

Sitename: 46STMAP-14

Location: T-92 N R-29 W section 22 SW1/4 SE1/4 SE1/4

Landscape position: till plain

Parent Material: diamicton

Soil Series: Nicollet

Vegetation: pasture

Slope: 2 %

Elevation: 1131 ft.

Quadrangle: Bode

Date Drilled: 10/29/2001

Described by: D.J. Quade

Landowner: Humboldt County Conservation Board

Remarks: 2.7 inch diameter core. Driller Aquadrill Inc.

GPS Location: Garmin 17N WAAS Receiver (<3-5 meters)

Depth (ft)	Horizon /W. Zone	Description
DeForest Formation-- Undiff.		
0.0-2.7	Ap	black (10YR 2/1) to very dark gray (10YR 3/1) loam; massive to weak fine subangular blocky structure; friable; noneffervescent; abrupt wavy boundary; core compressed and possibly disturbed. Recovered ~1.5 / 4.5 ft.
2.7-3.0	BC	dark grayish brown (2.5Y 4/2) loam; massive; friable; noneffervescent; clear smooth boundary ; few thin fine sand layers.
Dows Formation-- Morgan Mbr.		
3.0-4.5	CB	dark grayish brown (2.5Y 4/2) loam diamicton and few thin beds of fine sand; common fine distinct yellowish brown (10YR 5/4) mottles; vaguely stratified (>1.0 to 0.1 ft. beds); friable; few fine calcium carbonate accumulations; noneffervescent

Depth (ft)	Horizon /W. Zone	Description
4.5-5.4	MRJL	olive brown (2.5Y 5/4) loam diamicton; common fine medium faint gray (2.5Y 5/1) mottles; massive; ; fine dark yellowish brown (10YR 4/4) horizontal joints; noneffervescent; silt content seems variable in this interval.
5.4-7.5	MRJU	olive brown (2.5Y 5/4) loam diamicton; few medium coarse distinct gray (2.5Y 5/1) mottles; massive; ; medium brown (7.5YR 4/4) horizontal joints; strongly effervescent
7.5-7.8	MRJU	olive brown (2.5Y 5/4) loam diamicton; few coarse distinct gray (2.5Y 5/1) mottles; massive; friable; common fine Fe and Mn concretions; strongly effervescent
7.8-9.5	RJU	olive brown (2.5Y 5/4) loam diamicton; vaguely stratified (>1.0 to 0.1 ft. beds); friable; common fine strong brown (7.5YR 4/6) horizontal joints; strongly effervescent;
9.5-12.8	RJU	olive brown (2.5Y 5/3) loam to coarse loam diamicton; vaguely stratified (>1.0 to 0.1 ft. beds); very friable to friable; fine to medium distinct brown (7.5YR 4/4) horizontal joints; strongly effervescent; sand content variable in this interval.
12.8-16.9	RJU	olive brown (2.5Y 5/3) and olive brown (2.5Y 4/3) loam diamicton; vaguely stratified (>1.0 to 0.1 ft. beds); friable; fine to medium distinct strong brown (7.5YR 4/6) horizontal joints; strongly effervescent; silt content variable in this interval.

Depth (ft)	Horizon /W. Zone	Description
16.9-19.0	RU	olive brown (2.5Y 4/3) and olive brown (2.5Y 5/3) loam diamicton; vaguely stratified (>1.0 to 0.1 ft. beds); very friable; strongly effervescent possible debris flow.
		<i>Dows Formation-- Alden Mbr.</i>
19.0-22.3	UJU	dark gray (5Y 4/1) loam diamicton; massive; slightly firm; few medium prominent strong brown (7.5YR 4/6) and dark reddish brown (5YR 3/4) horizontal joints; strongly effervescent
22.3-24.5	UJU	dark gray (2.5Y 4/1) loam diamicton and one thin layer of olive brown (2.5Y 5/3) fine sand; massive; slightly firm; common fine distinct brown (7.5YR 4/4) to strong brown (7.5YR 4/6) horizontal joints; strongly effervescent
24.5-37.7	UU	dark gray (5Y 4/1) loam diamicton; massive; slightly firm; moderately effervescent; abrupt wavy boundary ; lower contact with oxidized deposit. Possibly Alden Mbr. or Sheldon Creek Formation. Sampled.
37.7-39.3	OU	brown (10YR 5/3); massive; slightly firm; few medium gypsum accumulations; strongly effervescent Alden or Sheldon Creek Formation??
		<i>Cretaceous Bedrock</i>
39.3-44.5	OL	shales and sandstone; laminated; firm

RUTLAND MARSH CORE (W54830)

SE SE SE SE SW sec. 22, T92N, R29W, Humboldt Co., Iowa

elevation: 1130 ft.

logged by Brian Witzke, 11/ 2001

depths in feet

QUATERNARY

0-39.5. See description by D. Quade, L. Seigley

CRETACEOUS

DAKOTA FORMATION

39.5- 41.1. Mudstone, pale to very light green-gray, mottled with red brown and medium brown, very silty to sandy, soft, maleable when wet, upper slightly calcareous, upper part with scattered quartz crystals/quartz nodules (to 1 cm

41.1-42.2. Siltstone to very-fine-grained sandstone, very light yellow-brown to yellow-orange; quartz grains, subrounded, looks like quartzarenite; may be slightly argillaceous.

42.2-44.5. Siltstone to very-fine-grained sandstone, ochrous, medium red brown to dark maroon, hard cemented in part, iron-oxide cements, calcite cements noted; quartz grains, subrounded to subangular; poor recovery in part.

MISSISSIPPIAN

GILMORE CITY FORMATION

HUMBOLDT MEMBER

44.5-45.2. Poor recovery, part broken. Limestone, peloidal and oolitic (fine oolitic packstone-grainstone in part), scattered oncolites (to ½ inch); common calcite-filled fenestral fabrics and birdseye structures through; scattered small intraclasts (to 5 mm).

45.2-47.2. Limestone, dense, fine oolitic packstone-grainstone, top 0.2 ft part sublithographic; open pores (1-2 mm) noted at 45.9, 46.1 (with 1" calcite void fill), 46.2-46.4, basal 0.3 ft; oncolites noted at 45.4-45.5 (¼ - ½"), 45.7-45.8 (to 1"), 45.9-47.2 (¼ - ½"); stylolites noted at 47.0 and base; calcite-filled fenestral fabrics/birdseye at 45.4, 45.7-45.9, 46.2-46.45, 46.6-46.9.

47.2-49.0. Limestone, dominantly fine oolitic packstone-grainstone, small intraclasts; peloidal wackestone-packstone? lower 0.6 ft; dense, pale brown, sublithographic limestone top 0.2 ft; oncolite (½") at 47.7; stylolites at 47.4, 47.7-48.3 (large angled stylolite, part open), 48.3, 49; partially-open fracture 48.3-49; calcite-filled fenestral fabrics/birdseye (1-10 mm) 48-48.3; calcite-filled fenestrae and void/fracture fills 48.5-48.7.

49.0-49.9. Limestone, intraclastic packstone-grainstone, most clasts 1-4 mm, some clasts to 10 mm; vertical calcite fracture fills through; calcite-filled fenestral fabrics/birdseye at 49-49.2, 49.5-49.9.

49.9-51.6-. Limestone part intraclastic as above, calcite-filled fenestral fabrics/birdseye common through; scattered open pores (1-2 mm) at 50.6 and 51.4 (with calcite void fill to ½"); calcite-filled fractures (part open) continued from above to 50.5; intraclastic (1-5 mm, some to 10 mm) and finely oolitic at 51.1-51.6; oncolite? 1" at 51.25; cup coral at 51.4; open fracture (~horizontal) at 51.3; stylolite at base.

51.6-53.8. Limestone, part oxidized yellow-orange; part intraclastic (1-7 mm) top 0.3 and 52.1-52.7; peloidal below 52.7; oncolite? at 53.1; calcite-filled fenestral fabrics/birdseye 51.8-51.9; scattered open pore space (1-5 mm) 51.8-52.5; iron-oxide vug fills (½ to 1½"); calcite-filled fractures lower 0.5 ft; stylolite at 53.5.

53.8-55.2 (run). Limestone, part broken into small pieces; upper half is dense, peloidal-intraclastic, approaches sublithographic, with common calcite-filled fenestral

fabrics/birdseye; lower half is probably peloidal, dense; scattered open pores near top; possible oncolites at ~55.0.

- 55.2-59.2. Limestone, dense, dominantly peloidal packstone; intraclasts to 15 mm at 57.1-57.3; open pores noted 56.9-57.2; subvertical fracture (part open) at 56.8; open fracture at base (with oxidized pyrite); cup coral with oncolitic coating at 56.6; oncolites (to 1½") at 57.5-57.9; intraclasts/oncolites 58.4-58.6; stylolites at 56.3, 57.0, 58.0.
- 59.2-62.7 (box). Limestone, peloidal-intraclastic packstone-grainstone, oxidized yellow-orange, subvertical to subhorizontal open fractures noted at top, 59.6-60.2, 60.7-60.9, 62.4; open vugs and pores noted 61.7-62.3, 62.5; stylolite 60.5.
- 62.7-65.2 (run). Limestone, as above, oxidized yellow-orange; scattered pores through; open vertical fractures 63-64.5 and 65-65.2.
- NOTE: Significant footage discrepancies between box footages and core-barrel-run footages (marked inserts) are apparent; run inserts as follows: "65.2-72.7" (= 7.5 ft) but 10.1 feet of core recovered; "72.7-82.7" (= 10 ft) but 10.3 ft recovered; "82.7-93.0" (= 10.3 ft) but 9.5 ft recovered; "93.0-99.0" (=6 ft) but 6.7 ft recovered. These discrepancies are difficult to reconcile, and a resolution using actual core thicknesses starting at 65.2 (and not run footages) is utilized. The following translation is used "72.7" (run) = 75.3, "82.7" (run) = 85.6, "93.0" (run) = 95.1, "99.0" (run) = 101.8, and "102" (run) = 102.6.
- 65.2-72.4. Limestone, oxidized yellow-orange through, dominantly a peloidal and small intraclastic packstone; possible oncolites noted at 66.7, 67.5 (2"), 71.8 (1"); intraclasts (1-10 mm) with faint fenestral fabric at 69.2-69.7; subvertical open fracture and scattered open pores 65.2-66.3; open voids (to 1") 66.8; open vertical fracture 69.4-71 and 71.7-base; stylolites noted at 66.5, 68.4, 69.7, 71.2, base.
- 72.4-75.1. Limestone, part oxidized yellow-orange, dominantly fine peloidal and intraclastic packstone-grainstone; intraclastic to oncolitic (to 1") at 72.6-73.3; part oolitic/coated grain with larger intraclasts (to 1 cm) scattered, fenestral fabrics/birdseye at ~74-74.8; part sublithographic with fenestral fabrics at 74.8-75.1; bedding fracture 73.9; vertical fracture (partly open) at 74-75.1; stylolites at 73.5, 73.8; gastropods (to 1") noted 72.9-73.3.
- 75.1-77.9. Limestone, motly dense, peloidal wackestone-packstone to sublithographic mudstone, part intraclastic (especially 75.7-76, 76.2-76.4); calcite-filled fenestral fabrics/birdseye throughout; stylolites noted at 75.3, 75.4, 75.5, 75.6, 76, 76.1, 76.4; oxidized bedding planes (open) at 77.5, 77.6.
- 77.9-78.45. Limestone, intraclastic packstone, pisolitic to oncolitic (oncolites to 1 cm); stylolites at 78.1, 78.2, 78.4 (swarm).
- 78.45-79.8. Limestone, peloidal to sublithographic, calcite-filled fenestral fabrics/birdseye noted 78.4-78.9 (part open pores at base), 79-79.1, 79.4-79.5; stylolites at 78.5, 78.7 (faint), 78.9, 79.3, 79.6.
- 79.8-80.7. Limestone, intraclastic wackestone top 0.2 ft (clasts to 5 mm); fine intraclastic wackestone, faintly laminated; prominent calcite-filled fenestral fabrics (part open pores) at 80.3-80.7; stylolites at 80.2 (major argillaceous stylolite), 80.3.
- 80.7-82.0. Limestone, dense, peoidal to sublithographic; faintly laminated 81.2-81.4; basal 0.1 ft with intraclasts (to 1.5 cm); calcite-filled fenestral fabrics/birdseye noted 80.9-81.2 and 81.4-81.8; stylolites at 80.8, 81, 81.2, 81.3, 81.4, 81.6; base with prominent argillaceous stylolite surface.
- 82.0-84.0. Limestone, peloidal-intraclastic wackestone to packstone, part sublithographic; sublithographic with prominent fenestral fabrics top 0.3 ft; faintly laminated 83-83.4; calcite-filled fenestral fabrics/birdseye at 82.4-82.6 and 83.6-83.8 (part with open pores/fractures); scattered open pores 82-82.7; stylolites 82-82.2 (abundant), 82.4, 82.7, 82.9, 83.2 (prominent argillaceous stylolite), 83.3 (swarm of four), 83.4, 83.9.
- 84.0-86.4. Limestone, dominantly a peloidal-small intraclastic wackestone to packstone; peloidal to sublithographic 84-84.9; top 0.4 ft with fenestral fabrics/birdseye, common open pores;

larger intraclasts noted at 85-85.7 (to 5 mm) and 85.8-86.4 (to 1 cm, includes possible oncoïd).

- 86.4-86.7. Limestone, peloidal-intraclastic packstone, lower 0.2 ft with intraclasts 1-5 mm.
- 86.7-89.9. Limestone, part with gray unoxidized hues; peloids, small intraclasts, fine skeletal debris; scattered intraclasts to 4 mm; recrystallized in part with common medium to coarse crystalline calcite; prominent stylolites noted 87.3, 87.6, 87.7 (with calcite fracture); large diagonal stylolite 88-88.4, 88.5, 89; prominent argillaceous stylolites at 88.9-89.2, 29.4-89.6, 89.8-89.9 (part open).
- 89.9-101.1. Limestone, dense, homogeneous, recrystallized peloidal-skeletal-intraclastic limestone, common medium to coarse crystalline calcite; larger intraclasts at 90.3 (to 1 cm), 90.9 (1"), 92.3-92.7 (1-7 mm), 94.6 (1 cm), 97.6 (8 mm), 98.1-98.2 (8 mm), 98.3 (4 mm); prominent stylolites at 90.5 (part open) 90.8, 91.1, 91.5, 92.2, 93.7, 94.6, 96, 96.2, 96.5, 96.7, 97.3, 97.4, 97.8, 98.1, 98.3, 99.8, 101.1; slightly darker colored 96.6-97.3 (coarse laminae?).

MARBLE VALLEY MEMBER

- 101.1-102.6 (end run). Limestone, peloidal to sublithographic, part poor recovery, included broken and rounded core fragments; top 0.7 ft with abundant stylolite swarms, fine calcite-filled fenestral fabrics/birdseye scattered to common through; intraclasts at 100.3 (1-8mm); remaining core pieces include sublithographic to intraclastic limestone, common calcite-filled fenestral fabrics, stylolites, intraclasts to 8 mm
- 102.6-104.2. Limestone, skeletal to intraclastic, fine to coarse packstone, large intraclast at 103.3 (1"); bottom 0.4 ft is dense, part intraclastic; stylolites at 103.8, 104.
- 104.2-105.0. Dolomite, fine to medium crystalline, fine to coarse crystalline downward; common stylolites, argillaceous stylolite at 104.5.
- 105.0-110.0 (3.4 ft recovered). Core loss probably in middle to upper part of interval. Top is dolomite, calcitic, stylolites, calcite-filled vugs, large burrow mottles; Limestone below, with calcitic dolomite near top (f-m crystalline), limestone is part dolomitic, with dolomite near base, common stylolites in limestone and dolomite; middle of unit with common cup corals, intraclasts and stylolites; blackened stylolite fill near base; coarse skeletal packstone at base.
- 110.0-113.0. NO CORE recovered (difficulties with slightly bent core barrel).
- 113.0-122.6 (100% recovery and below). Limestone, dense, no fractures, skeletal packstone-grainstone with scattered intraclasts; skeletal debris includes brachiopods, bryozoans, crinoid debris, coarse crinoid debris 117-119, common cup corals 119.8-122.6; prominent stylolites every 1 to 2 ft (part with blackened stylolite fills).
- 122.6-128.2. Limestone, skeletal packstone-grainstone, medium to coarse grained, coarse crinoid debris common through; slightly darker gray than above, scattered to common stylolites through; cup corals noted at 123.4, 123.6.
- 128.2-131.7. Limestone, dominantly fine to coarse skeletal packstone-grainstone, fine intraclasts noted near base; cup coral near base; stylolites common through; black stylolite fills at 128.8-129.

IOWA FALLS MEMBER

- 131.7-134.7. Dolomite and calcitic dolomite, porous skeletal molds (fine to medium crinoid debris), very fine to coarse crystalline, intercrystalline porosity increases downward; stylolites in top 0.6 ft; black clay fill at top; becomes oxidized yellow-orange downward; gradational below.
- 134.7-143.7. Dolomite, includes calcitic dolomite top 3 ft, skeletal molds top 3 ft (crinoid debris); very fine to medium crystalline, common intercrystalline porosity through; interval is oxidized yellow-orange, part soft and crumbly in upper 3 ft; horizontal bedding breaks are solutionally enlarged in part, bedding plane breaks common top 4.2 ft; additional bedding plane breaks at 141.2, 142.7-143.7.

- 143.7-145.7. Dolomite, very fine to fine crystalline, becomes light-medium gray downward, common small crinoid debris molds, scattered brachiopod molds; common calcite-filled vugs lower 0.6 ft; middle part with 2" silty light-medium gray clay fill.
- 145.7-147.7. Dolomite, light gray to brown gray, common large calcite-filled vugs; pyrite-filled vug at 146.4; stylolites scattered in lower half; black and pyritic void fill at 147.4.
- 147.7-148.2. Dolomite, fine to coarse crystalline, porous skeletal molds (crinoid debris); black stylolite fill near top.
- 148.2-151.7. Limestone, dense, sublithographic mudstone to intraclastic wackestone; intraclasts to 1" at 149.2-150 and lower 0.4 ft; abundant stylolites through.
- 151.7-156.3. Dolomite, top 1.2 ft oxidized and very porous with molds and pores; 152-9-153.7 dense medium crystalline dolomite and calcitic dolomite/limestone; remainder is dolomite, fine to coarse crystalline, part with poikilotopic calcite fills, scattered zones of pores and small vugs; lower 1 ft with scattered stylolites, common stylolites at base.

MAYNES CREEK FORMATION

- 156.3-160.3. Limestone, dense, part may be slightly dolomitic, light gray to brown-gray, irregular gray mottles scattered through (0.5-2 cm diameter), fine crystalline, no fractures, no visible porosity; scattered calcite-filled vugs and stylolites in lower 3 ft; black stylolite fill at 159.2; lower 1 ft with irregular gray-mottled laminae, resembles domal stromatolite in part.
- 160.3-163.2. Limestone, dolomitic, dense, light gray to brown-gray, scattered to common light gray mottles as above, lower 0.9 ft becomes slightly argillaceous with argillaceous stylolite swarms downward.
- 163.2-164.3. Limestone, dense, extremely fine crystalline to sublithographic, pale brown, slightly argillaceous to 3"; irregular mottles or burrows near base.
- 164.3-164.7. Dolomite and dolomitic limestone, dark laminae, dark laminae are medium to coarse crystalline; stylolite at top; calcite-filled vug at base.
- 164.7-168.0. Dolomite and dolomitic limestone, light medium gray, very fine to medium and medium to coarse crystalline; mostly dense, but with some inter-laminar porosity; 165.3-166.4 with common laminae and stylolites, some clay fills; 166-166.2 is intraclastic limestone, clasts to 2 cm, stylolitic; lower 1.3 ft is non-laminated, fine to medium crystalline, denser.
- 168.0-173.2. Dolomite, light brown, part oxidized, fine to medium crystalline, intercrystalline porosity; 171.2 with fine laminae; 171.5-171.8 open subvertical fracture; lower 0.4 ft with partly open vertical fractures; stylolites at 168.7, 169.1, 169.3, 172.5, base; 172.5-172.7 with argillaceous streaks/laminae and open fracture.
- 173.2-183.2 (box). Dolomite, light brown gray, very fine to fine crystalline, top 4 ft part very porous to skeletal moldic; lower 3.5 ft with common crinoid debris molds, scattered pores; 181.5 open pores and small vugs; chert nodule, light to medium gray, smooth, dense, at 181.6-181.9; major stylolite at 174.8; subvertical fractures, part open, at 181.8 and 183.1; brachiopod molds noted at 175.2 (chonetid), 177.2 (rhynchonellid, chonetid), 177.8 (chonetid), 179.8-180 (rhynchonellids); fenestellid bryozoan mold at 181.2.
- 183.2-193.2 (box). Dolomite, light brown to brown-gray, mostly very fine to fine crystalline, scattered to common pores and vugs through interval; black stylolite fills at 184.6, 185.8; chert nodule near top (1"); top 6 ft highly fractured and broken with calcite fills scattered to common; 183.7-184.2 is partly brecciated with fractures, calcite fills, black stylolite fills; open calcite-lined vug at 186.4; 187.2-189.2 is broken, with gray clay fill at 187.8; 188.2-189.2 with common black clay fills; lower 4 ft is partly broken with subvertical fractures; black stylolite fills at 187.2 and 193.2; large 2" calcite-filled vug (white to black calcite) at 192.8.
- 193.2-203.2 (box). Dolomite, very fine to fine crystalline, denser and less porous than above; lower 1.3 ft with common small fossil molds, crinoid debris, indeterminate brachiopods;

- small chert nodule (with brachiopod) at 202.9; irregular 1" thick medium gray bands seen at 194.1-194.7; stylolites common top 0.3 ft; dark stylolite surfaces at 195.7, 197.9 (black), 198, 199.7, 201.6; subvertical fractures at 194.5 and 196.1.
- 203.2-213.2 (box). Dolomite, very light gray to light brown and orange-gray, extremely fine to very fine crystalline; common skeletal molds through include crinoid debris and brachiopods, identifiable brachiopods recognized at 205.2 (chonetids), 210.2 (chonetids), 213.1 (large chonetid and strophomenids); large chert nodule, smooth to dolomitic, light gray, at 208.7-209; black stylolite fills at 203.6, 205; black gooey filling at 211.2; subvertical fractures noted 205.9-206.5; open horizontal bedding break at 207.9.
- 213.2-216.4. Dolomite, pale gray downward to light brown gray, extremely fine to very fine crystalline; fine skeletal-moldic porosity common through; brachiopods noted at 215.6 (small chonetids), 216 (chonetid); black stylolite fills noted at 214.8, base; subvertical fracture at 214.1; lower half part broken and fractured.
- 216.4-222.2. Dolomite, light brown gray, very fine crystalline, oomoldic porosity scattered to common through (oolitic porosity), part very porous (especially 219.5-220.6); skeletal molds noted lower 1.6 ft include scattered crinoid debris and common large brachiopods (spiriferids, strophomenids); small cup coral noted at 219.9; chert nodule, very light gray, smooth at 219; stylolites at 217.7, 218.9, 222.2; open vug with calcite crystals at 218.2; open vertical fractures through top 1.3 ft.
- 222.2-225.2. Dolomite, light brown gray, denser than above, extremely fine to very fine crystalline; scattered small moldic porosity (especially 223.4-223.7); faint argillaceous stylolite at 224; open vug at 224.3; subvertical fracture at 223.9.
- 225.2-229.2. Dolomite, light brown gray, very fine and medium to coarse crystalline, common moldic porosity through; indeterminate brachiopod mold at 227.2; dark stylolites noted at 226.6 and 228.5; part broken with open vertical fractures at 225.7-226.2, 226.8; small vug with small quartz-crystals.
- 229.2-233.2. Dolomite, denser than above, scattered fine skeletal molds; lower 1.2 ft with scattered open subvertical fractures.
- 233.2-243.2 (8.8 ft recovered). Dolomite, light brown gray, very fine to fine crystalline; top half is porous to very porous, common pores and skeletal molds (crinoid debris), part fractured and broken, scattered to common subvertical fractures top ~2.5 ft; lower half is slightly more dense, less porous, scattered small skeletal molds, black stylolite ~240; open vertical fractures noted ~238-240; broken and fractured lower ~1 ft.
- 243.2-245.3. Dolomite, light brown gray, very fine crystalline, small skeletal molds, part porous to very porous, top 1.1 ft with open vugs and vertical fractures, open fractures lower 0.7 ft; irregular silicification/chert noted at 244.6, 245, base; stylolite at 244.2.
- 245.3-251.2. Dolomite, light brown gray, very fine crystalline, denser and less moldic than above; irregular chert/silicification nodules, dolomitic, noted at 246.6-46.7, 247.9, 249, 249.5, 250.4, 250.9-251; large open vug at 247.7; scattered small vertical fractures 248.2-249.2; stylolites noted at 246.5 (black), 249, 249.5, 249.9 (black), 250.1-250.2 (black), 250.4-250.5.
- 251.2-257.6. Dolomite, light brown gray, very fine crystalline, scattered to common skeletal molds (crinoid debris, scattered bryozoans), more porous than above; becomes denser in lower 2 ft; chert nodules, dolomitic, noted at 251.5, 252.2, 253.5-253.8 (includes smooth chert, contains fossils, crinoid debris, fenestellid bryozoans, brachiopods), 255.2; top 0.4 ft with common faint stylolites; stylolites noted at 252.8 (black), 253.2, 255.2 (black), 255.6 (black), 256.6, 257.2, 257.6; calcite-filled vugs noted at 254.6, 256.2; small open vugs at 254.7, 257.
- 257.6-263.2. Dolomite, light brown gray to very light yellow-brown, more porous than above, skeletal molds (crinoid debris, especially 259.6-260.5), base with crinoid debris and fenestellid bryozoan molds; part broken and weathered to crumbly (especially lower 2 ft);

chert nodules and silicification fabrics noted at 258-258.3 (silicified skeletal packstone with crinoid, brachiopod, bryozoan), 258.8-259.2 large silicified nodule (with crinoid, brachiopod), partially silicified/cherty (part crumbly) interval 261.2-262.2 (includes crinoidal-skeletal packstone fabrics); calcite-filled vug 258.3; large open vug at 260.6; stylolites at 258.3, 259.6 (black), 261.2, 262.4 (black).

- 263.2-273.2 (box). Dolomite, light brown-gray to very light gray, very fine crystalline, porous and skeletal moldic (small crinoid debris molds) throughout; fenestellid bryozoans at 265.2, large crinoid debris and articulated crinoid cup at 271.3; silicified fabrics and dolomitic chert, crumbly and porous in part, noted at 264, 270.2-270.5 (porous, crinoidal), 272.8; calcite-filled vugs at 266.1, 266.8-267.1; open vug 271.3; stylolites at 264.7, 265.6, 269.4, 269.8-270 (with black to gray shaley fill between), 270.9; open vertical fracture 268.7-269.1.
- 273.2-278.7. Dolomite, as above, scattered to common pores and skeletal molds (crinoid debris), scattered open vugs and calcite-filled vugs; silicified fabrics and dolomitic chert, crumbly and porous, nodules and irregular fills, scattered to common through (every 0.1-1.0 ft); black-stained fill lower 3 inches.
- 278.7-280.9. Dolomite, very light brown to brown-gray, fine to medium crystalline, poikilotopic calcite cements; scattered small molds in middle part; argillaceous streaks scattered through; stylolite at top; argillaceous stylolitic streak at base.

PROSPECT HILL FORMATION

- 280.9-299.2. Siltstone, approaches very-fine sandstone, slightly argillaceous, increasingly argillaceous in lower 6 ft (with argillaceous streaks); scattered horizontal burrow mottles through; lower 6 ft more burrowed, dominated by horizontal burrows but includes small to large subvertical to vertical burrow traces; slightly calcareous in lower part.
- 299.2-304.9. Siltstone, argillaceous, scattered to common horizontal burrows, shaley in part (301.2-303.2); variably calcareous, becomes harder and more cemented (calcitic or dolomitic) in lower 0.8 ft; irregular contact at base, siltstone-filled v-shaped irregular contact with 2 inches of relief.

DEVONIAN

FAMENNIAN INTERVAL

“APLINGTON-MAPLE MILL” UNDIFFERENTIATED

- 304.9-306.8. Dolomite, light brown gray, dense, very fine to fine crystalline, generally featureless; lower 2 inches is argillaceous with horizontal burrow mottles (some dark gray to black).
- 306.8-311.2. Dolomite, very porous with abundant crinoid debris molds; small cup coral noted at 309.4; 309.1-309.3 is an argillaceous siltstone with horizontal burrows, part pyritic (could be stratigraphic leak of Prospect Hill siltstone); base of unit marked by thin (3 mm) squishy pyritic clay.
- 311.2-317.2. Dolomite, very porous, fine skeletal molds (crinoidal in part), scattered to common small pores and vugs; interval may include some irregular silicification; argillaceous stylolites noted at 316.2, 316.7 (black).
- 317.2-322.9. Dolomite, porous, less porous than above, fine skeletal molds (crinoidal in part); argillaceous stylolites at 317.9, 320.1, 322.5.
- 322.9-327.9. Dolomite, light medium gray, denser than above, very fine crystalline, slightly argillaceous to argillaceous, scattered crinoid debris molds; interstratified with thin intervals (to 0.3 ft) of argillaceous silty dolomite to dolomitic siltstone; irregular silicification at 225.7-226.2; scattered horizontal burrow mottles through, pyritic in part.
- 327.9-330.0. Dolomite, light gray, fine to medium crystalline, very porous, probable skeletal molds (?crinoid debris); interval may be slightly silicified; gradational below.

330.0-330.7. Dolomite, dense, very fine crystalline, argillaceous, silty (may include dolomitic siltstone); stylolite at base.

UNASSIGNED INTERVAL (could be Famennian interval or upper part of Lime Creek Fm.)

330.7-340.2. Dolomite, pale gray to light gray, dense, very fine crystalline, slightly argillaceous is part; scattered stylolites top 2.5 ft and 334.7, 335.5, 337.8, 339; scattered argillaceous to shaley fills (medium to dark gray) noted at 331.2 (clay fill in subvertical fracture), 333.2, 334.2 (fractured to brecciated), 336.4, 337.2; part brecciated to intraclastic at 332.1-333.2 (brecciated lighter dolomite clasts 1-10 mm, rounded dolomite clasts at base 1-30 mm, argillaceous streak), 334.2-335.2 (small breccia clasts, calcite fracture fills), 335.6-336.2 (intraclastic or brecciated, clasts 1-10 mm), 336.5-337.2 (scattered breccia or intraclasts, small calcite spots/fenestrae?), 337.2-339.2 (scattered faint intraclasts).

340.2-343.7. Dolomite, argillaceous to shaley, light to medium gray, dense; dark gray to black argillaceous to shaley streaks at top, 341.6, 342; irregular lighter-colored streaks and broken to brecciated clasts in medium gray dense argillaceous dolomite matrix at 340.7-341.2; rounded intraclasts (to 1½ inch) noted at 341.2-341.6; lower 2.1 ft is shaley, dense, in part probably an argillaceous dolomitic siltstone, part pyritic, may be faintly burrow mottled; dark argillaceous streak at base, irregular basal contact with shaley leaks into underlying dolomite.

343.7-355.0. Dolomite, very light brown-gray to light brown; fine and medium to coarse crystalline; part slightly argillaceous; some poikilotopic calcite cements; dominantly dense dolomite, but minor porosity 345.6-348.2; irregular faint laminations noted in top 0.5 ft, 351.8-352.2, and bottom 1.8 ft; irregular argillaceous partings/streaks/swirls noted at 343.9, 344.9-345.4 (contains irregular dolomite masses), 348.6-349.2; stylolites notes at 345.4, 345.7, 349.2, 349.7, 351.7-352.2, 352.9, 353.2; calcite-filled fractures 346.2-347.2 and lower 1.8 ft; irregularly fractured to brecciated at 348.6-349.2, 349.8 (dark), 350-350.2 (fractured light brown dolomite in darker matrix).

355.0-359.2. Dolomite, as above, but with common fractures (part cemented); stylolites scattered to common through; part brecciated at 355.9, 356.6-356.9, 358.1-358.9; major stylolite at base.

359.2-364.7. Dolomite breccia, light to dark brown-gray dolomite clasts (1 mm to 3 cm, smaller clasts in lower 1.5 ft), argillaceous clasts in light brown dense dolomite; argillaceous streaks and irregular argillaceous laminae noted 361.1-362.4, 362.5, 362.8.

364.7-368.7. Dolomite, light brown, fine to medium crystalline, scattered fractures and small pores; part finely laminated; dense, dark gray argillaceous/shaley at 365.5-365.8; stylolite at base.

368.7-370.0. Dolomite, light medium gray, denser than above, part with argillaceous to shaley streaks; part brecciated in upper part; dark streak at base.

370.0-371.2. Dolomite, light brown, fine to medium crystalline, part with scattered small pores; fractured to brecciated in lower part.

371.2-373.8. Dolomite, light medium gray, denser than above, argillaceous with dark gray argillaceous to shaley streaks through most; brecciated 273.4-372.8 and lower 0.6 ft.

373.8-374.4. Dolomite, light medium gray, slightly porous, slightly argillaceous; irregular contact and color change at base.

374.4-376.3. Dolomite, light brown, very fine to medium crystalline; laminated in upper part; fractured and crumbly downward.

376.3-380.2. Dolomite, light gray, part slightly argillaceous, scattered porosity; laminated near top; scattered stylolites and argillaceous streaks in lower part; brecciated 376.8-378.7, clasts angular to rounded (1 mm to 1½ inches diameter), irregular gray mottles; pyritic surface at base.

LIME CREEK FORMATION

380.2-383.2. Dolomite, light medium gray to light brown-gray downward, very fine to medium crystalline; porous to very porous with irregular vugular networks ($\frac{1}{4}$ to 2 inch diameter vugs), especially 381.8-382.4; pyritic surface at top; gradational below.

383.2-393.2. Dolomite, very light brown-gray, fine to medium crystalline, part with irregular gray mottlings; porous through most with indeterminate pores/molds and small vugs, also intercrystalline porosity, most porous top 4 ft, 389.2-392.2; argillaceous streaks noted at 386, 386.3, 387.5-387.9, 388.5, 388.8 (dark), 292.6 (1 inch medium to dark gray shale); stylolite at 385.6; vug with large calcite-crystals at 391.5; open vertical fracture 384.2-384.6.

393.2-401.9 (Note: Total depth listed as 400 feet, but 393.2-400 interval contains 8.7 feet of recovered core. Final depth tentatively listed as 401.9 ft). Dolomite, very light brown-gray, very fine to fine crystalline and fine to coarse crystalline (sugary-texture), common intercrystalline porosity; top 2 ft and lower 3 ft are very porous, abundant intercrystalline porosity in sugary-textured dolomite; faintly laminated 397.2-398.5; possible crinoid debris molds at 397.2; argillaceous streaks near top, 394.7-395, and 395.2-395.5; stylolite 2.5 ft above base; common large open vugs at 395.8-396.6; broken with open fractures in lower 1 ft; 1 inch gray shale at base.