



Line & Equipment Opening Program

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TABLE OF CONTENTS

1.	Purpose and Scope	1
2.	Scope	1
3.	Definitions	1
4.	Procedure	2
5.	Appendix	4
6.	References	4
7.	Revision Log	5

1. PURPOSE AND SCOPE

To establish a standard procedure for safe preparation and opening any system that has contained hazardous material such as: acid, steam, caustic, ammonia, flammable, combustible, radioactive, oxidizer or toxic materials and includes other materials above 140 degrees F.

2. SCOPE

The Line Breaking and Equipment Opening Procedure applies to all Mosaic Fertilizer LLC Phosphates Business Unit facilities for work performed by employees or contractors.

3. DEFINITIONS

3.1 Line Breaking and Equipment Opening – The act of disconnecting piping or opening process systems by unbolting, unscrewing, cutting, or other means. It does not typically include the opening of valves, removal of nozzles, strainers or other routine operational tasks.

3.1.1 The act of linebreaking or equipment opening begins with loosening of the first bolt/nut or other securing device on the system being worked on.

3.2 Line Breaking and Equipment Opening Matrix (See Appendix A) - A chart that identifies the minimum personal protective equipment (PPE) requirements for line or equipment opening that contains or has contained Hazardous Materials.

3.3 Hazardous Materials - Materials that have the potential to cause injury to employees, damage to property or equipment, or an environmental concern. Includes acids, process (pond) water, hot scrub water, caustic, steam, ammonia, flammables, combustibles, radioactive and toxic materials or oxidizers. Specific materials covered under this program are included in the Line Breaking and Equipment Opening Matrix (See Appendix A) and includes other materials above 140 degrees F.

3.4 Highly Hazardous Materials – Sulfuric acid, ammonia, FSA, caustic soda, molten sulfur, reactor slurry or other materials deemed highly hazardous that may require additional PPE and/or PPE downgrade approvals per the Line Breaking and Equipment Opening Matrix (Appendix A).

3.5 Safe Work Permit (Permit) – A form utilized to identify and eliminate potential hazards during job preparation, and to authorize the work.



4. PROCEDURE

4.1 General

- 4.1.1 A Safe Work Permit shall be obtained from the Equipment Owner or person responsible for the job. All precautions and approval signatures must be completed before physically opening a line or system.
- 4.1.2 Exceptions to the Line Breaking Procedure include routine operations involving:
 - a. Opening rail car or truck: lids, domes or doors;
 - b. Connecting/disconnecting hoses used for loading/unloading and that are equipped with quick disconnects;
 - c. Instrument air lines from manifold to instrument or actuator;
 - d. Catching samples from pressurized lines.
 - e. Other routine operational procedures conducted by personnel in their assigned area that do not require securing/lockout of systems, hot work or work with highly hazardous materials.
- 4.1.3 The Supervisor in charge of the work, or his/her designee, shall ensure that the Permit has been completed and all precautions have been taken, that the Work Group understands their assignment and are aware of potential hazards and the required PPE associated with the job.
- 4.1.4 Systems that have contained or could contain Hazardous Materials shall be isolated and secured by one of the following methods: 1) double block and bleed valve; 2) a single block valve and a locked out pump; or 3) blinding of the line. If none of the previous methods are possible both Manager and Safety Department approval are required.
 - a. Automated valves shall not be used or considered an isolation point without means of physically disconnecting the power source and verifying the valve will maintain a positive position during the work.
 - b. Knife gate valves:
 - i. May suffice as a blind for isolating Hazardous Material lines if:
 - A. The knife gate valve shall be of the open frame type construction where the slide gate is visible at all times.
 - B. The slide gate completely covers the bore of the pipe and:
 - C. The motive force for actuating the valve is disabled, locked out and pressures bled down; or
 - D. The slide gate actuating rod is physically disconnected and a lock placed through the connector pin hole.
- 4.1.5 The Safe Work Permit should be posted at a designated location available for review. Lockout must be performed on all equipment related to the line breaking or equipment opening.
- 4.1.6 Hazardous material linebreaking or equipment opening activities will not be performed by a single employee (2 person minimum).
- 4.1.7 The Line Breaking and Equipment Opening Matrix (See Appendix A) will be used to identify PPE requirements for all activities associated with this program.
- 4.1.8 Identify means of first aid: i.e. emergency safety shower/eyewash or other means of available flushing solution or fresh water (running water hose).
- 4.1.9 Verify that fire watch and fire protective devices, if required, are charged and attended.
- 4.1.10 Barricade the area or post a watchman/attendant to ensure other workers do not enter while the line or system is being opened.

- a. Barricading or use of a watchman/attendant is required for line breaking jobs involving hazardous materials until the line, vessel or equipment has been opened and verified as safely secured and drained. This will be noted on the Safe Work Permit.
 - b. A watchman/attendant shall be required only when barricading the of area is not in place. The watchman/attendant may be a member of the line breaking crew or a separate designated individual based on the exposure or injury risk of the job. If a watchman/attendant is used:
 - i. The watchman/attendant is responsible for observing the line break, keeping non-authorized personnel out of the area, and summoning/rendering help if needed.
 - ii. The watchman/attendant shall not be assigned any other responsibilities that would prevent the person from observing the work.
 - iii. The watchman/attendant shall have the same safety equipment and wear the same PPE as the person(s) performing the job if there are splash or spray hazards that have the potential to reach the watchman or attendant during the line break.
 - iv. If line breaking is being performed from an aerial lift, the watchman/attendant shall be on the ground within sight of the job and have all the necessary safety equipment. The watchman/attendant shall be qualified to operate the aerial lift if needed in an emergency.
- 4.1.11 Always assume the line or system could contain pressurized or hazardous materials and position yourself accordingly out of the line of fire. Use proper body positioning to limit potential exposure. (Use caution on not over extending.)
- 4.1.12 Place a canvas or plastic shield over the flange or door, if possible, to safeguard against spraying or splashing of hazardous materials.
- 4.1.13 Never break a chemical line over head where you are in the line of fire.
- 4.2 Line Break Approvals:
- 4.2.1 The Permit shall be signed by both the Equipment Owner and a Work Group Representative indicating they have field verified the equipment and area are safe for work to begin, and all precautions have been completed as listed on the Permit.
 - 4.2.2 Methods used for securing the system will be documented in the Line Breaking section of the Permit.
 - 4.2.3 Prior to commencing Work the Equipment Owner Supervisor shall obtain final approval as per the Matrix for Final Safety Approval and complete the appropriate approval section on the Permit.
- 4.3 PPE
- 4.3.1 The Equipment Owner shall indicate on the Permit in the PPE and Additional Precautions sections the type of special PPE that is required. The PPE Matrix – Line/Equipment Opening or Routine Work (see Line Breaking/Equipment Opening or PPE Programs) shall be referenced to identify the required PPE.
 - 4.3.2 All systems are considered pressurized and the PPE requirements apply until after the line or equipment has been opened and verified as clear and safe to perform work. The required PPE may then be reduced to minimal levels.
 - a. The downgrading of PPE after the initial line break must be approved following the requirements for downgrading PPE section on the Line Breaking/Equipment Opening PPE Matrix. PPE downgrades will be documented on the Safe Work Permit in the PPE Section.

- b. For highly hazardous chemicals the downgrade approval must be obtained from a Permit Approver at the highest level as outlined by the Matrix for Final Safety Approval.
- c. Documentation of the PPE downgrade including the time will be listed in the PPE section of the Permit. Approval may be obtained verbally or in person.


4.4 Flanged Lines

- 4.4.1 When opening flanged lines, first loosen the bolts on the side opposite of you to prevent any trapped material or residual material from spraying in your direction.
- 4.4.2 Break the flange seal carefully (if feasible) to ensure all the contents have been drained and the line or system is clear before removing all the bolts.
- 4.4.3 The line, fitting, or door being opened should be secured so as to prevent it from dropping or falling when the flange, door or fitting is loosened.

4.5 Special Hazard Considerations


4.5.1 Flammable/combustible material hazard:

- a. Lines containing flammable/combustible materials shall be tested with appropriately calibrated instruments before the initial work begins (check concentration at sample ports or at bleed valves) if possible and/or when the initial bolt or bolts are loosened and there is potential for leakage.
- b. If flammable/combustible vapors exceed 1% of the LEL, immediately stop work and implement necessary controls for the duration of the line break before proceeding.

 **Note:** Continuous air monitoring shall be required in atmospheric conditions greater than 1% of the LEL.

4.5.2 Respiratory hazards:

- a. Lines that present a respiratory hazard such as ammonia shall be tested with appropriately calibrated instruments before the initial work begins (check concentration at sample ports or at bleed valves) if possible and/or when the initial bolt or bolts are loosened and there is potential for leakage.
- b. If toxic vapors (example - ammonia 25 ppm or more) are present, re-bolt and have the system flushed or purged until vapors are at an acceptable level.

 **Note:** Ammonia lines or systems may be opened with more than 25 ppm present if additional precautions are taken. Proper respiratory protection and barricading off the affected area are required. Special precautions should be listed and approved on the Safe Work Permit. (Volume in the vessel and pressure should be considered.)

5. APPENDIX

- 5.1 Appendix A - Line Breaking and Equipment Opening Matrix
- 5.2 Appendix B – Line Breaking and Equipment Opening Procedure Example

6. REFERENCES

- 6.1 Mosaic EHSS-Phos Program – Hazardous Work and Safe Work Permit Program
- 6.2 Mosaic EHSS-Phos Program – Lockout-Tagout (Control of Hazardous Energy)
- 6.3 Mosaic EHSS-Phos Program – Personal Protective Equipment
- 6.4 Mosaic EHSS-Phos Program – Respiratory Protection



7. REVISION LOG

Revision Log				
Rev. No.	Requested By	Approved By	Revised By	Rev. Date
0	Initial Issue for Mosaic	Sr. Management	Safety Dept.	12/5/06
1	Added detail text from SWP Program	Safety Dept.	Safety Dept.	2/22/07
2	Added PPE Matrices for legacy plants	Safety Dept.	Safety Dept.	3/2/07
2	Reformat for ISO		D. Allen	8/9/2011
2	Updated per HSS guidelines	Mike Neal	Todd Smith	4/15/2012
3	Updated per EHSS review process	EHSS	EHSS PMO	11/01/2020