STANDARD OPERATING PROCEDURE
STAN MAYFIELD BIOREFINERY PILOT PLANT

TITLE: Decanter System Operation

AUTHOR: Troy Tian **DATE: January 3rd, 2012**
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A. Scope

This SOP describes the procedure to operate the Decanter to remove insoluble solids from the stillage, beer well, and liquefaction process streams.

B. Safety and Training Requirements

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

Refer to UF Biosafety guidelines and the NIH Guidelines whenever handling biological cultures/genetically modified organisms.

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 Glasses
- Protective Gloves
- Hard hat

C. Related Documents and SOPs

1. Beer Well SOP-4600
2. Biomass Liquefaction SOP-2325
3. Ethanol Distillation SOP-4905
4. Process Water System Operation SOP-9505
5. Steam Supply SOP-9305
6. Sampling SOP-0511
7. Potable Water System SOP-9705
8. Air System Operation SOP-9405

D. Preparation/Materials/Equipment

1. Solids Bin (BN-2204)
2. Grease (Castrol Longtime PD-2) & Grease gun

E. Detailed Procedure

1. Prepare the Decanter Feed Tank (TS-4901) for receiving slurry according to the Initial valve table below:

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Decanter				
Line	Application	Valve	Position	Check
Liquefaction	To Decanter Feed Tank	2301-V-40	Closed	
Stillage	To Decanter Feed Tank	4602-V-01	Closed	
Decanter Feed	Bottom Drain	4901-V-02	Closed	
		4901-V-04	Open	
		4901-V-05	Open	
		4901-V-07	Open	
	Drain	4901-V-03	Closed	
	Drain	4901-V-06	Closed	
	Slurry feed to heater	4901-V-17	Open	
	Slurry feed to tank	4901-V-14	Open	
Pick heater	Low pressure steam	4901-V-12	Open	
	Pressure gauge	4901-V-16	Open	
Process Water	To Decanter	4901-V-08	Closed	
Level Indicator		4901-V-01	Open	

1. At the HMI, monitor the Decanter Feed Tank level in LI-4901-02.
2. At theHMI, turn on the Decanter Feed Tank Agitator (AG-4901) once the tank level exceeds 15%.
3. Locally monitor the Decanter Feed Tank contents temperature in TI-4901-02. Do not exceed the working temperature of 119°F.
4. Place a solids bin underneath the outlet of the Decanter to collect solids.
5. Turn on the Decanter by switching on the panel and pressing the Centrifuge Start button at the panel screen. Make sure to add three pumps of decanter grease (Castrol Longtime PD-2) to each of the three zerk fittings.
6. Ensure that the actual differential speed is within ± 2 RPM of the set point once the decanter bowl gets up to speed (5500 RPM).
7. At the Decanter panel, switch to Process Mode.
8. At the HMI, set the flow rate at 2.5 GPM in FIC-4901 for Decanter Feed Pump (PP-4901).
9. At the HMI, turn on the Decanter Feed Pump (PP-4901).
10. Once the decanter feed pump is energized and begins turning stably, open V-02 to introduce decanter feed to the pump.

NOTE: Make sure that the vibration of the decanter does not exceed 11 mm/sec..

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12. Once stable operation is reached, increase the flow rate to 3.0 GPM.
13. At HMI, monitor the Decanter Feed Tank level in LI-4901-03.
14. When the decanter feed tank level is 0%, turn off the Decanter Feed Pump (PP-4901) at the HMI.
15. Close the slurry feed line valves 4901-V-02 and -07.
16. At the Decanter panel, switch to CIP mode.
17. Flush the Decanter with process water by opening valve 4901-V-08, and regulate to provide 5 gpm flow.
18. Locally monitor process water flow rate in FI-4901-07.
19. Once the solids are flushed from the Decanter, turn off the Decanter by:
    a. At the Decanter panel, switch to Idle Mode.
    b. At the Decanter panel, press Stop Centrifuge button and switch off the panel.

Return valve positions to the initial valve setting table.

Re-Start from Power Failure and E-stop

1. Following an electrical power failure, it is assumed that all utility services are also lost and that the decanter feed pump is off.
2. Radio control room or visually confirm the pump is off and/or flow is zero from the local flow meter FIC-4901.
3. If there is no flow, immediately shutdown decanter, and shut V-02 to isolate decanter feed tank.
4. Following shutdown close biomass inlet valve V-07, to isolate the decanter.
5. Once all systems have been reestablished in plant, you may restart the decanter.
    a. Leave decanter in **Idle Mode** .
6. Following start up, open valve V-08 to flush with process water.
    a. Throttle valve to 5 gpm.
7. Once steady state has been achieved and all biomass has been purged from the system turn off V-08 and turn decanter to **Process Mode.**
8. Re-open biomass inlet valve V-07.
9. Radio control operator to restart biomass feed pump at desired flow rate.
10. Re-open V-02 once decanter feed pump is energized and stable.