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#### Show Notes Episode 8 – Using Granular Activated Carbon to Treat for PFOA/PFAS

Per- and polyfluoroalkyl substances are manmade chemicals that include PFOA, PFOS, GENX and many other substances. They are everywhere, in everything and considered “forever chemicals”. They are ingredients in fire foam, non-stick pans, waterproof fabrics, to name a few. There are long and short chemical chains. The short chains are more difficult to remove than long chain.

Currently these chemicals can be removed by RO, Ion Exchange Resin and Activated Carbon. Activated Carbon has been used for many years to treat PFAS. We have a lot of experience with it.

#### Treatment

- Coal based carbon outperforms coconut carbon. We suggest using Calgon Filtrasorb 400. Filtrasorb 600 works well but is more costly.
  - This carbon’s performance is consistent because it is reagglomerated, (coal is pulverized and put back together). The manufacturing process is controlled. Each lot meets the same quality standard.
  - Coconut is a crop so there can be variations from year to year. Coconut carbons are direct fired. Coconut carbons will remove PFAS however, they will not last as long as the coal.
  - If you look at a coal-based carbons you will see many pathways or roads to the adsorption sites or parking lots. Coconut carbon also has many pathways but fewer adsorption sites.

#### Equipment Application – Municipal and Well Water

- Check for pH. Low pH has the potential to strip off iron and arsenic (naturally occurring minerals in coal) from the activated carbon. Treat if lower than 7.
- Fiberglass tank, downflow service cycle only. No backwash.
  - Backwashing will introduce untreated water to the bottom of the bed. Bad carbon gets mixed with good carbon.
  - Most valve manufacturers allow raw water to escape during the backwash cycle. If you drink water during the backwash cycle it will be untreated.
- Precondition the carbon by wetting it for 12-24 hours then blow the water out before installation.
  - Carbon has oxygen in it. Expel the carbon to open up the adsorption sites or parking lots.
- Install a simple 5-micron pre-filter. It is a sentinel to crud in the water. It will prevent this crud from affecting the carbon performance.
- Use two tanks – Lead (worker) Lag (guard)
  - 1054 tanks are commonly used.
- Please a sample port between the two tanks to determine when the contaminant will break through. A second sample port is not necessary because you can take that sample from any tap.



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- Install a simple totalizing meter after the system to record how much water is being treated.
  - We do not suggest using a meter from associated equipment, such as a water softener because it can be reset accidentally or as a result of a power failure.
- This equipment should be after all other equipment but before the UV system.

#### Sizing the equipment

- Test for TOC, total organic carbon, because it competes for adsorption sites. TOC can be invisible or visible as tannins. It consists of lignin and humic acids. There can also be VOC's – volatile organic chemicals. Two to three parts per million of TOC is a lot.
- Determine Empty Bed Contact Time, EBCT. That is the amount of time it takes the water to go through the bed of carbon.
- Determining the size of the tanks is tricky in a residence. The water runs at a higher rate in the morning and evening hours; not at all during the night and daytime hours. The EBCT needs to accommodate the peak flow rates.
- Most homes we have treated have 4 cubic feet of carbon. Two 10x54 tanks filled with two cubic feet of carbon in each.

#### Exchanging the Equipment

- Exchanges happen based on breakthrough of the Lead or Worker tank. It is in spot number one.
- Remove the lead tank, move the guard tank into its spot (#1) and put the fresh tank in as the guard tank (#2 spot).
- All tanks should be exchanged if they are in use for two years. Biofilm builds up and makes the carbon gooey.

#### Extra Information

[What are PFAS's](#)

[Empty Bed Contact Time Calculator](#)

[EBCT](#)

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