
	GILES CHEMICAL ~ PREMIER MAGNESIA		
	Company Procedure		
	Title: <b>Digester Operations</b>	Number: <b>P12-PR-200-012</b>	
	Owner: <b>Kenneth Basehore</b>	Revision: <b>05</b>	
	Effective Date: <b>1/31/17</b>	Page: <b>1 of 3</b>	

## 1.0 Purpose

The purpose of this procedure is to put into detail how to properly operate the circulation loop in order to maintain the proper pH and density of the first digester.

## 2.0 Scope

This procedure applies to all digesters and mixing pots at the Manufacturing facility.

## 3.0 Responsibility

Lead Operators, Process Operators

## 4.0 Safety Considerations

Safety shoes and safety glasses are required when working in, on, or around the digesters. Sulfuric acid is highly corrosive to clothing and the human body. If you come into contact with it, immediately flush the affected area(s) with water for 10 minutes.

Safety is a condition of employment. Employees are not authorized to work in an unsafe manner and are prohibited from harming the environment of the facility or community.

## 5.0 Materials/Equipment



- pH paper
- pH Meter
- Sample dipper
- Hydrometer

## 6.0 Procedure

The pH and density of the first digester are controlled to produce mud suitable for filtering into brine. The pH is controlled by the Monitoring System. It receives a signal from the pH meter and feeds acid to the Digester accordingly. In a similar fashion, the density is controlled by the Monitoring System. It receives a signal from the density meter and feeds water to the digester. Both control systems depend on the circulation loop to operate properly.

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Note: If Digesters are to be down for any period exceeding 24 hours, remove pH probes and place them in buffer solution to prevent damage.

Warning: The acid will not run if the circulation loop is flowing less than 50 gallons per minute. Make sure the circulation loop is running properly before starting the digester.

As a secondary check, both the pH and density of the mud in the digester must be independently monitored in conjunction with the Monitoring System.

**1. Independent pH Monitoring – Check the pH at least once per hour once by the Process Operator and once by the Lead Operator on alternate rounds.**

- a. Tear off a strip of litmus paper (pH paper) long enough to reach the liquid sample in the sample dipper.
- b. Pull a sample from the circulation loop with the sample dipper, and record the pH measurement from the in-line pH meter.
- c. Dip the pH paper in the mud.
- d. Compare the color of the dipped paper with the colors on the pH paper dispenser to get an estimate of the pH.
- e. Compare the pH from the pH paper with the pH meter reading at the time of the sample collection.
- f. Record the readings in the batch record.
- g. If the pH paper and meter disagree by more than 1 unit, the pH meter may need to be recalibrated. Note the difference on the Digester pH Log and contact Maintenance for help.

**2. Independent density monitoring – The Process Operator or Lead Operator is to check the density at least once per hour**



- a. Pull a sample from the circulation loop with the sample dipper.
- b. Place a hydrometer in the cylinder and let it come to rest.
- c. Observe and record the numerical reading on the hydrometer.
- d. Compare the hydrometer reading with the electronic Density and Flow meter reading from the Monitoring System.
- e. If the hydrometer and Density meter disagree by more than 0.014, the Density meter may need to be adjusted. Note the difference on the Digester pH log and contact Maintenance for help.

**3. If the independent monitoring and automatic control measurements agree on a measurement (within tolerance), and adjustments still need to be made, follow these scenarios:**

- a. If the pH is high, lower the pH set point. This will increase the acid feed to bring the pH down.
- b. If the pH is low, increase the pH set point. This will decrease the acid feed.
- c. If the density is high, increase the mother liquor feed

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- d. If the density is low, decrease the mother liquor feed
4. Several steps can be taken to mitigate 'boiling'
  - a. Increase the pH
  - b. Increase the mother liquor feed
  - c. If neither of those options is viable, the Monitoring System will automatically shut down the MgO feed until the tanks cool down.

## 7.0 Reference Documents

Digester pH Log (P12-FM-100-006b)  
 Digester Troubleshooting Flow Chart (P12-PR-200-025)  
 Starting and Stopping Digesters (P12-PR-200-013)  
 Starting a Digester from Empty (P12-PR-200-011)  
 Cleaning the MgO mix pot (P12-PR-200-015)  
 Starting and Stopping the Main MgO Mix Pot (P17-PR-200-097)  
 Main MgO Mix Pot Operations (P17-PR-200-098)  
 Cleaning the Main MgO Mix Pot (P17-PR-200-099)

## 8.0 Change Information

Document review:

- Changed document owner
- General formatting and grammar corrections
- Corrected job assignments
- Added hydrometer to required materials list
- Added steps to include the recording of data in the batch record
- Added trouble shooting steps 3 and 4
- Added several reference documents
- Lowered the minimum circulation loop flow from 60 to 50 gpm

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