
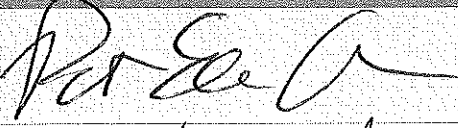

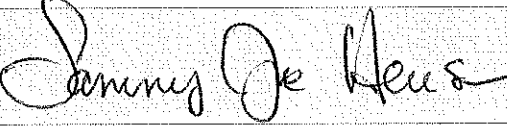

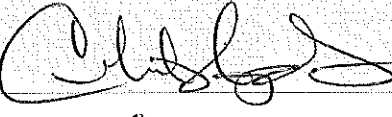

	GILES CHEMICAL ~ PREMIER MAGNESIA		
	Validation Protocol		
	Title: Main MgO Mix Pot IQ/OQ/PQ Validation	Number: E17-VAL-PIQ-550	
	Owner: Kenneth Basehore	Revision: 0	
	Effective Date: 1/31/17	Page: 1 of 14	

I. Approvals

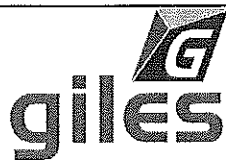
Signing below indicates agreement that the protocol is ready for execution of the Installation, Operational, and Performance Qualification for the Main MgO Mix Pot, located at 102 Commerce Street at the Main Plant production facility, on top of Digester #4.

Project Member	Functional Area	Signature	Date
Patrick Owen	Engineering		1/18/17
Kenneth Basehore	Engineering		1/10/17
Sammy Henson	Maintenance		1/18/17
Jason Bumgarner	Production		1-18-17
Matt Haynes	Operations		1-20-17
Deborah Durbin	Quality		1/20/17

A final summary report that consists of results and conclusions based on the data collected after protocol execution will be written and approved. The executed protocol will be attached behind the report.

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II. Purpose

The purpose of this protocol is to certify with documented evidence that the Main MgO Mix Pot functions as intended throughout its anticipated operating ranges. This protocol sets forth the objectives, methodology, documentation, and test activities needed to complete the Installation Qualification (IQ), Operational Qualification (OQ) and Process Qualification (PQ) for the Main MgO Mix Pot, located at 102 Commerce Street at the Main Plant production facility, on top of Digester #4.

III. Background

The Main MgO Mix Pot was custom built on site by contractors during late 2016, and finished during January 2017. It is intended to receive a powder MgO feed from the MgO silos. This powder will be mixed with city water in a custom built tank. The resultant slurry is fed to Digester #4.

IV. Overview

No other departments or systems will be affected by the installation of use or this equipment.

The following tests will be performed during this qualification:

- MgO feed rate verification – To document that the MgO feed varies as the feed setpoint is changed.
- Discharge feed rate verification – To document that the slurry discharge feed varies as the setpoint is changed.
- Control verification – To document that the controls will start and stop the Mix Pot as designed.

V. System Description

1. The Main MgO Mix Pot is turned on through the monitoring system
2. MgO and water start to flow into the vessel
3. Agitation is on
4. The slurry is pumped to Digester #4

VI. Scope



The IQ, OQ and PQ contained within this protocol is intended to certify with documented evidence that the Main MgO Mix Pot is installed, operates and functions as intended throughout its anticipated operating ranges.

The product affected by this equipment is all salt produced in the Main Plant at 102 Commerce Street, Waynesville, NC.

VII. Roles and Responsibilities

1. Engineering
 - Write and issue the protocol

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- Investigate protocol deviation reports
 - Execute the IQ, OQ and PQ portions of the validation
 - Review the data and originate the interim notification to Quality Assurance
 - Write and route the final report
2. Quality Assurance
- Review and approve the protocol
 - Review and approve the raw data and notifications
 - Review, approve and file the final report
3. Maintenance
- Provide equipment manuals needed to execute the validation
 - Review and approve the protocol
 - Review and approve the raw data and notifications
 - Review and approve the final report
4. Production
- Review and approve the protocol
 - Review and approve the raw data and notifications
 - Review and approve the final report
 - Assist, as needed with the execution of the IQ, OQ and PQ

VIII. Test Program

1. Installation Qualification (IQ)

a. Objective

The objective of the installation verification is to document that the Main MgO Mix Pot is installed correctly.

b. Equipment and Materials

- Main MgO Mix Pot
- Calibrated multimeter



c. Procedure

- Verify that the equipment is situated to allow sufficient room around the machine for access doors and panels to be opened.
- Verify that the equipment is level
- Verify that the electrical utilities fall within the manufacturer's required ranges

d. Acceptance Criteria

Ensure that the installation is correct, per the design drawings.

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2. Operational Qualification (OQ)

a. Objective

The objective of the operational qualification is to ensure that the Main MgO Mix Pot operates as indicated by the design drawings. The controls will be operated to test the ability of the machine to start/stop and feed as required.

b. Equipment and Materials

Main MgO Mix Pot

c. Procedure

Test each operation of the Main MgO Mix Pot

d. Acceptance Criteria

Verification that the tested operations operate as indicated by the designer's specifications.

3. Performance Qualification (PQ)

a. Objective

The objective of the performance testing is to document that the Main MgO Mix Pot performs the functions required by Giles Chemical. This protocol will verify the following:

- The MgO feed varies, based on inputs from the monitoring system
- The slurry discharge rate varies based on inputs from the monitoring system
- The agitator provides turbulent mixing

b. Equipment and Materials

- Main MgO Mix Pot
- Agitator

c. Procedure

Run the machine for long enough to allow the feed rates to equilibrate. Vary the MgO feed and discharge rate to look for a response in flow rate. Ensure the agitator provides turbulent mixing.

d. Acceptance Criteria



The PQ will be accepted if the MgO and discharge rates are controlled successfully through the monitoring system, and if the agitator is providing turbulent mixing.

IX. Calibration

Verify that all instruments used are within the calibration dates.

- Calibrated multimeter

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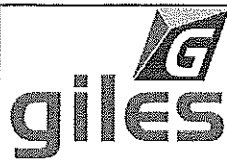
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X. References

- ISM assembly drawing created on 9/12/16 for 'Giles Tank'

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PREMIER
MAGNESIA, LLC**XI. Installation Qualification (IQ)****1. Equipment**

Device	Calibration Date	Calibration Expiration	Verified By	Date
Multimeter Model: Fluke 114 S/N: 36250117WS	10/3/16	10/3/17	KLB	1/23/17

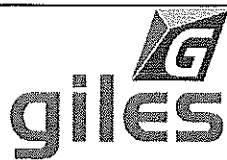
Expected	Actual	Verified By	Date
Agitator Model: VEM3561 S/N: 36J035S266G3	MODEL VEM3561 S/N 36J035S266G3	KLB	1/23/17
Main MgO Mix Pot atop of Digester #4	MAIN Mix Pot ATOP DIGESTER #4	KLB	1/23/17

2. Acceptance Testing

Expected	Actual	Verified By	Date
There is sufficient room around the vessel to allow access doors and panels to be opened.	There <u>is</u> sufficient room around the machine to allow access doors and panels to be opened.	KLB	1/23/17
The equipment is level	The equipment <u>is</u> level	KLB	1/23/17
Mixer power supply 240 VAC \pm 20	240 VAC	KLB	1/23/17
Mixer power supply 60 Hz	60 Hz	KLB	1/23/17

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**3. Acceptance of Testing and Review**

Expected	Actual	Initials	Date
All actual results match the expected values.	All actual results <u>MATCH</u> the expected values.	KLB	1/23/17
The relevant standard working procedures are approved	The relevant standard working procedures <u>ARE</u> approved	KLB	1/23/17
List the procedure numbers	P12-PR-200-013 P17-PR-200-098 P17-PR-200-099 P12-PR-200-015 P12-PR-200-012 P12-PR-200-097	KLB	1/23/17
Results reviewed and accepted by		aw	1/31/17

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**XII. Operational Qualification (OQ)****1. Equipment**

Expected	Actual	Verified By	Date
Main MgO Mix Pot atop of Digester #4	MAIN MgO Mix Pot ATOP OF DIGESTER #4	KLB	1/23/17
Agitator Model: VEM3561 S/N: 36J035S266G3	MODEL VEM3561 S/N 36J035S266G3	KLB	1/23/17

2. Acceptance Testing

Expected	Actual	Verified By	Date
The vessel is stopped	The vessel <u>is</u> stopped	KLB	1/23/17
The agitator is stopped	The agitator <u>is</u> stopped	KLB	1/23/17
Press the start button to start the agitator	The agitator <u>is</u> started	KLB	1/23/17
In the monitoring system, press the 'Start Mix Pot' button	The start button <u>is</u> pressed	KLB	1/23/17
The machine is running	The machine <u>is</u> running	KLB	1/23/17
Change the MgO feed	Old MgO feed: 3.0 New MgO feed: 1.0	KLB	1/23/17
Change the discharge pump speed	Old pump speed: 2.5 New pump speed: 7.0	KLB	1/23/17

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In the monitoring system, press the 'Stop Mix Pot' button	The button <u>15</u> pressed	KLB	1/23/17
The machine is stopped	The machine <u>15</u> stopped	KLB	1/23/17

3. Acceptance of Testing and Review

Expected	Actual	Initials	Date
All actual results match the expected values.	All actual results <u>MATCH</u> the expected values.	KLB	1/23/17
The IQ section is complete with no deviations	The IQ section <u>15</u> complete with no deviations	KLB	1/23/17
Results reviewed and accepted by		aw	1/31/17

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XIII. Performance Qualification (PQ)

1. Equipment

Expected	Actual	Verified By	Date
Main MgO Mix Pot atop of Digester #4	MAIN MgO MIX POT ATOP OF DIGESTER #4	KLB	1/23/17
Agitator Model: VEM3561 S/N: 36J035S266G3	MODEL VEM3561 S/N 36J035S266G3	KLB	1/23/17

2. Acceptance Testing

Expected	Actual	Initials	Date
Start the Main MgO Mix Pot, and allow to come to equilibrium	The Main MgO Mix Pot <u>IS</u> started, and at equilibrium.	KLB	1/23/17
Lower the MgO flow rate into the Mix Pot	Old flow rate: 3.0 New flow rate: 1.0	KLB	1/23/17
The level in the Mix Pot drops	The level in the Mix Pot <u>DROPS.</u>	KLB	1/23/17
Return the MgO flow rate to its original value	Old flow rate: 1.0 New flow rate: 3.0	KLB	1/23/17
Raise the discharge flow rate into the Mix Pot	Old flow rate: 2.5 New flow rate: 7.0	KLB	1/23/17
The level in the Mix Pot drops	The level in the Mix Pot <u>DROPS.</u>	KLB	1/23/17
Return the discharge flow rate to its original value	Old flow rate: 7.0 New flow rate: 2.5	KLB	1/23/17

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Turn off the Main MgO Mix Pot	The Main MgO Mix Pot <u>is</u> off	KLB	1/23/17
Within 30 minutes, Digester #4's temperature drops at least 5 degrees	Start time and temperature: 15:10 99.6°C End time and temperature: 15:25 94.0°C	KLB	1/23/17
Turn on the Main MgO Mix Pot	The Main MgO Mix Pot <u>is</u> on	KLB	1/23/17

3. Acceptance of Testing and Review

Expected	Actual	Initials	Date
All actual results match the expected values.	All actual results <u>MATCH</u> the expected values.	KLB	1/23/17
The IQ section is complete with no deviations	The IQ section <u>is</u> complete with no deviations	KLB	1/23/17
The OQ section is complete with no deviations	The OQ section <u>is</u> complete with no deviations	KLB	1/23/17
The relevant standard working procedures are effective	The relevant standard working procedures <u>ARE</u> effective	KLB	1/27/17
List the procedure numbers	P12-PR-200-013 P17-PR-200-098 P17-PR-200-099 P12-PR-200-015 P12-PR-200-012 P12-PR-200-097	KLB	1/27/17
Results reviewed and accepted by		aw	1/31/17

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XIV. Protocol Deviation Report Log

Log each protocol deviation report in the table below. Attach PDRs to this protocol.

PDR #	Description	Protocol Section	Date Initiated	Date Resolved
		N/A	KLB 1/23/17	

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**XV. Signature Identification Log**

Identify in the table below any personnel involved in the execution of this protocol.

Name	Affiliation	Signature	Initials	Date
Kenneth Basehore	PROD. ENGINEER		KL B	1/23/17
Ashley Williams	Quality Associate		aw	1/31/17

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