Residential

Residential Bacterial Well Water

Minnesota, USA

Background:

Recently, Argonide was approached by a customer with a challenging residential issue. The location is in the St. Cloud area of Minnesota. The home is served by well water plagued with Iron Bacteria that yielded a "Swampy" odor in the water. *Even with a water treatment system installed*, this condition makes controlling the iron bacteria build up in the toilet tanks and staining of fixtures a daily chore to keep clean to remediate the problem. Clorox chlorine pucks are used in all 4 toilets to help reduce odor and iron bacteria buildup. The homeowner installed an Iron Oxidizing Filter with ozone regeneration, a water conditioner to soften the water, a 4.5" X 20" Dual Gradient Density (DGD) 2501 filter cartridge to protect a 4.5" X 20" Fiberdyne "floplus" filter cartridge, the final stage of treatment prior to the treated water entering the service plumbing. The estimated daily water usage for this family of 5 is 320 gallons.

A water analysis was obtained to confirm the level and types of iron. The report confirmed the presence of Iron Reducing Bacteria (IRB) estimated to be 9,000 colony forming units per milliliter (cfu/mL). In addition, Sulfate Reducing Bacteria (SRB) was present and estimated at <200 cfu/mL. Coliform Bacteria was present, but E coli was absent.

Challenge:

Because of the bacterial state of the well water and the water condition, the water treatment system required frequent servicing and repair to restore optimal performance. The ozone generator, check valve, and venturi were cleaned and/or replaced and a filter bed cleanup after regeneration performance was restored. The water softener control valve was serviced and cleaned to restore proper brine draw performance to ensure optimal brine strength to clean the resin. After restoration service was completed, the hydraulic performance of the well pump at 40 PSI was confirmed at 13.5 GPM which met the 13.0 GPM required backwash flow rate for the Iox-Filter. The effluent water from the filter showed measurable iron migration of 0.15 mg/L iron, and being in the ferric state, passed through the softener as well and into the service plumbing.

Solution:

The homeowner installed a variable area flow meter in the service piping to measure flow rate relative to the pressure drop (Delta P) across the Fiberdyne filter. Prior to the servicing of the system, the water pressure to the system was 60 PSI. The pressure drop was extremely high at 56 PSI which yielded a net pressure to service of 4 PSI. The homeowner indicated that the wife and daughters were not very happy with poor flow in the showers. After service to the system, a NanoCeram P4.5-20 AG filter was installed in place or the DGD 2501 to provide protection of the Floplus post filter. At 61.5 PSI, and 4.0 GPM flow rate, The NanoCeram filter delta P was 0.5 PSI and the Floplus delta P was 3.0 PSI. The ferric iron captured by the NanoCeram was visible through the clear filter bowl and no detectable iron was present in the effluent water.

Summary:

After 35 days, the delta P across the NanoCeram filter was 4.5 PSI and the Floplus delta P was 7.5 PSI for a total delta P of 12 PSI at 4.2GPM flow rate with 60 PSI inlet pressure. At 47 days, the delta P across the NanoCeram was 22 PSI and the floplus was 18 PSI which yielded a 40 PSI drop leaving a net flow to service of 20 PSI. The owner installed another filter housing to put a DGD 2501 upstream of the NanoCeram to help in reducing the load on the NanoCeram. The goal is to achieve 90 – 120 days between NanoCeram cartridge replacement which is intended to help defray the maintenance costs of the system. He was happy to report that they no longer had to use the Clorox Chlorine pucks for bacterial slime control in the toilet tanks citing only an occasional hand cleaning to keep the tanks clean and fresh. Regular maintenance on the "oxidizing filter" and ozone generation system will be required to ensure maximum life for the cartridge filters. The family appears to be happy with the performance of the Argonide NanoCeram Advanced Filter Performance and intends to make it a regular service item to provide clean, clear, and odor free water for the home.

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