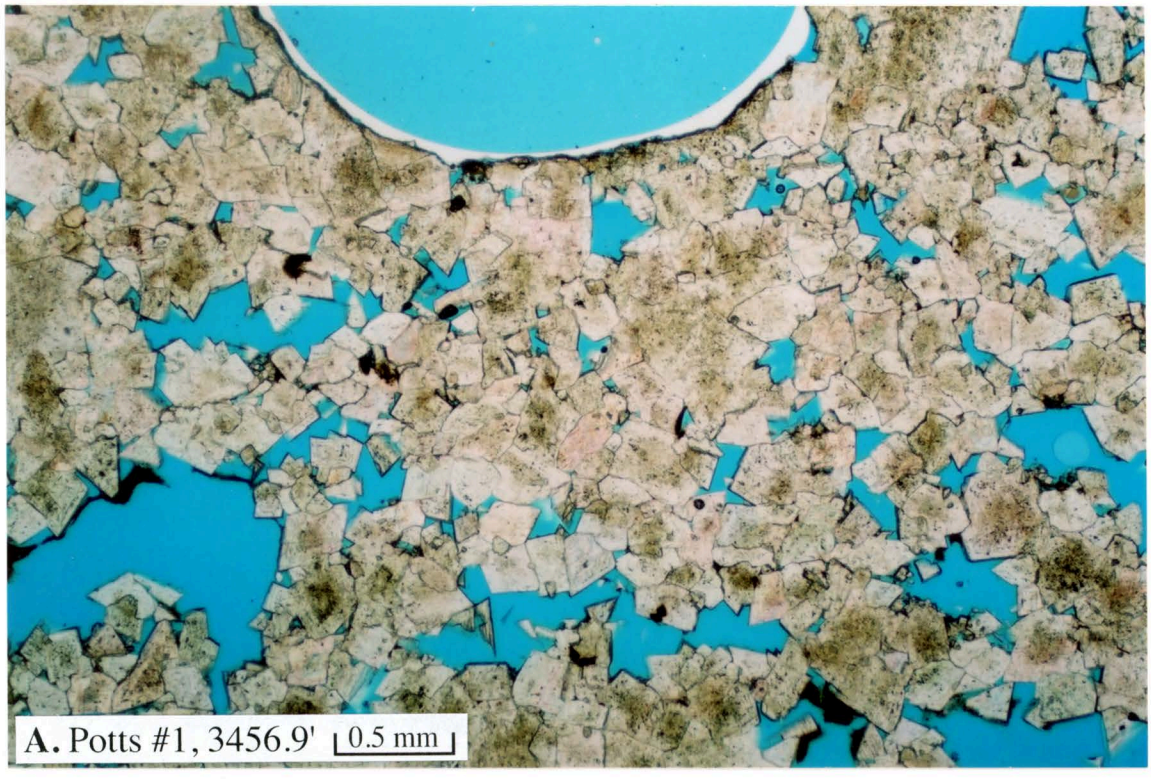
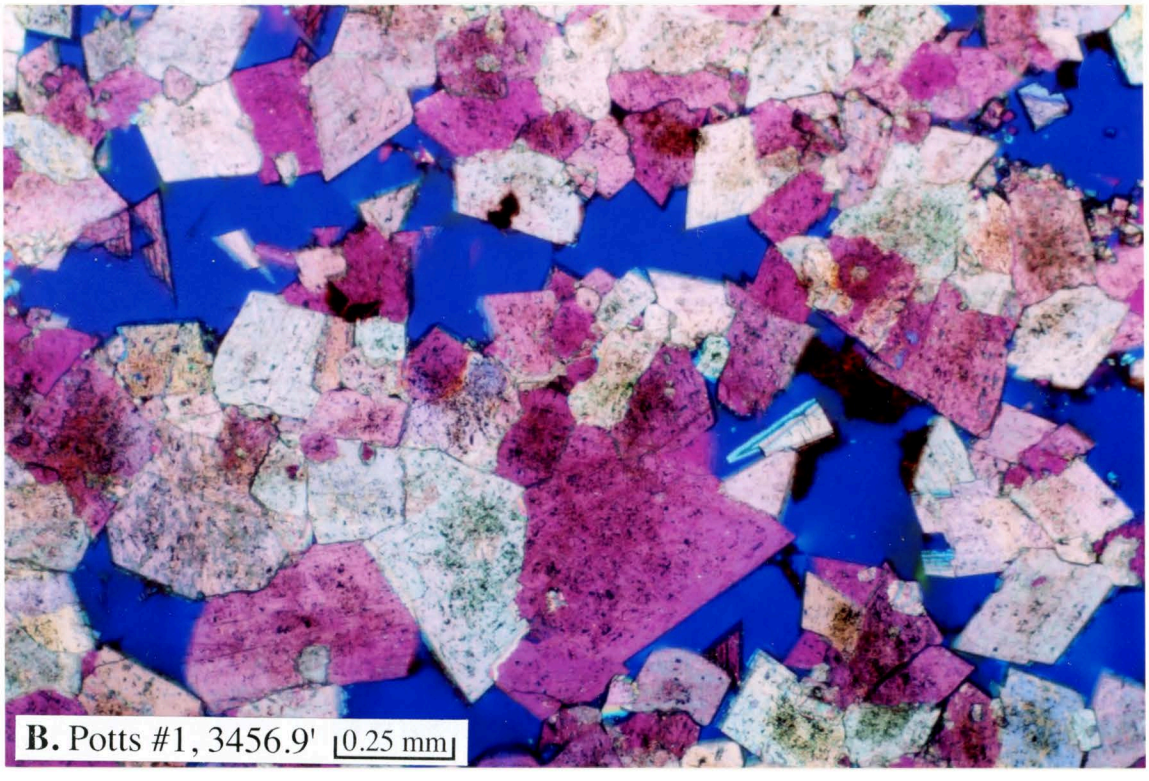
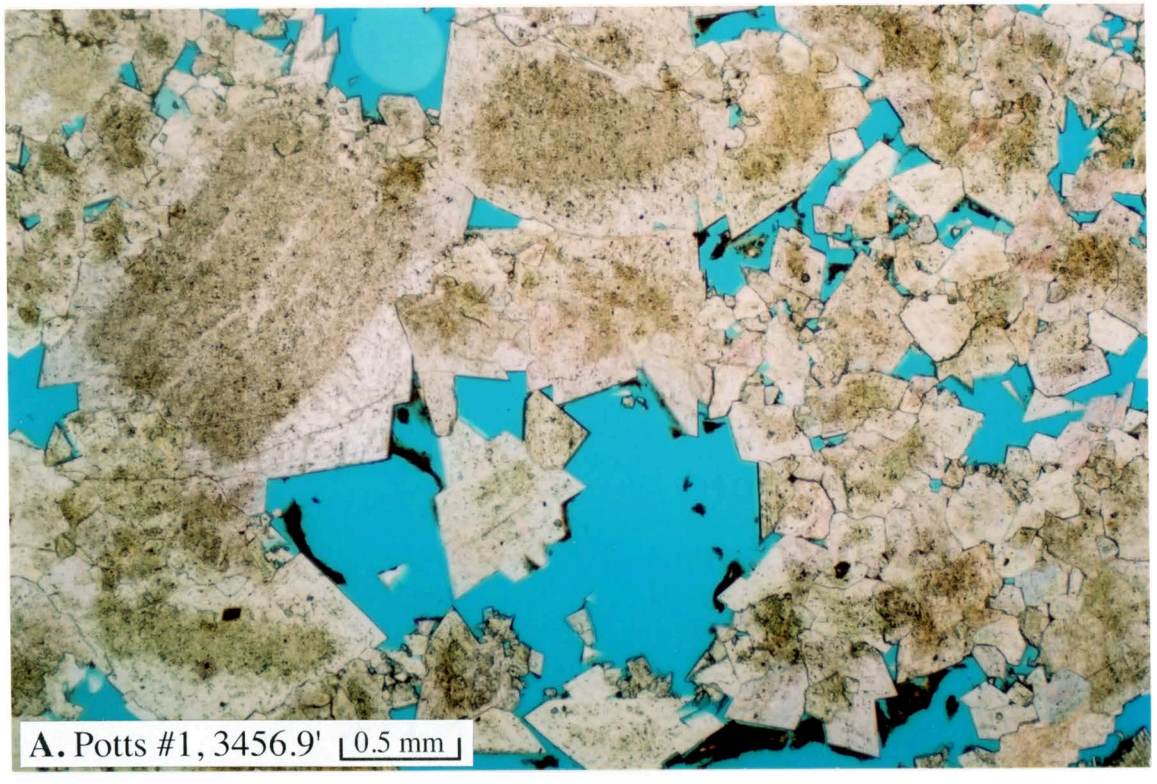
Plate 1. Potts #1, 3456.9 ft: Viola Formation Dolomite
"Up" Notch in Porous Medium-Crystalline Vuggy Dolomite

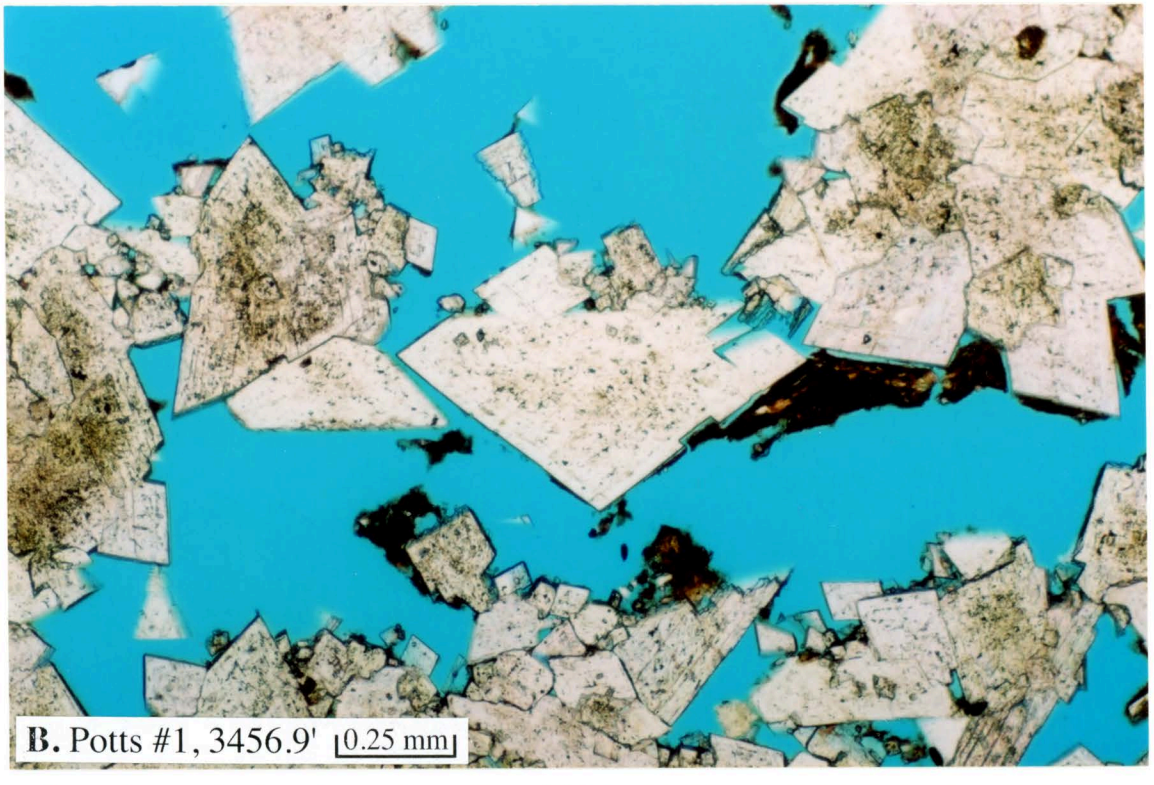




This well was drilled by Petro Lewis Corp. in 1982 in Sec. 7, T4S, R14E (Nemaha County, KS) to 3790 ft in the Cambrian and completed as an oil well pumping 111 BOPD and 26 BWPD from the Viola dolomite at 3455 to 3460 ft. The well produced 70.6 MBO before being P & A in 1995. A core was cut at top of the Viola Dolomite through the reservoir zone. As shown in these photomicrographs, the reservoir consists of medium- to coarse crystalline dolomite with up to 20% vuggy and intercrystalline porosity. The dolomite crystals are mostly euhedral with no undulose extinction (they are not saddle dolomite). Drilling mud lines some pores.

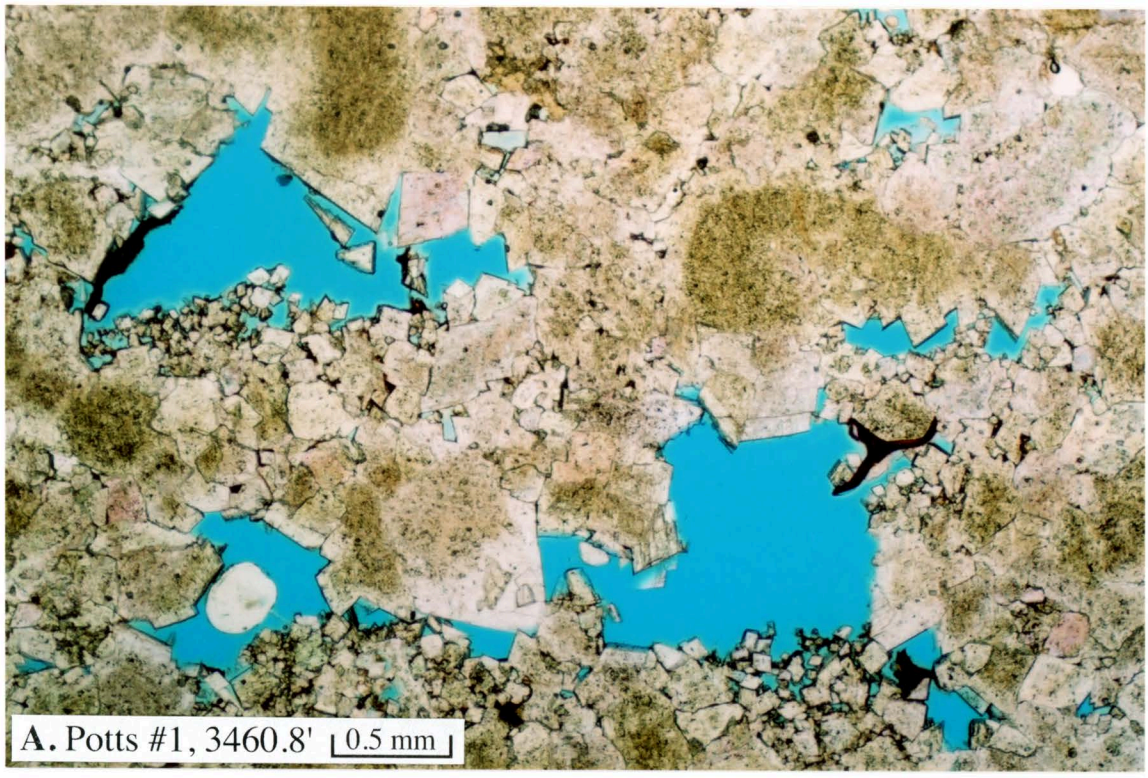
Plate 2. Potts #1, 3456.9 ft: Viola Formation Dolomite
Euhedral Dolomite Crystals Growing into Vuggy Pores with some Drilling Mud

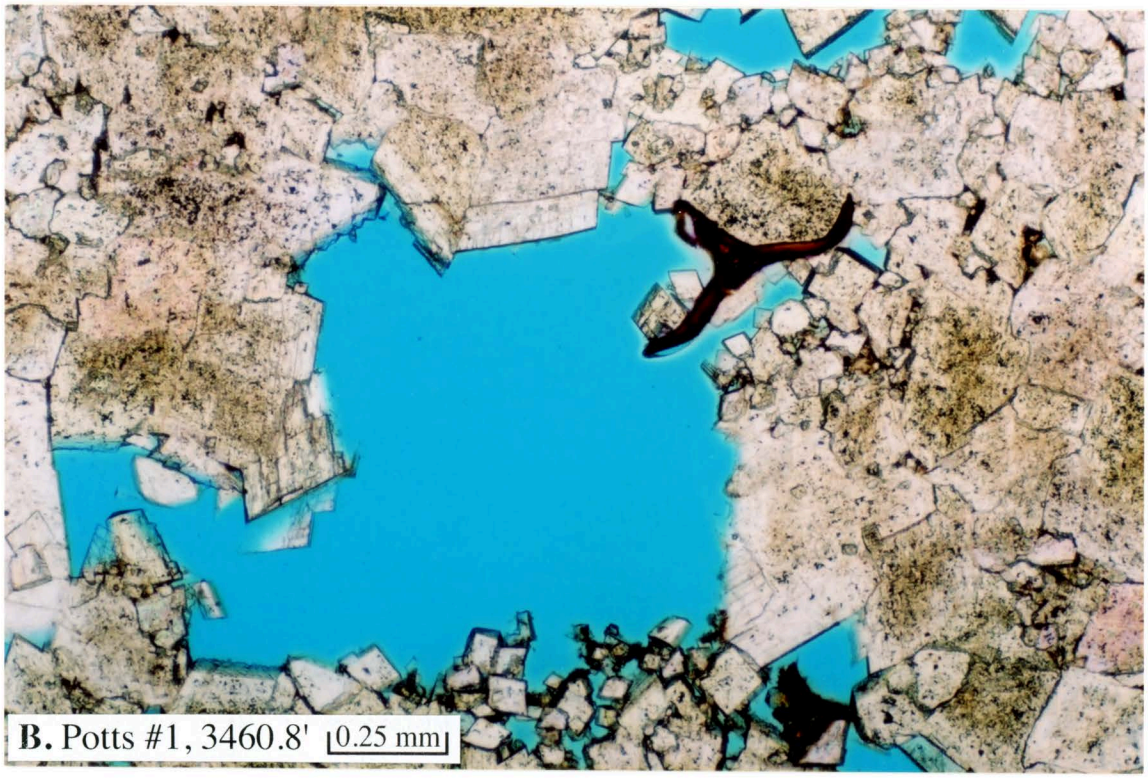




These photomicrographs show more of the same sample seen in Plate 1. This is more of the medium- to coarse crystalline dolomite with large vugs containing some beautiful euhedral crystals over 1 mm in size. The largest dolomite crystals have echinoderm fragments as nuclei (e.g., the cloudy part of the large crystal at upper left in Photo A). The crystal faces of the dolomites are straight with no hint of undulose extinction. Most of the dark material lining some vugs in both photos is drilling mud. Total porosity in this sample is estimated at 20%.

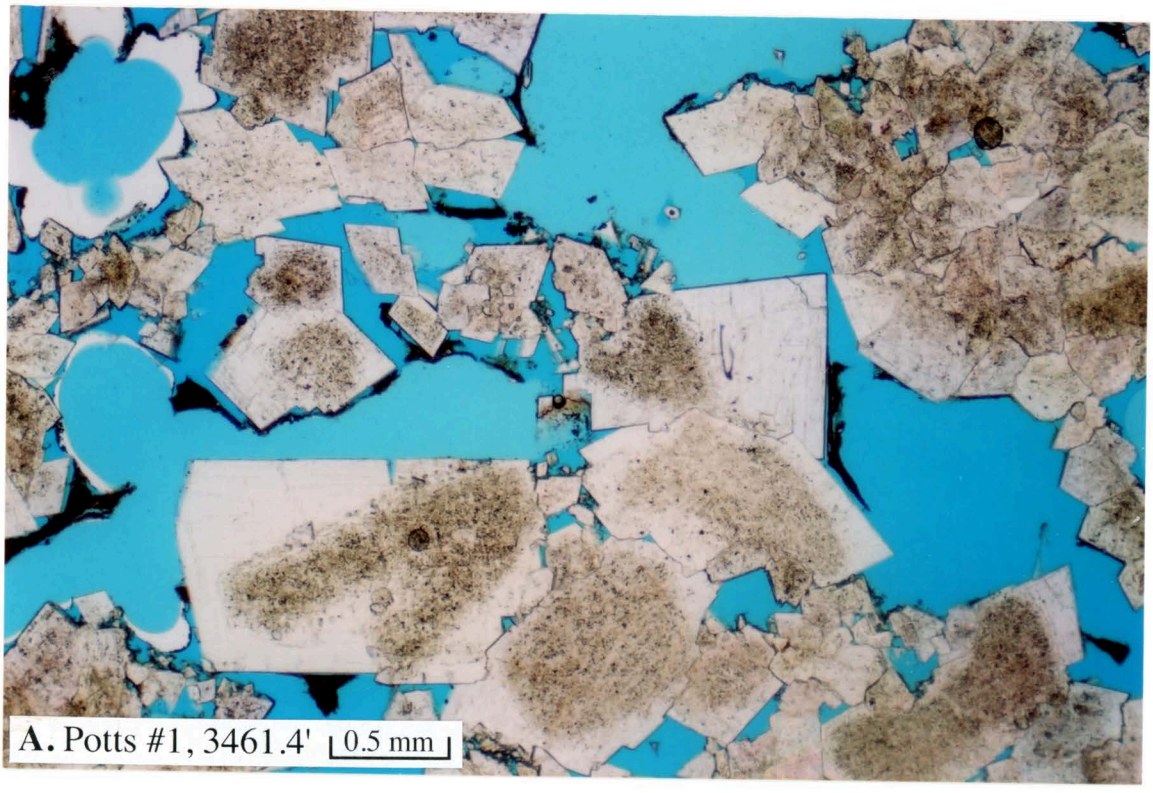
Plate 3. Potts #1, 3460.8 ft: Viola Formation Dolomite
Bitumen Residue in Vugs in Medium-Crystalline Dolomite

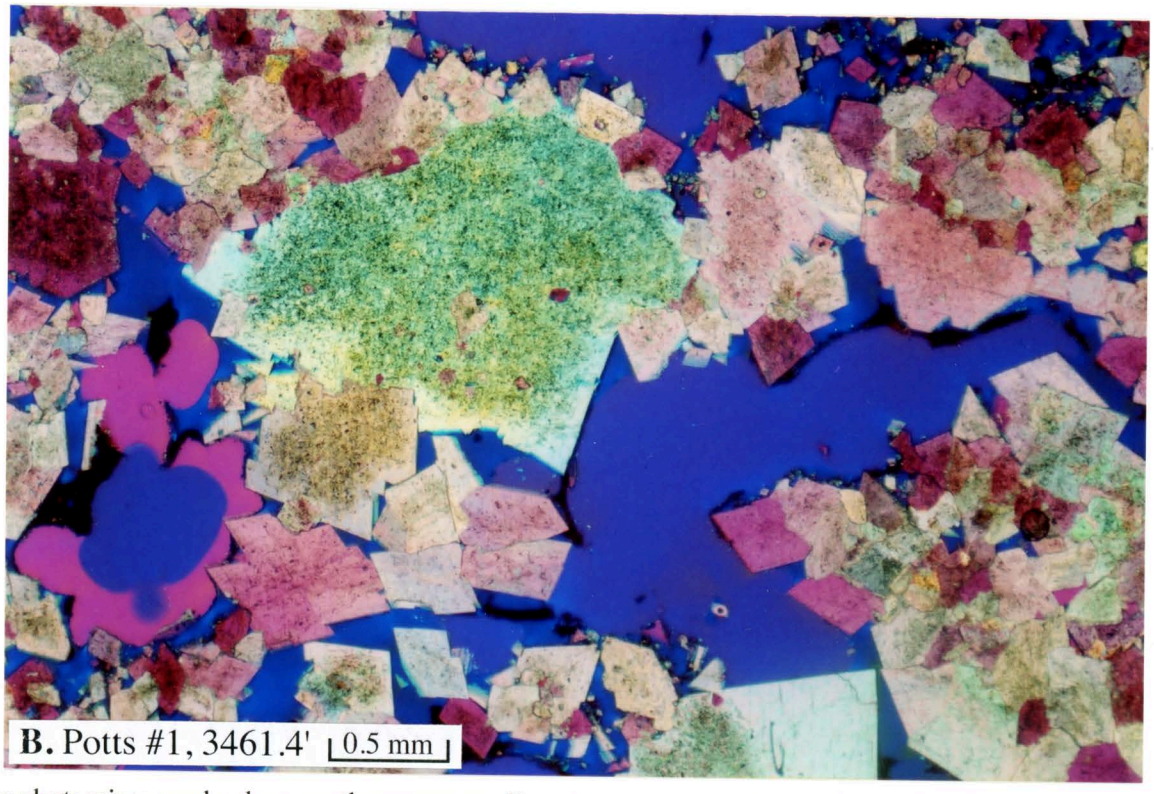




This sample from about 4 ft below that shown in Plates 1 and 2 reveals more of the vuggy medium- to coarse-crystalline dolomite that forms the Viola reservoir in this well. A patch of brown bitumen residue is visible at upper right in Photo B, and the core pieces in this interval have a heavy brown oil stain. The vugs are lined with euhedral dolomite crystals locally exceeding 1 mm in size and contain some very small crystals of dolomite as a geopetal fill. A small white air bubble is visible in the blue epoxy at lower left of Photo A.

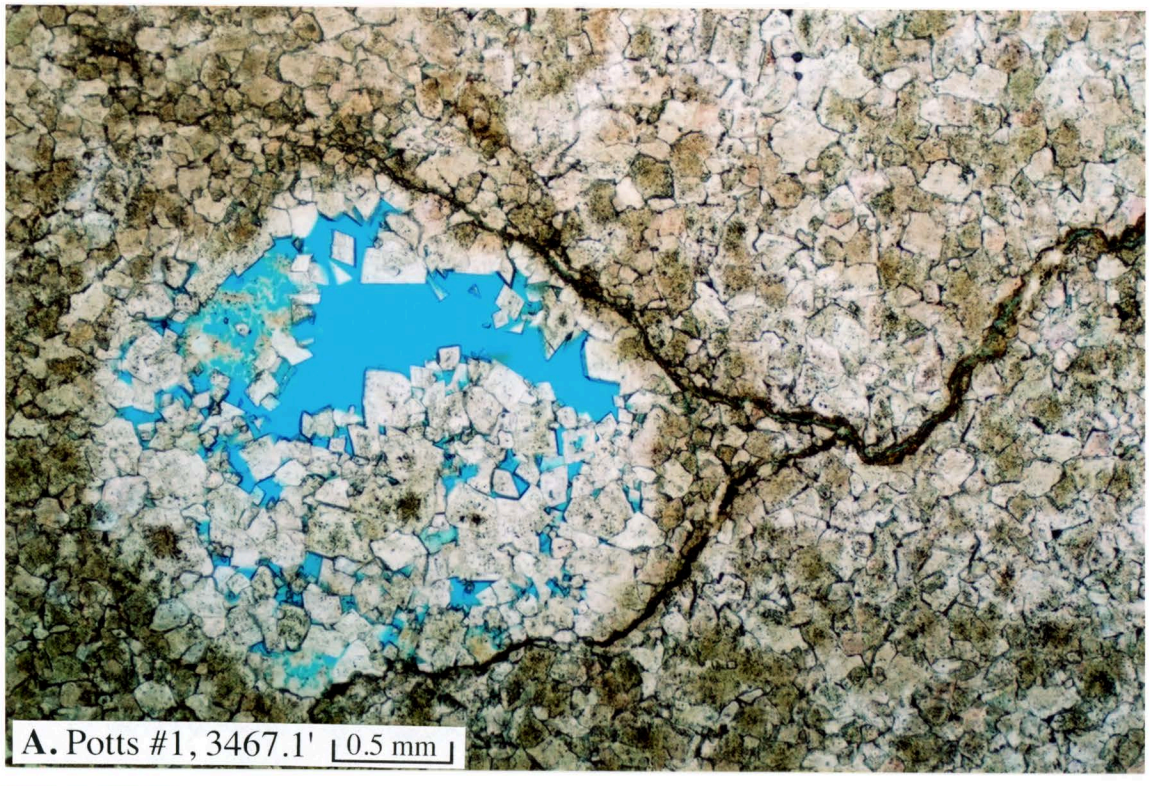
Plate 4. Potts #1, 3461.4 ft: Viola Formation Dolomite
Cloudy Echinoderm-Fragment Nuclei in Very Porous Coarse-Crystalline Dolomite

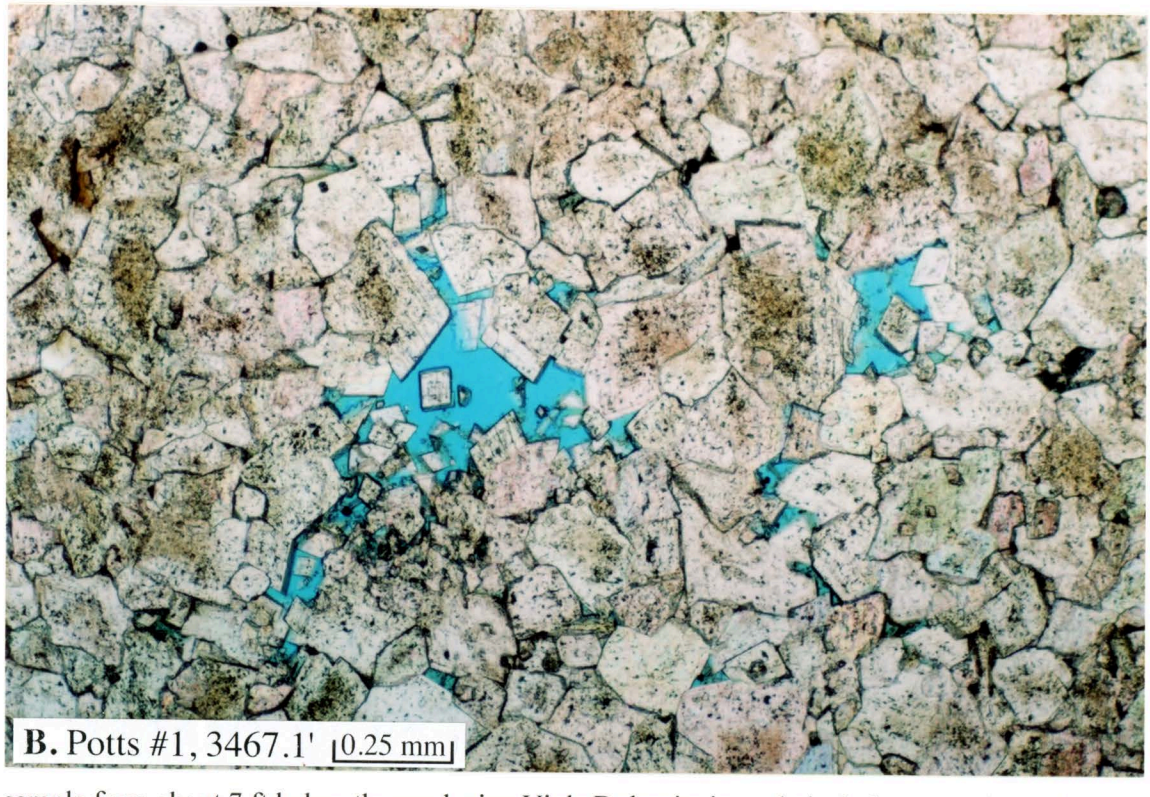




These photomicrographs show another vuggy medium- to coarse-crystalline dolomite from just below the Viola reservoir in this well. Brown bitumen residue lines parts of the poor system where it coats the nice euhedral dolomite crystals (best seen in Photo A). The cloudy centers of some crystals represent former echinoderm fragments that have unit extinction (visible in Photo B taken with crossed polarized light and a gypsum filter). A large air bubble partly filled with blue epoxy is visible at far upper left in Photo A and again at lower left in Photo B. Total visible porosity is estimated at about 20%.

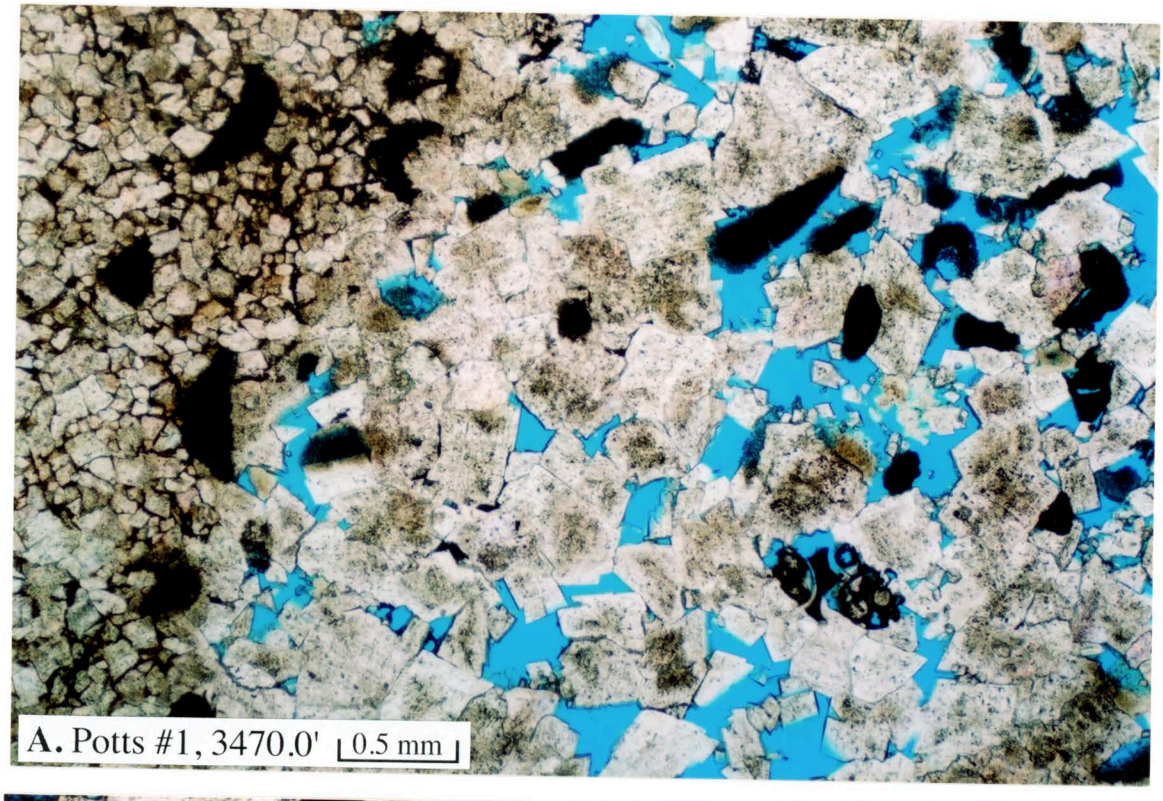
Plate 5. Potts #1, 3467.1 ft: Viola Formation Dolomite
Vugs and Wispy Stylolite in Relatively Tight Finely-Crystalline Dolomite

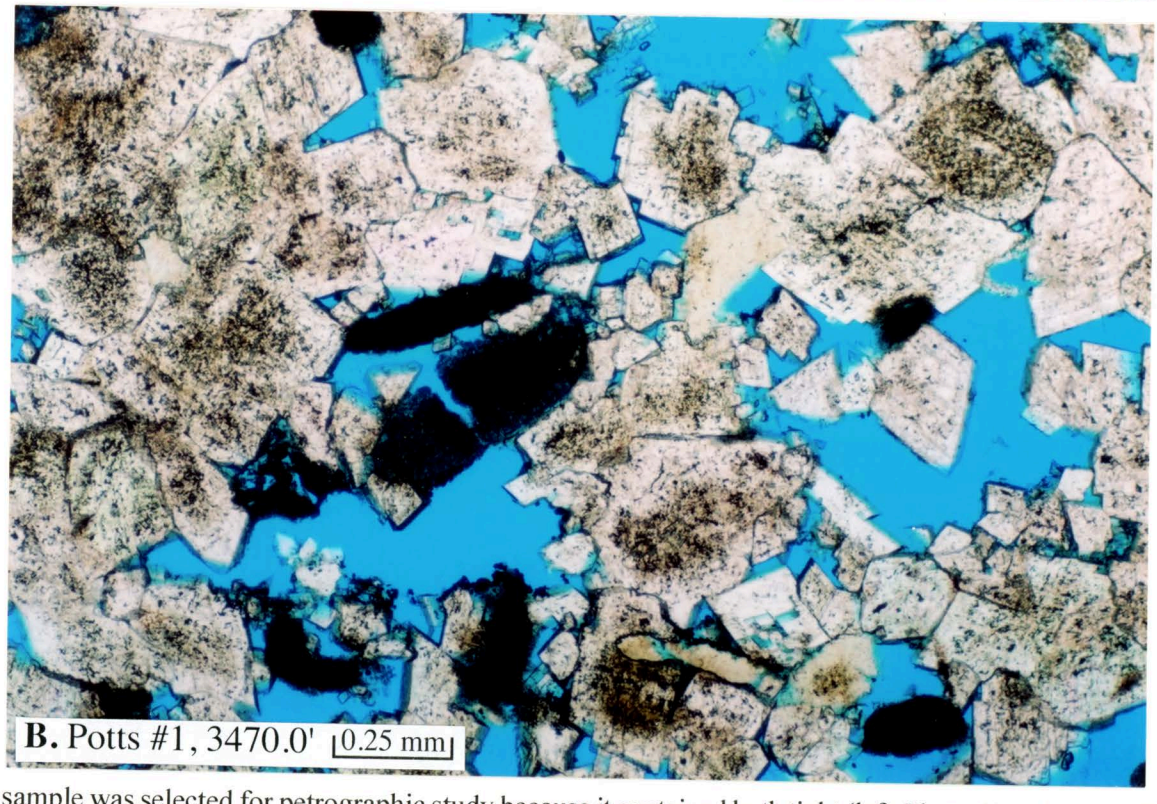




This sample from about 7 ft below the producing Viola Dolomite is a relatively low porosity bed with a few scattered vugs. Here the core lacks the heavy brown oil stain, presumably because it comes from below the oil/water contact, but also because it is quite tight. The round vug at left center in Photo B is partly filled with dolomite crystals and was probably originally a fossil fragment (now dissolved). A wispy stylolite extends around and to the right of this vug. Photo B shows pinpoint vugs lined with dolomite crystals.

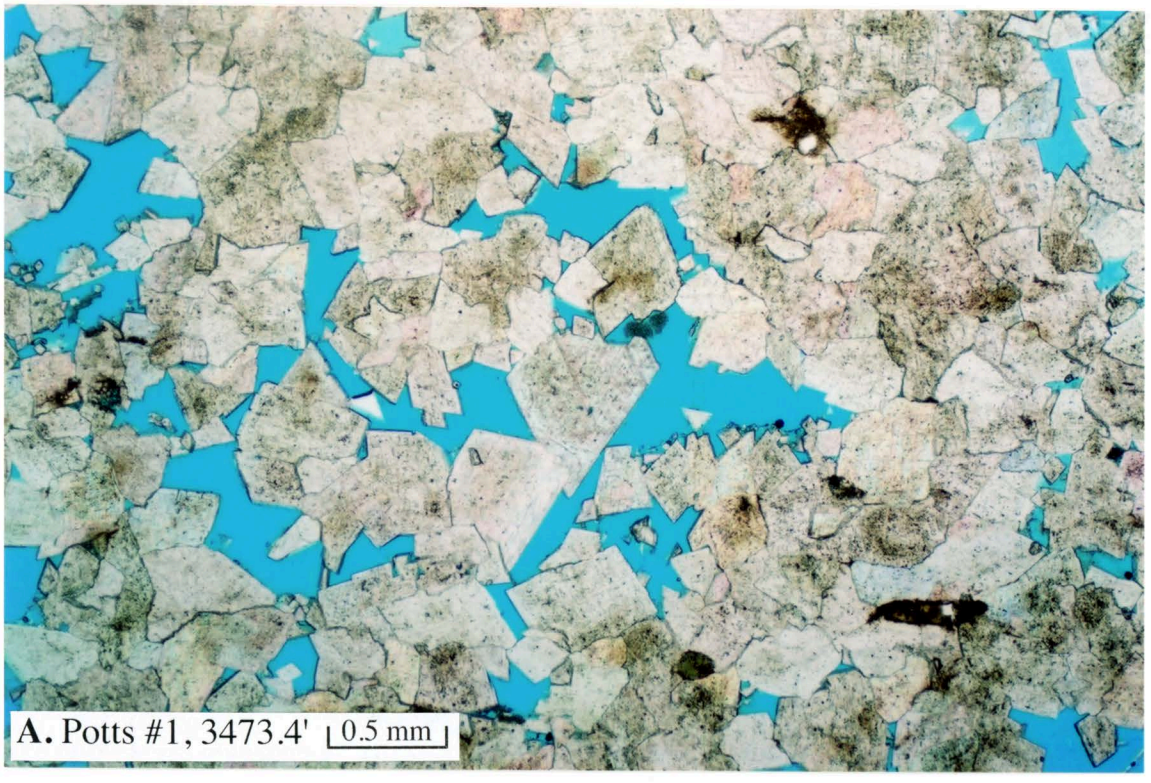
Plate 6. Potts #1, 3470.0 ft: Viola Formation Dolomite
Odd Dark Grains across Contact between Tight and Porous Dolomites

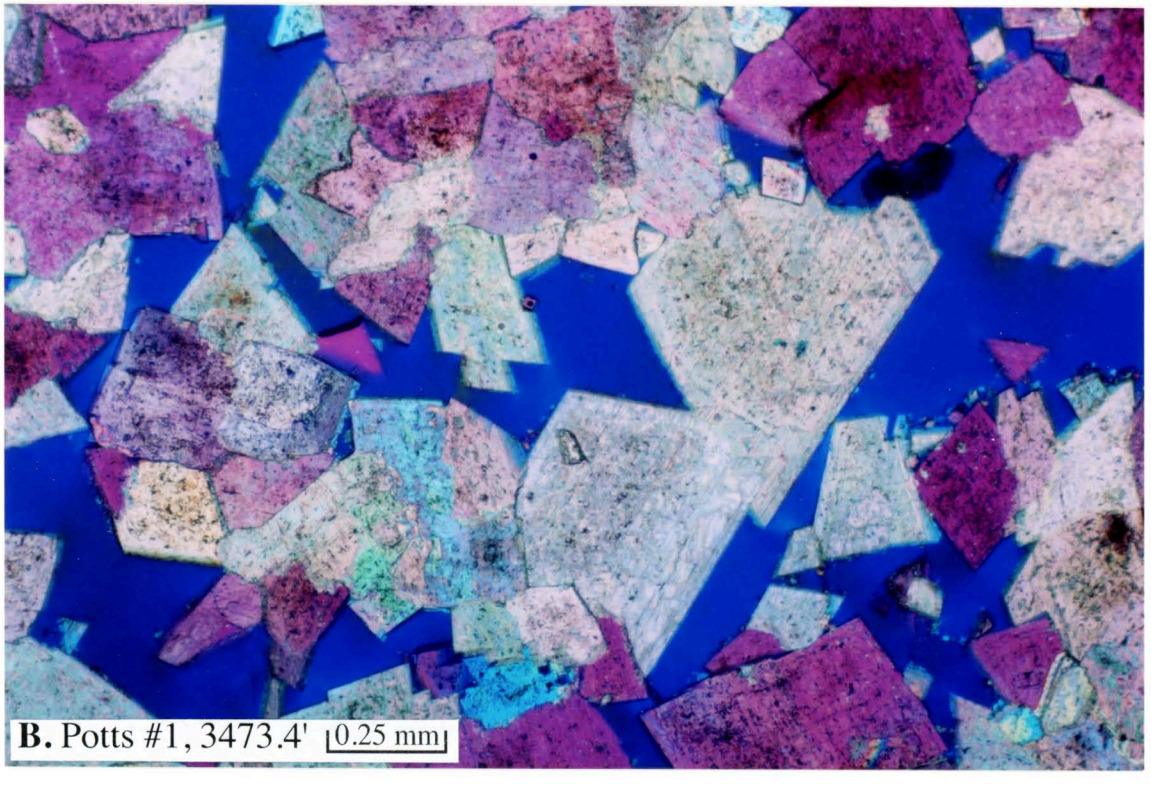




This sample was selected for petrographic study because it contained both tight (left, Photo A) and porous fine- to medium-crystalline dolomites separated by a near-vertical contact (at left, Photo A). The thin section reveals scattered dark grains that appear to be very finely crystalline dolomite, possibly originally intraclasts of dolomite mudstone. The porous part of the sample (Photo B) contains up to 20% intercrystalline and vuggy porosity lined with euhedral dolomite crystals. Reservoir quality appears good, but oil stain is lacking.

Plate 7. Potts #1, 3473.4 ft: Viola Formation Dolomite
Coarse Euhedral Dolomite Crystals in Porous Wet Dolomite





Shown here are photomicrographs of another porous dolomite from below the oil/water contact in this well. The dolomite has excellent intercrystalline porosity, but lacks any oil staining. Photo B, taken with crossed polarized light and a gypsum filter, shows that straight crystal faces on the relatively large dolomite crystals. Thus, this is not hydrothermal saddle dolomite but instead a relatively low-temperature form of dolomite that most likely formed in a mixing-zone environment.