittle; lighter druse at 48.25, waxy bedding plane solution at 48.2, 48.3 and 48.4; solution etched, iron stained-inclined fracture 48.1-48.25; and vertical fracture 48.3-48.4.

13 48.6-50.0 Limestone, light yellow 2.57 G/2, micritic, dull luster, hard and dense, darker tan size grains in places, calcite amorphous vertical fracture in top part of unit.

14 50.0-50.25 Shale, light gray 1.65 G/1, resistively massive, with glauconitic spots and streaks, calcareous, soft.

15 50.25-50.45 Limestone, yellowish gray 2.57 G/1, micritic, solution along bedding planes top and bottom.

16 50.45-52.0 Limestone, yellow gray 2.57 G/1, micritic, dull luster, hard and dense, bottom .15 silty and shaly.

17 52.0-52.3 Limestone, dolomitic (slaw fiss), grayish yellow 2.57 G/2, micritic, dull to earthy luster, hard and dense; few small wags in top.

18 52.3-52.9 Limestone, light gray 2.57 G/1, micritic, dull luster, hard and dense; numerous small wags in upper part decreasing downward; possible weathered bedding planes at 52.8 and 52.9.

19 52.9-54.1 Limestone, light gray 2.57 G/1, micritic, shaly luster, hard and dense, weathered high angle fracture 54.0-54.1; weathered steeply sloping fracture 54.3-54.6; deeply weathered to solution enlarged vertical fracture 54.6-54.6; solution on bedding plane 54.85; basal bedding plane weathered.

20 54.1-54.2 Limestone, yellowish gray 2.57 G/1, micritic to microcrystalline, hard and dense, "lithologic"; grades downward to limestone silty grayish yellow 2.57 G/2 at 54.15; thin to yellowish gray 2.57 G/1, with an organic zone at 54.75 granular bluish 2.57 G/1, base part waxy 54.9-54.2; several pieces of shale reversed and out of place in this unit.

21 54.2-58.55 Limestone, dolomitic (slaw fiss), gray 1.65 G/1 to light gray 1.65 G/1 at top, micritic, dull luster, hard and dense, "waxy fracture" in places, unevenly laminated in part.

22 58.55-58.65 Clay shale, calcareous, light gray 2.57 G/1, laminated 58.55-58.65, but shaly fracture, laminated, with irregular vertical black shaly layers 58.65-58.65.

23 58.65-58.65 Limestone, gray 1.65 G/1, fine crystalline to micritic, hard and dense, top shaly; bottom grades into underlying shale.

24 60.5-60.72 Shale, gray 1.65 G/1, finely laminated, soft.

25 60.7-64.02 CORE LOSS

26 64.0-67.26 Limestone, same as 60.0-60.5, top grades upward into shale, bottom contact sharp with underlying unit.

27 67.26-67.26 Limestone, shaly, organic, dark grayish yellow 2.57 G/2, finely laminated, hard and dense, somewhat fissile.

28 67.26-67.26 Limestone, light gray 2.57 G/1, micritic, earthy to earthy luster, soft.

29 67.26-67.62 Limestone, olive black 1.65 G/1, finely laminated but not fossil, hard and dense.

30 67.6-72.3 Limestone, gray 1.65 G/1, micritic, dull to very dull luster, unevenly laminated in part, large weathered iron stained and waxy zone at top, vertically fibrous heavy iron (dolomite) at 69.3 and waxy zone at 69.65 and waxy zone at base of unit in olive organic shaly zone.

31 72.3-77.2 Limestone, gray 1.65 G/1, micritic to microcrystalline, fossiliferous with calcite filling, organic shaly in top .25; slightly fossil in bottom 1.7 foot, base of unit black organic shaly; small wags common 74.1-74.3.

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18 54.0-54.0 Fills, silt or clay, calcareous iron stained short to top of unit

19 54.0-61.0 Limestone (slaw fiss), grayish yellow 2.57 G/2 to light gray 2.57 G/2, micritic (very finely crystalline), dull to earthy luster, hard and dense, slightly harder and more calcareous zone 54.5-58.4 (macro-waxy zone 57.0-58.0); nearly vertical slightly undulating slickensided high angle fracture 54.4-54.6; crystalline fine vertical fracture (zone) 57.7-58.3; high angle fracture 58.4-58.3, 58.4; irregular vertical calcite amorphous fracture 58.4-58.3.

20 61.0-66.2 Shale and clay shale, light greenish gray 1.65 G/1, calcareous, shaly but to coring

21 66.2-66.52 Limestone, yellowish gray 2.57 G/1, microcrystalline, hard and dense, top piece recovered.

22 66.52-66.52 Fills, silt, silty, laminated, calcareous, attached to part.

23 66.52-70.2 Limestone, brownish gray 1.65 G/1, micritic to lithographic, hard and dense, brittle, some small wags with shaly texture, shaly fossils in zone; slightly iron stained vertical fracture 66.85 to 68.25 into body broken core; iron stained and calcite etched high angle fracture 68.2-68.3, 69.3-70.0 (lower part shaly); low angle bedding plane or fracture with iron stain and calcite coating 68.6; possible solution zone at 68.6 below body broken core.

24 70.2-70.62 Limestone, pale yellow 2.57 G/2, micritic, earthy luster, hard and dense, part of section above.

25 70.6-71.2 Limestone, grayish yellow 2.57 G/2, micritic or lithographic, hard and dense, brittle; slightly inclined vertical fracture iron stained with calcite 70.6 to 71.1 in body broken core.

26 71.2-71.62 Fills, silt or clay, pale yellow 2.57 G/1, calcareous.

27 71.62-71.62 Limestone, pale yellow 2.57 G/2, micritic, earthy luster, hard but crumbly earthy with hammer, iron stained.

28 71.62-73.0 CORE LOSS

29 73.0-73.0 Limestone, light gray 2.57 G/2, micritic, shaly to earthy luster, hard and dense in places, hard and dense calcareous, calcite amorphous irregular vertical fracture 73.0-73.1; top of unit iron stained at well on top .10 of fracture to support coring measuring; wags .10 across at 73.3 with shaly texture.

30 73.0-73.0 Limestone, grayish yellow 2.57 G/2, micritic, dull luster, hard and dense, unit traversed by calcite filled vertical fracture from overlying unit, slight fold edge at about 73.0-73.0.

31 73.0-73.0 Clay shale, light gray 2.57 G/1, soft, finely laminated.

32 73.0-73.0 Limestone, grayish yellow 2.57 G/2, micritic, silty, soft, earthy luster, porous in part, closed to small wags.

33 76.0-79.62 Limestone, yellowish gray 2.57 G/1, micritic to microcrystalline, dull luster, hard and dense, trace voids near.

34 79.6-80.0 CORE LOSS

35 7.8 80.0

BENTONITE

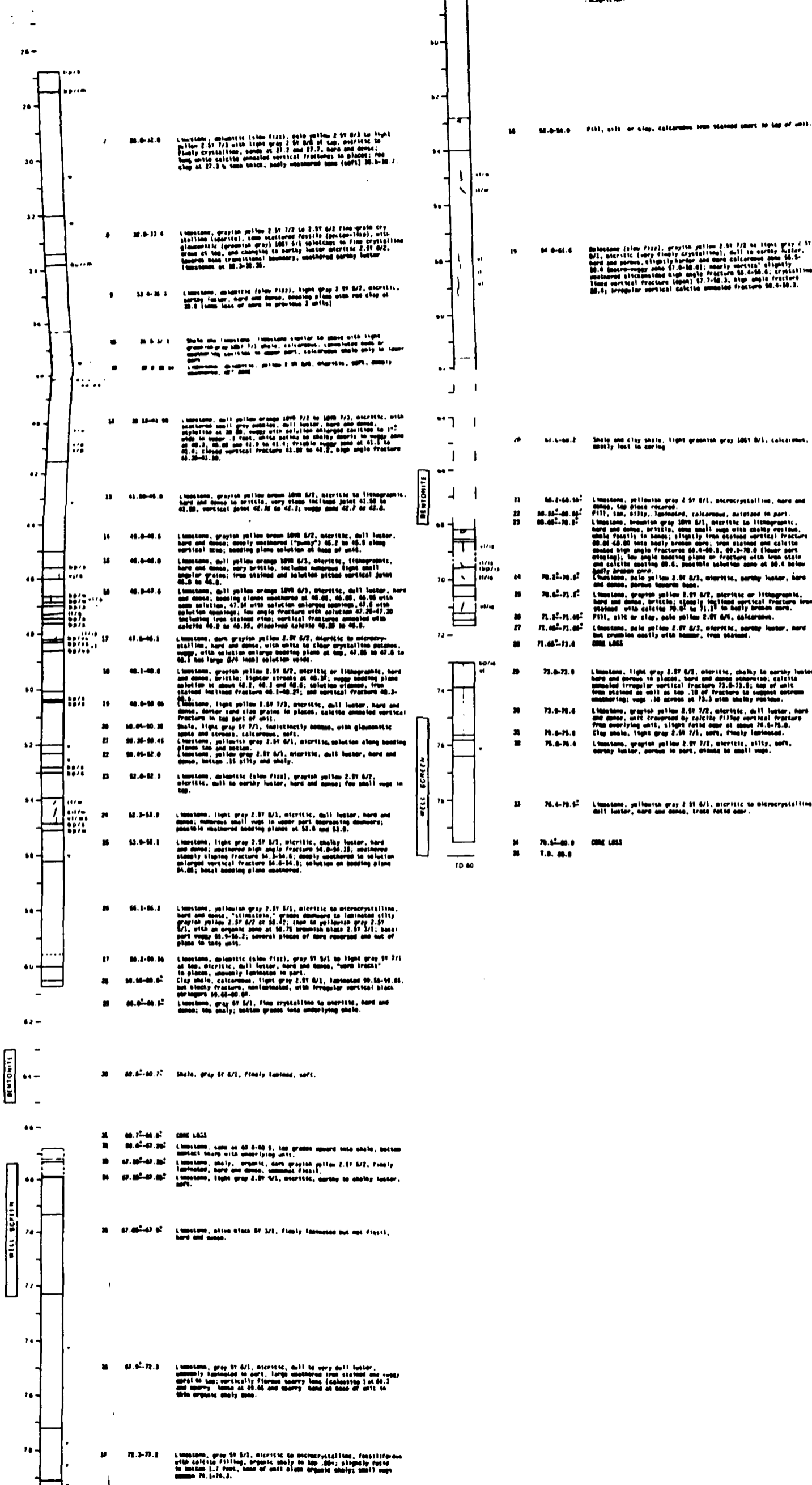
WELL SCREEN

BENTONITE

WELL SCREEN

TD 80





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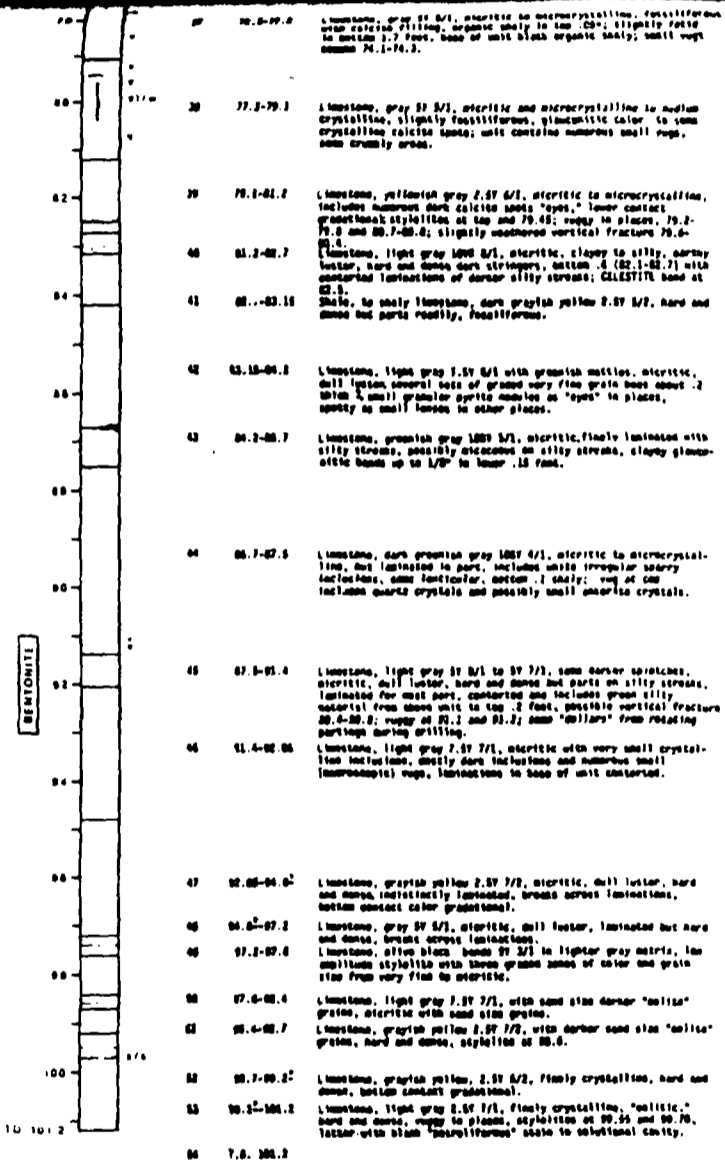
660-

Depth (feet)	Interval	Description
76.0-77.0	76.0-77.0	Limestone, gray 5/1, micritic to microcrystalline, fossiliferous with arctica (Strophomena) species mainly in top 25%; slightly ferric to bottom 1.7 feet, base of unit black organic shaly; small vugs common 76.1-76.3.
77.2-79.1	77.2-79.1	Limestone, gray 5/1, micritic and microcrystalline to medium crystalline, slightly fossiliferous, glauconitic color to some crystalline calcite bands; unit contains numerous small vugs, some crumbly areas.
79.1-81.2	79.1-81.2	Limestone, yellowish gray 2.5/1, micritic to microcrystalline, includes numerous dark calcite bands "eyes," lower contact gradational; stylolites at top and 79.48; vuggy in places, 79.2-79.9 and 80.7-80.8; slightly weathered vertical fracture 79.6-79.8.
80.2-82.7	80.2-82.7	Limestone, light gray 10/1, micritic, clayey to silty, earthy luster, hard and dense dark shaly; bottom 5 (80.1-82.3) with contacted laminations of darker silty streaks; CELESTITE band at 82.5.
82.1-83.15	82.1-83.15	Shale, to shaly limestone, dark grayish yellow 2.5/1 1/2, hard and dense but parts readily, fossiliferous.
83.15-84.2	83.15-84.2	Limestone, light gray 7.5/1 with greenish mottles, micritic, dull luster, several sets of graded very fine grain beds about .2 thick & small granular spherule nodules or "eyes" in places, locally at small lenses in other places.
84.2-86.7	84.2-86.7	Limestone, greenish gray 10/1 1/2, micritic, finely laminated with silty streaks, possibly micaceous on silty streaks, clayey glauconitic bands up to 1/8" in lower .15 feet.
86.7-87.1	86.7-87.1	Limestone, dark greenish gray 10/1 1/2, micritic to microcrystalline, but laminated in part, includes white irregular sparry inclusions, some lenticular, bottom 1 shaly; vug at top includes quartz crystals and possibly small ankerite crystals.
87.5-91.4	87.5-91.4	Limestone, light gray 5/1 to 5/1 1/2, some darker streaks, micritic, dull luster, hard and dense but part on silty streaks, laminated for most part, contacted and includes green silty material from above unit in top .2 feet, possible vertical fracture 88.6-88.8; vuggy at 91.1 and 91.2; some "dollars" from rotating partings during drilling.
91.4-92.00	91.4-92.00	Limestone, light gray 7.5/1 1/2, micritic with very small crystalline inclusions, mostly dark inclusions and numerous small (microscopic) vugs, laminations to base of unit contacted.
92.00-94.0	92.00-94.0	Limestone, grayish yellow 2.5/1 1/2, micritic, dull luster, hard and dense, indistinctly laminated, breaks across laminations, bottom contact color gradational.
94.0-97.2	94.0-97.2	Limestone, gray 5/1, micritic, dull luster, laminated but hard and dense, breaks across laminations.
97.2-97.6	97.2-97.6	Limestone, olive black bands 5/1 1/2 in lighter gray matrix, low amplitude stylolites with three grade zones of color and grain size from very fine to micritic.
97.6-98.4	97.6-98.4	Limestone, light gray 7.5/1 1/2, with sand size darker "miller" grains, micritic with sand size grains.
98.4-98.7	98.4-98.7	Limestone, grayish yellow 2.5/1 1/2, with darker sand size "miller" grains, hard and dense, stylolites at 98.6.
98.7-99.2	98.7-99.2	Limestone, grayish yellow, 2.5/1 1/2, finely crystalline, hard and dense, bottom contact gradational.
99.2-100.2	99.2-100.2	Limestone, light gray 2.5/1 1/2, finely crystalline, "micritic," hard and dense, vuggy in places, stylolites at 99.55 and 99.70, luster with black "retrofracture" stain in solution cavity.
100.2	99	T.B. 100.2

BENTONITE

78	78.0-79.0	Limestone, gray 57 5/1, micritic to microcrystalline, fossiliferous with calcite filling, organic matter in top 2.5'; slightly void to bottom 1.5 feet; base of unit black argillite beds; shell very common 78.1-78.2.
79	79.1-79.1	Limestone, gray 57 5/1, micritic and microcrystalline to medium crystalline; slightly fossiliferous, glauconitic color to some crystalline calcite beds; unit contains numerous small vugs, some crumbly areas.
80	79.1-81.2	Limestone, yellowish gray 2.57 6/1, micritic to microcrystalline, includes numerous dark calcite spots "eyes," lower contact gradational stylolites at top and 79.45; vuggy in places, 79.2-79.5 and 80.7-80.8; slightly weathered vertical fracture 79.6-80.4.
81	81.2-82.7	Limestone, light gray 100 6/1, micritic, clayey to silty, earthy luster, hard and dense dark stringers, bottom 8 (82.1-82.7) with conchoidal laminae of darker silty streaks; calcite band at 82.3.
82	82.7-83.15	Shale, to shaly limestone, dark grayish yellow 2.57 6/2, hard and dense and parts readily, fossiliferous.
83	83.15-84.2	Limestone, light gray 7.57 6/1 with granitic mottles, micritic, dull luster, several sets of graded very fine grain beds about .2 mm to 1 small granular pyrite nodules as "eyes" in places, mostly as small lenses in other places.
84	84.2-85.7	Limestone, greenish gray 100 6/1, micritic, finely laminated with silty streaks, possibly micaceous on silty streaks, clayey glauconitic bands up to 1/8" to lower .15 feet.
85	85.7-87.3	Limestone, dark greenish gray 100 6/1, micritic to microcrystalline, but laminated in part, includes white irregular sparry inclusions, some lamellar, section shaly; red at top includes quartz crystals and possibly small amorphous crystals.
86	87.3-89.4	Limestone, light gray 57 6/1 to 57 7/1, some darker streaks, micritic, dull luster, hard and dense but parts on silty streaks, laminated for most part, conchoidal and includes green silty material from above unit in top 2 feet, possible vertical fracture 88.4-88.8; vuggy at 91.1 and 91.2; some "dollars" from rotating partings during drilling.
87	91.4-92.86	Limestone, light gray 7.57 7/1, micritic with very small crystalline inclusions, mostly dark inclusions and numerous small (amorphous) vugs, laminae in base of unit conchoidal.
88	92.86-94.6	Limestone, grayish yellow 2.57 7/2, micritic, dull luster, hard and dense, indistinctly laminated, breaks across laminations, bottom contact color gradational.
89	94.6-97.2	Limestone, gray 57 5/1, micritic, dull luster, laminated but hard and dense, breaks across laminations.
90	97.2-99.6	Limestone, olive black bands 57 5/1 in lighter gray matrix, low amplitude stylolites with three graded zones of color and grain size from very fine to micritic.
91	99.6-100.4	Limestone, light gray 7.57 7/1, with some fine darker "mottles" grades, micritic with sand size grains.
92	100.4-100.7	Limestone, grayish yellow 2.57 7/2, with darker sand size "mottles" grades, hard and dense, stylolites at 100.4.
93	100.7-100.2	Limestone, grayish yellow, 2.57 6/2, finely crystalline, hard and dense, bottom contact gradational.
94	100.2-101.2	Limestone, light gray 2.57 7/1, finely crystalline, "micritic," hard and dense, vuggy in places, stylolites at 99.56 and 99.70, luster with some "microcrystalline" beds to occasional cavity.
95	101.2-101.2	

BENTONITE



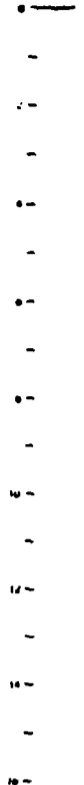
Depth (feet)	Interval	Description
76.0	76.0-77.2	Limestone, gray 5/1, micritic to microcrystalline, fossiliferous with calcitic filling, organic shaly to top .25'; slightly ferric to bottom 1.7 feet, base of unit black organic shaly; small vugs common 76.1-76.2.
77.2	77.2-78.1	Limestone, gray 5/1, micritic and microcrystalline to medium crystalline, slightly fossiliferous, glauconitic color to some crystalline calcite spots; unit contains numerous small vugs, some crumbly areas.
78.1	78.1-81.2	Limestone, yellowish gray 2.5/1, micritic to microcrystalline, includes numerous dark calcite spots "eyes," lower contact grades into stylolite at top and 79.48; vuggy to plane, 79.2-79.6 and 80.7-80.8; slightly weathered vertical fracture 79.6-80.4.
81.2	81.2-82.7	Limestone, light gray 4/1, micritic, clayey to silty, earthy luster, hard and dense dark silty, bottom 3 (82.1-82.7) with concentrated laminations of darker silty streaks; CELESTITE base at 82.3.
82.7	82.7-83.15	Shale, to shaly limestone, dark grayish yellow 2.5/1, hard and dense but parts readily, fossiliferous.
83.15	83.15-84.2	Limestone, light gray 7.5/1 with greenish mottles, micritic, dull luster, several sets of graded very fine grained bands about .2 thick & small granular pyrite nodules in "eyes" in places, mostly as small lenses in other places.
84.2	84.2-86.7	Limestone, greenish gray 10/1, micritic, finely laminated with silty streaks, possibly micaceous on silty streaks, clayey glauconitic bands up to 1/8" in lower .15 feet.
86.7	86.7-87.6	Limestone, dark greenish gray 10/1, micritic to microcrystalline, but laminated in part, includes white (irregular sparry inclusions, some lamellar, bottom .1 shaly; vug at top includes quartz crystals and possibly small ankerite crystals.
87.6	87.6-91.4	Limestone, light gray 5/1 to 7/1, some darker streaks, micritic, dull luster, hard and dense but parts on silty streaks, laminated for most part, concretionary and includes green silty material from above unit to top .2 feet, possible vertical fracture 88.4-88.8; vuggy at 91.1 and 91.2; some "dillers" from rotating partings during drilling.
91.4	91.4-92.06	Limestone, light gray 7.5/1, micritic with very small crystalline inclusions, shaly dark inclusions and numerous small (microscopic) vugs, laminations to base of unit concretionary.
92.06	92.06-94.6	Limestone, grayish yellow 2.5/1, micritic, dull luster, hard and dense, indistinctly laminated, breaks across laminations, bottom contact color gradational.
94.6	94.6-97.2	Limestone, gray 5/1, micritic, dull luster, laminated but hard and dense, breaks across laminations.
97.2	97.2-97.6	Limestone, olive black bands 5/1 in lighter gray matrix, low amplitude stylolite with three graded zones of color and grain size from very fine to micritic.
97.6	97.6-98.4	Limestone, light gray 7.5/1, with sand size darker "celite" grains, micritic with sand size grains.
98.4	98.4-98.7	Limestone, grayish yellow 2.5/1, with darker sand size "celite" grains, hard and dense, stylolite at 98.6.
98.7	98.7-99.2	Limestone, grayish yellow, 2.5/1, finely crystalline, hard and dense, bottom contact gradational.
99.2	99.2-101.2	Limestone, light gray 2.5/1, finely crystalline, "celitic," hard and dense, vuggy to plane, stylolite at 99.55 and 99.76, luster with black "spherulitic" state in solution cavity.
101.2	T.S. 101.2	

BENTONITE

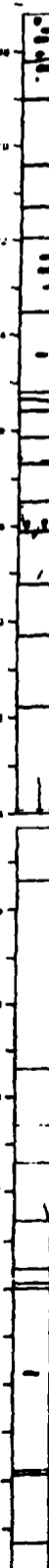
**Lemon Lane Landfill Boring 4**

Monroe County, Indiana Bloomington Quadrangle  
NW corner, NE1, SE1, Sec. 31, T. 9 N., R. 1 W., Second Principal Meridian  
650 El. 1423 M., Sec. 31, T. 9 N., R. 1 W.  
Lat. 39° 10' 30.5" N., Long. 82° 33' 30" W.

Altitude (topographic) 870  
Ground level 229.99  
Top inner casing -  
Top outer casing 122.99  
Total depth 86.65



BENTONITE



- 1 0-17.2 Aggreg. to 16.8 to corals, then transition to 17.2
- 2 17.2-21.95 Limestone, grayish yellow 2.59 7/2, fine grain crystalline to microcrystalline, tabular in part - fragments of brachiopods, hard and dense, small glauconitic shells, small scattered brachiopod grates, CHEST mostly light gray 18W 8/2 with lime and darker zones, shell at 17.25-17.25 (shell) at 17.5-17.5, shell at 17.5-17.5, shell at 18.0-18.1, shell at 18.3-18.4, shell 18.5, shell of disc 18.0-18.8, edge of disc 20.0-20.9, edge of shell 21.0-21.19, trace of shell 21.30; stylolites common 19.0-19.7, 20.0-20.5; solution enlarged and iron stained stylolites, low angle, at 20.10, iron stained stylolite at 19.0, unweathered stylolite at 20.40, 21.3.
- 3 21.00-25.20 Limestone, light gray 5V 7/1, micritic, dull luster, fossiliferous (bivalves and fenestrate brachiopods), large white fossils in places, earth shaly mostly by hammer, hard and dense, shaly streaks 22.55, 22.55, 22.55, 22.5, and glauconitic shaly streaks 22.55, 22.55, glauconitic shale bands at 24.00-24.00, 24.0-24.01 and streaks in limestone 25.10-25.20; CHEST, grayish white 8/1 plus in part on gray 8/2 and 8/1 tabular discs, fossiliferous, at 22.20-22.40, 22.6-22.7, 22.8 (see notes) 24.0-24.01, unweathered bedding planes at 25.00-25.00
- 4 25.20-30.15 Limestone, light gray 2.59 7/1, crystalline fine to medium with micritic bands, fossiliferous, hard and dense; unweathered low angle break in shaly streaks at 25.20, limestone fill (4" x 4") to bedding plane at 25.6, unweathered bedding plane at bottom.
- 5 30.15-29.25 Limestone, grayish yellow 2.59 7/2, fine crystalline to microcrystalline, hard and dense, tabular corals with shaly streaks and shaly calcite filling at 27.0-28.2; CHEST light gray 8/2 with black shells and partial very thin, thin at 26.00-26.70; stylolites at 26.5, 26.50-26.60 (1" x 1" x 1" x 1"), 26.70, 27.20-27.6 (massive), 27.8 (in top of corals); unweathered bedding plane (possibly stylolite) at 26.7, 27.8, and slightly subhorizontal enlarged stylolite at 26.15 (in corals); shaly streaks very rough fracture 27.70-28.15, inclined fracture 28.00-29.1 slightly weathered with other red mud state, thin red mud fill at 29.70 on unweathered bedding plane.
- 6 29.25-33.9 Dolomite, light yellow orange 18W 8/2 to pale yellow 2.59 8/2, very fine crystalline, dull to waxy luster, hard and dense, dense in part scattered fossil zones (fenestrate brachiopods), several calcite lenses or possible fossil casts, small calcite shell "eyes" 32.3-32.8, numerous small voids to fossil zones, basal .05 of unit is light gray 2.59 8/1 and is only unweathered part, vertical calcite with crystals to basal .05, very irregular nearly vertical fracture with iron stains but generally light 32.25-32.9; possible unweathered and displaced bedding plane 30.3, 31.0.
- 7 33.0-34.0 Shale, light granitic gray 18W 7/1, laminated, glauconitic, soft CHEST 18W 8/2
- 8 34.0-35.4 Limestone, gray 5V 8/1, microcrystalline, dull luster, laminated, hard and dense with soft glauconitic shaly streaks, 4" shale band at 34.00.
- 9 35.4-38.4 Dolomite (slow fizz), light gray (unit) 7.59 8/1, very fine grained, with shaly to earthy luster, hard and dense, slightly porous, numerous vertical glauconitic stringers, some calcite bedding of brachiopod shells, base of unit includes streaks of shale from below, slightly weathered low angle common bedding plane at 35.00 and 36.0.
- 10 38.4-40.0 Shale or clay shale, dolomitic, fissile after penetration, granitic gray 18W 8/1, laminated to massive unweathered to shaly part, soft (relatively recent core).
- 11 40.0-41.4 Dolomite (slow fizz), light gray 7.59 8/1, micritic, hard and dense, lower 5' interbedded with granitic gray 18W 8/1 mudstone with vertical contacts, units breaks easily with hammer.
- 12 41.4-42.6 Dolomite (slow fizz), light gray (unit) 7.59 8/1, very fine grained, shaly luster, hard and dense; iron stained strongly inclined fracture at 42.3-42.6.
- 13 42.6-43.6 Conglomerate, calcareous, light gray 7.59 8/1, dolomitic (slow fizz) micritic matrix with scattered granitic to 8/2 lens, glauconitic pebbles or nodules, calcite shaly filling of voids, bottom 10" sandstone.
- 14 43.6-43.8 Limestone, pale yellow 7.59 8/2, micritic, shaly luster, hard and dense (note: top of this unit fits base of overlying unit - bottom of this unit broken by grilling).
- 15 43.8-44.0 Conglomerate, as above, smaller pebbles, an unweathered irregular contact with underlying unit, this unit badly weathered and iron stained.
- 16 44.0-46.2 Limestone, dolomitic (slow fizz), pale yellow 2.59 8/2 to light yellow 2.59 7/2, very fine grained, in part laminated near top, thin at 45.0-45.5; CHEST, irregular light colored horizontal zone at 45.7-46.5, very shaly voids to scattered places, base of unit horizontal; inclined fracture at 47.7-47.8, thin mud filled void at 47.8-47.9 very calcareous and has very small voids in fill.
- 17 46.2-48.2 Limestone, grayish yellow 2.59 6/2, micritic to microcrystalline, hard and dense, unweathered base 1/16" of .05 above base of unit.

**Lemon Lane Landfill Boring 3**

Monroe County, Indiana Bloomington Quadrangle  
Near Luster E4, SW1, Sec. 31, T. 9 N., R. 1 W., Second Principal Meridian  
1580 El. 2050 M., Sec. 31, T. 9 N., R. 1 W.  
Lat. 39° 10' 24.5" N., Long. 82° 33' 43" W.

Altitude (topographic) 872 corrected to 870  
Ground level 99.67  
Top inner casing -  
Top outer casing 101.43  
Total depth 59.7

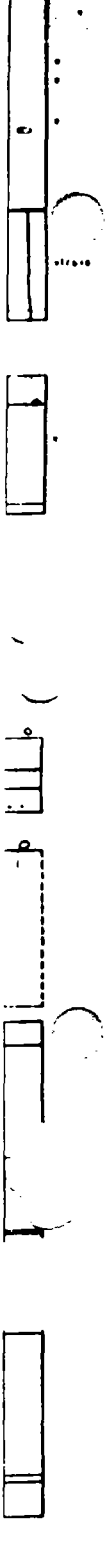
1 0-22.2 See clayey silty residual, split open 0-1.5, transition to 22.2.

- 2 22.2-23.7 Dolomite (slow to fizz) pale yellow 2.59 8/2, micritic, dull luster, hard and dense, calcite filled irregular vertical fractures in top part, easily broken core.
- 3 23.7-25.6 CORE FALL, transition
- 4 25.6-28.00 Dolomite (slow fizz), light yellow 2.59 7/2, micritic, dull to waxy luster, hard and dense, slightly porous; tabular CHEST, light gray 8/2, calcite filled irregular vertical fractures in top part, easily broken core center 30.00-30.05; numerous small voids

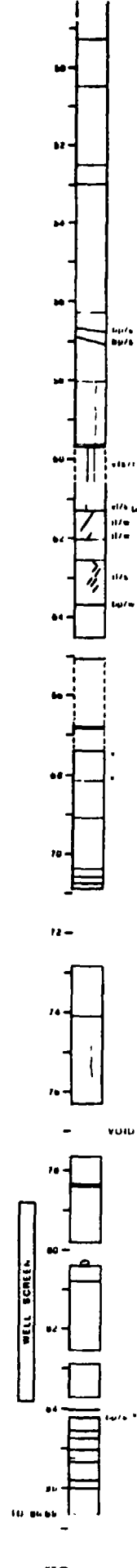








6	20.0-20.00	Dolomite (slow fizz), light yellow 2.57 7/2, micritic, dull to earthy luster, hard and slightly porous. (color CDEI). Light gray 1.57 5/2, also dark center in 20-20.00, numerous small eggs in 20.00-20.04, 20.75-20.06, 20.50-20.75, basal 1.0 micritic.
8	20.00-20.06	Dolomite (slow to fizz), pale yellow 2.57 6/2, micritic, silty and laminated, hard and dense; unaltered.
9	20.00-20.05	Dolomite (slow to fizz), pale yellow 2.57 6/2, micritic, dull luster, hard, slightly porous, slightly porous in places, green calcite spots 2.1-2.8, some calcite filled tight nearly vertical fractures.
7	20.00-20.0	CONE LOSS
8	20.0-20.6	Limestone, grayish yellow 2.57 7/2, micritic to microcrystalline, hard and dense, dull luster, pyrite stringer, (MST), light gray 1.00 6/2, with white rim, at base of unit 20.55-20.60; calcite filled vertical fracture through unit, high angle fracture 20.0-20.10.
9	20.0-20.7	Limestone, light gray 2.57 6/2 to 7.57 6/1, micritic, dull to earthy luster, hard and dense, slightly porous in places, green calcite spots 2.1-2.8, some calcite filled tight nearly vertical fractures.
10	20.7-20.0	Shale to limestone, light greenish gray 1.00 7/1, nearly laminated, calcareous.
11	20.0-23.0	CONE LOSS, piece of red clay. Truncated 20.0-23.0
11	43.0-44.0	Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense, bottom 1/2 silty, some at top .00 of next lower unit, calcite embedded irregular horizontal fracture at 43.75.
13	44.0-44.7	Limestone, yellowish brown 2.57 6/2, micritic, laminated, hard and dense, lower boundary transitional.
14	44.7-44.8	Limestone, yellowish gray 2.57 6/1, lithographic, hard and dense, small whole fossils in band at 44.8.
15	44.8-45.0	CONE LOSS, recovered limestone piece .15 inches.
16	46.0-46.2	Limestone, grayish yellow brown 1.00 6/2, micritic lithographic, hard and dense, (basal brown core with possible silicified or part of spongy fossils), includes dull micritic limestone in places; vertical fracture to top of unit .10, which shaly residue in vugs towards base of lithographic unit.
17	46.2-46.3	CONE LOSS
18	46.0-46.0	Limestone, light yellow 2.57 7/2, micritic, dull to earthy luster, hard but crumbles under hammer blow; top has calcite dissolution of shale.
19	46.0-46.20	Limestone, dolomitic (slow to fizz to top and bottom), grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense.
20	52.20-52.7	Shale, clay shale, light gray 2.57 6/2, indistinct bedding, calcareous; includes .20 CONE LOSS.
21	52.7-53.0	Limestone, grayish yellow 2.57 7/2 to yellowish gray 2.57 6/1 micritic to microcrystalline, hard and dense.
22	53.0-53.00	Clay, light gray 5.7 7/1, calcareous, with some very small eggs or cavities.
23	63.00-64.0	2.00 CONE LOSS IN GRAY CLAY CASE FILL
24	66.0-66.00	Dolomite, grayish yellow 2.57 7/2, micritic, earthy luster, hard, porous, slightly waxy 67.1-67.0.
25	66.00-66.0	Clay, light gray 2.57 7/1, laminated, hard when dry, calcareous.
26	66.0-66.7	CONE LOSS
27	7.0. 66.7	



16	60.0-60.00	Limestone, grayish yellow 2.57 6/2, micritic to microcrystalline, hard and dense, calcareous base 1/4" of .05 above base of unit.
18	60.00-62.00	Limestone, light gray 2.57 6/2, micritic, perhaps dolomitic (slow fizz), hard and dense, base of unit shaly, calcareous and embedded 1/2" above and below.
20	62.00-63.0	Low shale, dolomitic (slow fizz), light greenish gray 1.00 7/1, hard but breaks easily with hammer, slightly porous, bottom 1/2" top 1/2" micritic.
21	63.0-64.0	Shale, light yellow 2.57 7/2, bedding indistinct, mostly compacted, calcareous, with small eggs.
22	64.0-64.05	Limestone, pale yellow 2.57 6/1, micritic, dull luster, hard and dense, but the whole unit in places; includes enlarged inclined bedding planes 64.7-66.0, 66.0-67.10.
23	64.00-66.00	Limestone, light gray 2.57 6/2, micritic, dull luster, hard and dense, vertical fracture with white calcite filling 64.00-64.05 to 64.10; very dense, microcrystalline with thin micritic bedding 64.1-64.04, and broken at 64.20 but not weathered.
24	64.00-64.70	Shale, pale yellow, 2.57 6/2, with bright greenish streaks, finely laminated, soft, weathered shale, calcareous.
25	64.70-61.0	Limestone, light gray 2.57 7/1, micritic and sublithographic, hard and dense, brittle (some dull brown due to crossing of thin earthy vertical fractures and a fifth shaly vertical plane-again joints), with possible red clay bedding; crossed vertical fracture from top (brown core) to 60.0, unweathered irregular steeply inclined fracture 60.0-61.10; includes enlarged vertical fracture 61.10 to 61.20 with waxy surface.
26	61.0-62.00	Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense; irregular vertical to steeply sloping fracture, slightly weathered 61.0-61.01, curved fracture with desiccation, slightly weathered 61.01-62.00; top of unit waxy by solution from overlying porous zone (some pieces dried and returned to box).
17	62.00-62.50	Limestone, pale yellow 2.57 6/1, micritic, dull to earthy luster, hard and dense.
28	62.00-63.70	Limestone, grayish yellow 2.57 6/2, lithographic, brittle, hard and dense; thin angle fracture 62.10-62.15 (left to right slope), 62.70-62.00, 62.75-62.00, 63.0-63.15, 63.00-63.20, 63.20-63.30 (right to left slope), with essentially all surfaces solution etched; bottom contact weathered and oxidized.
29	63.70-64.00	Limestone, light gray (unit) 7.57 6/2, micritic, silty, shaly to earthy luster, hard and dense.
30	64.00-65.1	CONE LOSS
31	65.1-66.0	Fine, silty and clay, pale yellow 5.7 6/1, laminated, oxidized in some laminations, (massed sample).
32	66.0-66.00	Limestone, dull yellowish brown 5.7 6/1, micritic, hard and dense.
33	66.00-67.00	Limestone, brittle, dull yellowish brown, 5.7 6/1, micritic, hard and dense; plane to part weathered with calcite; appears somewhat; hard when compared to base of core.
34	67.00-68.15	Limestone, grayish yellow 5.7 7/2, micritic, silty, earthy luster, hard but breaks easily with hammer, porous, waxy near top and bottom.
35	68.15-69.1	Limestone, grayish yellow 2.57 7/2, micritic, hard and dense, dull luster to top, brighter towards base.
36	69.1-70.00	Limestone, dolomitic, grayish yellow 2.57 7/2, micritic, earthy luster, hard waxy in part, porous in part, "calcareous" lower .20 dense and very slow to fizz (dolomite).
37	70.00-70.0	Limestone or siltstone, light gray 2.57 6/1, poorly laminated, calcareous, soft in lower part.
38	70.0-70.75	Limestone, yellowish gray 2.57 6/1, micritic to microcrystalline, hard and dense.
39	70.75-70.00	Shale, grayish yellow 2.57 6/2, organic, thin unit, laminated, soft (mass core loss).
40	70.00-72.00	CONE LOSS in shale
41	72.00-74.1	Limestone, grayish yellow 2.57 6/2, micritic, hard and dense; unweathered nearly vertical fracture 73.0-74.1.
42	74.1-76.1	Limestone, grayish yellow 2.57 6/2, micritic, earthy luster, almost entire waxy, hard and waxy towards base; nearly vertical fracture, 74.75-75.0; vertical fracture 75.00-76.1 (both appear to be "dry" at right angles).
43	76.1-77.55	VOID
44	77.00-78.20	Limestone, grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense (top of unit porous).
45	78.20-78.00	Shale, dark brown 1.00 3/1, organic, laminated, soft
46	78.00-79.00	Limestone, dolomitic (slow fizz), light gray 2.57 7/1, micritic, dull luster, hard and dense, calcite "spots" 78.1-78.8.
47	79.00-80.4	CONE LOSS .10 reaction fragment of overlying limestone.
48	80.4-80.0	Limestone, light gray 2.57 6/1, micritic, dull luster, hard and dense.
49	80.0-82.00	Dolomite (slow to fizz) light gray 7.57 7/1 to gray 6.1, micritic, silty porous, hard, parts irregularly with hammer blow.
50	82.00-82.00	CONE LOSS AND BRUSH PIECES
51	82.00-83.7	Limestone, light gray 7.57 6/1, micritic, dolomitic (slow to fizz), hard and dense, some lighter spots, possible worm burrows, in top.
52	83.7-84.00	CONE LOSS AND BRUSH PIECES.
53	84.00-84.25	VOID (driller)
54	84.25-84.50	Limestone, yellowish gray 2.57 6/1, micritic, finely laminated, very tough and dense; top of unit waxy and solution modified with black stain
55	84.50-84.75	Shale, yellowish gray 2.57 6/1, (dark gray) finely laminated, hard but parts readily, calcareous.
56	84.75-85.00	Limestone, gray 5.7 6/1, micritic, dull luster, hard and dense.
57	85.00-85.25	Shale, yellowish gray 2.57 6/1 (dark gray) finely laminated, hard, with whole fossils, calcareous; low angle fracture of 85.25-85.20
58	85.25-85.00	Limestone, gray 5.7 6/1, micritic, dull luster, hard and dense.
59	85.00-85.0	Shale, yellowish gray 2.57 6/1 (dark gray) organic, finely laminated, hard and dense, calcareous.
60	85.0-85.00	Limestone, yellowish gray 2.57 6/1 (dark gray) micritic, dull luster, hard and dense.
7.0. 85.00		

0 20.0-22.00 Silty limestone (slaw fissil), light yellow 2.57 7/2, micritic, dull to earthy luster, hard and slightly porous, tabular CMBT, light gray 2.57 6/2 with some darker 20.25-20.30, numerous small vugs 20.3-20.40, 20.75-20.80, 20.85-20.90, basal 1.0 carbonate.

1 22.00-27.00 Silty limestone (slaw to fissil), pale yellow 2.57 6/2, micritic, silty and laminated, hard and dense; weathered.

2 27.00-34.00 Silty limestone (slaw to fissil), pale yellow 2.57 6/2, micritic, dull luster, hard, slightly porous; stylolite at 34.65; irregular vertical fracture free stained and calcite coated, 32.05-34.00.

3 34.00-35.00 CORE LOSS

4 35.00-36.00 Limestone, grayish yellow 2.57 7/2, micritic to microcrystalline, hard and dense, dull luster, earthy luster, CMBT, light gray 1000 6/1, with white vugs, at base of unit 35.55-36.00; calcite filled vertical fracture through unit, high angle fracture 35.0-36.15.

5 36.00-37.00 Silty limestone, light gray 2.57 6/2 to 2.57 6/1, micritic, dull to earthy luster, hard and dense, slightly porous in places, green calcite vugs 37.1-37.6, some calcite filled light nearly vertical fractures.

6 37.00-38.00 Shale to limestone, light greenish gray 1007 7/1, poorly laminated, calcareous.

7 38.00-43.00 CORE LOSS, piece of red clay. Irregular 38.4-43.0.

8 43.00-44.00 Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense, bottom 4" shaly, same as top. 00 or next lower unit, calcite cemented irregular horizontal fracture at 43.75.

9 44.00-44.75 Limestone, yellowish brown 2.57 6/2, micritic, laminated, hard and dense, lower boundary (condition).

10 44.75-45.2 Limestone, yellowish gray 2.57 6/1, lithographic, hard and dense, small white fossils in band at 44.9.

11 45.2-46.0 CORE LOSS, rounded limestone piece .15 thick.

12 46.00-46.25 Limestone, grayish yellow brown 1008 6/2, micritic lithographic, hard and dense (slightly brown core with possible articulation or part of brownish piece); include dull micritic limestone in places; vertical fracture in top of unit. 30; whitish shaly residue in vugs towards base of lithographic unit.

13 46.25-46.5 CORE LOSS

14 46.50-50.0 Limestone, light yellow 2.57 7/2, micritic, dull to earthy luster, hard but crumbles under hammer blow; top has calcite cementation 4" thick.

15 50.00-52.00 Limestone, dolomitic (slaw to fissil in top and bottom), grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense.

16 52.00-52.7 Shale, clay shale, light gray 2.57 6/2, indistinct bedding, calcareous; includes .20 CORE LOSS.

17 52.7-53.0 Limestone, grayish yellow 2.57 7/2 to yellowish gray 2.57 6/1 micritic to microcrystalline, hard and dense.

18 53.0-53.00 Clay, light gray 57 7/2, calcareous, with some very small vugs or cavities.

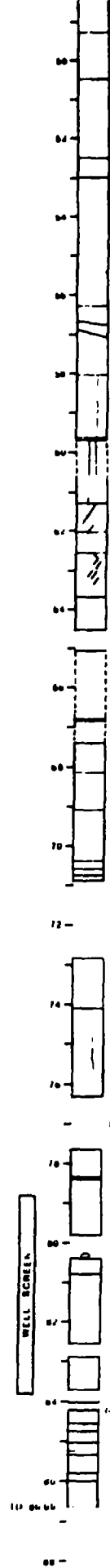
19 53.00-55.0 2.00 CORE LOSS IN GRAY CLAY CORE FILL

20 55.00-56.00 Silty limestone, grayish yellow 2.57 7/2, micritic, earthy luster, hard, porous, slightly vuggy 57.1-57.8.

21 56.00-56.0 Clay, light gray 2.57 7/1, laminated, hard when dry, calcareous.

22 56.00-56.7 CORE LOSS

23 56.7-56.7 T.S. 56.7



24 56.7-56.8 Limestone, grayish yellow 2.57 6/2, micritic to microcrystalline, hard and dense, glauconitic base 1/16" of .05 above base of unit.

25 56.80-56.90 Limestone, light gray 2.57 6/2, micritic, perhaps dolomitic (slaw fissil), hard and dense, base of unit shaly, glauconitic and oxidized 4" above and below.

26 56.90-57.0 Limestone, dolomitic (slaw fissil), light greenish gray 1007 7/1, parts irregularly earthy with common, slightly porous, bottom soft 4" below.

27 57.0-56.3 Shale, light yellow 2.57 7/2, bedding indistinct, mostly sandstone, calcareous, with whitish streaks.

28 56.3-56.05 Limestone, pale yellow 2.57 6/2, micritic, dull luster, hard and dense, but the whole vugs in places; bottom enlarged inclined bedding planes 56.7-56.8, 56.8-57.05.

29 56.05-56.05 Limestone, light gray 2.57 6/2, micritic, dull luster, hard and dense; vertical fracture with white calcite filling 56.05-56.05 to 56.15; vugs some, interconcentric with low micritic bedding 56.1-56.05, and broken at 56.30 but not weathered.

30 56.05-56.70 Shale, pale yellow, 2.57 6/2, with bright greenish streaks, finely laminated, soft, unweathered shale, calcareous.

31 56.70-56.2 Limestone, light gray 2.57 7/1, micritic and lithographic, hard and dense, micritic (core dull brown due to crossing of low angle vertical fractures and 4 1/2" shaly bedding vertical plane-bed joints, with possible red clay bedding); crossed vertical fractures from top (broken one) to 56.4, unweathered irregular shaly inclined fracture 56.4-56.15; bottom enlarged vertical fracture 56.15 to 56.20 with vuggy surface.

32 56.2-56.05 Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense; irregular vertical to steeply sloping fracture, slightly weathered 56.2-56.05, curved fracture with dolomite, slightly weathered 56.05-56.05 top of unit vugs by solution from overlying porous zone (more porous than and reversed in bed).

33 56.00-52.50 Limestone, pale yellow 2.57 6/2, micritic, dull to earthy luster, hard and dense.

34 52.50-52.70 Limestone, grayish yellow 2.57 6/2, lithographic, brittle, hard and dense; high angle fracture 52.50-52.60 (left to right slant), 52.70-52.60, 52.75-52.60, 53.0-53.15, 53.05-53.20, 53.20-53.30 (right to left slant), with essentially all surfaces solution etched; bottom contact unweathered and oxidized.

35 52.70-52.60 Limestone, light gray (unit) 2.57 6/2, micritic, silty, shaly to earthy luster, hard and dense.

36 52.60-52.50 CORE LOSS

37 52.50-52.50 Fill, silt and clay, pale yellow 57 6/1, laminated, oxidized in some laminations, (massive sample).

38 52.50-52.50 Limestone, dull yellowish brown 57 5/4, micritic, hard and dense

39 52.50-52.40 Limestone, argillaceous, dull yellowish brown, 57 5/4, micritic, hard and dense; pieces in part unmetamorphosed with calcite; appears porous; locally brown core-much loss of core.

40 52.40-52.35 Limestone, grayish yellow 57 7/2, micritic, silty, earthy luster, hard but breaks shaly with hammer, porous, vugs near top and bottom.

41 52.30-52.1 Limestone, grayish yellow 2.57 7/2, micritic, hard and dense, dull luster to top, brighter towards base.

42 52.1-52.00 Limestone, dolomitic, grayish yellow 2.57 7/2, micritic, earthy luster, hard, vugs in part, porous in part, "silicified," lower .20 dense and very shaly to fiss (dolomitic).

43 52.00-52.0 Limestone or siltstone, light gray 2.57 6/1, poorly laminated, calcareous, soft in lower part.

44 52.00-52.05 Limestone, yellowish gray 2.57 6/1, micritic to microcrystalline, hard and dense.

45 52.05-52.00 Shale, grayish yellow 2.57 6/2 dry, blackish when wet, laminated, soft (when more wet).

46 52.00-52.00 CORE LOSS in shale

47 52.00-52.00 Limestone, grayish yellow 2.57 6/2, micritic, hard and dense; unweathered nearly vertical fracture 52.0-52.1.

48 52.1-52.3 Limestone, grayish yellow 2.57 6/2, micritic, earthy luster, abundant white vugs, hard and vuggy towards base; nearly vertical fracture, 52.75-52.8; vertical fracture 52.05-52.1 (both appear to be "dry" at right angles).

49 52.3-52.55 VOID

50 52.55-52.30 Limestone, grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense (top of unit rounded).

51 52.30-52.40 Shale, dark brown 1008 3/2, argillaceous, laminated, soft

52 52.40-52.00 Limestone, dolomitic (slaw fissil), light gray 2.57 7/1, micritic, dull luster, hard and dense, calcite "eyes" 52.3-52.0.

53 52.00-52.4 CORE LOSS .10 reaction fragments of overlying limestone.

54 52.4-52.0 Limestone, light gray 2.57 6/1, micritic, dull luster, hard and dense.

55 52.00-52.50 Silty limestone (slaw to fissil) light gray 2.57 7/1 to gray 6/1, micritic, silty porous, hard, parts irregularly with hammer blow.

56 52.50-52.75 CORE LOSS AND BRICK IN CORE

57 52.75-52.75 Limestone, light gray 2.57 6/1, micritic, dolomitic (slaw to fissil), hard and dense, some lighter spots, possible core hollow, in top.

58 52.75-52.75 CORE LOSS AND BRICK IN PIECES.

59 52.75-52.75 VOID (drill bit)

60 52.75-52.75 Limestone, yellowish gray 2.57 6/1, micritic, finely laminated, very tough and dense; top of unit vuggy and solution etched with glass stain

61 52.75-52.75 Shale, yellowish gray 2.57 6/1, (dark gray) finely laminated, hard but parts readily, calcareous.

62 52.75-52.75 Limestone, gray 57 6/1, micritic, dull luster, hard and dense.

63 52.75-52.75 Shale, yellowish gray 2.57 6/1 (dark gray) argillaceous, finely laminated, hard and dense, calcareous.

64 52.75-52.75 Limestone, yellowish gray 2.57 6/1 (dark gray) micritic, dull luster, hard and dense.

65 52.75-52.75 T.S. 52.75

25.0-26.00 Dolomite (also see 21.2), light gray to 2.57 6/2, micritic, dull to earthy luster, hard and dense, crystalline, calcareous, calcite, light gray 2.57 6/2, calcite, some luster, 25.00-26.00, numerous small vugs, 25.0-26.00, 25.75-26.00, 25.50-26.75, basal 1.0 centimeter.

26.00-27.00 Dolomite (also see 21.2), pale yellow 2.57 6/2, oolitic, silty and laminated, hard and dense, calcareous.

27.00-28.00 Dolomite (also see 21.2), pale yellow 2.57 6/2, micritic, dull luster, hard, slightly porous; stylolites at 27.50; irregular vertical fracture from stained and calcite coated, 27.00-28.00.

28.00-28.0 CORE LOSS

28.0-28.4 Limestone, grayish yellow 2.57 7/2, micritic to microcrystalline, hard and dense, dull luster, pyrite stringer, CHEST, light gray 100% 6/1, with white rim, at base of unit 28.00-28.00; calcite filled vertical fracture through unit, high angle fracture 28.0-28.15.

28.0-28.7 Limestone, light gray 2.57 6/2 to 2.57 6/1, micritic, dull to earthy luster, hard and dense, slightly porous in places, green calcite vugs 27.1-27.8, some calcite filled tight nearly vertical fractures.

28.7-28.9 Shale to limestone, light greenish gray 100% 7/1, poorly laminated, calcareous.

28.0-23.0 CORE LOSS, piece of red clay. Truncated 28.0-23.0

23.0-24.1 Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense, brittle, some on top .05 of base lower unit, calcite coated irregular horizontal fracture at 23.75.

24.0-24.2 Limestone, yellowish brown 2.57 6/2, micritic, laminated, hard and dense, lower secondary transitional.

24.0-24.2 Limestone, yellowish gray 2.57 6/1, lithographic, hard and dense, small white fossils in bed at 24.0.

24.0-24.0 CORE LOSS, rounded limestone piece .15 thick.

24.0-24.2 Limestone, grayish yellow brown 100% 6/2, micritic lithographic, hard and dense (locally brown core with possible alveolate or out of nucleus plates); includes dull micritic limestone in places; vertical fracture in top of unit .3; whitish shaly inside in vugs towards base of lithographic unit.

24.0-24.0 CORE LOSS

24.0-24.0 Limestone, light yellow 2.57 7/2, micritic, dull to earthy luster, hard but crumbles under hammer blow; top has calcite deposition 4" thick.

24.0-24.0 Limestone, micritic (also see 21.2), earthy luster, hard and dense.

24.0-24.0 Shale, clay shale, light gray 2.57 6/2, indistinct bedding, calcareous, includes .05 CORE LOSS.

24.0-24.0 Limestone, grayish yellow 2.57 7/2 to yellowish gray 2.57 6/1 micritic to microcrystalline, hard and dense.

24.0-24.0 Clay, light gray 57 7/1, calcareous, with some very small vugs or carbonates.

24.0-24.0 2.00 CORE LOSS IN GRAY CLAY CORE FILL

24.0-24.0 Dolomite, grayish yellow 2.57 7/2, micritic, earthy luster, hard, porous, slightly waxy 27.1-27.8.

24.0-24.0 Clay, light gray 2.57 7/1, laminated, hard when dry, calcareous.

24.0-24.0 CORE LOSS

24.0-24.0 T.B. 24.0



24.0-24.0 Limestone, grayish yellow 2.57 6/2, micritic to microcrystalline, hard and dense, glauconitic base 1/4" at .05 above base of unit.

24.0-24.0 Limestone, light gray 2.57 6/2, micritic, earthy luster, hard and dense, base of unit shaly, glauconitic and calcareous 4" above and below.

24.0-24.0 Thin shale, micritic (also see 21.2), light greenish gray 100% 7/1, partly irregularly shaly with hammer, slightly porous, bottom half top 6" calcareous.

24.0-24.0 Shale, light yellow 2.57 7/4, bedding indistinct, mostly calcareous, calcareous, with whitish streaks.

24.0-24.0 Limestone, pale yellow 2.57 6/2, micritic, dull luster, hard and dense, but the whole mass in place, calcite enlarged inclined bedding planes 24.7-24.8, 24.9-24.11.

24.0-24.0 Limestone, light gray 2.57 6/2, micritic, dull luster, hard and dense, vertical fracture with white calcite filling 24.00-24.05 to all to 24.05; vugs some, interconnected with the micritic calcite filling 24.05-24.1 and brown at 24.20 but not calcareous.

24.0-24.0 Shale, pale yellow, 2.57 6/2, with bright greenish streaks, finely laminated, soft, weathered shale, calcareous.

24.0-24.0 Limestone, light gray 2.57 7/1, micritic and sublitographic, hard and dense, brittle (core badly broken during its crossing of top smooth vertical fracture and 2 1/2" shaly vertical fracture), with possible red clay filling; crossed vertical fractures from top (brown core) to 24.05, unweathered irregular shaly inclined fracture 24.0-24.15, calcite enlarged vertical fracture 24.15 to 24.20 with waxy surface.

24.0-24.0 Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense; irregular vertical to shaly sloping fracture, slightly weathered 24.0-24.05, curved fracture with calcite, slightly weathered 24.0-24.05 top of unit waxy by solution from overlying porous zone (core piece stained and returned to unit).

24.0-24.0 Limestone, pale yellow 2.57 6/2, micritic, dull to earthy luster, hard and dense.

24.0-24.0 Limestone, grayish yellow 2.57 6/2, lithographic, brittle, hard and dense; high angle fractures 24.0-24.05 (left to right slope), 24.05-24.10, 24.10-24.15, 24.15-24.20, 24.20-24.25 (right to left slope), with essentially all surfaces solution etched; bottom contact weathered and oxidized.

24.0-24.0 Limestone, light gray (white) 2.57 6/1, micritic, silty, shaly to earthy luster, hard and dense.

24.0-24.0 CORE LOSS

24.0-24.0 Fill, silt and clay, pale yellow 57 6/4, laminated, based on same limestone, (same sample).

24.0-24.0 Limestone, dull yellowish brown 57 6/4, micritic, hard and dense.

24.0-24.0 Limestone, brackish, dull yellowish brown, 57 6/4, micritic, hard and dense; piece in part stained with calcite; appears permeable; badly brown core-much loss of core.

24.0-24.0 Limestone, grayish yellow 57 7/2, micritic, silty, earthy luster, hard but breaks easily with hammer, porous, waxy near top and bottom.

24.0-24.0 Limestone, grayish yellow 2.57 7/2, micritic, hard and dense, dull luster in top, irregular towards base.

24.0-24.0 Limestone, micritic, grayish yellow 2.57 7/2, micritic, earthy luster, hard waxy in part, porous in part, "limestone," lower .20 dense and very shaly to fill (limestone).

24.0-24.0 Limestone or siltstone, light gray 2.57 6/1, poorly laminated, calcareous, soft to lower part.

24.0-24.0 Limestone, yellowish gray 2.57 6/1, micritic to microcrystalline, hard and dense.

24.0-24.0 Shale, grayish yellow 2.57 6/2, drab, blocky when wet, limestone, soft (some core loss).

24.0-24.0 CORE LOSS in shale

24.0-24.0 Limestone, grayish yellow 2.57 6/1, micritic, hard and dense; unweathered nearly vertical fracture 24.0-24.1.

24.0-24.0 Limestone, grayish yellow 2.57 6/2, micritic, earthy luster, abundant small vugs, hard and waxy towards base, nearly vertical fracture, 24.75-25.0; vertical fracture 25.05-25.7 (both appear to be "dips" at right angles).

24.0-24.0 VOID

24.0-24.0 Limestone, grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense (top of unit rounded).

24.0-24.0 Shale, dark brown 100% 6/3, organic, limestone, soft

24.0-24.0 Limestone, micritic (also see 21.2), light gray 2.57 7/1, micritic, dull luster, hard and dense, calcite "vugs" 24.0-24.0.

24.0-24.0 CORE LOSS .20 reaction fragments of overlying limestone.

24.0-24.0 Limestone, light gray 2.57 6/1, micritic, dull luster, hard and dense.

24.0-24.0 Dolomite (also see 21.2) light gray 2.57 7/1 to gray 6 6/1, micritic, silty porous, hard, partly irregularly with hammer blow.

24.0-24.0 CORE LOSS AND BRICKEN CORE

24.0-24.0 Limestone, light gray 2.57 6/1, micritic, micritic (also see 21.2), hard and dense, some lighter spots, possible vugs towards top.

24.0-24.0 CORE LOSS AND BRICKEN PIECES

24.0-24.0 VOID (driller)

24.0-24.0 Limestone, yellowish gray 2.57 6/1, micritic, finely laminated, very tough and dense, top of unit waxy and solution modified area black stain.

24.0-24.0 Shale, yellowish gray 2.57 6/1, (dark gray) finely laminated, hard but parts readily, calcareous.

24.0-24.0 Limestone, gray 57 6/1, micritic, dull luster, hard and dense.

24.0-24.0 Shale, yellowish gray 2.57 6/1 (dark gray) finely laminated, hard, with shale fossils, calcareous, low angle fracture at 24.20-24.25.

24.0-24.0 Limestone, gray 57 6/1, micritic, dull luster, hard and dense.

24.0-24.0 Shale, yellowish gray 2.57 6/1 (dark gray) organic, finely laminated, hard and dense, calcareous.

24.0-24.0 Limestone, yellowish gray 2.57 6/1 (dark gray) micritic, dull luster, hard and dense.

24.0-24.0 T.B. 24.0

4 20.0-20.05 Dolomite (also fiss) pale yellow 2.57 7/2, micritic, dull to earthy luster, hard and dense, slightly porous, tabular cleavage. Light gray 2.57 7/2, with some calcite 20.00-20.05, numerous small vugs 20.0-20.05, 20.75-20.85, 20.95-20.95, basal 1.0 enclosed.

5 20.00-20.05 Dolomite (also to fiss), pale yellow 2.57 6/2, micritic, dull to earthy luster, hard, slightly porous, slightly tabular at 20.05; irregular vertical fracture from stained and calcite stained, 22.00-24.00.

6 20.00-20.05 Dolomite (also to fiss), pale yellow 2.57 6/2, micritic, dull luster, hard, slightly porous, slightly tabular at 20.05; irregular vertical fracture from stained and calcite stained, 22.00-24.00.

7 20.00-20.05 CORE LOSS

8 20.0-20.0 Limestone, grayish yellow 2.57 7/2, micritic to microcrystalline, hard and dense, dull luster, pyrite stringers (0.07), light gray 2.57 6/2, with white rim, at base of unit 20.05-20.05; calcite filled vertical fracture through unit, high angle fracture 20.0-20.05.

9 20.0-20.7 Dolomite, light gray 2.57 6/2 to 7.57 6/1, micritic, dull to earthy luster, hard and dense, slightly porous to block, green calcite vugs 2.1-2.5, some calcite filled tight nearly vertical fracture.

10 20.7-20.8 Shale to limestone, light greenish gray 2.57 7/1, poorly laminated, calcareous.

11 20.0-43.0 CORE LOSS, piece of red clay. Truncated 20.4-43.0

12 43.0-44.2 Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense, brittle, some at top 0.05 of next lower unit, calcite enclosed irregular horizontal fracture at 43.75.

13 44.2-44.7 Limestone, yellowish brown 2.57 6/2, micritic, laminated, hard and dense, lower boundary transitional.

14 44.7-45.2 Limestone, yellowish gray 2.57 6/1, lithographic, hard and dense, dull shale fossil in bed at 44.5.

15 45.2-46.0 CORE LOSS, rounded limestone piece .15 thick.

16 46.0-46.2 Limestone, grayish yellow brown 2.57 6/2, micritic lithographic, hard and dense (some brown core with possible calcite at top of limestone piece); includes dull micritic limestone in place; vertical fracture to top of unit .30; within shaly voids in vugs towards base of lithographic unit.

17 46.2-46.0 CORE LOSS

18 46.0-46.0 Limestone, light yellow 2.57 7/2, micritic, dull to earthy luster, hard but crumbles near hammer blow; top has calcite deposition 4" thick.

19 20.0-20.20 Limestone, dolomitic (also to fiss in top and bottom), grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense.

20 51.20-52.7 Shale, clay shale, light gray 2.57 6/2, indistinct bedding, calcareous, includes .20 CORE LOSS.

21 52.7-53.8 Limestone, grayish yellow 2.57 7/2 to yellowish gray 2.57 6/1 micritic to microcrystalline, hard and dense.

22 53.8-53.85 Clay, light gray 5/1, calcareous, with some very small vugs or carbonates.

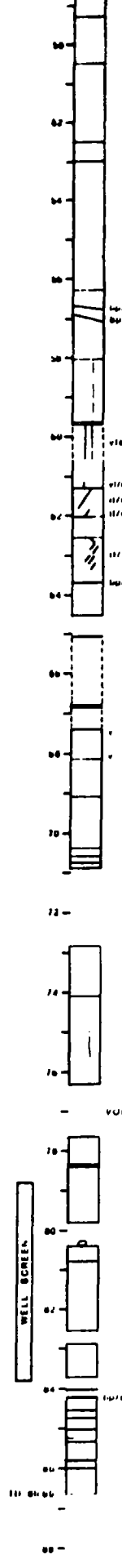
23 53.85-54.0 1.00 CORE LOSS IN BENT CLAY CASE FILL

24 54.0-54.05 Dolomite, grayish yellow 2.57 7/2, micritic, earthy luster, hard, porous, slightly vuggy 57.1-57.6.

25 54.05-54.8 Clay, light gray 2.57 7/1, laminated, hard when dry, calcareous.

26 54.0-54.7 CORE LOSS

27 7.0- 80.7



28 60.2-60.24 Limestone, grayish yellow 2.57 6/2, micritic to microcrystalline, hard and dense, glauconitic base 1/16" of .05 above base of unit.

29 60.00-62.00 Limestone, light gray 2.57 6/2, micritic, perhaps dolomitic (also fiss), hard and dense, base of unit shaly, glauconitic and dolomitic 4" above and below.

30 62.00-63.0 Limestone, dolomitic (also fiss), light greenish gray 2.57 7/1, partly irregularly earthy with hammer, slightly porous, bottom soft; top 4" included.

31 63.0-64.2 Shale, light yellow 2.57 7/6, bedding indistinct, shaly, calcareous, with whitish streaks.

32 64.2-64.05 Limestone, pale yellow 2.57 6/2, micritic, dull luster, hard and dense, but the minute vugs in places; solution enlarged fractured bedding planes 55.7-56.5; 55.5-57.25.

33 64.00-64.00 Limestone, light gray 2.57 6/2, micritic, dull luster, hard and dense, vertical fracture with white calcite filling 56.00-56.00 to top to 59.00; vuggy zone, interpenetrated with tan micritic bedding 59.1-59.41, and broken at 59.25 but not enclosed.

34 64.00-64.20 Shale, pale yellow, 2.57 6/2, with bright greenish streaks, finely laminated, soft, weathered shale, calcareous.

35 64.20-61.2 Limestone, light gray 2.57 7/1, micritic and lithographic, hard and dense, brittle (some badly broken owing to crossing of two smooth vertical fractures and a fifth nearly vertical plane-shear joint with possible red clay seepage); crossed vertical fractures from top (broken core) to 60.4; unweathered irregular strongly inclined fracture 60.5-61.11, solution enlarged vertical fracture 61.15 to 61.20 with vuggy surface.

36 61.2-62.05 Limestone, yellowish gray 2.57 6/1, micritic, dull luster, hard and dense; irregular vertical to steeply sloping fracture, slightly weathered 61.2-61.00, curved fracture with sinuities, slightly weathered 61.00-61.00 top of unit vuggy by solution from overlying porous zone (some pieces stained and rounded to top).

37 62.00-62.00 Limestone, pale yellow 2.57 6/2, micritic, dull to earthy luster, hard and dense.

38 62.00-63.70 Limestone, grayish yellow 2.57 6/2, lithographic, brittle, hard and dense; high angle fractures 62.56-62.66 (top to right shale), 62.70-62.80, 62.70-62.90, 63.0-63.10, 63.20-63.30, 63.30-63.35 (right to left shale), with essentially all surface solution vugs; bottom contact weathered and stained.

39 63.70-64.00 Limestone, light gray (unit) 7.57 6/1, micritic, shaly to earthy luster, hard and dense.

40 64.00-64.1 CORE LOSS

41 64.1-64.0 FILL, silt and clay, pale yellow 5/1, laminated, graded on some laminations, (massed sample).

42 64.0-64.05 Limestone, dull yellowish brown 5/1, micritic, hard and dense.

43 64.05-67.00 Limestone, brucite, dull yellowish brown, 5/4, micritic, hard and dense; pieces in part unattached with calcite; appears porous; badly broken core-much loss of core.

44 67.00-68.15 Limestone, grayish yellow 5/1 7/2, micritic, shaly, earthy luster, hard but breaks shaly with hammer, porous, vugs near top and bottom.

45 68.15-68.1 Limestone, grayish yellow 2.57 7/2, micritic, hard and dense, dull luster to top, brittle towards base.

46 68.1-70.40 Limestone, dolomitic, grayish yellow 2.57 7/2, micritic, earthy luster, hard vugs in part, porous in part, "limestone," lower .20 dense and very shaly to fiss (dolomitic).

47 70.40-70.6 Limestone or siltstone, light gray 2.57 6/1, poorly laminated, calcareous, soft to lower part.

48 70.6-70.70 Limestone, yellowish gray 2.57 6/1, micritic to microcrystalline, hard and dense.

49 70.70-70.80 Shale, grayish yellow 2.57 6/2 dry, blocky when wet, laminated, soft (some core loss).

50 70.80-70.85 CORE LOSS in shale

51 72.00-74.1 Limestone, grayish yellow 2.57 6/2, micritic, hard and dense, unweathered nearly vertical fracture 73.4-74.1.

52 74.1-74.3 Limestone, grayish yellow 2.57 6/2, micritic, earthy luster, abundant minute vugs, hard and vuggy towards base; nearly vertical fracture, 74.70-75.9; vertical fracture 75.00-75.2 (both appear to be "dry" at right angles).

53 74.2-77.65 VOID

54 77.65-78.20 Limestone, grayish yellow 2.57 7/2, micritic, earthy luster, hard and dense (top of unit rounded).

55 78.20-78.40 Shale, dark brown 2.57 3/2, argillitic, laminated, soft

56 78.40-79.00 Limestone, dolomitic (also fiss), light gray 2.57 7/1, micritic, dull luster, hard and dense, calcite "eyes" 78.5-79.0.

57 79.00-80.4 CORE LOSS .30 residual fragment of overlying limestone.

58 80.4-80.8 Limestone, light gray 2.57 6/1, micritic, dull luster, hard and dense.

59 80.0-80.50 Dolomite (also to fiss) light gray 2.57 7/1 to gray 6/1, micritic, shaly porous, hard, parts irregularly with hammer blow.

60 80.50-82.00 CORE LOSS AND BRUCITE CORE

61 82.00-82.7 Limestone, light gray 2.57 6/1, micritic, dolomitic (also to fiss), hard and dense, some lighter spots, possible wire burrows, to top.

62 82.7-82.85 CORE LOSS AND BRUCITE PIECES.

63 82.85-84.25 VOID (artificial)

64 84.25-84.50 Limestone, yellowish gray 2.57 6/1, micritic, finely laminated, very tough and dense; top of unit vuggy and filled with black stain.

65 84.50-84.70 Shale, yellowish gray 2.57 4/1, (dark gray) finely laminated, hard but parts readily, calcareous.

66 84.70-85.00 Limestone, gray 5/1, micritic, dull luster, hard and dense.

67 85.00-85.20 Shale, yellowish gray 2.57 6/1 (dark gray) finely laminated, hard, with shale fossils, calcareous; low angle fracture at 85.20-85.20.

68 85.20-85.80 Limestone, gray 5/1, micritic, dull luster, hard and dense.

69 85.80-86.0 Shale, yellowish gray 2.57 6/1 (dark gray) argillitic, finely laminated, hard and dense, calcareous.

70 86.0-86.00 Limestone, yellowish gray 2.57 6/1 (dark gray) micritic, dull luster, hard and dense.

71 7.0- 80.00