EVALUATION AND AUTOMATION OF SMALL PRESSURE FILTER SYSTEMS

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Descriptors: Pressure filter automation; infiltration; water quality control.

Problem and Research Objectives:

Passage of amendments to the Safe Drinking Water Act required the US Environmental Protection Agency to specify where filtration of surface water sources is mandatory. Disinfection was also required for public water systems using surface water supplies. This project designed, constructed and installed a field scale pressure filter system for the Town of Contoocook, NH. The system was then run for seven months to evaluate the success of this technology for surface water treatment.

Principal Findings and Significance:

Software: The software system accomplished all primary objectives. The hardware could use more expansion slots to allow telephone notification capability.

Precoat DE Size: The influent flow rate decreased over time as the headloss in the filter increased because the DE pilot plant was operated at constant gravity with no flow controller. The best hydraulic performance was obtained by the medium grade DE (Celite 503). The 503 grade had slow headloss development, but did not treat quite as much volume as the larger 545 grade DE. Visual inspection of the filter coat by the operator showed uneven filter coating with the 545 grade at all precoat doses.

Precoat DE Dose: The optimum precoat dose for both the 503 and the 545 DE grades, as determined by headloss development, was 0.15 lb/ft2. For all grades of DE tested, 0.15 lb/ft. was the optimum dose for maximum volume of water treated at a minimum terminal headloss.

Bodyfeed Dose and Size: After determining the optimum precoat grade and loading, i.e., Celite 503 at 0.15 lb/ft2 dose, various bodyfeed combinations of DE size and dosage were tried. All bodyfeed application rates resulted in faster headloss development than using precoat only. Influent flow rates decreased more rapidly for all bodyfeed application rates than for precoat only.