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PT. SE ML/RB/RD

SHE Procedure
Energy Isolation - LOTO

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Any document applicable to PT Supreme Energy Muara Laboh contains the characters "ML" in the document reference.

Any document applicable to the PT Supreme Energy Rajabasa project company contains the characters "RB" in the document reference.

Any document applicable to the PT Supreme Energy Rantau Dedap project company contains the characters "RD" in the document reference.

If a document applies to all three Supreme Energy companies, the term "Supreme Energy" may refer to any and all of these companies.

Within each document, for any reference to the project company, the term "Company" will be used. This term will refer to those companies the names of which are referred to in the document reference. The term Project refers to the project developed by the Company.

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1. Introduction

Appropriate Lockout / Tagout (LOTO) procedure should be followed during maintenance and repair work on equipment connected to or containing mechanical, electrical or other energy sources. The purpose of LOTO procedure is to prevent the accidental release of energy sources which could result in injury to personnel or damage to equipment.

LOTO is generally accomplished by isolating the equipment to be worked on from external energy sources, neutralizing internal energy sources, placing padlocks and warning tags on isolation devices, and establishing a system to manage the process changes caused by isolating the equipment. LOTO does not usually apply to normal operating activities such as collecting samples, replacing pressures gauges, or making routine operational equipment checks and adjustments. Some systems are designed to normally operate with components locked or chained in position (e.g., pressure safety valves locked open or containment drain valves locked closed). These systems should be managed in a manner consistent with LOTO procedure.

When new equipment is installed, or when existing equipment is replaced, repaired, renovated or modified, it should be designed to accept appropriate lockout devices, blinds or other methods of isolating and neutralizing energy sources.

2. Lockout / Tagout Definitions

Affected Personnel - A personnel who operates equipment or machines on which service or maintenance is being performed under LOTO procedure, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Personnel - A personnel who is authorized and initiates the LOTO procedure on machines or equipment in order to perform servicing or maintenance work on the machine or equipment (i.e., the person locking out / tagging out the equipment also is the same person doing the work on it). Affected personnel becomes an authorized personnel when that personnel's duties include performing servicing or maintenance on the equipment being locked out / tagged out and that personnel has successfully completed appropriate training.

Energized - Connected to an energy source or containing remaining or stored energy.

Hazardous Energy / Substance Isolating Device - A mechanical device that physically prevents the transmission or release of energy. These devices include, but are not limited to, the following: manually operated electrical circuit breaker, disconnect switch, skillet blind, blind flange, line valve, and block valve. This does not include a push button or selector type switch.

Hazardous Energy/Substance Source - Any source of electrical, mechanical, hydraulic, air powered, chemical, thermal, pressurized piping, compressed air, or other stored energy; which, in the event of unexpected energization or startup of machinery / equipment or release of stored energy, could cause injury to personnel.

Inspector - A designated authorized personnel who is assigned to inspect the energy control (LOTO) procedures of other specific authorized personnel or specific equipment where LOTO procedure is applied.

Job-Lock - A device used to provide the continuity of energy isolation during multiple shift operation. It is placed on a lockbox. A key to the job-lock is controlled by each assigned primary authorized personnel for each shift.

Lockout - The placement of a lockout device on a hazardous energy / substance isolating device, in accordance with an established procedure to ensure that the hazardous energy / substance isolating device and equipment being controlled by it cannot be operated until the lockout device is removed.

Lockout Device - A device that utilizes a positive means such as a keyed lock or a combination lock to secure a hazardous energy / substance isolating device in a safe position and prevent the energization of a machine or equipment. Included are blank flanges and bolted slip blinds.

On The Job -This refers to the specific servicing and maintenance job where LOTO procedure is in effect. This is not necessarily when the individual reports to work which may be away from the site of the service/maintenance work.

Other Personnel - Personnel whose duties do not require them to be involved in the LOTO procedure in any way. Training requirements are minimal, essentially requiring only that the personnel be aware of the energy control program and know that they are prohibited from attempting to restart or re-energize machines or equipment that are locked out / tagged out.

Primary Authorized Personnel - The authorized personnel who exercises overall responsibility for following to the LOTO procedure.

Principal Authorized Personnel - Authorized personnel who oversee or lead a group of servicing / maintenance workers (e.g., electricians, mechanics, etc.)

Tagout - The placement of a tagout device on a hazardous energy / substance isolating device, in accordance with an established procedure, to indicate that the hazardous energy / substance isolating device and the equipment being controlled by it shall not be operated until the tagout device is removed.

Tagout Device - An obvious warning device such as a tag and a means of attachment, which can be securely fastened to a hazardous energy / substance isolating device, in accordance with an established procedure, to indicate that the hazardous energy / substance isolating device and equipment being controlled by it shall not be operated until the tagout device is removed.

3. Lockout / Tagout Equipment

Any device that is needed to control hazardous energy should be operated in a manner that will isolate the affected equipment from its energy source (for example, opening the electrical disconnect switch, in an electrical control panel, closing the valve, installing blind, or setting brake).

The following equipment is normally used for LOTO:

3.1 Padlocks

- Locks used for LOTO should be keyed padlocks. Each padlock should be keyed differently. Supervisors should retain spare keys for each padlock assigned to their work area.
- Padlocks should be color-coded to identify the group which owns them. The following color code is recommended for padlocks:
  - Yellow - Operations
  - Red - Electricians
  - Blue - Maintenance (except Electricians)
  - Green - Instrument Technicians
  - White - Facilities Engineering
- Depending on the facility (size and number of personnel), padlocks may be individually assigned or placed on a lock board for common use. A log should be maintained with each lock board, which identifies who is using each padlock and where the padlock is being used.
- Padlocks used for LOTO should not be used for other purposes.

3.2 Tags

- Tags should be used to identify locations where equipment has been altered for LOTO, including valves, flanges, skillets, spectacle blinds, switches and blocking devices. The tag should identify the person who applied it, the reason the tag was applied, and the date the tag was applied.
- Tags may be color-coded to identify the group which owns them. Color-coding of tags should be consistent with the color-coding of padlocks.
- Tags may be multi-part so that sections can be torn off and retained in a control room or other central location.
- Tags should be clearly mark, weather resistant and contain an eyelet so they can be fastened to equipment with a tie-wrap or wire.
- Tags should be multi-lingual as needed to communicate information and potential hazards to the local workforce.

3.3 Bar Clips

Where multiple padlocks are required at a single lockout point, bar clips (multi-lock hasps) or similar devices should be used.

3.4 Chains

Chains may be used with padlocks to secure valve handles or other equipment.

3.5 Blind Flanges, Skillets and Spectacle Blinds

Appropriate blind flanges, skillets and spectacle blinds should be provided at each facility to ensure that LOTO can be performed safely. They must be rated (working pressure and size) for the lines and process conditions where they will be used.

3.6 Built-In and Customized Energy Isolating Devices

New equipment should be designed with appropriate built-in isolation devices so that LOTO padlocks can be easily installed. Older equipment might require the use of customized attachments (e.g., special lockout bars, hasps to cover operating buttons, sliding-rod devices which can be extended and locked in position to prevent operation of control handles) so that padlocks can be attached.

3.7 Machine or Equipment Shutdown

The equipment should be shut down using its normal operating controls (i.e., depress stop button, open switch, close valve, etc.). The nearest operating control device should be used for this shutdown.

4. Energy Isolation – Lockout / Tagout Program

Site-specific LOTO procedure should be developed locally to ensure consistency with local management systems and operating practices. Local procedures should specify the responsibilities of personnel involved in Lockout and Tagout Procedures, and describe how each will be accomplished:

- establish procedures for controlling energy in areas where there is a potential for an uncontrolled release of energy
- conducting periodic inspections to ensure that LOTO procedure is being followed
- training personnel about the purpose, function and restrictions of the LOTO program
- informing contractors about the LOTO procedure
- obtaining information from contractors on the contractor's LOTO program

For a program to be effective and consistently applied, policies, procedures and responsibilities should be documented. Such a written program for control of hazardous does not need to be a lengthy or complex document. A template for a written LOTO program is provided in Appendix A.

The program should be reviewed at regular intervals and when there is reason to believe that measures taken may not protect personnels.

4.1 Electrical Isolation

- Equipment should be carefully reviewed to ensure all electrical energy sources have been identified.
- Equipment should be isolated from electrical energy sources by the opening and locking of all main power supplies. If the main power supply cannot be locked out, the equipment should be physically disconnected from power sources by a qualified electrician. Lockouts of local switches may leave other portions of the equipment energized. Special attention should be given to equipment connected to alternate power sources.
- Large capacitors should be discharged.
- After the equipment has been isolated from the main power supply, local electrical switches and start/stop stations should be activated to confirm the isolation is complete, then turned back off and tagged "Do Not Operate".

4.2 Mechanical Isolation

- Potential sources of mechanical energy (e.g., pressurized fluids, springs, elevated components, rotating equipment and gears) should be neutralized or physically blocked out before work starts, to prevent unintentional energizing or movement of equipment. Examples include:
  - Bleeding down and/or isolating process fluid, steam, air, or hydraulic lines and cylinders.
  - Blocking out gears and other mechanisms.
  - Placing dies, lifts, or any equipment that might descend, slide, fall or roll in their "zero energy" or neutral position (typically the lowest position), or installing
  - physical blocks to prevent equipment from moving.
  - Releasing coiled springs and any spring-loaded devices.
  - Chaining rotating equipment.
- The preferred method for mechanically isolating equipment from process lines is disconnecting the lines and installing blind flanges, skillets or spectacles blinds.
- Blind flanges, skillets and spectacle blinds must be rated (working pressure and size) for the lines and process conditions where they will be used.
- Double block and bleed may also be used to isolate equipment from process lines.
- Bleed lines should be carefully checked to ensure they are not plugged and that any seepage from the bleeder is readily and safely detectable.
- Isolation by use of a single block valve is generally not acceptable. Exceptions should be made only under carefully controlled and supervised conditions.
- All valves used for mechanical isolation should be locked out, either on the valve body or by use of a chain through the handle.
- Mechanical isolation in preparation for confined space entry must be achieved by installation of blind flanges or skillets, or disconnection and removal of all associated lines.

5. Hazard Evaluation

The purpose of a hazardous energy control program is simply to evaluate and minimize or eliminate the chance that a worker may be injured while working on a piece of equipment that has not been de-energized prior to repair or maintenance.

Examples of hazards that may be present in geothermal operations for which energy control devices may be effective include:

- electrical energy
- heat energy
- substances under pressure
- mechanical energy
- stored energy
- hydraulic energy
- corrosives
- flammables

Before equipment is turned off or shut down, workers should determine the type, magnitude and the hazards of the energy associated with the machine or equipment to be serviced and/or maintained.

The worker should notify all affected personnel of the work to be performed.

6. Hazardous Energy Control Steps

In addition to the hazard evaluation or preparation for shutdown, the following steps should be followed relative to hazardous energy control:

- machine or equipment shutdown
- isolation of equipment
- control and relief of stored energy
- application of LOTO devices
- verification of equipment isolation
- performance of scheduled work
- removal of LOTO devices to restore equipment to normal operation

7. Application of Lockout / Tagout Devices

A lock and tag should be attached to the energy isolating device by the Personnel performing the servicing or maintenance.

Lockout (individual locks or group locks with clasp or clip type devices) and/or tagout devices, whichever applies, should be attached to each hazardous energy / substance isolating device by the Personnel(s) performing the servicing or maintenance. No Personnel should place a personal LOTO device for another personnel. Lockout devices should be attached in a manner that will secure the hazardous energy / substance isolating devices in a "safe" or "off" position.

Tags with a "DANGER" legend should be attached to the shackle of the lock. The tag should include the name of the Personnel applying the device. Use of both LOTO is the preferred method for ensuring de-energization of equipment during servicing and/or maintenance activities.

In cases where lockout cannot be accomplished due to equipment design, tags should be used to isolate the equipment. A tagout should not be considered, in any way a lockout. If a tagout is the only means of isolating equipment, then the site supervisor or the individual senior to the individual responsible for managing the equipment isolation or energy control procedures should sign off before proceeding with the tagout. In situations where a piece of equipment cannot be locked out, modifications to allow positive lockout should be made immediately.

7.1 Control / Relieve Stored Energy

All potential hazardous stored or remaining energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure) should be relieved, disconnected, controlled, blocked, drained, repositioned, and/or otherwise determined safe.

If there is a possibility of re-accumulation of stored energy to a hazardous level, verification of isolation should be continued until the servicing or maintenance is completed or until the possibility of such accumulation no longer exists. The frequency of the verification should be based on knowledge of the hazard and should be established before the operation begins

7.2 Verification of Equipment Isolation

After determining that no Personnel are exposed, the Personnel conducting the LOTO should confirm that the energy source has been disconnected or isolated as defined under "Isolation of Equipment" in this Section. This must be done prior to initiating work (by attempting to energize or making certain the equipment will not operate). The operating controls should be returned to "neutral" or "off" position after completing the "isolation" test (this is done to ensure that upon completion of the LOTO maintenance job, that the machine does not "spontaneously" start-up upon being re-energized).

7.3 Perform Scheduled Work

With the LOTO device applied, the machine or equipment is ready for work to proceed. The lock and tag must remain in place until the work is completed.

In situations in which LOTO must be temporarily removed from the hazardous energy/substance isolating device to test the machine/equipment, the procedures outlined below should be followed:

- The machine should be cleared of tools and equipment;
- Personnel should be cleared from the area;
- The lockout devices should be removed;
- The machine should be energized and tested;
- The work or test shall be performed;
- In returning to the lockout/tagout condition, the above energy control measures should be followed.

7.4 Removal of the Lock and Tag to Restore Equipment to Normal Operation

After the servicing and/or maintenance work is completed and the equipment is ready for normal operations, the Personnel should confirm that all work is completed and the equipment is ready for startup. The Personnel should then check the area around the machine or equipment to confirm that all tools have been removed, safeguards are in place, and that all Personnel have been safely positioned or cleared from the area.

The lock and tag should be removed by the same personnel who installed the devices (except as noted below). Finally, all affected personnel should be advised that the servicing is complete and equipment is ready to use.

Under normal circumstances, the lock and tag should only be removed by the personnel who installed it.

When removal by someone else is necessary, the steps listed below should be followed:

- The removal of a lock and tag should be done only under the direction of the Supervisor in charge of the job after they have confirmed that it is safe to remove the device.
- The Supervisor should verify that the Personnel who applied the device is not at the facility.
- The Supervisor should ensure that the Personnel has been informed of the removal of the device before he/she resumes work at the facility.

7.5 Tagout Only Procedures

Tagout procedures alone are only used when a hazardous energy/substance isolating device is not capable of being locked out. In addition to the procedures identified for LOTO, the measures below should also be used.

A standardized tag should be used.

Additional measures shall be considered to make the protection afforded by the tagout procedure equivalent to that provided by the lockout procedure. These include, but are not limited to, removal of a valve handle, the blocking of a controlling switch, or the opening of an extra disconnecting device.

The tag should be attached directly to the hazardous energy / substance-isolating device. If not possible, the tag should be located as close as safely possible to the device.

The tag should be attached in such a manner as will clearly indicate that the operation or movement of hazardous energy / substance isolating devices from the "safe" or "off" position is prohibited. The language on the tag should include the phrases "Do Not Start", "Do Not Open", "Do Not Close", "Do Not Energize", or "Do Not Operate". The tag should identify the person who applies it.

The tag should be able to resist wear and the environment to which it is exposed, and it should be secured so that it cannot be accidentally separated during use.

The tag attachment mechanism shall be non-reusable, attachable by hand, self-lockable, non-releasable

7.6 Procedure Involving More Than One Person

When servicing and/or maintenance work is performed by more than one authorized Personnel, one of the following procedures shall be followed as applicable (Group lockout for a small number of authorized Personnel):

- Primary authorized Personnel should be designated as having overall LOTO responsibilities. This designation may be changed (for example, if the designated person completes his/her portion of the work and leaves), provided that all affected Personnel are notified of the change in advance. The primary authorized Personnel should identify all of the authorized Personnel involved in the servicing/maintenance operation.
- A multiple lockout device shall be used on each piece of equipment locked out, and each authorized Personnel shall provide for his/her own protection by attaching a tagged lock to the multiple lockout device.
- Individual authorized Personnel shall remove their own lock(s) when they (or their crew) stop working on the facility, or depart from the job (i.e., at shift end or conclusion of work assignment).

7.7 Lockboxes

A lockbox procedure may be used when multiple energy sources and/or a group of personnel are involved in maintenance or repair operation.

Under a lockbox procedure the primary authorized personnel should place a LOTO device upon each hazardous energy / substance isolation device. The keys from these locks should then be placed inside a lockbox. Each authorized Personnel assigned to the job should then place his/her personal lock on the lockbox.

As a member of a group, each assigned authorized personnel should verify that all hazardous energy has been isolated and released of energy.

The LOTO devices should not be removed or the hazardous energy / substance device(s) activated until after each authorized personnel has removed his/her lock from the lockbox and the LOTO device(s) are removed.

When the maintenance work extends beyond one shift, a job- lock should also be attached to the lockbox

7.8 Job-Locks and/or Tags

Job-locks or tags may be used by the supervisor(s) of the authorized personnel to provide continuity of energy / substance isolation from shift to shift as applicable to the circumstances of the job.

To achieve job lockout, the supervisor should place a lock on the equipment and leave it on the lockout device for the duration of the job. The Supervisor or his/her relief shall maintain possession of the key.

Each authorized personnel should place his/her lock on the lockout device upon coming onto the job requiring lockout or tagout, and remove his/her lock or tag whenever he/she departs the job (at shift end or conclusion of the work assignment).

Job-locks or tags shall be removed only after all authorized personnel have released the equipment and the job has been completed or is being temporarily energized for other purposes

7.9 Shift or Personnel Changes When Job-Locks Are Not Used

When an off-going authorized personnel transfers servicing duties to an on-coming authorized Personnel (relieving in the presence of each other on the job during a shift change), the on-coming personnel should install his/her LOTO device as soon as the off-going personnel removes his/her lock.

When an off-going authorized personnel transfers servicing duties (during a shift change) to an on-coming authorized personnel by removing his/her LOTO device before the on-coming authorized personnel arrives, the personnel should observe the following procedures:

- The off-going authorized personnel should apply an interim tagout device at the time he/she removes his/her device.
- The interim tagout device shall indicate that the off-going authorized personnel's lock has been removed but the machine or equipment has not been re-energized, depressurized.
- The on-coming authorized personnel should verify that the system is still de-energized or depressurized and shall remove the interim tag and substitute his/her LOTO device.

When interim tagout device(s) are used in lieu of lockout device(s), the following procedures should be used:

- A tag should be used with spaces for the off-going authorized personnel to sign, giving the date, time, and location and for the on-coming authorized Personnel to sign, giving the date, time, and location.
- The off-going authorized personnel should transfer his/her servicing duties to the on-coming authorized personnel by signing off in the appropriate spaces on the tag.
- The on-coming authorized personnel should sign on the tag, giving the date, time and location he/she assumes servicing duties on the tag.
- Each authorized personnel should verify the de-energizing and energy isolation of the equipment for his/her own protection before signing on the tag.

7.10 Valve Lockout Procedure

The personnel who is to work on the equipment should turn the valve to the closed position and lock it with a chain and padlock (or other locking device) so it cannot be moved to the open position.

The personnel locking out the valve shall complete and attach the identification tag to the lock shackle.

After the work is completed, lock and tag should be removed only by the Personnel who locked out and tagged out the valve. If circumstances require someone else to remove the lock/tag, its removal should be done under the direction of a supervisor, and then only after a careful inspection of the work area and the equipment (which is locked out) has been made.

7.11 Blinds

Blinding is considered to be equivalent to locks for the purpose of de-energizing equipment or machines.

Pipelines should be assumed to be under pressure regardless of precautions taken. As far as feasible, pipelines should be physically traced to determine the sources of pressure that need to be blanked off. A check valve should not be depended upon to prevent back flow in a pipeline.

Valves should be locked out both upstream and downstream of the work area. The concern is to prevent a hazardous energy or flammable fuel / gas / toxic mixture from being present inside the pipeline.

The pipeline should be drained. Personnel should not stand in front of valves, connections, bull plugs, gauges or chokes while they are being removed, even if pressure has been relieved. If a section of pipe is to be removed temporarily, the pipeline should be blinded.

Blinds placed on pipelines should be tagged following tagout procedures.

7.12 Cord and Plug Connected Electrical Equipment

LOTO should not apply to cord and plug connected electrical equipment if the equipment is unplugged and the plug is in the exclusive control of the personnel who is performing the servicing or maintenance of that equipment.

The cord and plug is considered to be within the personnel's control if it is in arm's reach and in line of sight of the Personnel or is otherwise under his/her physical possession.

If the cord and plug is not within the personnel's sight or physical control, a LOTO device shall be attached to the cord and plug in such a way that it shall not permit the plug to be inserted into the outlet.

8. Periodic Inspections

Inspections of the LOTO procedure should be conducted by Supervisors to determine that the procedures are being followed. These inspections may be completed through random audits and planned visual observations. The frequency of these inspections conducted by the Supervisor should cover at least 20% of all LOTO jobs, and no less than one inspection per year.

The inspections should:

- Be performed by an personnel other than the one utilizing the energy control proccdurc being inspected
- Provide for a demonstration of the procedures and correct any deviations or inadequacies observed
- Where tagout alone is used for energy control, include the personnel in discussion of his/her responsibilities under the energy control procedure being inspected, and the limitations of tags.

All supervisor inspections should be documented. The documentation should include the date, location, verification that all deficiencies were corrected and the "inspector's" name.

9. Personnel Training

Unless English is the operational language of the facility or area of operation, training should be conducted in the local language.

All personnel who may work in an area where energy control procedures could be used must receive training in the purpose, function, and restrictions of the LOTO procedure. Particular attention should be placed on the hazard evaluation component, including recognition of applicable hazardous energy sources, the type and magnitude of the energy present in the workplace, and in the methods and means necessary for energy isolation and control.

When tagout is used alone, all personnel shall receive training as previously discussed plus training in the limitations of tags.

All personnel who receive initial training on LOTO procedure should receive retraining on a periodic basis.

All training should be documented. The documentation should include personnel's names and dates of training.

10. Contractor Relations

Whenever contractor personnel are to perform servicing and/or maintenance work on machines and equipment, the facility supervisor and a contractor representative should inform each other of their respective LOTO procedures. Contractor LOTO procedure should provide a level of protection at least equal to that of the facility program.

When facility and contractor personnel are working together, the facility LOTO system should be used. If not, the facility supervisor should ensure that facility personnel understand and comply with the restrictions and prohibitions of the contractor's LOTO procedures.

Contractors using their own LOTO procedures should provide evidence of training to the facility.

Appendix A

Hazardous Energy Control Program

Date: _____ **Area / Location:** _____

Person Responsible For Hazardous Energy Control Program

Name: _____ Job Title: _____

Machine / Equipment Type

List types of equipment where these same procedures would apply (i.e., equipment of the same type with similar energy sources)

_____
_____
_____
_____
_____

Location of Equipment:

_____
_____
_____
_____
_____
_____

Energy Controls

Identify and describe the types of energy controls in use and their capability of being locked out.

Types of Energy Controls:

_____
_____
_____
_____

Energy Sources and Controls

Check and/or list energy type and magnitude for this equipment:

Electrical_____ Steam_____ Hydraulic_____
Air powered_____ Natural Gas_____ Other_____

Can the machine be locked out at the main energy source? ___

Stored energy sources:

Identify Energy Sources Type and Magnitude) and Location:	Lockable? Yes or No	Type Lock/Block Device Needed

Shutdown / Lockout Procedures

List, in order, the steps necessary to shut down and de-energize the equipment. Be specific. List the control type and location. For stored energy, be specific about how the energy will be released or controlled

NOTE: Notify affected Personnel whenever these procedures will be completed.

Shutdown (What control applied & Location of the control):

_____
_____
_____
_____
_____

Isolation (What control applied & Location of the control):

_____
_____
_____
_____
_____
_____
_____

Lockout / Tagout (What control applied & Location of the control):

Control / Relieve Stored Energy (What control applied & Location of the control):

Verify Equipment Isolation (What controls shall be tested):

Start Up Procedure

List steps necessary to remove lockout / tagout devices and re-activate (energize) the equipment. Personnel must be clear of area during any testing or activation.

NOTE:
Lockout / tagout devices to be removed by or with the approval of the authorized Personnel who installed them or, if necessary, under the direction of the supervisor in charge of the job.

Lockout / Tagout Removal:

Start Up Procedure:

Procedures Involving More Than One Person

List the procedures that will be used if more than one person is involved in the LOTO work. One or more of the following categories may apply.

Group Lockout:

Lockbox:

Job Locks and/or Tags:

Shift or Personnel Changes:

Outside Personnel and Contractors:

Alternate Procedures

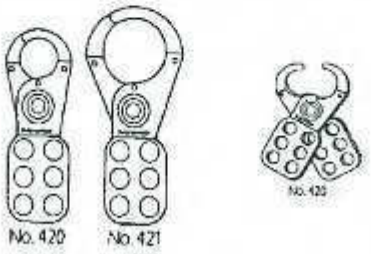
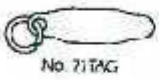
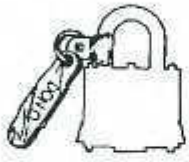
List those operations where the procedures do not apply (such as in tagout only, etc.). Alternate measures that provide effective protection must be developed for these operations.

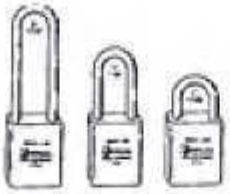
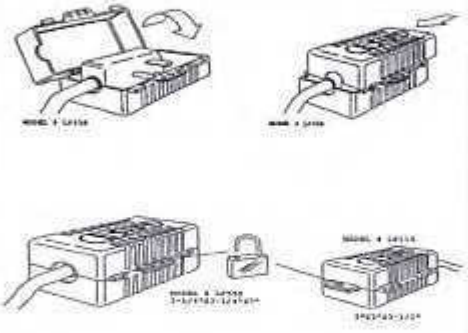
Affected and Authorized Personnel

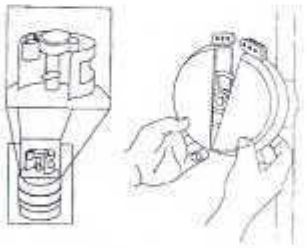
List each person affected by this procedure and those authorized to use this procedure.

Affected Personnel's Name	Occupation/Job Title	Location
Authorized Personnel's Name	**Occupation/Job Title**	**Location**
Other Personnel's Name	**Occupation/Job Title**	**Location**

Appendix B
Lockout Equipment Examples

Description	Illustration
Safety Lockout - vinyl-coated, high-tensile steel - plated to resist rust - accepts six padlocks up to 3/8" shackle diameter - OSHA standard 1910.123(b5) for machine guarding	
Padlock (Colored Bumper) - laminated steel body - pin tumbler lock - double-locking, case-hardened steel shackle - pair of keys - each lock keyed differently - shackle: 9/32" diameter; 3/4" vertical & 5/8" horizontal clearance / - 1 1/2 " wide body	 No. 3
Identification Tags and Collars - Allows instant identification - Designed to withstand rugged work environment - Tags can have names and numbers inscribed, painted, or stamped - 1 3/4" long; 1/2" wide	  No. 71SC9 
Optional 9" Chain Attachments - permanently attach lockouts at pre-designated control and valve sites	

Description	Illustration
Safety Lockout - Aluminum with red poly resin coating for greater visibility - Protection for electric, gas, water, steam, acid, and pneumatic control units and levers - Round design of hasp prevents engagement of circuit breaker boxes and disconnect switches - Accepts up to 3/8" shackle diameter - OSHA standard 1910.123(b5) for machine guarding	
Safety Lockout - Heavy duty steel with 1/4" shackle size solid steel U bolt - 0.060 malleable steel lock plate makes vandalism and accidental breakage virtually impossible - Ideal for chemical, food, pharmaceutical and other process industry applications - Accepts up to 3/8" shackle diameter - OSHA standard 1910.123(b5) for machine guarding	
Color-coded padlocks - Aluminum body with anodized finish - Case-hardened steel, chrome-plated shackle and cover plate - Double ball locking system - Six colors - [B=blue, D=duranodic (brown), E=green, G=gold, K=black, R=red] - Each lock keyed differently - 3/4" thick body	
E-Safe Lock-A-Plug Practical and positive protection - Encompasses the plug - Hole on one end for cord feed - Strong poly pro material - Totally dielectric - Sliding closure - Integrated multiple lockout **Model LP110** - Accepts any 110 volt plug - Maximum plug size 2" x 2" x 3-1/2" - Maximum cord diameter 3/4" **Model LP550** - Accepts any 220 or 550 volt plug - Maximum plug size 3 1/4" x 3 1/4" x 7" - Maximum cord diameter 4"	

Description	Illustration
V-Safe Valve Cover The V-Safe valve cover consists of two flattened half-moons that completely cover the valve, made of nearly indestructible plastic. - excellent dielectric properties. - excellent resistance to solvents. - non-cracking - resistant to extreme temperature changes	

Standard Tagout Devices

supremeenergy

PT. SE ML/RB/RD

SHE Procedure

Hazard Identification Risk Assessment and Risk Control

October 2014

ML/RB/RD-RSH/SHE-MAN-SOP23-Rev 0

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The Supreme Energy project companies - PT Supreme Energy Muara Laboh, PT Supreme Energy Rajabasa and PT Supreme Energy Rantau Dedap are independent companies developing geothermal projects in Sumatra, Indonesia. Based on the agreement of the shareholders of the individual project companies, the Supreme Energy companies are managed in an integrated way in order to maximize the synergies in terms of use of resources and organization of their core and supporting processes. Consequently, important portions of the documentation body developed and applied within each company (manuals, procedures, description of processes, guidelines etc.) are common to all project companies. The applicability of each document to one or several project companies is reflected in the reference of each document.

Any document applicable to PT Supreme Energy Muara Laboh contains the characters "ML" in the document reference.

Any document applicable to the PT Supreme Energy Rajabasa project company contains the characters "RB" in the document reference.

Any document applicable to the PT Supreme Energy Rantau Dedap project company contains the characters "RD" in the document reference.

If a document applies to all three Supreme Energy companies, the term "Supreme Energy" may refer to any and all of these companies.

Within each document, for any reference to the project company, the term "Company" will be used. This term will refer to those companies the names of which are referred to in the document reference. The term Project refers to the project developed by the Company.

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1. Introduction

In order to manage the health and safety of personnel at a facility effectively, an organization has to be able to identify, assess and control hazards which have the potential to cause harm or damage.

This procedure sets out the actions necessary to ensure that all hazards with a potential to cause harm or damage are systematically identified at SUPREME ENERGY's sites. The level of risk of each hazard is determined at each site. Controls are then implemented to eliminate, isolate, or minimize the hazard.

2. Responsibilities

The site's Safety Health and Environment (SHE) Committee will implement a systematic hazard identification and assessment program specific to each individual site. The aim is to identify all hazards at the site and to introduce controls for those hazards. Typically these will be hazards inherent at the site and those caused by routine or normal activities. Non-routine work related hazards will usually be managed by the permit-to-work system.

Hazard identification and control is a shared responsibility between management and staff. Hazards will be systematically identified by examining specific areas of the work site and the activities carried out in them.

Designated staff and management are to review their work areas to consider the potential hazards present. The risk posed by the hazards identified will be evaluated and appropriate control measures developed.

The Safety Health Environment (SHE) Representative is responsible for updating and maintaining the Hazard Identification Register.

3. Definitions

Consequence
The outcome of an event or situations expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain.

Frequency

A measure of likelihood expressed as the number of occurrences of an event in a given time.

Hazard

A source of potential harms or damage or a situation with potential harm or damage.

Hazardous Material

A liquid, solid,or gas that may result in a physical and/or a chemical hazard. A physical hazard is used to describe the flammable, toxic, corrosive, or reactive hazards of a material. A health hazard refers to the acute or chronic health effects of a material.

Likelihood

A qualitative description of probability and frequency.

Probability

The likelihood of a specific outcome, measured by the ratio of specific outcomes to the total number of possible outcomes.

Risk

The measure both of the likelihood (frequency) and the consequences (severity) of a specified untoward event caused by an identified hazard.

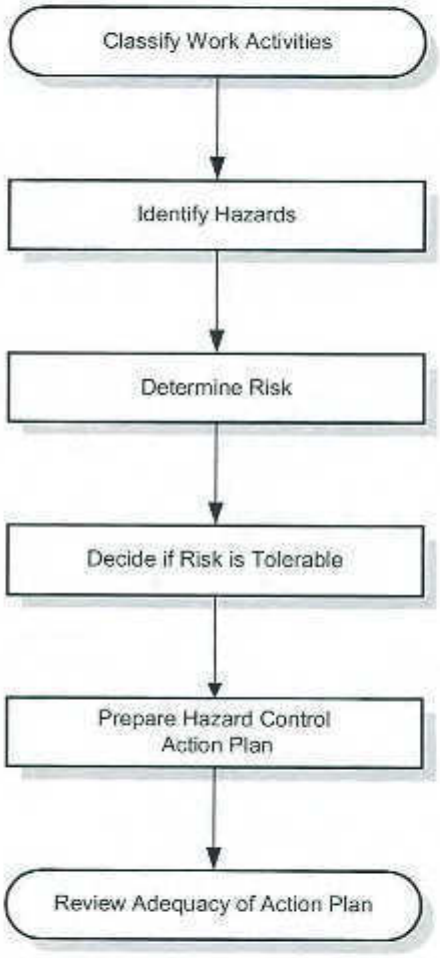
4. Steps in a Hazard Management Program

The steps required in order to carry out an effective Hazard Management Program are presented in Figure 4.1 and are listed below:

- Classify work activities: prepare a list of work activities covering premises, plant, people and procedures, and gather information about them;
- Identify hazards: identify all significant hazards relating to each work activity. Consider who might be harmed and how;
- Determine risk: make a subjective estimate of risk associated with each hazard assuming that planned or existing controls are in place. Assessors should also consider the effectiveness of the controls and the consequences of their failure;
- Decide if risk is tolerable: judge whether planned or existing precautions (if any) are sufficient to keep the hazard under control and meet legal requirements;
- Prepare risk control action plan (if necessary): prepare a plan to deal with any issues found by the assessment to require attention. Organizations should ensure that new and existing controls remain in place and are effective;
- Review adequacy of action plan: re-assess risks on the basis of the revised controls and check that risks will be tolerable.

Note: The word "tolerable" here means that risk has been reduced to the lowest level that is reasonably practicable (the As Low As Reasonably Practicable ALARP Principle).

Figure 4.1 Steps in a Hazard Management Program



5. Hazard Identification

5.1 Hazard Categories

To help with the process of identifying hazards, it is useful to categorize hazards by types. Some examples are listed below:

- Physical hazard: Substance capable of causing damage from physical effects of excessive pressures, fires, explosions, and chemical reactions, such as:
  - Compressed gases
  - Combustible liquids
  - Explosive, flammable, pyrophoric, unstable and reactive substances.
- Chemical Hazards: Chemicals can affect the skin by contact or they affect the body either through the digestive system or, via the lungs if air is contaminated with chemicals, vapor, mist or dust.

  There can be an acute effect, (i.e. the person is affected immediately), or there can be a chronic effect, (i.e. the person is affected in the medium to long term).
- Noise Hazards: Excessive noise can disrupt concentration, interfere with communication and result in loss of hearing. High impact noises are particularly damaging. Noise can also mask out signals, adversely affecting communication.
- Radiation Hazards: Ionizing radiation is in such equipment as radioactive gauging devices, radiographic sources, or the radioactive trace elements used in analytical chemistry. Non-ionizing radiation covers infra-red radiation (heat producing processes), lasers, ultraviolet radiation (welding, sunlight), and microwaves (high frequency welders, freeze drying).
- Electrical Hazards: This covers the risk of injury from all forms of electrical energy.
- Lighting Hazards: Inadequate lighting levels are a potential safety hazard. A common problem area is the reaction time needed for the eyes to adjust from a brightly lit to a darker environment. Temporary lighting is often inadequate.
- Vibration Hazards: This includes whole-body vibration - e.g. truck drivers, people standing on vibrating platforms, and operators of mobile equipment - and also segmental vibration effects from such equipment as hand tools, chainsaws and pneumatic hammers.
- Temperature Hazards: Extremes of cold or heat can cause problems due to individual fatigue or reduced capacity to work.
- Biological Hazards: These include insects, bacteria, fungi, plants, worms, animals and viruses.
- Ergonomic Hazards: This covers risk of injury from manual handling procedures, incorrectly designed work stations, audio and visual alarms, and color coding control mechanisms.

- Physical Hazards: This includes a wide range of risks of injury - as diverse as being caught in or by machinery, buried in trenches or hurt by collapsing machinery. This category also includes the hazards from working in confined spaces, being hit by flying objects, caught in a jet stream, falling from heights and tripping on obstacles.
- Miscellaneous Hazards: This includes stress, fatigue, the effect of shiftwork, and even assaults from other people.

5.2 *Hazard Identification*

There are three fundamental methods of hazard identification applicable to various workplace circumstances.

Hazard Identification by Area

Fixed workplaces are ideally suited to hazard identification by area which involves grouping hazards into common types and identifying them by surveying in detail the different parts of the workplace.

An outline of steps in the process is given below.

(a) Obtain an up-to-date and accurate plan of the workplace.

(b) Draw up a diagram to show the movement of people or plant.

(c) Divide the workplace into discrete areas and number them. This division can be based on how work is carried out or on the physical layout of the site. Thus, for example, a power plant on it might contain a stores area, a plant area, workshops, offices, control room and switch rooms.

(d) Ask staff in each identified area to list what they consider is the hazards in the places they work and why they consider these to be hazards or potential hazards. Use a data collection form for information gathering.

Note: Process of hazard identification should be **audited**. Therefore, an audit trail established, with information clearly recorded.

(e) It is recommended that a meeting be held to fill in the data sheets rather than just handing them out. It is also important that judgments as to the likelihood that harm would result from the hazard are not made at this time.

(f) To further assist the hazard identification process makes use of all available information. This can come from the following sources: codes of practice, pamphlets, booklets, regulations, manufacturers' information material, in-house and external reports, complaint details, environmental and health monitoring reports, etc. Use can also be made of records and reports on accidents and "near misses", both at the particular workplace and more generally within the industry itself.

Hazard Identification by Task Analysis

Work that is not done at a fixed workplace is better analyzed by first identifying the different type of work involved and the tasks that people are called on to perform, and then the hazards they face in doing these tasks can be identified. This method is well suited to those work activities where there is considerable scope for the workers themselves to decide how the task will be carried out.

This analysis method is applicable to such work as maintenance, construction and similar activities where people tend to work in small autonomous groups with minimal supervision. A major problem with this type of approach is that hazards that are not part of a particular person's work tasks will not be identified by that person.

Steps included in the process are listed below:

(a) Identify all the tasks that people carry out. A task consists of a number of steps, actions or stages performed in order to complete a specific work assignment. The task identification process can initially be done by asking people what they specifically do. The work should be broken down into small enough components to be analyzed, but not so small as to make the analysis impractical. A task breakdown of the work carried out may already exist, for example from the development of a quality assurance system.

(b) Discuss and then list the steps or stages involved in performing each task.

(c) Ask those involved what hazards they consider apply to each identified step, and record these.

(d) To assist the hazard identification process, use of all available information.

Hazard Identification by Process

A more technical approach to hazard identification is to identify the processes involved at a work site and then go through each process step-by-step, identifying the hazards in each element of the process. The time taken to identify individual potential hazards in this way can be longer than the time taken to quantify the risks of these hazards.

Steps in this method are listed below:

(a) Make an inventory of all substances and/or chemicals used in the process.

(b) Outline the process from start to finish (source to sink). Identify the steps where process fluids are transformed by physical or chemical means.

(c) Draw up a flow chart detailing every step of the process (including waste streams) and setting out the various stages where chemicals and substances are used in the process.

(d) Identify all the hazards at each of the process.

(e) To further assist the hazard identification process, make use of all available information.

5.3 Hazard Identification Register

A detailed list of the hazards identified shall be prepared clearly linking delineated hazards to specific work areas, specific workplace activities or specific processes within the workplace. Information that needs to be recorded to allow the next stage of the process to be undertaken (risk assessment) includes:

- the exact location, activity or process of the hazard.
- determining who could come into contact with the hazard.
- when and how likely they are to come in contact with the hazard.
- how often (frequency).
- the consequence of coming into contact with the hazard, e.g. the worst case with no controls.

All the information obtained should be recorded on the Hazard Identification Register Form 5.1. These forms will form the basis of the Site Hazard Identification Register and will be available for all personnel at the site to view.

In addition, hazards may be added to the register, via a Safety Alert Card.

Form 5.1

Hazard Identification Register

Area/Activity/Process _____ **Staff Member** _____

Hazard Type _____ **Date** _____

Hazard Description	Location of Hazard	People Who Could be Exposed	When/How/Why/ How Often?	Consequences	Action Taken/Date

6. Risk Assessment

6.1 Determine Risk

The risk from the hazard should be determined by estimating the potential severity of harm (consequence) and the likelihood that harm will occur.

Severity of Harm

Information obtained about work activities is a vital input to risk assessment. When seeking to establish potential **severity of harm**, the following should also be considered:

(a) part(s) of the body likely to be affected
(b) nature of the harm, ranging from slightly to extremely harmful:

(i) slightly harmful, e.g.
- superficial injuries; minor cuts and bruises; eye irritation from dust;
- nuisance and irritation (e.g. headaches); ill-health leading to temporary discomfort;

(ii) harmful, e.g.
- lacerations; burns; concussion; serious sprains; minor fractures;
- deafness; dermatitis; asthma; work related upper limb disorders; ill-health leading to permanent minor disability;

(iii) extremely harmful, e.g.
- amputations; major fractures; poisoning; multiple injuries; fatal injuries;
- occupational cancer; other severely life shortening diseases; acute fatal diseases.

Likelihood of Harm

When seeking to establish likelihood of harm, the adequacy of control measures already implemented and complied with, needs to be considered. Here legal requirements and codes of practice are good guides covering controls of specific hazards.

The following issues should then typically be considered in addition to the work activity information:

(a) number of personnel exposed
(b) frequency and duration of exposure to the hazard
(c) failure of services e.g. electricity and water
(d) failure of plant and machinery components and safety devices
(e) exposure to the elements (flooding, high winds, sun, etc)
(f) protection afforded by personal protective equipment and usage rate of personal protective equipment

(g) unsafe acts (unintended errors or intentional violations of procedures) by persons, for example, who:

(i) may not know what the hazards are

(ii) may not have the knowledge, physical capacity, or skills to do the work

(iii) underestimate risks to which they are exposed

(iv) underestimate the practicality and utility of safe working methods.

It is important to take into account the consequences of unplanned events.

These subjective risk estimations should normally take into account all the people exposed to a hazard. Thus any given hazard is more serious if it affects a greater number of people. But some of the larger risks may be associated with an occasional task carried out just by one person, for example, maintenance of inaccessible parts of the plant.

6.2 Decide if Risk is Tolerable

Table 6.1 shows one simple method of estimating risk levels and for deciding whether risks are tolerable. Risks are classified according to their estimated likelihood and the potential severity of harm.

Table 6.1 A Simple Risk Level Estimator

	Slightly Harmful	Harmful	Extremely Harmful
Highly Unlikely	**Trivial Risk**	**Tolerable Risk**	**Moderate Risk**
Unlikely	**Tolerable Risk**	**Moderate Risk**	**Substantial Risk**
Likely	**Moderate Risk**	**Substantial Risk**	**Intolerable Risk**

Note: Tolerable here means that risk has been reduced to the lowest level that is reasonably practicable.

7. Hazard Control Action Plan

7.1 *Prioritizing Actions*

Risk categories shown, for example in Table 7.1, form the basis for deciding whether controls or improved controls are required to reduce the risk from an identified hazard to acceptable levels.

To establish a prioritization (timescale for action) list an approach is shown in Table 4.2, which shows that control effort and urgency should be proportional to risk.

Based on this approach, an inventory of actions, in priority order, to devise, maintain or improve controls, can be developed and implemented.

Table 7.1 A Simple Risk-Based Control Plan

Risk Level	Action And Timescale
Trivial	No action required and no documentary records need to be kept.
Tolerable	No Additional controls are required. Consideration may be given to a more cost-effective solution or improvement that imposes no additional cost burden. Monitoring is required to ensure that the controls are maintained.
Moderate	Efforts should be made to reduce the risk, but the costs of prevention should be carefully measured and limited. Risk reduction measures should be implemented within a defined time period. Where the moderate risk is associated with extremely harmful consequences, further assessment may be necessary to establish more precisely the likelihood of the harm as a basis for determining the need for improved control measures.
Substantial	Work shall not be started until the risk has been reduced. Considerable resources may have to be allocated to reduce the risk. Where the risk involves work in progress, urgent action should be taken.
Intolerable	Work shall not be *started* or *continued* until the risk has been reduced. If it is not possible to reduce risk even with unlimited resources, work has to remain prohibited.

Note: Tolerable here means that risk has been reduced to the lowest level that is reasonably practicable.

7.2 *Hazard Control Options*

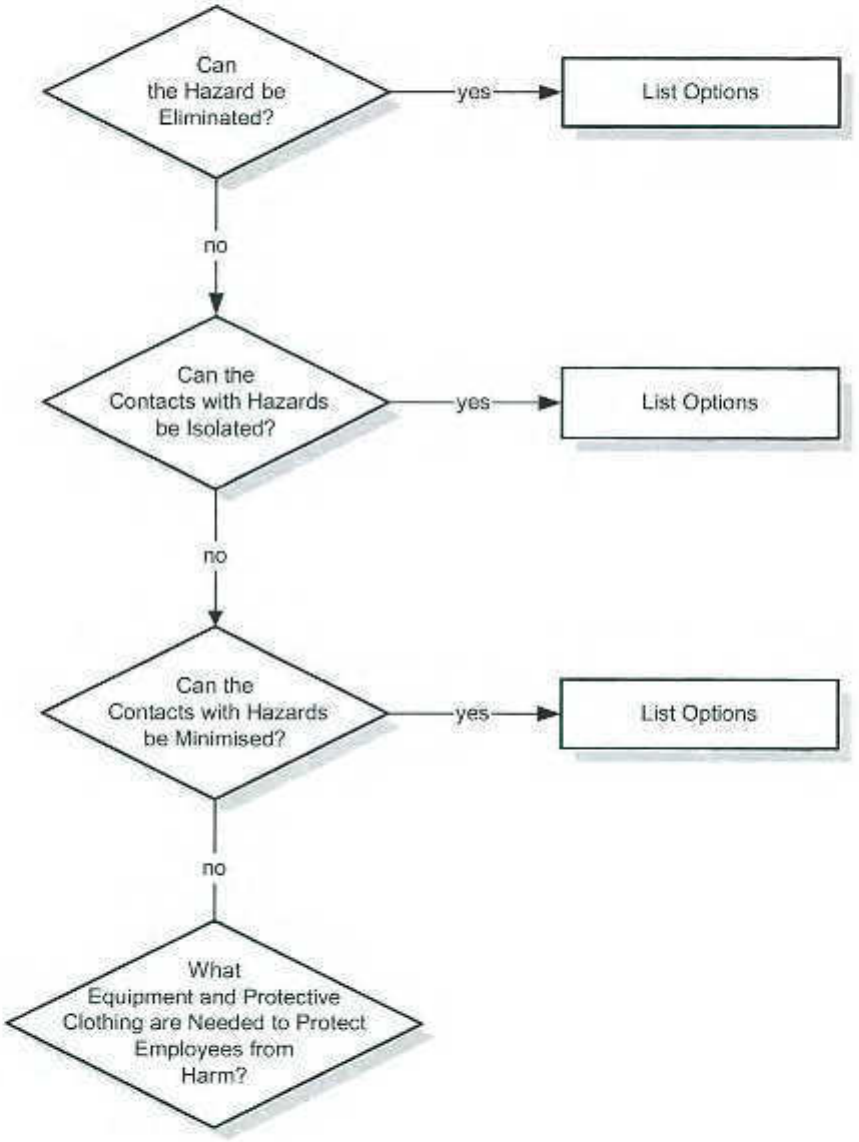
It is important when developing control options for identified significant hazards that all options are considered including reviewing the existing controls to ensure that the most effective controls are in place. Controls should be chosen taking into account the points listed below.

- If possible, eliminate the hazard altogether, e.g. substitute with a safer chemical for a more hazardous one
- If elimination is not possible, try to reduce the risk, e.g. by using a low voltage electrical appliance
- Enclose/isolate process or pieces of equipment
- Where possible, adapt work to the individual, e.g. to take account of individual mental and physical capabilities
- Take advantage of technical progress to improve controls
- Implement measures that protect everyone
- A blend of technical and procedural controls is usually necessary
- Consider the need to introduce planned maintenance of, for example, machinery safeguards
- Adopt personal protective equipment only as a last resort, after all other control options have been considered
- Review the need for emergency arrangements
- Pro-active measurement indicators are necessary to monitor compliance with the controls.

Consideration also needs to be given to the development of emergency and evacuation plans, and provision of emergency equipment relevant to the organization's hazards.

A decision tree for deciding how a hazard can be controlled is presented in Figure 7.1.

Figure 7.1 Hazard Control Decision Tree



8. Review Adequacy of Action Plan

The action plan should be reviewed before implementation, typically by asking these questions.

(a) Will the revised controls lead to tolerable risk levels?

(b) Are any new hazards created by the implementation of the proposed control?

(c) Has the most cost-effective solution been chosen?

(d) What do people affected think about the need for, and practicality of, the revised preventive measures?

(e) Will the revised controls be used in practice, and not ignored in the face of, for example, pressures to get the job done?

9. Implementation of Control Options

Once an appropriate control option has been decided on, it will be implemented and its implementation recorded in the Hazard Identification Register and a hazard control plan will be filled in, assigning responsibilities and a timeframe for the implementation of the control.

The frequency of inspection for each control will be based on the degree of risk the hazard represents.

10. Plant Failures

10.1 General

Operations involving high energy systems require that the hazards presented by system and equipment failures are of particular concern. Plant hazard identification and control must start at the conceptual design stage and extend right through to decommissioning.

Most hazards not covered at the design stage will tend to be managed by operating procedures. Non-routine plant activities will usually be controlled by careful work planning and implementation.

10.2 Maintenance

The ongoing safety of plant and equipment is largely controlled by routine maintenance and prompt defect identification and rectification. To this end all safety-related maintenance is to be separately identified and monitored. It is of note that the term 'safety related maintenance (starred maintenance)' refers both to maintenance on safety equipment and safety systems, as well as systems and equipment if a failure occurred which could lead to hazards to personnel.

11. Management of Change

The management of hazards at a facility is a continuing process. The adequacy of control measures should be subject to continual review and changes made as if required.

If conditions change, (activity change, process change or new equipment) then the extent that hazards and risks are affected by the change should be reviewed and the risk assessment revised to take into account these changes.

12. Hazardous Areas

As part of the hazard control process, certain areas, because of the nature of hazards identified in that area, will have specific control measures. Areas designated as Hazardous Areas will be marked on a site layout map and warning signs erected to inform persons that the area is hazardous, has restricted access and is subject to specific work controls. The Site Safety Health Environment (SHE) Committee will establish appropriate rules for each designated Hazardous Area.

Hazardous Areas can include areas where there is the likelihood of flammable or toxic gases being present; high noise hazards, eg areas around a venting rock muffler or a safety valve's vent; high voltage areas, such as switchyards.

13. Safety Alert Cards

If SUPREME ENERGY employees, contractors or visitors in their work come across a hazard that they believe has not been identified, or a control measure that is deficient, a Safety Alert Card should be filled in and forwarded to the Site Safety Health Environment (SHE) Representative.

The Site SHE Representative will process the Safety Alert Cards received and raise them at the next site SHE Committee meeting for consideration. The actions decided on by the SHE Committee will be conveyed to the person who raised the Alert.

Safety Alert Cards are red cards which are located in small boxes attached to SHE Noticeboards throughout the site. A copy of the card is presented as Figure 13.1.

Figure 13.1 Safety Alert Card

SAFETY ALERT CARD

Date:

Time:

Work Area:

Hazard / Item:

Unsafe Condition: