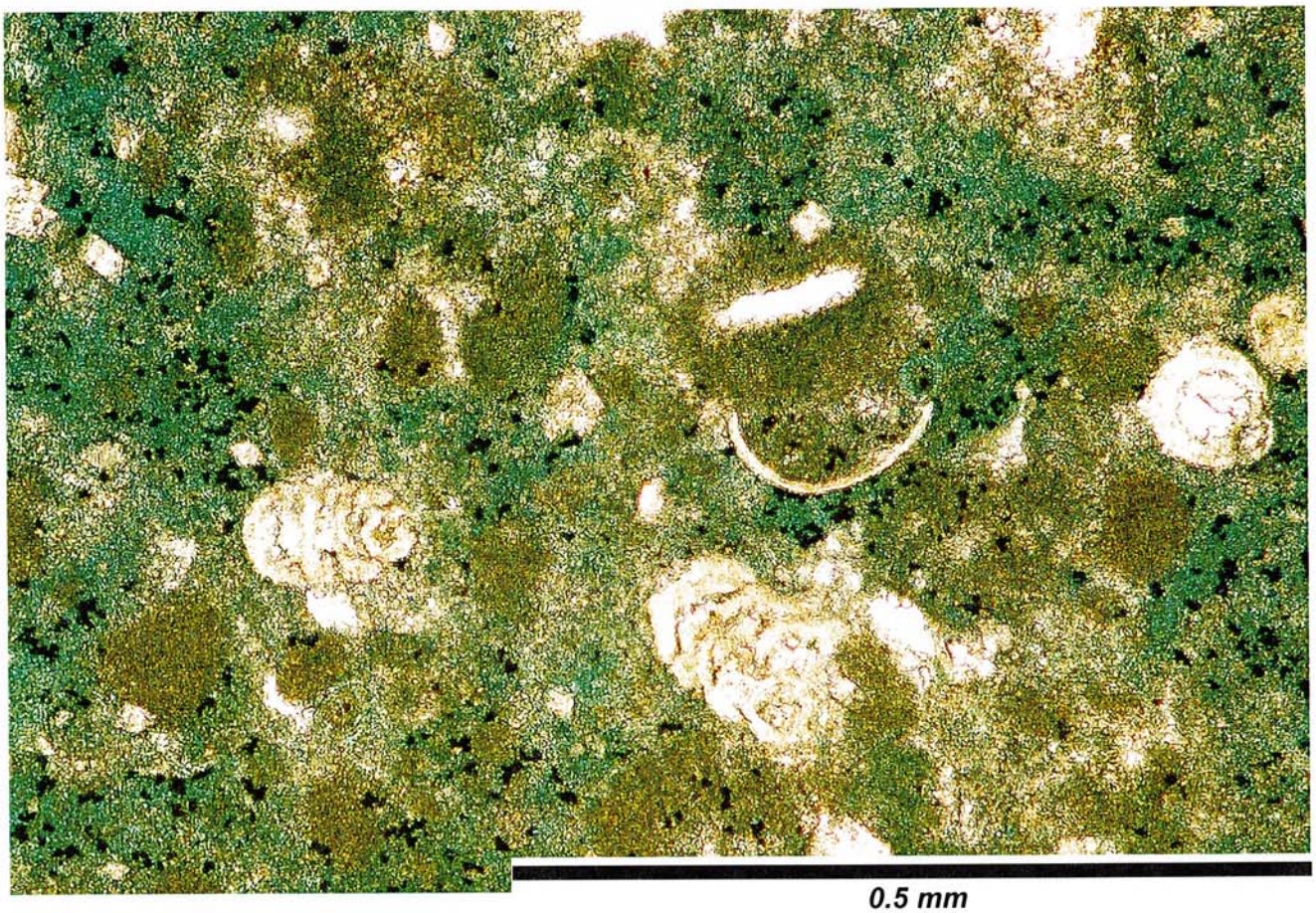
Appendix B

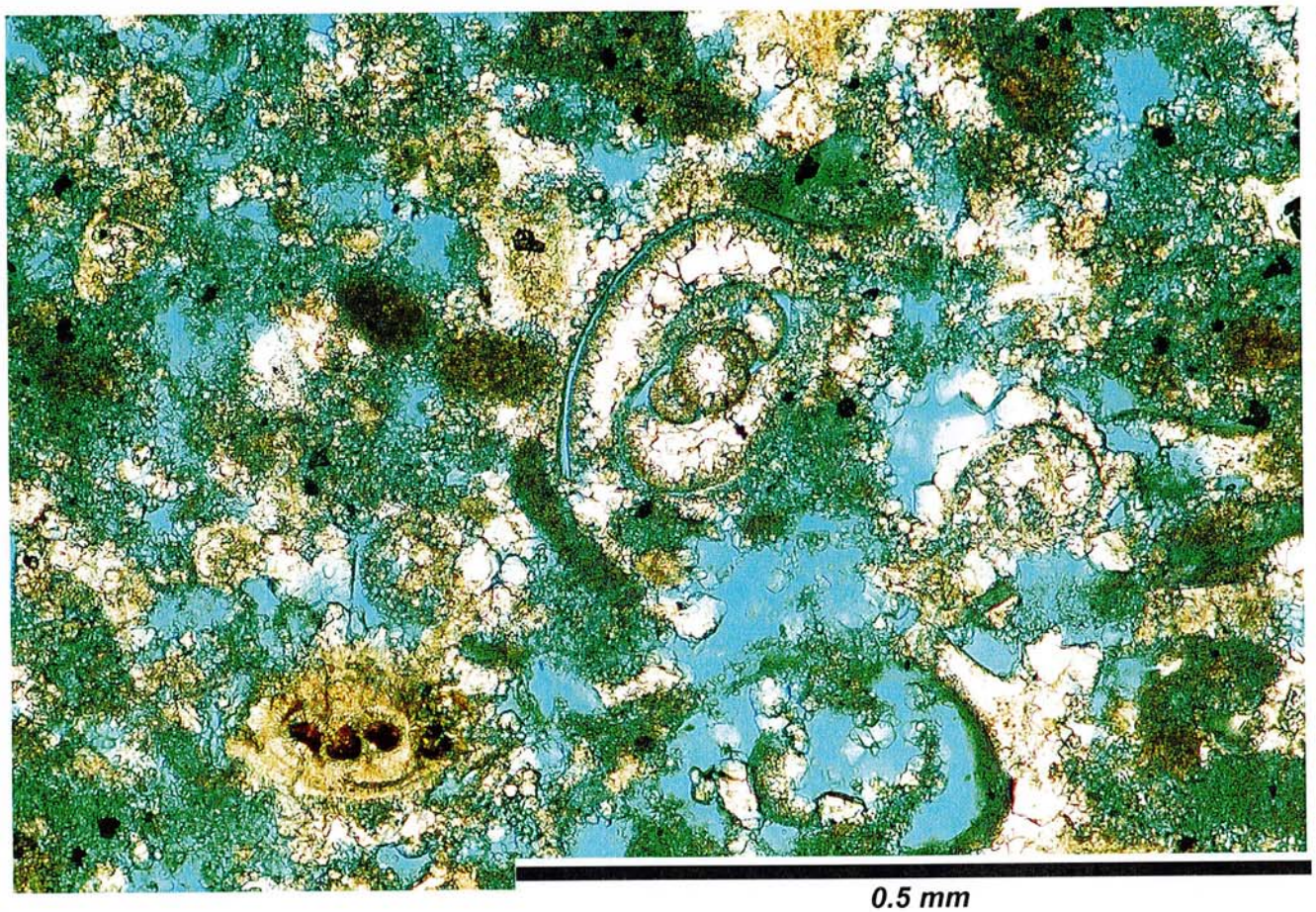
Thin Section Photomicrographs



Brighton Reservation ASR exploratory well.
1,029 to 1,036 feet below land surface.
Avon Park Formation

Fossil peloid wackestone.
Limestone has a low visible porosity and apparent permeability. Fossils consist mostly of small foraminifera. Microporosity is evident by blue coloration of matrix due to absorption of epoxy. Blacks specks are air vacuoles.

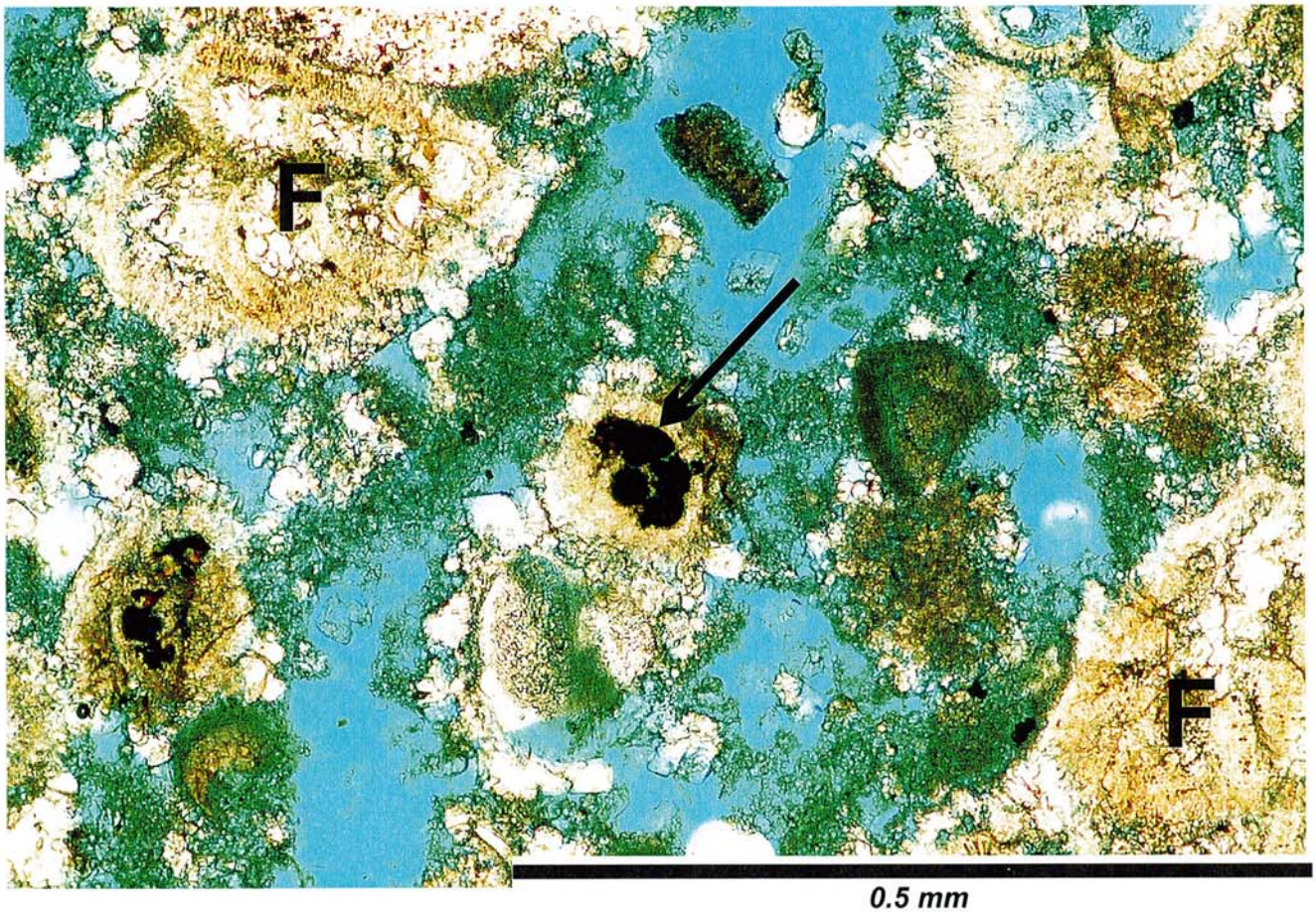
Figure B-1. Thin section photomicrograph (1,029 To 1,036 ft bls).



Brighton Reservation ASR exploratory well.
1,120 to 1,123 feet below land surface.
Avon Park Formation

Fossil peloid packstone.
Pores are filled with blue epoxy. Fossils consist mostly of small foraminifera. The foraminifera in the center of the photograph is preserved as an open mold (filled with blue epoxy). There is only minor calcite cement (clear crystals).

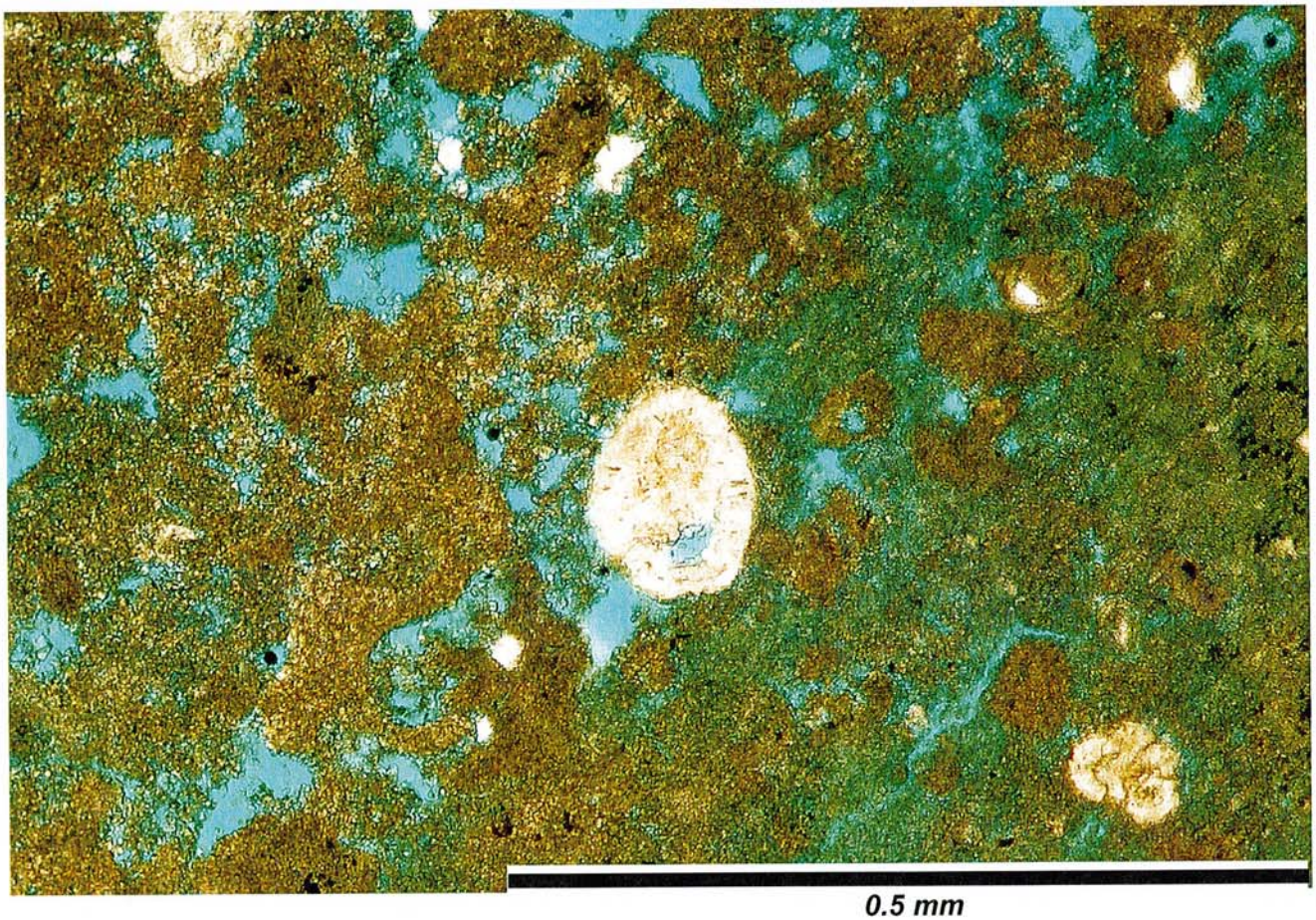
Figure B-2. Thin section photomicrograph (1,120 to 1,123 ft bls).



Brighton Reservation ASR exploratory well.
1,120 to 1,123 feet below land surface.
Avon Park Formation

Fossil peloid packstone.
Pores are filled with blue epoxy. Fossils consist mostly of small foraminifera (F). Iron sulfide minerals, such as pyrite, are sparse. Iron sulfides are believed to by the source of the arsenic leached in some ASR systems. A small patch of iron sulfide (black material) is present in the center of the foraminifera in the center of the photograph (arrow). Minor dolomite is also present. Calcite cement is minor, and occurs mostly within and attached to foraminifera.

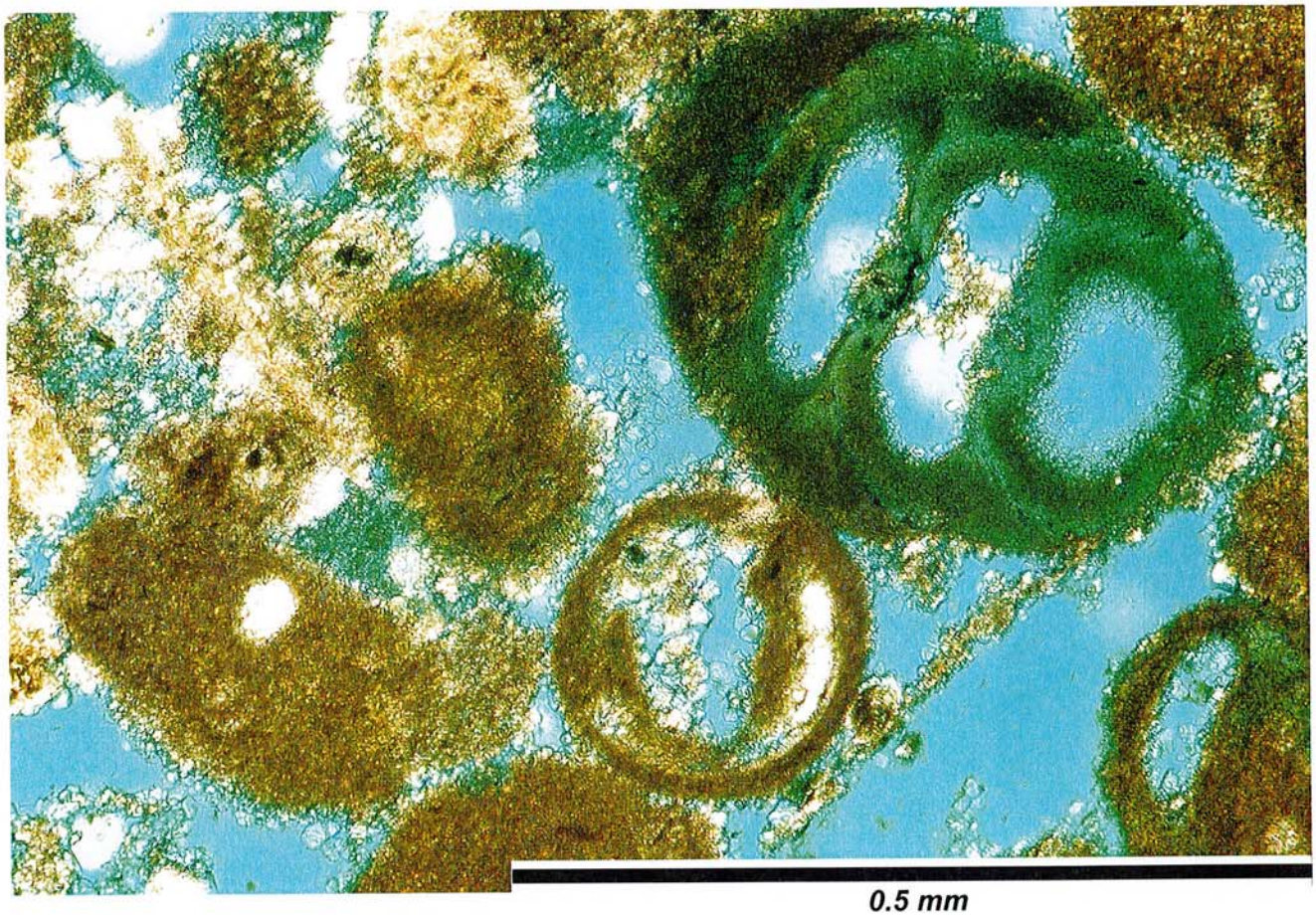
Figure B-3. Thin section photomicrograph (1,120 to 1,123 ft bls).



Brighton Reservation ASR exploratory well.
1,230 to 1,236 feet below land surface.
Avon Park Formation

Fossil mudstone.
Micrite matrix has a peloidal texture with some visible pores (filled with blue epoxy). A small planktonic foraminifera is present in center on the photograph. This limestone is expected to have a low hydraulic conductivity, but a high (30%) total porosity.

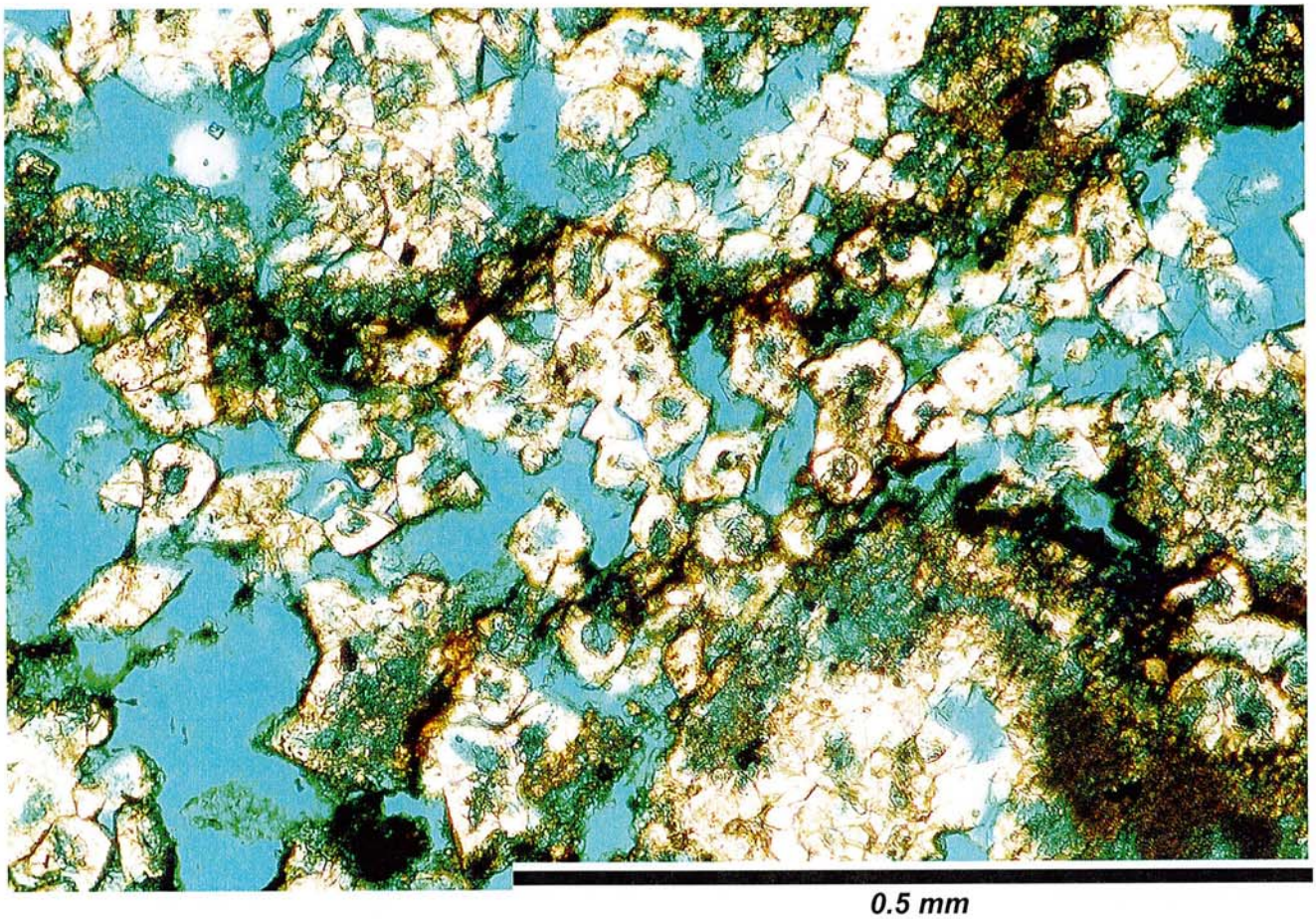
Figure B-4. Thin section photomicrograph (1.230 to 1,236 ft bls).



Brighton Reservation ASR exploratory well.
1,276 to 1,281 feet below land surface.
Avon Park Formation

Peloid/intraclast bioclast packstone
Micrite (carbonate mud) is locally present so limestone is classified as a packstone rather than a grainstone. Sample has a high visible porosity (macroporosity), which is filled with blue epoxy. Grains consist of transported carbonate sand. Fossils consist mostly of diverse foraminifera. The abundant large interconnected pores would give the limestone a relatively high hydraulic conductivity. Calcite cement is volumentrically minor.

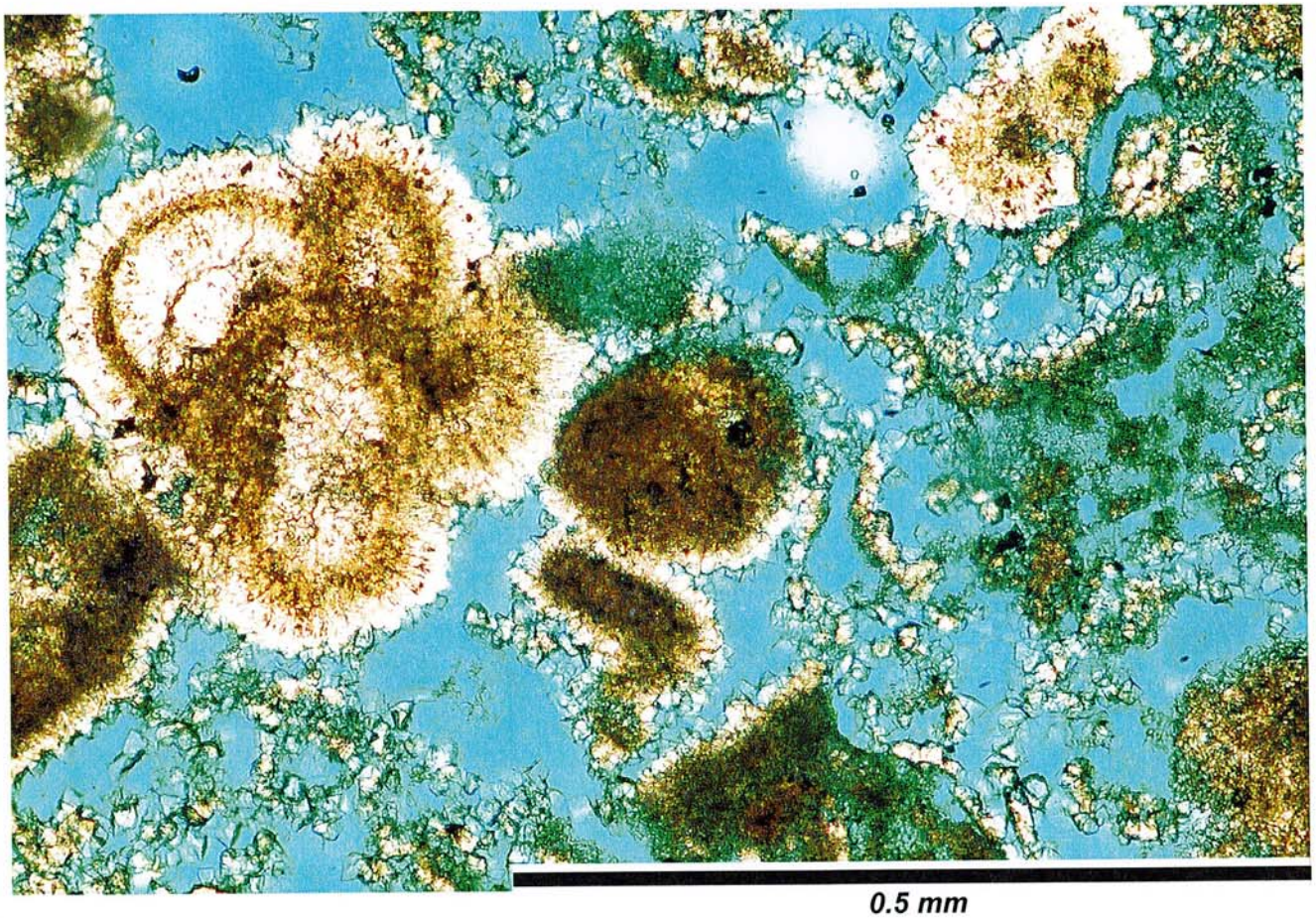
Figure B-5. Thin section photomicrograph (1,276 to 1,281 ft bls).



Brighton Reservation ASR exploratory well.
1,299 to 1,302 feet below land surface.
Avon Park Formation

Laminated mudstone
Sample contains abundant rhombohedral dolomite crystals with hollow cores (filled with blue epoxy). Organic-rich laminae (dark streaks) appear to contain common iron sulfides, much more so than any of Avon Park Formation lithology. Sample has a high total porosity and likely a moderate hydraulic conductivity. Calcite cement is volumentrically minor.

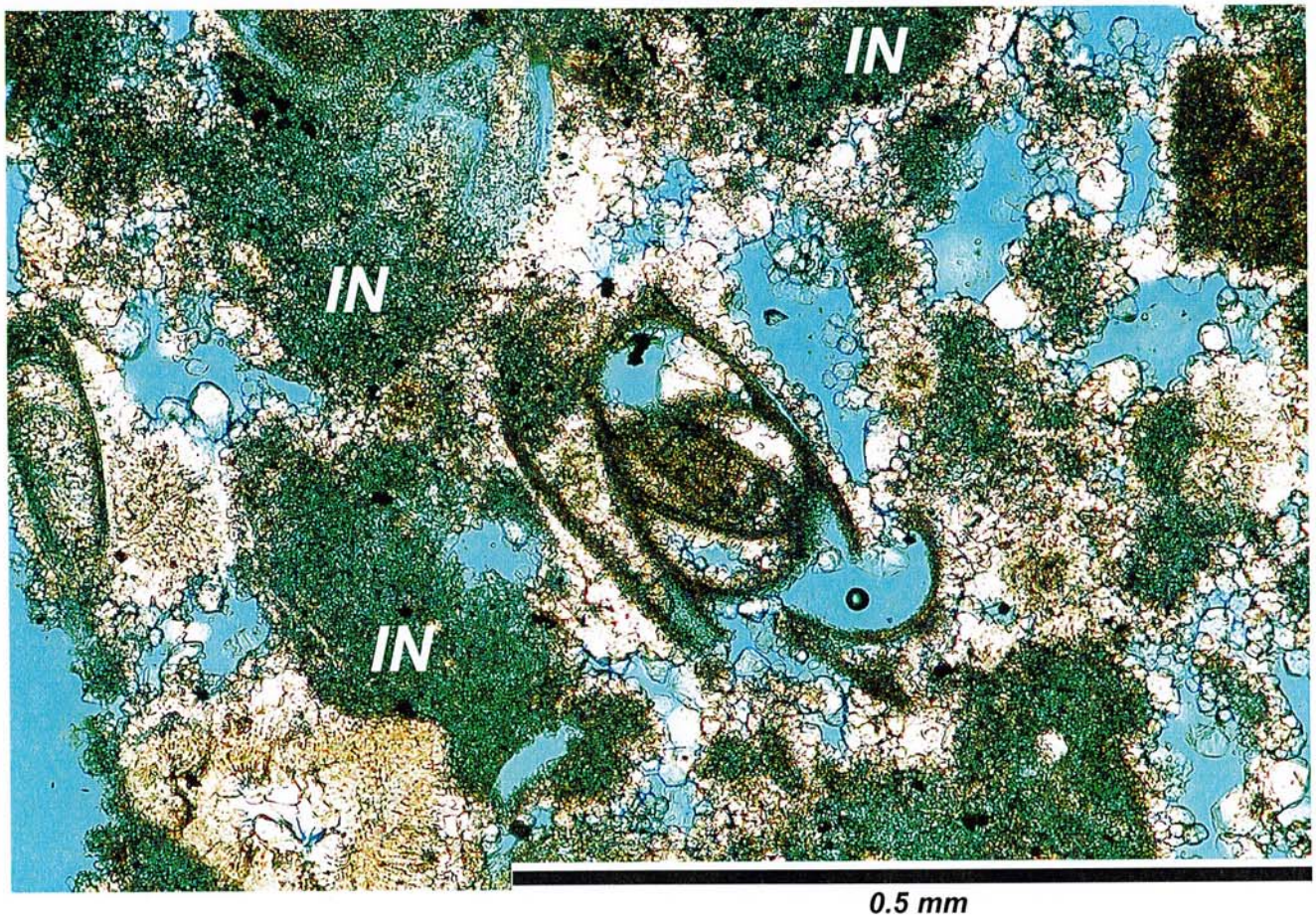
Figure B-6. Thin section photomicrograph (1,299 to 1,302 ft bls).



Brighton Reservation ASR exploratory well.
1,302 to 1,307 feet below land surface.
Avon Park Formation

Peloid/intraclast bioclast packstone or grainstone.
Limestone has a very high total porosity (filled with blue epoxy) and apparent hydraulic conductivity. Sample contains abundant microspar, which is very finely crystalline calcite. Calcite cement is sparse and is best developed as syntaxial overgrowths on fossils, such as foraminifera (upper right) and echinoid fragments (ossicles).

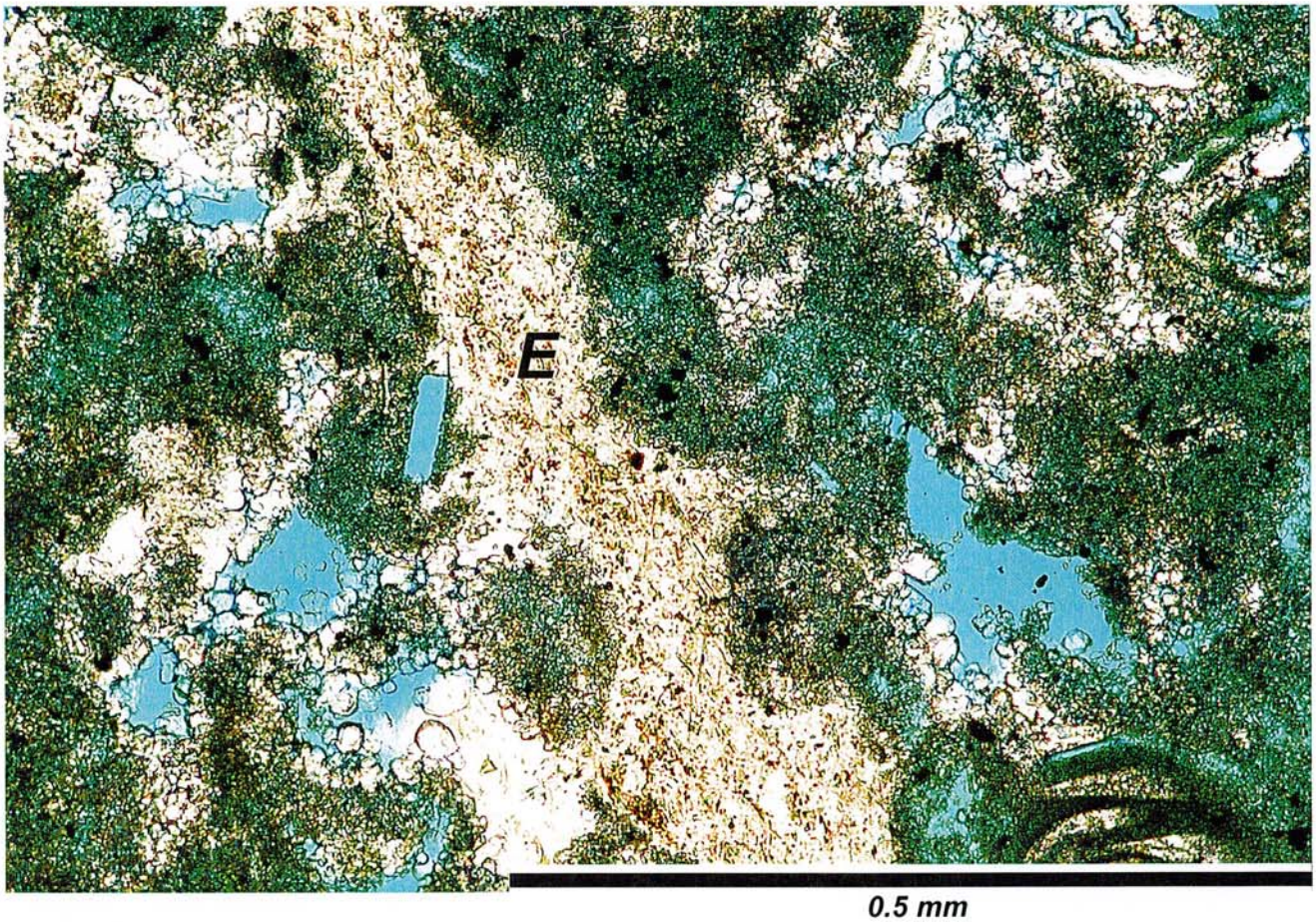
Figure B-7. Thin section photomicrograph (1,302 to 1,307 ft bls).



Brighton Reservation ASR exploratory well.
1,436 to 1,440 feet below land surface.
Avon Park Formation

Peloid/intraclast bioclast packstone.
Limestone has a moderate to high total porosity (filled with blue epoxy) and apparent hydraulic conductivity. The main grain types are reworked carbonate mud clasts (intraclasts; IN) and foraminifera (center). Calcite cement is sparse and is best developed as overgrowths on and within fossils.

Figure B-8. Thin section photomicrograph (1,436 to 1,440 ft bls).



Brighton Reservation ASR exploratory well.
1,436 to 1,440 feet below land surface.
Avon Park Formation

Peloid/intraclast bioclast packstone.
Limestone has a moderate to high total porosity (filled with blue epoxy) and apparent hydraulic conductivity. The main grain types are reworked carbonate mud clasts (intraclasts) and foraminifera (center). An echinoid ossicle (E) is shown in the center of the photograph. Calcite cement is sparse and is best developed as overgrowths on and within fossils.

Figure B-9. Thin section photomicrograph (1,436 to 1,440 ft bls).

Appendix C

Geophysical Log Interpretations

GEOPHYSICAL LOG INTERPRETATION

Brighton Reservation ASR Exploratory Well

Nominal 7 3/8 inch diameter borehole (0 to 1,580 feet bls)
MV Geophysical, July 19, 2007

Depth (ft bls)	Observations
X-Y caliper and gamma ray, and dual Induction	
0 - 640	Constant 10-inch diameter, reflecting casing and drilling through cement plug as based. Gamma ray activity decreases sharply below 650 ft bls reflecting the transition from clayey & phosphatic strata of the Hawthorn Group to relatively pure limestones of the Ocala Limestone.
640 – 1,036	Gradual variation in borehole diameter, reaching a maximum of approximately 14-inches from 770 to 830 ft bls. No sharp peaks that would be indicative of fracture zones or large cavities. Generally low gamma ray activity (mostly < 30 GAPI). Resistivity gradually increases, leveling off at about 30 ohm-m between 975 and 1,070 ft bls. The water samples from this interval had the lowest salinity.
1,036 – 1,205	Slight downhole increase in gamma ray activity to values in the 20 to 40 GAPI range. The increase appears to coincide with the boundary between the Ocala Limestone and the underlying Avon Park Formation. Borehole diameter (9 to 11 inches) is close to bit size 7 3/8-inches. No evidence of fractures or large cavities, other than a small feature at about 1,178 to 1,182 ft bls. Resistivity decreases with depth to values in the 15 to 20 ohm-m range.
1,205 – 1,398	Zone of alternating fractured intervals with enlarged boreholes (20 to 36-inches) and less fractured strata (borehole diameters ≤ 14-inches). Decreased gamma ray ray activitity (≤ 25 GAPI) between 1,240 and 1,398 ft bls, compared to overlying and underlying strata. Variable resistivity, mostly ≤ 15 ohm-m. The overall lithology is relatively pure (low clay) fractured soft limestones.
1,398 – 1,510	Pronounced downhole decrease in borehole diameter (≤ 11 inches) reflecting an increase in rock hardness. Fractured zones with associated cavity development during drilling is present between 1,398 and 1,425 ft bls.

Depth (ft bls)	Observations
Flowmeter, fluid conductivity, and temperature	
580 – 1,170	Fluid conductivity is relatively constant at about 2,906 µs/cm and temperature at 84.3 °F.
1,170 – 1,202	Fluid conductivity starts to increase to 2,920 µs/cm.
1,202 – 1,210	Major flow zone on flowmeter log. Most of flow enters well from this zone. Very minor flow is evident from below.
1,210 – 1,315	Fluid conductivity fluctuates, gradually increasing to 2,940 µs/cm at 1,315 ft bls.
1,315 – 1,335	Zone of rapid increase in conductivity to 2,995µs/cm. Temperature increases to 85.4 °F.
1335 -1,515	Fluid conductivity and temperature shows little change with depth.
Borehole Video Survey	
615	Last joint in 10-inch diameter SDR casing.
635	Bottom of casing
643	Bottom of cement plug from over drill. Increase in borehole diameter immediately below.
643 – 654	Limestone, irregular, rough borehole wall.
654 – 730	Limestone, circular cross section, no fracturing or cavities. Some spalling of material off the borehole wall, which appears as dark irregular pactches with tool or bit drag marks.
730 – 800	Smooth borehole wall (just faint shallow pitting) with tool/bit drag marks, chalk appearing. No factures of solution cavities.
800 – 900	Limestone, same as above. Oblique fracture at about 876 ft bls.
900 – 985	Limestone, same as above.

985 – 1,000	Limestone, similar to above except borehole wall roughness and pitting is somewhat increased.
1,000 – 1,100	Limestone, mostly smooth to moderately rough borehole wall. Some horizontal bedding is evident by variation in hardness (borehole wall roughness). No fractures or solution cávities are evident.
1,100 – 1,161	Limestone, similar to above.
1,161 – 1,177	Limestone, vertical to oblique fractures are present. Hairline features enlarged by drilling.
1,177 – 1,182	Limestone, fractured. Borehole enlargement due to fracture bounded blocks falling off. Fractures appear to have small apertures.
1,182 – 1,196	Limestone, smooth to moderately rough borehole wall, no fracturing.
1,196 – 1,204	Limestone, fractured, small apertures, borehole enlarged during drilling.
1,204 – 1,215	Intervals of borehole enlargement. Large open subvertical fractures. Lateral camera view shows that borehole wall is very angular and that there is no suggestion of dissolution (smooth walls). Large cavity was created by drilling. Loose rock is present on base.
1,215 – 1,300	Zones of fractured rock with borehole enlargement separated by zones with less well developed fracturing. Some large cavities between 1,241 and 1,251 may be natural instead of produced by drilling.
1,300 – 1,393	Limestone, same as above. Lateral camera view from 1,320 to 1,322 suggests that bedding is subvertical to oblique. Appears to be fine suspended material moving upwards form 1,384 to 1,393 ft bls.
1,393 – 1,425	Increased turbidity. Interbedded rock with well developing fracturing and less well developed fracturing.
1,425 – 1,508	Mostly minimal borehole enlargement with zones of fracturing and increasing borehole diameter. Moderate borehole wall roughness, which suggests the presence of harder rock below 1,400 ft bls. Fracture zones are present at: 1,437–1,439, 1,447–1,450, 1,451–1,458, 1,464-1,466, 1,470-1,474, 1,479-1,480, 1,482-1,484, 1,503-1,508.
1,508	Bottom of hole is blocked with rock fallen from above. Lateral view shows that rock is well laminated.

GEOPHYSICAL LOG INTERPRETATION

Brighton Reservation ASR Exploratory Well

Nominal 17-inch diameter borehole (0 to 640 feet bls)
MV Geophysical, June 1, 2007

Depth (ft bls)	Observations
X-Y caliper, gamma ray, and dual induction	
0 - 160	Cased interval, diameter approximately 17.5-inches.
160 – 253	Moderate gamma ray activity (25 to 80 GAPI) typical of Hawthorn Group clays and marls.
253 – 340	Zone of reduced gamma ray activity (20 to 28 GAPI), borehole close to gauge. Interval of relatively pure quartz sands.
340 – 530	Moderate to high gamma ray activity, mostly in the 40 to 140 GAPI range, peaking to 205 GAPI at 510 ft bls. Typical response of phosphatic and clayey strata of lower Hawthorn Group. Downhole transition from clean sands to clayey silts and sands at about 340 ft bls is also marked by pronounced decrease in resistivity.
530 – 630	Moderate to high gamma ray activity, as above. Caliper log indicates constant diameters of 6.5 and 8 inches (versus 17-inch diameter bit), which indicates that tool arms had not opened fully.