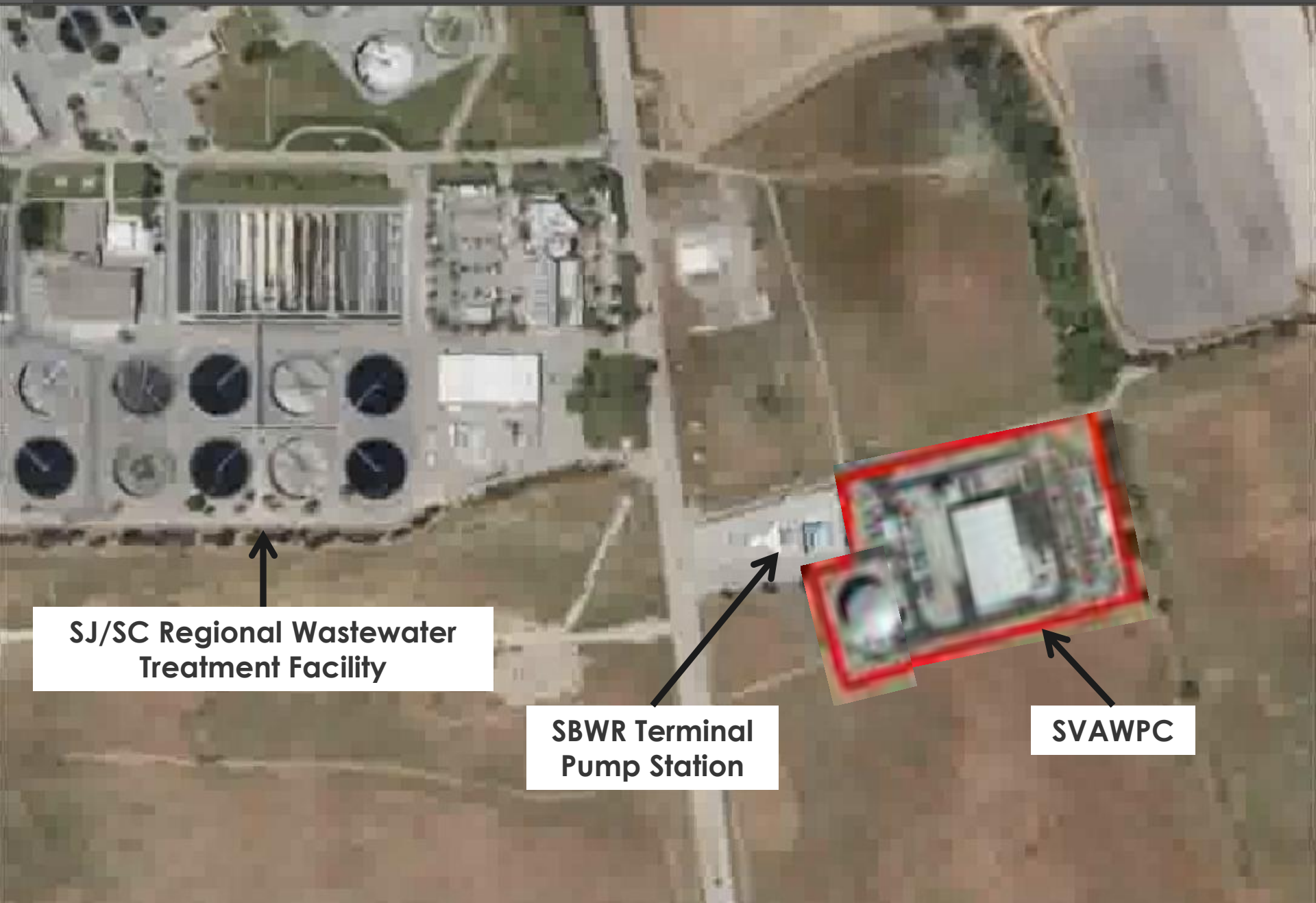
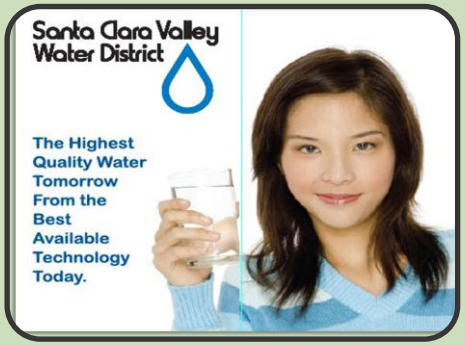
Silicon Valley Advanced Water Purification Center

Silicon Valley Advanced Water Purification Center



Benefits of new purification center

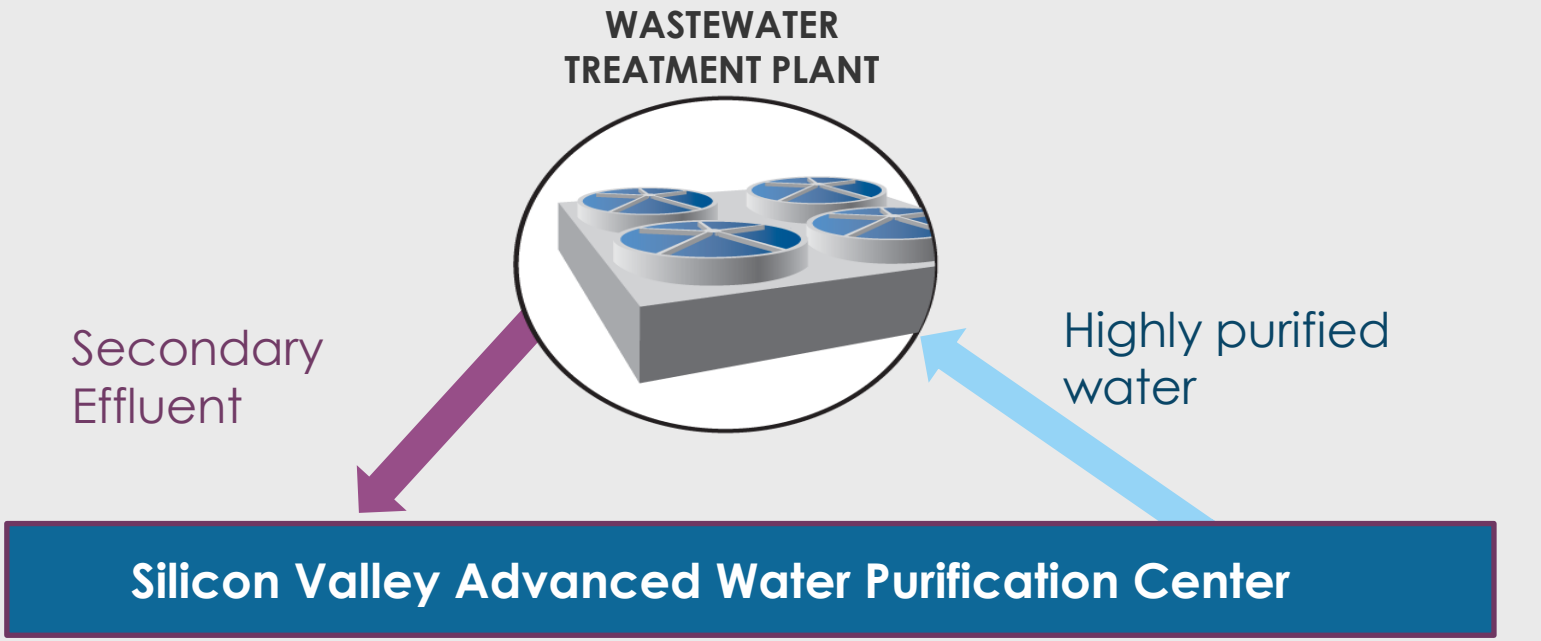


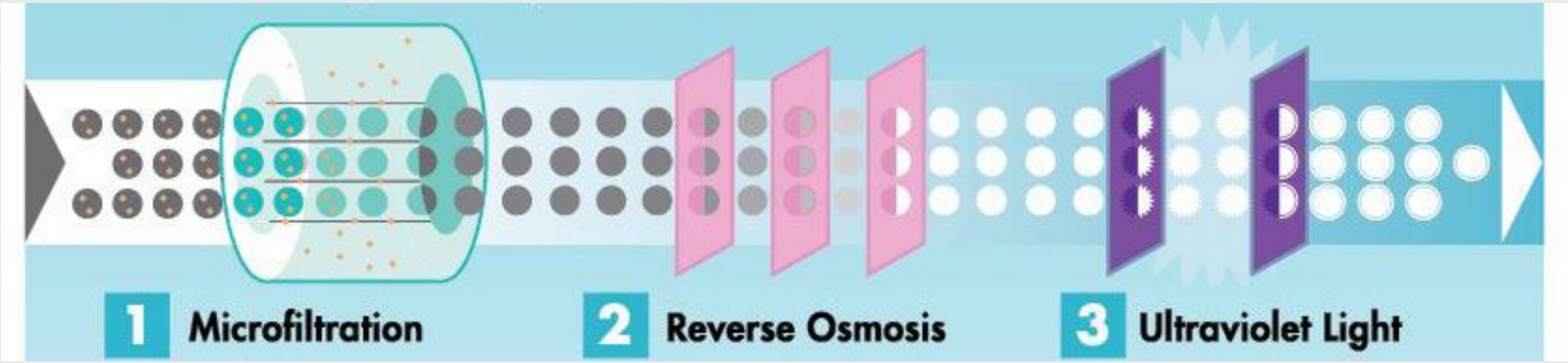
Water quality benefit

Operational benefit

Potable Reuse Demonstration benefit

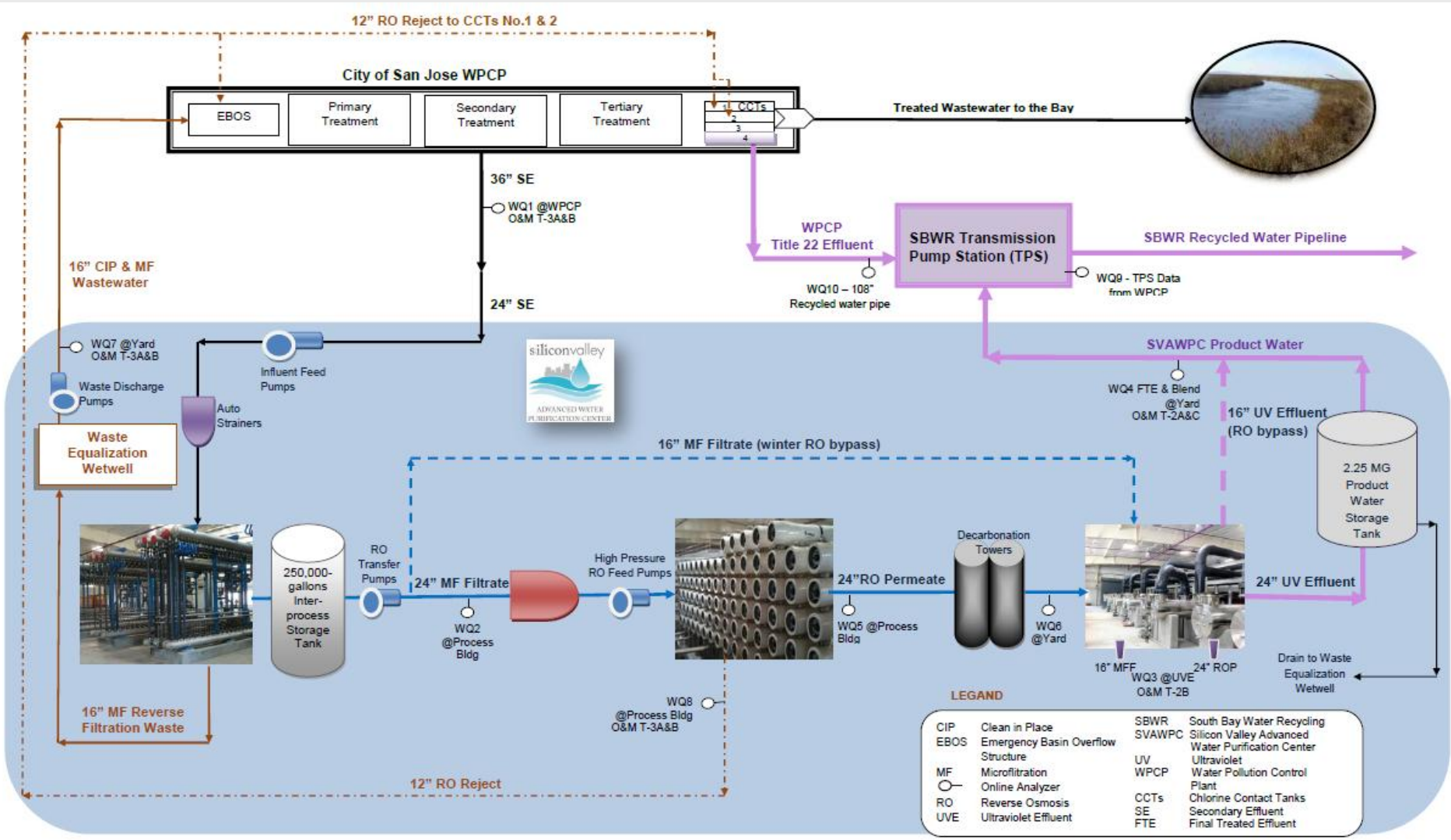
Purifying with proven technologies



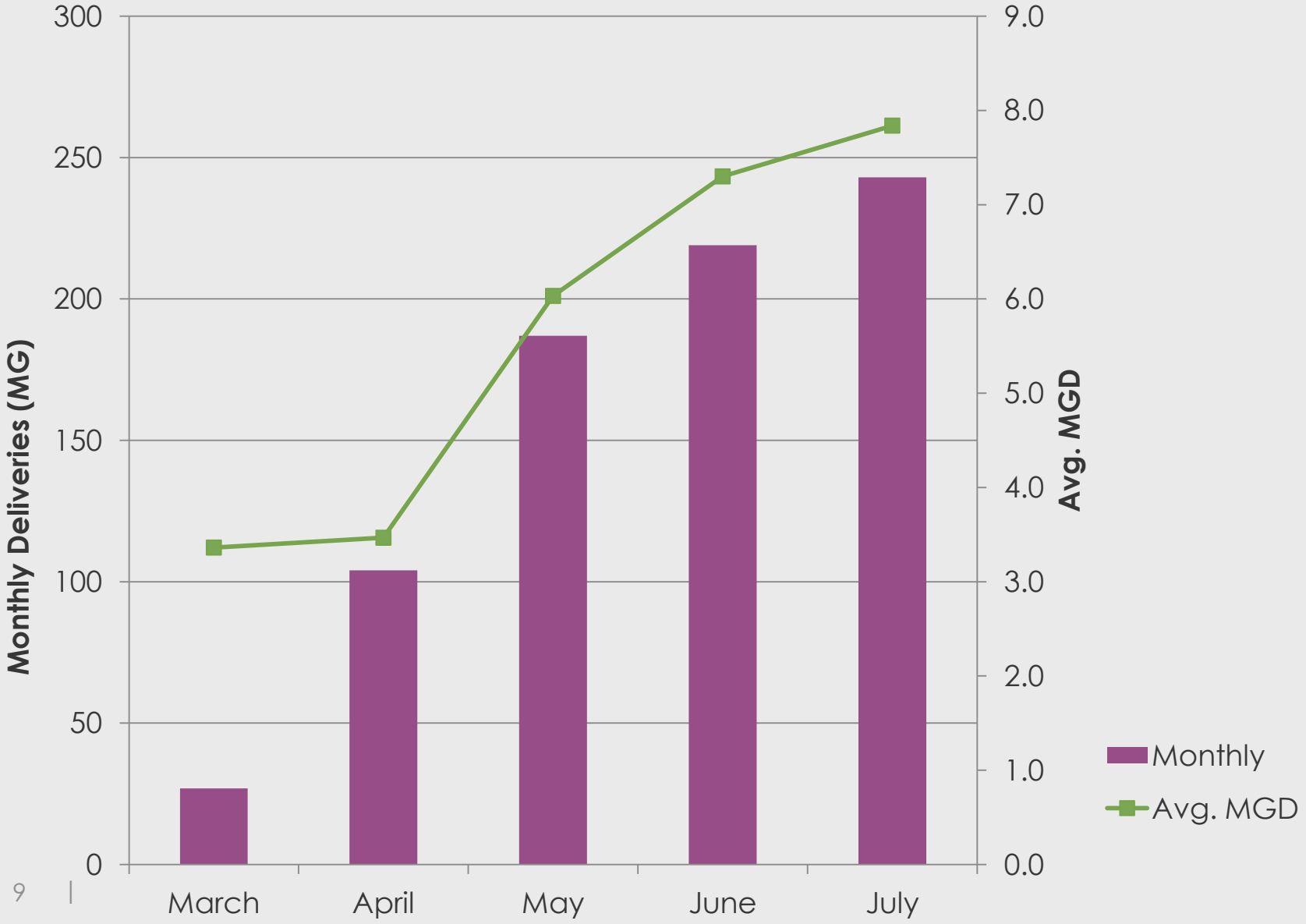


Process Flow Diagram

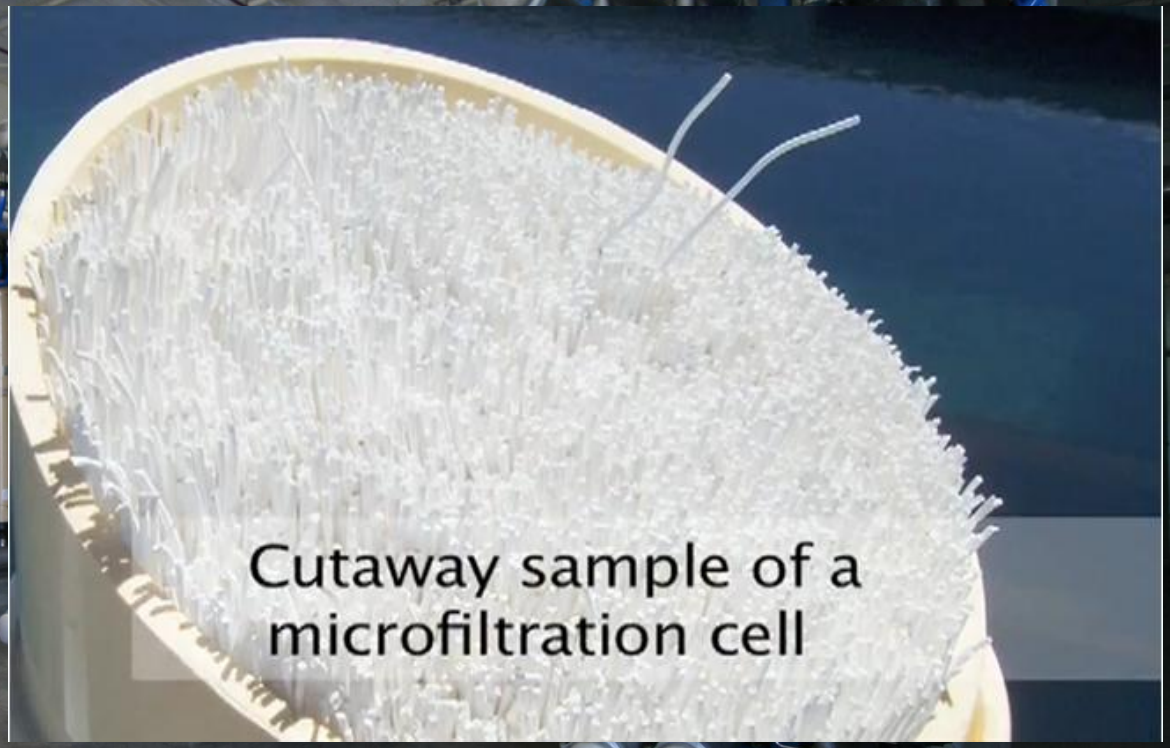
Silicon Valley Advanced Water Purification Center



Production Since March 2014

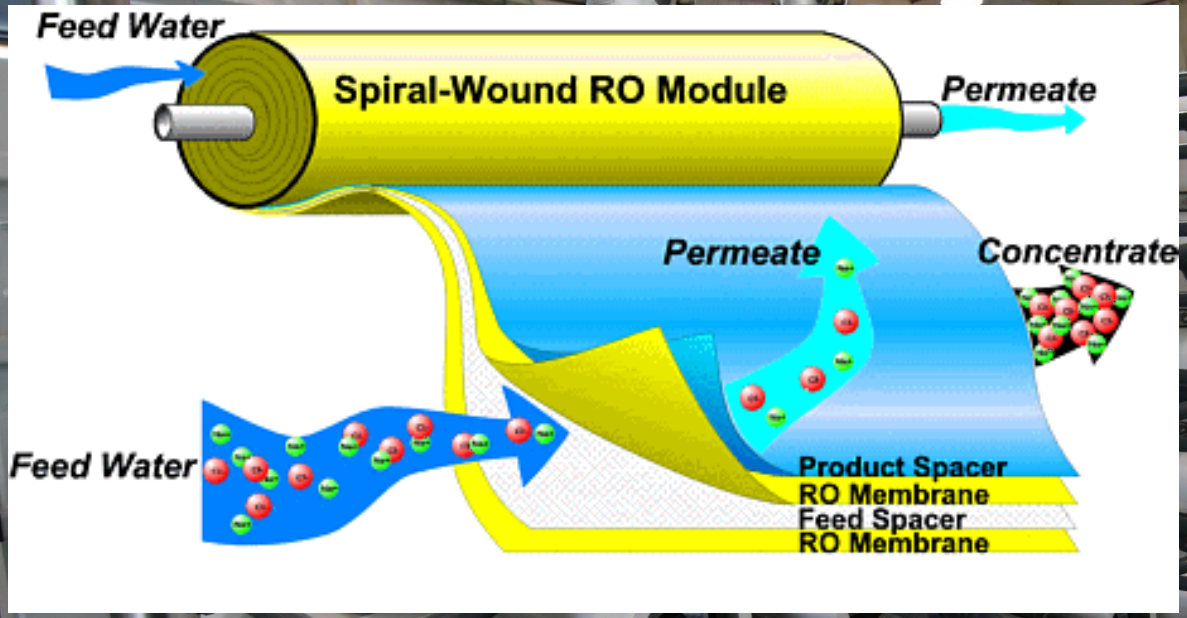


Microfiltration



- 0.1 Micron
- 8 racks
- 112 module/rack
- >6000 fibers/module
- 6,500 miles of fiber

Reverse Osmosis



- <0.0001 Micron
- 1 nM
- 3 Trains
- 80 Vessels/Train
- 2 Phase
- 85% Recovery

Ultraviolet Disinfection

- 6 reactor sets
- 2 stage
- 50-80 mJ/cm^2
- 40 bulbs/reactor
- 480 bulbs
- Low Pressure
- High Output

Regulating Authority for Operating Permit

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

- SAN FRANCISCO BAY REGION
  - ORDER 96-011 - GENERAL WATER REUSE REQUIREMENTS FOR: MUNICIPAL WASTEWATER AND WATER AGENCIES

Santa Clara Valley Water District

Operating Permit

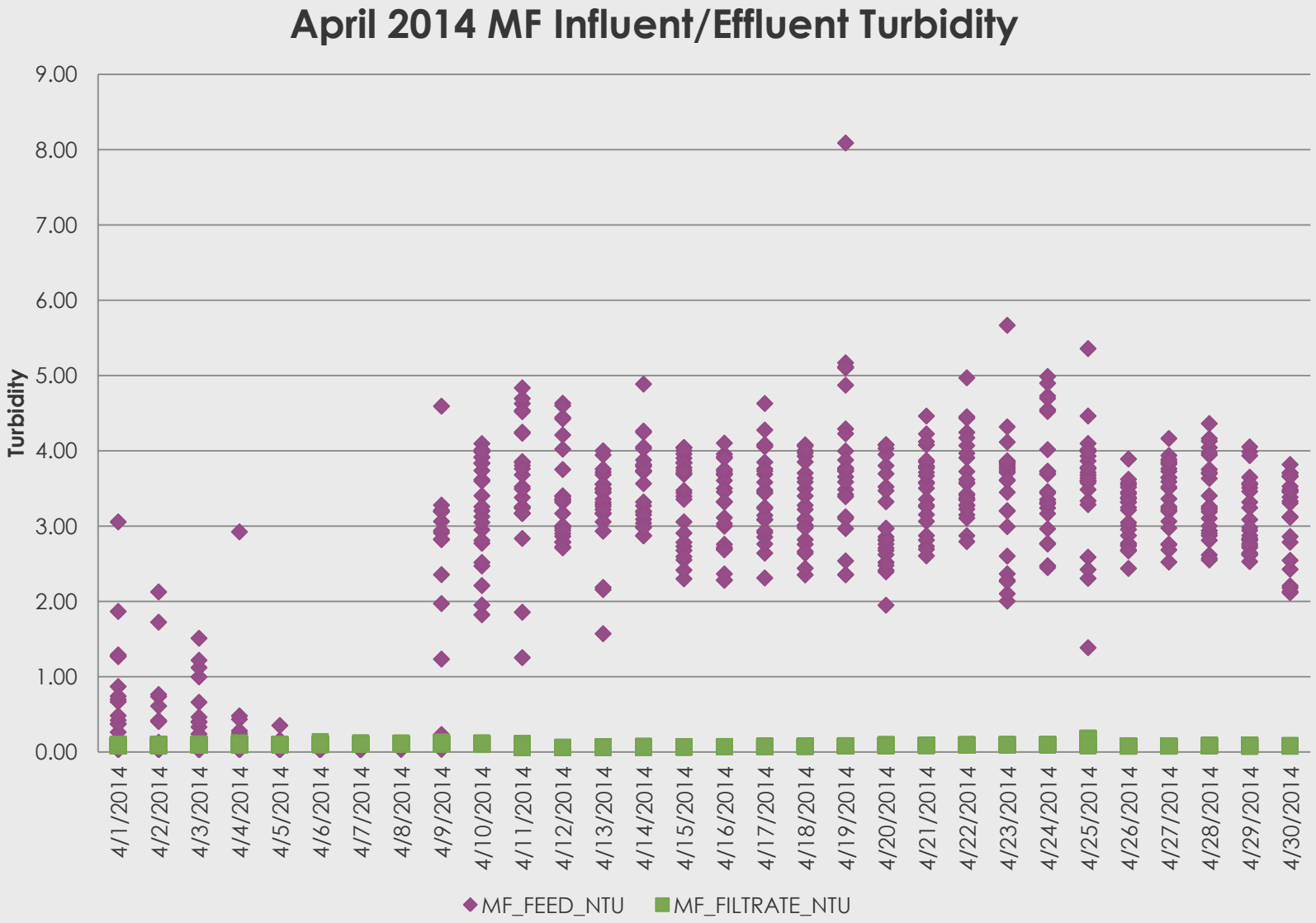
Water Quality Requirements

Total Coliform	<2.2MPN/100ml (7-day median)
	<23MPN/100ml (Any sample)
	Daily samples from UV Effluent

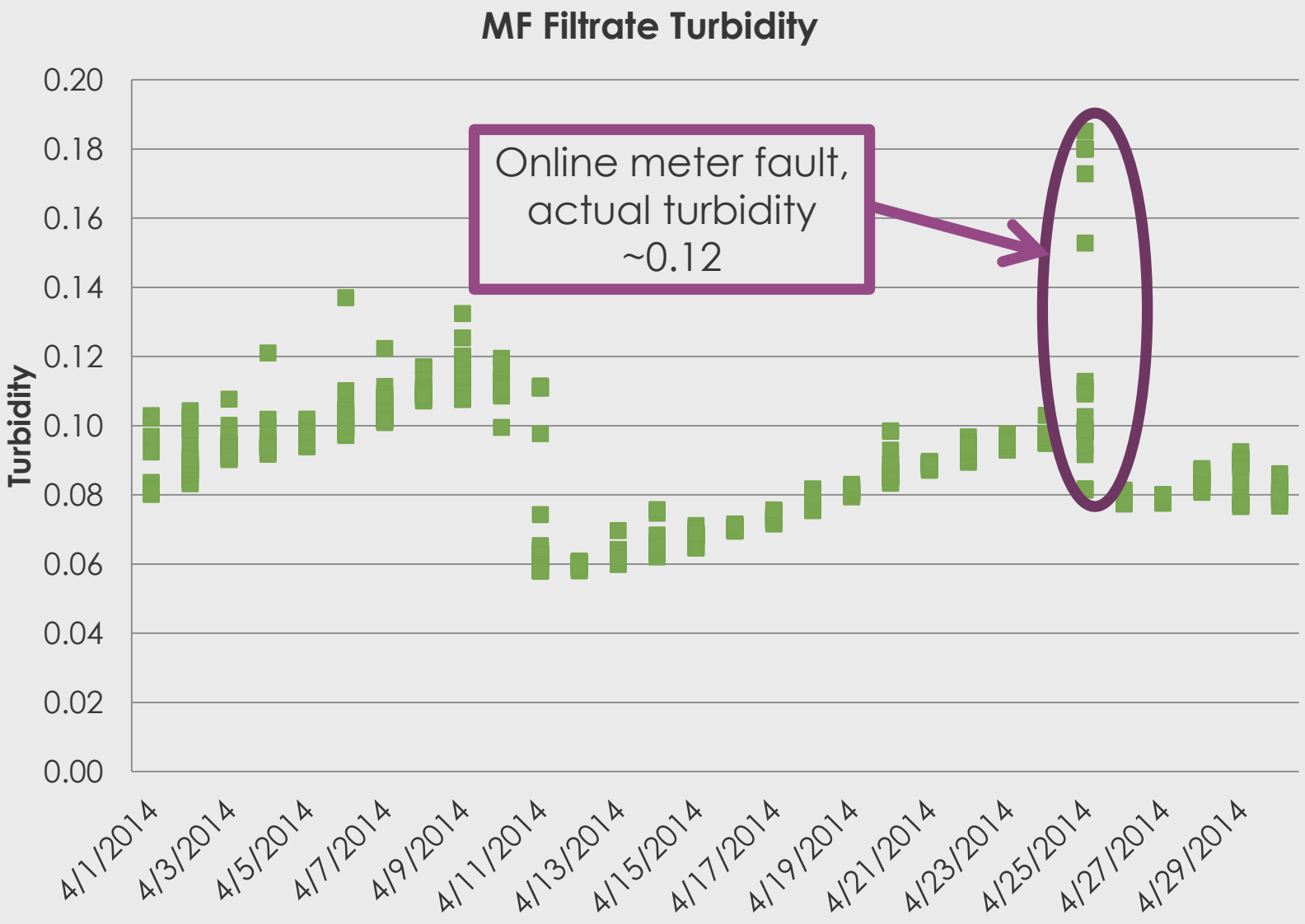
Filtered Recycled Water (Microfiltration Filtrate) Turbidity	0.2 NTU (No more than 5% of the time within a 24-hr period)
	0.5 NTU (At any time)

Santa Clara Valley Water District

Process Monitoring - MF



Process Monitoring - MF



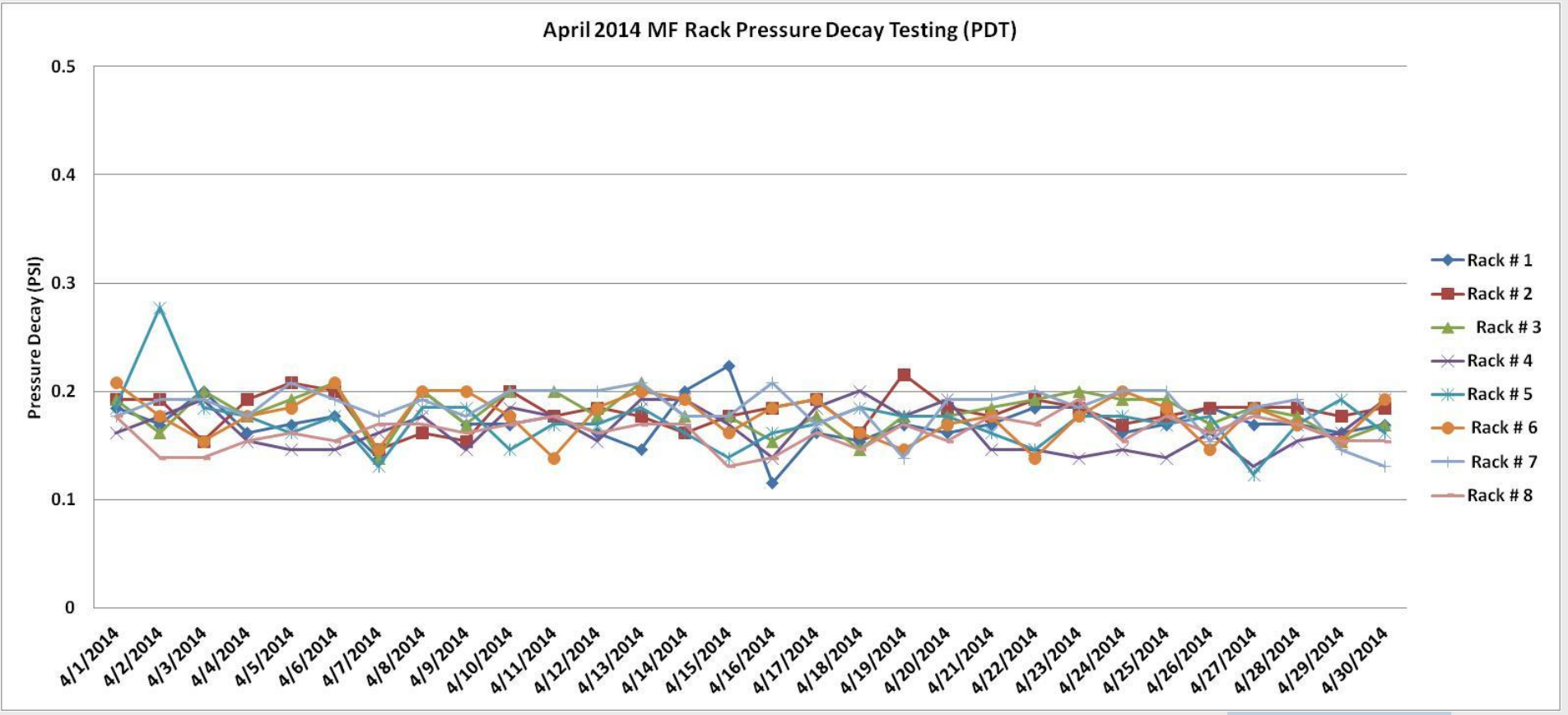
Operating Permit

Microfiltration Requirements

Membrane FLUX	≤25 gfd
Transmembrane Pressure (TMP)	≤25±psi
Membrane Integrity Test (MIT)	Daily – Decay <0.3psi (air-pressure hold for 5-mins)

Santa Clara Valley Water District

Process Monitoring - MF



Operating Permit

Requirements for Ultraviolet Disinfection

UV Disinfection Dose	Under MF Mode, 80 mj/cm^2 Under RO Mode, 50 mj/cm^2
UV Reactor Flow	2.0 MGD (MF) 2.86 MGD (RO)
UV Intensity Sensor Calibration Check	Monthly (at least)
Duty UV Sensor Intensity: Reference Intensity Ratio	≤1.2

Santa Clara Valley Water District

Operating Permit

More Requirements for Ultraviolet Disinfection

UV Sensor (Wedeco 13599) Recalibration	Annually
UV Reactor Flow Meter Verification	Monthly
UV Transmittance (UVT)	65% MF/ 95% RO
UVT Meter Inspections	Weekly
UV Lamps (Wedeco XLR30) Hours of Operation	10,074 (Max)

Santa Clara Valley Water District

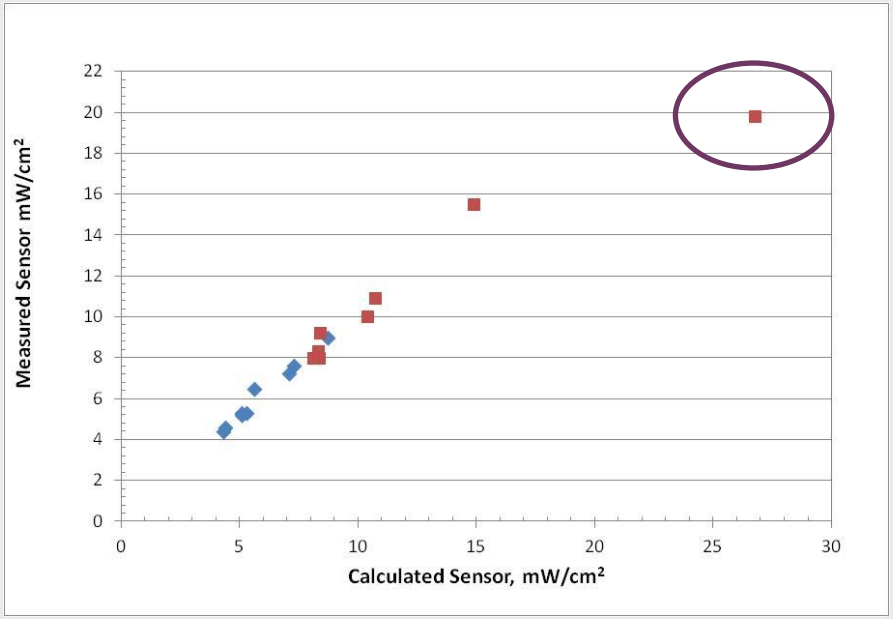
UV Startup Performance

- **UV Layout**
  - 8 mgd
  - 5 duty trains
  - 1 redundant train
  - 2 reactors per train

System DDW Approved for Tertiary Recycled Water Production

UV Startup Performance

- Sensors Accurate to UVT of 50%-97%
- RO Permeate UVT of 99.7% (calibrated bench)
- MF Filtrate UVT of 71% (calibrated bench)



Bioassay Testing and Future Testing

Table 5 RO Effluent Spot-Check Bioassay Test Results
UV Spot Check Bioassay Testing Results
Xylem Water Solutions U.S.A., Inc.

Test #	Flow, mgd	UVT, %	Power, %	Train tested	# of reactor(s) in operation	Measured UV Dose[(1)], mJ/cm^2
11	1.30	89.0	50	1	1	119.0
12	1.811	89.2	50	1	1	105.0
13	1.81	93.6	50	1	1	111.0
14	1.82	89.1	50	1	1	98.7
15	2.86	88.4	50	1	1	67.5
16	2.85	94.1	50	1	1	110.1
17	2.85	92.2	75	1	1	129.7
18	2.85	99.7	50	1	1	162.3
19	1.29	99.7	0	1	0	0

- **UV Layout**
  - 8 mgd
  - 5 duty trains
  - 1 redundant train
  - 2 reactors per train
  - 1.6 mgd per train

-100% power
- 2 reactors in series
- 99% UVT
- Dose estimated at >800 mJ/cm^2

Operating Permit – Records & Reporting

Records should be maintained on UV lamp age and replacement.

Monthly reporting to the Regional Board includes:

1. Daily total coliform bacteria monitoring
2. Maximum daily coliform reading for previous month
3. Minimum daily chlorine residual
4. Daily maximum turbidity
5. Daily UV compliance determinations, including minimum daily UV dose.
6. Summary of operational problems, plant & equipment breakdowns, diversions to emergency storage or disposal, and all corrective and preventative actions taken (CM & EM Reports)

Santa Clara Valley Water District

Current Log Removal Estimates

Pathogenic Microorganism	Log Removal Goal (Sect 60320.108)	Primary and Secondary Treatment	MF	RO	UV (~800 mJ/cm^2)	**Totals**
Viruses	12	1.9	0	1.7	6	**9.6**
Giardia	10	0.8	4	1.7	6	**12.5**
Cryptosporidium	10	1.2	4	1.7	6	**12.9**

Loading Reverse Osmosis Membranes

TRAIN PROFILE FORM

SCVWD Train No. _____

System Analytical Data

Turbidity (NTU) _____

Temperature (ºF) _____

pH (units) _____

Conductivity (umhos/cm):

Feed _____

Permeate _____

Concentrate _____

System Pressures

Feed (psig) _____

1st Stage DP (psi) _____

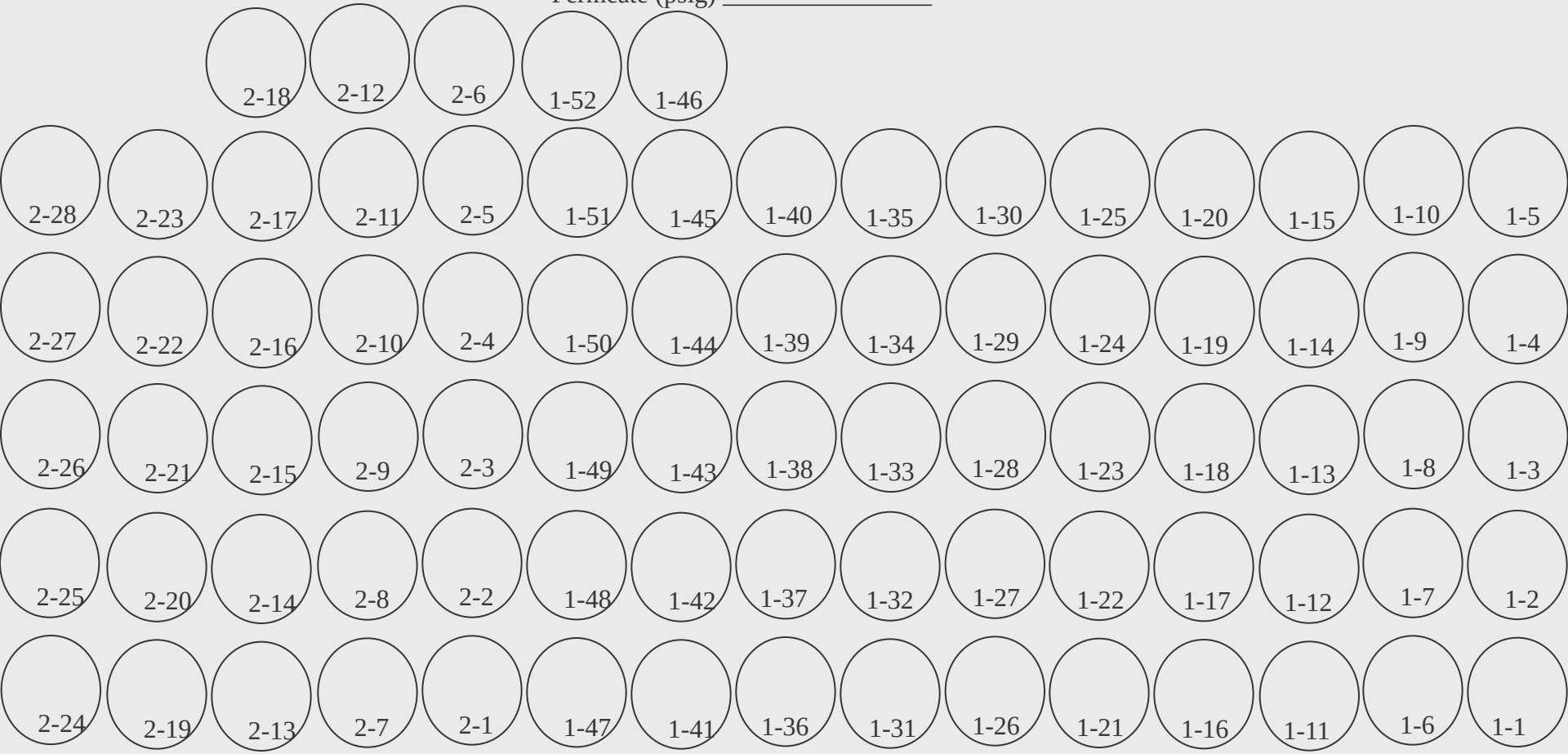
2nd Stage DP (psi) _____

Permeate (psig) _____

System Flows

Permeate – Total (gpm) _____

Concentrate (gpm) _____ _____



TRAIN PROFILE FORM

SCVWD Train No. 1

System Analytical Data

Turbidity (NTU) 0.084
Temperature (°F) 70 °C
pH (units) 6.8
Conductivity (umhos/cm):
Feed 12.96
Permeate 24.26
Concentrate 8153

System Pressures

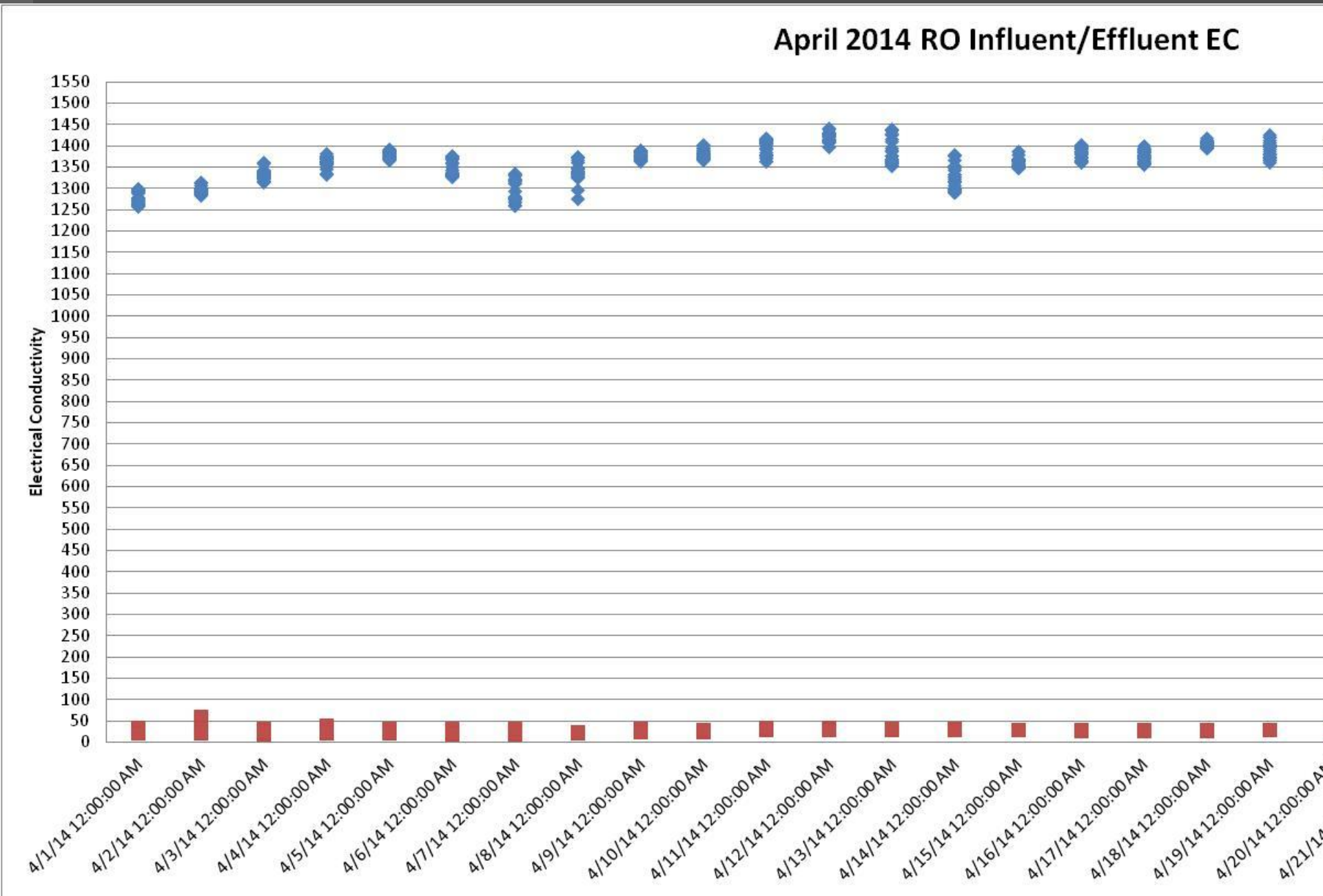
Feed (psig) 166
1st Stage DP (psi) 18.15
2nd Stage DP (psi) 9.89
Permeate (psig) 10.25

System Flows

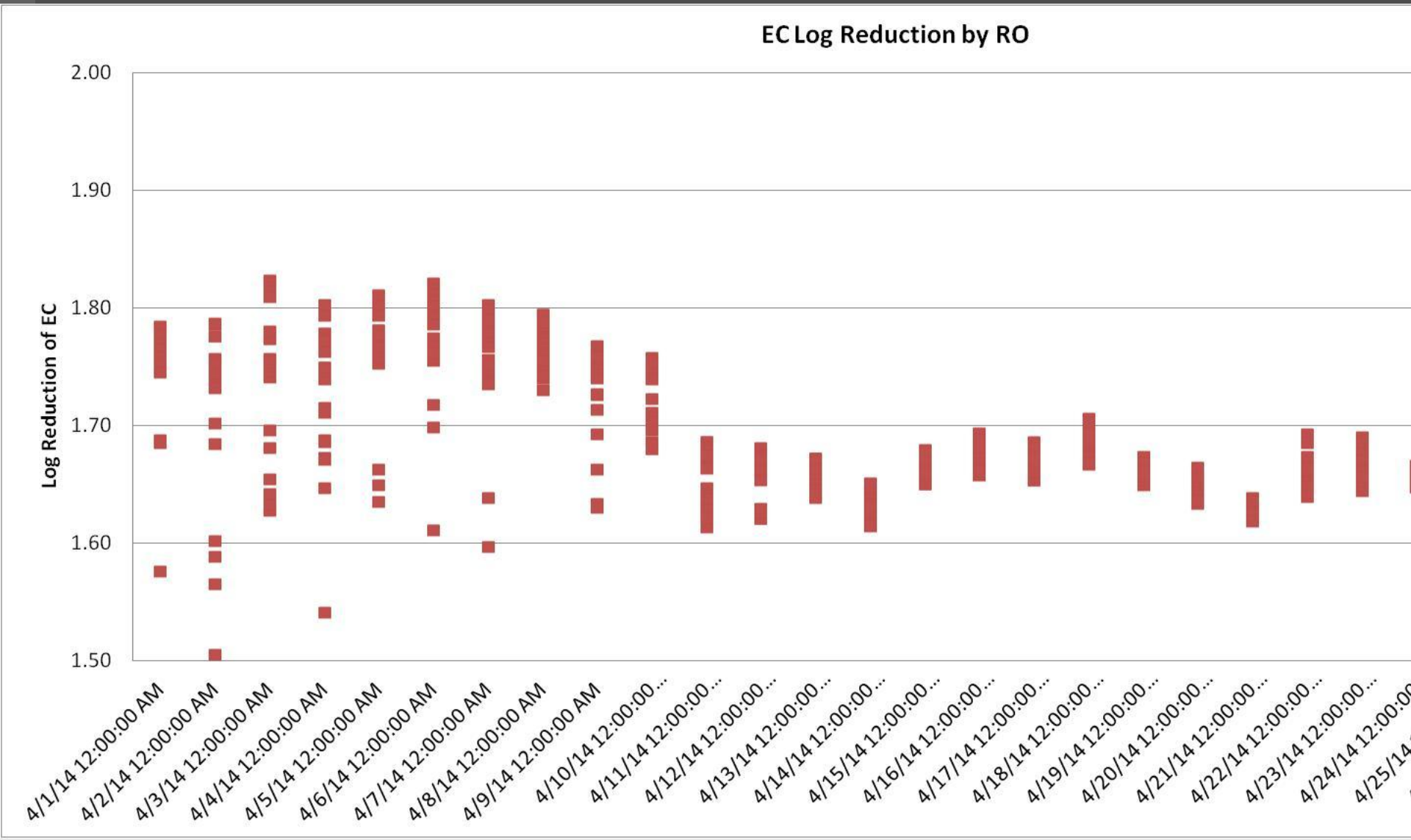
Permeate – Total (gpm) 1850
Concentrate (gpm) 329

		35.76 2-18 78	43.76 2-12 84	42.72 2-6 90	14.83 1-52 60	12.72 1-46 54								
55	39.14 2-28 71	40.63 2-23	56.13 2-17	47.61 2-11	40.40 2-5	11.57 1-51	12.71 1-45	12.58 1-40 47	14.21 1-35 41	12.42 1-30 35	12.05 1-25 29	12.64 1-20 23	18.87 1-15 17	14.39 1-10 11	11.92 1-5 5
54	43.36 2-27	50.58 2-22	40.81 2-16	45.12 2-10	45.59 2-4	14.18 1-50	14.52 1-44	12.67 1-39	12.18 1-34 40	11.76 1-29	12.12 1-24	12.12 1-19	12.03 1-14 16	13.35 1-9 10	13.85 1-4 4
53	40.58 2-26	40.53 2-21	43.91 2-15	42.35 2-9	40.33 2-3	13.36 1-49	11.91 1-43	13.29 1-38	14.11 1-33	12.89 1-28	12.24 1-23	13.52 1-18	11.24 1-13 15	11.60 1-8 9	12.06 1-3 3
52	37.76 2-25	42.62 2-20	40.34 2-14	40.62 2-8	44.88 2-2	12.67 1-48	12.40 1-42	12.13 1-37	12.15 1-32	12.58 1-27	13.26 1-22	12.16 1-17	11.53 1-12 14	11.18 1-7 8	11.04 1-2 2
51	47.95 2-24	46.06 2-19	35.18 2-13	38.07 2-7	48.84 2-1 1	12.92 1-47	12.43 1-41	12.31 1-36	12.67 1-31	11.95 1-26	13.92 1-21	11.62 1-16	11.93 1-11 13	11.71 1-6 7	11.12 1-1 1

Process Monitoring – Reverse Osmosis



Process Monitoring – Reverse Osmosis

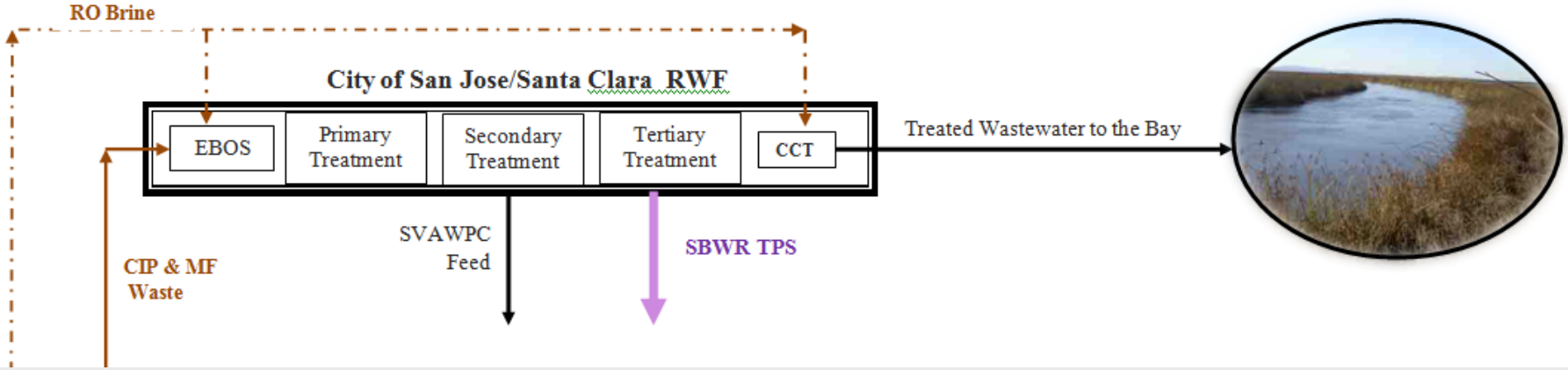


Agreements with the City of San Jose

- TDS <60mg/L
- pH 6.5-8.5
- Chloramine Residual 5-10mg/L
- Blended TDS Target 500 ± 50 mg/L
- Dissolved Oxygen >1.0mg/L and Sulfide <0.1mg/L
- RO Brine and Waste Monitoring (CTR, Chronic Toxicity, other constituents)

Chronic Toxicity Testing

Chronic Toxicity Testing

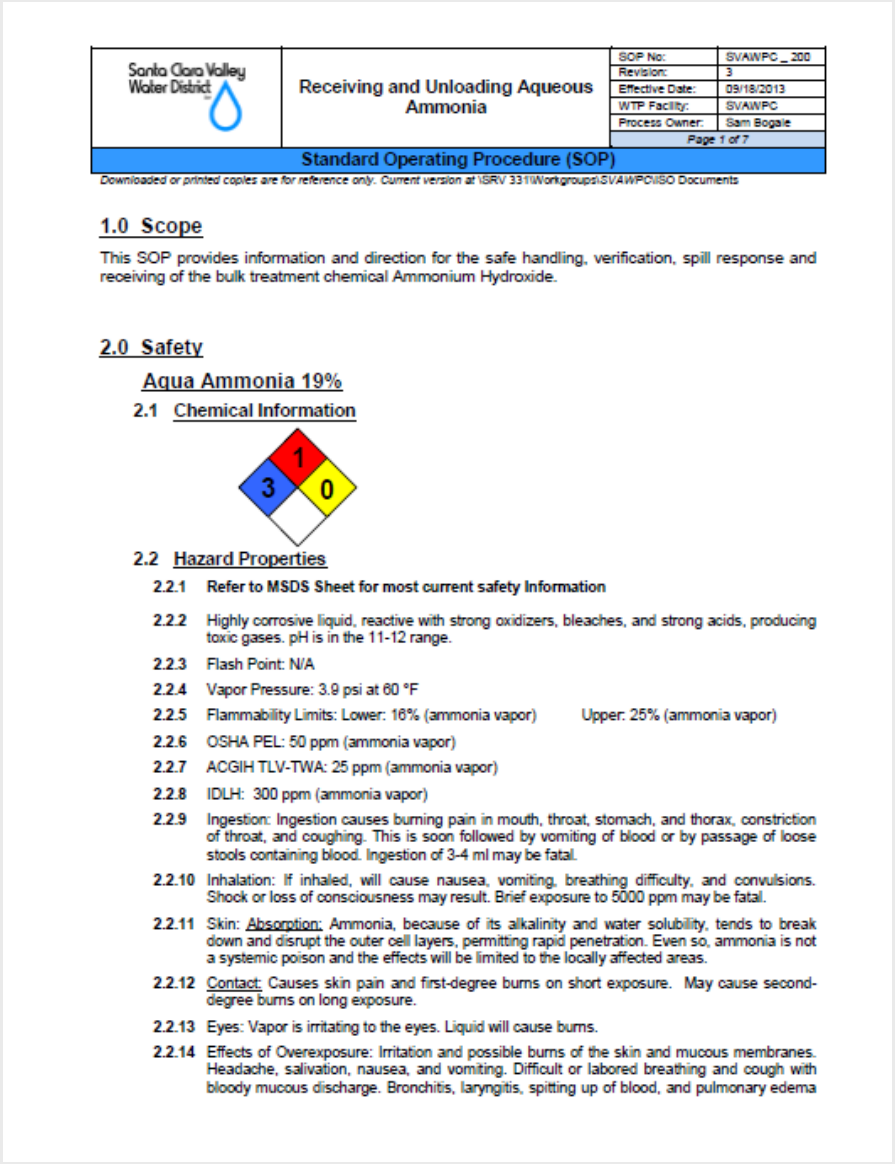


- Testing protocol per RWF NPDES. 40 CFR 136, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water and Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, currently third edition (EPA-821-R-02-014)*
- Normal test species *Ceriodaphnia dubia*. Acute Chronic Toxicity test species Rainbow trout (*Onchorhynchus mykiss)*
- Conduct monthly routine sampling to start, then reduced to quarterly
- 1%, 2%, 4% and 8% dilutions of RO Brine
- If there is a finding of "toxicity", then accelerated (twice per month) sampling required.

Getting Ready for Operations

Standard Operating Procedures

- There are currently 53 Standard Operating Procedures completed
- Developed using ISO 9001:14001 QEMS protocols
- Reviewed for Quality Control
- SOP Training Videos for each SOP



Santa Clara Valley Water District

Receiving and Unloading Aqueous Ammonia

SOP No:	SVAWPC _ 200
Revision:	3
Effective Date:	09/18/2013
WTP Facility:	SVAWPC
Process Owner:	Sam Bogale
	Page 1 of 7

Standard Operating Procedure (SOP)

Downloaded or printed copies are for reference only. Current version at \\SRV 331\Workgroups\SVAWPC\ISO Documents

1.0 Scope

This SOP provides information and direction for the safe handling, verification, spill response and receiving of the bulk treatment chemical Ammonium Hydroxide.

2.0 Safety

Aqua Ammonia 19%

2.1 Chemical Information

2.2 Hazard Properties

2.2.1 **Refer to MSDS Sheet for most current safety Information**

2.2.2 Highly corrosive liquid, reactive with strong oxidizers, bleaches, and strong acids, producing toxic gases. pH is in the 11-12 range.

2.2.3 Flash Point: N/A

2.2.4 Vapor Pressure: 3.9 psi at 60 °F

2.2.5 Flammability Limits: Lower: 16% (ammonia vapor) Upper: 25% (ammonia vapor)

2.2.6 OSHA PEL: 50 ppm (ammonia vapor)

2.2.7 ACGIH TLV-TWA: 25 ppm (ammonia vapor)

2.2.8 IDLH: 300 ppm (ammonia vapor)

2.2.9 Ingestion: Ingestion causes burning pain in mouth, throat, stomach, and thorax, constriction of throat, and coughing. This is soon followed by vomiting of blood or by passage of loose stools containing blood. Ingestion of 3-4 ml may be fatal.

2.2.10 Inhalation: If inhaled, will cause nausea, vomiting, breathing difficulty, and convulsions. Shock or loss of consciousness may result. Brief exposure to 5000 ppm may be fatal.

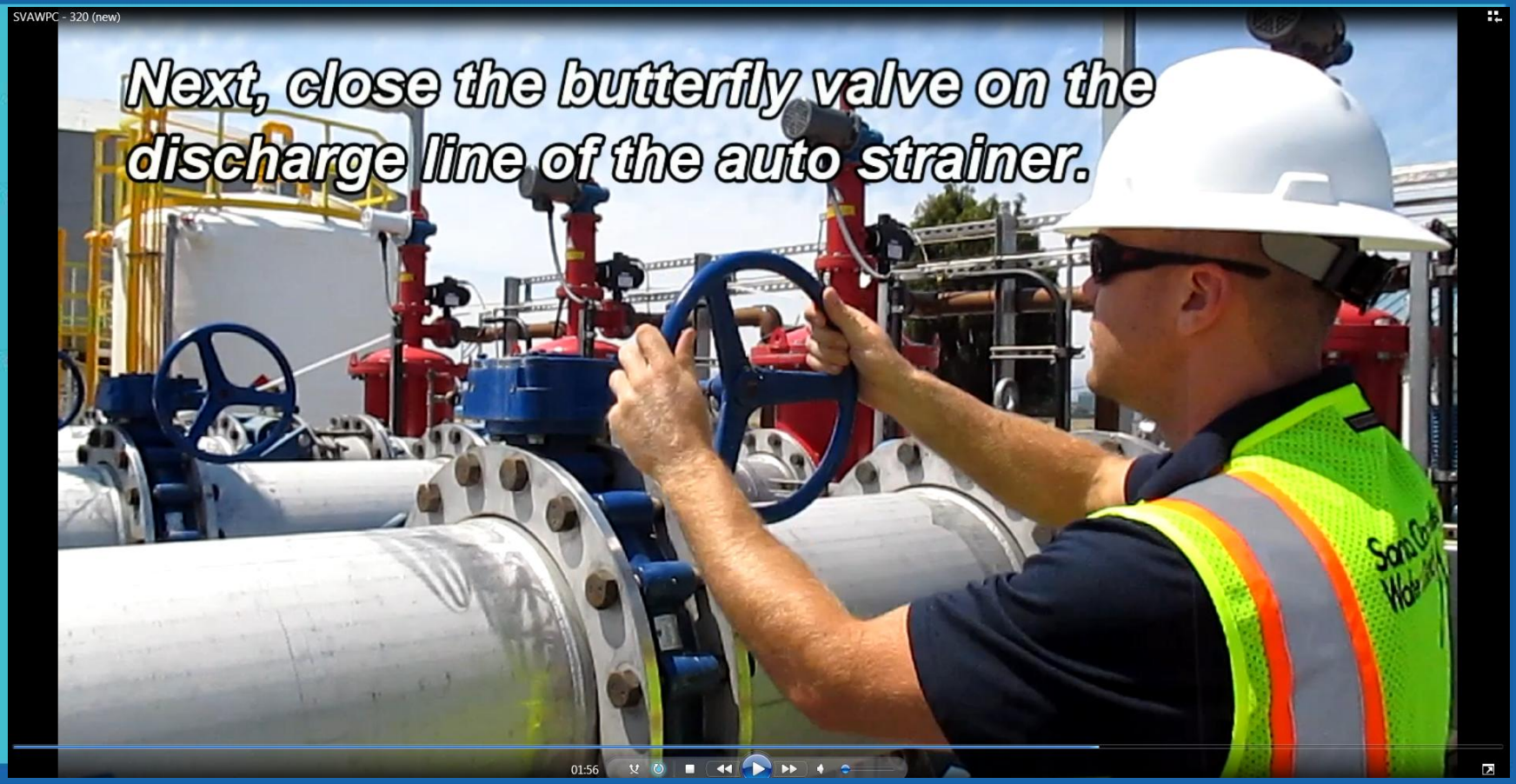
2.2.11 Skin: Absorption: Ammonia, because of its alkalinity and water solubility, tends to break down and disrupt the outer cell layers, permitting rapid penetration. Even so, ammonia is not a systemic poison and the effects will be limited to the locally affected areas.

2.2.12 Contact: Causes skin pain and first-degree burns on short exposure. May cause second-degree burns on long exposure.

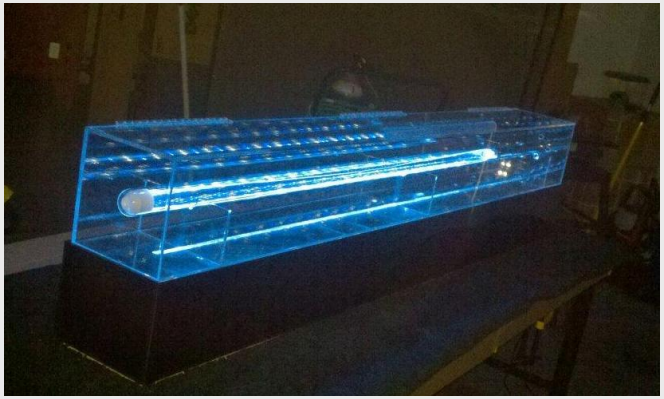
2.2.13 Eyes: Vapor is irritating to the eyes. Liquid will cause burns.

2.2.14 Effects of Overexposure: Irritation and possible burns of the skin and mucous membranes. Headache, salivation, nausea, and vomiting. Difficult or labored breathing and cough with bloody mucous discharge. Bronchitis, laryngitis, spitting up of blood, and pulmonary edema

Training Videos



Consumables



Asset Management

Santa Clara Valley Water District

Equipment Data Sheet

Silicon Valley Advanced Water Purification Center

Equipment Type:	Influent Strainer
	(PMP-1101 Pictured, Typical)
Location #:	SVA-1
Location Label:	Influent Pumps and Strainers
Drawing Page #:	091

LINKS TO EQUIPMENT REFERENCES

- Submittals
- Manufacturer Specifications
- Manufacturer Cut Sheet
- Manufacturer O&M Manual
- Contract Specifications
- Electrical Wiring Drawings
- Technical Information

SPECIFICATIONS

Manufacturer:	Amiad	Equipment Cost:	
Type:	EBS-10000	Replacement Cost:	$1,614.00
Cat #:	KES1Y0.14J.0101	Element Type:	Weavewire
In/Out Diameter:	14"	Max. Working Pressure:	10 bar/130 psi
Perforation:	300 micron	Max. Working Temp.	60℃/140℉
Manufacturer:	Amiad	Power Requirements:	440V AC 3PH 60Hz
Type:	EBS-10000	Equipment Cost:	
		Replacement Cost:	$1,614.00

ASSETS

SCADA Tag:	Serial:	Asset Number:	MAXIMO ID:
STR-1101	11-05-100015168	E52345	SVA_60MIS52345

Continued on the next page...

Operations Water Wiki

Advanced Water Treatment Plant - Windows Internet Explorer

http://d1308786/mediawiki/index.php/Main_Page

File Edit View Favorites Tools Help

Favorites | Advanced Water Treatment Plant

siliconvalley

ADVANCED WATER PURIFICATION CENTER

Page | Discussion | Read | Edit | View history

- Main page
- Asset Registry
- SOP Information
- Regulatory Information
- City of San Jose Documentation
- SDS Documents
- Pilot Tesing
- Forum
- Staff
- Help

Toolbox

- What links here
- Related changes
- Special pages
- Printable version
- Permanent link
- Page information

A Training and Knowledge Retention Tool for Operators and Maintenance.

This wiki is designed as a resource for district staff to aid in the operation and maintenance of the Silicon Valley Advanced Water Treatment Plant. **This site is not intended for public use.** Any and all edits/additions must be approved by an administrator. If there are any questions, concerns, or issues with obtaining or using a login, please contact an administrator.

Recent Events
2014

August: RO Cartridge Filter Replacement

Questions?

Find more information visit…

www.purewater4u.org

Or contact me…
Crystal Yezman, T4/D3, P.E.
cyezman@valleywater.org

Santa Clara Valley Water District