

**STANDARD OPERATING PROCEDURE  
STAN MAYFIELD BIOREFINERY PILOT PLANT**

TITLE: Process Water System

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**A. Scope**

This SOP describes the procedure to operate the Process Water system in order to provide process water for the plant. Process water consists of water supplied by Buckeye and a small amount of water recycled within the process.

**B. Safety and Training Requirements**

Refer to UF lab safety policies regarding equipment listed in section D below before starting any process work.

Review the location of fire extinguishers, fire blankets, safety showers, spill cleanup equipment and protective gear before beginning any process work.

During operations in the plant, the following safety gear will be utilized at all times:

- Safety Goggles or Face Shield
- Protective Gloves
- Hard Hat

**C. Related Documents and SOPs**

1. Process Water Pump manual XXXX
2. Process Water Cooler manual XXXX
3. CIP System SOP-8205
4. Decanter Operation SOP-4905
5. Refrigeration System Operation SOP-9210
6. Hot Water Operation System SOP-9605
7. Biomass Pretreatment SOP-2110
8. CO<sub>2</sub> Scrubber SOP-7210
9. Biomass Storage and Handling SOP-1200
10. C5 Hydrolysate Storage SOP-2135
11. Phosphoric Acid System Operation SOP-8405
12. Lime Slurry System Operation SOP-8110
13. Liquid/Solid Separations SOP-2125
14. Steam Supply System Operation SOP-9305
15. UV Waster System SOP-9555
16. Ethanol Distillation SOP-4005

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17. Fermentation Tank A SOP-3230
18. Fermentation Tank B SOP-3235
19. Fermentation Tank C SOP-3240
20. Primary Propagator 1 SOP-3210
21. Primary Propagator 2 SOP-3215
22. Secondary Propagator 1 SOP-3220
23. Secondary Propagator 2 SOP-3225
24. Ethanol Distillation SOP-4905

**D. Preparation/Materials/Equipment**

1. Process Water Pump (PC-9501)
2. Process Water Tank (TS-9501)
3. Process Water Cooler (HP-9501)

**E. Detailed Procedure**

**E.1 Startup Procedure**

1. Initial valve positions settings are given in the table below.

Process Water System				
Line	Line Number	Valve	Position	Check
Service Water to Process Water Tank	RCW-9501-36-SS10	9501-V-01	Close	
		9501-V-04	Close	
Condensate to Process Water Tank	CP-4603-15-CS72	4603-V-05	Close	
		9501-V-05	Close	
	CP-9302-29-CS72	9302-V-42	Close	
		9501-V-06	Close	
Process Water to Process Water Pump	RCW-9501-02-SS10	9501-V-07	Close	
	Drain	9501-V-08	Close	
Process Water to Process Water Cooler	RCW-9501-35-SS10	9501-V-10	Close	
	Drain	9501-V-11	Close	
Process Water to Process Water Tank (Loop)		9501-V-14	Close	

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Line	Line Number	Valve	Position	Check
Process Water to Downstream Process	RCW-9501-03-SS10	9501-V-19	Close	
	Pressure Indicator	9501-V-18	Open	
	Drain	9501-V-17	Close	
	to UV Water Tank	RCW-9501-16-SS10	9501-V-20	Close
	to Boiler Package	RCW-9501-49-SS98	9501-V-21	Close
	to Prep Tank	RCW-9501-31-SS98	9501-V-22	Close
	to Propagator and Fermenters	RCW-9501-47-SS98	9501-V-23	Close
	to Screw Press Conveyor	RCW-9501-37-SS98	9501-V-24	Close
	to H3PO3 Mix Tank	RCW-9501-06-SS98	9501-V-25	Close
	to Lime Slurry Tank	RCW-9501-07-SS10	9501-V-26	Close
	to Refrigeratin Package	RCW-9501-08-SS98	9501-V-27	Close
	to Sample Cyclone	RCW-9501-48-SS10	9501-V-28	Close
	to CIP System	RCW-9501-09-SS10	9501-V-29	Close
	to Hydrolyzer Package	RCW-9501-51-SS10	9501-V-30	Close
	to CO2 Scrubber	RCW-9501-10-SS98	9501-V-31	Close
	to C5 Screw Feeder	RCW-9501-11-SS10	9501-V-32	Close
	to Hot Water Tank	RCW-9501-50-SS10	9501-V-33	Close
	to Cooling Water Tank	RCW-9501-13-SS10	9501-V-34	Close
	to Decanter	RCW-9501-27-SS10	9501-V-35	Close
	to Acid/Base Drum Unloading	RCW-9501-32-SS98	9501-V-36	Close
	to CIP Return Filter	RCW-9501-32-SS10	9501-V-37	Close
Cooling Water to Process Water Cooler	CWS-9202-29-CS51	9202-V-31	Close	
		9501-V-16	Close	
	Drain	9501-V-15	Close	
Cooling Water to Cooling Water Tank	CWR-9501-30-CS51	9501-V-12	Close	
		9203-V-03	Close	
	Drain	9501-V-13	Close	
Level Indicator		9501-V-03	Open	
Drain		9501-V-02	Close	

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2. Assure the process water supply is ready.
  - a. Verify that the water pressure is approximately 60 PSI at PI-9501-10 at the process water supply outside the northeast corner of the plant.
3. At HMI, set the level of the Process Water Tank (TS-9501) to 80% full using LIC-9501-01.
4. Assure drain valve 9501-V-02 is closed.
5. ~~Open valve 9501 V 01, 04 to let the service water fill the Process Water Tank.~~
6. The Process Water Tank also receives the condensate returns from the Steam Condensate Flash Tank and Distillation and Dehydration Package. Refer to the Steam Supply System Operation SOP-9305 and Ethanol Distillation SOP-4905 for corresponding valve operation.
7. Assure the cooling water system is operational according to the Refrigeration System Operation SOP-9210.
8. ~~Open valves 9202 V 31 and 9501 V 16 to supply the cooling water to the Process Water Cooler (HP-9501).~~
9. ~~Open valve 9501 V 12 and 9203 V 03 to return the cooling water to the Cooling Water Tank (TS-9202).~~
10. Assure that PRV-9501-05 is set at 60 PSI.
11. ~~Open valve 9501 V 07, 11, 14 to open the process water recirculation loop.~~
12. At HMI, set the temperature to 115 °F in TIC-9501-03.
  - a. TIC-9501-03 regulates TV-9501-V-03 which controls the flow rate of cooling water to prevent the process water temperature increasing above 115 °F.
13. At HMI, turn on the Process water Pump (PC-9501) to recirculate process water through the Process Water Cooler (HP-9501).
14. ~~Open valve 9501 V 19 to open the main process water supply line to the processes downstream (UV Water Tank, Boiler Package, Prep Tank, Propagators, Fermenters, Screw Press Conveyor, Phosphoric Acid Mix Tank, Lime Slurry Tank, Refrigeration Package, CIP, Sample Cyclone, CO2 Scrubber, C5 Screw Feeder, Cooling Water Tank, Decanter and Acid/Base Drum).~~
15. ~~Refer to the respective SOP for the corresponding valve operation.~~

**E.2 Shut Down Procedure****~~E.2.a. Short Term~~**

1. ~~At the HMI, turn off the Process water Pump (PC 9501).~~
2. ~~Close valves 9302 V 42 and 4603 V 05 to stop the Process Water Tank from receiving the condensate returns from the Steam Condensate Flash Tank and Distillation and Dehydration Package.~~

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~~3. Close valve 9501 V-06 to close the cooling water supply.~~

~~**E.2.b. Long Term**~~

1. At the HMI, turn off the Process water Pump (PC-9501).
2. Restore all valves to the initial positions according to the initial valve configuration table.