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Cleaner water through applied chemistry and biology

10180 Queens Way #6 · Chagrin Falls, OH 44023 · Phone: 440-708-2999 · Fax: 440-708-2988

November 28, 2012

Rhonda Reda
Ohio Oil & Gas Energy Education Program
1718 Columbus Road, SW
P.O. Box 187
Granville, OH 43023-0187

RE: Water Sample Testing

Pint bottle of sample was received 10/9/2012 with your letter dated 10/1/2012 stating that someone left it at a Youngstown City Council meeting.

Request was to characterize the sample.

Visual Observations

Sample was comprised of a lighter colored floating layer and a darker amber aqueous layer that included a few specks of material at the bottom that were visible without the aid of a microscope.

Brightfield and phase contrast microscopy were used on the specks. The next two brightfield photos show one of the specks (brown material with a pattern) and some oil droplets at the top of the photographs. The brown patterned speck is part of a leaf. Photo 3 is part of another leaf. No attempt was made to characterize the type of leaves present.

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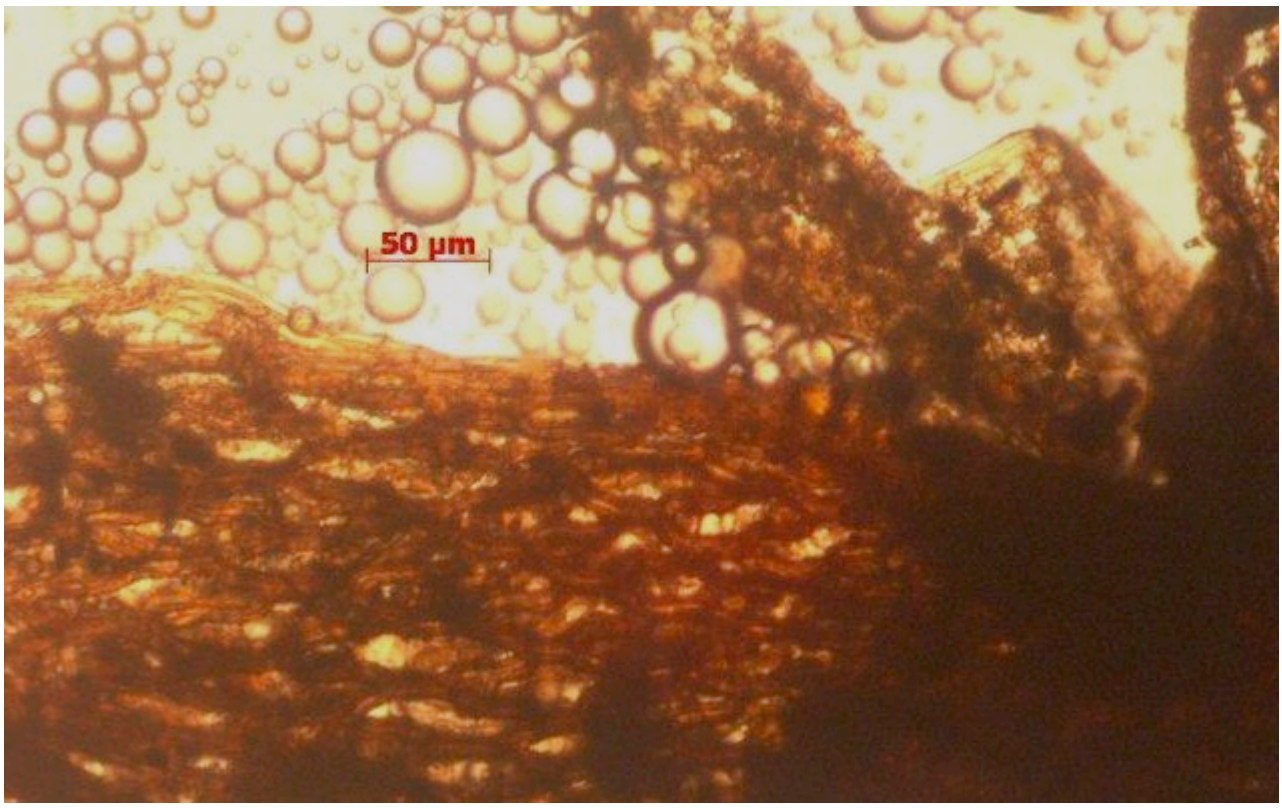

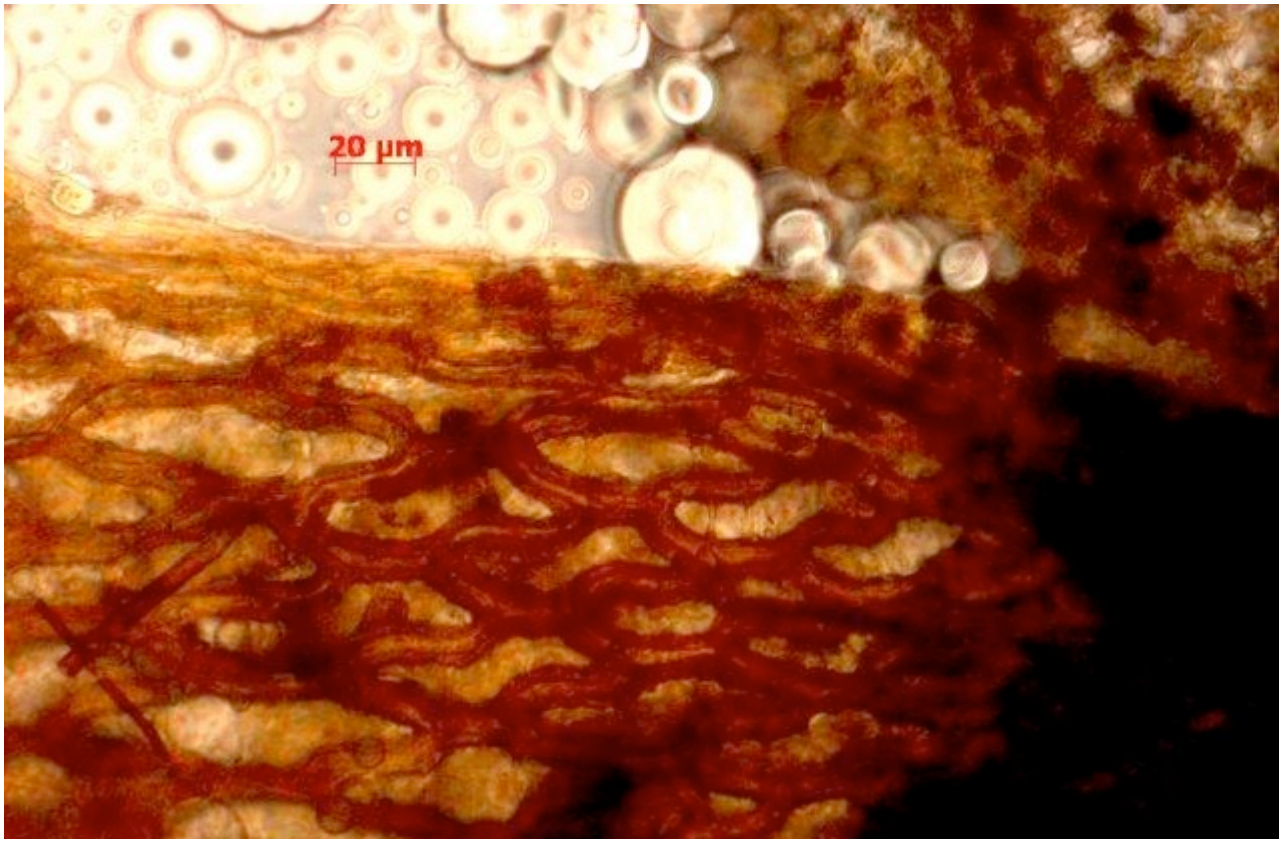

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Photo 3.

Photographs 4 & 5 used phase contrast microscopy and are primarily oil droplets

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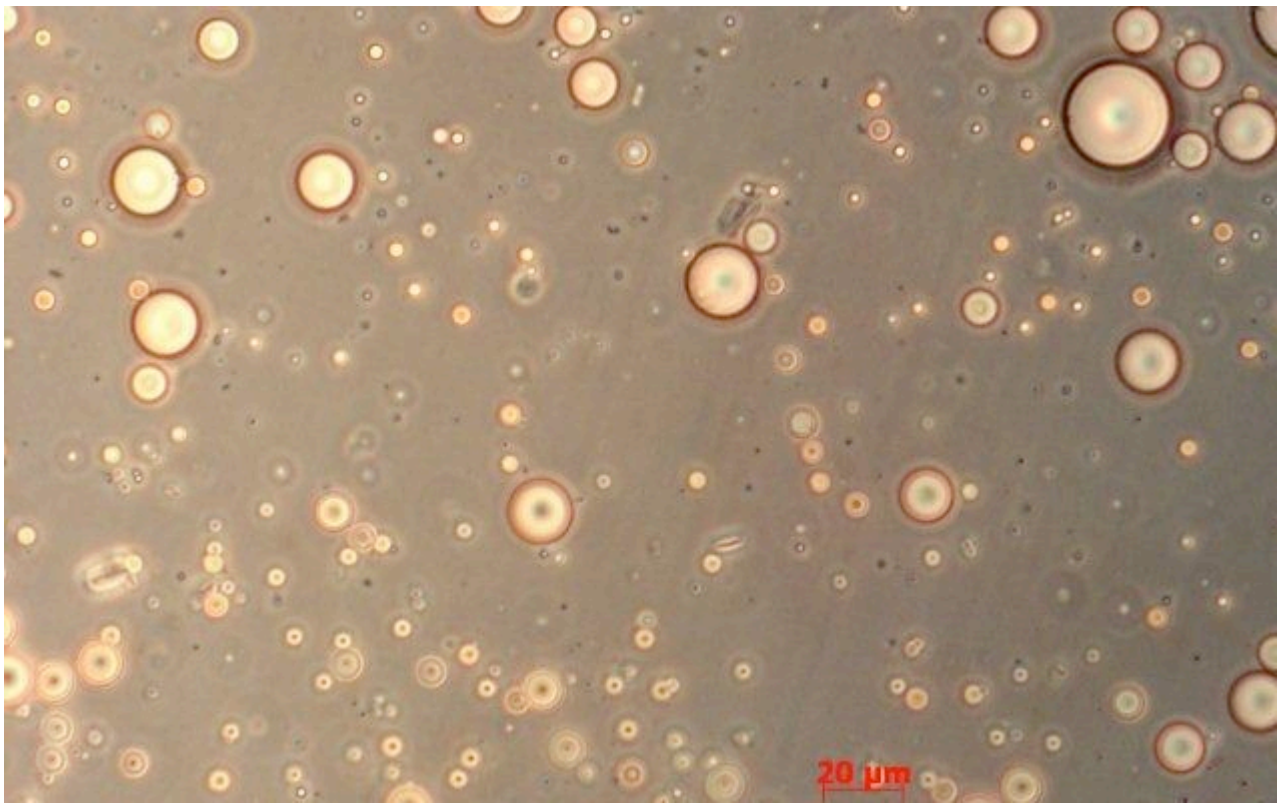

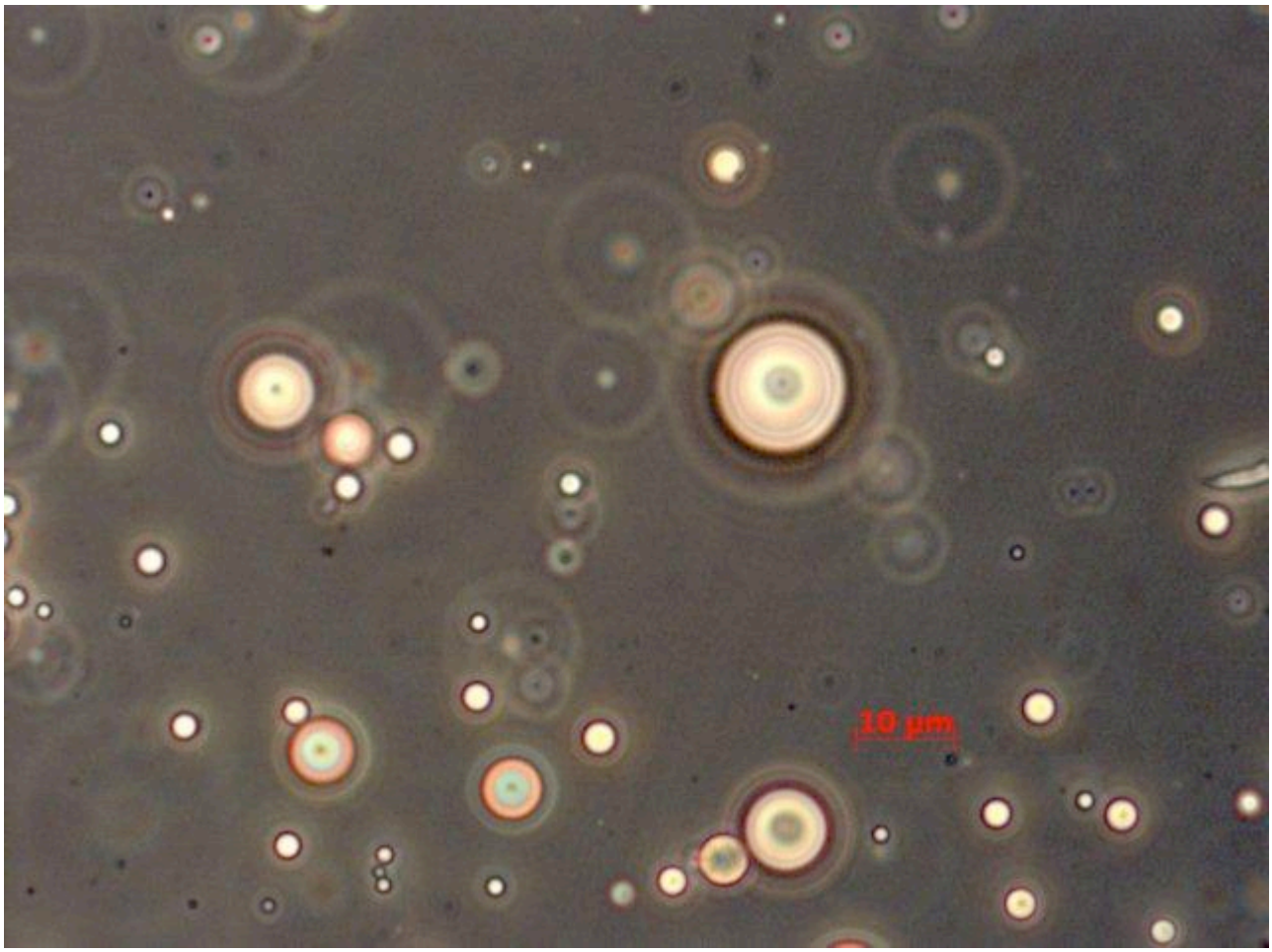

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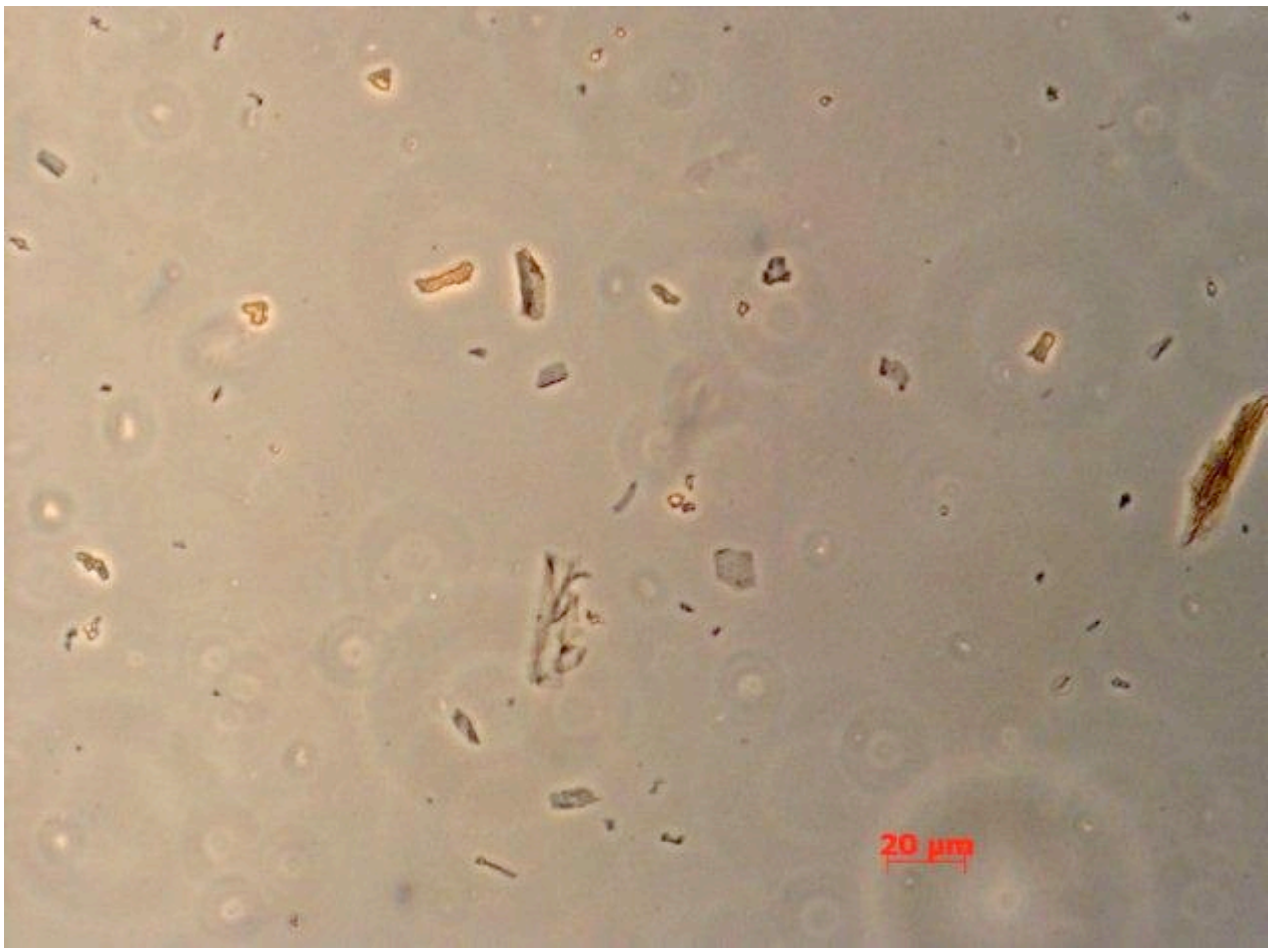

Photographs 6,7 and 8 are phase microscopy images of unidentified debris, possibly small bits of leaves or other organic material.

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Other Observations

Analysts noted the sample had odors of vinegar (acetic acid) and chewing tobacco. We lack the necessary organic analytical instruments and knowledge to corroborate these observations.

Sample was shaken vigorously and an aliquot was analyzed for oil and grease. Sample was 1.91% oil/grease.

Using a pH probe and meter was deemed too likely to damage the probe with the associated expense of probe replacement. pH using pH paper was in the 3-5 pH range. Conductivity was not measured for the same reason.

The visual paucity of microbes in the photographs is explained by the low pH. The oil layer on top will impede, if not eliminate, oxygen exchange to the aqueous portion of the sample, but facultative and anaerobic bacteria should still have been visible in the microscopic photographs had they been present.

A 1/100 dilution of the sample was analyzed via ion chromatography. Chloride is present at around 10,000 mg/L and sulfate around 480 mg/L. Chloride and sulfate concentrations vary, but are both in the 5-100 mg/L range for most water wells we have analyzed.

Hypothesis

If cider vinegar was supplemented with table salt, vegetable oil and some leafy material such as chewing tobacco, a sample with similar characteristics could be the result.