1.0 PURPOSE

The purpose of this program is to establish minimum requirements for identifying and isolating energy sources and employing lock, tag and try procedures to prevent injuries to workers from the unexpected energization, start-up or release of stored energy from machines, equipment or processes during construction, construction start-up, servicing or maintenance.

2.0 SCOPE

This program applies to all St. Francis Xavier University (StFX) work sites, including contractor operations. All legislative jurisdictional, StFX and contractor requirements will be reviewed, and the more stringent requirements will be applied.

3.0 RESPONSIBILITY

3.1 Managers

- Verify the overall operation and jobsite activities as they pertain to this program;
- Ensure supervisors and workers are adequately trained;
- Appoint the authorized persons.

3.2 Supervisors

- Verify that this program is implemented and followed by workers in the field;
- Ensure workers are adequately trained;
- Direct, monitor, and manage workers under their supervision;
- Monitor implementation and operations for compliance.

3.3 Workers

- Comply with the elements of this program;
- Comply with all legislative jurisdictional requirements and site specific requirements;
- Follow the direction and instructions of their supervisor.

4.0 DEFINITIONS

4.1 Affected Person

A worker whose job requires him/her to work in an area in which this lockout program is used to attain a zero-energy state.

4.2 Authorized Person

Any person working for an employer who implements a lockout and is deemed competent to safely perform the task by formal education, experience, or a combination of both.

4.3 De-energized

A state where equipment or systems contain no stored or residual energy.

4.4 Energy

Energy includes electrical, mechanical, pneumatic, hydraulic, thermal, chemical, gravitational, or any other form of energy that may be hazardous to a worker including any source of energy that could activate moving parts or release energy and cause injury to a worker.

4.5 Energy Isolating Device

A mechanical device that physically prevents the transmission or release of energy designed such that it cannot be unintentionally or readily removed without the use of force or by destructive means. An isolation device may be utilized to hold open, restrain, regulate, or redirect a source of hazardous energy. An energy isolating device is not a pushbutton, a selector switch or other such circuit control devices.

4.6 Group Isolation

A process used where more than one worker isolates a single piece of equipment or system.

4.7 Isolated

A state in which a system is protected with a mechanical device that prevents the system from inadvertently becoming activated.

4.8 Lock Box

A lockable container secured by subsequent locks placed on the outside by affected workers for holding the authorized person's key.

4.9 Lockout Device

A Lockout Device is anything that keeps the energy source away from a machine. This could be as simple as a lock that makes a switch impossible to reach or to turn on, hasps or other devices for specific energy isolating devices. For the purposes of this program, "lock" may also mean "lockout device" depending on the energy isolating device on the equipment being locked out.

4.10 Lockout Hasp

A lockout device that allows more than one padlock to be applied to an energy isolating device. These hasps are often referred to as scissor, gang, or multi-locks.

4.11 Lockout Procedure

A written procedure that lists all switches, controls and/or valves that must be secured in the de-energized position to control energy sources. A lockout procedure is attached to a lock box for lockouts that involve more than one energy source. The lockout procedure must be thoroughly reviewed and validated before the lockout is completed and work begins.

4.12 Lockout/Tagout

The placement of a lock and tag on the energy isolation device in accordance with an established procedure indicating that the energy isolating device or the equipment to be controlled shall not be operated until removal of the lock and tag.

4.13 Owner/Client Representative

A person assigned or delegated to act on behalf of the owner or client.

4.14 Padlocks

A lockout device applied to the isolation point of an energy source that will effectively prevent an energy source from inadvertently becoming activated and is removed by the use of a key.

4.15 Tag (Identification)

A tag that meets the requirements of this program and easily identifies that a device is isolated.

4.16 Try/ Verify

This is the final step in de-energizing a system. Verify/Try equipment zero energy state by attempting to operate it.

5.0 PROCEDURE

Isolation refers to the securing of a system to a source of energy such that the isolation system will prevent an inadvertent release of energy that could cause or lead to a major injury or damage to equipment or loss of production.

Isolation verifies that electrical, mechanical, hydraulic, pneumatic, gravitational, or any other form of energy will not cause an unintended motion, start-up, release, or energization of machinery, equipment, or process systems.

Prior to any maintenance, servicing, construction, or any other work undertaken on equipment or machinery, all associated sources of energy must be identified and measures taken to de-energize and isolate those sources of energy from being inadvertently activated.

5.1 Hazards

- Activation of energized equipment or systems;
- Exposure to harmful substances; and
- Release of stored energy.

5.2 Controls

5.2.1 Engineering

Prior to any maintenance, servicing, construction, or any other work undertaken on equipment or machinery, all associated sources of energy must be identified and measures taken to de-energize and isolate those sources of energy from being unintentionally activated.

5.2.2 Administrative

- Unless otherwise agreed upon, the owner/client will de-energize and isolate the required equipment or machine. The owner/client representative will install their hasp, lock(s) (isolation) and tag(s) on all applicable energy isolation points.

- A lockout procedure is always completed when more than one energy isolation point is involved in the lockout sequence. The project manager/supervisor must verify that the lockout procedure is implemented.

- Where required, the authorized person will obtain permission or a permit to work on the equipment or machinery from the owner/client.

- If the authorized person is completing the de-energization and isolation of the equipment or machinery, they are to communicate, train and instruct on the purpose and use of the overall procedure. They will verify their actions will not cause injury, equipment damage, process failure, or disruption.

- An accurate listing of the location of all energy isolation points and isolation devices will be maintained by the authorized person on the Energy Isolation Log Form.

  This log shall contain:

  - Equipment identification information;
  - Name of individual who isolated a system;
  - Location of the isolation;
  - Date isolation installed;
  - Date isolation removed;
  - Lock number;
  - Permit number; and
  - Signature of the authorized person.

5.3 Isolation Steps

- An authorized person will contact an owner/client and review all energy isolation points associated with the equipment or machinery. The isolation points shall be identified through review of drawings, process and flow diagrams, equipment specifications and by physical inspection of the work site.

- Where required, the authorized person will obtain permission or a permit to work on the equipment or machinery from the owner/client.

- Unless otherwise agreed upon the owner/client will de-energize and isolate the required equipment or machine. The owner/client representative will install their hasp, lock(s) (isolation) and tag(s) on all applicable energy isolation points.

- If the authorized person is completing the de-energization and isolation of the equipment or machinery they will verify their actions will not cause injury, equipment damage, process failure or disruption.

- The authorized person will physically identify the equipment or machinery that has been isolated and confirm all sources of hazardous energy are de-energized, isolated and discharged.

- The authorized person must review the complete system to verify that all computer software controls, motor controls and other circuits that control energy sources cannot cause inadvertent energization of the isolated equipment.

- The authorized person will apply their personal lock and tag to each energy isolation point(s) using a lockout hasp.

- After the authorized person has installed their lock(s) and tag(s) they will physically confirm that the isolation is effective, correct and the energy source cannot become inadvertently activated. With electrical equipment the authorized person or lockout authority will test and try all manual control points and remote start devices or points to verify the machinery or equipment does not activate.

- An accurate listing of the location of all energy isolation points and isolation devices will be maintained by the authorized person on the Energy Isolation Log Form.

- The workers involved in working on the isolated machinery or equipment will review and confirm the energy isolation points.

- Upon completion of review the workers will install their personal locks and tags on each energy isolation point or lockout box.

- When the equipment to be worked on is high voltage electrical gear (480V or higher), the electrical/mechanical supervisor or designate will verify proper de-energization and lockout/tagout of all energy sources. Electrical PPE must be worn as required during high voltage electrical work and at other times as deemed necessary to protect from arc-flash injuries.

5.4 Isolation Control

- Only locks assigned by StFX will be used by employees for the purpose of isolation control, unless otherwise specified in the project specific safety plan.
- The employee will be given a single key for their lock and shall retain the key on their person at all times. No duplicate keys are permitted or kept.
- Only the employee who has installed a lock on an isolation point may remove their lock. No other person is allowed to remove another employee's lock.
- Tags must be securely attached to each isolation point. The tag must indicate the following:
    - DO NOT OPERATE;
    - The reason for the isolation;
    - The printed name and signature of the person who installed the isolation or lock;
    - Contact information (telephone contact, radio contact);
    - The date and time the isolation/lock was installed; and
    - The name of the employer.
- Various warning tags can be utilized so long as all the required information is included on the tag. When recording information on the tag use permanent ink pens or markers. Reference HSSE Form 05-001 Isolation Tag.
- All tags must be of a sturdy non-conductive material that are resistant to weather and site conditions.
- Personal lockout devices (locks) must be identified by some means of permanent identification applied directly to the isolation device (e.g. engraved number, color coding).
- For each project or task, a log shall be used to record information on every lock placed into service.

5.5 Individual Isolation of Hazardous Energy

- An authorized person will contact the owner/client and review all energy isolation points associated with the equipment or machinery. The isolation points shall be

identified through review of drawings, process and flow diagrams, equipment specifications, and by physical inspection of the work site.

- The authorized person will apply their personal lock and tag to each energy isolation point(s) using a lockout hasp.
- After the authorized person has installed their lock(s) and tag(s) they will physically confirm that the isolation is effective, correct, and the energy source cannot become unintentionally activated. With electrical equipment, the authorized person will test and try all manual control points and remote start devices or points to verify the machinery or equipment does not activate.
- The workers involved in working on the isolated machinery or equipment will review and confirm the energy isolation points.
- Upon completion of review, the workers will install their personal locks and tags on each energy isolation point or lockout box.
- The authorized person will physically identify the equipment or machinery that has been isolated and confirm all sources of hazardous energy are de-energized, isolated, and discharged.

5.6 Group Isolation of Hazardous Energy

Group isolation may be required in situations where there are multiple isolation points. Because of the number of energy isolating points or overall size of the workforce it may become impractical to apply individual locks to each isolation point.

- Prior to starting any work, an authorized person will contact an owner/client representative and review all energy isolation points associated with the equipment or machinery.
- The isolation points shall be identified through review of drawings, process and flow diagrams, equipment specifications, and by physical inspection of the work site.
- Where required, the authorized person will obtain permission or a permit to work on the equipment or machinery from the owner/client representative.
- The authorized person completing the de-energizing and isolation of the equipment or machinery will verify their actions will not cause injury, equipment damage, process failure, or disruption prior to completing the de- energizing.

- Unless otherwise agreed upon, the owner/client will de-energize and isolate the required equipment or machine. The owner/client will install their locks or isolation and tags on all applicable energy isolation points.

- A single lock or isolation is applied to each energy isolation device by the authorized person.

- The authorized person's key is placed in the lock box and secured by subsequent locks. They are placed on the lock box by workers who are working on the equipment.

- The authorized person will physically identify the equipment or machinery that has been isolated and confirm all sources of hazardous energy are de-energized, isolated, and discharged.

- The authorized person will apply their personal lock and tag to each of the energy isolation points using a lockout hasp.

- After the authorized person has installed all their locks and tags they will physically confirm that the isolation is effective and the energy source cannot become unintentionally activated. With electrical equipment the authorized person will test and try all manual control points and remote start devices or points to verify the machinery or equipment does not activate.

- A complete listing of the location of all energy applicable isolation points and isolation devices will be recorded by the authorized person on the Group Energy Isolation Log Form and a copy posted by the lock box.

- The workers involved in working on the isolated machinery or equipment will review the lock out log and confirm the energy isolation points.

- Each worker will apply a single lock to the cover of the lock box by means of a lockout hasp. The lock box is locked so that the authorized person's key is secured inside the box and inaccessible until all the other lock(s) have been removed.

- Upon completion of work, reinstatement and re-energizing of equipment will follow the requirements for restoring equipment to service.

5.7 Restoring Equipment to Service

- When the work is completed on a system and the equipment is ready to be energized or returned to service, the project manager/supervisor and authorized person will verify

that tools are removed, guards replaced, and that re-energizing will not cause injury, equipment damage, process failure, or disruption.

- The project manager/supervisor and authorized person will notify any workers that may be affected by the re-energizing of the equipment being restored to service.
- Workers will remove their individual lock(s) or isolation. Each worker must remove their lock when they have completed their work on an isolated system or equipment or at the end of their shift.
- The authorized person will contact the owner/client representative and advise that the work is complete, and the system is ready to be energized.
- The authorized person will then remove their individual lock(s) or isolation device.
- The owner/client representative will remove their individual locks or isolation device.
- Unless otherwise agreed upon, the owner/client representative will energize the system.
- In the event that the system or equipment must remain de-energized and isolated beyond the end of the shift and work is intended to continue, the workers going off shift will remove their lock(s) and the workers coming onto shift will install their individual locks. The lock(s) of the authorized person will remain in place during this transfer.
- In situations where the equipment or system must remain de-energized and isolated for an extended period, the project manager/supervisor will verify the authorized person who initiated the isolation maintains their lockout.
- Where more than one authorized person is required due to shift change, days off or job specific requirements, a transfer of the isolation(s) and lock out(s) must be completed. A log of isolation points must be utilized to communicate overlapping requirements, instructions, and information. The transfer or turnover of isolation must be personally handed/turned over from one authorized person to the other.

5.8 Removal of a Lock by Others

- If a worker's lock or isolation is left on a system or equipment after the work is completed or a lock has not been removed at the end of a shift, the project manager/ supervisor or designate will attempt to contact the worker and have them return to the site to remove their lock or isolation.

- If the worker cannot remove their lock or isolation, the project manager/supervisor will then authorize the removal of the lock only after confirmation by the mechanical/electrical supervisor and authorized person that in doing so poses no risk or danger to workers, property or process.

- The project manager/supervisor or their designate must complete an Energy Isolation Removal Form and lead an incident investigation with regards to removal of the lock.

- The Energy Isolation Removal Form and Incident Investigation shall be sent to the OH&S Officer for follow-up and record retention.

5.9 Training

Training will be given on energy isolation for all equipment or machines by the competent person or a supervisor who has been trained in lockout and tagout by a safety professional. All workers will be given lockout and tagout awareness training during safety orientation. However, authorized and affected workers will be given additional training in the following procedures before any involvement in lockout or tagout:

- The requirements of jurisdictional legislation;
- The types and magnitudes of energy sources;
- Lockout and tagout procedures for the isolation of energy sources;
- Procedures for removing locks and tags; and
- Procedures for restoring energy.

Re-training will be given whenever there is a change in job assignment, a change in equipment or processes that would create a new hazard, or whenever a change in procedures is instituted. Refresher training will be given once each year unless the above conditions occur.

This training can be accomplished by using this program as a “Toolbox Topic.” It will be necessary to include site specific information on the types and size of the energy sources to be locked out. Maintain the original of the materials covered along with worker’s signature to satisfy the recordkeeping requirement.

The Energy Isolation Training Form will be used to record worker training and the records will be maintained by the OH&S Officer.

6.0 ATTACHMENTS

Isolation Tag
Energy Isolation Training Form
Energy Isolation Removal Form
Energy Isolation Log Form
Group Energy Isolation Form

REVISION SUMMARY		
DATE	**REVISION**	**SUMMARY**
25 Mar 2019	1	New program
22 Apr 2019	2	Change Program # from HSE-05 to OHS-04
16 Mar 2020	3	Change logo, removed numbering from forms,