PROCEDURE

Energy Isolation and Lockout Procedure

REVISION HISTORY

Revision No.	Issue Date	Amendment Description	Date Effective	Revalidated
00	01-06-2018	Newly Established	01-06-2018	31-05-2021

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ABBREVIATIONS

HSE: Health, Safety Environment

ID: Identification

JSA: Job Safety Analysis

LOTO: Lockout Tag Out

LOTOTO: Lockout Tag Out Try Out

MCC: Main Control Centre

MOC: Management of Change

P&ID: Piping and Instrumentation Diagrams

PHA: Process Hazard Analysis

PLC: Programmable Logic Controller

PTW: Permit to Work

PSA: Process Safety Analysis

QA: Quality Assurance

QSC: Qatar Steel

QSC: Qatar Steel Company

RACI: Responsible, Accountable, Consulted, Informed

SOP: Standard Operating Procedure

1 INTERNAL CONTROLS

1.1 Validation

To assure Management, Shareholders and External Agencies confidence in the company's policies and practices, QATAR STEEL internal Audit may verify compliance with this procedure. The HSE Department shall ensure that this procedure is reviewed every three years to ensure that it continues to serve the purpose intended.

1.2 Employee Responsibilities

All employees of the company are required to observe the company's policy and procedures.

1.3 Approval

This procedure, and any amendments made thereto, requires the following approvals.

AUTHORITY	DATE
Approved by Mohammed Nasser Al- Hajri Managing Director & General Manager	01-06-2018
Checked by Majid Mohammed Al-Marri Acting Manager - HSE	01-06-2018
Drafted by Yousef Rashid Al-Suwaidi Head of Section -HSE	01-06-2018

This document has been reviewed by the Document Controller. It complies with the requirements of policy 1.12.0.2.01.01 and it is considered ready for issue.

Signed by _____ **Date** 01.06.2018

2 PURPOSE

The objective of this Isolation and Lockout procedure is to ensure that all potential hazards from energy sources associated with equipment, machinery work and process hazards are risk assessed and controlled appropriately.

This may include, where possible eliminating the need for working on the machine, finding an alternative way to perform the task and if not possible, minimizing the risk through energy and process hazard isolation, authorization of permits, preparation, and training.

The objective is also to ensure that energy sources from equipment and machinery are well isolated from process, fluid or gas streams.

With the implementation of this procedure, positive isolation will be required for all identified sources of hazardous energy.

3 SCOPE AND APPLICATION

This Procedure applies to all Qatar Steel Company employees and contractors undertaking work for Qatar Steel and covers the management and requirements associated with energy isolation prior to work on any equipment or systems. This procedure provides for isolation with the Qatar Steel Company Red Flag method of isolation. The energy isolation process that includes locking out by means of a mechanical locking device is commonly abbreviated as Lockout Tag Out (LOTO). LOTO shall also include the Try Out step, i.e., Lockout Tag Out Try Out. When written in full it is abbreviated as LOTOTO.

The procedure applies to all energy, process, fluid stream isolation and locking requirements for all types of work performed on all types of fixed plant and equipment as well as mobile equipment within Qatar Steel Company premises, along with the respective responsibilities of involved parties.

The Isolation and Lockout procedure is linked and subordinate to, the Work Permit System of Qatar Steel Company, which is designed to ensure that work performed within Qatar Steel facilities is recorded and conducted in a safe, coordinated and consistent manner. Refer to the Work Permit System Procedure 2.32.2.1.06.01, Revision 05, which states the following: “The submission of a work permit is not the only requirement for performance of work in Qatar Steel premises. Other relevant procedures must also be followed to ensure that the job is completed safely. Furthermore, a party shall not be relieved of responsibility for the safe performance of work simply because it has complied with this procedure”.

When to Apply Energy Isolation and Lockout

When non-routine activities such as maintenance, repair, removal, replacement, un-jamming, ad hoc cleaning and when normal safety devices such as barriers, guards, rails, inter-locking devices, etc., are removed, there must be alternative methods in place to protect workers from the increased risk of injury as a result of exposure to the unintended or inadvertent release of energy.

Employees or contractors can be seriously or fatally injured if machinery that they work on or come into contact with unexpectedly energizes, starts up, or releases stored energy. Energy, process and fluid stream isolation and lockout are necessary to disable machinery and to prevent the release of potentially hazardous energy while maintenance or servicing activities are performed.

Isolation and lockout must be applied before conducting the following tasks but should not be limited to these tasks:

- Cleaning tasks where there is the risk of exposure to hazardous energy sources;
- Bypassing safety interlocks and emergency systems or removing machine guards;
- Major maintenance works, breakdown maintenance, condition based maintenance, or repairs;
- Any activity where the risk assessment (Job Safety Analysis) indicates potential injury due to contact with energized machine/parts or sources of hazardous process streams;
- Working in confined spaces where there is the risk of exposure to hazardous energy sources.

When Isolation and Lockout is not required

Isolation and lockout is not required when doing work:

- That has the potential severity of less than a level 3 consequence rating* as per the QSC risk matrix and is performed under a well-established SOP
- That has the potential severity of less than a level 3 consequence rating* as per the QSC risk matrix and is performed under the direction of a competent person(s) for minor adjustments, tuning, testing, etc.
- That requires some intervention on energized equipment such as in-service monitoring, testing, calibration, alignment, setting or adjustment. In such instances the work may be performed under a well-established SOP or Method Statement that has been developed together with proper risk assessment (including HSE). Such instance to include a clear description of temporary control measures that will mitigate the risks to below a level 3 consequence rating as per the QSC risk matrix.
- That is carried out at a safe distance from demarcated or barricaded positions such as cleaning, inspection or lubrication, provided that proper precautionary measures are in place.

*The consequence rating based on the QSC risk matrix (refer to figure 3 of the QSC Risk Assessment Procedure 2.32.2.1.03.01).

Working on Energized or Running Equipment

- All instances where working on energized or running equipment is required, must be identified by each department.
- An approved work procedure, SOP or Method Statement is required to perform any work on energized or running equipment.

- Authorization must be obtained to work on energized equipment by means of an Energized Work Authorization Form (Appendix 6).

Bypassing Field Equipment Signals

- Authorization must be requested and obtained to bypass field equipment signals in a Request for Equipment Signal Bypass as per Qatar Steel Field Equipment Signal Bypassing procedure.

4 DEFINITIONS

Affected Person(s):

A person who is required to operate or use equipment on which servicing or maintenance is performed under the energy isolation and lockout procedure, or who is required to work in an area in which such service or maintenance is being performed. Affected persons include production operators or general workers who are normally assigned to operate or work in the area of a process or production line on which service or maintenance is performed. Affected persons are those who may potentially be at risk if proper isolation and lockout is not applied correctly.

Area Supervisor/ Area in Charge:

Person in charge of an area. May be a Team Leader, Shift Supervisor or a Temporary Shift Supervisor. The Area in Charge is the person authorized by the Manager who will be responsible for keeping his area and personnel safe. There will be an Area Supervisor/ Area in Charge for each shift. Responsibility includes the management of people, processes, materials, equipment, infrastructure, contractors, subcontractors, visitors and the environment.

Authorized Isolator(s):

Persons who are trained, competent and appointed in writing to carry out isolation and lockout on equipment. Certain competencies may require verification of competency by means of testing and/or assessment and may require the person to be certified as competent. This may include certification by an approved second or third party.

Authorized Person:

An authorized person is a generic term for anyone who is trained, competent and appointed in writing to carry out specific work on any system, apparatus, or plant. The certificate of appointment must state the type of work the person is authorized to carry out and the apparatus, plant or section to which it applies. In the context of this procedure, an Isolator is for example the authorized person who can perform lockout and tag out on machines or equipment for the purpose of performing service or maintenance on those machines or equipment.

Competent Person:

A competent person is a person who has been trained and has been assessed and found to be capable of performing the tasks described in the Procedure(s).

Complex/Multiple Isolation and Lockout:

When more than one agency applies isolation or locking devices to multiple energy source isolating points. A multiple lockout hasp and/or group lockout box will be used.

Confined Space:

Confined space is any place, not designed for human occupancy. A space that has limited or restricted means for entry or exit and is not designed for continuous occupancy and has one or more of the following characteristics: contains or has the potential to contain a hazardous atmosphere; contains material that has the potential to engulf an entrant; has walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant. Some confined spaces may also contain any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or conditions that may lead to heat stress.

Contractor/Contractor Personnel/Contractor Employee/contractor work group:

A company (third party) that has a contract with QSC to provide services to QSC or an employee, or employees of a company that has been engaged by QSC to provide services to QSC which may include maintenance or alteration work.

Contractor Supervisor:

The authorized person in charge of the work and/or of the employees of a company that has been engaged by QSC to provide services to QSC, which may include maintenance or alteration work.

De-energized:

Equipment or utility that is disconnected from all energy sources, containing no residual or stored energy and is incapable of re-accumulating energy.

Deviations:

Deviations include any changes or variations to the requirements described in this Procedure and must be requested and authorized in writing by the most senior person in charge with accompanying risk assessment. May include minor deviations (e.g., Permit extensions) or major deviations (e.g. special measures to be taken when there is no control measure).

Employee:

A person who is employed by Qatar Steel Company. An employee will be required to have an

employee number and a Qatar Steel Company ID card that categorizes him as an employee and not as a contractor.

Electrical Isolation:

The isolation of electrical energy by means of an electrical isolation device or other approved method of isolating the source of electrical energy.

Energized:

Equipment that is connected to an energy source or containing residual or stored energy will be classified as energized.

Energy isolating device:

A device that when correctly applied as an isolation point, will prevent the transmission or release of hazardous energy. This may include but is not limited to:

- An electrical circuit breaker
- A 'disconnect' switch point
- A hand valve, blind flange or spade in a pipeline.
- Other blocking device used to physically block or isolate energy or process fluids, air or gas.

Manual levers or electronic push buttons, electrical (auto) cut-out stop, pull-cords, interlocks, selector switches, control valves, energy isolation via PLC, computer logic shutdowns or other control-system devices are not positive isolating devices.

Executor/Executing Authority:

A person who is trained, competent and authorized, who is responsible for the work being completed as described in the QSC Work Permit System. The Executor must ensure that the work being done has been adequately described so that all associated hazards and risks can be identified.

Executing Party:

A group of persons who are trained, competent, authorized and are responsible for completing work as described/permitted in the Permit to Work. The Executor must ensure that the work being done has been adequately described so that all associated hazards and risks can be identified and controlled.

Isolation Action Owner (also Isolator/Isolating Authority):

The person who will be responsible to carry out the isolation, affix and remove locking devices and log the action in the Isolation and Lockout Register. In instances where there are multiple energy sources to be isolated and/or where multiple agencies participate in the lockout the

Isolation Action Owner may also be the Lockout Leader (Team Leader), who will form and lead a team from operations, mechanical, electrical and hydraulic. The Isolation Action Owner/Isolator may also be the Executor.

Isolation Lock:

A lock with a key that is used to isolate hazardous energy and process sources in accordance with a procedure and is color coded as per a color coding standard for QSC. Locks may be used in conjunction with a hasp and/or a lockbox.

Isolation and Lockout Register:

A document which is kept to record all isolation and lockout of all types of energy on all equipment within a department or section. Separate Isolation and Lockout Registers will be kept for electrical, mechanical and operations or process isolations and lockout. If required there may be a satellite register for isolation and lockout kept by each agency at their respective work locations.

Red Flag:

A Red Flag is a tagging device that is placed on, or as close as possible to an isolation point that has been isolated, to clearly indicate that the energy source has been isolated (locked out). The word "RED FLAG" is written in large white letters on a red background. The Red Flags must display the employee name, employee number, department, section, shop, telephone/mobile number and Flag serial number.

Tags:

Tags are used in conjunction with isolation locks. Different tags are used to indicate specific danger warnings such as 'Do not Operate', 'Do not Start', 'Do not Open, 'Locked Out', etc. Pre-printed Tags will require the information of the person who placed the tag and lock (e.g., name, company ID, department and expected completion of the lockout). Contact details (mobile phone number) may also be written on the tag. In the event of group lockout, the details of the Lockout Leader are to be provided on the tag. Tags may include an ID photograph of the lock owner in the case of personal locks.

Issuer/Issuing Authority:

Issuer is a person who is trained, competent and authorized to issue a Work Permit after ensuring that all the hazards, associated with the work being done in that area, have been identified and all necessary safety precautions will be implemented to ensure that the work can be completed safely. Issuer/Issuing Authority identifies energy sources and equipment to be isolated.

Lockbox/Group Lockbox:

A lockbox is a fully enclosed box into which keys to isolation locks can be placed and the box can

be closed and locked with more than one lock in situations where larger numbers of persons and/or equipment are included in the lockout. A lockbox is required to provide protection that is equivalent to each service or maintenance worker placing a personal lock on each isolation device.

Lockout:

The placement of a lockout device on an energy isolating point that has provision for the fitting of a locking device, thus ensuring the positive isolation of the energy source so that the equipment being isolated cannot be operated until the lockout device is removed.

Lockout Device:

A device that utilizes a positive means such as a mechanical lock, with a key, to hold an energy-isolating device in a safe position and prevent the energizing of a machine or equipment.

Lockout Leader:

An authorized person who oversees, leads or coordinates lockout and tag out tasks in instances where, due to complex lockout, there is a requirement for locking with a hasp and/or a group lockout box. The Lockout Leader is responsible to verify that the isolation and lockout is complete by coordinating the activities of all agencies involved in the lockout. Lockout Leaders should be selected from the applicable isolation agency depending on the most prevalent energy source(s) to be isolated. The Lockout Leader is also the Team leader of an Executing Party.

Multiple Locking Device (Hasp):

A metal device that has a hinge that makes provision for several locks to be placed. Also known as a Hasp and may be in the shape of a caliper.

Permit Issuer:

The authorized person who issues and reviews the permit with the permit recipient, the Executor and approves the permit once all precautions have been checked and verified, including isolations and emergency response.

Executer:

The Executor is a person who is trained, competent and authorized to perform the work described in a Work Permit. The Executor accepts the permit from the Issuer and assumes responsibility for the work to be performed. The Executor is responsible for communicating requirements of the permit to personnel working on the job.

Permit to Work:

Permit to Work is a documented format that authorizes certain people to carry out specific work within a specified time frame and according to specified requirements. It sets out the isolation and

lockout precautions required to complete the work safely, based on a risk assessment. (Also see Work Permit).

Personal Lock:

A lock with key, used by each authorized person to place a lock on energy isolation devices, hasp or lockbox. The Personal Lock is for the personal protection of the Personal Lock owner and is kept and used by that person only. Personal locks will be color coded according to the agency of the lock owner and the tag will contain the minimum information indicated in this Procedure.

Positive Isolation:

Positive isolation is the term used to describe complete and total containment of potentially harmful release of energy or process hazardous materials as determined in a risk assessment (JSA) to ensure that it would not be possible to operate equipment due to the measures that are taken to isolate the energy. This may include for example the placement of mechanical lockout devices on an energy isolating point or the removal of fuses, racking out switch gear or creating a complete line break, thus ensuring that the equipment being controlled cannot be operated until the lockout device is removed or the line break is reversed.

Process Isolation:

Refers to the isolation of process and fluid streams by means of devices such as covers, locks, blind, blind spade, etc.

Safe Position:

The position, or state, of a device used for isolating energy after the equipment has been isolated from the energy source.

Site Inspection:

Inspection prior to, during and at the completion of work performed prior to the removal of locking devices and uplifting the isolation to a normal operating state.

Tag Out:

The use/application or placing of a temporary or removable tag that is used in conjunction with a lockout device. The tag out identifies the owner of the lockout device, the person who placed the lockout device, along with relevant danger warnings.

Try Out/Test for Zero Energy:

The trial step in the isolation and locking out procedure serves to verify a zero energy state. Also referred to as the Try Out step.

Work Permit:

A Work Permit is a documented format that authorizes certain people to carry out specific work within a specified time frame. It sets out the precautions required to complete the work safely, based on a risk assessment (also see Permit to Work as both terms are used in this procedure). See Work Permit System (2.32.2.1.06.01).

Zero Energy State:

A condition where every energy/power source that could otherwise release energy or produce any movement of the machine, or any of its parts, has been isolated and where all stored energy has been released and will not re-energize.

5 DETERMINE THE REQUIREMENT FOR ISOLATION AND LOCKOUT

5.1 Hazard Identification

Types and sources of potentially hazardous energy must be identified, classified and addressed appropriately. The identification of hazards associated with performing an activity, the hazards present in a facility or the hazards in an area where there is the possibility of such hazards resulting in loss or harm, is referred to as Hazard Analysis.

Examples of potentially hazardous sources of energy are, but are not limited to, the following:

- Electrical Energy
- Mechanical Energy
- Thermal Energy
- Pneumatic Energy
- Hydraulic Energy
- Gravitational Energy
- Residual, Stored or Kinetic Energy
- Radiation, Liquid and Gaseous Chemicals
- Biological Energy

5.2 Risk Assessment

It is a mandatory requirement before any work is performed on machines, utilities or equipment that a competent individual(s) assesses the hazards and risks associated with tasks that may require energy isolation and lockout. This is to identify the need for isolating and locking out prior to issuing the Permit to Work and before work commences. The tools that must be used are Hazard Identification and Risk Assessment (HIRA) and Job Safety Analysis (JSA). These tools must be applied at the specific location where work will be carried out and must make use of proper

checklists that will ensure that all potential hazards are assessed and control measures are applied to reduce the risks to a level that is as low as is reasonably possible. Where the HIRA process identifies non-routine, or high risk jobs, (i.e. with potential consequence rating level 3, 4 or 5 as per the QSC risk matrix) then the JSA process shall be applied as detailed in Section 5.3 of the QSC Risk Assessment Procedure. The JSA process breaks jobs up into a series of sequential activities and is used to assess the hazards, risks and controls associated with each activity. JSA must be carried out on the QSC Job Safety Analysis Worksheet.

The competency of the person(s) doing JSA must be assured in site records (competency matrix) and/or by certification (e.g., at the back of the site ID card). Where a potential hazard is identified, the relevant permit recipient is responsible to ensure that a risk assessment is undertaken by a competent person to determine the hazards and risks and to apply control measures that will bring the potential consequence rating level to an acceptable level before carrying out work.

The HSE Inspector from the respective department must participate in the JSA and must sign the applicable section in the Work Permit in instances where high consequence potential is identified (Section G of the Work Permit). The risk assessment shall be carried out in accordance with QSC Procedure 2.32.2.1.03.01 and take into account:

- The nature of the work to be done
- Timing of work (day or night)
- Environmental conditions
- Types of energy involved
- The range of methods by which the work can be done
- The hazards involved and the associated risks
- The actual method selected.

If the risk assessment identifies risks to any employees or contractors arising from the work to be carried out, the permit recipient must ensure that the risk is:

- Eliminated
- Or, if it is not possible or feasible to eliminate the risk, it is to be reduced by acceptable level by the mitigation measures.

5.3 Hazards Control

5.3.1 Notification

Before conducting any isolation and lockout, the affected person(s) must be notified. Notification can take different forms such as communication log/register, display boards, area warning lights, barricades, warning signs, tool box meetings, etc.

5.3.2 **Barriers**

The person(s) responsible for executing the task (Executing Authority) or other duly nominated person shall be responsible to ensure that the work area has barriers / guards installed preventing unauthorized entry to the hazardous area.

5.3.3 **Warning Signs**

The person(s) responsible for executing the task (Executing Authority) or other duly nominated person(s) will be responsible to signpost the hazardous area with danger signs and signs forbidding entry to unauthorized personnel into the hazardous area.

6 APPLICATION OF ISOLATION AND LOCKOUT

6.1 Preliminary Requirements:

The following requirements must be met prior to engaging in any isolation and lockout process at each area or operation:

- Major equipment, machinery and utilities that are capable of producing or releasing potentially hazardous sources of energy are to be identified by location, name, tag ID/asset number;
- All sources and types of potentially hazardous energy must be identified and uniquely labeled for all major equipment, machinery and utilities;
- Assessment/understanding of the exposure of personnel to these hazardous sources of energy by identifying the type of jobs to be performed on identified equipment, machinery and utilities and by carrying out risk assessment/JSA;
- All sources of hazardous energy are required to be capable of positive isolation and lockout. This requires the identification of isolation points for each and every source of hazardous energy and ensuring that there is adequate provision for locking and tagging with suitable locking devices to ensure the protection of all persons who might potentially be at risk;
- Isolation and lockout points must be identified, numbered and marked in electrical single line diagrams and/or in pipeline diagrams for each facility, plant, utilities or equipment. In addition, the energy source and the isolation point must be numbered and labelled according to international symbols at the isolation point;
- Machine/equipment or activity-based specific energy isolation procedures (SOPs) are to be established (Machine/Equipment Specific Isolation and Lockout Procedure). These procedures are to be well illustrated and accessible at or close to the isolation point when the equipment is to be isolated. Where required, provide laminated isolation and lockout procedures in cards at the equipment to be isolated and locked. If conditions do not allow this, they are to be kept readily at hand when required;

- All appropriate lockout devices, tags or Red Flags are to be kept at a controlled point and must be available as required. Lockout Stations are to be provided, maintained, properly controlled and adequately equipped;
- Authorized employees must be identified, trained, qualified and competent to perform energy isolation and lockout as per a competency matrix.

The Executor or the Lockout Leader in the case of group lockout, must ensure that no unauthorized persons enter the work area. The area must be barricaded and warning signs posted as required to prevent unauthorized entry.

The Lockout Station at each of the major operating facilities or maintenance work station must be under the control of an authorized person. This must be managed/controlled either by the maintenance or the operations department, depending on the organization structure and responsibilities assigned to each. The type and selection of lockout devices that are kept in each Lockout Station will depend on the equipment and machinery and the locking requirements for that operating area. Red Flags must also be managed/controlled at these Lockout Stations.

There must be a register of locking and tagging devices at each Lockout Station to ensure that devices and accessories are issued and tracked. Padlocks must be issued according to the color code of the relevant agency and lock/key numbers must be recorded against the name of the persons to whom they were issued.

In instances where energy isolation points are not lockable for positive isolation (by means of the attachment of a padlock or hasp) the following procedures will apply:

- Each operation is to ensure that there is a plan to review and prepare all isolation points to meet minimum requirements for positive isolation and lockout by means of a mechanical lockout. Where equipment does not have locking arrangements, the Red Flag procedure must be applied until such time that adequate locking arrangements can be made. All of the requirements of this procedure must be met even when Red Flags are used instead of padlocks.
- Once isolation points have been identified for the equipment or machinery each operation must prepare Machine/Equipment Specific Lockout Procedures for the equipment. These must be placed at the isolation points when isolation and lockout is performed.
- Danger/lockout tags, or Red Flags where lockout provision is not available, must be securely affixed to the isolation point after the energy source has been isolated. The tag or Red Flag must be visible and fixed to the isolation point such that it cannot fall off at any time.

The Lockout Leader must review and approve the isolation and locking out arrangements in instances of group/complex lockout to verify that the isolation and locking system is safe for proceeding with work.

The Work Permit must:

- Be valid for one shift only without shift change but may be renewed/revalidated twice only as per the provisions of the QSC Permit to Work System
- Identify and list the equipment to which the permit applies or reference the applicable Machine/Equipment Specific Isolation and Lockout Procedure (Appendix 2)
- Indicate the type of isolation/lockout (electrical, mechanical or other), required to control risk for the work activity
- Include the names of the Issuer/Issuing Authority, Executor/Executing Authority, Isolator/Isolating Authority and Field Operator(s) involved in the work.

6.2 Types of Isolation and Responsibility

Three types of isolation are identified as follows. This will determine responsibility (who is to be the Isolation Action Owner) for the isolation and lockout:

- **Electrical Isolation.** This will either be carried out in the electrical MCC rooms or at field isolation points and would normally include breaker isolation, control circuit switch isolation, fuse isolation and/or racking out of switchgear.
- **Mechanical Isolation,** which involves closing of manual valves for hydraulic circuits, lube oil circuits, pneumatic operated circuits and providing of physical blinding for process related gas piping by opening and closing of a pair of flanges after installation of solid blind in-between.
- **Operational Isolation,** which involves closing of process related air, gas or water piping manual valves.

The locking device will be provided by the equipment owner (in most of the cases the maintenance and engineering department) and the job Executors will be required to place their locks on the equipment, hasp or lockout box, depending upon the agencies involved.

In the case of complex isolation and lockout, i.e., where there is more than one energy source and/or where there is more than one agency involved for the same isolation action, there will be a Lockout Leader assigned who will take overall responsibility for the coordination and control over the isolation and lockout. In such instances the Lockout Leader will be the Isolation Action Owner.

6.3 Equipment Shutdown:

General:

It will be the responsibility of the operations or utilities person in charge to shut down, empty/drain and flush the machine or equipment, using an approved standard operating procedure (SOP) for shutting down the machine or equipment in such a way that the system is brought down to a zero energy state.

The Isolation Action Owner will be responsible to verify that the correct energy source(s) to be isolated has been identified. The Isolation Action Owner will ensure that energy has been drained

to a zero energy state and will either carry out the isolation action or will ensure that that it is carried out by other concerned agencies. If lockout is required, the Isolation Action Owner will affix the locking and tagging device (or Red Flag as provided for in this Procedure) then enter the isolation action in the Isolation and Lockout Register (or in the Handling of Red Flag Sheet where Red Flag is used). The operations owner/Isolation Action Owner and all affected persons must verify and ensure that all lockout is complete with a 'Try Out' step.

Maintenance work:

The steps for isolation and lockout are as follows:

- The Permit Issuer (in conjunction with the Executor) will prepare the Permit to Work and give it to the Permit Executor, who will carry out risk assessment as prescribed in the Risk Assessment Procedure and ensure that Isolator(s) isolate, lock and tag.
- The Isolator(s) verify isolation by signing the Permit.
- The Permit Executor, signs and returns the Permit to Permit Issuer, requesting the Permit to be issued. The Permit Issuer signs and issues the Permit to the Executor, who permits the work to be carried out after all Affected Persons are informed.
- In the case of complex lockout with multiple agencies and/or multiple energy sources, the Executor appoints a Lockout Leader or himself assumes the role of Lockout Leader
- The Isolation Action Owner takes responsibility for isolation and lockout by overseeing and verifying that Isolators from all agencies apply isolation and lockout (including applying personal locks if necessary for their own protection).
- The isolation and lockout process must be formally recorded and signed by the Isolating Parties in the Isolation and Lockout Register (Appendix 3).
- Upon completion of the work, the above process is reversed with the final action being the removal of locking and tagging devices.
- The Permit must be closed and returned to the Isolators or Isolation Action Owner, before isolation and lockout may be removed and equipment may be restored to an operating condition.
- After isolation is removed the Isolator(s) signs the Permit and the Executor returns the original copy (1) to the Issuer and retains the second copy (2) for filing.

Work performed by Operations

In instances where isolation and lockout is performed by operations persons (for example when cleaning is performed or when contractors are engaged by operations), the same Permit issuing/closing and isolation and lockout application/removal procedure is to be followed as indicated under the Maintenance Work section above.

Contractor work:

Only authorized QSC personnel may shut down and isolate equipment and machinery as per the above requirement. If contractors have to work on equipment they must be authorized (as an Executor) to do so by the relevant person in charge (Departmental Manager), following the issuing of a Permit to Work. Where the agency engages contractors is the QSC Maintenance Department, the above procedure under Maintenance Work is to be followed. In the event that contractors are engaged by the Operations, the operations person in charge will shut down the equipment and follow the above procedure under work performed by Operations. Contractors may then perform additional and/or personal lockout and tag out.

In the case of new installations that are not yet transferred to operations (such as green field projects), equipment shutdown is to be the responsibility of the person in charge of the Project.

Contractor locks must be provided for contractors and must conform to the QSC specification and standard color coding of locks. In the event that contractors have their own locks it must be specified on the Permit to Work and the color of their locks may not be in conflict with the color coding standard of QSC. The Permit Issuer will be responsible to ensure that the contractor person in charge is competent and authorized to perform locking and tagging, at least to the minimum standard of that specified in the QSC procedure.

In instances where lockout with padlocks is not possible due to the lack of provision for padlock attachment on the equipment to be isolated, Red Flag(s) must be provided and used by authorized contractors.

6.4 Isolation of the types of energies that are present

All potentially hazardous sources of energy must be identified for each machine or equipment that will be isolated. The Permit to Work must specify the energy sources to be isolated. Risk assessment is to be carried out and/or the Machine/Equipment Specific Isolation and Lockout Procedure for the equipment must be used to determine which energy hazards are present and how isolation and locking is to be performed. The Isolation Action Owner (Lockout Leader in cases of complex lockout), must inspect to be certain which electrical breakers and switches, breaker boxes, valves, or other energy isolating points will be isolated and identify all isolating devices to apply to the equipment or machinery to be locked out.

Only qualified electrical technicians may isolate electrical isolation points and follow the Lockout Tag Out Procedure specifically prepared for the type of work assigned. Wherever there is routine locking and isolating of a particular machine or equipment, a Machine/Equipment Specific Isolation and Lockout Procedure must be developed and displayed at the isolation point (Appendix 2).

6.5 Application of Lockout Tag Out Devices:

General:

Lockout and tag out the energy isolating devices with assigned padlocks, tags or Red Flags.

The key for the padlock must be under the exclusive control of the employee performing the task.

If more than one person works on the equipment, each person shall place his or her personal lock, tag (or Red Flag) on the energy-isolating device or on a lockout box.

When an energy-isolating device cannot accept multiple locks, a multiple lockout device (hasp), or a lockout box must be used. Where Red Flags are used, multiple Red Flags may be placed on, at or as close as possible to the isolating device.

Each person removes their assigned lock, tag or Red Flag when they complete their work on the equipment. Group locks/equipment isolating locks (or Red Flags) remain in place until the work is complete.

De-energizing of Equipment and Verification of Isolation and Lockout:

These steps in the procedure are to be followed for the purpose of reaching a Zero Energy State on equipment being serviced or worked on by authorized employees. The following describes the general steps for de-energizing, isolating and locking out all equipment.

- Notify all potentially affected persons that isolation and lockout will be applied on to equipment or machinery. Forums such as daily or shift Tool Box Meetings should be formalized to provide for the official briefing of planned activities involving isolation and locking out of equipment
- If the equipment or machinery planned for isolation and locking is energized, it is to be shut down by normal stopping procedures;
- Identify the isolation and lockout points or refer to the Machine/Equipment Specific Isolation and Lockout Procedure;
- Dissipate, drain or restrain secondary or stored energy (e.g., rotating flywheels, compressed air, gas, steam or water pressure, elevated machine parts, spring tension, etc.). All sources and types of energy must be identified and accounted for.
- Lock out the identified energy sources with assigned padlocks, identification tags and other standardized lockout devices. Red Flags to be used where isolating devices do not have locking arrangements. The key to the lock must be removed by the authorized person or by the personal lock owner in the case of a personal locks. The key is to be kept in that persons possession;
- Ensure that all operating controls or switches are changed to the OFF or neutral position;
- After the energy sources have been locked out, potentially affected persons have been notified, the area has been cleared and demarcated, attempt to move the switch or valve back to the ON position (the Try Out step). If the device moves to the ON position, go through the lockout procedure again. If the source still does not lockout, STOP work and notify the Supervisor;

- After corrective measures have been taken, again, prior to starting work on locked out equipment, verify that energy is isolated and equipment is de-energized by attempting to operate the equipment by the start button or operating controls, etc.
- Repeat the formal Try Out step until it is verified that there is no possibility for the release of potentially hazardous energy. All participants in the lockout have the right to ensure the complete isolation of all energy sources;
- All questions concerning the lockout procedure must be directed to the Isolation Action Owner or the Lockout Leader in the event of complex/group lockout.

All isolation and lockout steps must be carried out prior to issuing the Work Permit. The Issuer may not grant permission for work to commence (Section "I" of the Work Permit, until the Isolator(s) has confirmed that isolation and lockout has been carried out (Section 12/13 of the Permit to Work). The Red Flag serial number is to be entered in Sections 12/13 of the Work Permit when there is no provision for attaching a padlock.

The principle for lockout and tag out is "one lock – one key per lock – one tag per lock". The same principle will apply for the application of Red Flag.

Personal and Group Padlocks

Each authorized employee will be provided with a Personal Lock for their individual protection. All locks will be color coded according to the standard Qatar Steel color coding below. More than one Personal Lock may be issued to employees who may be required to apply a lock to more than one isolation point at any one time. There shall only be one key per lock.

Group or team padlocks may be used under certain circumstance such as for "out of service" equipment or for short term shut down. Personal Locks may also be applied for the individuals' protection within these groups by attaching these to multi-lock devices such as hasps or lockout boxes. They can also be used for general services where the isolation points remain in locked-open/closed position during normal operations (e.g. fire water service, compressed air supply, emergency breathing air supply etc.).

Contractor group locks will be color coded according to the standard Qatar Steel lockout color code below.

Color coding for locks:

- Electrical group lock – red
- Mechanical group/CRS Shop Maintenance lock – yellow
- Operations group lock – blue
- Hydraulic group lock – green
- Contractors/visitors – white

- Utilities group lock - grey
- Utility Operation group lock – Orange
- Utility Maintenance group lock - Purple

There is no specific color for personal locks. Each person who will carry out work on equipment and who will be exposed to potentially hazardous sources of energy will apply his personal lock and tag to the lockout device. The personal lock will be the color of the agency that he represents as per the above color code. Tags will identify personal lock owners by including the details of the person who places the lock on the device (e.g., date, name, employee ID number, section, mobile/contact number), irrespective of the color of the lock.

Isolation padlocks are to be dedicated for lockout and may not be used for any other purposes. When locks are not in use they must be kept in Lockout Stations (see Appendix 1) which must be under the control of the person who is in charge of their safekeeping and control.

Multiple Lockout (also Complex Lockout):

If more than one employee is required to lock out equipment and if an isolating device(s) will not accept multiple locks, a multiple lockout hasp or group lockout box will be utilized. This will be required in situations where more than one employee or agency (e.g. mechanical, electrical, operations and/or contractors), may be involved in the lockout and/or where there are multiple energy sources that must be locked out on the equipment.

Each person that is carrying out work on such equipment must have their own lock for attaching to multi-lock hasps or a group lockout box. Once each person no longer needs to maintain their lockout protection, that person will personally remove his lock from the isolating devices, lockout box or multi lock hasps.

Group Lockout Box:

Different types and colors of group lockout boxes are available. They may be wall-mounted, detachable or portable. The type and color requirement must be specified by the Lockout Leader. Lockout boxes will be used for those instances where multiple persons need to apply a lockout to a machine/equipment or where equipment is shut down for an extended period of time. (See Group Lockout Devices in Appendix 1). Lockout boxes must be kept under the control of a single person, as assigned the responsibility of Lockout Leader. This may be the principal agency performing the work, the process owner or operations person in charge.

The procedure is as follows:

- Operations will bring the machine/equipment to a safe zero energy state;
- The Lockout Leader who is responsible for the group lockout, must ensure that an Isolation Lock (and tag if required), is place on all lockout points;
- Isolation locks are all to be a specific standard color (per QSC standard);

- The keys for all isolation locks must then be placed in the Lockout Box;
- The Lockout Leader must then place his lock and tag on the Lockout Box. A tag may be used that has the name of the Lockout Leader, the date, and other information as required;
- The Lockout Leader must then verify that positive isolation of the equipment has been accomplished for all work that will be performed on the equipment by performing the Try Out verification step;
- Each agency/person working on the machine or equipment will place their agency/personal lock and tag on the Lockout Box. Each person has the responsibility to verify the effectiveness of the lockout measures when attaching their personal locks and thereby accepting the lockout performed by the Lockout Leader;
- The Lockout Leader is responsible to verify isolation of all parts of the equipment contained in the group lockout. Employees carrying out the work in a group lockout will not have to place a lock on all the equipment isolation points, only the group lockout box;
- The Isolation and Lockout Register must be completed and all participants in the lockout must sign the register (Appendix 3);
- As each person completes their work on the machine or equipment they then take their lock off the lockout box;
- After all work is completed on the equipment and the last lock is removed the Lockout Leader can then unlock the lockout box, remove the isolation keys from inside the lockout box when instructed by the Issuer.
- The Lockout Leader will be responsible for ensuring that the equipment isolation locks are removed (electrical authorized persons to unlock electrical isolation devices). All parties (issuer and isolators) together with the Lockout Leader are to ensure that it is safe to startup the equipment and will be responsible to ensure that no person(s) is working on the equipment. The Isolation and Lockout Register is to be signed, when the restart is carried out.

Group Multi-Lock Hasp:

A group multiple lock hasp must be used for a single point lockout, where multiple persons need to perform work. The procedure is as follows:

- The Lockout Leader responsible for the group lockout must ensure that the equipment has been brought to a safe Zero Energy State and then ensure isolation and lockout is carried and place a multi-lock hasp and his personal lock and tag on the hasp;

- Each person working on the machine must place their personal lock and tag on the multi-lock hasp;
- As employees complete their work on the machine or equipment they must take their personal locks off the multi-lock hasps.
- After all work is completed on the equipment and the last personal lock is removed the Lockout Leader can then remove his lock and ensure that isolation lock is removed from the isolation point. Unlock the multi-lock hasp and energize the equipment following the procedure described above.
- The Lockout Leader may then give permission for the safe startup of the machine or equipment. The Lockout Leader is responsible to ensure that no person(s) is working on the equipment before it is restarted.

Cords and Plugs

When electrical equipment is connected to an energy source with a cord and plug attachment, the plug must be removed from the outlet. The cord and plug can be used as the energy isolating device if the plug is under the *exclusive* control of the person who is potentially at risk of exposure to the electrical energy source. *Exclusive* control means that the cord and plug attachment is withdrawn from the outlet and easily within reach and sight of the protected person at all times while performing the equipment service or maintenance. When the cord and plug attachment cannot be kept under exclusive control the plug head must be covered, locked and tagged with an appropriate plug lockout device so as to prevent it from being accidentally plugged in.

Examples of devices that can be used for locking out electrical cords and plugs are shown in Appendix I.

Change of Responsibility with Face to Face Handover:

When there is a face to face change of responsibility for the isolation, lockout and tag out, the following steps must be followed:

- The isolator/executor who is handing over responsibility for the lockout must give a face to face explanation of the isolation and lockout that is in place to the isolator/executor that is taking over the responsibility of the lockout operation.
- The isolator/executor taking over responsibility for the lockout must place his lock(s) and tags and the isolator/executor who is handing over the lockout will remove his lock(s) and tags.
- The changing of locks must happen simultaneously. The machine or equipment may not be left without a lock and tag attached to the lockout points. Locks may include isolation and personal locks.
- The person taking over the lockout must then perform all required verifications to assure positive energy isolation and lockout.

- The Isolation and Lockout Register must be completed by both persons.

The above activities must be carried out in accordance with the Permit to Work System which sets out the requirements for the extension or the renewal of the PTW. The same handover procedure must be followed if Red Flags are used.

Change of Responsibility with Face to Face Handover between Lockout Leaders:

If a change is needed for the Lockout Leader, then the outgoing Lockout Leader must give a face to face explanation to another authorized person who will then become the Lockout Leader.

The incoming Lockout Leader shall place his lock and tag on the multi-lock device (lockout box or hasp) and the outgoing Lockout Leader will remove his lock and tag from the lockout box or hasp. The changing of locks shall happen simultaneously. The machine/equipment must not be left without a lock and tag attached to the lockout points and/or the lockout box or hasp.

The isolation locks on the isolation points on the machine/equipment do not have to be changed if the key(s) to those locks are inside a lockbox, but the incoming Lockout Leader is responsible to review the lockout to ensure it is correct and must then perform all required verifications to ensure energy isolation. The Isolation and Lockout Register must be completed by both the incoming and outgoing Lockout Leaders.

Change of Responsibility without Face to Face Handover:

The procedure below describes the steps in change of responsibility for isolation and lockout of equipment locks when there is no face to face handover: If the isolation and lockout must remain in place the person who is handing over responsibility for the lockout must hand the custodianship of the key(s) for isolation locks to the Shift in Charge (electrical Shift in Charge for electrical isolation, mechanical Shift in Charge for mechanical isolation, hydraulic Shift in Charge for hydraulic isolation and operations Shift in Charge for operations isolation). The permit issuer will follow the Work Permit System by closing the work permit or by revalidating the permit with another authorized person:

- The person who is handing over responsibility for the lockout of equipment is to sign over the custodianship for the key(s) of the equipment locks to the Shift in Charge (for the relevant agency) and both the person handing over the l key(s) and the Shift in Charge receiving the keys(s) will sign the Isolation and Lockout Register;
- The Shift in Charge will secure the keys for the equipment lockout in a lockable key cabinet for the custodianship of keys. The key for the lockable cabinet must be kept on his person by the Shift in Charge at all times;
- The Work Permit System requirements are to be followed, i.e., declaration upon the closing of the permit that the lockout will remain and upon the issuing of a new permit, clearly indicating the number of the previous permit as well as the details of the lockout on the new permit.

Change of Responsibility for Isolation and Lockout between Shift(s) in Charge

There must be face to face handover of custodianship over the keys to equipment locks from the outgoing Shift in Charge to the incoming Shift in Charge.

- The outgoing Shift in Charge hands over custodianship of the keys to the locks in a face to face handover with the incoming Shift in Charge The outgoing Shift in Charge must hand over the key to the key-cabinet that secures all keys of the isolation locks, to the incoming Shift in Charge;
- Both the incoming and the outgoing Shift in Charge must inspect the contents of the key-cabinet and verify that all keys listed on the key control register are locked in the key-cabinet. Both must sign the Isolation and Lockout Register and the key-cabinet control register.

Change of Responsibility for Red Flags without Face to Face Handover:

The above procedure for the change of responsibility for lockout without face to face handover, will apply for Red Flags when there is no face to face handover. In the case Red Flags, responsibility for the isolation will be handed over to the Shift in Charge in the Isolation and Lockout Register, where the outgoing Red Flag owner signs over the responsibility for the Red Flag to the Shift in Charge.

Change of Responsibility for Red Flag between Shift(s) in Charge

There must be face to face handover of custodianship over Red Flags from the outgoing Shift in Charge to the incoming Shift in Charge. All of the requirements for the handover of custodianship of isolation keys must apply equally for the handover of custodianship for Red Flags from the outgoing Shift in Charge to the incoming Shift in Charge.

Contractor Work:

Contractors must add their locks and tags (or the locks provided by QSC), to the isolating device, hasp or lockout box. Until all contractor personnel are trained and authorized to do so, only Contractor Supervisors or the leader of the contractor work group is authorized to participate in the lockout procedure. The QSC Contract Owner is responsible to ensure that the Contractor Supervisors and any other contractor personnel are competent to apply lockout and tag out. The Maintenance Manager or his delegated authority may authorize contractors to apply lockout.

The Contractor Supervisor contractor work group leader must be present on site for the entire duration of work activity. It will be the responsibility of the QSC person in charge (Shift in Charge) to ensure that the Contractor Supervisor or work group leader from the contractor company is competent to perform isolation and lockout.

6.6 Verification of Isolation and Lock Out

Prior to starting work on equipment, each potentially affected person(s) must verify that de-energizing of the machine or equipment has been accomplished. Verification includes the "Try Out" step. This may include: pushing the start button, attempting to start equipment via PLC,

maintenance electrician checking with multi-meter, etc. Verification methods will differ depending on the type of equipment and on the work that is being performed. This is to be specified in a Machine/Equipment Specific Isolation and Lockout Procedure (Appendix 2).

6.7 Restoring Locked Equipment to Service

Upon completion of work:

- Inspect the work area to ensure that all tools and equipment have been moved from the machine;
- Notify all affected persons that the equipment will be restarted
- Remove isolation, lockout and tag out (or Red Flag) and return the equipment to operation.

Above to be carried out in accordance with the requirements the QSC Work Permit System, i.e., work permit to be closed prior to the removal of isolation, lockout and tag out (or Red Flag).

6.8 Forced Removal of Lockout Tag Out

If a person who placed his lock fails to remove his lock or fails to handover responsibility to another authorized person, the following steps must be taken:

- The highest authority, or his delegated authority, as well as the HSE Manager, or his delegated authority, must be notified of the lock left on the equipment;
- Attempts must be made to contact the person who left the lock on the equipment;
- If the person who left his lock cannot be contacted at work, at home or elsewhere, a message should be left notifying him that his lock will be removed. If he is reached the person in charge then determines if it is feasible for the person to return to the operation to remove his lock. If so, the person who left his lock must return and remove his lock.
- If the employee (lock owner) cannot be reached, the person in charge must assume responsibility for the lockout and carry out a full inspection of the work area, notify all affected persons that the lock will be removed and ensure that the Permit to Work is to be closed.
- The person in charge may then instruct the forceful removal of the lock and enter the information in the Emergency Lock Removal Register (Appendix 4).
- The person in charge must ensure that the person who left his lock is notified before the start of the next work shift that the lock was removed.
- If additional work is to be done on the equipment, the person in charge must then forcefully remove the locks, and replace the locks with his own personal lock or if other persons are to work on the equipment they will then place their locks on the isolation or on a group lock out device.

The above steps must also be followed in the event that a Red Flag must be removed. The Red Flag Removal Authorization Form must be completed.

6.9 Training and Competency Requirements

Competency for performing isolation and lockout will be determined and mapped according to the roles and functions identified in isolation and lockout. This will be included in a centralized QSC competency matrix.

All new employees and contractors, who are required to participate in lockout and tag out or who may be affected by isolation and/or lockout must receive training according to their role and function before performing the job. There will be three main categories of training and competency in lockout and tag out:

- Authorized persons are those employees or contractors who will be required to perform locking and tagging and will need to be able to attach and remove locking and tagging devices. This will include all isolators and executors. They will receive more detailed training that may be conducted by a third party such as suppliers of lockout devices. Permit issuers will be required to be able to identify hazardous energy sources, isolation points and suitable locking and tagging devices but they will not be required to be able to use these devices.

- Other affected persons are those employees or contractors who will not be required to perform locking or tagging but may for example operate, inspect or clean machinery/equipment that is to be locked and tagged. They will be given general awareness training to ensure that they are aware of the restrictions and rules pertaining to their role and function in the event that they work in and around equipment that is isolated and locked out;

- Other employees, contractors or visitors who may enter facilities and will have to be informed, for example about lockout, tag out, barriers, warning signs, demarcation, etc. This will include general information and briefing such as site or facility induction.

Knowledge and awareness training in isolation and lockout must include:

- Types of energy and hazards associated with these;
- Information about the Energy Isolation and Lockout Procedure;
- Devices used for lockout;
- Machine/Equipment/Activity Specific Isolation and Lockout Procedures;
- Compliance with Permit to Work conditions as they apply to Isolation and Lockout;
- The selection, use/application and storage of any locking and tagging equipment.

6.10 Responsibilities

The persons performing the following roles should assume the major responsibility for the activities covered by this procedure:

- Operations or Project Managers
- Permit Issuer
- Permit Executor
- Isolator
- Isolation Action Owner
- Lockout Leader
- Operators and Technicians
- Team Members/Affected Persons – employees or contractors performing work

The **Facility Owners/Project Managers** are responsible for the implementation of this procedure and to ensure that all permit issuers, executors and isolators have received training in both the Permit to Work System and the Isolation and Lockout Procedures.

The **Facility Owners/Project Managers** must appoint authorized persons. The scope of each authorization must be clearly defined and a list of authorized persons shall be available.

All **Maintenance/Projects and Capital Work Personnel** are responsible for ensuring that the requirements of this procedure are communicated to contract and project personnel working onsite.

It is the responsibility of **Principal Contractors** to ensure all their personnel and subcontractors understand and comply with this Standard whilst working on site.

All Personnel - Anyone who observes an at-risk/unsafe act or condition has the responsibility to bring this to the attention of the personnel performing the work. If the unsafe situation cannot be satisfactorily resolved by discussion between the parties involved, the work must be stopped, the Permit withdrawn and the matter brought to the attention of the Permit Issuer.

Permit Issuer, Executor and Lockout Leader

The Permit Issuer, Executor and Lockout Leader must accept responsibility for isolation and lockout tasks. This must include:

- Ensuring all team members are trained and competent to perform their role in isolation and lockout;
- Reviewing the Permit in conjunction with Permit users and the workers performing the work;

- Verifying the isolation and lockout of all energy sources as required in this Procedure and as indicated in the Machine/Equipment Specific Isolation and Lockout SOPs;
- Ensuring that Permit users comply with requirements of Permits;
- Ensuring that risk assessment/JSA is done before jobs start and as required throughout the job duration;
- Ensuring that Job Method Statements are prepared and are relevant for jobs to be carried out
- Signing of Permits and completing other Permit, isolation and lockout documentation.

Team Members

- Complete a risk assessment/JSA on the task;
- Follow Job Method Statements for performing tasks;
- Understand and comply with the requirements of this Procedure, of permits, SOPs and any other authority to perform the job;

Permit Issuer

- Physically check (in conjunction with Executors/Isolators) and test all isolation points as identified on the Permit and procedure.
- Review the Permit and risk assessment in conjunction with the Executor.
- Issue Permits to Work and clearance of Permits to Executors.

6.11 Control over Lockout Equipment and Devices

Procurement

Each department will be responsible for identifying the type and quantities of lockout equipment and devices that will be required for the department to comply with this procedure. Approved suppliers will be identified by the QSC QA department.

Issuing

Each department must maintain a register of all devices that are issued or provided in departmental lockout stations. Items that are kept in lockout stations must be controlled. Lockout devices may only be issued to persons who have been trained and found to be competent to apply locking and tagging devices. The lock number of personal locks will be recorded in the register together with the name and company ID number of the personal lock owner. More than one Personal Lock may be required in instances where technicians will be required to lock out more than one isolation point at any point in time. Locks may not be removed from the QSC site.

6.12 Implementation of this Procedure

This Isolation and Lockout Procedure will come into effect on the date indicated in the revision table above. The Procedure will replace the 'Red Flag' method of tagging per the QSC Red Flag Fixing Procedure number 3.42.4.0.02.05, Revision 02.
Once QSC personnel are trained and equipped to meet the locking and tagging requirements of this procedure, lockout and tag out must be applied. In situations where executors and/or isolators have not yet been trained to apply locking devices or where isolation is carried out on machinery and equipment that does not have adequate provision for attaching locking devices, the minimum requirements of the Red Flag Fixing method and practice will continue to apply.
In instances where isolation has been performed and there is no provision made for locking or where this procedure has not yet been implemented, the placement of a Red Flag or the attachment of an isolation tag without a lock (as indicated in Appendix 1 pages 28, 37-39), the isolation will be deemed to be locked out and must be treated with the same level of respect as if it were positively isolated and locked with a mechanical locking device.

When Using Isolation with Red Flag/Tag Out without Locking Out

- The Isolator hangs a Red Flag/Tag at the location of the isolation point and clearly identifies in the Isolation and Lockout Register that the isolation point only has a Flag/Tag.
- Where a Red Flag/Tag cannot be affixed directly to the energy isolation device, the Flag/Tag shall be located as close as possible to the device, in a position that will be immediately visible to anyone attempting to operate the device.
- The Executor/Isolation Action Owner must visit each isolation point where a Red Flag/Tag has been placed to verify that isolation has been carried out properly.
- All other requirements of this procedure will apply irrespective of the fact that isolation is carried out with Red Flag/Tag without locking out.

6.13 Field Audits, Inspections and Verification

Site supervision will be required to carry out inspections of isolation and lockout while work is being performed.

The site designated authority, for example, the Facility Owner/Manager and/or the HSE Manager will be required to conduct field verification inspections to ensure that the isolation and lockout procedures are being followed.

Annual audits are to be conducted by a certified safety auditor for e.g., HSE specialist with certification from a suitable third party.

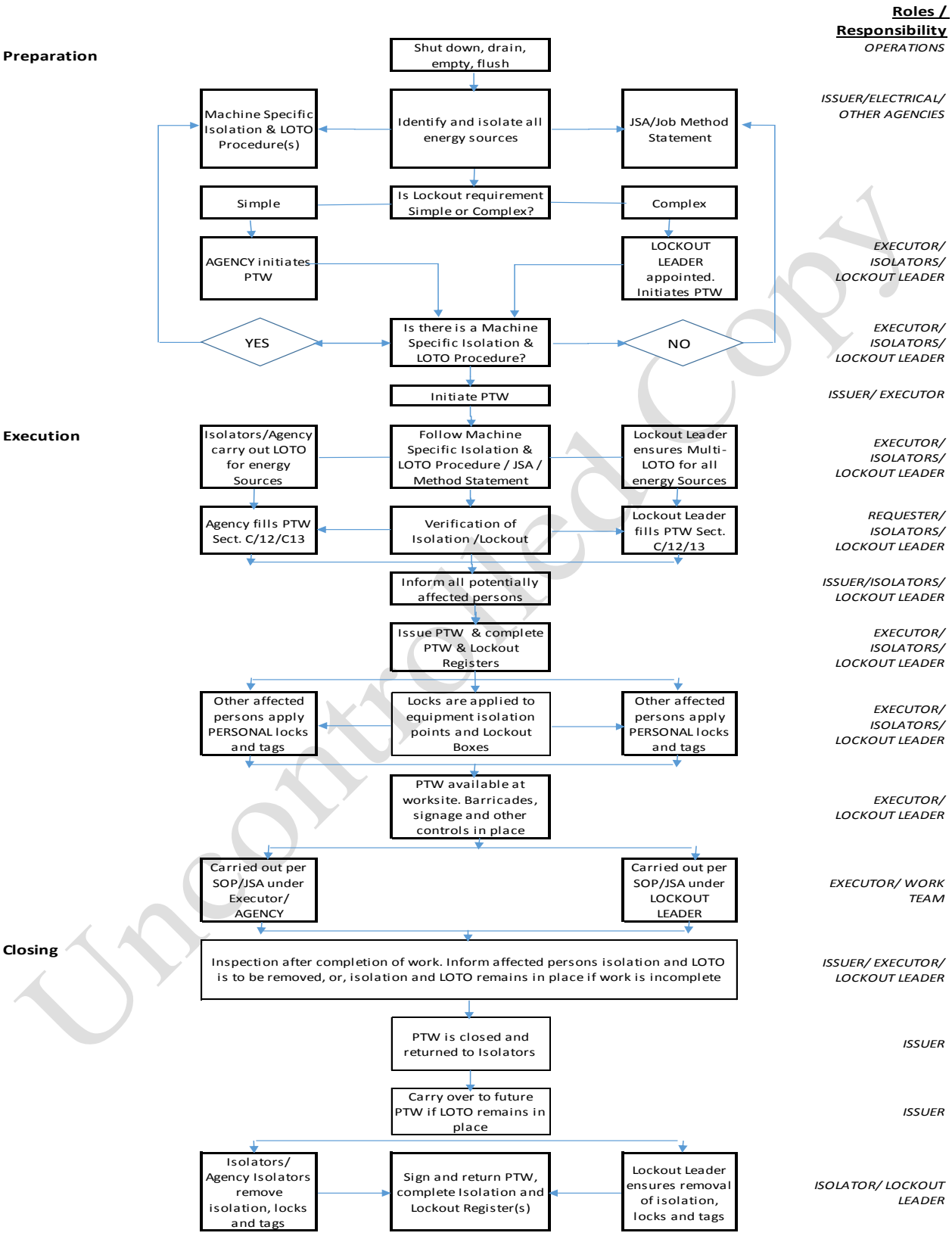
An audit or inspection checklist is attached as Appendix 5.

6.14 Management of Change (MOC)

No changes may be made to this Procedure without approval from the QSCC HSE Manager. Any suggestions or recommendations for updates or improvements to this Procedure must be submitted in writing to the HSE Manager. Each submission should give details of the proposed amendment and the reason why it is considered necessary.

The HSE Manager will keep a log of all change requests, prioritize them for action and subject to his approval, schedule them for inclusion in the next official update of the document. The latest version of this Procedure will be made available via the QSCC computer network. Earlier versions will be retained for a minimum of three years in accordance with the QSCC document management system.

6.15 Isolation and Lockout Procedure Flowchart



6.16 Isolation and Lockout Procedure RACI Matrix

Activities	Operations/ Area in Charge	Permit Issuer(s)	Permit Executor(s)	Isolator(s)	Operators/ Technicians
Develop Machine/ Equipment Specific Isolation /lockout SOPs	A/R	C	C	R	I
Shut down plant, machines, equipment for maintenance (plant hand over)	A	R	I	I	I
Perform isolation (other than Electrical) and drain energy to zero state (de-energize)	C	R	I	A/R	I
Perform electrical isolation and bring to zero energy state	C	C	I	A/R	I
Carry out HIRA/ JSA (non-routine) and/or consult SOP (routine)	C	C	A/R	C	C
Perform lockout and attach tags or Red Flag	I	I	R	A/R	C
Request Permit to Work	I	C	A/R	C	I
Verify and confirm isolation and lockout by signing Permit to Work	I	A/R	R	A/R	I
Issue Permit to Work	I	A/R	I	I	I
Carry out work for which Permit is issued	I	I	R	I	I
Inspect work in progress	R/I	R/I	A/R	I	I
Inspect work/ work area after completion	I	A/R	R	I	R
Account for all affected persons (headcount/name list)	I	A	R	I	I
Inform all affected persons prior to isolation removal	I	A/R	R	R	I

Close Permit to Work	I	A/R	R	R	I
Remove isolation, locks and tags or Red Flag	I	I	R	A/R	I
Complete Isolation and Lockout Register	I	I	R	A/R	I

Legend:
R – Responsible
A – Accountable
C – Consult
I – Inform

6.17 References

OSHA Standard for The Control of Hazardous Energy (Lockout/Tagout), Part 1910.147

Brady Workplace Safety Compliance Solutions: Solutions for Hazardous Energy Control (Brady Worldwide, Inc. Brochure 2012)

QSC Hazard Identification, Risk Assessment and Risk Management Procedure (QSC Risk Assessment Procedure 2.32.2.1.03.01)

QSC Permit to Work System Procedure 2.32.2.1.06.01

QSC Red Flag Fixing Procedure number 3.42.4.0.02.05, Revision 02.

QSC Field Equipment Signal Bypassing Procedure (11.09.2017)

6.18 Other Related Procedures

Other high risk activities such as hot work, confined space or working at heights may be associated with energy isolation. Refer to those procedures and comply with all requirements in addition to energy isolation requirements.