

Disk Filters for Tertiary Filtration in Municipal and Industrial Applications

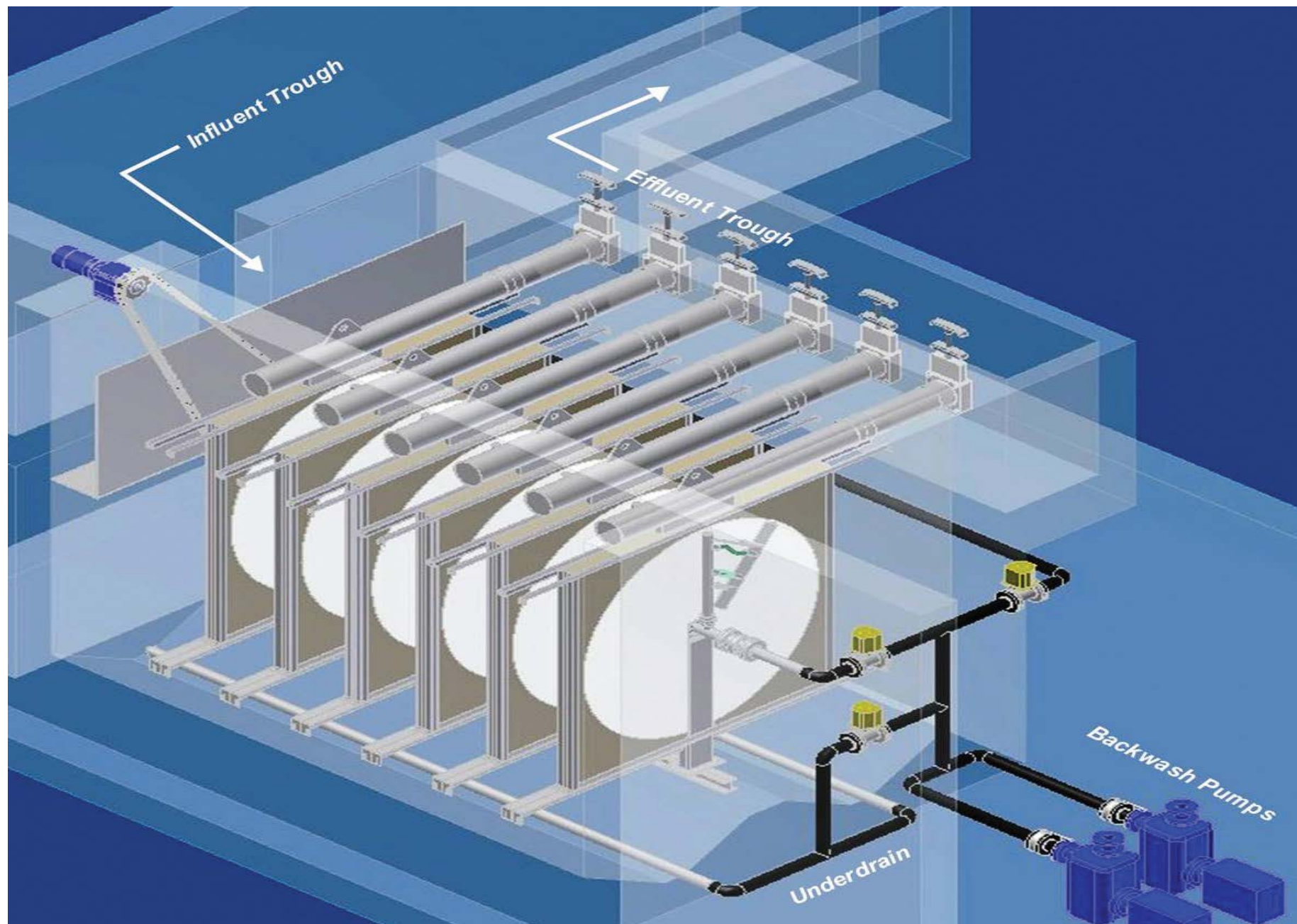
By

Rich Stummer

Daman Superior LLC

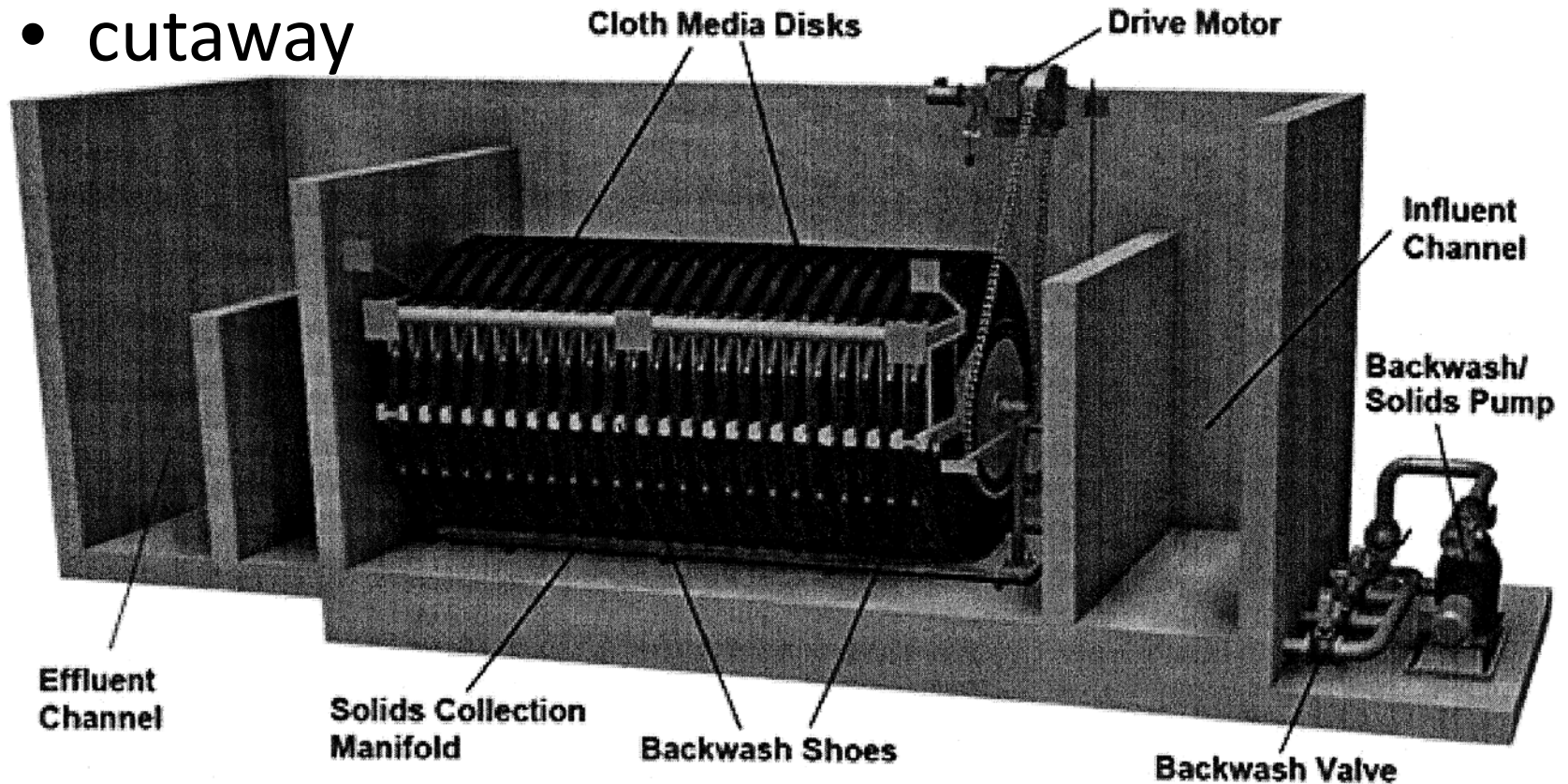
Agenda

- What is a Disk Filter
- Applications for Disk Filters
- Types of Disk Filters
- Advantages of Disk Filters
- Operation of Disk Filters
- Specific Design Features
- Case Studies
- Questions

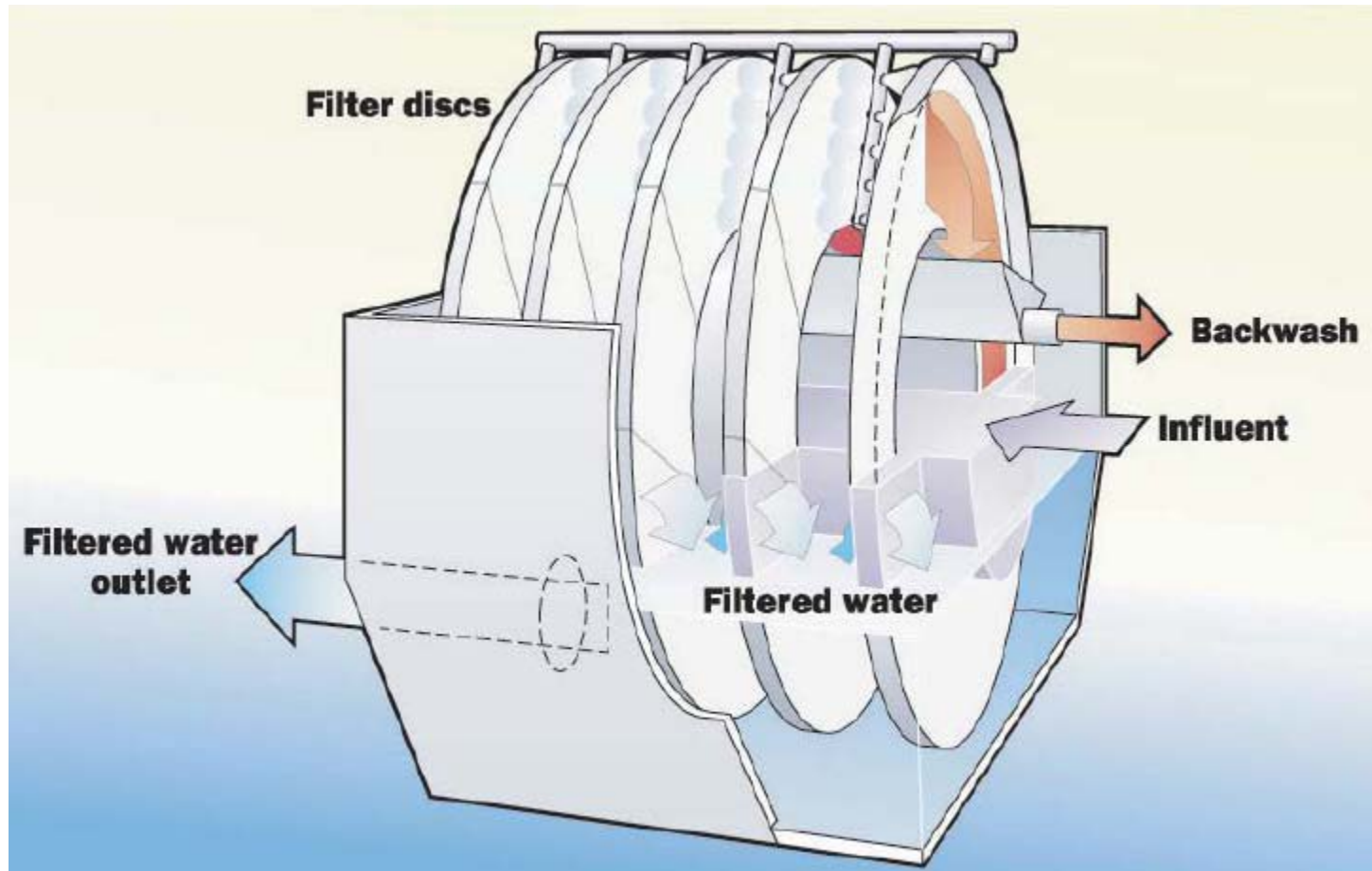


Aqua-Disk

- cutaway



Kruger Hydrotech Inside - Out



Five Star Filtration, LLC



**12" ΔP
(backwash
initiation)**

**Normal
Water Level
(after
backwash)**

**Influent
Weir**

Applications

- Total Suspended Solids (TSS) Removal
- Phosphorous Removal
- Surface Water Treatment
- Water Reuse – Irrigation, golf course & greenhouse watering
- Industrial Polishing – treating mine effluents, industrial river water use, boiler water
- Pretreatment for Membranes

Types of Disk Filter

- Inside – Out
 - Influent flows from inside Disk to outside
- Outside – In
 - Influent flows from outside to inside Disk
- Filter material
 - Cloth
 - Stainless Steel Mesh

Disk Flow Illustration



Outside-In Design

- Water Fills the Basin
- Influent Water Flows through the Cloth and Clean Effluent is gathered on the Interior of the 4" thick Filter Disk
- Clean Water Rises up through the "Throat" of the Disk, and Exits the Disk through the Effluent Pipe at the top that is connected to the Effluent Trough



Advantages of Disk Filter

- Flexible – applications requiring removal of colloidal & suspended solids
- Small footprint to flow ratio
- Easily expanded
- Ultra low backwash rates (typically <1%)
- Uninterrupted flow during backwash
- High quality filtrate
- High solids/hydraulic loading capacities

Disk Filter

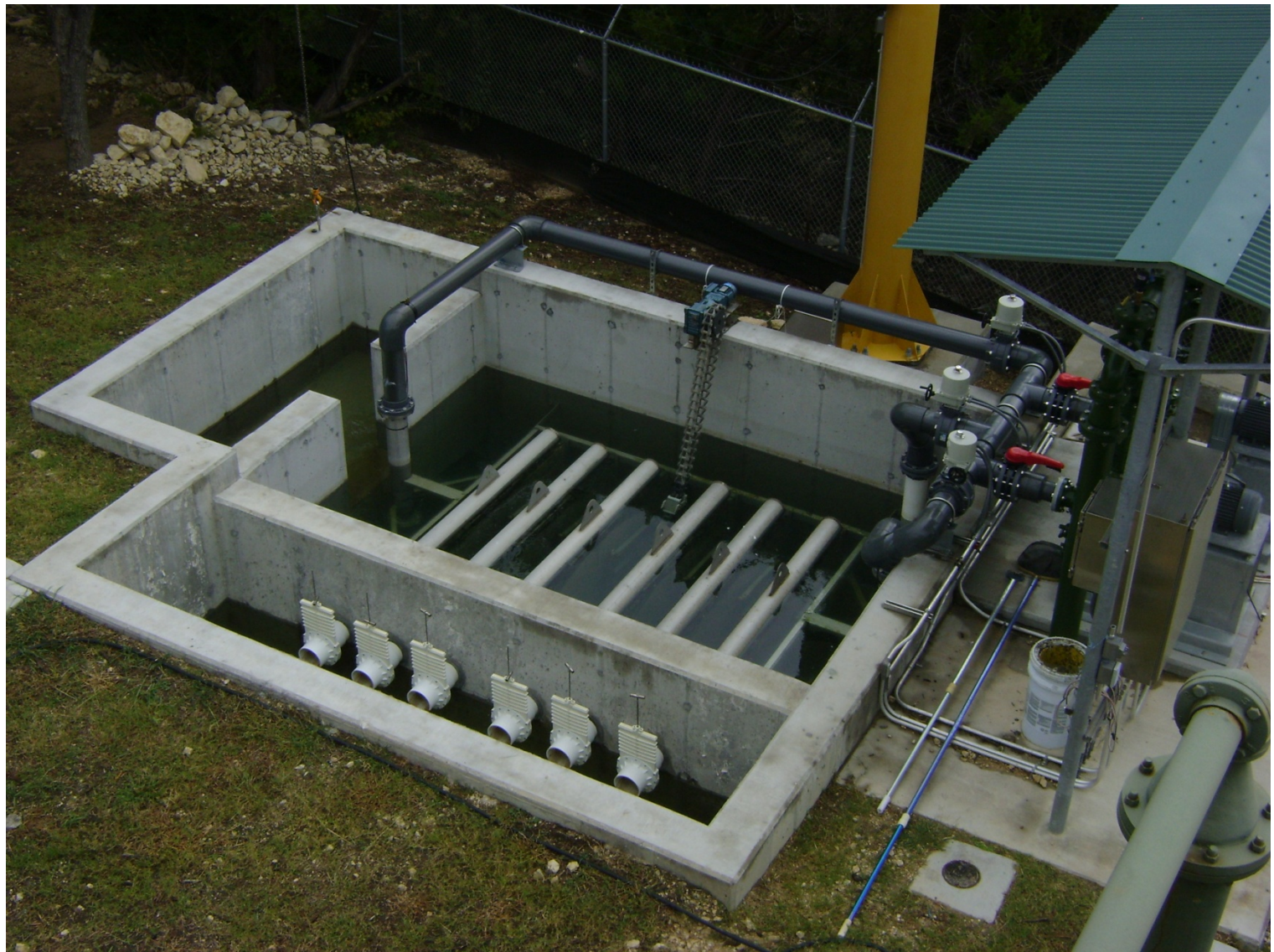
- Cloth Media Membrane or Stainless Steel Membrane
- Tank – concrete, steel, fiberglass
- Pumps – backwash & solids capture
- Drive motor for disk or suction shoe
- Gravity flow through disk filter to effluent channel

Disk Filter

- Solids collection by vacuum
- Solids collection in bottom of tank
- Solids removed by backwash pumps
- Effluent used for backwash
- Backwash pumps can handle 2" solids









Five Star Disk Filter Features

- No Rotating Seals
- Highest Quality Filtrate
- Easy Disk Removal while System is Operational
- Filtrate Discharge Point for Each Disk
- Title 22 Approved
- Un-interrupted Flow during Backwash Cycle
- Low Backwash Rate (typically <1%)
- Low Headloss (minimum 12")
- High Solids and Hydraulic Loading Capacities

Typically Receives Flow from Secondary Clarifiers

Five Star Disk Filter is a Tertiary Filter designed to:

- Remove Suspended and Colloidal Solids
- Reduce Phosphorus with Chemical Addition
- Produce “High Quality – Reuse Water”

System Operates Automatically with Virtually “NO” Operator Attention Requirements

PLC communicates with SCADA

Operates in “Static Mode” with NO Moving Parts 97% of the Time

System Minimizes Backwash Flow – Typically <1% of Influent

Five Star Cloth

- Yellow, Jersey Fabric
- 20% Acrylic/80% Polyester Face
- 100% Polyester Backing Yarn
- Acrylic Latex Back Coating
- 12/32" Finished Pile Height
- Cloth 1A - 37.5 oz Per Linear Yard
CA Title 22 Approved @ 12.75 gpm/ft²
- Cloth 2A – 68 oz. Per Linear Yard
CA Title 22 Approved @ 10.35 gpm/ft²

California Title 22 Certifications

2008

- Five Star received Title 22 ACCEPTANCE @ 6 gpm/ft² (Cloth 1A)

2011

- Five Star received Title 22 ACCEPTANCE:
Cloth 1A: 12.75 gpm/ft²
Cloth 2A: 10.35 gpm/ft²

EASY AS 1-2-3

Disk Isolation & Removal



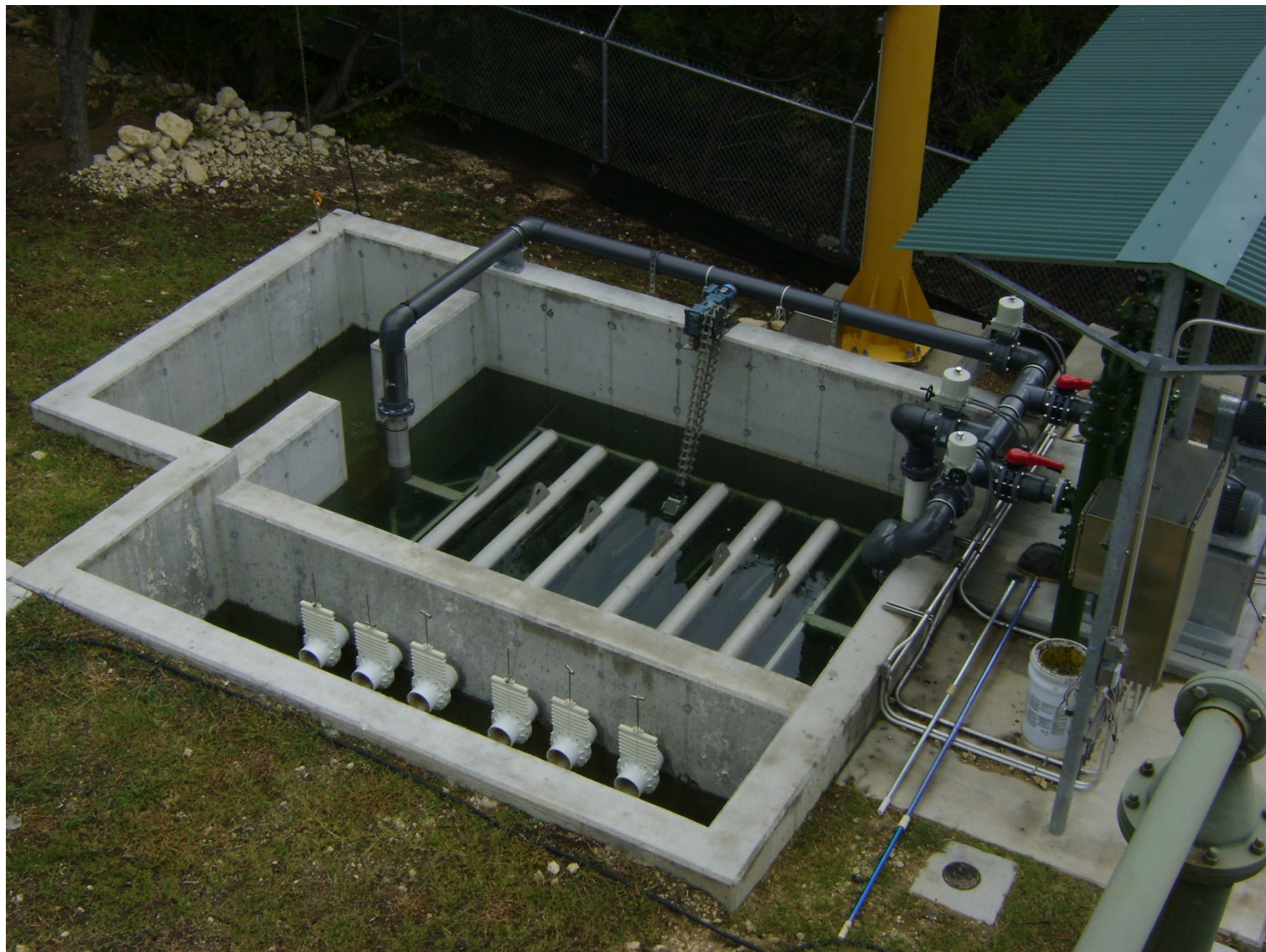
1. Close the Knife Gate Valve in the Effluent Trough.



2. Slide the Fernco Coupling onto the Filtrate Pipe on the Disk.

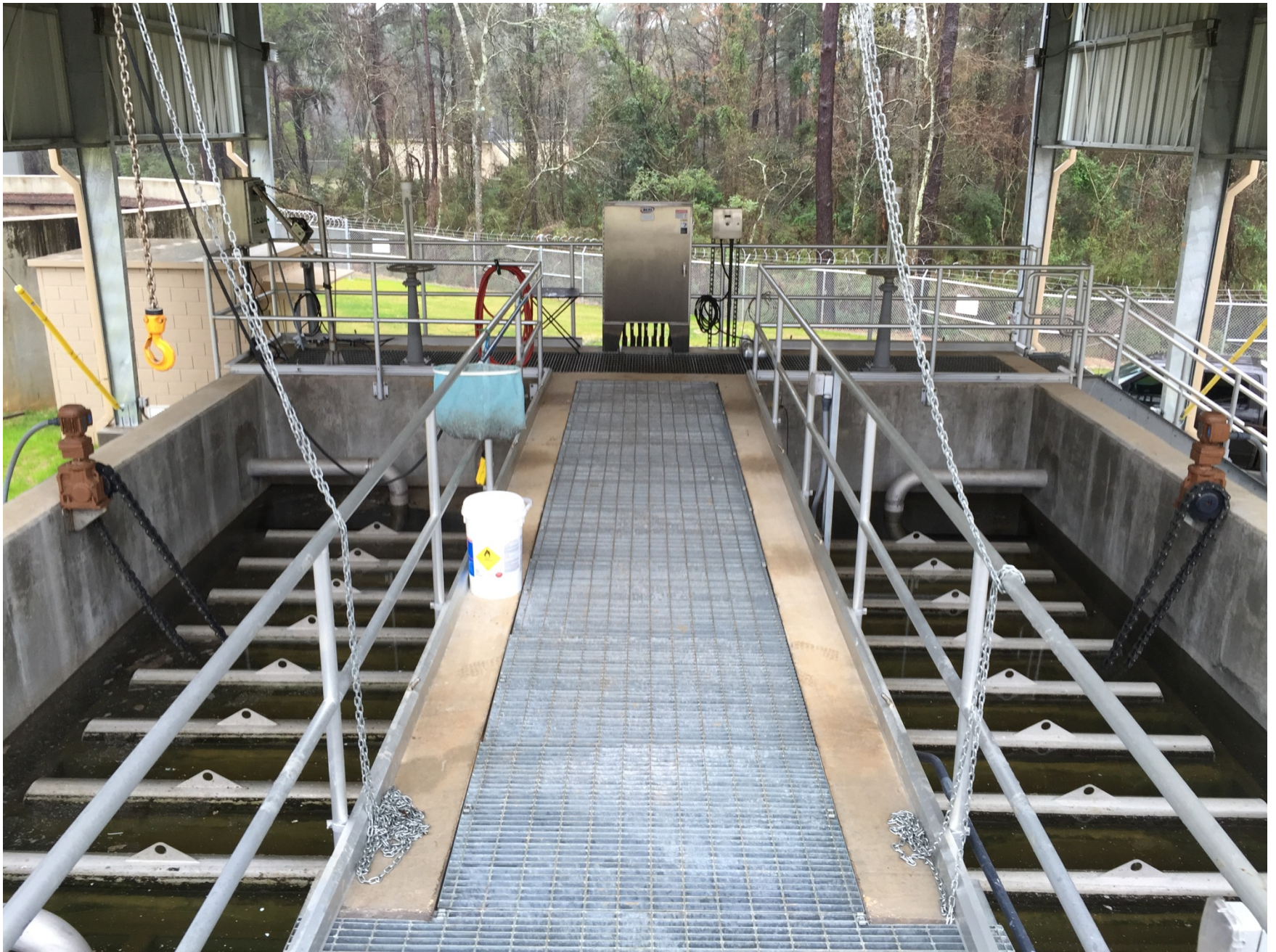


3. Remove a Disk utilizing the Lifting Eye on the Filtrate Pipe.



Cloth Replacement







APRIL SOUND MUD #3 & #4; CONROE, TX
(2) 8D84D-C

Five Star Filtration
Pilot/Demo Unit **Model 2D36DA**



Pilot Utility Requirements

- Power: 460 Volts, 25 amps, 60 cycle/3 phase plus ground (50' electrical cable on board)
- OR 230 Volts, 50 amps, 60 cycle/single phase (50' electrical cable onboard)
- Influent: 3" (PVC furnished w/all connections)
- Effluent: Four inch (4") quick-disconnect w/20 ft. hose.
- Backwash: Two inch (2") quick disconnect coupling w/ 50 ft. hose.

Pilot Connections



Pilot Control Panel



Pilot Pumps & Connections





LAKE HAVASU CITY, ISLAND WWTP, AZ
(1) 4D84D-SS



Steiner Ranch WWTP WCID #17 , Austin, Texas



Komoka, CN WWTP (Expansion)

Komoka, Ontario, CN



Komoka, CN WWTP (Expansion)

Komoka, Ontario, CN



Pecan WRP

Queen Creek, AZ



Questions?

- Daman Superior Booth – additional information and questions
- Thank You