

Weaver, Mathew

From: Weaver, Mathew
Sent: Tuesday, February 08, 2011 4:24 PM
To: Homan, John
Cc: Peppersack, Jeff
Subject: Murphy Hot Springs MOU

John,

I made a few comments to the Murphy Hot Springs MOU, I will have the document back up to you shortly. However, concerning bullet point number two, I have some concerns regarding the clause that states water will be delivered to the Scroggins' property *"at a pressure level high enough to sustain household use"*.

As reported during our meeting last week and confirmed in a memo by Brockway, the elevation difference between the springs and the Scroggins' home is 30 feet (13 psi). The Scroggins' home is approximately 175 feet away from the south spring, which is identified in the MOU as the source of water for Scroggins. The MOU indicates that a $\frac{3}{4}$ " tee will divert water into a 1-1/2" service line that will deliver water to the Scroggins' home. The head loss associated with a $\frac{3}{4}$ " tee and ~175 LF of 1-1/2" service line is about 1 psi. The MOU also states that Scroggins shall install a "back flow preventer valve" on the 1-1/2" service line. I have looked at a number of back flow prevention devices and they all have a head loss of ~5 psi in the 1-1/2" diameter range. Therefore, assuming no other losses in the connection, by the time water is delivered to the Scroggins home, the best case pressure in the line will be 7 psi (13 -1 - 5). The 2006 International Plumbing Code (IPC) indicates that the minimum water pressure at any in-home fixture should be 15 psi. DEQ has guidelines indicating that the minimum water pressure servicing a home should be 20 psi. The table below lends further detail concerning the minimum flow rate and pressure required at common household fixtures in order for the fixtures to function. You will note that common fixtures such as bathtubs, sinks, and showers require a minimum of 8 psi.

So to summarize, my concern is that the conditions of the MOU are such that they will defeat the specific intent of bulleted item number two and the larger intent that the water in the Scroggins home will be useable to the residents. Solely from the perspective of Scroggins, the MOU would serve him better if the north spring was listed as the source, the service tee and service line were both 1-1/2", and there was no back flow prevention device required on the line. In this scenario although the pressure of his supply water would not adequately meet IPC & DEQ requirements, at least it would be enough to power his in-home fixtures if used one at a time.

I'm not sure what I expect us do with this information, but I thought I would share none the less.

Let me know if you've have any questions.

Mat Weaver, PE
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Fixture Water Requirements*

Fixture Description	Flow Rate (gpm)	Flow Press. (psi)
Bathtub	4	8
Bidet	2	4
Combination fixture	4	8

Dishwater, residential	2.75	8
Drinking fountain jet	0.75	8
Laundry tray	4	8
Lavatory	2	8
Shower	3	8
Shower, temperature controlled	3	20
Sillcock, hose bibb	5	8
Sink, residential	2.5	8
Sink, service	3	8
Urinal, valve	15	15
Water closet, blow out, flushometer valve	35	25
Water, closet, flushometer tank	1.6	15
Water closet, siphonic, flushometer valve	25	15
Water closet, tank, close coupled,	3	8
Water closet, tank, one piece	6	20

*Table recreated from 2006 International Plumbing Code, Table 604.3 *Water Distribution System Design Criteria Required Capacity at Fixture Supply Pipe Outlets*, pp. 38