1. PURPOSE

This procedure establishes minimum standard work practices and program requirements for isolating Hazardous Energy Sources from processes, machines, or equipment to prevent unexpected or unintentional energizing, startup, or release of stored energy that could cause personal injury.

2. DEFINITIONS

Affected Employee

A person who operates or uses a machine or equipment on which servicing, or maintenance is being performed under Lockout or Tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. Affected or Authorized Employees may disable, shut down, or turn off machines or equipment. An Affected Employee becomes an Authorized Employee when that employee's duties include performing servicing or maintenance.

Authorized Employee

A person who locks out or tags out machines or equipment to perform servicing or maintenance on a machine or piece of equipment, which has a source(s) of energy that can cause injury to the employee. Furthermore, any employee who implements a Lockout and/or Tagout system procedural element on machines or equipment (for servicing and/or maintenance purposes) is considered an authorized employee. This includes employees who:

- *perform energy source isolation*
- *implement Lockout and/or Tagout on machines/equipment*
- *dissipate potential (stored) energy*
- *verify energy isolation*
- *implement actions to release machinery/equipment under Lockout*
- *test or position machines*

Capable of Being Locked Out

An energy isolating device is Capable of Being Locked Out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are Capable of Being Locked Out, if Lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability. Equipment (e.g., piping, valves) that accepts bolted blank flanges and bolted slip blinds are Capable of Being Locked Out.

CHE

Control of Hazardous Energy.

De-Energized

Disconnected from all Energy Sources and containing no residual or stored hazardous energy.

Designated Representative

Authorized Employee who oversees or leads a work crew (Servicing and/or Maintenance employees such as plumbers, carpenters, electricians, metal workers, mechanics) and can affix or remove a Lockout/Tagout Device on behalf of the Authorized Employees of the work crew in accordance with a Personal Accountability Process.

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Electrically Qualified Person
A worker who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify and avoid the hazards involved with the specific tasks the person will perform. Electrically Qualified Persons, once trained, are allowed to perform tasks with exposed energized circuits.

NOTE: A person is "qualified" with regards to certain equipment or tasks in the workplace, but not necessarily all electrical equipment or tasks. Refer to Section 5.3 Attachments, N-ID-OSA 036: *Electrical Safe Work* (in development) for training requirements for BASF and Contingent Workers.

Energy Isolating (Control) Device
A device that, when utilized or activated, physically prevents the transmission or release of energy. Such devices include, but are not limited to the following:
A manually operated electrical circuit breaker.
A manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no pole can be operated independently.
A disconnect switch.
A line valve bolted blank flange and bolted slip blinds.
Any similar device used to block or isolate energy.

The following are not considered Energy Isolation Devices:
On/off push buttons.
Selector switches.
Safety interlocks.
Other control circuit type devices including Programmable Logic Controllers (PLCs).

Energy Source
any source of electrical, mechanical, hydraulic, pneumatic, kinetic, chemical, thermal (e.g., high or low temperature), gravitational, or other energy (e.g., ionizing radiation).

Group Lockout/Tagout
Group Lockout/Tagout is method of how each Authorized Employee of a group (two or more employees) performing Servicing and/or Maintenance exercises their control over the associated Hazardous Energy by attaching their personal Lockout/Tagout devices, Group Lockout/Tagout Devices/Mechanisms, and equipment Job Lock/Tag. See attachment G for the specific locking processes.

Hazardous Energy
An Energy, including mechanical (e.g. power transmission apparatus, counterbalances, springs, pressure, gravity), pneumatic, hydraulic, electrical, chemical, nuclear, and thermal (e.g., high or low temperatures), that could cause injury to personnel. A hazard is only present when energy may be released in quantities or at rates that could injure personnel. Trains on a non-locked track present a form of hazardous energy.

Hot Tap
A procedure used in the repair, maintenance, and service activities which involve welding performed on a piece of equipment (pipelines, vessels or tanks) under pressure to install connections or

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appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Isolation
Process of preparing and positioning equipment and components to De-Energize from sources of Hazardous Energy according to hazardous energy control procedures to achieve a Zero Energy State.

Job Lock/Tag
devices used to ensure the continuity of energy Isolation during a multiple-shift or multi-group Servicing and/or Maintenance operation.

Learning Objectives
Specific knowledge, skills, or attitudes the training participant is intended to have learned at the conclusion of the training program. As a minimum, learning objectives will include applicable regulatory-required training elements.

Lock Box
Container into which all of the keys and/or tabs from the Lockout/Tagout Devices securing the machines or equipment are inserted and which would be secured by individual Authorized Employee Lockout/Tagout Devices and by a Transition Device (during multi-shift or multi-servicing/maintenance group operations).

Locking/Lockout
Placement of Lockout Device(s) on an Energy Isolating Device, in accordance with a hazardous energy control procedure, to ensure the Energy Isolating Device and the equipment is controlled to a Zero Energy State and cannot be operated until the Lockout Device is removed.



NOTE:
- *A person cannot serve as a lockout device or a tag-plus device.*
- *Except when a personal lock is applied to the hasp of a lockbox, lockout devices must always be accompanied by a tagout device.*
- *Personal lockout devices must have the name of the person who applied on the lock itself or on an attached tag.*

Normal Production Operations
Utilization of a machine or equipment to perform its intended production function. The physical act or process of removing or releasing the Isolation, during the start-up process, as well as machine or equipment re-energization and/or start-up, is considered a Normal Production Operation. Conversely, machine or equipment adjustments performed during set-up is not considered a Normal Production Operation.

Operating/Owning Department
Unit or department that operates or is responsible for the daily operation of the process, area or facility where work is being conducted.

Permit Issuer

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Personnel that have been trained, qualified, and authorized to issue permits on behalf of the Operating/Owning Department.

Personal Accountability Procedure
Physical steps (practices) taken by the Designated Representative or Authorized Employee that identifies each Authorized Employee before starting Service/ Maintenance and, after the job, reverses the physical steps (practices) to account for each Authorized Employee before the Energy Isolating Device is released and the equipment is reenergized. The Personal Accountability Process shall be able to identify each Authorized Employee being protected and reliably ascertain the identity of and account for everyone who is being protected by each respective Energy Isolating Device. Devices acceptable to demonstrate personal accountability include but are not limited to:

- Personal Lockout Device
- Work authorization permit signatures (only when protected by crew lock, as described in Attachment G, Section 3.M)



NOTE:
- *Verbal and visual methods do not afford equivalent personal protection and are not an acceptable Personal Accountability Process.*
- *Personal lockout devices must have the name of the person who applied on the lock itself or on an attached tag.*

Personal Lockout Device
Device securely fastened to an Energy Isolating Device that is used to physically ensure a Safe Position and prevents the energizing of a machine or equipment to protect personnel during Servicing and/or Maintenance. A lock with a key is the most commonly used Lockout Device.

Personal Tagout Device (Tags)
standardized/prominent warning device, such as a tag and means of attachment, which is securely fastened to an Energy Isolating Device to protect personnel during Servicing and/or Maintenance. Tagout devices used for this procedure may not be used for other tasks, such as operational control or restriction of equipment use. Tagout devices must always be accompanies by a lockout device or a tag-plus device.



NOTE:
Only Red and White "Isolation" or Purple and White "Operations Isolation" tags may be used for locking/tagging equipment.

Safe Position
The specific position of an Energy Isolation Device that achieves a Zero Energy State and prevents unexpected energization of the equipment (i.e., open/closed, de-activated, blocked, removed).

Servicing and/or Maintenance
Workplace activities to prepare and maintain equipment such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

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Tagging/Tagout
The placement of a Tagout Device on an Energy Isolating Device, in accordance with established procedure, to indicate that the Energy Isolating Device and the equipment being controlled may not be operated until the Tagout Device is removed in accordance with established procedures.

Tag-Plus (Full Employee Protection)
system utilizing a mechanism of physical protection on the Energy Isolating Device to make equipment inoperative. The intent is to prevent injury or death through the inadvertent activation of an energy isolating device associated with human error, inadvertent contact, the loss or detachment of a tag, or from any other limitation of tags when Lockout cannot or is not used.

At the Beaumont Site, tag-plus may be used when the equipment can accept a lock ONLY by operations when conducting operations performed maintenance in accordance with an approved procedure. Otherwise, tag-plus is only permissible when a lock is not able to be used, including on bleed valves.

These alternatives must make the isolating device inoperable if selected for use.

Some examples include, but are not limited to:

- Securing the valve handle in the safe position using a cable (do not use metal or plastic chain).
- Securing the valve handle in the safe position using a 175 lb. cable tie.
- removing an isolating circuit element (e.g. fuse or racking out/withdrawing a circuit breaker)
- removing the motor lead or T-lead
- removing a valve handle
- locking, blocking, or barricading a controlling switch
- opening of an upstream disconnecting device (e.g., disconnecting switch, circuit breaker)
- applying grounding cluster to force protective device operation
- taping or securing non-lockable electrical breaker devices
- securing equipment shafts that could be rotated while being worked on



NOTE:
- *A person cannot serve as a lockout device, a tagout device, or a tag-plus device.*
- *Each tag-plus mechanism must be accompanied by a tag approved for use in the control of hazardous energy program.*

Testing
Temporary removal of Personal Lock/Tag to re-energize equipment to check operation or position prior to completion of the Servicing and/or Maintenance.

Verification (Previously – Try)
Means to confirm that Isolation has been achieved for each type of Hazardous Energy Source. In addition to visual inspection, physical steps and tests may include sampling with chemical indicating tubes, photo-ionization detectors or combustible gas indicators, measuring pH of wash water, checking voltage, checking rotation, attempting to operate a valve or switch, successful purge/flush, etc.

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Zero Energy State
The point of Isolation at which all potential Hazardous Energy Sources have been verified to be De-Energized.

4-Eyes Principle
use of two (2) or more individuals reviewing a job or task together in the field to ensure that all hazards are identified and eliminated/controlled through safe work practices, use of Personal Protective Equipment (PPE), communication / awareness, etc. At a minimum, this includes a Permit Issuer and individual(s) conducting the work.

3. Scope

This procedure applies to the BASF Beaumont Facility.
This procedure applies to all activities where there is a potential for exposure to a Hazardous Energy Source, unless specifically exempted below. This includes work involving isolating equipment from Hazardous Energy Sources for Servicing/Maintenance, Line Breaking, Equipment Preparation, and other work where there is the potential for exposure to a Hazardous Energy Source.

3.1. Application

This procedure applies to the control of Hazardous Energy Source during Servicing and/or Maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment, or release of stored energy, could harm personnel. Changing filters, valves, gaskets, strainers, and gauges are not considered a part of normal operation and must follow the control of hazardous energy procedure.

3.1.1. Exception: Minor tool changes and adjustments, and other minor servicing activities which take place during Normal Production Operations are not covered by this standard. Changing filters, valves, gaskets, strainers, probes, and gauges are not considered a part of normal operation and must follow the control of hazardous energy procedure.

A. In order to be considered a minor servicing activity, the following must ALL be true:

A.1. Minor servicing activities are those that do not require interruption of service to complete.

A.2. The must be routine, repetitive, and integral to the use of the equipment for production,

A.3. provided that the work is performed using alternative measures which provide effective protection, such as guarding methods or use of special tools.

A.4. In general, if you must manually operate valves or other energy isolating devices and/or disassemble the piping/equipment to perform the operation that you are performing, then you must follow the control of hazardous energy procedure. In all such cases, the line breaking procedure must also be followed.

3.1.2. De-Energized Parts and Equipment

This procedure applies to work on exposed de-energized parts or near enough (the greater distance between the arc flash boundary or limited approach boundary) to them to expose the worker to any electrical hazard they present.

Conductors and parts of electric equipment that have been De-Energized but have not been locked out or tagged in accordance with this procedure shall be treated as energized parts and

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equipment and shall follow specific electrical safety related work practices; Refer to Section 5.3 Attachments, N-ID-036: *Electrical Safe Work Program*.

3.1.3. Energized Parts and Equipment

Operation and maintenance of electric power generation, transmission, distribution lines/equipment. These tasks require specific training, work practices and employee protection from hazards with energized electrical equipment not identified in this procedure.

Each person is responsible for knowing their own level of qualification and ensuring that they are performing tasks that are within the scope of their electrical qualifications.

In general, work performed on energized electrical parts and equipment is not allowed at the Beaumont Site. Exceptions to this can be found in the Beaumont Site Electrical Safe Work Procedure.
See BMEHS-002.047 for more details on Electrical Safe Work.

3.1.4. Control of Non-Electrical Hazards; Electrically Powered Equipment

This procedure also applies to control of exposure to non-electrical hazards from electrically powered machines or equipment (electric utilization systems). Example: a rotary valve un-jamming task, which exposes workers to mechanical hazards, even though the valve's energy source is electrical.

3.2. This procedure does not apply to:

3.2.1. Cord and Plug Type Electrical Equipment

Work on cord and plug connected electrical equipment. Exposure to hazards of unexpected energization or startup of equipment is controlled by unplugging the equipment from the Hazardous Energy Source. This means the plug is under the exclusive control of the employee performing the service or maintenance. The plug is under the exclusive control of the employee if:

- It is physically in the possession of the employee or,
- It is in arm's reach and in the line of site of the employee,
- The employee has affixed a Lockout/Tagout Device on the plug

3.2.2. Electric Power Generation, Transmission, Distribution Lines/Equipment

Operation and maintenance of electric power generation, transmission, distribution lines/equipment.
See BMEHS-002.047 for more details on Electrical Safe Work.

3.2.3. Hot Taps

Hot Tap operations are covered by BMEHS-002.016

3.2.4. Normal Production Operations

Control of Hazardous Energy Sources for Normal Production Operations is specified in OSHA standards, Subpart O, Machinery and Machine Guarding.
Changing filters, valves, gaskets, strainers, and gauges and other activities that are performed by operations but involved energy isolation and line/equipment breaking are not considered a part of normal operation and must follow the control of hazardous energy procedure.

3.3. Site Specific Interpretations of Activities:

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The following items have been reviewed and meet either the single isolation point exemption, the minor servicing activities exemption, or have equal protection to the control of hazardous energy policy, provided that the criteria below the activities are met when they are performed. Thermowells are added to this list as a precautionary measure since the activity itself should not result in exposure to hazardous energy but would if the thermowell has unexpectedly failed. This list is not all-inclusive of activities that would meet the two exemptions listed. See Attachment H for a flow chart showing these activities.

Exempt from control of hazardous energy (no lock or tag must be applied):

3.3.1. Removal of a blind flange/plug from a bleed valve and the operation of a bleed valve if the below items are complied with:
- A. Performed by Operating/Owning Department only.
- B. PPE grid identifies proper PPE for each potential exposure condition and is followed during each task.
- C. Personnel are instructed in and use proper defensive positioning techniques during tasks.
- D. Personnel maintain direct control of the bleed valve during the blind flange/plug removal.
  - D.1. Direct control is only maintained with the operator is within 10 feet and visual line of sight of the valve.

3.3.2. Collection of samples from sample ports or bleed valves provided that the following are below items are complied with:
- A. Performed by Operating/Owning Department only.
- B. PPE grid identifies proper PPE for each potential exposure condition and is followed during each task.
- C. Personnel are instructed in and use proper defensive positioning techniques during tasks.
- D. Personnel maintain direct control of the bleed valve during the blind flange/plug removal.
  - D.1. Direct control is only maintained with the operator is within 10 feet and visual line of sight of the valve.

3.3.3. Removing of sensors in thermowells:
- A. If it is known or suspected that the thermowell has failed, the control of hazardous energy procedure should be followed in full.
- B. Performed by maintenance department only under a safe work permit.
- C. PPE grid identifies proper PPE for each potential exposure condition and is followed during each task.
- D. Sensors are removed slowly while observing the threads for presence of liquids during the removal process.
  - D.1. If liquids are observed, the sensor should immediately be tightened, and the control of hazardous energy procedure must be followed in full prior to removal of the sensor.
- E. Personnel are instructed in and use proper defensive positioning techniques during tasks.
- F. Personnel maintain direct control of the sensor being removed during the removal activity.

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3.3.4. Loading and unloading operations performed by Operating/Owning Department may be exempted from this procedure if they are using a BASF Manager approved procedure that covers all steps necessary to ensure personnel are not exposed to hazardous energy during the process of loading and/or unloading.

3.3.5. Gas bottles that supply lab instruments, cutting torches, or other equipment and the energy can be isolated at the bottle by person replacing the bottle.

Exempt from equipment specific isolation procedures, but still have to be isolated and locked and tagged appropriately.

3.3.6. Servicing of pressure gauges/transmitters provided that the following are below items are complied with:

A. All requirements of Section 4.2.2 - Exemptions to Equipment-Specific Hazardous Energy Control Procedures

B. The equipment is isolated with a lockout and tagout device for the duration of the work.

B.1. Maintenance must use Red Isolation Tag. Operations can use purple Operations Isolation Tag.

C. PPE grid identifies proper PPE for each potential exposure condition and is followed during each task.

D. Personnel are instructed in and use proper defensive positioning techniques during tasks.

3.3.7. Changing gaskets, probes, valves, strainers, and filters, if completed by the owning/operating department following a site procedure which meets the requirements for an equipment specific isolation procedure.

3.3.8. Ventilation lab hood systems Identified as: CAL #1, CAL #2, CAL #3, CAL #4, CAL #5, MSL #1, FPL #2, FPL #3, FPL #4, ENV #1, and PIL's Door 1- South Blower.

A. The electrical motor that is the driver for listed equipment shall only require a single lock for energy isolation (supplied by service group).

B. Additional protective measures by the PIL/QC Lab must be in place to ensure adequate protection from all possible stored energy is addressed before maintenance activity can begin, such as but not limited to;

B.1. A safe work permit for each task and work crew assigned to maintenance activity

B.2. Close and move all containers/flasks, no GC's active, no heat, no pressurized canisters or bottles, etc., shall be in vent hood during maintenance activities.

B.3. Vent hood sash is 100% closed during maintenance activities and maintain communication between Service Group and QC Lab personnel during maintenance activity.



NOTE:
Only capped and secured atmospheric pressure containers may be left in the hood.

4. PROCEDURE

4.1. General Program Requirements

4.1.1. Overview of Program Expectations

A. Prepare for shutdown

A.1. Identify isolation sources by preparing the equipment specific isolation procedures and related paperwork

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B. Notify all affected employees of activities and equipment involved
   B.1. Communicate the isolation through permitting processes or radio communication where necessary
C. Shut down the equipment
   C.1. Use approved unit procedures
D. Isolate the equipment
   D.1. According to the equipment specific procedures developed
E. Apply lockout and tagout devices
F. Release stored energy
G. Verify that the equipment is properly isolated
H. Maintain the integrity of the lockout through the duration of the job

4.1.2. Authorization

A. Operating technicians who have been qualified for specific areas are approved to prepare and/or approve hazardous energy control procedures. These employees are knowledgeable of the system, energy sources, and other hazards associated with the equipment being isolated.
B. Owning/operating department personnel who are qualified in their areas are able to perform activities covered by their unit's procedures without obtaining a safe work permit.
   B.1. If a unit's procedures cover activities that require the application of the Control of Hazardous Energy procedure, but do not meet the requirements of an equipment-specific energy isolation procedure, the unit procedure shall be updated to meet these requirements. Until the procedure is amended, a safe work permit must be obtained, and the CHE procedure must be followed.
C. Activities performed by those not qualified in operating the unit and those that are not covered by operating procedures are required to be performed under a safe work permit.
D. See BMEHS-002-026 Safe Work Permit Procedure for Beaumont Site Specific Permitting Requirements.
E. If a permit is required the applicable equipment-specific hazardous energy control procedures shall, at a minimum, be referenced on the permit.

4.1.3. Zero Energy Isolation Verification

A. All activities shall be performed, to the extent possible, under a Zero Energy State that has been verified and documented by Operating/Owning Department personnel.
B. When Zero Energy State verification is not possible:
   B.1. Proper PPE and/or additional administrative/engineering controls shall be utilized (and documented on the permit) to minimize exposure to hazards.
C. Verification Considerations
   C.1. Equipment interlocks must be verified they are not engaged in order to prevent the Isolation.
      C.1.1. "For Example", if "A" pump is locked out and "B" pump is specified in the equipment specific energy isolation procedure; if an active interlock keeps the "B" pump from running, then during the "TRY" process, one would have a false sense of security that "B" pump was correctly locked out.

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C.2. Verification of a local field switch on automatically or remotely controlled equipment (such as by DCS systems) cannot serve as the sole means to verify Isolation.

C.3. If work is being performed on electrically operated devices such that failure to de-energize the circuit puts workers in contact with live circuits, voltage will be tested by a Qualified Electrician to verify that power is de-energized.

C.4. Other methods may be necessary to determine if other forms of energy sources have been isolated (hydraulic, pneumatic, chemical, pressure etc.).

D. Examples of Verification (Try)

D.1. Starting or energizing the equipment using all start devices (local and remote).

D.2. Opening a bleed or vent to verify the absences of chemicals, pressure, water, air or other types of energy.

D.3. Conducting air monitoring at an open bleed or vent to assure no flammable or toxic liquids, vapors or gases are present.

D.4. All paths locked open to achieve a Zero Energy state must be verified clear.

D.5. If possibilities of re-accumulation of stored energy exist, verification of isolation shall continue until servicing or maintenance is complete, or until such re-accumulation hazards no longer exist.

4.1.4. NEW AND REPLACEMENT EQUIPMENT

A. Whenever replacement, major repair, renovation, modification of a machine or equipment is performed, and whenever new machines or equipment are installed, Energy Isolating Devices for such equipment shall be designed, installed and tested to accept a Lockout Device.

B. All manual valves must include a locking mechanism to ensure valve cannot be operated when locked in position.

4.1.5. Communication

Prior to performing servicing and maintenance activities subject to this procedure, the Operating/Owning Department shall notify all Affected Employees of the work, including any potential hazards/consequences associated with the work. In addition, Affected Employees shall be notified prior to placing equipment back into service.

Communication shall include but is not limited to, completed specific energy isolation procedures, Lockout/Tagout Sheets and safe work permits. These documents shall be maintained in the permit room. In addition, any Affected employees will be notified prior to placing equipment back into service.

For operations performed maintenance, communication is achieved by displaying the Operations Isolation Tag stub in the control room.

4.1.6. Long Term Isolation

Process information only (orange, black and white) tags shall be used for the isolation of equipment that is permanently taken out of service. All pertinent isolation information shall be noted on the tag. Locks are not required where equipment is deenergized, zip ties can be used. If equipment is still energized, the I/E Department has special locks

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(Yellow Locks) that must be used that are not in this procedure and not used for LOTO work.

NOTE:
Red and White Danger tags can only be used for isolation of equipment that is under current maintenance activities.

4.2. Written Equipment Specific Hazardous Energy Control Procedures

Activities subject to the requirements of this procedure shall be performed using written equipment specific hazardous energy control procedures, unless exempted in Section 4.2.1.

See Attachment B for the Equipment Specific Isolation Procedure and Attachment F for instructions on developing the equipment specific isolation procedures.

Completed package for written Equipment Specific Procedures at the Beaumont site will include:

- A General Hazardous Energy Control Procedure (Attachment A),
- An Equipment Specific Isolation Procedure that is specific to the equipment being lockout out (completed Attachment B)
- Tagout Sheet
- P&IDs showing all equipment to be isolated.
  - A field verification of the P&ID shall be performed.

The Beaumont Site has chosen to group the equipment specific isolation procedures into the groups identified below. If units have equipment listed in these groups, a Lockout for each group of equipment needs to be inspected once a year.

- Motor/starter (pre / post bump)
- Motor/starter with interlock (electrician required)
- Compressors/Pumps/Centrifuges
- Vessels (tanks, process drums, reactors, towers) without other energy sources
- Vessels with Radiation Sources
- Vessels (tanks, process drums, reactors, towers) with other energy sources.
  - Example - agitators, coils, etc.
- Fans (cooling towers, fin fans)
- Flares/Thermal Oxidizers
- Boilers (utilities, waste-fuels)
- High Voltage Equipment (XA & Power Distribution)
- Single Point Isolation Equipment (Described in Section 4.2.1)

4.2.1. Exemptions to Equipment Specific Isolation Procedures

Equipment specific energy control procedures are not required if all the following eight conditions are met:

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1. The equipment has no potential for stored or residual energy or re-accumulation of stored energy after shutdown that could endanger employees.
2. Equipment has a single Hazardous Energy Source that can be readily identified and isolated.
3. The Isolation and Locking out of the Hazardous Energy Source will completely Deenergize and deactivate the equipment.
4. The equipment is isolated from the Hazardous Energy Source and locked out during service/maintenance.
5. A single Lockout Device will achieve a locked-out condition.
6. The Lockout Device is under the exclusive control of the Authorized Employee performing the service or maintenance.
7. The service/maintenance does not create hazards for other employees.
8. The site/unit has had no incidents involving the unexpected activation or reenergization of the equipment during service/maintenance.

5. WORKER OR CREW LEADER RESPONSIBILITIES PRIOR TO WORK

5.1. When equipment has been isolated per department procedures, the person(s) performing the work, and/or the crew leader, will verify the site/department procedures have been applied and:

5.1.1. Attach a personal isolation lock to each energy isolation device (or lockbox) on the equipment to be worked on.

5.1.2. Obtain a SWP prior to performing any work, if necessary.

6. TESTING/POSITIONING OF EQUIPMENT

Testing is allowed only during the limited time necessary and only on the affected components. After completion of the Testing, the equipment shall be De-Energized and all Lockout/Tagout requirements reinstated prior to resuming Servicing and/or Maintenance.

6.1. For situations in which Lockout/Tagout Devices must be temporarily removed and equipment energized to test or position it, the following sequence of actions will be followed:

6.1.1. Approval must be obtained from the Operating/Owning Department and Authorized Employees.

6.1.2. Machines or equipment must be cleared of non-essential tools and materials.

6.1.3. Verification must be made that components are operationally intact.

6.1.4. Employees sign off (release) the existing work crew accountability form portion of the safe work permit.

A. Testing shall be performed in the sequence:

A.1. The work crew tags/locks are removed first.

A.2. Operating/Owning Department tags/locks are removed.

A.3. The Operating/Owning Department will restore all valves, switches, etc. to normal operating positions and perform test.

A.4. Equipment/machines must be de-energized and energy control measures previously in place must be restored before servicing activities may resume.

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A.5. Employees sign on (acceptance of) the WCAF portion of the SWP prior to the resumption of work.

6.1.5. Post Test/Positioning - Equipment/machines shall be De-Energized and energy control measures previously in place shall be restored before Servicing and/or Maintenance may resume unless Testing demonstrates that the Servicing and/or Maintenance is completed by Authorized Employee of Operating/Owning Department.

7. Locks, Tags, Procedures, Energy Isolating Devices (Protective Materials and Hardware)

NOTE:
Lockout Devices and Tagout Devices used for energy Isolation under this procedure are not to be used for tasks not related to Servicing and/or Maintenance, such as operational control or restriction of equipment use.
Lockout Devices shall be designed to withstand the environment where applied.

7.1. Unless technically infeasible, lockout is the minimum requirement for isolation of electrical Hazardous Energy while performing work on electrical equipment.

7.2. The Beaumont Site shall utilize lockout with tags unless an energy isolation device is incapable of accepting a lock (i.e., certain types of valves). In the case where lockout cannot be instituted, Tag Plus must be utilized.

7.2.1. Exception: Tag plus may be the default method of isolation control for operations performed maintenance, if performed utilizing a site or unit procedure for the maintenance activity that meets all of the requirements for an equipment-specific isolation procedure.

7.3. Approved Control of Hazardous Energy Lockout Devices (Locks)

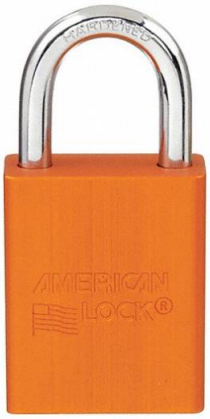
The following contains a description of the energy control devices approved for use at the Beaumont Site and their application.

NOTE:
All locks must have personal identification on the lock or have a tag attached with information identifying who applied the lock.
All lockout devices applied to energy isolating devices must be accompanied by an appropriate tagout device.
Only when applied to the hasp on the lock box is it acceptable to apply a lock without a tag.

7.3.1. Operations Locks

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	**Red** - Operations locks placed on the energy isolating device by the operations unit. These are divided into sets of locks (lock boxes) that are commonly keyed within the set, but keyed differently from set to set.
	**Orange** – "Job Lock" - Lock that is placed on the outside of the operations lock box. Locks are keyed individually per lock box. Placed upon the Energy Isolating Device (in absence of lockbox) and/or Lockbox (when used) during group Lockout/Tagout and shall be the first lock/tag applied and the last removed. It is applied as a continuity device for jobs lasting over multiple shifts or personnel changes and may identify the party or department responsible (e.g., operations, maintenance) for application and removal. A Job Lock may have multiple keys if they are in sole possession of the Designated Representative of the Owning/Operating Department, e.g., each shift supervisor has sole control of one of the keys. Differs from a personal lock in the following ways: • Identification of Job Lock/Tag may be by department or individual. • Removal of Job Lock/Tag may be someone other than the individual who applied the Job Lock/Tag, such as another designated representative • Multiple keys may exist for a Job Lock if an Owning/Operating Department Designated Representative on each shift maintains control of key, whereas any one Personal Lock shall have only one dedicated key.
	**Purple** – BASF Operations personal locks. Keyed individually. All personal locks must be marked or have a tag with the owner's name on it.

7.3.2. Maintenance and Contractor Locks

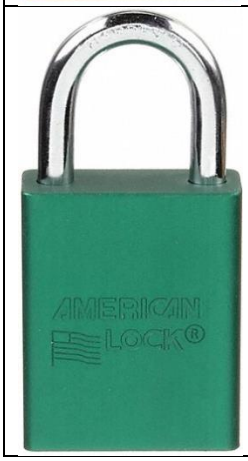
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	**Blue** – BASF Maintenance personal locks. Keyed individually. All personal locks must be marked or have a tag with the owner's name on it.
	**Black** – BASF I&E and Electrical Technician personal locks. Keyed individually. All personal locks must be marked or have a tag with the owner's name on it.
	**Brown** – BASF Mechanical Maintenance Department Locks, keyed alike

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	**Gold** – BASF I&E Department Locks, keyed alike
	**Green** – the primary embedded contractor will provide locks for all of their employees. If a contractor places a lock on a lockout, it must be marked or have a tag with their name on it.

7.4. Approved Tagout Devices and Other Tags

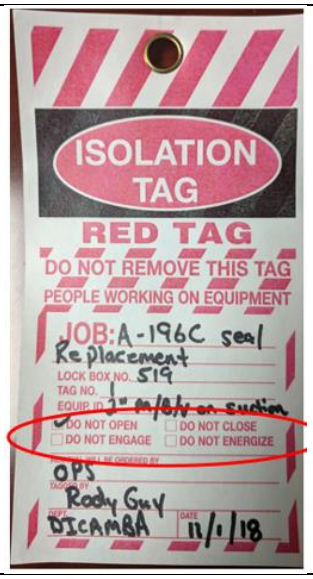
The following contains a description of various tags used at the Beaumont Site and their application. Process information tags and LO/LC tags are not to be used as energy isolation tags.

NOTE:
All tagout devices used for control of hazardous energy must be accompanied by an appropriate lockout device or an appropriate tag-plus device.
All tags must be completely filled out prior to placing on an energy isolation device.
All information must be printed in permanent ink and must be legible.
Tags, their means of attachment, and contained legible information, shall be able to withstand chemical and weather exposure and be incapable of being inadvertently or accidentally removed.

Tags Used in Control of Hazardous Energy

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Red Isolation Tags –
Red Isolation Tags are to be used in conjunction with locks or a tag plus device for the control of hazardous energy.
A completed tag shall have the wording “Isolation Tag – Do NOT OPEN/ENGAGE/CLOSE/ENERGIZE” and:

- The reason for locking/tagging (Job)
- Lock box number
- Tag number from the tag out sheet
- The equipment number or description
- Activity being prevented (Do not open, do not engage, do not close, do not energize)
- Person or department that will authorize removal
- Name of the person installing the tag
- Department that person reports to
- Date



Operations Isolation Tag –
Operations Isolation Tags are to be used in conjunction with locks or a tag plus device for the control of hazardous energy.
These should only be utilized for operations performed maintenance where control of hazardous energy is required and an operations procedure for the maintenance exists or for servicing or maintenance performed by operations that meets the exemption from equipment specific isolation procedures outlined in Section 4.2.1.
The following shall be completed on both portions of the tag.

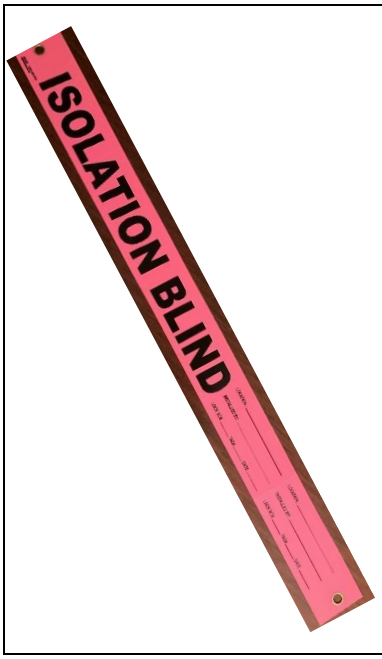
- Date
- The equipment number or description
- Isolation Point and Position
- Name of the person installing the tag
- The reason for locking/tagging

If operations performed maintenance is completed without the employee performing the work leaving the area, the bottom “stub” of the operations isolation tag may be kept on the worker.

If the employee must leave the area, for any reason, the “stub” of the tag must be posted in the control room for communication of the isolation until the work is completed.

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	**Isolation Blind Tag** – Isolation Blind Tags are to be used when a blind is used as an energy control device. These should be completed, the information must be transferred to the tag out sheet, and the tab/stub shall be placed in the lock box for the duration of the job. The following shall be completed on both portions of the tag. • Location • Installed by • Lock box # • Tag # • Date

Tags not to be used in the Control of Hazardous Energy	
Insert Process Inforamtion Tag Picture Here	**Process Information Tags –** Process Information Tags are NOT to be used as energy isolation tags. You can use these tags with locking devices not in the control of hazardous energy program or with some other means to hold the tag in place. Process Information Only tags are used to convey process information. They can show material status, equipment out of service, or any specific instructions needed to be communicated at a given position in the process. A comment section is provided for more detail info. No time-based renewal requirements apply to this tag.

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LO/LC Valve Tags –
LO/LC Valve Tags used for the control of valves that are considered safety critical. These tags are not to be used as energy isolation tags. See BMEHS-002.040 for more information on the proper use of these tags.

7.5. Isolation Paperwork Package

7.5.1. Isolation Drawings

A. Whenever an equipment-specific hazardous energy control procedure is required, an isolation drawing must be generated. A P&ID should be used if available, otherwise a hand drawing can be substituted. The following information must be noted on the drawing:

A.1. Isolation locations that are numbered and align with the Lockout/Tagout sheet

A.2. Locks and tags, blinds, and other isolating devices.

A.3. Isolation locations shall be highlighted and show open/closed position

A.4. The P&ID/drawing must be signed and dated by the employee who applies the Locks and Tags.

7.5.2. General Isolation Procedure (Attachment A)

A. This procedure is to be used in conjunction with ALL specific Equipment/Machine Lockout Procedures to ensure control of hazardous energy during maintenance and service. It applies to all servicing and maintenance activities that fall under the Control of Hazardous Energy. The General Isolation Procedure can be found in Attachment A.

7.5.3. Equipment Specific Isolation Procedure (Attachment B)

A. This procedure is to be used in conjunction with General Lockout Tagout Procedure for servicing and maintenance activities on equipment/machines. This procedure is specific to the equipment that is being locked and tagged out. The Equipment Specific Isolation Procedure Form can be found in Attachment B.

8. Training

8.1. BASF and Contracted Employees not involved in Control of Hazardous Energy:

8.1.1. BASF and Contracted Employees not directly involved in the site/unit's hazardous energy control program shall receive awareness training for this and other Safe Work practices in

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accordance with the EHS Curriculum Assignment Process. Included are Affected Employees, and the training shall include:

A. Recognition of Lockout/Tagout devices.
B. Recognition when the energy control procedure is being used.
C. The purpose and use of the site/unit energy control procedure.
D. The importance of not tampering with Lockout/Tagout devices and not starting or using equipment that is in a Lockout or Tagout condition.

8.2. BASF and Contracted Employees Involved in Control of Hazardous Energy Sources

8.2.1. Authorized Employees shall also, in addition to Affected Employee training, can recognize and understand:

A. Applicable Hazardous Energy and their hazards.
B. The types and magnitudes of Hazardous Energy in the workplace.
C. Use of adequate methods and means to control these sources.
D. Use of equipment specific hazardous energy control procedures.
E. Means of Verification of effective energy control.
F. The requirements for issuing a permit, and the necessary means to safeguard against the hazards posed during these activities.
G. When Tagout systems are used, employees shall be trained in the limitations of tags:
H. Tags are warning devices and do not provide physical restraint provided by a lock.
I. A Tag is not to be removed without authorization of the Authorized Person responsible for it and is never to be bypassed, ignored or otherwise defeated.
J. Tags shall be legible and understandable by all Authorized Employees, Affected Employees, and all other employees in areas where energy control procedures may be utilized.
K. Tags and their means of attachment shall be able to withstand chemical and weather exposure encountered in the workplace.
L. Tags may provoke a false sense of security and their meaning shall be understood.
M. Tags shall be securely attached to Energy Isolating Devices so that they cannot be inadvertently or accidentally detached during use.

8.3. Retraining

8.3.1. Retraining of an employee is required whenever:

A. There is a change in job assignment affecting the level of participation in the program (e.g., an employee changes from an Affected Employee to an Authorized Employee).
B. An applicable equipment specific hazardous energy isolation procedure has been changed due to equipment or process changes or a new hazard is introduced.
C. Inspection, individual performance, or other activity reveals there are deviations from or inadequacies in employee's knowledge or use of the energy control procedures.

8.4. Training Records

8.4.1. Training documentation shall include but not be limited to:

A. Trainee's name.
B. Date(s) of attendance.
C. Means to verify understanding.
D. Learning Objectives for the course.

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NOTE:
Documentation shall be maintained according to Corporate Policy, BC037, Record Retention Policy and the applicable record retention schedule.

8.5. Training frequency for Affected Employees and Authorized Employees

8.5.1. Training shall be delivered in accordance with the EHS curriculum assignment process.

8.6. Contractor Employees

8.6.1. All contractor employees are required to have Beaumont site specific training. This training shall be completed at ISTC the local area safety council, or it can be administered on site by qualified individuals.

8.6.2. REFER TO BMEHS-002-036 CONTRACTOR EHS QUALIFICATION AND OVERSIGHT FOR ADDITIONAL REQUIREMENTS

9. Periodic Review

This section outlines the method of review of the program and its application.

9.1. Program Review

Beaumont Site Management shall review the effectiveness of the site program at least annually to ensure that the RCMS management systems are properly implemented, and the elements adequately control exposures to Hazardous Energy. This review can be performed in conjunction with the EHS Management System Review.

9.1.1. As a minimum, the following management system elements shall be included in the review:

A. A review of the site/unit procedure and records to ensure all currently required elements are included.

B. A review of all incidents and other nonconformance reports involving Hazardous Energy control activities that have occurred since the last management system annual review. The review shall verify root causes have been properly identified and appropriate corrective actions have been implemented.

C. Results of periodic inspections (See Section 4.6.2.) for the energy control procedures.

9.1.2. The program review for all BASF sites shall be documented, retained according to BC037: *Records Management Policy*, and shall include the following:

A. Name of reviewer and Authorized Employees (where applicable) included in the review.

B. Date(s) of review.

C. Equipment specific hazardous energy control procedure(s) inspected and the machine or equipment on which the energy control procedure was being used (BASF MSHA, Canada, and Mexico Sites).

D. Findings and corrective action, where applicable, of any deviations or deficiencies identified during the review.

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NOTE:
Corrective actions resulting from the reviews shall be tracked to completion and shall be communicated to all Authorized and Affected Employees.

9.2. Periodic Inspection

Periodic inspections shall be performed at least annually, based on twelve-month intervals, to verify that each energy control procedure is adequate and being properly applied. Energy control procedures used less frequently than once a year need be inspected only when used. Energy control procedures or practices that are not required to be written per the exemption stated in Section 4.5.2, still need to be inspected and reviewed to ensure that they are adequate and being properly utilized.

For the purposes of Periodic Inspection, energy control procedures may be grouped together as one procedure **(**See Section 4.5.1.1.**).** The periodic inspections shall contain at least two components:

- An inspection of each energy control procedure utilized during the service and maintenance activity.
- A review of each employee's responsibilities under the energy control procedure being inspected. If procedures are grouped, then a representative sample number of employees implementing the procedure within each group may be inspected and/or interviewed as long as the sample number reasonably reflects hazardous energy control practices for the procedures being inspected.

See below the Beaumont Area Grouped Equipment. Lockouts from this group will be inspected on an annual basis.

- Motor/starter (pre / post bump)
- Motor/starter with interlock (electrician required)
- Compressors/Pumps/Centrifuges
- Vessels (tanks, process drums, reactors, towers) without other energy sources
- Vessels (tanks, process drums, reactors, towers) with other energy sources. Example - agitators, coils, nukes, etc.
- Fans (cooling towers, fin fans)
- Flares/Thermal Oxidizers
- Boilers (utilities, waste-fuels)
- High Voltage Equipment (XA & Power Distribution)
- Single Lock Isolation Jobs

Authorized employees who will perform audits are to be identified and at the discretion of the Unit/Area Manager or their designee, and shall include:

- A comparison of the procedure(s) against existing equipment design and layout.
- A comparison of the procedure(s) against actual implementation practices (i.e., observe the process as it is being performed).
- Interviews with Authorized Employees utilizing the procedure(s) that include:

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- Discussion with each Authorized Employee regarding their responsibilities under the procedure(s). A representative sample number of Authorized Employees is acceptable when procedures are grouped.
- Discussion of any limitations or concerns with the Isolation methods specified by the procedure(s).
- Determination if the procedure is adequate to provide the necessary protection, and if not, what modification(s) are needed.

The periodic inspection shall be documented by using the Control of Hazardous Energy Sources Periodic Inspection Checklist (Attachment E) and shall include the following:

- Name of inspector and Authorized Employees included in the inspection.
- Date(s) of inspection.
- Equipment specific hazardous energy control procedure(s) inspected and the machine or equipment on which the energy control procedure was being used.
- Findings and corrective action, where applicable, of any deviations or deficiencies identified during the inspection.
- Send a copy of the inspection checklist to the Site Safety Representative to ensure that findings and corrective actions are identified and tracked to completion.



NOTE:
Corrective actions resulting from the reviews shall be tracked to completion and shall be communicated to all Authorized and Affected Employees.

10. RESPONSIBILITIES

10.1. Site Director –

Responsible for the implementation of this procedure.

10.2. EHS&S Manager –

Responsible for issuing, reviewing, administration, and/or interpretation of this procedure

10.3. Site Leadership Team –

Responsible for ensuring that this procedure is followed in their areas.

11. RELATED DOCUMENTS

BMEHS-002.016 Hot Tap and Stopple
BMEHS-002.017 Hot Work and Vehicle Entry
BMEHS-002.026 Beaumont Safe work Procedure
BMEHS-002.036 BASF Contractor EHS Management
BMEHS-002.047 Electrical Safe Work Procedure (ESWP)
N-ID-OSA 014 Control of Hazardous Energy (Lock, Tag and Try)
N-ID-OSA 024 Safe Work
N-ID-OSA 036 Electrical Safe Work Program (ESWP)
Corporate Policy, BC037
Attachment A – Beaumont Site General Lockout Tagout Procedure
Attachment B – Beaumont Equipment Specific Procedure Template
Attachment C – Beaumont Tagout Sheet for Energy Isolation
Attachment D – Personal Lock Removal Form
Attachment E – Control of Hazardous Energy Sources Periodic Inspection Checklist

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Attachment F – Developing and Executing Work through Equipment Specific Isolation Procedures
Attachment G – Locking/Tagging and Removal Requirements
Attachment H – Site-Specific Interpretation of Various Common Activities
Attachment I – Justification for Allowed Tag-Plus Methods

Revision Number	Revision Description	Revised By	Revision Date
012	Update to reflect change to Corporate Procedure (Major Change).	G. Dawson	06/01/18
013	Update Department lock colors for I&E and Maintenance, Update Lockout/Tagout sheet to show different service areas and signoffs for completed work.	R. Guy & G. Dawson	01/29/19
014	Procedure review and added specifics to Long-term lockout. Added information about new Electrical Safe Work Procedure.	G. Dawson	11/11/19
015	Revised format, added TOC, added hyperlinks for reference docs.	RJ Sumrall	04/17/20
	Procedure Review.	G. Dawson	12/01/20
	Modified Attachment A Hyperlink. Procedure Review	D. Durr	11/09/21
016	Multiple Updates (MOC 0976-ADMB-22-0046)	C. Wilding	06/10/2022
	Procedure Review	G. Dawson	12/09/2022
	Procedure Review	G. Dawson	10/16/2023
	Procedure Review	G. Dawson	12/18/2024

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