



EDMONTON REFINERY



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INTRODUCTION

To protect workers by establishing a minimum standard for the isolation and lockout of hazardous energy and fluid associated with equipment prepared for maintenance or construction activities.

1. **Prevent Accidents:** Safeguards workers from accidental release of hazardous energy or fluids, which could lead to serious injuries or fatalities.
2. **Establish Standards:** Creates a clear and uniform set of guidelines for isolating and locking out hazardous systems during maintenance or construction.
3. **Promote Compliance:** Helps the Edmonton Refinery adhere to occupational health and safety regulations, avoiding legal and financial penalties.
4. **Foster Awareness:** Encourages a culture of safety by prioritizing the identification and management of risks.

This safe work practice is intended to ensure compliance with Part 15 of the Alberta Occupational Health and Safety Code.

In general, hazardous fluids and energy are isolated by three means:

- blinds or other isolation devices (e.g. plugs) that are typically not locked
- valves, electrical disconnects and other lockable devices
- disabling of equipment through removal of key components



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Many pieces of equipment require the use of a combination of lockable and non-locked devices to ensure a zero-energy state.

The intent of this practice is to provide an integrated system to manage isolation, blinding and lockout of equipment so that all energy sources are managed in a four-step process:

1. Isolating the equipment
2. Verifying the isolation
3. Securing the isolation
4. Managing the security

This Safe Work Practice applies to all Suncor Employees and Contractors performing work involving the Isolation of Hazardous Fluids and Energy at the Suncor Edmonton Refinery.

EH&S REQUIREMENTS AND PRECAUTIONS

All Suncor Employees using this Safe Work Practice will review and complete evaluation on GN75 through Workday.

All Contractors are to follow the requirements outlined in this document

Any Incidents with Controlling Hazardous Energy will be documented in the Incident Management Tool.

REFERENCES

OH&S Code Part 15 – Managing the Control of Hazardous Energy

GN59 – Issuing and Accepting a Safe Work Permit

GN90 – Field Level Hazard Assessment

GN98 – Electrical Distribution System Operating Safe Work Practice

EL10 – Electrical Power Distribution System Isolation and Lockout

DEFINITIONS – SEE APPENDIX D

1.0 TYPES OF LOCKS & LOCK-OUT EQUIPMENT

1.1 Personal Locks

- 1.1.1 A lock or locks operable by a single key, uniquely identified as being assigned to one worker in control of that key.

1.2 Operations Unit Locks

- 1.2.1 Uniquely labelled and color-coded set of locks belonging to a single operating unit. Each unique group of locks is operable with a single type of key. Copies of the key are issued only to members of the identified operating group.



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Light Oils	(green)	Syncrude	(black)
Heavy Oils	(orange)	Unionfining	(silver)
Utilities	(brown)	P&S	(purple)
Coker Operators	(pink)	Shift Supervisors	(white)

- 1.2.2 Operations locks are mandatory for lockable energy and process isolations required for maintenance type work on equipment under Operations control (see 6.3 for certain exceptions involving valves).

1.3 Maintenance Craft Locks

- 1.3.1 Uniquely labelled and color-coded set of locks belonging to a single maintenance craft. Each unique group of locks is operable with a single type of key. Copies of the key are issued only to members of the identified maintenance craft.

Pipefitters	(red/gold stripe)	Electricians	(yellow/grey stripe)
Millwrights	(blue/gold stripe)	Instrumentation	(black & green)
Projects - Electrical	(maroon/grey stripe)	Projects – PF/BM	To Be Determined

- 1.3.2 The purpose of Maintenance Craft Locks is to protect equipment from inadvertent energization during periods when work is not complete, but no workers are present.
- 1.3.3 Craft locks are mandatory for multi-shift jobs and will be left in place for the duration of a particular craft's work.
- 1.3.4 Installation and removal of Craft Locks are to be recorded on the Zero Energy Roster in the area provided.
- 1.3.5 Maintenance Craft Locks are not to be used as the primary worker lock protecting workers while they are working on equipment.

1.4 Group Lock Box and Associated Locks



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Group Lock Box - Lock-out device used to secure the master key of a group of locks installed on isolating devices. Lockbox and associated locks are identified by area and number (e.g. HO LB - 1).

1.4.1 The lock box is, in turn, secured by an Operations Unit lock, Craft locks, and personal locks and stored in the permit office.

NOTE

Plant 12 Alkylation lockboxes will be stored inside of the demarcation line in the West end shop.

1.4.2 The lockbox master key (one only) will open all locks from a particular lockbox. If a key is lost the locks will be rekeyed or destroyed. If a key is dropped into an irretrievable location or broken, approval by the Manager Operations is required to procure a duplicate.

1.5 Red “Do Not Operate – Equipment Isolated” Tag

1.5.1 Tags are installed in the following circumstances:

- Removal or air gap that is part of an isolation.
- For the local unlockable switch of a disconnected electrical device.
- Locked out electrical switchgear in locations where locks are located behind cabinet doors.
- Local electrical stop/start switches after the source is isolated and locked.
- For Individual locks if a Zero Energy Plan is not used (i.e. individual isolations – See section 3.1).

1.5.2 Tags are not required for locks (other than electrical noted above) because the lock ID provides traceability via the Zero Energy Plan.

1.5.3 Tags are uniquely numbered so they can be recorded on the Zero Energy Isolation form.



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(FRONT)

DANGER

**DO NOT
OPERATE**

EQUIPMENT ISOLATED

Equip Name/No. _____

Reason for tag: _____

Date Tested: _____

Tested by: _____

TAG # XXXXXX

(BACK)

DANGER

**DO NOT
OPERATE**

EQUIPMENT ISOLATED

This tag may only be removed
in accordance with GN75:
Isolation and Lockout of
Hazardous Fluids and Energy

Tag information on reverse.

2.0 ZERO ENERGY ISOLATION/LOCKOUT AND ROSTER (See Appendix B)

2.1 The Zero Energy Plan includes the following components:

- zero energy isolation and lockout listing
- zero energy isolation approval and verification
- zero energy roster for work crews
- blind schematic (if applicable)
- Appendix A (if applicable)

2.2 Filling out the Zero Energy Isolation/Lockout Form and Roster:

- Should contain a drawing or schematic indicating each isolation point, bleed and vent. Can also contain any notes with relevant information.
- Includes a detailed description of work being performed.
- Details the type of isolation used and location of the isolation.
- Each isolation will detail lock or tag number, date installed, and date removed.
- Other information included is number of locks used, and if a blind schematic or if a Single Isolation form (Appendix A) is required.
- Normal position is indicated to aid with returning the equipment to their previous running state (if required).



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- Isolation is verified by the **Independent Verifier**. The independent verifier confirms zero energy, that the isolation is appropriate for the work scope, and that the correct equipment is locked out/tagged. This person cannot be the same person as the person who isolated the equipment. The printed name of the Independent Verifier will be recorded on the Zero Energy Isolation plan under the “Isolation Verified By” field.
 - **Zero Energy Isolation Roster**: Workers will fill out the Zero Energy Isolation Roster whenever they apply a personal or craft lock to the Zero Energy Isolation.
- 2.3 The master copy of the Zero Energy Plan is kept in the permitting office. A copy is to be supplied in the lockbox if a remote lockbox is used.
- 2.4 The use of blinds is the preferred process/mechanical isolation method as it provides the maximum level of isolation for controlling Hazardous Energy. The installation and removal of blinds will be documented on the blinding schematic and will accompany the Zero Energy Isolation/Lockout and Roster (Appendix B).
- 2.5 Work outside of production areas will still follow the energy lockout practice.
- 2.6 As each worker completes their work or reaches the end of shift, they shall REMOVE their personal locks. If the work scope is not complete, a craft lock must be applied.
- 2.7 Craft locks are to be removed when all craft specific tasks have been completed for the job.
- 2.8 All craft locks must be signed on and off of the Zero Energy Isolation Roster.
- 2.9 Upon completion of all work, Operations shall VERIFY all worker personal locks and craft locks have been removed.
- 2.10 The Zero energy Plan will be retained with the final permit for the job for audit purposes.



NOTE

For work on Coker equipment the Coker operator will prepare the equipment and the Zero Energy Isolation plan. Verification will be co-signed by both a Coker and Heavy Oils Operator. A Heavy Oils unit lock will be applied to the isolation. Heavy Oils will issue the Safe Work Permit. Field Verification on the SWP will also be co-signed.

3.0 LOCKOUT METHODS

Lockout methods may vary, depending on the circumstances the following can be used:

- individual isolation (see 3.1)
- apply ops unit locks and worker locks directly in the field (see 3.2)
- utilize group lock box method (see 3.3)
- Complex group isolations (see 3.4)
- Electrical Lockout authority (see 3.5)

NOTE

ALL workers shall APPLY worker personal locks to the isolation device (or Group Lockbox) regardless of lockout method.

3.1 Securing by Individual Isolation

Individual isolation, also known as self isolation, is intended for a short duration, where the completion of group isolation offers no significant value in terms of risk reduction. The individual isolation points and the lock identifiers must be documented on the **Safe Work Permit**.

3.1.1 Individual isolation is limited to three isolation points or less.

3.1.2 Individual isolation is at the discretion of the Permit Issuer. Permit Issuers can request a Zero Energy Plan with Operations locks or lock boxes to be used on jobs requiring less than three isolation points if the Permit Issuer believes the isolation could have significant impact on the plant, equipment, site personnel, or for any other reason.

3.1.3 The worker is responsible to perform and verify their own isolations.



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- 3.1.4 The worker is trained in the hazards related to performing the individual isolation, verifying Zero Energy, and executing the work for themselves.
- 3.1.5 The worker will provide all points to isolate and the means to verify the intended energy state. The Isolation Points are to be agreed to with the Permit Issuer and documented as part of the approved Work Permit.
- 3.1.6 A tag and individual locks shall be used to indicate which individual controls the isolation.
- Each worker involved in the scope of work requiring an isolation from Hazardous Energy attaches their own personal lock to each Isolation Point.
 - Permit number shall be included on the tag.
- 3.1.7 After securing each isolation point with individual locks, the worker(s) verifies that the Hazardous Energy source is effectively isolated.
- 3.1.8 Individual isolations are to be removed at the end of each shift, and the equipment should be returned to service.
- If isolations go over the shift, individual locks will be replaced with craft locks. The Permit Issuer will be notified and will develop a Zero Energy Plan with Operations locks or lock boxes to be used to identify the isolation.
- 3.1.9 In situations like steam trap winterization, where a worker will be repairing or replacing multiple traps over the course of the day, they can provide a list of locations to the permit issuer and adhere to the use of three or fewer isolation points for each work location.
- 3.1.10 **Examples where individual isolations may be utilized:**
- Instrumentation (i.e., calibration, function testing, troubleshooting)
 - Simple electrical isolations (i.e., lighting, heat tracing, starter PMS, box heaters)
 - Steam tracing
 - Heating, ventilation, and air conditioning (HVAC) equipment such as heaters, overhead doors, fans



3.2 Securing by Operations Unit Locks in the Field

- 3.2.1 Unit locks can be used when 3 locks or fewer are required and the number of workers are few.

NOTE

For large numbers of lockout points or workers, use the group lockbox or complex group isolation method

- 3.2.2 A Zero Energy Plan is developed that identifies all isolation points (see section 2).
- 3.2.3 Operations will INSTALL unit locks at each isolation point, record and initial each isolation on the Zero Energy Isolation Plan and check that overall equipment isolation is satisfactory.
- 3.2.4 The Isolation Installer shall re-evaluate and have the Isolation Plan re-approved, if the intended isolation plan cannot be achieved.
- 3.2.5 If the lockable device(s) is electrical, refer to Section 4 If the lockable device(s) is a block valve, refer to Section 5.
- 3.2.6 If the only means of energy isolation is a disconnect or removal, this must be done by a qualified crafts person and a lock-out tag secured at the point of disconnect.
- 3.2.7 Isolation is to be verified by Independent Verifier. The independent verifier confirms zero energy, that the isolation is appropriate for the work scope, and that the correct equipment is locked out/tagged. This person cannot be the same person as the person who isolated the equipment. The printed name of the Independent Verifier will be recorded on the Zero Energy Isolation plan under the "Isolation Verified By" field.
- 3.2.8 The permit issuer and acceptor will review the Zero Energy Isolation Plan, acceptor will then initial the permit confirming that the review has occurred.
- 3.2.9 For a field verification an Operator MUST accompany the Permit Acceptor to VERIFY the Zero Energy Isolation in the field. Operations Verifier and the Permit Acceptor will verify the isolation points and test stop/start switches where applicable.



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- 3.2.10 Each worker working on the equipment must apply their own personal lock to each isolating point and register the lock(s) by filling out the Zero Energy Roster associated with the job. A scissor lock-out is recommended for devices requiring multiple locks.
- 3.2.11 On multi-shift jobs, workers are to remove personal locks at the end of each shift. A craft lock will be utilized per Section 1.3
- 3.2.12 When work is complete, workers shall remove their lock(s) and return the work permit. Workers are then no longer authorized to work on the equipment.
- 3.2.13 Operations shall verify the work is complete, remove operations unit locks and prepare the equipment for recommissioning.

3.3 Securing by Group Lock Box

- 3.3.1 A group lock box is used when the number of isolation points and/or the number of workers applying locks makes it impractical to apply all locks in the field.
- 3.3.2 All lockboxes will have an operations lock applied even when not in use to prevent attrition of lockbox locks.
- 3.3.3 A Zero Energy Plan is developed that identifies location and type of all isolation points for the job (see section 2).
- 3.3.4
- 3.3.5 Operations will INSTALL locks for each isolation point using the series of locks common to one lock box and one master key. The operator installing the locks will record and initial the isolation list, and check that overall isolation is satisfactory.
- 3.3.6 Isolation is to be verified by Independent Verifier. The independent verifier confirms zero energy, that the isolation is appropriate for the work scope, and that the correct equipment is locked out/tagged. This person cannot be the same person as the person who isolated the equipment. The printed name of the Independent Verifier will be recorded on the Zero Energy Isolation plan under the "Isolation Verified By" field.
- 3.3.7 Operations place master key in lock box and APPLY a unit lock to the lock box. A copy of the Zero Energy Plan will be attached to the



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lockbox.

- 3.3.8 The permit issuer and acceptor will review the isolation list; acceptor will then initial permit that this has taken place.
- 3.3.9 An Operator MUST accompany the Permit Acceptor and VERIFY the equipment to be worked on by placing hand to equipment to ensure craftsperson understanding of the location of work.
- 3.3.10 Each worker shall then APPLY their personal lock to the lock box and record their name/lock ID on the Zero Energy Roster. A worker is entitled to review the isolation points.
- 3.3.11 The Isolation Installer shall re-evaluate and have the Isolation Plan re-approved, if the intended isolation plan cannot be achieved.
- 3.3.12 If the lockable device(s) is electrical, refer to Section 4.
- 3.3.13 If the lockable device(s) is a block valve, refer to Section 6.
- 3.3.14 As each worker completes his/her work on the equipment, they shall REMOVE their personal lock from the group lock box. This signifies they are no longer authorized to work on the equipment.
- 3.3.15 On multi-shift jobs, workers are to remove personal locks at the end of each shift. A craft lock will be utilized per Section 1.3.
- 3.3.16 Once all work is complete and all worker locks have been removed from the lockbox, Operations will REMOVE unit lock from lock box.
- 3.3.17 Using the master key, Operations will REMOVE isolation locks and return them with the master key to the lock box.
- 3.3.18 Operations will prepare the equipment for recommissioning.

NOTE

Combining lockboxes maybe required in some isolations. This must be done in a way that makes accessing the keys impossible without removing all worker locks. The use of more than one lockbox must be indicated on the Zero Energy Isolation/Lockout List.



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3.4 Securing by Complex Group Isolations

A complex group isolation method may be used when it is not Reasonably Practicable or would not provide adequate protection from Hazardous Energy to secure energy Isolation Devices according to individual isolation or group isolation methods.

3.4.1 Complex isolation may be used because of:

- The physical size and extent of the machinery, equipment, or powered mobile equipment.
- The relative inaccessibility of the energy-isolating devices.
- The number of workers involved in the work, potentially from various trades, requiring Hazardous Energy control.
- The number of energy-isolating devices involved.
- The extended length of time of the required isolation.
- The interdependence and interrelationship of the components being isolated.
- Possible use of cascading lockboxes
- Any other reason that would render compliance with the requirements of the individual isolation or group isolation sections inadequate to protect the workers.

For Example:

- Coke Drum isolations
- FCCU structure isolation
- Alky train isolation
- Hydro processing reactor isolations

3.4.2 A complex isolation requires the development of a P. Eng approved **Zero Energy Isolation Plan**. This plan must be authorized by the Manager Operations or delegate before implementation.

3.4.3 Isolation is to be verified by Independent Verifier. The independent verifier confirms zero energy, that the isolation is appropriate for the work scope, and that the correct equipment is locked out/tagged. This person cannot be the same person as the person who isolated the equipment. The printed name of the Independent Verifier will be recorded on the Zero Energy Isolation plan under the "Isolation Verified By" field.

3.4.4 The Isolation Installer shall re-evaluate and have the Isolation Plan re-approved, if the intended isolation plan cannot be achieved.



3.5 **Securing by Electrical Lockout Authority** **(EL10, Electrical Power Distribution System Isolation and Lockout Procedure)**

- 3.5.1 The Electrical Lockout Authority (LOA) has the ultimate responsibility of administering the isolation, lockout, and re-energization of power distribution equipment for the purpose of operation and maintenance activities. The Electrical LOA must be a Competent Electrical Worker with intimate knowledge of the power distribution system.
- 3.5.2 Instances may exist, such as shutdown or large work crews, where it is impractical for each employee or craft to apply personal locks to the isolating devices. In these instances, all keys securing the isolating devices shall be secured in a Group Lock Box. Workers shall then apply their personal lock to the Group Lock Box. A copy of the Guarantee of Isolation (GOI) shall always accompany the Group Lock Box.
- 3.5.3 Electrical LOA Locks shall be the first applied and last removed from isolating devices and remain for the duration of the lockout.
- 3.5.4 Operations will apply a unit lock or a group lockbox lock to the LOA lockbox and will reference that unit lock or lockbox while permitting work within the electrical LOA isolation.
- 3.5.5 Any individual required to work on equipment isolated by the LOA lockbox shall apply their personal locks on the group lockboxes. On multi-shift jobs, workers are to remove personal locks at the end of each shift. A craft lock will be utilized per Section 1.3.

3.6 **Performing Additional Work of Changing Lockout Points**

- 3.6.1 In some circumstances it is necessary to add, remove or change isolation points on a system as work changes, progresses or is added.
- 3.6.2 If additional work is to be performed using part or all of an existing isolation system, the following steps are to be taken:
- Update work description on the Zero Energy Isolation form.
 - Operations will conduct a review of the existing isolation to ensure it is valid for the additional work scope/job change.
 - Permit issuer and acceptor review and initial isolation list.



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- Add new names/locks to roster as required (if required attach additional sheet).
- Apply worker locks per normal practice.

3.6.3 If isolation points and/or locks are to be added to a lockbox for new work, then:

- A second isolation list will be created referencing the first lockbox.
- A second lockbox will be utilized for the additional lock points.
- A lock from the second lockbox will be used and secured to the first lockbox. The personal locks from the first lockbox will then be moved to the second lockbox.

3.6.4 If locks must be removed prior to job completion to alter the isolation, then:

- Operations will notify workers and create a new isolation list.
- Work is to stop; workers remove their locks to provide access to a lockbox and reapply once the isolation is revised.
- After any modification of an isolation system, operations and workers must verify and test the isolation to ensure work can continue safely.
- If workers request temporary lock removal (same shift) for specific activities with no alteration to the isolation, a new isolation list is not required.

3.7 Lock Removal by Others

If a worker is unable to remove his/her personal lock or has left the site without removing a personal lock or a craft lock, the following procedure MUST be followed before the Team Lead Operations (TLO) can authorize removal of the lock.

3.7.1 For craft locks CALL IN an appropriate craft member to remove the craft lock.

3.7.2 For personal locks, IDENTIFY the owner (worker) of the lock. The TLO will take all reasonable steps to contact the owner of the personal lock.

3.7.3 If worker cannot be contacted, or is incapable of removing lock, TLO then attempts to CONTACT Craft Supervisor or designate to inform them before the lock removal.



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- 3.7.4 The Operations Shift Team Lead/Lead Pumper/Coker Push must ENSURE that no other workers will be endangered, and that the equipment is safe to operate.
- 3.7.5 TLO can then AUTHORIZE removal of the lock after confirmation that:
- attempt was made to contact personal lock owner.
 - attempt was made to call in Craftsperson to remove craft lock.
 - attempt was made to contact Craft Supervisor (or designate) regarding lock removal.
 - Shift Team Lead/Lead Pumper/Coker Push has confirmed no workers are in danger and equipment is safe to operate.
- 3.7.6 Once authorized, the Shift Team Lead/Lead Pumper can REMOVE the lock.
- 3.7.7 The TLO must ensure that the owner of the lock and owner supervisor are notified **as soon as possible** of lock removal (leave message, etc.)
- 3.7.8 STL/LP must COMPLETE an Enablon entry (type-hazard) to record the lock removal which must:
- include the equipment from which the lock was removed
 - identify who authorized the “lock removal by other” (TLO)
 - include reasons and circumstances for removing the lock
- 3.7.9 The STL/LP/CP must enter the lock removal on the shift log. This TLO must also enter the lock removal on the TLO log.

4.0 ELECTRICAL LOCKOUT

4.1 Electrical Lockout



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WARNING

Only Competent ELECTRICAL Workers are authorized to operate electrical isolation devices/switches/circuit breakers that:

- Have a voltage GREATER than 750 Volts
- Feed more than one service (Example: a 480 Volt breaker that feeds a MOV distribution panel)
- Feeds an electrical distribution system (Example: 480 Volt Main breaker that feeds a power to a complete MCC)
- Include removal of fuses from fuse holders

For these isolations NOTIFY AN ELECTRICIAN and refer to the following SOPs:

- EL1 - Lockout/Rack In of 13800/4160/2300 HV Starters
- EL10 - Electrical Power Distribution System Isolation and Lockout Procedure

Isolation of the electrical energy to single service equipment LESS than 750 Volts shall be done only by authorized personnel (Operations) familiar with the operation of the equipment. (Example: a 480 Volt motor starter that provides service to a single pump.)

NOTE

Blanket lockout of substation breakers by Operations during unit shutdown does not require completion of a Zero Energy Plan. This is done to prevent accidental startup of equipment regardless of whether it is being worked on or not.

However, lockout of specific substation breakers for specific jobs during turnaround does require full application GN75 in order to protect the workers.

4.1.1 ALL workers shall DISCUSS job scope, isolation points, ground points and review the permit and Zero Energy Plan as well as any other special requirements.

4.1.2 ALL isolation points shall be recorded on the Zero Energy Plan, except for individual isolations, which must comply with Section 3.1.

4.2 Isolating Electrical Equipment



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WARNING

Do not stop equipment using the isolation device unless the START/STOP or HAND/OFF/AUTO control station is not working correctly in an emergency situation or is inaccessible (e.g. fire scenario or loss of containment).

- 4.2.1 Operations shall STOP or Confirm the equipment is not running AND, if there is a control station, ENSURE the following is completed (where possible):
 - SWITCH HAND/OFF/AUTO station to the OFF position
 - SWITCH REMOTE/LOCAL station to the LOCAL position
 - INSERT LOCK BAR to the STOP BUTTON
- 4.2.2 Operations then proceed to the substation or isolation device to ISOLATE the equipment and CONFIRM the tagging on the isolation device matches the tagging of the equipment that is to be locked out.
- 4.2.3 ISOLATE the equipment by operating (MOVE) the circuit breaker handle/isolation switch fully to the OFF or OPEN position.
- 4.2.4 SECURE isolation by APPLYING operations Unit Lock or lockbox to ALL isolation devices identified in the Zero Energy Plan.
 - IF an electrician is REQUIRED to assist with the isolation method, the electrician shall apply a separate Electrical Craft Lock to that isolation. Operations will then install their own Operations Unit locks or Lockbox lock (for group method).
 - All electrical isolation points shall be tagged with a DO NOT OPERATE tag.
 - If a lock is not readily visible (e.g. behind a normally closed panel/door) ATTACH an additional DO NOT OPERATE tag to the front of the panel/door noting the presence of the lock inside the cabinet.
 - Where locks cannot be applied to an isolation device, at absolute minimum a DO NOT OPERATE tag is required to be posted at the isolation point and at the equipment. Normally non-lockable electrical isolations will be air gapped by an Electrician to ensure it is impossible to start by simply turning "ON" the breaker. In such a case the AIR gapped cables, the breaker and the equipment will all be supplied with DO NOT OPERATE tags which contain the equipment number, the name of the isolator and the date.



WARNING

Breakers are to be used as the standard for electrical isolations. If a piece of equipment can only be electrically isolated by a switch, an Electrician must be called, and they must review the isolation and verify zero energy.

- 4.2.5 VERIFY that the isolation device is locked in the off position by attempting to move the isolating handle to the “On” position after the locks are applied.
- 4.2.6 Operations shall try a TEST START the equipment using the approved start procedures and OBSERVE equipment does not start. In general, this requires:
 - SWITCH HAND/OFF/AUTO station to the HAND position
 - SWITCH REMOTE/LOCAL station to the LOCAL position AND press the START button
 - If there is NO local control station (i.e. remote-controlled equipment) TEST START the equipment using the remote station or by contacting the DCS board operator
- 4.2.7 Operations shall complete the DO NOT OPERATE tag at the control station by updating the “Date Tested” and “Tested by” section on tags.

4.3 Lock Removal and Clearance of Isolation

- 4.3.1 As each worker completes their work, they shall REMOVE their personal locks. Also, each craft must ensure craft locks have been removed and signed off when all of their work is complete.
- 4.3.2 Upon completion of all work, Operations shall VERIFY all worker personal locks have been removed.
- 4.3.3 Operations shall PROCEED to the equipment and VERIFY it is safe to energize the equipment and no workers are in danger. If there is a control station, ENSURE (where possible):
 - HAND/OFF/AUTO station is in the OFF position
 - REMOTE/LOCAL station is in the LOCAL position
 - LOCKBAR is inserted to the STOP BUTTON
- 4.3.4 REMOVE remaining locks (Operations Unit Lock/Lockbox Lock/Electrical Craft Lock) and the DO NOT OPERATE tag from the isolation device.



NOTE

When electricians have ASSISTED with the isolation method and lockout, the electricians craft lock is the last to be removed when the equipment is over 750 Volts. Once the workers have communicated to operations that all work is complete, operations will authorize the removal of the electrician craft lock via the Safe Work Permit.

- 4.3.5 Operations to energize the isolation device for single service equipment. An Electrician is required to CLOSE the isolation device for breakers that feed electrical distribution systems or to RACK equipment which operates at or above 750 VAC.

5.0 BLINDING

Blinding refers to the practice of installing blinds at an open flange, between two flanges, or plugging/capping the open end of a screwed fitting.

Where the blind will be subjected to pressure, the blind thickness shall conform to ANSI/ASME B31.3 SECTION 304.5.3.

Blinds used for non-pressure isolation shall be a minimum of ¼ inch in thickness and shall be identified as a blind with a “T” handle, metal tag, or a stamp. Non-pressure isolation blinds are only permitted when pressure is isolated from the blind by an additional pressure rated blind or DB&B. A good example of this is isolation for confined space during turnaround when battery limits are blinded using pressure rated blinds. The use of non-pressure blinds will be noted on the blind schematic.

Blinds shall be identified as a blind with a “T” handle, metal tag or a stamp. If a blind cannot be identified in this fashion, operations must witness the installation of the blind.

5.1 Blind Lists and Schematics

- 5.1.1 Blind lists and tags are required whenever blinds are used except for blind flanges on open pipe when removing valves, pumps or other equipment for maintenance.
- 5.1.2 Operations shall verify and initial the accuracy of all schematic blind lists.
- 5.1.3 Schematic blind lists showing location, rating, size and tag numbers shall accompany permits. The number of blinds listed on a



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particular schematic blind list is the maximum number of blinds allowed per permit.

- 5.1.4 If a sequence to blinding or debinding is critical, this information needs to be clearly communicated to maintenance personnel, illustrated on the blinding schematics and identified on the safe work permit.
- 5.1.5 During a scheduled maintenance shutdown, a master blind installation and removal book is required. This master blind book consists of ALL the schematic blind lists for a particular Block or Plant. Any unforeseen blinding requires the creation of a schematic blind list which must be added to the master blind book.

5.2 Installing Blinds

- 5.2.1 Refer also to PF7 Installing / Removing Blinds
- 5.2.2 During routine/scheduled maintenance shutdowns, battery limit blinds shall be the first blinds installed and the last removed.
- 5.2.3 The flare will be isolated and blinded once operations has deemed the unit cleaned, de-inventoried, and depressured (i.e., does not require additional flow to flare or pressure relief to flare as a safety mechanism).

NOTE

Flare gas should not be allowed to travel backwards towards the process area, therefore planning and timing of the flare isolation and blinding is imperative.

- 5.2.4 Blinds should be installed at flanges nearest to the work being carried out.
- 5.2.5 When the closest flange is inaccessible or requires extensive scaffolding, blinds may be installed at an alternate flange if BOTH of the following conditions are met:
 - there are no traps, pockets, or connecting lines between the flanges, e.g. instrument impulse lines which cannot themselves be blinded.
 - the line is tested and verified to be free from hazard between the work and the blind.



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- if blinds are required to be installed where the above two conditions cannot be met, a written detailed procedure providing sufficient protection to workers must be developed and approved by the Director Operations and Director Maintenance.
- 5.2.6 When blinding equipment or piping, consider the possibility of thermal expansion of contained liquids. Provisions must be made to relieve any pressure resulting from such expansions, e.g. thermal relief valves, open vents, etc.
- 5.2.7 A bleeder blind should be used where piping does not have a vent or a drain to enable depressuring; and where block valves pass and there is no means of depressuring.
- 5.2.8 Each area is responsible for the safe storage and care of unit dedicated blinds.
- 5.2.9 Each blind tag shall have the Block or Plant designation listed above the blind number. e.g. "BLK A" or "PLANT 51".
- 5.2.10 For each number there shall be two blind tags: one red and one white. Whenever tags are not in use, they are located on the board with the red tag showing.
- 5.2.11 Before blinding, Operations will remove necessary tags from the board and hang both red and white tags at each of the precise points to be blinded. Operations will then update the master blind schematic with the location and numbers of blind tags hung.
- 5.2.12 When Maintenance personnel obtain a permit to INSTALL blinds, they will receive a copy of the schematic blind list and, if required, will be shown the exact blinding locations and tags. Once the blinds have been installed, Maintenance will ensure both tags remain attached, return the permit, and sign off the master blind schematic. Operations will then verify the installation/location of the blinds per the schematic, return the white tags to the blind tag board, and sign off the master blind schematic.
- 5.2.13 When Maintenance personnel obtain a permit to REMOVE blinds, they will receive a copy of the schematic blind list and, if required, shall be shown the blinds and tags. Once they have removed the blinds, they leave the red tags at the flanges, return the permit, sign off the master blind schematic, and return the blinds to the blind bin. Prior to the end of shift, Operations shall confirm the removal of



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the blinds, remove the red tags, replace them on the blind board covering the white tags, and sign off the master blind schematic.

CAUTION

When blinding or deblinding requires the use of supplied air breathing apparatus, a safe environment must be verified prior to removal of this protection.

5.2.14 In the event of having more than 1 permit issuer/shift in the starting up or shutting down phase of a block, all other permit issuers on that shift will co-authorize the permit for battery limit blind installation and removal.

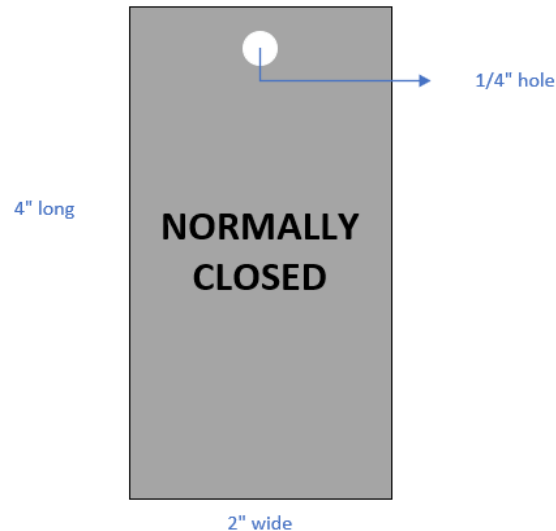
5.2.15 When spectacle blinds are used, the same tagging procedure above is employed. Spectacle blinds can either be in the blinded or open position when in normal operation.

5.2.16 The blind tag boards will be able to tell you the following:

- If both tags of a certain blind number are gone, then the tags are at the blinding point, or the blinds are being installed.
- If only the white tag is on the board, then the blind has been installed and verified. The only exception would be when a blind has been removed and the red tags have not yet been returned to the board.
- If both tags are on the board with the red one visible, then the blind has been removed and verified.
- In the case of some blinds, closed may be the normal position. In these cases, a vent/spec tag on the board would indicate open position of the blind and a normally closed tag will be hung in front of the white one.



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5.2.17 Multiple tagging of a single blind point is acceptable in cases where the blind is being used for more than one job or jurisdiction (e.g. battery limit blind providing isolation for two different areas). The blind cannot be removed until authorized by all tag owners.

5.2.18 Blinding on either side of battery limit valves is acceptable for isolation. When blinding at battery limits, consideration must be given to the work being done when choosing which side of the valve to install the blind.

For Abandonment Piping refer to GN78.

6.0 ISOLATION AND LOCKOUT OF PROCESS EQUIPMENT USING VALVES

Operations will fill out the applicable Risk Assessment (as assigned by the General Manager Operations) prior to isolating process equipment to identify, assess and control hazards. Special attention shall be paid to the sequence of isolation and the plan to open equipment to atmosphere and break the pressure boundary. These will be reviewed at the Shift Meetings.

When isolating process equipment, double-block and bleed or blinding are the preferred methods of isolation. If this cannot be achieved, refer to section 6.2. Block in all valves necessary to isolate the equipment from the process fluid. Consider all sources of process energy including seal barrier fluid and discharge pulsation dampers.



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If the equipment has a bleed to flare, open the bleed and listen for flow. Check pressure gauges to verify that the equipment is depressuring.

See OP-3 for steam and N₂ purge instructions (if applicable).

Ensure that any flare connections are blocked in and locked.

De-pressure the equipment by opening bleed, vent and/or drain valves.

CAUTION

Make careful consideration of temperature, pressure and type of process fluid when opening drains or bleeds to atmosphere. Allow equipment to cool if necessary. Avoid draining liquids to pad, use drain hoses secured and directed to the oily water sewer.

CAUTION

If drain valves are plugged, follow the Standard Operating Procedure "OP-1-Clearing Plugged Drain Valves".

Determine if isolation valves are holding by observing flow from drains or bleeds. If positive isolation cannot be achieved, close the bleed and/or drain valves and attempt to reseal the isolation valves. Determine if other valves upstream or downstream can be used for isolation.

Operators must lock each isolation valve hand-wheel such that the hand-wheel cannot be turned any more than one-half turn after the valve is shut tight.

If isolation valves are equipped with air or nitrogen actuators, the valves must be hand jacked closed/locked and the energy source (air or nitrogen) must be blocked in, locked or otherwise de-energized.

If isolation valves are electrical Motor Operated Valves (MOV's) the "ELECTRICAL LOCKOUT" procedure (Section 4) must be followed. In addition, the hand wheel must be locked to prevent manual opening.

Operations are to tag open bleed or drain valves so that they are easily identified when the equipment is to be re commissioned.

Prepare the Zero Energy Plan utilizing the unit lock, group lock box or complex isolation methods described in Sections 2 and 3.



6.1 Double Block and Bleed (DB&B)

6.1.1 Double Block & Bleed is an isolation using 2 block valves with a bleed valve in between. The distance between the two block valves should be as short as possible to reduce the possibility of buildup of debris that could plug the bleed.

NOTE

A control valve can be used as part of a double block and bleed isolation as long as the valve can be put into manual, does not have a mechanical stop and is locked as per Section 6.1.3.

6.1.2 When isolating by this method, Operations shall CLOSE the flow line block valves and OPEN the bleed valve. Ensure the bleed is not plugged and drain hoses are not attached.

6.1.3 Operations shall install lock(s) so that the isolation valves are secured in this position. It will also be acceptable to secure the bleed in the open position with a numbered cable car seal or a numbered high grade polypropylene seal, providing the number is identified on the Zero Energy Isolation/Lockout Plan.

6.1.4 If DB&B's are recorded on a blind schematic they must still be recorded and managed using the Zero Energy Isolation Plan.

6.1.5 A DB&B with a passing block valve must be authorized through the hazard assessment in Appendix A (other than streams identified in 6.2).

6.1.6 For a double block without a bleed, single isolation standards apply.

6.2 Single Isolation

6.2.1 Conditions for working under single isolation

Single Isolation may be used only where Blanking/Blinding or DB&B is not Reasonably Practicable. If any of the conditions below cannot be met, specific certification for the use of single isolation by a P. Eng through the Appendix A risk review process must be obtained. The approval is valid for a single instance only.



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Single isolation does not require an Appendix A for equipment and piping systems when all the following conditions are met:

- The piping and/or equipment is rendered to a state of Zero Energy confirmed by Operations,
 - Piping and or equipment is de-inventoried by draining, venting purging or fushing **and**
 - Piping and or equipment does not contain pressure and has a verified open path from the isolation point to atmosphere
- replacement equipment/component is close by and ready for immediate installation, **and**
- work can be completed within equivalent exposure time to install and remove blinds/blanks/plugs/caps, **and**
- the open process piping will not be left unattended and valves will be left in a desired position through mechanical means (either car seal or chain and locks) that is strong enough to withstand unintended movement, **and**
- Scope of work does not include either of the following
 - Hot Work
 - Confined Space Entry

6.2.2 In addition, the following low-risk services can be completed under single isolation without following the Appendix A process:

- steam tracing and 50# trap servicing
- low pressure water and condensate systems
- air services
- lube/seal oil service (lube/seal pump driver de-energized/locked out)
- Turbines/pumps/Compressors/Other driven equipment – See Section 9 for details

If positive isolation still cannot be achieved, use of the risk assessment/approval process in Appendix A (sections 1, 6-9 only) will be followed.

6.3 Work for which Valve Lockout is Not Required

6.3.1 In turnaround situations or when entire systems have been blinded/gas freed, valves which are gas free each side that are closed for local work (excluding confined space) do not require locks or use of Appendix A.



7.0 SPECIAL ISOLATION METHODS

- 7.1 For all special isolation and increased level of approval is required and a formal hazard assessment needs to be completed.
- 7.2 For freeze plug applications, refer to GN27- Freeze Plug Application.
- 7.3 For mechanical plug (e.g. carber) applications, refer to manufacturer specifications. Note that mechanical plugs come in two types: single isolation and double isolation with bleed.
- 7.4 Lockout by air gapping or removal of key equipment components requires that the isolation point be tagged and recorded (when applicable) on the Zero Energy Plan.
- 7.5 A PSV confirmed to be holding where there are no downstream valves providing isolation on the system, relieving to a low pressure system can be used as an isolation point for the purpose of replacing a rupture disc or installing a blind if the job is of short duration. (Appendix A form required)
- 7.6 Elevator Isolations will be performed by, and in accordance with, the equipment manufacturer or certified representative. The equipment manufacturer shall provide a procedure in which to perform work on the elevator and associated equipment. The procedure will be reviewed by Suncor representation and must meet or exceed Suncor and regulatory requirements.
- 7.7 De-railers/locked switches are isolation methods to prevent rail car or engine movement on a track in which personnel or property may be at risk of being struck. De-railers/locked switches will be identified on the Zero Energy Roster. Blue flags are an administrative control and also have to be installed.
- 7.8 For isolations requiring a trained and qualified Rope Access Technician to perform the isolation, a Safe Work Permit will be issued to identify the proper isolation point. While completing the isolation, an Operations representative must visually confirm the correct piece of equipment has been isolated. If the isolation point cannot be visually seen, another means of verification must be performed to confirm the correct equipment has been isolated as per the isolation plan. After the isolation is complete, the Rope Access Technician will initial the zero energy roster as the Installer, with the Operations Representative that witnessed the isolation initialing as the Independent Verifier.



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- 7.9 For isolations involving a Radiation source of energy, personnel will follow GPR-A-13-9: Edmonton Refinery Radiation Safety Policy and Procedures manual.
- 7.10 Heating Ventilation and Air Conditioning (HVAC) Technicians will follow Refinery document MN1: Working on Energized HVAC Equipment up to 480V.

8.0 WORKING ON LIVE EQUIPMENT

- 8.1 If any equipment requires servicing, repair, testing, with the energy source live (not covered by existing Suncor procedure), a trade specific procedure must be developed and approved in writing by the General Manager of Operations and the Director Maintenance.
- 8.2 Work must never be performed on an isolation point that is part of an active lock-out/tag-out without the work scope being identified on the safe work permit. This will include Operations to verify the suitability of the isolation to perform the work. (ex: re-routing chain through valves).
- 8.3 For work on a live flare line, refer to GN-24 Working on a Live Flare Line.
- 8.4 Electricians may require energized breakers or equipment for PM's or trouble shooting works. The energized breakers must be identified on the Safe Work Permit and Electrical Procedures followed.
- 8.5 HVAC Technicians working on energized equipment will refer to Refinery document MN1: Working on Energized HVAC Equipment up to 480v.

9.0 STANDARD ISOLATIONS

The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate. Deviation of the standard isolations may require Appendix "A" and P. Eng approval.

- 9.1 **Isolation for pump or compressor work that is external to pump or compressor**, including:
- Coupling Work (inspections / removals / installs / alignments)
 - Lube Oil Changes
 - Lube Oil System Work, that does NOT include removing a bearing housing cover.



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9.1.1 **Pump / Centrifugal Compressor:** Discharge valve is closed and locked.

9.1.2 **Turbine:** Inlet and exhaust valves are closed / locked, and the turbine is depressured & mechanically tripped.

9.1.3 **Motor:** Racked out and locked as per Section 4.

9.1.4 **Verify:** Turbine isolation valves are holding and the shaft is stationary.

9.1.5 **Reciprocating Compressors:** For Reciprocating Compressors, to rotate the flywheel to facilitate decoupling, the compressor must be depressured with proven isolation on the inlet and outlet valves.

9.2 **Isolation for pumps or compressors for work on their secondary seal systems or for bearing inspections, including:**

- Any secondary seal component work (seal oil vessel inspections / bladder changes, PSV replacements, heat exchangers cleaning / inspection)
- Pump / Compressor Bearing Inspections

The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate.

9.2.1 **Pump / Compressor:** Suction and discharge valves are closed and locked, and the pump / compressor is drained and depressured.

9.2.2 **Turbine:** Inlet and exhaust valves are closed / locked, and the turbine is depressured & mechanically tripped.

9.2.3 **Motor:** Racked out and locked as per Section 4.

9.2.4 **Verify:** Pump / compressor / turbine isolation valves are holding and the shaft is stationary.

WARNING:

- For Pumps / Compressors that have a pressurized secondary seal, the Pump / Compressor must be depressured BEFORE the secondary seal system can be depressured.



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9.3 Isolation for Pump or Compressor work that is internal to the equipment, including:

- Seal changes
- Impeller / Rotor / shaft work
- Bearing Changes

NOTE

The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate.

9.3.1 **Pump / Compressor:** Suction and discharge must be DB&B or blinded.

9.3.2 **Turbine:** Inlet and exhaust valves are closed / locked, and the turbine is depressured & mechanically tripped.

9.3.3 **Motor:** Racked out and locked as per Section 4.

9.3.4 **Verify:** Turbine isolation valves are holding and the shaft is stationary.

9.4 Isolation for Turbine work external to the steam chest, including:

- Governor work
- Trip Mechanism work
- Turbine Bearing Inspection
- Coupling work (inspections / removals / installs / alignments)

Note: The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate.

9.4.1 **Pump / Compressor:** Discharge valve is closed and locked.

9.4.2 **Turbine:** Inlet and exhaust valves are closed / locked, and the turbine is depressured & mechanically tripped.

9.4.3 **Motor:** Racked out and locked as per Section 4.

9.4.4 **Verify:** Turbine isolation valves are holding and the shaft is stationary.

9.5 Isolation for Turbine work internal to the steam chest, including:



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- T&T replacements
- Trip Packing
- Carbon changes
- Rotor work / shaft work
- Turbine Bearing changes

Note: The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate.

9.5.1 **Pump / Compressor:** Discharge valve is closed and locked.

9.5.2 **Turbine:** Inlet and exhaust valves are DB&B or blind & mechanically tripped.

9.5.3 **Verify:** The shaft is stationary.

9.6 **Isolation for Motor work, including:**

- Motor replacements / overhauls
- Motor bearing changes

Note: The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate.

9.6.1 **Pump / Compressor:** Discharge valve is closed and locked.

9.6.2 **Motor:** Racked out and locked as per Section 4.

9.6.3 **Verify:** The shaft is stationary.

9.7 **Isolation for Work on Gear Boxes that are a separate piece of equipment from the driver or the driven machinery.**

Note: The isolations below cover typical isolation points and sets the minimum standard. Operations must ensure that all other relevant isolation points are identified and isolated as appropriate.

9.7.1 **Pump / Compressor:** Suction and discharge valves are closed and locked, and the pump / compressor is drained and depressured.

9.7.2 **Turbine:** Inlet and exhaust valves are closed / locked, and the turbine is depressured & mechanically tripped.



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9.7.3 **Motor:** Racked out and locked as per Section 4.

9.7.4 **Verify:** Pump / compressor / turbine isolation valves are holding and the shaft is stationary.

9.7.5 **Sundynes:** In the case of Sundyne gear boxes, single isolation is NOT acceptable, DB&B or blinding is required.

NOTE

For work on gearboxes, there is a higher chance of injury due to pinch points were the shaft to spin inadvertently and that is why the isolation requirements are different than a typical coupling inspection

NOTE

Blocking in both sides of a pump or compressor can lead to overpressure scenarios due to temperature changes, so it should be confirmed that the blocked in section has over pressure protection.

10.0 First Break Procedure

The First Break procedure refers to the practice of identifying where the pressure envelop is to be physically disconnected on de-energized equipment within the process units by having a qualified Operations Representative present during the disconnect or labelling the location in the field with a 'First Break' tag (See First Break Tag Method).



DATE	
FIELD VERIFIER	PERMIT ACCEPTOR

10.1 First Break Process

10.1.1 Operations shall ensure that the first break of a pressure envelope occurs at the proper location by having a qualified Operations Representative physically present until zero energy has been confirmed from the first break location or clearly identifying the location of the disconnect with a First Break tag.

10.2 First Break Tag Method

10.2.1 If using the First Break tag, the tag must be installed after the Zero Energy Plan has been established.

10.2.2 First Break Tags are affixed by the Initial Isolation Installer or an Operations Representative during the joint field scope review with the Permit Acceptor.



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- 10.2.3 During the joint field verification an Operations Representative and the Permit Acceptor will initial the First Break tag acknowledging the agreed upon location of the break point.
- For more details on joint field verification refer to GN59 ISSUING AND ACCEPTING A SAFE WORK PERMIT
- 10.2.4 The tag may be relocated to a more practicable location during or after the joint field verification, assuming that the location is:
- Agreed upon by an Operations Representative and the Permit Acceptor
 - Within the existing Zero Energy Plan
- 10.2.5 Once the equipment or system has been disconnected at the applicable First Break location, the Permit Acceptor or designated worker shall remove and discard the First Break Tag.

NOTE

During Scheduled Unit Shutdowns and Turnarounds

First Break procedure requirements are not required once the battery limit blinds have been installed, and the hazardous energy is being controlled through a master blind installation and removal book.

END



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Revision Record		
Rev.	Date (yyyy/mm/dd)	Revision Notes
1	2017/09/21	Added steps 7.10 and 8.5. Reworded steps 9.3, 9.3.1, and 9.3.2.
2	2019/05/27	Removed RP51/54 reference as they were revoked and replaced with GN78, GN98 & EL10. Added Coker Isolation/Lockout changes.
3	2020/02/04	First break procedure added.
4	2023/10/12	Minor change. First break updated to allow Ops representative to be physically present as an alternative to hanging first break tag.

Feedback –

General Comments:

Suggested Improvements:

Details

Functional Location:

Start:

End:

Associated GN75-B Form #:

Safe Work Permit Numbers:

This document is to be completed per the requirements of SOP GN75 ISOLATION AND LOCKOUT OF HAZARDOUS FLUIDS AND ENERGY.

To protect workers by establishing a minimum standard for the isolation and lockout of hazardous energy and fluid associated with equipment prepared for maintenance or construction activities.

This safe work practice is intended to ensure compliance with Part 15 of the Alberta Occupational Health and Safety Code.

Complete the entire form under the following circumstances:

- For single isolation (other than those exempt in GN-75 6.2.2) where it is not reasonably practicable to provide blinds or double block and bleed, and single isolation provides adequate protection to workers
- When risks of single isolation are generally the same or less than the risks of installing blinds
- For work under double block with no bleed, or double block and bleed with bleed passing

Complete only sections 1, 6, 7, 8 and 9 under the following circumstances (note: P. Eng approval is not required in this case):

- Where single isolation is approved under GN-75 6.2.2, but positive isolation cannot be achieved, and a significant hazard exists as identified in the Hazardous Commodity Table (e.g. Installation of blinds while isolation valve is passing)

Section 1 – General

Job Description:	
Trades Involved:	

Section 2 – Work Justification

Describe Alternatives to and Justification for working under single isolation	
---	--

Section 3

Signed copy GN75B Zero Energy Lockout List will be provided by permit issuer.

Section 4 Valve Characteristics

Type of Valve:	
Size of Valve:	
Valve Orientation (vertical/horizontal – fouling effects?)	

Identify any Sealing/Seating or Steam Leakage issued (deposits, etc.):	
--	--

Section 5 – Single Isolation Integrity

List method used to verify/test integrity of single isolation:	
Drain Valve	

Section 6 – Fluid Properties to be Isolated by Single Isolation

Fluid Name:	
Pressure:	
Temperature:	
Flammability – Flash Temperature:	
Auto Ignition Temperature:	
Liquid, Vapour or Slurry:	
Toxicity:	
Corrosive:	
Solids/Deposits:	

Section 7 – Mitigation Steps

If Valve Passes, Describe Mitigation Steps:	
---	--

Section 8 – Precautions for First Break and Ongoing Work

Chemical Protection (chemical suites, gloves, face)	
Respiratory Protection:	
Eye Protection:	
Line of Fire:	
Egress:	
Location of Shower/Eye Wash:	
Fire Equipment/Crew required at Work site (if yes, specify):	

Approvals

Maintenance Coordinator/Supervisor		
Manager Area Ops/Operations Coordinator/Shift Supervisor		
Engineer (P Eng req'd only for GN75 5.1 Applications)		

The undersigned agree that work under the single isolation described provides adequate protection to the workers and the job can proceed safely.

Hazardous Commodity Table

Serious Injury or Fatality Potential		
Toxic	At or above Occupational Exposure Limit (OEL), or Asphyxiating Gases (associated with Confined Space Entries or First Break work)	
Flammable	Flammable Liquids, Combustible liquids within 8°C / 15°F of flash point, Hydrocarbon above auto-ignition temperature, or Liquefied and supercritical flammable gases	
Reactive	Pyrophoric material, Air / water reactive material, or Liquid Oxygen	
Corrosive	Hydrofluoric Acid, Sulphuric Acid, Caustic, etc, or Aerosolizing highly corrosive (i.e., Chlorine, Bromine)	
Physical Properties	>1000 PSI, >93°C in liquid state, or >204°C in vapour state	>200 to 1000 PSI, >60 to 93°C in liquid state, or >60 to 204°C in vapour state

Process Planning Documentation

The below table defines the required Decontamination and Process Planning documentation, for any role executing work, based on the hazards identified in the Hazardous Commodity Table above.

	Required Documentation	Responsible Person
Detailed Mitigation Plan (Process Plan) - Energy Isolation Plan - Breaking Containment - Confined Space Entry	Plans shall identify and mitigate the potential safety hazards associated with the work. Documented Mitigation Plan (i.e. Process Plan) - Formal Hazard Assessment (FHA) - Work Instruction and/or Procedures - Documented Isolation Plan - Isolation visual representation - Documented decontamination plan (i.e. Draining, Purging, Zero Energy Checks, etc) - Vent/drain management plan (In alignment with CHE Best Practice) - PPE and line of fire consideration - Return to service checklist	Competent Isolation Plan Approver (as outlined by site in alignment with risk level escalation) Endorsement from Operations Shift Supervisor/Team Lead Note: Competent Operator (Area Operating Authority) can develop the Isolation Plan documentation and provide drawing/sketch
Partial Mitigation Plan (Process Plan) - Energy Isolation Plan - Breaking Containment	Plans shall identify and mitigate the potential safety hazards associated with the work. - Work Instruction and/or Procedures - Control of Hazardous Energy (<i>Documented Isolation Plan may not be required for Operations minor maintenance tasks</i>)	Competent Operator (Area Operating Authority)

Exemptions to this are listed in 6.2.2

This document is to be completed per the requirements of SOP GN75 ISOLATION AND LOCKOUT OF HAZARDOUS FLUIDS AND ENERGY.

SUNCOR EDMONTON REFINERY ZERO ENERGY ISOLATION / LOCKOUT LIST - GN75			WORK TO BE PERFORMED			
DATE:						
FORM # (Initial Safe Work Permit No.)						
EQUIP NUMBER:						
EQUIP DESCRIPTION:						
schematic or notes (if req'd)						
Function location						
BLIND SCHEMATIC(S) ATTACHED? Y N/A			TOTAL LOCKS APPLIED			
APPENDIX 'A' ATTACHED? Y N/A			ISOLATION VERIFIED BY:			
TYPE OF ISOLATION	LOCATION OF ENERGY ISOLATION	Normal Position	OPERATIONS LOCKBOX OR UNIT LOCK			
Single Valve, DB&B Air Gap, Breaker, Switch, etc			Lockbox Lock or Tag#	Date Installed	Installed by - Initial	Removed by - Initial
Ops Unit Lock Applied to Lock Box (N/A if lockbox not used)						

Distribution: Master: STL binder, copies to lockbox and permit acceptor (if req'd)

Suncor Edmonton Refinery Zero Energy Roster (ref. GN75)

Section 1: Complete only if workers applying individual locks on lockbox or in field

Workers Installing Personal Locks (print)	Initial	Personal/Craft Lock Identifier		Workers Installing Personal Locks (print)	Initial	Personal/Craft Lock Identifier

Section 2: Craft Lock Log - Craft locks not to be used for primary worker protection. Craft locks remain until job completion.

Worker Installing Craft Lock (print)	Initial	Identify Company, Craft and Lock	Worker Removing Craft Lock (print)	Initial

Section 3: Complete only if acting as 'Lockout Authority' by applying personal lock for multiple workers under Complex Group Isolation					
By completing this section, person acting as 'Lockout Authority' is responsible to ensure their locks adequately protect workers acting under the lockout authority. Prior to lock removal, 'Lockout Authority' will notify workers that lockout protection is being removed, that no further work is authorized, will ensure workers are clear, and sign lock removal declaration. Complex group has to be approved by a P. Eng.					
Lockout Authority Name (print)	Initial	Lock Identifier	Identify Group Protected (company, trade, etc.)	Lock Removal Declaration (sign)	P. ENG Approval (print and sign)

Alternative Isolation: An Alternate Isolation is a Non-Standard Isolation and may be used to achieve system isolation when process/mechanical isolations are not possible based on the equipment/system or when an appropriate operating window (e.g., a plant shutdown or turnaround) is not available to perform a critical repair or improvement. Examples of Alternate Isolations may include: • Freeze plugs or Stopples • Mechanical plugs (e.g., Carber plug) • Using control valves as Isolation Devices.

Operations: An operating crew that safely monitors all processes and equipment within the process unit assigned.

Isolation Author: Develops an isolation plan to mitigate the risks associated with all sources of Hazardous Energy. The isolation plan is developed by Operations. Operations Coordinator or designate will approve planned isolations. Shift Team Leads can design and approve isolation plans for emergency and urgent work. Approved isolation drawing will be stored in Operator Log Tool. Electricians will provide Operations with Zero Energy Plan and Ground Requirements as part of the developing the isolation plan.

Installer: Person who performs the initial isolation or lock-out of hazardous energy. The installer must put their initials on the Zero Energy Roster under the “Installed By” column.

Independent Verifier: The independent verifier confirms zero energy, that the isolation is appropriate for the work scope, and that the correct equipment is locked out/tagged. This person cannot be the same person as the installer. The printed name of the Independent Verifier will be recorded on the Zero Energy Isolation plan under the “Isolation Verified By” field. Person who visually CONFIRMS the CORRECT equipment required to be locked out/tagged as per the isolation plan. This person cannot be the same person as the installer. The printed name of the Independent Verifier will be recorded on the Zero Energy Roster under the “Isolation Verified By” field.

Individual Isolations: Also known as self isolation, is intended for a short duration, where the completion of group isolation offers no significant value in terms of risk reduction

Zero Energy Roster: This form is reviewed and signed by all workers that will be working on the equipment. The form will also identify each workers lock number. Copies will be secured in the lock box and in the permit office

Blind Schematic: A list showing location, rating, size and tag numbers shall accompany permits. The number of blinds listed on a particular schematic blind list is the maximum number of blinds allowed per permit.

Uncontrolled When Printed



CONDITIONS TO PERFORM WORK AGAINST SINGLE ISOLATION VALVES

Alberta Occupational Health and Safety (AB OH&S) Code Section 215.5(5) states "if it is not reasonably practicable to provide blanking, blinding or double block and bleed isolation, an employer must develop and implement procedures for an alternate means of isolation certified by a professional engineer as safe and appropriate for the protection of workers".

Section 9(2) and 9(3) on Hazard elimination and control states that:
9(2) "If reasonably practicable, an employer must eliminate or control a hazard through the use of engineering controls".

9(3) "If a hazard cannot be eliminated or controlled under subsection (2), the employer must use administrative controls that control the hazard to a level as low as reasonably achievable".

Based on interpretation of requirements of AB OH&S Codes, single valve isolations are permitted for equipment and/or piping systems if all the following conditions are met:

1. the piping and/or equipment is rendered to a state of zero energy confirmed by Operations. Zero energy is defined as:
 - a. Piping and/or equipment is de-inventoried by draining, venting, purging or flushing, and
 - b. Piping and/or equipment does not contain pressure and has a verified open path from the isolation point to atmosphere.
2. Work can be completed within equivalent exposure time to install and remove blanks/blinds
3. Open piping and/or equipment will not be left unattended, and the valves will be left in desired position through mechanical means (either car-sealed or chain and lock) that is strong enough to withstand unintended opening, (reference: AB OHS Code, Section 215.5(4)).
4. Scope of work does not include either of the following:
 - a. Hot work (reference: AB OHS Code, Section 169(2)(b)(iii))
 - b. Confined space entry (reference: AB OHS Code, Sections 49(1), 49(3), and Part 15).
5. Prior to commencing work, a risk assessment is completed for working against single isolation:
 - a. With participation from workers that will be performing the work with potential to be exposed (reference: AB OHS Code, Section 9)
 - b. Reviewed and approved as per ARO table with the Risk Responsible accepting the risk (reference: Manage Operational Risks OEMS Process Standard, Section 2.3.6)
 - c. For MIH scenarios, critical controls are identified and validated by critical control owners (reference: Manage Operational Risks OEMS Process Standard, Section 2.3.7, 2.3.8 and 2.4.2).
 - d. Risk Responsible approves the risk and ensures critical controls are implemented (reference: Manage Operational Risks OEMS Process Standard, Section 2.4.2, 2.4.3).

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If the above-mentioned criteria are met, single valve isolation is considered approved by this letter as:

1. An administrative control with
2. Risk of performing work assumed as per Suncor Manage Operational Risk OEMS Standard and
3. Not requiring an individual professional engineer to approve working against single isolation valve.

References:

1. OCCUPATIONAL HEALTH AND SAFETY CODE, Alberta Regulation 191/2021, December 10, 2024
2. Manage Operational Risk, OEMS Process Standard, MOR ST6.0, Revised Date: September 21, 2023

Next Revision:

This document should be reviewed for revision when:

1. There is a revision made to AB OH&S Code
2. A revision made to Manage Operational Risk OEMS Process Standard

Signed:


Jitendra Torwar, P.Eng.
(APEGA Membership No.: 81432)
Date: 18th February, 2025

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The following individuals have aproved this document

UserName: Jared Walsh

Title:

Date: 2025-02-21

Meaning: I approve that this document is valid

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