Plant Water Profiler Results

ABC Dairy Products Manufacturing Company – XYZ Plant
Year 2018 Report

The Plant Water Profiler Tool helps your organization understand how water is being procured and consumed at its plant and identifies potential water and cost savings. The PWP Tool helps break down the water intake, water consumption, and true cost of all water-using systems in your plant. It quantifies potential water savings that can be achieved from minimizing water loss and increasing water recirculation. Furthermore, it provides a list of next steps that might help your plant reduce water consumption. The PWP Tool is an excellent "first step" in identifying opportunities for water and associated cost savings.

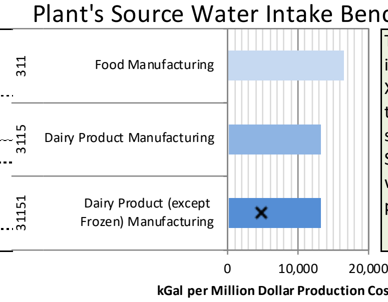
Plant's Information

Corporation Name:	ABC Dairy Products Manufacturing Company	Primary Contact:	
Plant Name:	XYZ Plant	Name:	John Doe
Primary Product:	Cultured Dairy Products	Phone:	xxx-xxx-xxxx
Industry Type and NAICS 5-Digit Code:	31151. Dairy Product (except Frozen) Manufacturing	E-mail:	abc@email.com

Plant's Annual Water Use and Cost Summary

Facility-wide Source Water Intake		13.20	Million Gallon
		18.86	kGal per 1000 lb
		4,756.76	kGal per Million Dollar Production Cost
System-Level Total Source Water Intake		13.65	Million Gallon
Direct Cost of Water	$	49,990	Dollars
True Cost of Water	$	255,084	Dollars
	$	364	Dollars per 1000 lb
	$	91,922	Dollars per Million Dollar Production Cost
True Cost/Direct Cost		5.10	

Plant's Source Water Intake Benchmark

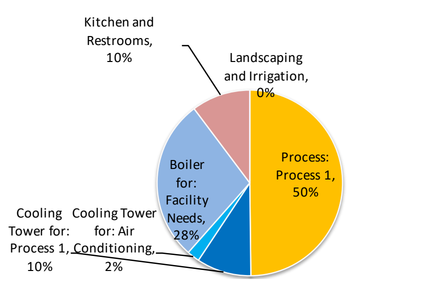


This chart compares water intake in your plant (marked as X) with the min-max range of that in the same industry subsector and type in the United States. For comparison, source water intake is normalized by production cost.

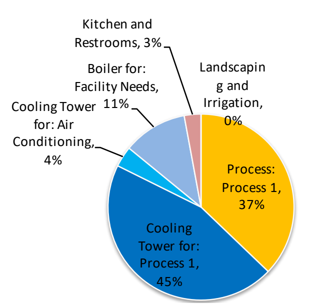
Annual Water Use and Cost Summary by System

Water-Using System	Source Water Intake	Gross Water Use	Direct Costs		True Cost of Water*		True Cost/Direct Cost
	Million Gallon per Year		$/Year	$/kGal	$/Year	$/kGal	
Process: Process 1	6.8	7.76	$ 30,790	$ 4,528	$ 94,797	$ 13,941	3.079
Cooling Tower for: Process 1	1.3	101.3	$ -	$ -	$ 115,205	$ 88,620	
Cooling Tower for: Air Conditioning	0.3	21.09	$ -	$ -	$ 9,159	$ 30,529	
Boiler for: Facility Needs	3.85	5.13	$ 11,780	$ 3,060	$ 28,502	$ 7,403	2.42
Kitchen and Restrooms	1.4	1.4	$ 7,420	$ 5,300	$ 7,420	$ 5,300	1.0
PLANT TOTAL	**13.65**	**138.53**	**$ 49,990**	**$ 3,662**	**$ 255,084**	**$ 18,687**	**5.103**

Percent Source Water Intake by System



True Cost of Water by System



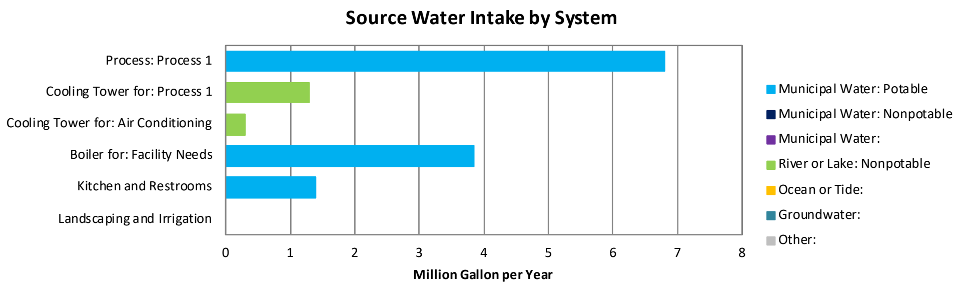
These charts present the breakdown of **source water intake** and **true cost of water*** in different water-using systems in your plant. By identifying systems that are contributing the most towards source water intake and true cost of water, you may **prioritize measures to align with your company's priority for water conservation versus cost savings.**

**TRUE COST OF WATER*
= $ Municipal Water Supply
+ $ Wastewater to Municipal Sewer
+ $ Water and Wastewater Treatment
+ $ Pump and Motor Energy
+ $ Heat Energy in Wastewater

Part 1: Source Water Intake

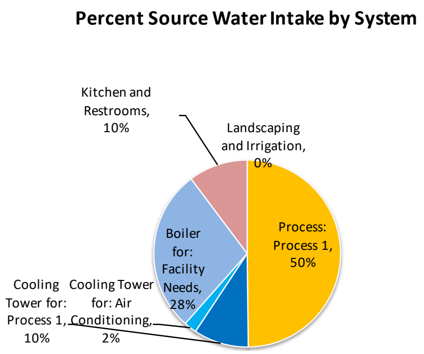
1.1 Source Water Intake by System

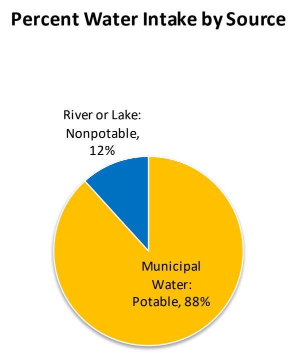
Water-Using System	Municipal Water: Potable	River or Lake: Nonpotable	Total					
	Million Gallon Per Year							
Process: Process 1	6.8	-	6.8					
Cooling Tower for: Process 1	-	1.3	1.3					
Cooling Tower for: Air Conditioning	-	0.3	0.3					
Boiler for: Facility Needs	3.85	-	3.85					
Kitchen and Restrooms	1.4	-	1.4					
PLANT TOTAL	**12.05**	**1.6**	**13.65**	**-**	**-**	**-**	**-**	**-**



This chart presents the **water intake from different sources** for different water-using systems in your plant.

By identifying systems with municipal water as the largest fraction of their source water intake, you may consider **alternative sources of water** as a measure to reduce the cost of source water intake**.**

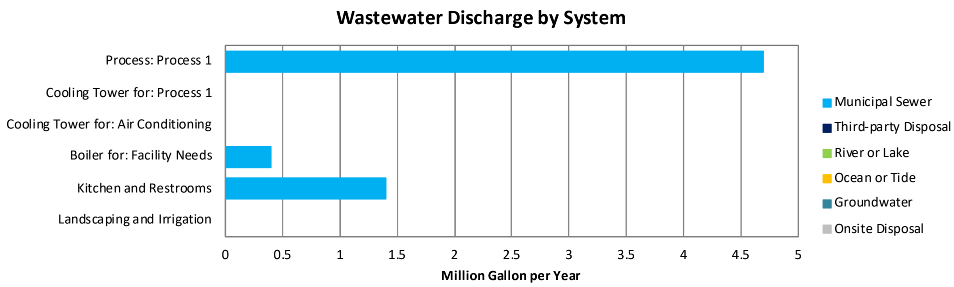




Part 2: Wastewater Discharge

2.1 Wastewater Discharge by System

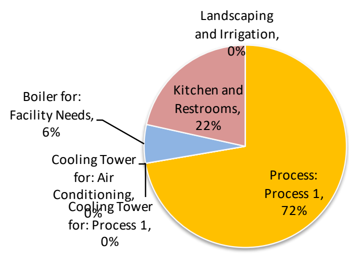
Water-Using System	Municipal Sewer	Total					
	Million Gallon per Year						
Process: Process 1	4.7	4.7					
Cooling Tower for: Process 1	-	-					
Cooling Tower for: Air Conditioning	-	-					
Boiler for: Facility Needs	0.4	0.4					
Kitchen and Restrooms	1.4	1.4					
PLANT TOTAL	**6.5**	**6.5**	**-**	**-**	**-**	**-**	**-**



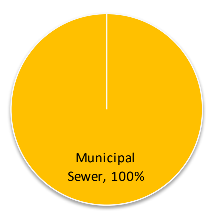
This chart presents the **wastewater discharge to different outlets** for different water-using systems in your plant.

By identifying systems from which wastewater discharge can be used as intake for other systems, you may consider **recycling wastewater** as a measure to reduce (a) the cost of wastewater discharge for a system as well as (b) the cost of source water intake for other systems.

Percent Wastewater Discharge by System



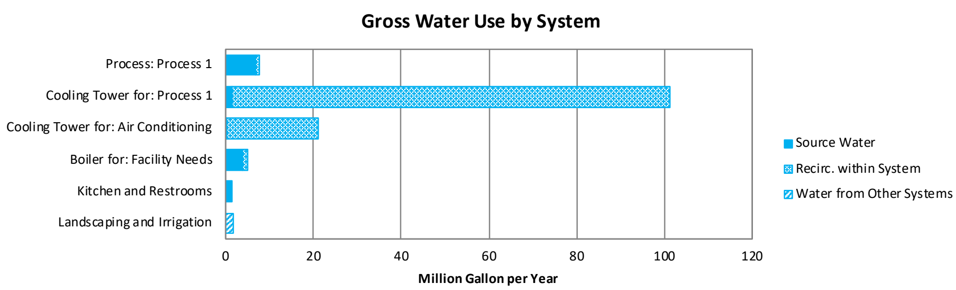
Percent Wastewater Discharge by Outlet



Part 3: Water Balance

3.1 Gross Water Use by System

Water-Using System	Incoming Water: Source Water	Incoming Water: Water from Other Systems	Recirc. within System	TOTAL	Reused & Recirc. Water / Gross Water Use
	Million Gallon per Year				
Process: Process 1	6.8	-	0.96	7.76	0.124
Cooling Tower for: Process 1	1.3	-	100.0	101.3	0.987
Cooling Tower for: Air Conditioning	0.3	-	20.79	21.09	0.986
Boiler for: Facility Needs	3.85	-	1.28	5.13	0.25
Kitchen and Restrooms	1.4	-	-	1.4	-
PLANT TOTAL	**13.65**	**1.85**	**123.03**	**138.53**	**0.901**

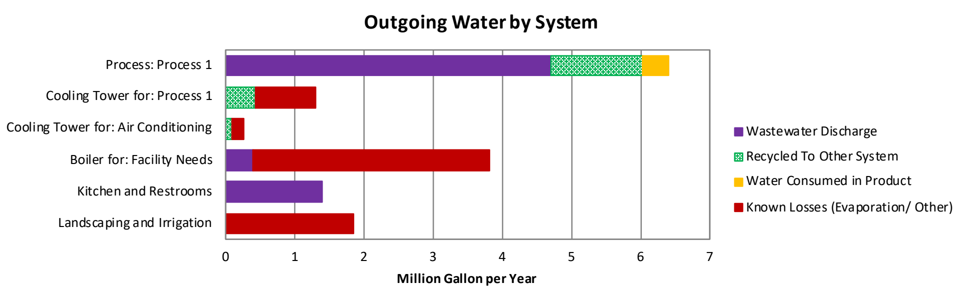


This chart presents the breakdown of **gross water use** for different water-using systems in your plant.

By identifying systems with source water as the largest fraction of their gross water, you may consider **water recirculation** as a measures to achieve source water savings.

3.2 Outgoing Water by System

Water-Using System	Wastewater Discharge	Recycled To Other System	Known Losses (Evaporation/ Other)	Water Consumed in Product	Total
	Million Gallon per Year				
Process: Process 1	4.7	1.33	-	0.375	6.405
Cooling Tower for: Process 1	-	0.43	0.87	-	1.3
Cooling Tower for: Air Conditioning	-	0.09	0.18	-	0.27
Boiler for: Facility Needs	0.4	-	3.422	-	3.822
Kitchen and Restrooms	1.4	-	-	-	1.4
PLANT TOTAL	**6.5**	**1.85**	**6.322**	**0.375**	**15.047**

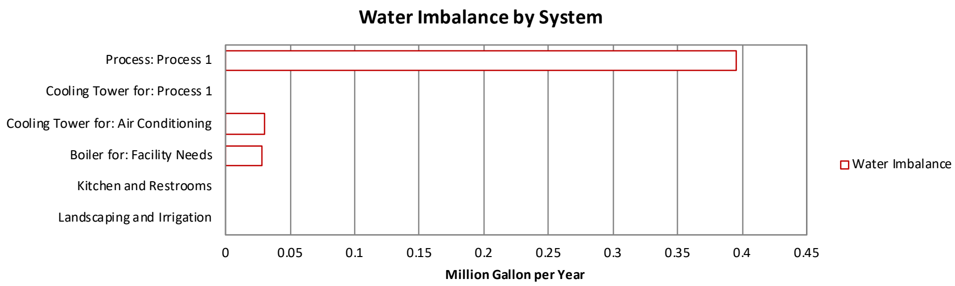


This chart presents the breakdown of **outgoing water** for different water-using systems in your plant.

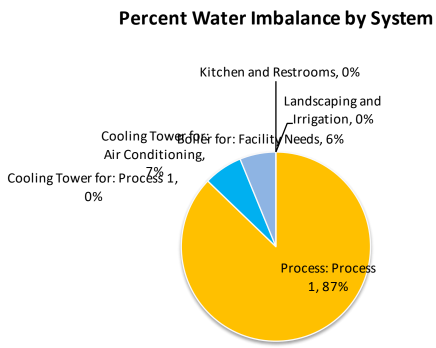
Accordingly, you may consider measures to reduce the cost of wastewater discharge by considering **water recirculation within the system** or **water recycling to other systems.**

3.3 Water Imbalance by System

Water-Using System	Incoming Water	Outgoing Water	Water Imbalance		
	Million Gallon per Year		Million Gallon Per Year	% of Incoming Water	% of Total Loss
Process: Process 1	6.8	6.405	0.395	5.8%	87.2%
Cooling Tower for: Process 1	1.3	1.3	-	-	-
Cooling Tower for: Air Conditioning	0.3	0.27	0.03	10.0%	6.6%
Boiler for: Facility Needs	3.85	3.822	0.028	0.7%	6.2%
Kitchen and Restrooms	1.4	1.4	-	-	-
PLANT TOTAL	**15.5**	**15.047**	**0.453**	**16.5%**	**100.0%**



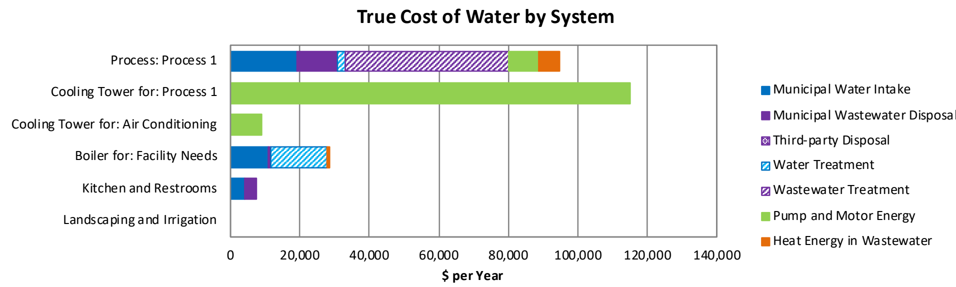
This chart presents **water imbalance** for different water-using systems in your plant. **A positive value indicates unknown water loss** and **a negative value indicates incoming water in the system from unknown sources**. Use these values to investigate unknown water flows, water losses and leaks. By identifying systems with the highest water imbalance, you may **prioritize measures to maximize water and true cost savings from eliminating unknown water flows and losses in those systems.**



Part 4: True Cost of Water

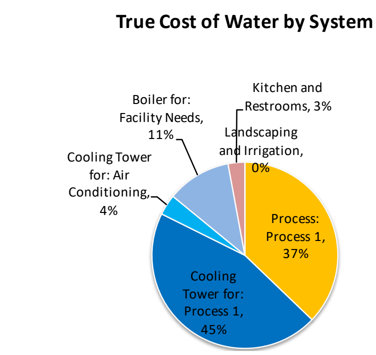
4.1 True Cost of Water by System

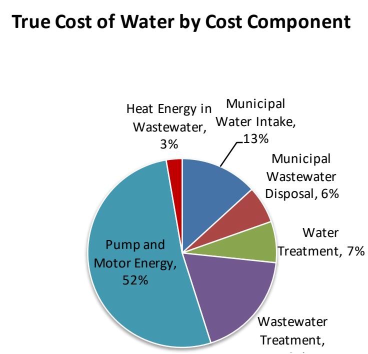
Water-Using System	Municipal Water Intake	Municipal Wastewater Disposal	Third-party Disposal	Water Treatment	Wastewater Treatment	Pump and Motor Energy	Heat Energy in Wastewater	Total
	$ per Year							
Process: Process 1	$ 19,040	$ 11,750	$ -	$ 2,176	$ 47,000	$ 8,797	$ 6,034	$ 94,797
Cooling Tower for: Process 1	$ -	$ -	$ -	$ -	$ -	$ 115,205	$ -	$ 115,205
Cooling Tower for: Air Conditioning	$ -	$ -	$ -	$ -	$ -	$ 9,159	$ -	$ 9,159
Boiler for: Facility Needs	$ 10,780	$ 1,000	$ -	$ 15,824	$ -	$ -	$ 899	$ 28,502
Kitchen and Restrooms	$ 3,920	$ 3,500	$ -	$ -	$ -	$ -	$ -	$ 7,420
PLANT TOTAL	**$ 33,740**	**$ 16,250**	**$ -**	**$ 18,000**	**$ 47,000**	**$ 133,161**	**$ 6,933**	**$ 255,084**



This chart presents the breakdown of **true cost of water** in different water-using systems in your plant.

By identifying systems and cost components that are contributing the most towards true cost of water, you may **prioritize measures to focus on them.**



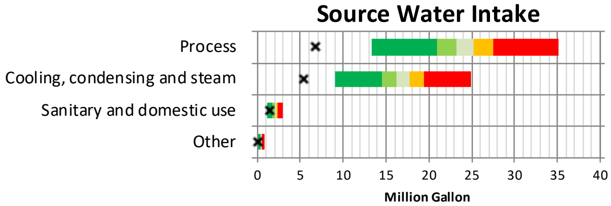


These charts present the percent distribution of **true cost of water** by different water-using systems in your plant (left) and by cost components (right).

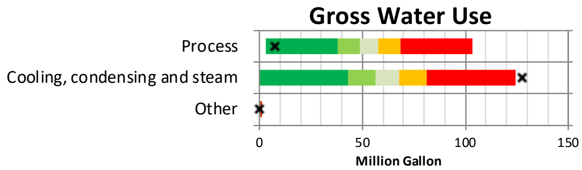
By identifying systems and cost components that are contributing the most towards true cost of water, you may **prioritize measures to focus on them.**

Part 5: Water Savings Opportunity

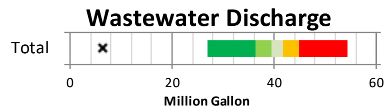
5.1 Comparison with Industry Average



Percentile	Comments
100%	
100%	
98%	
98%	Industry has high variance in data



Percentile	Comments
99%	
0%	Industry has high variance in data
97%	Industry has high variance in data



Percentile	Comments
100%	

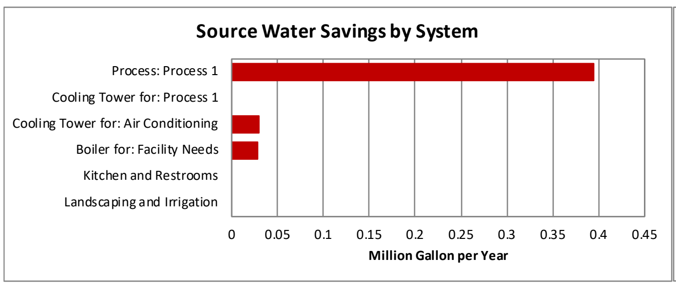
X : Plant | > 80% | 60-80 % | 40-60% | 20-40% | < 20% | **: Percentile Ranges***

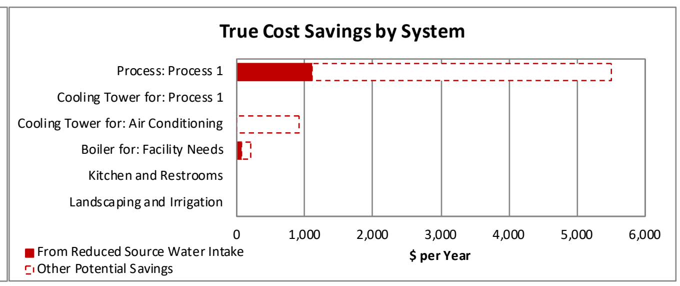
These charts compare water flows in your plant (marked as X) with those in the same industry subsector.

*** Percentile represents the percentage of similar facilities with a higher water usage.**

The percentiles are determined using data from STATCAN, Canada's statistics agency. Average water use for each industry was determined using total water use data and number of facilities for each 3-digit NAICS code. The standard deviation was derived using the reported coefficient of variance "grade" for each reported value.

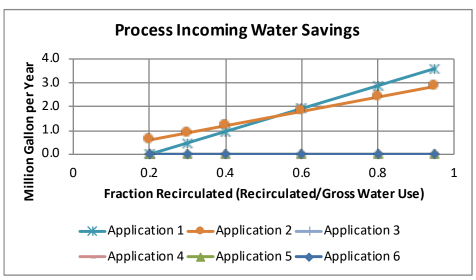
5.2 Savings from Eliminating Water Loss





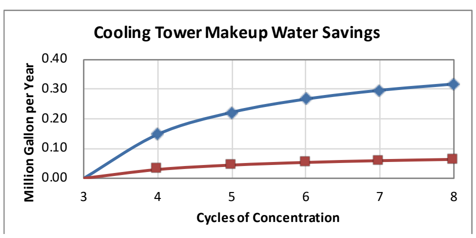
These charts present the intake water savings (left) and true cost savings (right) from eliminating unknown water loss in different water-using systems in your plant. The solid red bars in both charts represent water and true cost savings resulting from reduced municipal water intake. The red dotted bars represent maximum potential cost savings associated with other cost components identified in Part 3. These savings may or may not be realized depending on which part of the system water flow the unknown losses are eliminated.

5.3 Savings from Maximizing Recirculation Within Systems

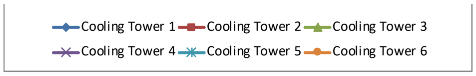


This chart shows incoming water savings from increasing fraction of recirculated water for different process applications. Each curve corresponds to a process application you have described.

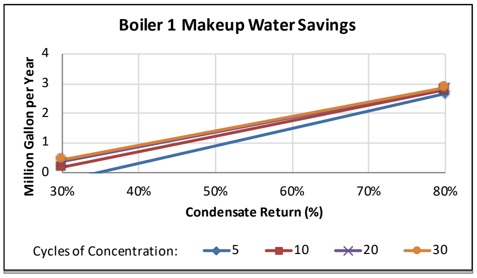
Based on an achievable/acceptable value for fraction of recirculated water on the x-axis, follow the curve to estimate incoming water savings on the y-axis.

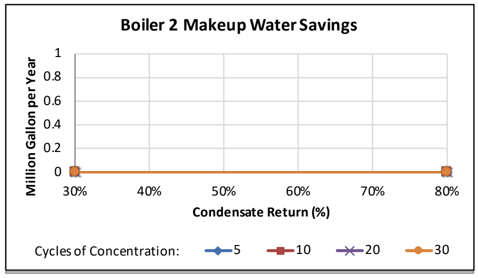


This chart shows makeup water savings in cooling towers from increasing the cycles of concentration. Each curve corresponds to a cooling tower you have described. Based on an achievable/acceptable value for cycles of concentration on the x-axis, follow the curve to estimate makeup water savings on the y-axis. **Note:** The presence of dissolved solids in the system increases as cycles of concentration



increase. This may lead to scaling and corrosion unless carefully controlled.





These charts show makeup water savings in boilers from increasing condensate return and cycles of concentration. Based on feasible values for % condensate return and cycles of concentration, follow the curve to estimate makeup water savings on the y-axis.
Note: The presence of dissolved solids in the system increases as cycles of concentration increase. This may lead to scaling and corrosion unless carefully controlled.

Part 6: Water Efficiency Projects and Opportunities

Part 6.1 Status of System Assessment and Measures Implementation

You have indicated the following status of system assessment and water efficiency measures implementation in the last 3 years.

Water-Using System	System Assessment Status	Measures Implementation Status
Process: Process 1	Completed	Substantially Completed
Cooling Tower for: Process 1	Completed	Little/None Completed
Cooling Tower for: Air Conditioning	Completed	Little/None Completed
Boiler for: Facility Needs	Completed	Substantially Completed
Kitchen and Restrooms	Not conducted/Don't know	NA

Part 6.2 Implemented Water Efficiency Projects

None Listed.

Part 6.3 Recommended Measures and Opportunities

Based on your inputs, the following water efficiency measures are recommended for your plant.

Plant Water Management

Construct a formal methodology to communicate water management practices to employees.

Make use of life-cycle cost analysis to evaluate and select water efficiency projects.

Establish suitable payback periods for water efficiency projects.

Match the quality of source water with the quality required by the use.

Use treated municipal and industrial wastewater instead of potable supplies for landscape irrigation, dust control, and cooling water.

Actively identify conservation measures that will reduce water use while sustaining production.

Try to conserve water and energy together, particularly when the energy is heat. Recycling warm water saves energy.

Try to reduce wastewater and toxic waste disposal. Efficient water management will decrease wastewater volume and require fewer chemicals that may produce toxic byproducts. When considered together, conservation becomes more cost effective.
Encourage water and wastewater utilities to provide rebates and other financial assistance to offset part of the initial cost of implementing water conservation measures.

Use the site audit analysis and water conservation plan to justify requests for reductions in wastewater charges.

Process: Process 1

Installed equipment to automatically shut off water flow when water is not required, such as at the end of a production cycle.

Regularly check solenoids and automatic shutoff mechanisms to ensure that they are working properly.

Set equipment to the minimum flow rates recommended by the manufacturer.

Install pressure-reducing devices on equipment that does not require high pressure.

Reuse water (closed loop) or use reclaimed water from other parts of the facility for process equipment.

Replace water-based transportation with either waterless techniques or recycled water.

Post signs near equipment encouraging employee awareness of water use, and discouraging tampering with equipment flow rate.

Equip all hoses with an automatic shutoff nozzle.

Replace or supplement process cleaning or facility cleaning with waterless techniques (e.g., using burnout ovens, ultrasonic cleaning, using alternative methods to clean products or containers or sweeping debris off the floor), where possible.
Use counter-current system for rinsing.

For rinsing, consider sequential use from high to lower quality needs.

Use conductivity flow controls for rinsing.

Use improved spray nozzles/pressure rinsing improved rinsing.

Use fog rinsing.

Reclaim and reuse spent rinse water for lower grade processes or for other facility applications.

Take steps to reduce the water used by steam sterilizers, such as jacket and chamber.

Use detergents that can easily be removed with little water.

Install submeter for water used for cleaning.

Integrate periodic monitoring of flow parameters in cleaning systems to reduce longer-than-necessary rinse flows. Parameters may include flow, time, temperature, pressure, and conductivity.
Scrutinize deionized water use carefully by making employees aware of deionized water use.

Use conductivity controllers to control quality of water in rinses.

Use low-pressure portable pumps for wash stations to reduce the total amount of water discharged.

Cooling Tower for: Process 1

Reuse treated wastewater (or other sources of water for cooling tower makeup) where possible?

Maximize cycles of concentration for cooling towers through efficient water treatment.

Condenser water pipe should be appropriately set to fix incorrect piping configuration.

Leaks can be minimized through a well-managed maintenance program. Pump gland leaks can be addressed in a timely manner by repacking them.

Constant wetness around the cooling tower is an indication of splash. This may be due to high winds or a design flaw. Install antisplash louvers to minimize splash.

Excessive drift results in water and chemical losses making it harder to control voluntary blowdown.

Flow meters will allow the operator to closely monitor the volume of water being used and verify that the system is operating at optimum cycles of concentration.

In the cooling system, suspended solids contribute to clogged spray nozzles, erosion of piping, pumps and heat exchangers resulting in unscheduled plant shutdowns. Side stream filter continuously removes a percentage of the solids loading.

Boiler for: Facility Needs

As more condensate is returned, less makeup water is required for saving on both water and pretreatment costs.

Incorrect location of steam traps can cause water logging of pipes resulting in water hammering and erosion.

Blowdown should be properly controlled to prevent excessive water loss.

Install conductivity sensor on boiler to automatically control surface blowdown.

Install a boiler blowdown flash tank to recover flash steam.

Install flue gas condenser to recover combustion product water.

Kitchen and Restrooms

Install signs on dual-flush toilets showing people how to use them.

Install metered or spring-loaded faucets, or faucets with sensors.

Use less water for partial loads for laundries.

Recalculate laundry formulas for less water.

Recycle rinse water to next wash.

Adjust plumbing to use the minimum amount of water that is functional.

Landscaping and Irrigation

Use low-flow sprinklers, trickle/drip irrigation, and optimized watering schedules.

Use preventive maintenance techniques.

Design your facility's landscape to consider the local climate and grouped plants by similar watering needs.

Plant grass only in places where it will provide optimal functional and aesthetic benefits.

Use systems to capture and reuse rainwater and storm water for landscaping, or for other uses (e.g., cooling tower make-up, process water, or dust suppression).