

Market Overview:

This organic herb farm water supply was placed on a "Boil Water Alert" Do not Drink The Water signs were required to be posted due to failure of bacteria testing. Company uses a deep well for source water for employees and irrigational purposes. Well was classified as Ground Water Under Direct Influence of Surface Water by the Commonwealth of Virginia Department of Health. This classification requires continuous 4 LRV disinfection for virus and cryptosporidium as well as a residual chlorine infection in distribution lines after primary disinfection.

Various technologies were reviewed by the owners and after much review and cost analysis the owners decided to utilize the Multi-Barrier Drinking Water Disinfection System model MB-3S-15-186KG.

This required the Commonwealth of Virginia to approve the installation of this equipment. In September of 2014 the Health department field reviewed & approved the final installation and required 4 weeks of bacteria monitoring and testing before they would left the "Boil Order Alert". In October 2014 the Health department notified the owner that the "Boil Order Alert" was removed.

Market Application: 15 gpm peak flow- Treatment Train

Pre Treatment:

Existing treatment - A duplex multi media filter has been installed at well house for some time and was not modified during this installation.

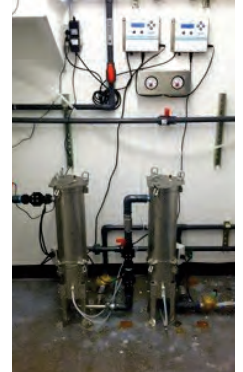
New treatment and equipment-

Stored Water: Two raw water storage tanks, approximately 2000 gallon each, are automatically refilled by source well pump system. This water tank maintains chlorine residual of ~1ppm of FAC, due to the presence of iron bacteria in the source water.

Multi-media Iron filter is used to reduce/remove the iron and reduce particulates.

Particulate Filters: Two Sub Micron Backwashing dead end filters 0.45 micron absolute, backwashed with clean water based upon pressure differential were installed to reduce the high level of silcon and colloidal clay materials found in the water. >1,000,000 particles <2 micron per 15mL samples. These levels vary with weather and have been measure as high as 8,000,000 per 15 mL.

Turbidity Montiors: An inline Hach 1720e turbidity probe measures NTU levels after all pre treatment and after the Multi-Barrier Disinfection System. NTU levels are maintained after Multi-Barrier to <0.1NTU and as low as 0.05 NTU.



Primary filtration and Disinfection for 4 LRV of virus and cryptosporidium

Multi-Barrier Disinfection System: MB-3S-15-186KG system. It consist of 3 stages of treatment.

Stage 1: Dead end filter - 0.45 micron absolute



Stage 2: Dead end filter - CMF Charged Membrane Filter for Cyrtosporidium reduction and to maintain the NTU to < .13

Stage 3: High Dose 186mJ/cm2 Low Pressure, High Output UV system with UV sensor to monitor UVT% and other critical aspects of the system.

Controller: Solid state electronic contoller provides fail safe monitoring of all stages of treatment and has a downstream solenoid shutoff which activates if system is in cricial alarm state.

Results: This system meets all of the requirements of the Commonwealth of Virgina Department of Health regulations and the Federal Regulations -Safe drinking water act.

Significant Initial and operating cost savings let to the final decisions for the selection of this equipment vs membrane and chlorination approaches. Both of which would have required similiar pre treatment requirements for this source water supply.