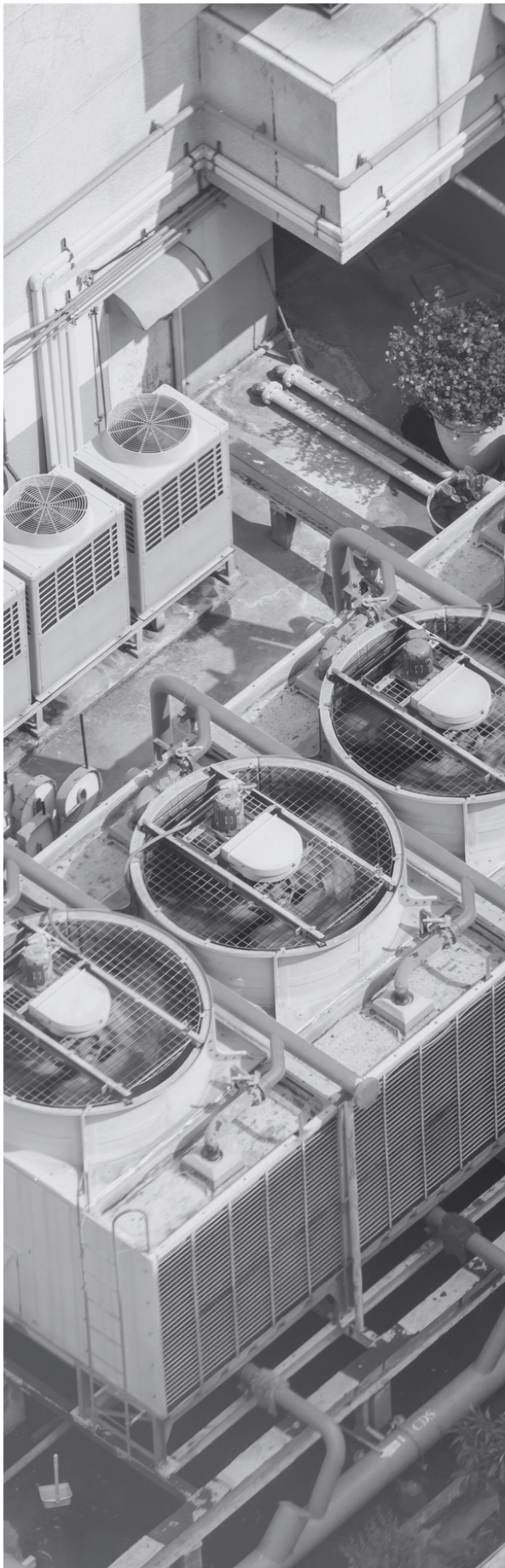




Cooling Water Treatment Roadmap

Client:
Vandelay Industries

Site Address:
1000 S Broadway, Los Angeles

Prepared By :
Capture H₂O

Presented By :
Brendon Marks

512 Via De La Valle Suite 301
Solana Beach CA 92075
1-866-LESS-H₂O (1-866-537-7426)



Goal: 20% reduction of potable water by 2028

**Maximize
Control**

C

**Minimize
Consumption**

B-

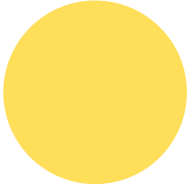
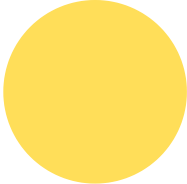
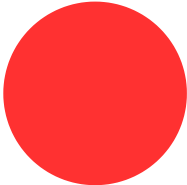
Water Savings

***6.1M
gallons
per year***

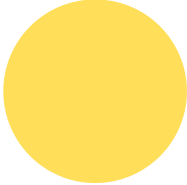
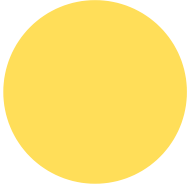
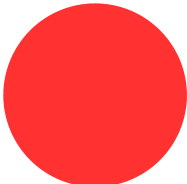
Cost Savings

***\$159,771
per year***

Maximize Control

Hazard	Score	Reason	Recommendation
Scale		No scale buildup was noted on the tower. Incoming water chemistry and controller conductivity readings indicate a slightly corrosive environment, likely leading to very little scale.	Recommend raising cycles of concentration while maintaining control of scale. Ensure scale inhibitor is dosed on a post-bleed feed. Implementing the Capture H₂O High Cycle program will control scale through pre-treatment softening, as well as provide 24/7 remote monitoring that will alert the team to mechanical issues in a timely manner.
Corrosion		The CoC of 1.36 is very low based on the assumed feedwater chemistry. No corrosion coupons were identified by the tower controller. The system is likely being subjected to a corrosive environment.	Ensure corrosion coupons are installed and being analyzed on a quarterly basis to verify corrosion control. Add PTSA probe and remote monitoring to ensure chemical residual is in target, and prompt action can be taken if ever out of target. Implement the High Cycle program, which will utilize high pH and natural silica in the water to create a corrosion resistant environment.
Bacteria		Heavy algae growth was seen on the FXV tower. The PT2 tower is fully enclosed, so the state of the interior basin and fill are unknown. The severity of the fouling could indicate a broken chemical pump or empty chemical tank. Both towers were being fed an additional chemical, which is presumed to be an oxidizing biocide. No ORP probe was identified, which is used to M&V biocide residuals.	Feed both an oxidizing and non-oxidizing biocide. Replace any broken equipment or increase biocide dosage. Install ORP probe and implement remote monitoring to ensure chemical residual is in target, and prompt action can be taken if out of target. Regularly test for ATP and Legionella to M&V bacteria control. Implement the Capture H₂O High Cycle program, which utilizes high pH and high conductivity to create a bio-static environment and prevent bacteria growth without the use of chemicals.

Minimize Consumption

Resource	Score	Reason	Recommendation
Water		The calculated 5.52 CoC is well below the LSI max, creating an opportunity to decrease water consumption by raising cycles. Cycles should also be increased to improve corrosion control. The water volumes for this building are extremely low relative to the size of the cooling towers, only 3.44% the design load. This could indicate accuracy issues with one or both water meters.	Maximize CoC while ensuring system scale is within control limits. Implementing a Traditional, Hybrid or High Cycle program with Capture H₂O will save water by increasing cycles of concentration, as well as provide 24/7 remote monitoring that will alert the team to mechanical issues that lead to water wastage in a timely manner.
Energy		No scale issues were noted and the proper chemicals are being fed, though there have been issues with the feed pumps. An MIC was noted in March 2025. If past chiller inspection reports can be provided, we can provide a more detailed assessment of the current program.	Inspect the chillers annually and test for ATP on a regular basis to ensure bacteria control. The High Cycle program utilizes soft water to dissolve existing scale and keep hardness low in the system, improving heat transfer efficiency and lowering energy consumption.
Chemical		The system is utilizing a series of 5 water treatment chemicals, including sulfuric acid to lower pH and achieve higher cycles of concentration. Two of the chemicals were found to be depleted, one of which had a broken pump.	Ensure the proper chemicals are being fed to control for scale, corrosion and bacteria and remote monitoring and trending of chemical residuals is implemented to M&V specs. Implement the Hybrid program to reduce chemical consumption by 80% or more while still controlling the system chemistry. Implement the High Cycle program to create a bacteria resistant environment utilizing high pH and conductivity, eliminating the need for hazardous chemicals to be on site.

Current State

Background

Vandelay Industries is interested in exploring improvements and alternative approaches to their cooling water treatment program at their facility in Rocklin, CA. This presentation outlines how Capture H₂O's programs can increase control and minimize consumption of the cooling systems, ultimately saving money through water, energy, and chemical savings.

Analysis of Current Situation

The facility is equipped with one two-cell BAC cooling tower with a cumulative capacity of 1,692 tons. Both annual makeup and blowdown volumes were provided, corresponding to a cycles of concentration (CoC) of 5.52.

It is assumed that this program is operating on a traditional liquid chemical water treatment program. This program is presumably feeding a scale and corrosion inhibitor, as well as oxidizing and non-oxidizing biocides to control for scale, corrosion and bacteria. The annual water volumes of 934,533 gallons of makeup and 169,442 gallons of blowdown, along with the 5.52 CoC, calculates to an average tower load of 58 tons. This equates to a 3.44% average load based on the 1,692 design load. This is very low for buildings of that nature and in that region. This may indicate accuracy issues with water meters, oversized towers, system overflows, or a combination of the following.

On the following pages, we modeled various average loads - 3.44%, 10%, 25% and 40% - to give a sensitivity analysis of what the savings potential could be if the metering data was incorrect. The presented savings are conservatively associated with a 3.44% average load.

Based on feedwater chemistry found online for this region, the calculated 5.52 CoC is significantly below the LSI range a traditional program aims for and is in a corrosive environment. The maximum cycles indicated by an LSI of +2.5 is 18.1, so there is an opportunity to increase cycles and decrease blowdown, while maintaining control of system fouling with the same water treatment approach. The chemistry data available online for Rocklin indicates very low hardness, conductivity and alkalinity in the water. Should a service report be provided, this will confirm the incoming water chemistry and current cycles of concentration.

No other information was provided about the system or any current issues. Problems with scale buildup, corrosion, high bacteria readings, fouling etc. would all be pertinent information to know.

Desired Outcomes

Capture H₂O can provide a traditional chemical treatment program that will help maximize control of scale, corrosion and bacteria and include 24/7 remote monitoring to maintain setpoint and optimize water, energy and chemical consumption. This is typically the first step of our value add and allows our team to build a relationship with your team. At a 3.44% load and operating at 12 cycles, we project that this program will save 99,887 gallons of water annually.

The Capture H₂O Hybrid Program can substantially reduce cooling tower blowdown and provide world class scale, corrosion, and bacteria control, while reducing chemical to feed by 80% or more. At a 3.44% load and operating at 20 cycles, we project that this program will save 129,172 gallons of water annually.

The Capture H₂O High Cycle Program can substantially reduce cooling tower blowdown and provide world class scale, corrosion, and bacteria control, all while feeding minimal to no water treatment chemicals. At a 3.44% load and operating at 100 cycles, we project that this program will save 160,814 gallons of water annually.

All programs include sensors and controllers capable of wirelessly monitoring each system, providing 24/7 visibility of system information and sending out alarms if out of target conditions are detected.

Cost/Savings Analysis Design

This document summarizes the estimated water and financial savings potential for Vandelay Industries' cooling tower system located in Los Angeles, CA by transitioning to one of Capture H₂O cooling tower water treatment programs. These programs can significantly reduce the operating costs of cooling tower systems by:

1. Raising the Cycles of Concentration (CoC) to reduce makeup and blowdown water consumption.
2. Reducing or eliminating the need to feed chemicals by using alternative means to control scale, corrosion and bacteria.

The savings analyses presented below are based on water chemistries available online, and cooling system design information and utility rates provided by Verizon.

Water Cost (\$/kgal)	Sewer Cost (\$/kgal)	Electricity Rate (\$/kWh)	Design Tonnage	Current Service & Chemical Cost	Current CoC	Capture Chemical CoC	Capture Hybrid CoC	Capture High Cycle CoC
\$3.32	\$0.00	\$0.22	1,692	\$80,000	5.52	12	20	100

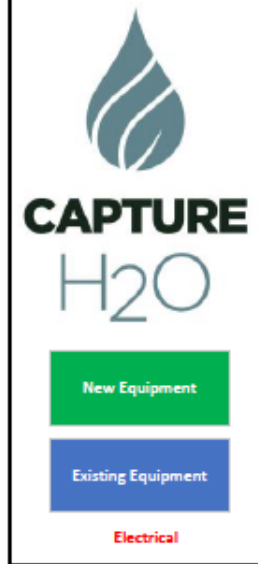
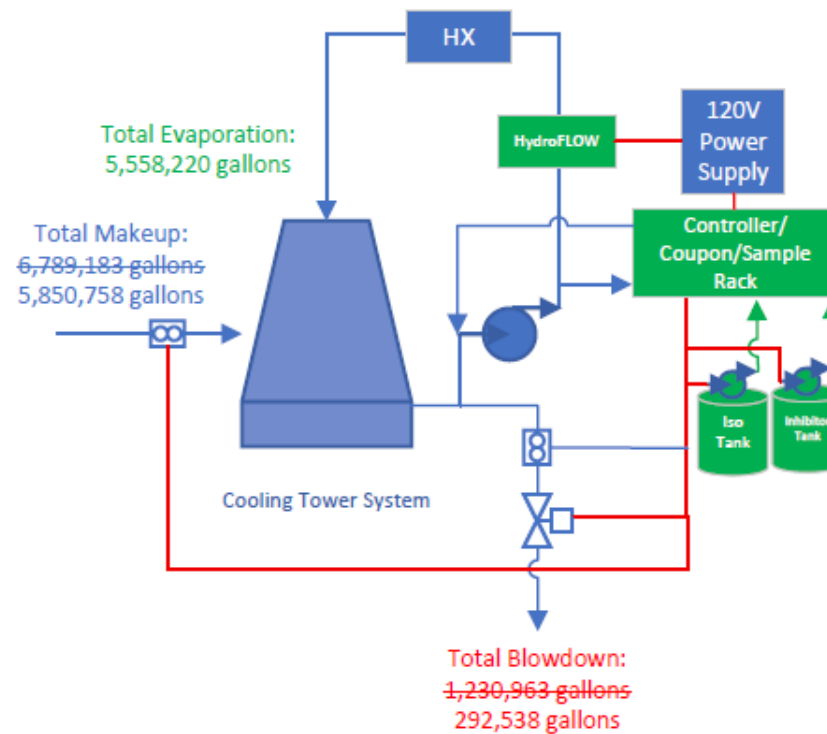
Note these ROIs are based on various assumptions that should be verified if there is interest in the initial business case. The primary assumptions to verify are:

- Number of cooling tower loops should be confirmed. It was shared that one two-cell BAC system was at the facility, though satellite images suggest there is another two-cell tower - one on the west side and the other on the north east side of the facility. This analysis assumes one open loop.
- Past service reports should be provided to verify incoming water chemistry. Change in this chemistry determines the allowable increase of CoC, influencing program paybacks. These chemistries will also validate the average load of the tower which is significantly lower than expected (see next bullet).
- The average load of the tower should be confirmed; the calculated 3.44% based on the provided water volumes is significantly below average for this size and type of building.
- Installation costs for the Chemical and Hybrid programs is \$5,000, and the High Cycle program is \$27,500. A subcontractor site walk will be required to provide a turnkey installation estimate.

If some or all of these items can be shared with Capture H₂O, an updated ROI projection can be provided. Ultimately, a contractor site walk will be required to provide a turnkey installation estimate.

Hybrid Program Design

25% Average Load



Current Program, 25% Load:

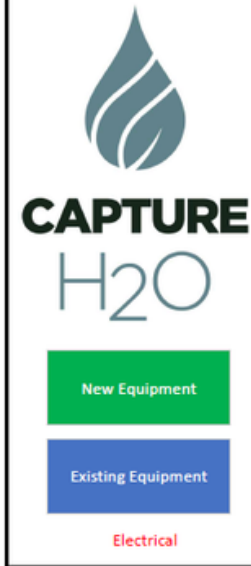
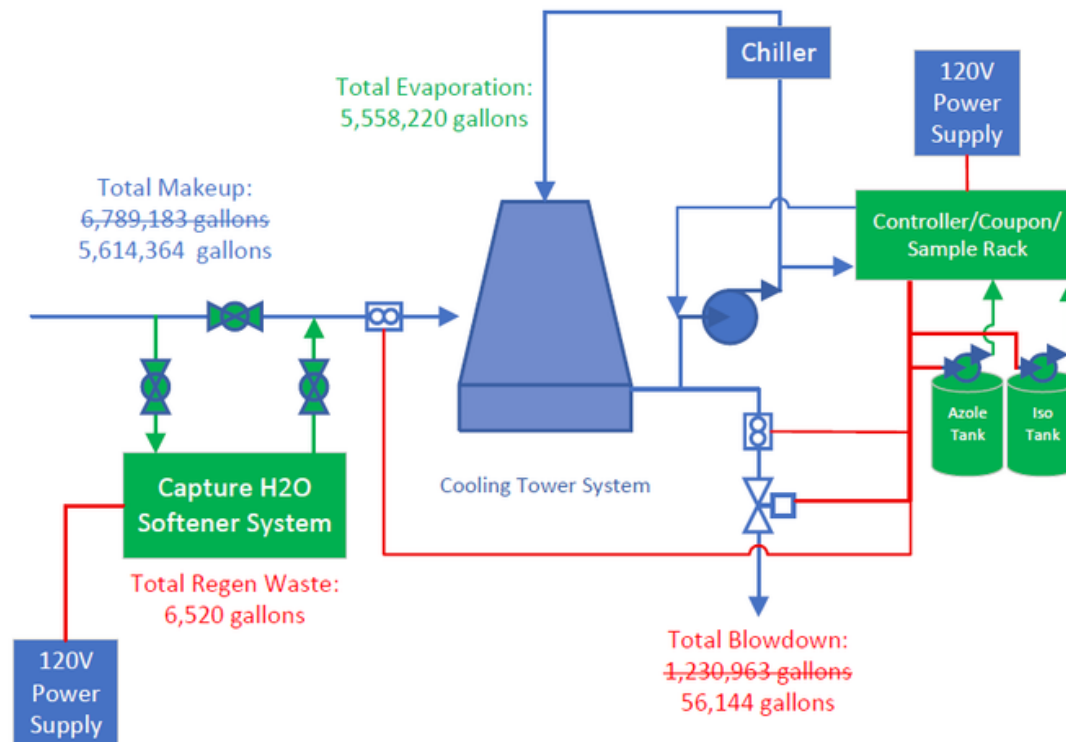
- Cooling Tower Cycles: 5.52
- Makeup Water Cost: \$3.32/kgal
- Sewer Cost: \$0.00/kgal
- Annual Makeup: 6,789,183 gallons
- Annual Blowdown: 1,230,963 gallons

Hybrid Payback, 25% Load, 20 CoC:

- CAPEX: \$39,300
- Capture Annual Service Cost: \$48,000
- Water Savings: 938,425 GPY
- Total Water Savings: \$3,116
- Annual Savings: \$35,116
- Payback: 13 Months

High Cycle Program Design

25% Average Load



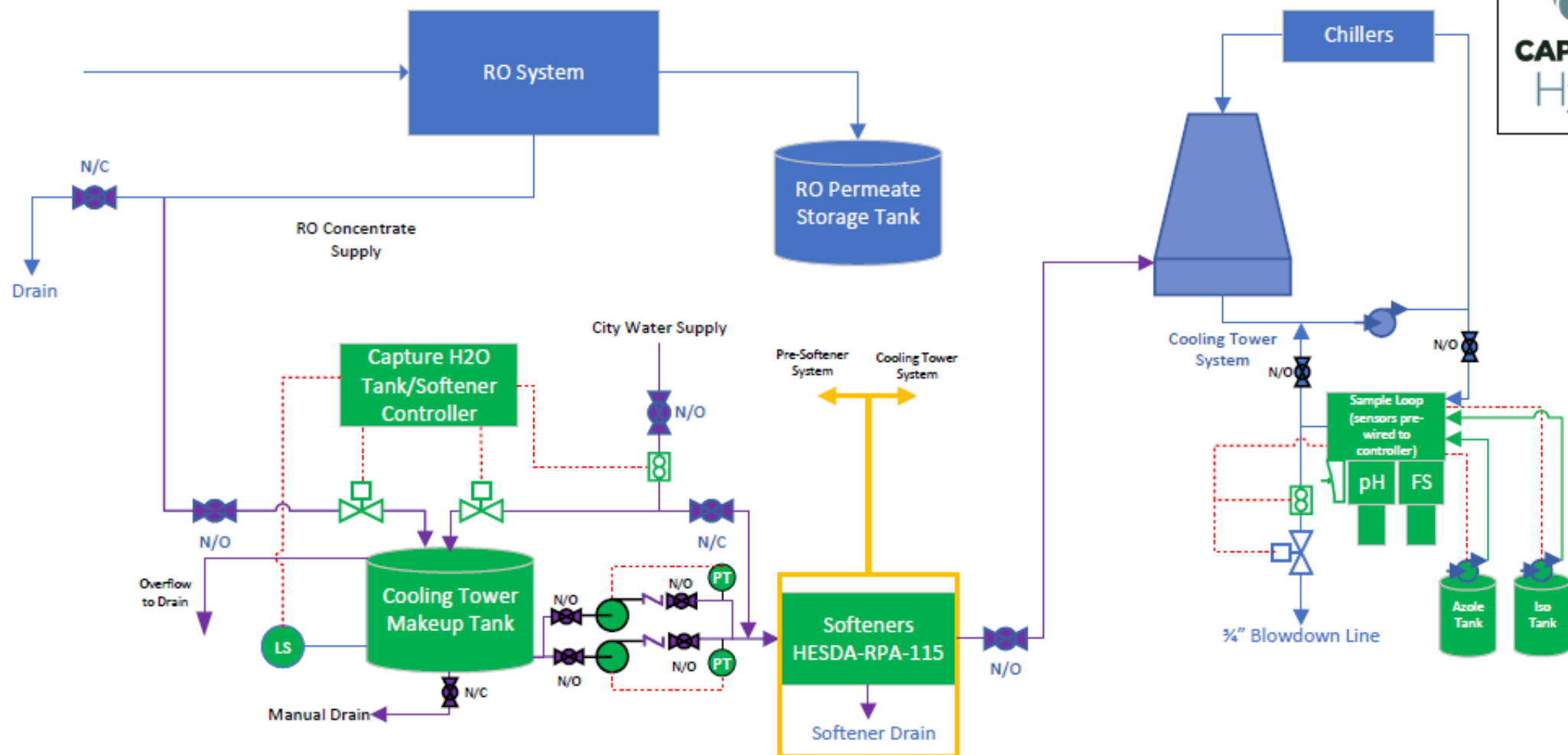
Current Program, 25% Load:

- Cooling Tower Cycles: 5.52
- Makeup Water Cost: \$3.32/kgal
- Sewer Cost: \$0.00/kgal
- Annual Makeup: 6,789,183 gallons
- Annual Blowdown: 1,230,963 gallons

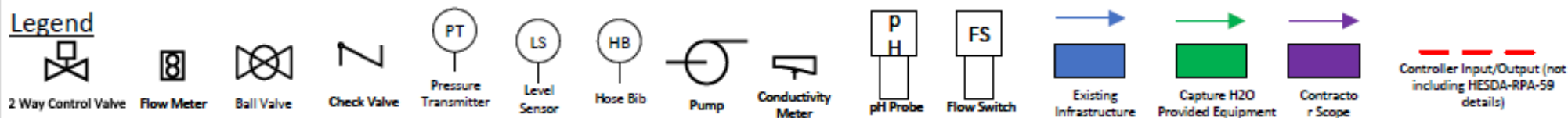
High Cycle Payback, 25% Load, 100 CoC:

- CAPEX: \$83,075
- Capture Annual Service Cost: \$40,000
- Water Savings: 1,168,299 GPY
- Total Water Savings (less salt \$): \$3,517
- Annual Savings: \$43,517
- Payback: 22 Months

High Cycle Program Design



Legend



<i>Liquid Chemical Program ROM Equipment and Install Cost = \$25,045</i>								
Average Load (Tons)	Current Annual Water Use (Gallons)	CH2O Annual Makeup Water Use (Gallons)	Annual Water Savings (Gallons)	Annual Water Savings (\$)	Current Service Cost (\$)	CH2O Service Cost (\$)	Annual Savings (\$)	Payback (months)
3.44%	934,517	834,630	99,887	\$332	\$80,000	\$48,000	\$32,332	8.6
10%	2,715,673	2,425,405	290,268	\$964	\$80,000	\$48,000	\$32,964	8.4
25%	6,789,183	6,063,513	725,670	\$2,409	\$80,000	\$48,000	\$34,409	8.1
40%	10,862,692	9,701,620	1,161,072	\$3,855	\$80,000	\$48,000	\$35,855	7.7

Hybrid Program ROM Equipment and Install Cost = \$39,300

Average Load (Tons)	Current Annual Water Use (Gallons)	CH2O Annual Makeup Water Use (Gallons)	Annual Water Savings (Gallons)	Annual Water Savings (\$)	Current Service Cost (\$)	CH2O Service Cost (\$)	Annual Savings (\$)	Payback (months)
3.44%	934,517	805,345	129,172	\$429	\$80,000	\$48,000	\$32,429	14.4
10%	2,715,673	2,340,303	375,370	\$1,246	\$80,000	\$48,000	\$33,246	14.1
25%	6,789,183	5,850,758	938,425	\$3,116	\$80,000	\$48,000	\$35,116	13.4
40%	10,862,692	9,361,213	1,501,480	\$4,985	\$80,000	\$48,000	\$36,985	12.7

High Cycle Program ROM Equipment and Install Cost = \$83,075

Average Load (%)	Current Annual Water Use (Gallons)	CH2O Annual Makeup Water Use (Gallons)	CH2O Annual Regen Water Use (Gallons)	Annual Water Savings (Gallons)	Annual Water Savings (\$)	Annual Salt Cost (\$)	Current Service Cost (\$)	CH2O Service Cost (\$)	Annual Savings (\$)	Payback (months)
3.44%	934,517	772,806	(897)	160,814	\$534	(\$50)	\$80,000	\$40,000	\$40,484	24.0
10%	2,715,673	2,245,745	(2,608)	467,320	\$1,552	(\$145)	\$80,000	\$40,000	\$41,407	23.5
25%	6,789,183	5,614,364	(6,520)	1,168,299	\$3,879	(\$362)	\$80,000	\$40,000	\$43,517	22.4
40%	10,862,692	8,982,982	(10,432)	1,869,278	\$6,206	(\$579)	\$80,000	\$40,000	\$45,627	21.4

City Water - High Cycle Program ROM Equipment and Install Cost = \$184,260												
Average Load	Current Annual Water Use (Gallons)	CH2O Annual Water Use (Gallons)	CH2O Annual Potable Water Use (Gallons)	CH2O Annual Wastewater Use (Gallons)	CH2O Annual Potable Regen Water Use (Gallons)	Annual Water Savings (Gallons)	Annual Water Savings (\$)	Annual Salt Cost (\$)	Current Program Cost	CH2O Program Cost	Annual Savings (\$)	Payback (months)
25%	14,914,673	3,942,000	3,942,000	0	(36,426)	10,936,247	\$561,228	(\$3,347)	\$74,500	\$48,000	\$584,382	4

RO Concentrate Reuse - High Cycle Program ROM Equipment and Install Cost = \$340,190												
Average Load	Current Annual Water Use (Gallons)	CH2O Annual Water Use (Gallons)	CH2O Annual Potable Water Use (Gallons)	CH2O Annual Wastewater Use (Gallons)	CH2O Annual Potable Regen Water Use (Gallons)	Annual Water Savings (Gallons)	Annual Water Savings (\$)	Annual Salt Cost (\$)	Current Program Cost	CH2O Program Cost	Annual Savings (\$)	Payback (months)
25%	14,914,673	3,942,000	2,562,300	1,379,700	(81,114)	12,271,259	\$628,123	(\$13,551)	\$74,500	\$48,000	\$641,071	6

High Cycle Program ROM Equipment and Install Cost= \$61,000

Average Load (Tons)	125
Current Annual Water Use (Gallons)	2,550,090
High Cycle Annual Water Use (Gallons)	1,708,016
High Cycle Regen Water (Gallons)	(13,937)
Annual Water Savings (Gallons)	828,137
Annual Water Savings (\$)	\$6,426
Annual Salt Cost (\$)	(\$1,027)
Energy Savings (\$)	\$4,638
Current Service and Chemical Cost (\$)	\$24,000
Capture H ₂ O Service and Chemical Cost (\$)	\$24,000
Chandler Water Efficient Technology Rebate	\$10,000
Annual Savings (\$)	\$10,037
Payback (months)	58

Next Steps



1. Capture H2O Water Savings Guarantee
2. First Three Months of Service are Free

 CAPTURE H ₂ O	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month ∞
Site Walk, Firm Proposal Delivered							
Capture H2O Installs Remote Monitoring							
Site Monitoring, Monthly Service Visits and System Optimization							
Upgraded Program Finalized Design Decision							
Upgraded Program Equipment Procurement							
Upgraded Program Installation							
Water, Energy & Chemical Savings							



CAPTURE
H₂O

Cooling Water Conservation

The Average Capture H₂O Customer Saves...

9.6M

*Gallons of
Water*

\$60K

*in Total
Savings*

Per Year



Our Clients



Capture H₂O Solution Types

Category	 Liquid Chemical	 Solid Chemical	 Hybrid	 High Cycle
Cycles Water	2 - 10	2-10	Double Current	20+
Savings	0%	0%	10 - 40%	25-50%
Chemicals	3 - 5, Most	3 - 5, Most	Less	Minimal
Value	Upgraded Service, Remote Monitoring	Upgraded Service, Remote Monitoring	Water Savings, Increased Safety, Remote Monitoring	Optimal Water Savings and Safety, Alt. Water Sources, Remote Monitoring
Typical Fit	Minimal CAPEX	Minimal CAPEX	250 - 750 tons, CAPEX	750+ Tons, Engaged Onsite Team, CAPEX

Industries We Serve



District Cooling



Food & Beverage



Biotech



Cold Storage



Commercial Office



Shopping Centers



sales@captureh2o.com



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