

**Meeting Summary of Tim Acomb's Presentation**  
**KLA Hydrofracking & Well Disposal Committee Meeting**

Wednesday, Sep. 10, 2014 @ 4:00 PM

KLA Office, Penn Yan, NY

Tim Acomb presented to the H&WD Committee the scientific and unbiased tutorial information that he presented in several meetings to Barrington Town Officials and the Barrington public.

1. The essence of this information indicates that HVHF in the Keuka Lake Watershed is significantly less economical, poses more environmental risks and requires specialized well drilling and completion activities.
2. The H&WD Committee maintains its position that HVHF should be prohibited in the Keuka Lake Watershed. This information will be of valuable help to the Committee in preparing arguments should the DEC not prohibit HVHF in the Watershed later this year or early next year.

**Geological Issues:**

1. The significant points applying to the H&WD Committee's efforts are.
  - a. The top of the Marcellus shale layer lies at a depth of less than 2000 feet subsea (2400 feet below the bottom of Keuka Lake near the end of the Bluff) and outcrops at Marcellus, NY.
  - b. The thickness of the Marcellus shale layer decreases from 100 feet at the southern end of Keuka Lake to 25 feet or less at the northern end of the Lake.
  - c. The economics of HVHF diminish because of reduced producible quantities of gas available from the thinner Marcellus Shale and less overburden pressure available to force the gas to the induced fractures and into the well bore.
  - d. The longest fractures from properly designed HVHF should extend approximately 300 to 800 feet from the perforation zones in the horizontal portions of the well. However, fractures have been mapped to be as long as 1800 feet from the perforations especially if geologic faults are present. These unusually long fractures could place fracturing fluids or brine waters close to the surface.
2. Because of these geological conditions, horizontal fracturing pressures must be significantly reduced (from 10,000 to 5000 psi) and the length of horizontal portions of the well will likely be 3000 to 4000 feet.

3. The envisioned economics of local gas production are probably not favorable to pursue the Marcellus Shale. The poor economics is due to the limited amount of total natural gas available in the thinner Marcellus shale layer and a recovery rate that will probably be less than 30% of the gas in the rock formation.

4. The estimated full cycle production cost of hydrofracked natural gas in Pennsylvania is estimated to be \$1.12 per mcf. At current natural gas prices the net profit is probably not attractive to the gas company.

**Environmental Concerns:**

1. Methane migration from the shallow rock layers into shallower water aquifers results almost entirely from inadequate cementing around the casings along the vertical portion of the well bore. Improperly sealed spacing between the outer conductor, surface casings and the drill hole preimeter can allow methane to migrate upward.

2. The most likely cause of anywater contamination by fracking fluid chemicals are flowback water spills. Multiple casings and good casing cementing will significantly limit flowback fluids and natural gas from escaping to the aquifers. However spills at the surface (at the gas well or while transporting fluids) can and will probably happen. The steep hillsides along Keuka Lake can result in any large amount of spilled fluids rapidly flowing into the Lake.

3. Air polluiton concerns stem primarily from diesel engine fumes and natural gas leakage. Diesel fumes will originate from heavy truck traffic, diesel powered generators and fracturing pumps and any possible compressor processing stations. Gas well site preparation, drilling, hydraulic fracturing and well completion operations are expected to averag 35-45 days per single well.

a. If Barrington was completely drilled, the Town could have a maximum of 24 well pads with 6 wells per pad totalling 144 wells.

b. Heavy truck traffic related to hydraulic fracturing operations is estimated at 547 trips per well or 3282 trips per well pad with a maximum of over 78,000 trips in Barrington likely spread over several years.

c. Methane leaks from well head equipment, pipes and compressors can be significant sources of air pollution if not properly monitored and remediated..

Nitrogen oxide fumes from diesel powered trucks and well site equipment combined with leaking methane and other natural gases can create ozone pollution and combine with partiulate matter to cause SMOG.

d. Noise from nearby truck traffic, drilling, fracturing operations and compressor stations can produce noise levels exceeding acceptable EPA limits near (closer than 500 feet) the drilling pads and on roads leading to the well pads. Noise can exceed twice the EPA acceptable noise level if people are closer than 200 feet to these noise sources.