

# COOLING WATER CASE STUDY: DATA CENTER

## Project Overview

- Cooling Water from Cooling Towers and Condensers
- Client: Data Center in Singapore
- Solution Type: CTFX500-15VS-P w/ 50um screen, Qty. x2
- Year of Completion: 2018
- Capacity: 72 m<sup>3</sup>/hr (318 gpm) per skid

## Customer Challenge

To reduce fouling prone suspended solids in the open cooling lines to maintain heat transfer efficiencies, prolong blowdown schedules for water savings and equipment lifespan, and increase chemical treatment efficiencies. There is a large demand for cooling in a country that solely uses desalination for fresh water source. Water consumption by filtration, blowdown, and evaporation was a very large concern. Additionally, footprint was limited for equipment to be installed.

## Solution

Using sweeper nozzles inside eight cooling tower basins, Evoqua was able to target the source of suspended solids and remove them directly before passing through heat exchange surfaces. As well, only two filtration packages were used to target multiple cooling towers.

## Results

Evoqua was able to target eight cooling tower basins with just two filtration skids in a compact footprint. This drastically reduced both CAPEX and OPEX with a better performing filtration efficiency to the desired degree. With the least flush waste in the industry, less discharge volume from the filter was required as well as prolonging blowdown schedules leading to large water and chemical savings compared to other filtration offerings.



## Scope of work

- Design & Engineering
- Equipment Supply
- Project Management
- Construction and Installation through Evoqua OEM
- Start-Up and Commissioning
- Training

# COOLING TOWER CASE STUDY: POWER PLANT

## Project Overview

- Side Stream Cooling Tower Filtration
- Client: Power Plant in Thailand
- Solution Type: V-2500-8 w/ 25u screen
- Year of Completion: 2011
- Capacity: 150 m<sup>3</sup>/hr (660 gpm)

## Customer Challenge

To reduce fouling prone suspended solids in the open cooling lines to maintain heat transfer efficiencies, reduce number of manual cleanings for water savings and equipment lifespan, and increase chemical treatment efficiencies.

## Solution

Using sweeper nozzles inside the cooling tower basins, Evoqua was able to target the source of suspended solids and remove them directly before passing through heat exchange surfaces.

## Results

With the least flush waste in the industry, less discharge volume from the filter was required as well as prolonging blowdown schedules leading to large water and chemical savings compared to other filtration offerings.



## Scope of work

- Design & Engineering
- Equipment Supply
- Project Management
- Construction and Installation through Evoqua OEM
- Start-Up and Commissioning
- Training

# COOLING TOWER CASE STUDY: MEDICAL EQUIPMENT FACILITY

## Project Overview

- Side Stream Cooling Tower Filtration of Condenser Loop
- Client: Medical Equipment Manufacturing Facility in Thailand
- Solution Type: V-250-3 w/80um screen
- Year of Completion: 2012
- Capacity: 50 m<sup>3</sup>/hr (220 gpm)

## Customer Challenge

To reduce fouling prone suspended solids in the open cooling lines to maintain heat transfer efficiencies, prolong blowdown schedules for water savings and equipment lifespan, and increase chemical treatment efficiencies.

## Solution

Using sweeper nozzles inside the cooling tower basins, Evoqua was able to target the source of suspended solids and remove them directly before passing through heat exchange surfaces.

## Results

With the least flush waste in the industry, less discharge volume from the filter was required as well as prolonging blowdown schedules leading to large water and chemical savings compared to other filtration offerings.



## Scope of work

- Design & Engineering
- Equipment Supply
- Project Management
- Construction and Installation through Evoqua OEM
- Start-Up and Commissioning
- Training



# COOLING TOWER CASE STUDY: MANUFACTURING FACILITY

## Project Overview

- Full Stream Cooling Tower Filtration
- Client: Manufacturing Facility in Thailand
- Solution Type: V-2000-12 w/10um screen, Qty. x2
- Year of Completion: 2013
- Capacity: 150 m<sup>3</sup>/hr (660 gpm)

## Customer Challenge

To reduce fouling prone suspended solids in the open cooling lines to maintain heat transfer efficiencies, prolong blowdown schedules for water savings and equipment lifespan, and increase chemical treatment efficiencies.

## Solution

Using sweeper nozzles inside the cooling tower basins, Evoqua was able to target the source of suspended solids and remove them directly before passing through heat exchange surfaces.

## Results

With the least flush waste in the industry, less discharge volume from the filter was required as well as prolonging blowdown schedules leading to large water and chemical savings compared to other filtration offerings.



## Scope of work

- Design & Engineering
- Equipment Supply
- Project Management
- Construction and Installation through Evoqua OEM
- Start-Up and Commissioning
- Training





## **Medical Center – Seattle, Washington Seven LCF-200 Skids, Seven 300 Ton Cooling Towers Cooling Tower Filtration**



## Medical Center – Seattle, Washington Before LCF Installed



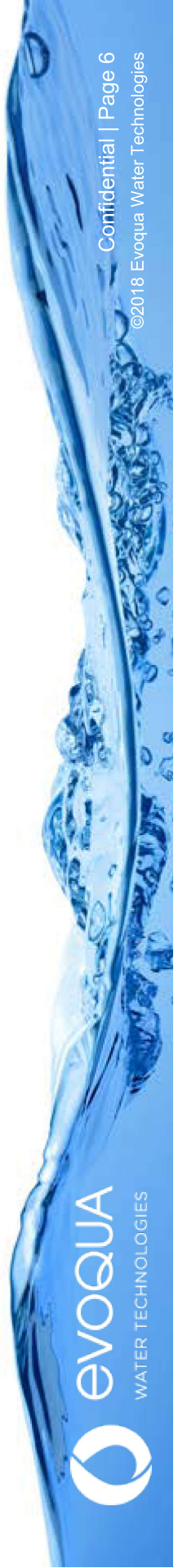


## **Medical Center – Seattle, Washington 1 Hour After Start-Up**





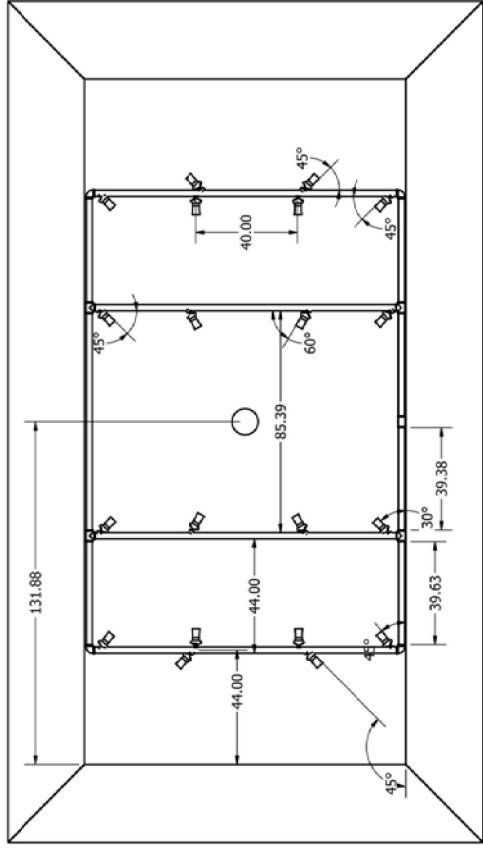
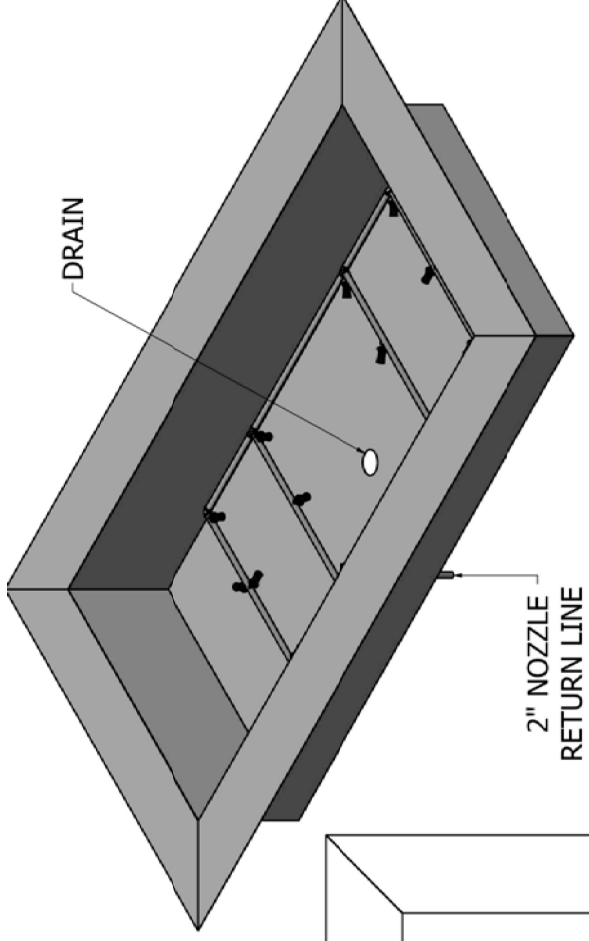
## Airport – Arizona Cooling Tower Filtration





## **Airport – Arizona CTF-500 Skid – Filters 3 Towers Cooling Tower Filtration**

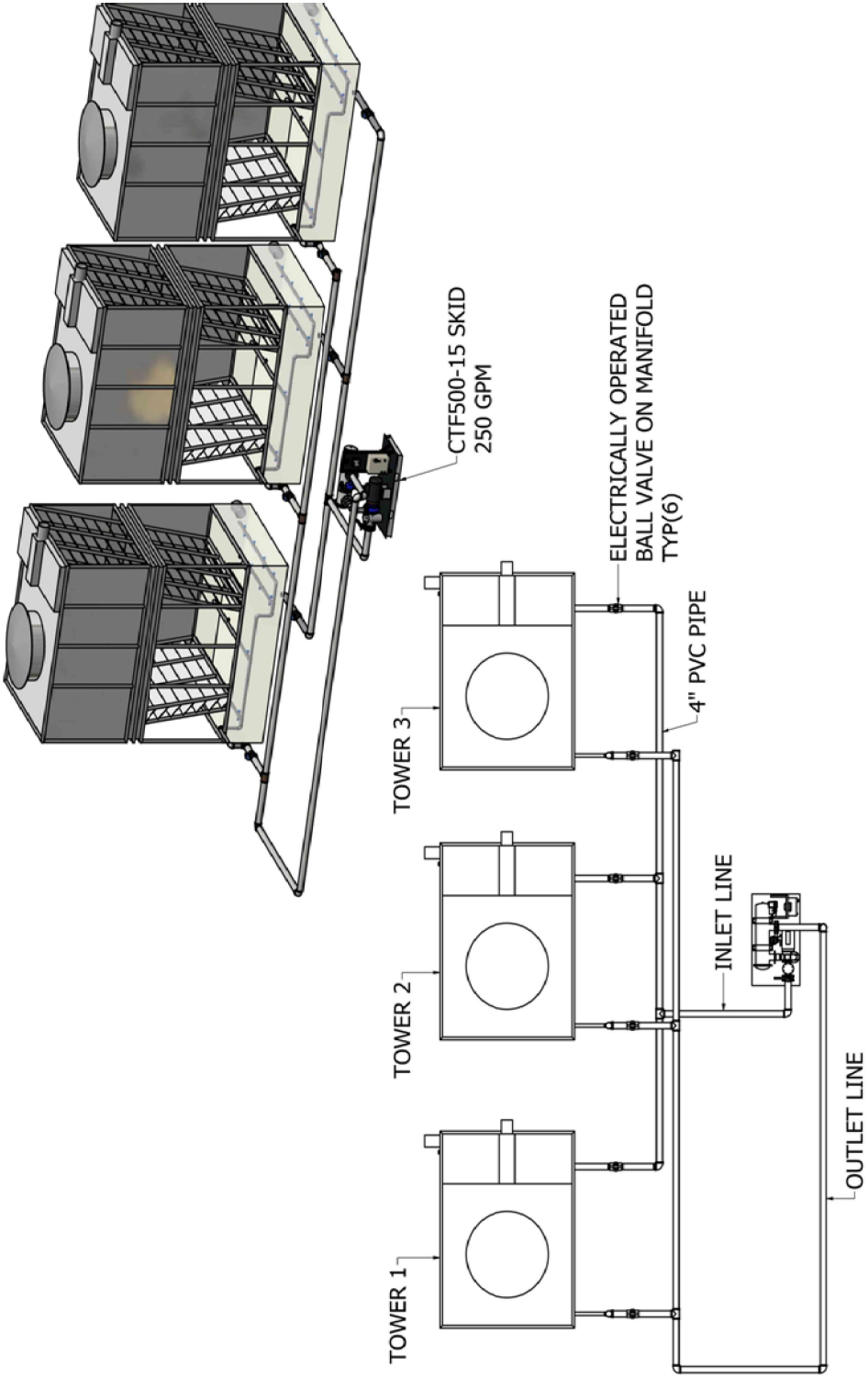




TOTAL NOZZLE COUNT: 20

## Airport – Arizona CTF-500 Skid – Filters 3 Towers Basin Nozzle Layout





## Airport – Arizona

### CTF-500 Skid – Filters 3 Towers

### Cooling Tower Filtration



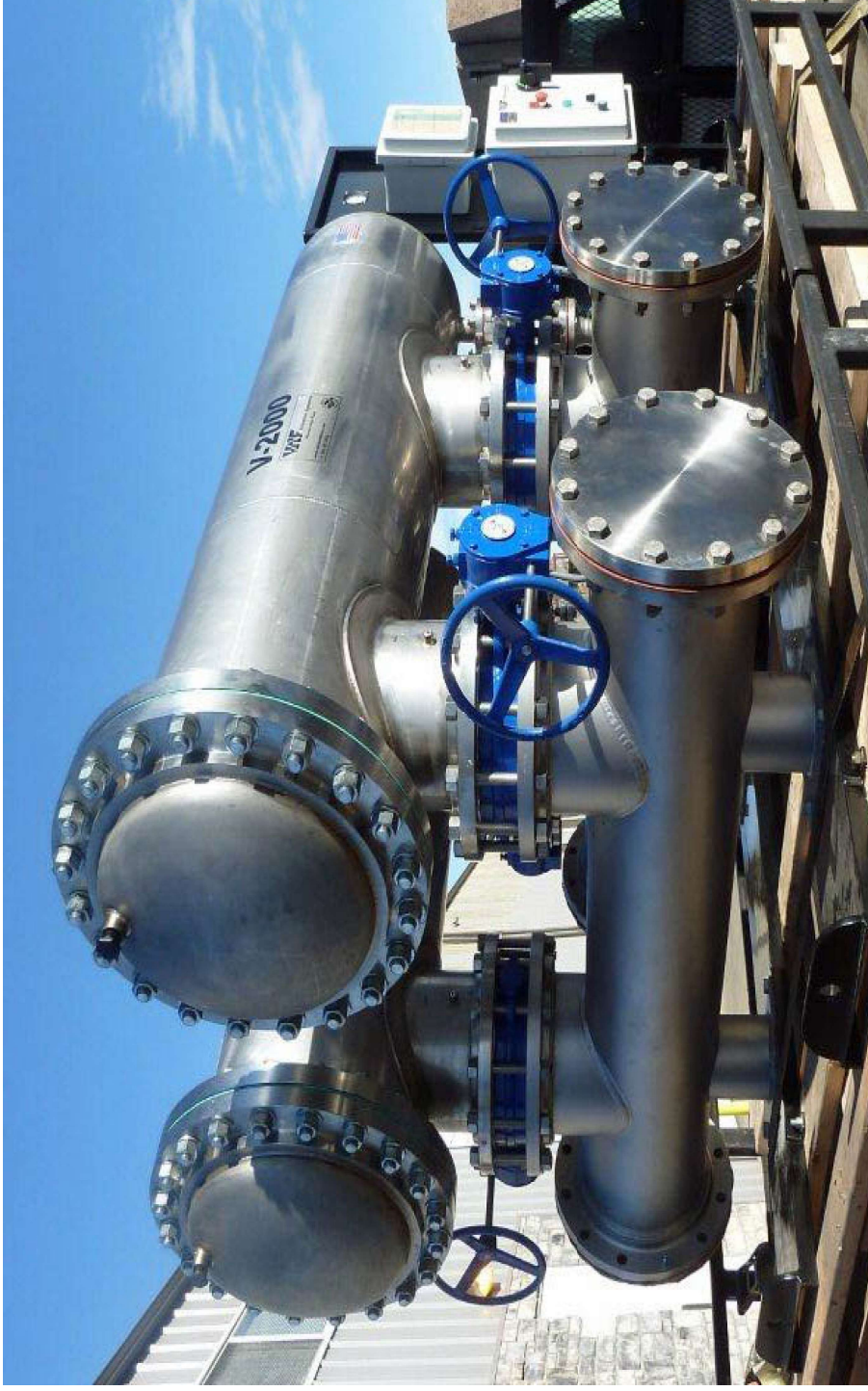
## Power Plant – Jacksonville, Florida 50 micron Full Flow Cooling Tower Filtration





## **Data Center – Colorado Springs, Colorado 25 micron 16 m<sup>3</sup>/hr (70 gpm) Cooling Tower Filtration, Separator Replacement**





**Geothermal Power Plant – Taupo, New Zealand**  
**Two V-2000s 100 micron 1,000 m<sup>3</sup>/hr (4,400 gpm)**  
**GeoThermal Cooling System**





Sample after V-1000



Sample after separator

## Petroleum Company - Guanajuato, Mexico V-1000 50 micron at 180 m<sup>3</sup>/hr (800 gpm) Cooling Tower Filtration





## Pharmaceutical Company – Juncos, Puerto Rico V-1500-8 50 micron 270 m<sup>3</sup>/hr (1,200 gpm) Cooling Tower Filtration



# Pre-Filtration

# PRE-FILTRATION OF RO CASE STUDY: MAJOR CAR MANUFACTURER PLANT

## Project Overview

- Industrial Wastewater Reuse for Pre-Filtration of RO membranes
- Client: Major Car Manufacturing Plant in the UK
- Solution Type: V-250-4 w/25um screen, Qty. x3
- Year of Completion: 2012
- Capacity: 30 m<sup>3</sup>/hr (130 gpm) per filter

## Customer Challenge

To replace existing piston filtration technology that required costly and time consuming maintenance.  
To be able to handle variable industrial process water for reuse throughout the plant.  
Customer wanted a simpler, more robust solution, with less flush waste to help achieve their goal of being a zero discharge facility.

## Solution

Process wastewater is collected in a tank with chlorine dosing, passed through iron filters, three V-250-4 units at 25u filtration, then directly into RO membranes.

## Results

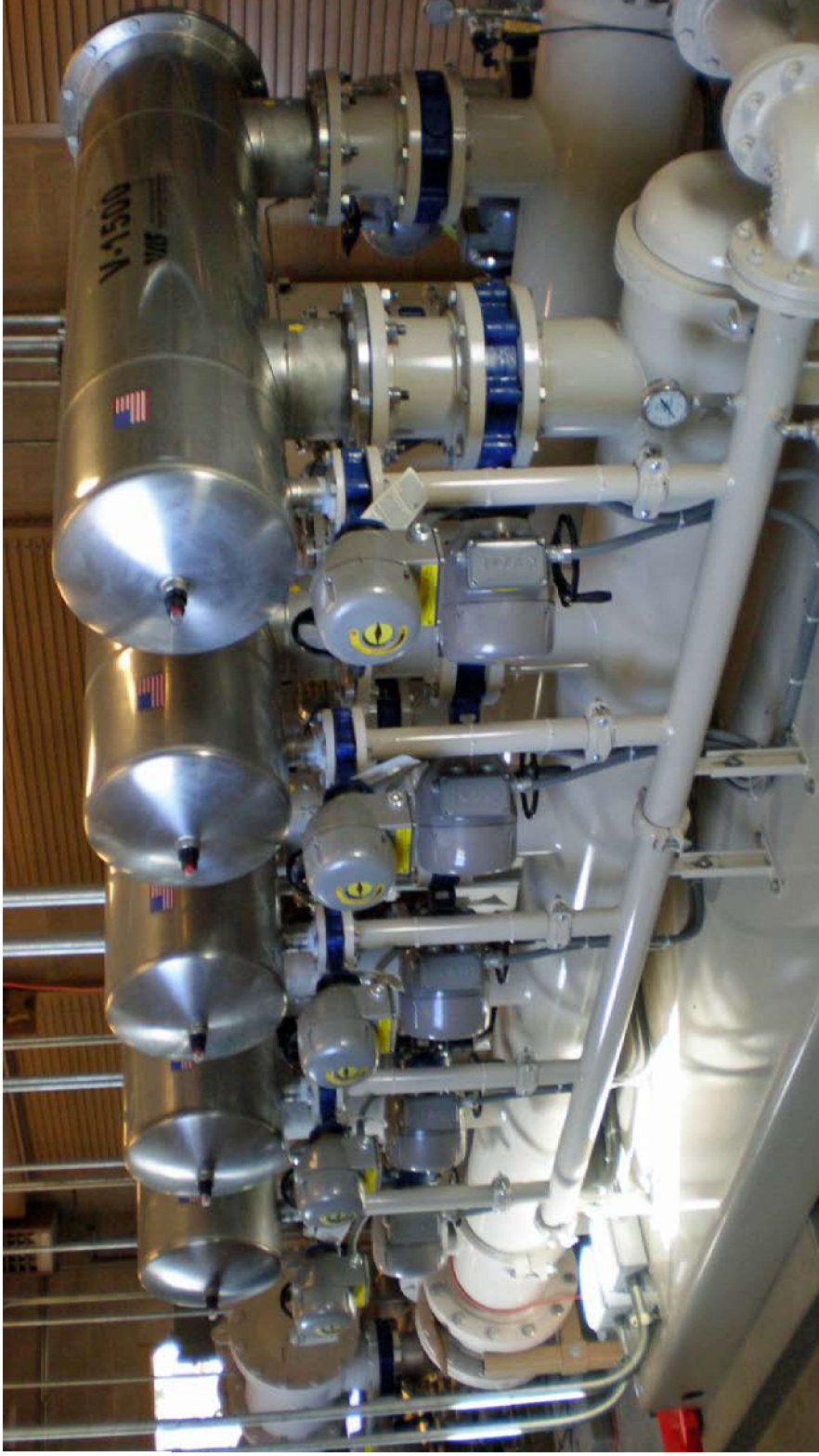
The V-series offered a much simpler and better performing design automatic self-cleaning screen filter, with all operating parts being contained within the body of the unit. This simplified and prolonged necessary maintenance schedules as well as eliminated leaking shaft seals all still in a fully automatic package.  
The V-series was able to supply a better filtration efficiency with absolute filtration in a bi-direction cleaning design which could keep up with loading spikes.  
With the least flush waste in the industry, 20% less discharge volume from the filter was required to be reprocessed helping the zero discharge plant goal compared to the previous offering.



## Scope of work

- Total Suspended Solids Water Quality Testing
- Design & Engineering
- Equipment Supply
- Project Management
- Construction and Installation Guidance
- Start-Up and Commissioning
- Training





**Kamas Fish Hatchery – Summit County, Utah**  
**Five V-1500s 25 micron 681 m<sup>3</sup>/hr (3,000 gpm)**  
**Pre-UV Filtration**



**Oil and Gas Company - Bakasi, Indonesia**  
**Two V-500s 25 micron 45 m<sup>3</sup>/hr (200 gpm) each**  
**Pre-Filter RO**





**El Paso, Texas**  
**V-1500 50 micron 182 m<sup>3</sup>/hr (800 gpm)**  
**Pre-Filtration of Reverse Osmosis**





**El Paso, Texas**  
**Two V-2000s 50 micron 227 m<sup>3</sup>/hr (1,000 gpm)**  
**Pre-Filter Arsenic Removal**





**Shrimp Farm - Los Mochis, Mexico**  
**V-1000 25 micron 45 m<sup>3</sup>/hr (200 gpm)**  
**Pre-UV Seawater Filtration**

# Food and Beverage





# SURFACE WATER PRE-FILTRATION CASE STUDY: BOURBON DISTILLERY

## Project Overview

- Surface Water and Lake Water Pre-Filtration for UF/RO Treatment for Bourbon Distillation, Food and Beverage.
- Client: Distillery, Shelbyville, KY USA
- Solution Type: V-1500NB-8 w/50um screen
- Year of Completion: 2018
- Capacity: 80 m<sup>3</sup>/hr (350 gpm)

## Customer Challenge

Distillery needed to replace previously used manual bag filter filtration due to excessive labor requirements. Bag filters were needing to be changed every hour due to peak loading up to 656 mg/L solids; this required full-time employee to monitor existing pre-filter system.

Customer requested fully automatic option that was absolute rated in filtration efficiency and could keep up with seasonal algae blooms and reduce fouling times on UF membranes.

## Solution

Raw lake water is fed through the V-Series™ filter at 50 um filtration degree on to Memcor® UF membranes and finally RO membranes before being used in distillation process for final Bourbon product.

## Results

The V-Series offered a fully automatic operation with minimal wastewater for flushing. This eliminated the need for employee to constantly watch the filtration process at pump station which was outside main facility. The V-Series offered better filtration efficiency than recommended membrane manufacturer standard with absolute filtration degree which lengthened UF backflush and membrane lifespan. V-1500 is able to handle peak loading conditions of summer with algae blooms as well as throughout the year minimizing downtime for production. BMS communication allowed system to be monitored inside main facility.



## Scope of work

- Total Suspended Solids Water Quality Testing
- Design & Engineering
- Equipment Supply
- Project Management
- Construction and Installation through Evoqua
- Start-Up and Commissioning
- Training



## Beverage Plant Pre-RO





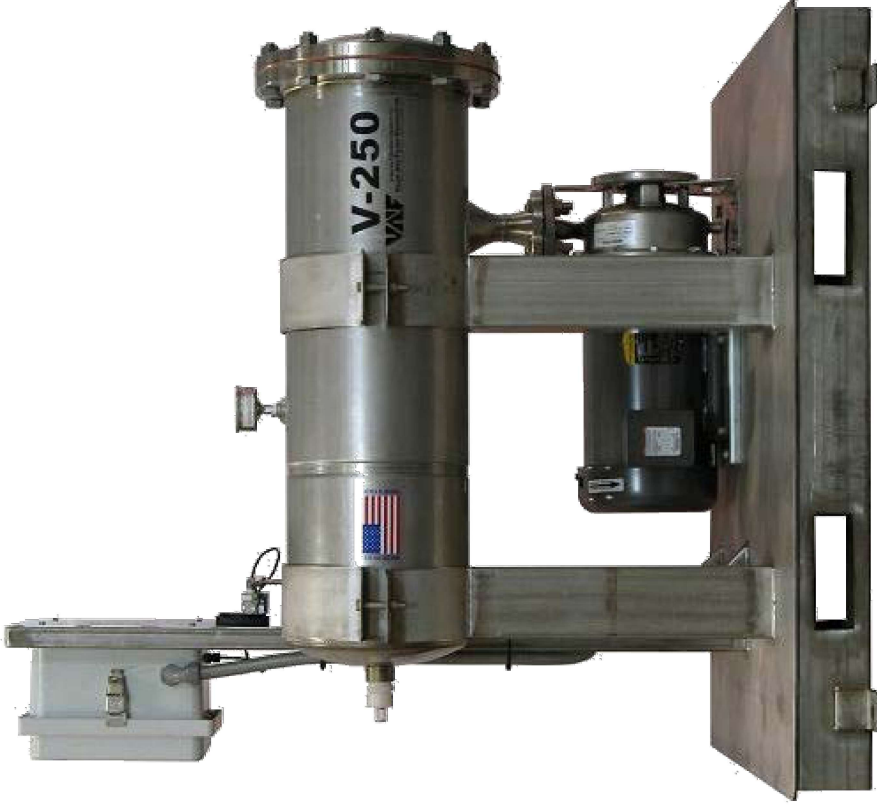
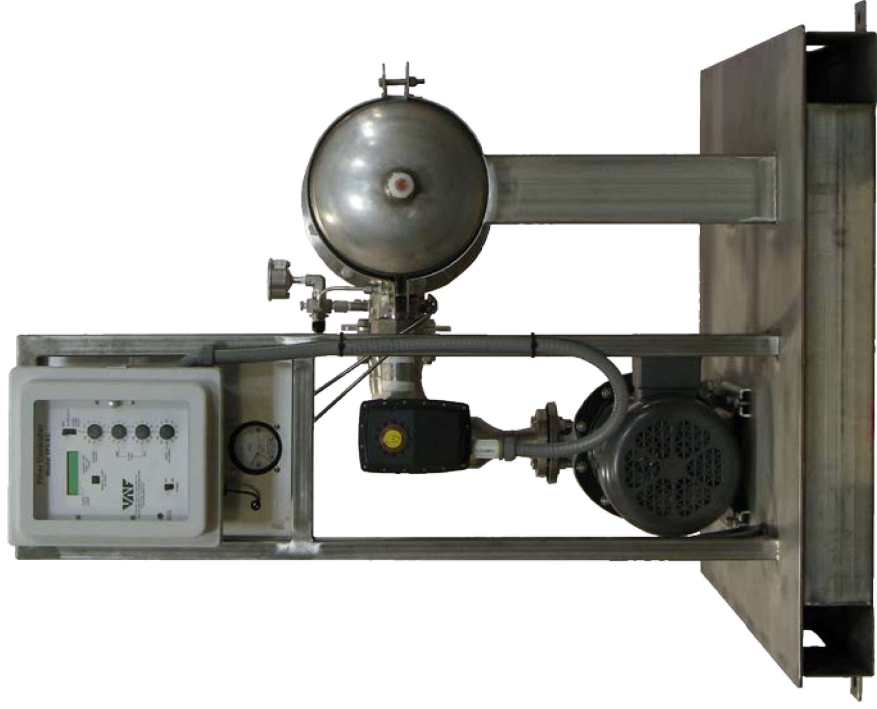
**Food Processing Plant - Denver, Colorado**  
**100 micron 90 m<sup>3</sup>/hr (400 gpm)**  
**High Temp 210°F Bean Cooker Recycling**



## Tomato Processing – California Nozzle Protection – Primary Conveyor Wash Down



# Seawater



**Offshore Platform – Gulf of Mexico  
V-250 25 micron 23 m<sup>3</sup>/hr (100 gpm)  
Sea Water Filtration - 316L SS Skids Filtering Process Water**





## Power Plant/Drinking Water Plant - Oman Twenty-Four VHS-1600s 8,722 m<sup>3</sup>/hr (38,400 gpm) Sea Water Intake with Separators

# Process Water





**Irving Tissue Paper Plant – Dieppe, New Brunswick, Canada**  
**Five V-1500s 80 micron 454 m<sup>3</sup>/hr (2,000 gpm)**  
**Intake Water**





**Copper Mine – Peru**  
**3,870 m<sup>3</sup>/hr (17,040 gpm)**  
**Intake River Water**



# Municipal



**American Fork, Utah**  
**Four V-3500s 200 micron 3,630 m<sup>3</sup>/hr (16,000 gpm)**  
**Secondary Municipal Water Use**

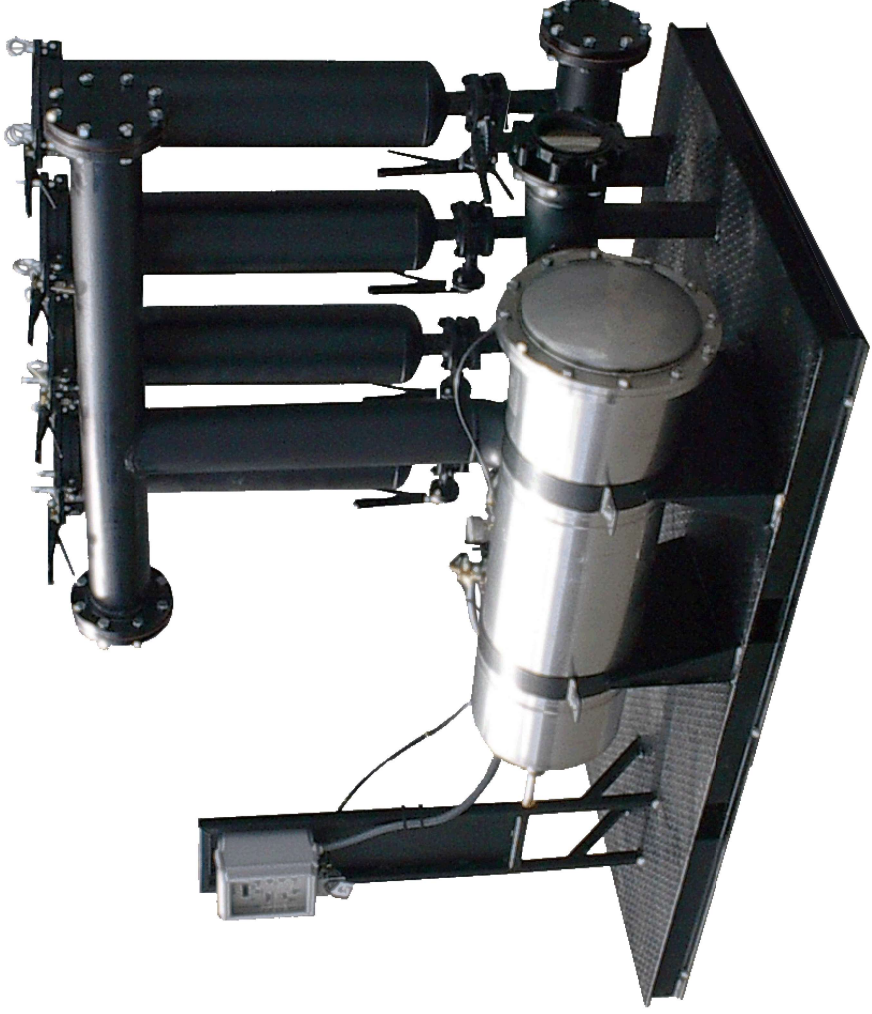






## **Wastewater Treatment Plant – Akron, Ohio V-2000 200 micron 570 m<sup>3</sup>/hr (2,500 gpm) Municipal Intake**

**Replacement of Older Filtration to Improve Filtration Process**



## **Municipal Water District – Encinitas, California V-1000-6 25 micron to 1 micron bags Groundwater ReInjection**





## **Water Treatment Plant – Cayey, Puerto Rico Centrifugal to V-Series to 1 micron Bag Filters River Water to Drinking Water Filtration**



## Sports Stadium – California 80 micron Effluent Filtration





## Wastewater Treatment Plant – Colorado 100 micron Two V-250s 41 m<sup>3</sup>/hr (180 gpm) Tertiary Filtration

# Oil and Gas





## Oil and Gas Company - Colorado 100 micron V-1000 to 25 micron bags 80 m<sup>3</sup>/hr (350 gpm) Frac Water Reinjection





**Oil and Gas Company - Colorado  
200 micron 520 m<sup>3</sup>/hr (2,300 gpm)  
Ditch Water for Frac Reinjection**