

1. Procedure summary

This procedure outlines the method to troubleshoot the Decanter.

1.1. Related Procedures

Decanter and Load Out	CB-02-006-002
TA Basket Strainer Replacement	CB-02-004-007
Decanter Harvest Monitoring	CB-02-006-003
Transfer Slurry for Transport	CB-02-007-003
DAF Operations	CB-02-004-004

1.2. Procedure impacts and concerns

Safety	When troubleshooting maintain all LOTO procedures when working with equipment.
Quality	A process interruption due to Decanter downtime will have a negative impact on culture health. Correct Decanter operations ensure optimal thickened algae solids content for downstream processing.
Delivery	All pumps need to be operated wet to prevent any damage
Environmental	Algae material spilled in the operations area needs to be recorded and cleaned up as soon as possible.
Cost	IF equipment is not shutdown when malfunctions occur there can be significant damage. Failure to monitor the Decanter operation properly and/or transfer the target product volume of thickened algae may result in insufficient harvest and result in product losses.
Compliance	Failure to monitor Decanter equipment can lead to a large amount of product that is not efficiently processed (too high of a moisture content) and/or large amounts of centrate that would have to be sent to the evaporation pond.

1.3. Responsibilities and owners

Document Owner	Manage content and distribution	Timothy Langer
Process Owner	Responsible for content and process validation	Marcos Delgado
Site Manager	Responsible for implementation and conformance	Rebecca White

2. Process**2.1. Process description**

1. Troubleshooting the Decanter is needed to ensure it is operating properly. If there is any malfunction the system must be shut down and the problem addressed. Mechanical systems need to be monitored, the process needs to be optimized and the decanter product collection system checked to ensure optimal operations.

2.2. Mechanical Decanter Troubleshooting**2.3.1 Mechanical Start-up**

Refer to Operation Chapter of the Decanter Instruction Manual for correct operation parameters.

Note the decanter nameplate. The values for:

- Maximum Bowl speed is 4300 RPM

- Temperature of feed product 5-60 degrees C

Make sure that the speed stated on the nameplate is reached within the specified time and maintained during operation.

Operation

The machine is monitored to a large extent by the decanter control unit. The only parameter that can be changed during normal operation is the Process Start/Stop.

In the case of poor clarification results: Decrease the feed flow (18-25 GPM) and possibly raise the varipond (0-2 bar).

In the case of poor solids drying results: Decrease the varipond (0-2 bar).

If drive faults occur (power failure, gear overload etc.), the product feed will be cut off and the flush water line opened.

Adhere to the "Lubrication and maintenance schedule". The "Lubrication and maintenance schedule" through a separate document, is part of the machine documentation.

Deterioration in the processing efficiency of the decanter can also be caused by high density product feed.

In the case of poor clarification results: Increase the back pressure on the centrate line (50-70 psi).

In the case of poor solids drying results: Adjust basic differential speed by selecting "Screen Select" and selecting "Scroll Control" and entering a value (0-10 RPM).

Deterioration in the processing efficiency of the decanter can also be caused by high temperature in the decanter (normal temperature range is 80-140 degrees F): Check the spray nozzles for clogged debris to the decanter body. Also check the decanter feed line for clogged debris at the decanter inlet.

Repairing the scroll

If the wear is extensive, the scroll must be reconditioned or replaced. Excessive wear to the scroll is indicated by, for example:

- frequent speed increases of the secondary drive

- increased residual moisture in the discharged solids

Wear Check: Check for wear every 500 operating hours. Concentrate specifically on:

- scroll

- scrapers in the solids discharge

- bushes in the solids discharge

- Catch chamber

2.3.2 Operating Faults

Start-up problems

If there is gap constriction due to deposits between bowl and catcher it may be necessary to clean the gaps.

If the speed indicator is faulty check the speed sensor.

Bowl bearings should not be over packed with grease. If so, remove surplus grease.

VFD fault can be cleared by cycling the power to the decanter control panel in the MCC building.

Hopper level sensor should be cleared of product prior to start up and periodically checked during operations.

Bearing temperature too high

This condition could exist if there is insufficient lubrication. Check lubrication system and re-check the bearing temperature.

If the temperature remains too high, this could indicate the onset of bearing damage. The roller bearings would need to be replaced.

The main bowl bearings could be overfilled with grease. Use the lubricant quantity specified in the "Lubrication and maintenance schedule." Excessive lubrication will bring about an unnecessary increase in bearing temperature.

Vibrations too high

The scroll should be cleaned and checked for one-sided product deposits.

The bearings could be damaged and they should be replaced.

Check for loose fits or loose screws. Tighten screws and replace damaged screws.

See Chapter 4, Section 6 of the Decanter Instruction Manual for proper screw tightening torques.

Check for product deposits that are grinding against rotating parts. Remove hood; check for deposits in decanter housing.

3. Required documents

3.1. Input documents

Harvest Record

<Input document number>

3.2. Output documents

Harvest Record

<Output document number>

4. Document control

4.1. Revision history

R0 – Initial Release – Marcos Delgado	May 31, 2012
R1 – Updated Mechanical Troubleshooting – Marcos Delgado	August 15, 2012
R3- Updated- Leo Willis	December 23,2014

4.2. Document approval

<Name>

<Approval date>

4.3. Document reviewers

<Name>

<Last reviewed date>

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<Last reviewed date>

5. Risk analysis

<Risk name>

<Mitigation plan>

<Owner>

<RPN>