

# Draft Environmental and Social Impact Assessment Report (ESIA)

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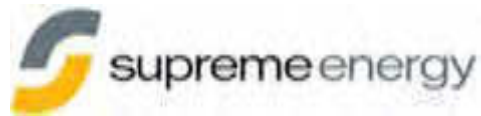
## INO: Rantau Dedap Geothermal Power Project (Phase 2)

Volume VI: Appendix 12C – Safety, Health and Environmental Manual

Prepared by ESC for the Asian Development Bank

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## **Chapter 2: Section 9 : Excavations and Shoring**

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## 9. Excavations and Shoring

### 9.1 Introduction

Excavating is recognized as one of the most hazardous construction operations. Workers may be exposed to hazards created when excavated surfaces become unstable. Hazards may also be created by the presence of underground installations, hazardous atmospheres, falling material and water accumulation. Engineering controls must be utilized to protect workers from these hazards.

The identification and control of hazards in all trenching work is not a simple matter. The physical hazards no longer lie on the surface, accessible to a simple inspection. There is no single ideal system of control. The most appropriate systems may vary to some extent with the type of trenching work carried out.

All trenching work is potentially hazardous. Attention must be paid at all times to considerations of safety by everyone involved in trenching operations.

This procedure applies to all excavations within SUPREME ENERGY operations, when soil is to be removed using powered equipment. It also applies when manually digging to a depth of 30cm or more. It does not apply to well drilling.

This procedure outlines the minimum safety requirements that must be followed to ensure the safety of workers and facilities during excavation work.

### 9.2 Definitions

#### *Excavation*

(means making a hole or channel by digging) - is any cut, cavity, trench, or depression in the earth's surface that is created by removing earth by hand or using powered mechanical equipment.

#### *Excavation Supervisor*

The Person in Charge (PIC) of the excavation work and responsible for ensuring that conditions in the facility or area are safe for the excavation work to begin. The PIC is designated by the department or section that operates the facility or is otherwise responsible for safe operations in the excavation area.

#### *Material*

- Consists of or includes solid material in such a form or state, or in pieces or particles so small, that it is capable of subsiding or flowing in such a manner as to trap or engulf a person
- Is enclosed inside a structure.

*Qualified Person*

A person who, by possession of a recognized degree, certificate, or professional standing, or who by knowledge, training, or experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the subject.

*Underground Services*

Means all authorized services placed in the ground and controlled by a recognized authority. It does not include underground structures such as brick sewers, railway tunnels, etc.

*Unforeseen Work*

Means work that occurs at such short notice that it cannot be planned in advance.

*Shoring*

(*shoring system*) is a structure of metal, timber or both that supports the sides of an excavation to prevent cave-in. Shoring systems may be mechanical or hydraulic.

*Angle of Repose*

The angle to the horizontal at which the material in the face is stable and does not fall away.

*Batter*

The inclination of a slope, expressed as (a) vertical units or (b) horizontal units.

*Benching*

(*benching system*) means to form the excavation faces into one or a series of horizontal levels or steps to prevent cave-in, (a sloping ground in horizontal steps).

*Face*

An exposed sloping or vertical surface resulting from material.

*Filling*

Any ground made up using imported material or material from the excavation.

*Safe Slope*

The steepest slope at which an excavated face is stable against slips and slides.

*Soil*

All materials encountered from the ground surface to the bedrock.

#### *Well Point System*

A system of pipes, jetted or driven at close centers into the ground and connected to a suction main for the purpose of lowering ground water, particularly in granular soil.

### **9.3 Responsibilities**

#### *9.3.1 Loose But Enclosed Materials*

The person in charge of the excavation shall take all practicable steps to ensure that, where any employee can be trapped or engulfed by material, a full body harness is provided that is:

- suitable for the purpose for which it is to be used
- attached to a life-line or other device
- securely fastened at its extremity
- attended by another employee who is competent, equipped, and stationed to affect an immediate rescue, if any employee is trapped or engulfed.

#### *9.3.2 Raised Objects*

The person in charge of the excavation shall take all practicable steps to ensure, where any employee is under any object/item that has been raised or lifted by any means to enable any work to be done, supports or other devices are placed or used under the object/item so that it cannot drop or be lowered while the employee is under it.

#### *9.3.3 Excavations With Faces More Than 1.5 Meters High*

All practicable steps shall be taken to ensure that, where any face of any excavation is more than 1.5 meters high, that face is shored. A permit-to-work (General Work Permit) is required for work more than 1.5m deep or where the material is unstable.

This does not apply where:

- the face is cut back to a safe slope
- the material in the face is of proven good standing quality under all reasonably foreseeable conditions of work and weather
- by reason of the nature of the work and the position of any employee in the vicinity, there is no danger to any employee
- the provision of shoring is impracticable or unreasonable by reason of the nature of the work and the contractor takes all practicable steps to ensure

that other precautions are taken to make the face as safe as possible in the circumstances.

All practicable steps shall be taken to ensure that any shoring used in any excavation:

- consists of materials that are suitable for the purpose for which they are to be used, of sound quality, and adequate in strength for the particular use
- has bracing, jacks, and struts that are securely held to prevent accidental displacement, and packings and wedges that are held by nails or spikes
- is placed in a proper manner by an experienced person under competent supervision
- is not altered, dismantled, or interfered with except on the instructions of the person in charge of the excavation.

#### 9.3.4 *Excavations of Hazardous Depth*

All practicable steps shall be taken to ensure, where any excavation is:

- i) readily accessible to any person; or
- ii) likely to collect or retain water of such a depth as to constitute a danger to any person,

The excavation is covered or fenced so no unauthorized person has access to it.

At completion of work the excavation shall be filled.

### 9.4 **Excavation Plan**

#### 9.4.1 *Plan Approval*

A formal excavation plan shall be prepared by the contractor or SUPREME ENERGY staff member responsible for the excavation work. This should be on Form 9.1 as provided at the end of this section. It shall be submitted at least two days before the start of any physical work.

For each excavation, an Excavation Supervisor shall be appointed who shall have authority and be personally responsible for the inspection, checking and maintenance of excavation work and safety. The Excavation Supervisor will carry out a formal inspection daily of the work and complete an inspection form (Form 9.2 at the back of this section).

The appointment of an Excavation Supervisor does not negate the responsibility of the rest of the staff for the work.



## 9.5 Safe Work Practices

### 9.5.1 Introduction

SUPREME ENERGY will organize and carry out excavations in such a manner so as to eliminate, or at least minimize, inconvenience or damage to underground services whilst still providing safe conditions for both workers and the public.

SUPREME ENERGY will isolate the underground services from the excavation work in order to allow work to continue without danger to the workers or the public.

All excavation work must be planned before work commences on site. This is essential if the work is to be carried out safely.

Before work starts, there should be on-site, sufficient suitable materials to support the length of excavation expected to be open in normal circumstances, plus extra material that can be used if required.

The designer of a trench support system needs to bear in mind that the system is usually required to serve two purposes:

- i) safety
- ii) avoidance of damage to adjacent buildings, roads and services.

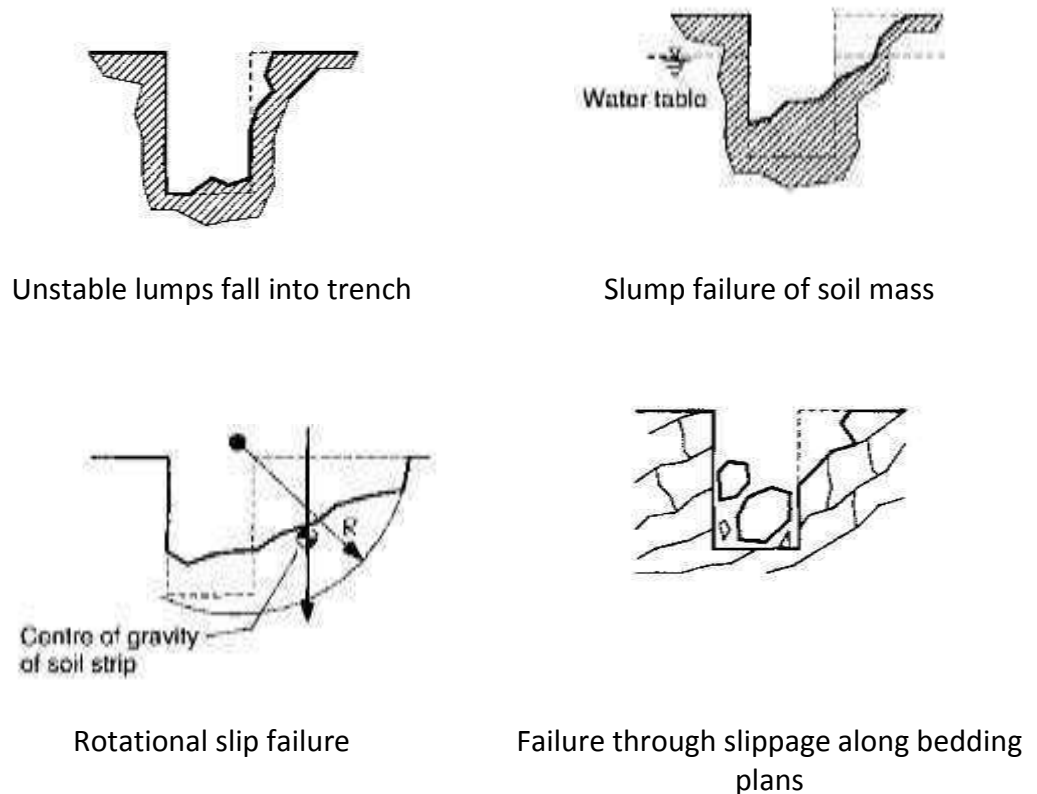
### 9.5.2 Modes of Failure

It should be noted that all excavations no matter what depth, may be hazardous. Modes of failure will depend on

- the depth and type of soil
- bedding planes
- vibration
- the presence of moisture: rain, or a high water table level
- any superimposed loading close to the edge of the excavation
- the length of time the excavation is open
- any previous disturbance of the soil.

While some types of soil often look stable and may stand for quite a long time, a false sense of security can build up.

Some common failure modes are shown in Figure 9.1



**Figure 9.1: Soil Failure Modes**

Removal of soil from an excavation causes unbalanced soil stresses. The use of a shoring system, or the cutting of the sides of the excavation to a safe slope, will help compensate these soil stresses. A shoring system, or the design of safe side slopes, is engineering problems that involve both structural design and soil mechanics. While experience can guide operators in recognition of hazardous situations, it is only engineering practice that can provide known safe solutions. Just because a 'solution' worked previously does not mean that solution is satisfactory for the current situation. There may be additional factors that need to be taken into account.

### 9.5.3 *Review of Site Plans*

The owners of underground services shall be approached for information and plans well before excavation is due to start.

For major projects, an early approach to service owners is recommended as it may be possible to divert some services from the excavation area.

Plans shall be obtained which show the recorded line and depth of all their known services buried in the proposed work area.

Plans are not normally drawn to scale but even if they claim to be, they shall not be relied upon to obtain accurate measurements. However, plans can give a good indication of the location, configuration and number of underground services at a particular site.

Those in charge of site work, and operators of locators, shall be aware the plans may show spare ducts, and that the accuracy of plans is limited as:

- the position of reference points may have changed since the plans were drawn
- re-grading of the surface may mean that the depths shown are now incorrect
- services, particularly cables may have been moved without the authority or knowledge of the owners
- in many cases service connections are not marked
- services tend to be drawn as straight lines but may in practice 'snake'. Excessively long cables may have been laid as horizontal loops outside substations, switch rooms, etc.

Even when work has to start without plans, as may be the case for emergency and unforeseen work, every effort should be made to locate buried services.

Where plans are not available in any situation, hand digging only shall be carried out.

#### 9.5.4 *Locating Devices*

The position of any services in or near the proposed work area should be pinpointed as accurately as possible by using a locating device, in conjunction with any available service plans or other suitable information.

Plans will help the operator using the locator to interpret the signal, and so give the maximum information to those involved with the work before digging starts.

The degree of confidence with which buried services can be detected depends on a number of factors such as the characteristics of the device being used, the type and depth of the service, the magnitude of the current carried by the cable or other service, and the effects of other cables and metal pipes close by.

Frequent and repeated use shall be made of locators during the course of work.

Locators will not detect plastic pipes or other non-metallic ducts and services unless either:

- a metallic tracer wire has been laid with the pipe
- a small signal transmitter is inserted into and pushed along the pipe.

Locating devices shall always be used in accordance with the manufacturer's instructions and shall be regularly checked and maintained in good working order.

#### 9.5.5 *CAT (Cable Avoiding Tool).*

Before using the CAT at the work site, carry out a visual survey of the area, look for some of the following:

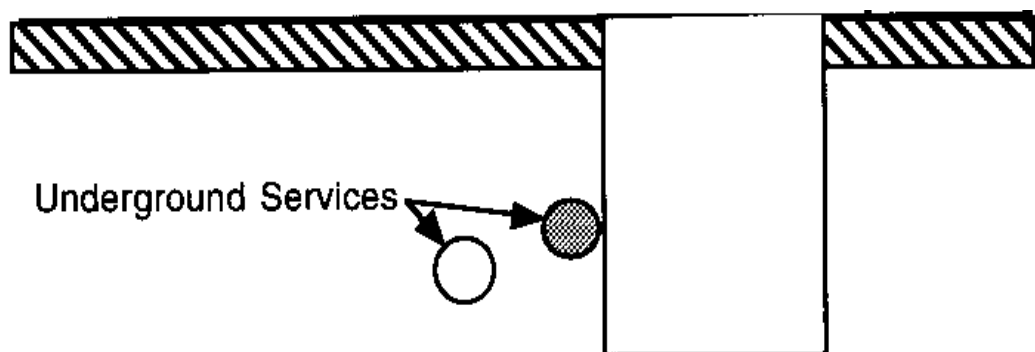
- overhead power lines
- street lighting
- cable poles
- housing in the area
- stop cock covers
- signs of previously dug trenches.

#### 9.5.6 *Safe Digging Practice*

Once a locating device has been used and/or the services are located, excavation may proceed, with trial holes dug using hand tools as necessary to confirm the position of any buried service. Special care shall be taken when digging above or close to the assumed line of such services.

Where practical, power tools shall not be used within 0.5 meters of the indicated line of the buried service.

Power tools and machinery shall not be used until services have been located and identified by hand digging



**Figure 9.2: Excavating Next to Underground Services**

When power tools have been used to break the surface away from the indicated line of the service, it shall then be positively located by careful hand digging under the paved surface.

If the service has not been located, where possible the CAT shall be used as a guide in or down the side of the excavation

Remember the minimum distance for any power tools used in excavation work must be no closer than 0.5 meters either side of the indicated line of the buried service. This may be reduced:

- i) where congestion of buried services renders it impracticable;
- ii) where surface obstructions limit the space available,

but only if the line of the service has been positively identified by plans and confirmed by a locator.

#### 9.5.7 *Excavations With a Face More Than 1.5 Meters High*

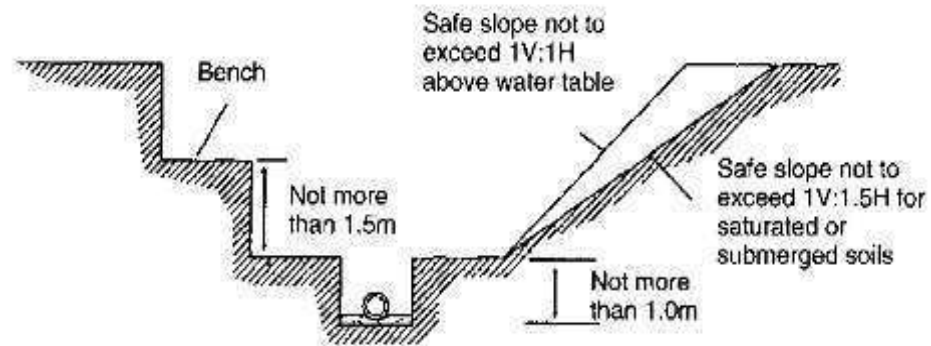
Where any face of any excavation is more than 1.5 meters high, that face shall be shored unless:

- the face is cut back to a safe slope and the material in the face will remain stable under all reasonably foreseeable conditions of work and weather
- the provision of shoring is impracticable or unreasonable, and safety precautions certified by an appropriately qualified person to be adequate, have been taken.

#### 9.5.8 *Safe Slopes in Excavation*

The safe slope of an excavation shall not exceed:

- i) IV:1H or the angle of repose, whichever is flatter, for soils above the ground water table.
- ii) IV:1.5H or the angle of repose, whichever is flatter, for saturated a submerged soils, or for excavations greater than 3m in depth.
- iii) Where the slope of an excavation is benched, the maximum height between benches shall not exceed 1.5m, except for the bench adjacent to the work area which shall not exceed 1m. Overall, the total width of the benched excavation shall not be less than that required in (i) or (ii) above.



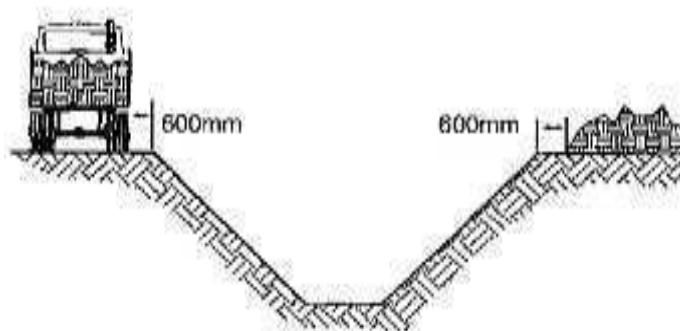
**Figure 9.3: Excavation Face Benched and Battered to a Safe Slope**

#### 9.5.9 *Materials and Loads Above Excavations*

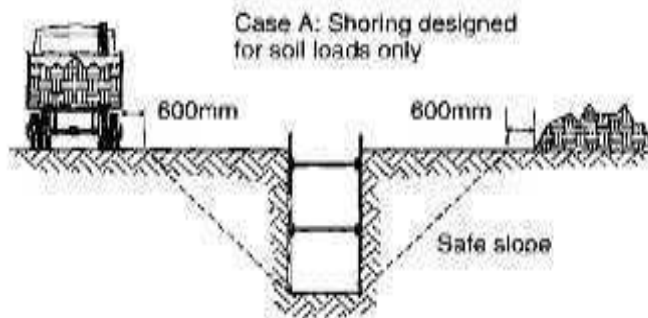
Excavated or other loose material shall be effectively stored or retained not closer than 600mm from the edge of the face unless the face is specially shored to allow for the increased load, and suitable toe boards or other safeguards are provided.

Mechanical plant, vehicles or any heavy loads shall not approach closer than:

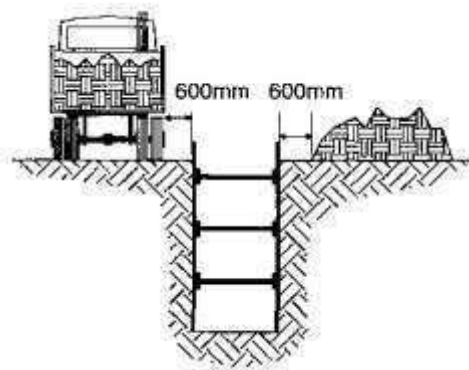
- 600mm from the edge of an excavation which is battered to a safe slope
- what would be the edge of the face if battered to a safe slope unless the actual face is specially shored to allow for the full effect of the additional load.



**Figure 9.4: Excavation with Battered Faces**



**Figure 9.5: Excavation with Shored Faces.**



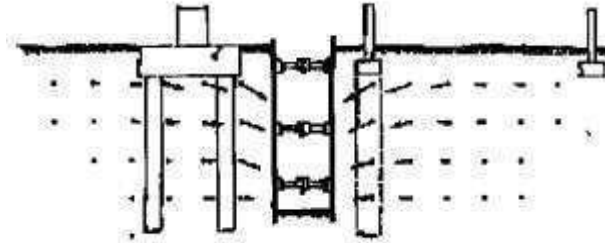
**Figure 9.6: Excavation with Shoring Designed for Surcharge Loads.**

**9.5.10** *Excavations Adjacent to Buildings or Structures:*

Where it is intended to excavate alongside another structure, the precautions listed below shall be observed:

- Never excavate below the level of the foundation of any adjacent structure, or within an area which would be inside the safe slope, unless adequate precautions have been taken to ensure that the stability of the excavation face and the building or structures above are not at risk either during or after excavating.
- If an excavation is likely to affect the stability of existing structures, advice from an appropriately qualified person must be obtained before the excavation is started.

- Where pumping is being carried out to lower the ground water level, subsidence of adjacent structures may result. The characteristics of the supporting soil may be changed by pumping, causing a loss of fines and reducing the load-bearing capacity of the soil. If such works are to be undertaken, expert advice should be obtained.



**Figure 9.7: Building Foundations Adjacent to Trench**

#### **9.6 Parties with Access Affected**

The Excavation Supervisor shall advise occupiers on work areas who may have their access affected by the contract works, when and where disruptions are likely to occur.

The Excavation Supervisor will advise SUPREME ENERGY that notice has been given.

#### **9.7 Equipment**

Equipment to be used in excavation shall be:

- specifically designed and manufactured for the purpose
- cleaned and maintained during use to ensure that performance is effective.

#### **9.8 Barriers and Signs**

- Where construction vehicles or plant use public thoroughfares, notices shall be placed at all exits and entrances to the work area to warn of the excavation.
- For all work carried out on roads, temporary warning signs shall be erected and traffic control measures used (a person with a stop/go sign).
- Fencing used for protection shall be adequate to prevent ready access to it by any person.
- Excavations carried out at any workplace to which people have, or might gain access, must be guarded to avoid danger to people. A fence one meter



high or a combination of signs, barriers, lights, markers, flags, or sentries may be necessary to provide adequate protection for the people and employees. These safety devices must be properly maintained until the excavation is complete or until there is no longer any danger.

- If an excavation is likely to collect or retain water of such a depth as will constitute a hazard to children or persons in the vicinity, the excavation must be covered or fenced off whenever workers are not present.
- Where excavation work is in or near access ways, and hazards exist, barricades, overhead protection, enclosed walkways or other means of protection shall be provided for the people.
- Where walkways or bridges are used, these shall be designed in accordance with sound engineering practice. Guard rails and mid-rails must also be provided where there is a fall hazard.

## **9.9 Permit-to-Work**

A permit-to-work is required for all excavations with a face more than 1.5 meters high. The permit-to-work (Master Work Permit) shall be obtained from SUPREME ENERGY. The Excavation Plan will be submitted along with the Master Work Permit application and in some instances will be the basis of the permit. The Master Work Permit shall be completed before the work commences and the following details should be included:

- nature and location of the work
- name, address and contact details of the employer
- intended date of commencement of the work
- estimated duration of the work
- precautions to be followed.

## **9.10 Examination of Excavations**

Excavations, including shoring and underpinning, shall be examined by the Excavation Supervisor before work starts each day, and after rain or any occurrence that could affect the stability of an excavated face.

Shoring members shall be checked for tightness against each other and against the soil face. A daily record shall be kept of examinations made, conditions found and precautions and/or actions taken (Form 9.2).

### 9.11 Road Surface Condition

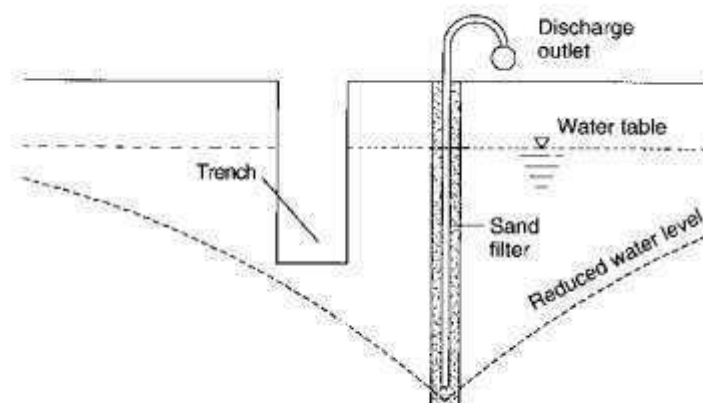
Work shall be carried out in a manner that protects the works and which permits the safe and convenient passage of traffic with minimum delays over the whole length of road affected by the excavation.

### 9.12 Surface Water and Drainage

In all excavations, the safety of faces and fillings often depends on the effectiveness of the control of surface and ground water. To control surface water, cut-off drains constructed parallel and a safe distance back from the face, shall collect water and discharge it clear of the working area. Drains may also be necessary in the trench itself.

Subsurface drains, well pointing, or sump pumping should be installed to cut off, remove, or intercept ground water and channel it away from the site if this is a hazard.

Well pointing can lower the water table 4-6 meters and is most suitable in sands. The inflow from clay soils to well-pointing may be insufficient to be effective. During construction, checks should be made for inflow from springs or seepage. Any inflow should be collected in sumps and pumped clear of the excavation.



**Figure 9.8: Well Pointing**

Springs coming up through the floor of an excavation are another cause of unstable conditions.

### 9.13 Harmful Gases

Excavations being below ground are a natural receptacle for all gases heavier than air. Gas of various kinds, from quite unknown sources, can seep through the ground particularly where other work is taken place in the vicinity.

Typically specific gases are found for certain ground types. These are summarized in Table 9.1.

**Table 9.1: Typical Gas for Specific Ground Types**

Type of Ground	Gases or Fumes Found
Peaty ground	methane, hydrogen sulphide
Filled and made ground	carbon dioxide, hydrogen sulphide
Reclaimed land and tip fills	carbon dioxide, methane
Thermal areas	carbon dioxide, carbon monoxide, hydrogen sulphide, sulphur dioxide, methane
Petroleum installations, service stations	petrol fumes, LPG, kerosene
City streets	natural gas, carbon dioxide, steam

Where there is any likelihood of air contamination, the works must be examined, using the correct type of detecting equipment.

#### 9.14 Overhead Service Lines

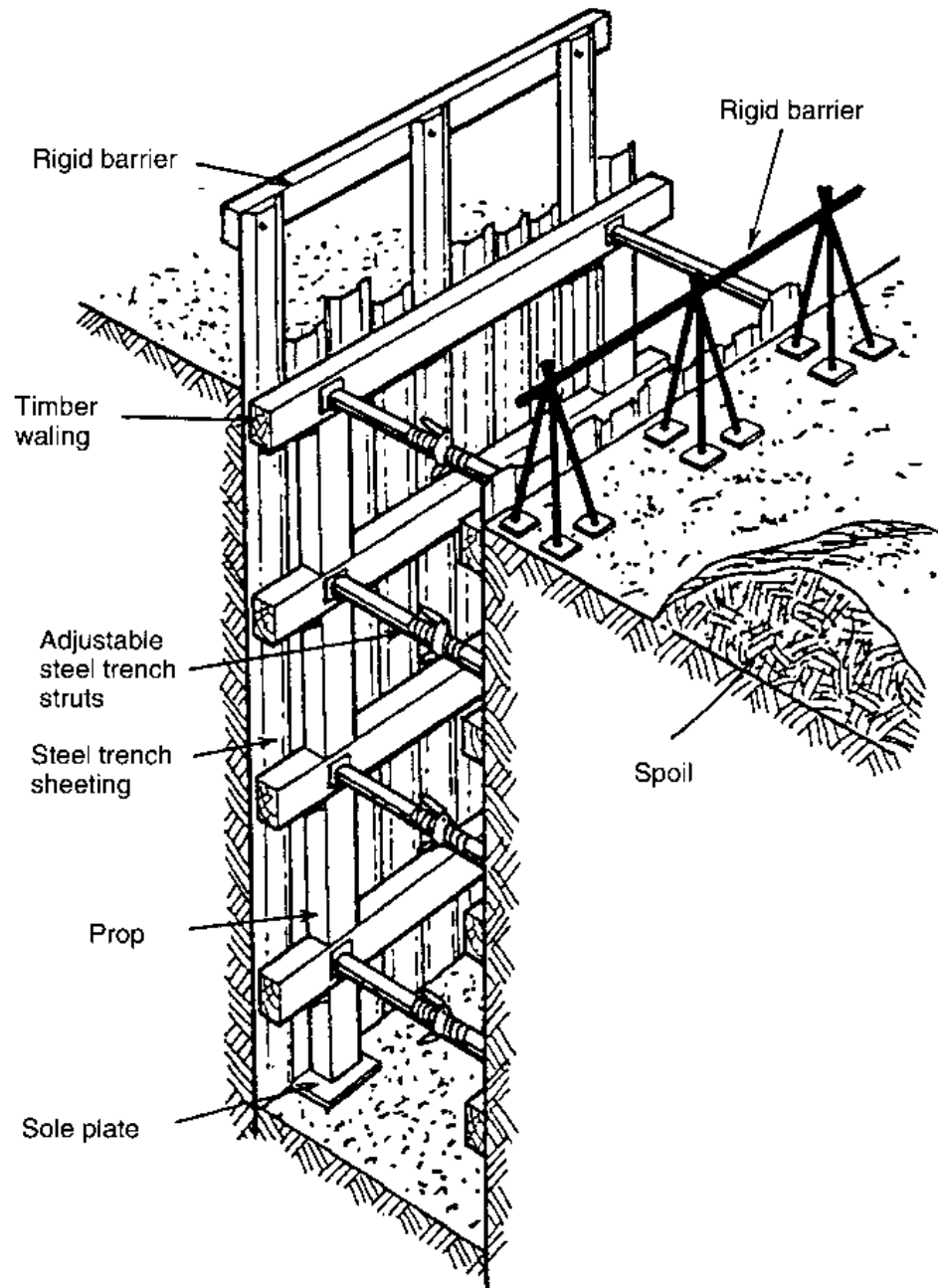
When using excavators, e.g. backhoe, consideration shall be given to overhead services in the vicinity of the work. No part of any plant, equipment or its load shall come within the minimum approach distances (set out below) from the overhead service lines unless written permission has been obtained from the owner of the lines.

**Table 9.2: Minimum Approach Distances**

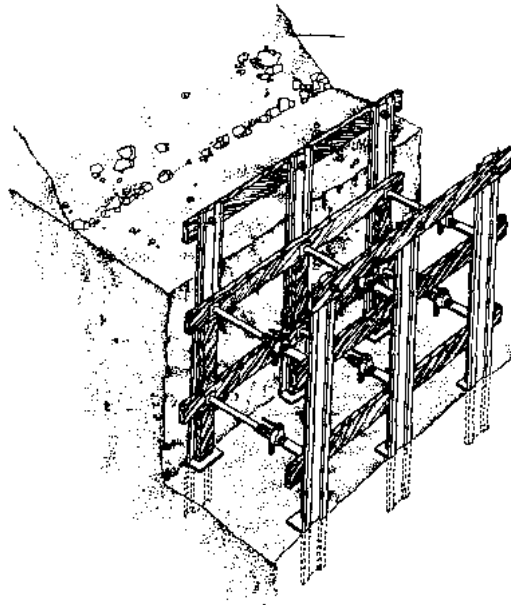
Type	Minimum Distance in meters
Telecommunications	4.0
Line voltage not exceeding 66kV	5.0
Line voltage exceeding 66kV	6.0

#### 9.15 Protection and Support Systems

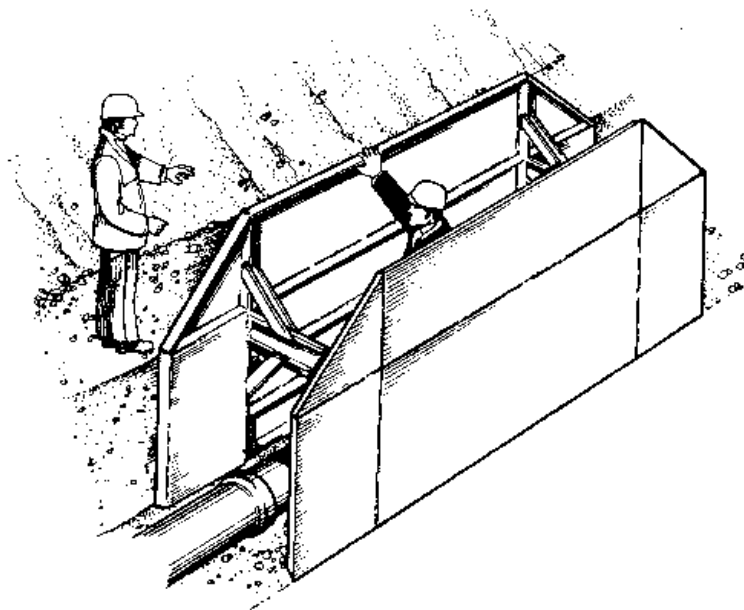
Diagrams that show protection and support systems that are used to shore up trenches are presented below.



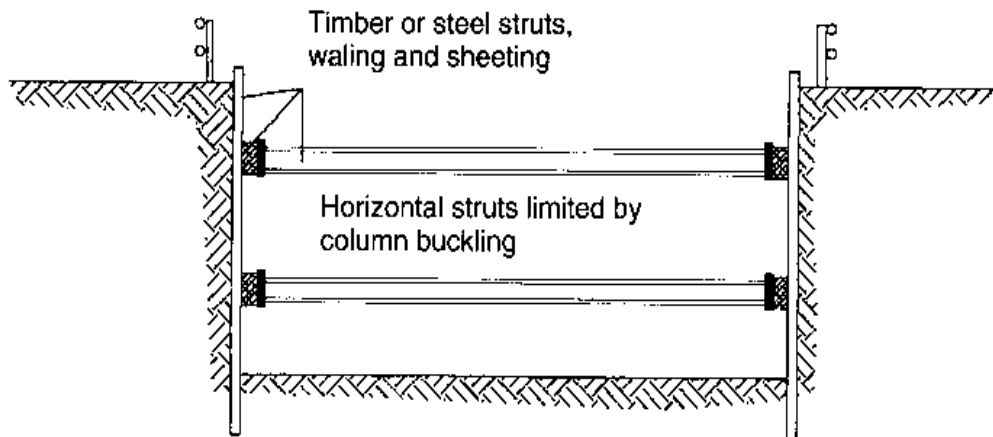
**Figure 9.9: Typical Close Sheet Trench Support Method.**



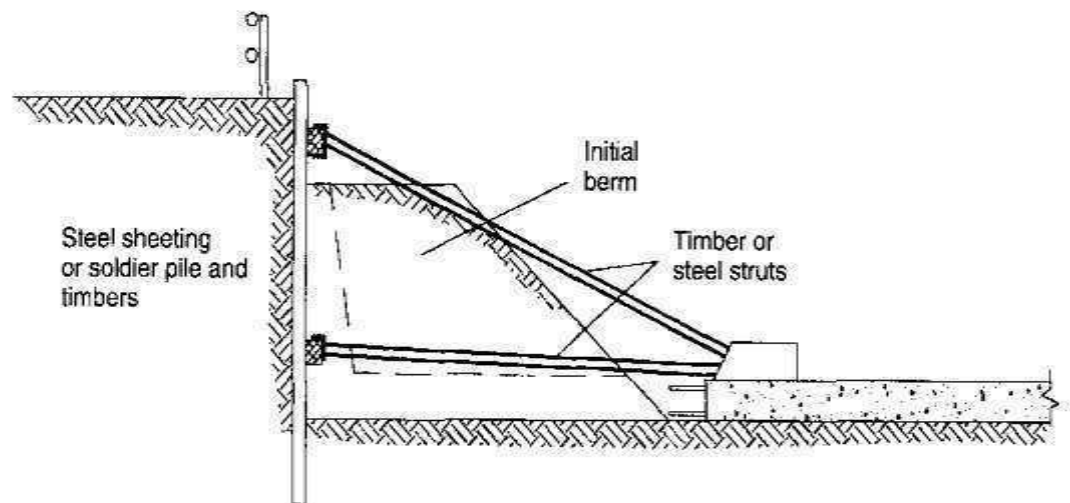
**Figure 9.10: Quarter - Sheetting**



**Figure 9.11: Trench Shield System**



**Figure 9.12: Horizontal Struts and Walings.**



**Figure 9.13: Raking Struts.**

## 9.16 Shoring Requirements for Trench Excavations

The size and type of shoring required for trench excavations are specified in the following tables.

**Table 9.3 : Timber Sheeting**

Soil Conditions	Trench Depth (m)	Timber Sheeting	
		Min Dims (mm)	Horizontal Spacing (mm)
<b>TYPE A</b> Unsaturated ground; soils above ground water table or level	up to 3.0	150 x 50	1200 - 300 (a)
	3.0 - 4.5	150 x 50	600 - close (b)
	4.5 - 6.0	200 x 50	300 close (c)
<b>TYPE B</b> Saturated ground, soils with ground water table or level	up to 3.0	150 x 50	close
	3.0 - 4.5	200 x 50	close

**Table 9.4 : Timber Waling**

Soil Conditions	Trench Depth (m)	Timber Waling	
		Min Dims (mm)	Vertical Spacing C to C (mm)
<b>TYPE A</b> unsaturated ground; soils above ground water table or level	up to 3.0	150 x 100	1200
	3.0 - 4.5	150 x 100	1200
	4.5 - 6.0	250 x 100	1200
<b>TYPE B</b> saturated ground, soils with ground water table or level	up to 3.0	225 x 150	1200
	3.0 - 4.5	250 x 150	1200
	Dims		Spacing C to C

**Table 9.5: Timber Struts**

Soil Conditions  Horizontal (mm)	Trench Depth (m)	Timber Struts (mm) <sup>(1)</sup>				
		Trench width up to			Spacing C to C	
		1.0 (m)	2.0 (m)	2.5 (m)	Vertical (mm)	(mm)
<b>TYPE A</b> unsaturated ground; soils above ground water table or level	up to 3.0	100 x 100	150 x 100	150 x 150	1200	900
	3.0 - 4.5	150 x 100	150 x 150	150 x 150	1200	900
	4.5 - 6.0	150 x 100	150 x 150	150 x 150	1200	900
<b>TYPE B</b> saturated ground, soils with ground water table or level	up to 3.0	150 x 100	150 x 150	150 x 150	1200	900
	3.0-4.5	150 x 150	200 x 150	200 x 150	1200	900

**Table 9.6: Steel Trench Struts**

Soil Conditions  Horizontal (mm)	Trench Depth (m)	Steel Trench Struts (mm) <sup>(2)</sup>				
		Trench width up to			Spacing C to C	
		1.0 (m)	2.0 (m)	2.5 (m)	Vertical (mm)	(mm)
<b>TYPE A</b> unsaturated ground; soils above ground water table or level	up to 3.0	No.2	No.3	No.3	1200	1600
	3.0 - 4.5	No.2	No.3	No.3	1200	1600
	4.5 - 6.0	2/No.2	2/No.3	2/No.3	1200	1600
<b>TYPE B</b> saturated ground, soils with ground water table or level	up to 3.0	2/No.2	2/No.3	2/No.3	1200	1600
	3.0-4.5	2/No.2	2/No.3	2/No.3	1200	1600

**NOTES**

1. All timber used for shoring shall be of sound quality No.1 framing grade or better.
2. Steel trench struts shall conform to BS 4074 : 1982 (Specification for Metal Pipes and Struts) or an equivalent standard. Metal props such as Acrow, Rapid Metal, etc. should not be used in place of trench struts.
3. Timber waling and sheeting made of steel or other material may be used in lieu of timber provided they are equivalent in strength to the sizes prescribed.



### Appendix 1: Form 9.1: Excavation Plan

To: .....

Master Work Permit No: .....

Contract Name: .....

From: .....

Location of works: .....

#### **Check list**

*(Please Tick appropriate Box)*

Layout and detailed drawings.	<input type="checkbox"/>	Traffic diversions.	<input type="checkbox"/>
Hard surfaces/obstructions broken out.	<input type="checkbox"/>	Existing services.	<input type="checkbox"/>
Limitations on plant.	<input type="checkbox"/>	Possibility of flooding.	<input type="checkbox"/>
Presence of standing or running water.	<input type="checkbox"/>	Means of draining water.	<input type="checkbox"/>
Condition and stability of adjacent structures.	<input type="checkbox"/>	Surcharge loads.	<input type="checkbox"/>
Vibrations.	<input type="checkbox"/>	Room for spoil and materials.	<input type="checkbox"/>
Availability of water supply for jetting etc.	<input type="checkbox"/>	Previous excavation.	<input type="checkbox"/>
Evidence of hazardous contamination.	<input type="checkbox"/>	Water table(s).	<input type="checkbox"/>
Estimate of 'free-standing' time of ground.	<input type="checkbox"/>	Ground to crack on drying.	<input type="checkbox"/>
Pattern of discontinuities in rock.	<input type="checkbox"/>	Special excavation techniques.	<input type="checkbox"/>
Suitability of spoil for backfill.	<input type="checkbox"/>	Profiles of ground depth.	<input type="checkbox"/>
Full description of soils.	<input type="checkbox"/>	Evidence of slope instability.	<input type="checkbox"/>
Access to site.	<input type="checkbox"/>	Notifiable to Client.	<input type="checkbox"/>
Shoring type.	<input type="checkbox"/>	Public Protection.	<input type="checkbox"/>
ladders required.	<input type="checkbox"/>	Gases Present.	<input type="checkbox"/>
Work site condition.	<input type="checkbox"/>	Controls of plant.	<input type="checkbox"/>
Visibility adequate.	<input type="checkbox"/>	P.P.E required.	<input type="checkbox"/>
Site fenced, Etc.	<input type="checkbox"/>	Emergency Procedures.	<input type="checkbox"/>
Day or Night Operation.	<input type="checkbox"/>	Hazard Identification.	<input type="checkbox"/>

Name of Excavation Supervisor: .....

Contact Number: .....

***Form 9.1 Excavation Plan (Cont.)***

The proposed Excavation Plan is to show all relevant proposed shoring, use of fencing, cones and safety zones/clearances. In addition the plan must show any other aspects that may have impact on the safety of the services, road users or site personnel.

Prepared by: Name: ..... Date: .....  
(print)

Sighted by: Name: ..... Date: .....  
(print)

## Appendix 2: Form 9.2 Excavation Inspection Checklist

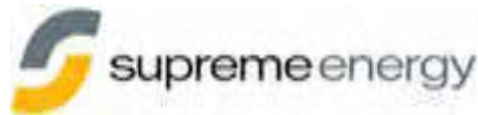
This is a basic inspection sheet. Other items should be added as appropriate to a particular project.

Name: ..... Contact Number: .....  
Date: ..... A. M. .... P. M. ....

<u>Item</u>	<u>Checked</u>	<u>Action required</u>
Is surface clear of plant, spoil heaps, materials	<input type="checkbox"/>	.....
Are spoil heaps being properly controlled	<input type="checkbox"/>	.....
Is the space between the trench and spoil heap clear.	<input type="checkbox"/>	.....
Is the work properly fenced off and 'signed'.	<input type="checkbox"/>	.....
Is access adequate.	<input type="checkbox"/>	.....
Are ladders available and being used.	<input type="checkbox"/>	.....
Climbing on the timbering addressed.	<input type="checkbox"/>	.....
Is the trench safe from exhaust gases.	<input type="checkbox"/>	.....
Buried services clearly marked and protected	<input type="checkbox"/>	.....
Underground Services supported	<input type="checkbox"/>	.....
Is there any movement or deterioration of the ground.	<input type="checkbox"/>	.....
Is the area affected by any heavy vibrations.	<input type="checkbox"/>	.....
Is the pumping arrangements suitable.	<input type="checkbox"/>	.....
Is the work being done in accordance with Plan.	<input type="checkbox"/>	.....
Are materials used the correct design sizes and quality	<input type="checkbox"/>	.....
Are all struts horizontal and positioned squarely.	<input type="checkbox"/>	.....
Is the method for backfill a safe one.	<input type="checkbox"/>	.....
Is work tidy.	<input type="checkbox"/>	.....
Adequate lighting provided.	<input type="checkbox"/>	.....
Is PPE available and being worn by workers	<input type="checkbox"/>	.....
Others.	<input type="checkbox"/>	.....
Others.	<input type="checkbox"/>	.....

### Comments:

.....  
.....  
.....  
.....  
.....  
.....



## **Chapter 2: Section 10 : Emergency Response Procedure (ERP)**

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### DISTRIBUTION LIST

Position	Copy No
<b>JAKARTA OFFICE :</b>	
President & Chief Executive Officer	1
Chief Operating Officer	2
Chief Financial Officer - Rantau Dedap	3
Chief Financial Officer - Muara Laboh and Raja Basa	4
Sr VP Support and Services	5
VP Operation	6
VP Relations & Safety Health and Environment	7
VP Explorations and Sub Surface Engineering	8
VP Business, Strategy and Development	9
VP Finance	10
Sr. Manager Supply Chain Management	11
Sr. Engineering Manager	12
Sr. Field Relations Manager	13
Sr. Accounting Manager	14
Sr. Drilling Manager	15
Manager Planning & Reporting	16
Manager Field Relations	17
Manager Business Relations	18
Legal Counsel	19
Manager Human Resources	20
Manager Project Muara Laboh	21
Manager Project Raja Basa	22
Manager Project Rantau Dedap	23
SHE Engineer	24
Emergency Room	25

### DISTRIBUTION LIST

Position	Copy No
<b>SITE :</b>	
Muara Laboh - Site Support Manager	31
Muara Laboh - Site Construction Manager	32
Muara Laboh - Field Representative	33
Muara Laboh - Security Supervisor	34
Muara Laboh - Emergency Room	35
Raja Basa - Manager Site Construction	36
Raja Basa - Field Representative	37
Raja Basa - Security Supervisor	38
Raja Basa - Emergency Room	39
Rantau Dedap - Manager Site Construction	40
Rantau Dedap - Field Representative	41
Rantau Dedap - Security Supervisor	42
Rantau Dedap - Emergency Room	43

**DOCUMENT CONTROL AND ADMINISTRATION**

	<b>Position</b>	<b>Signature</b>	<b>Date</b>
Custodian	Sr Manager SHE		
Reviewed by	VP Relations & SHE		
	VP Operations		
Approved by	President & CEO		



**REVISION STATUS**

Revision Number	Date	Section / Page	Remarks
00	26 July 2012		New Issue
01	5 December 2013	10.15 / 23	Add Emergency Phone Tree

## **10. Emergency Response Procedure**

### **10.1 Introduction**

SUPREME ENERGY has taken practicable steps to develop procedures to deal with emergencies which may arise at or near their facilities. This section provide information that SUPREME ENERGY operations can use to develop Emergency Response Procedure locally which may include additional detail and practical/exercises that can be used directly or modified to suit local conditions.

All staff at the facility shall be trained in the use and execute of the emergency procedures. All contractors and visitors to the facility will be advised of the site's emergency procedures and the locality of Muster Points (Safe Briefing Areas / Assembly Areas), with particular emphasis of the evacuation procedure which will be followed in the event of a fire, explosion, major H<sub>2</sub>S release, earthquake, major plant failure, bomb threat, etc.

### **10.2 Emergency Response Plan**

The key to effective response is being prepared (regardless of the size or type of emergency: release, discharge, fire, etc.), and minimizing the risk of personnel injury, environmental damage, and lost production time. This means that facilities shall maintain a comprehensive action plan that includes:

- Evaluation of the risk of emergencies associated with the products handled (type, size, and likelihood) at the facility or operation.
- Scenarios for large and small incidents that may occur at a facility (including equipment failure, human error, extreme weather, acts of vandalism or terrorism, fire, explosion, earthquake, volcanic activity, etc.).
- A communication system to alert all employees and emergency responders that an incident has occurred, or is likely to occur.
- Provision for a response team, a chain of command, and assigned personnel to make decisions and perform the functions necessary for effective team operations.
- Determination of the scope of facility response capabilities, including identified sources of additional resources if the incident increases.
- Procedures that allow response team members to develop and cultivate relationships with public emergency responders (whenever available) and community leaders so that communications during an incident will be rapid, clear, and will help expedite the response.

When developing a response plan or during an actual response, special issues need to be addressed. These issues involve human safety, environmental protection, public information, and government and country actions, shut down of facility operations, medical services, product ownership, local knowledge, and communications.

### **10.3 Emergency Response Team**

#### **10.3.1 Response Team**

For SUPREME ENERGY sites which are isolated from quick response municipal emergency services (fire, ambulance, etc.), an on-site Emergency Response Team will be set-up. The Emergency Response Team will consist of SUPREME ENERGY personnel who in addition to their normal duties have received training in:

- firefighting equipment and techniques.
- emergency rescue techniques (man-winch, etc.).
- self-contained breathing apparatus use.
- use of Muster Point's Control Board.

Emergency medical response will be provided by the site's Paramedics and trained First-Aiders.

A core number of Emergency Response Team personnel will be present at the site for each shift. The expanded team will be summoned by the Emergency Response Team Leader (ERT-L).

The team will provide the following services:

- limited fire fighting to enable personnel to safely evacuate buildings and to put out small scrub type fires.
- fire rescues of personnel trapped in a building.
- rescues of injured personnel trapped in the forest or at site (wells, cellars, H<sub>2</sub>S releases, etc.).

An ERT-L will be appointed to coordinate and lead emergency response at site.

An Emergency Response Shift Team Leader (ERT-STL) will be appointed for each site shift to coordinate emergency response within their area during a shift.

The ERT-L will be responsible for the following items:

- arranging specialist training of new team members.
- arranging refresher training of team members.
- managing and the maintaining of the emergency response equipment.
- organizing and running training sessions.
- coordinating the team in an emergency situation.

The ERT-STL will be responsible for managing and controlling the shift team in the event of an emergency situation for which the shift team is activated. Control will be passed over to the ERT-L when he arrives at the scene.

#### 10.3.2 *Emergency Response Vehicle*

For sites where municipal emergency services have a response time of more than 30 minutes, an Emergency Response Vehicle will be provided. This vehicle typically should, as a minimum, be equipped with the following:

- Four by four wheel drive capability
- Fire pumps - unless the site has water mains
- Fire hoses (suction and delivery)
- Ladders
- Fire extinguishers
- Nozzles, y-pieces, etc.
- Lightweight fire suits
- Self-contained breathing apparatus
- Rescue harnesses and ropes
- Man lifting gear (tripod and winch)
- Cutting equipment (power)
- Tool kit (axes, shovels, picks, etc.)
- First aid and resuscitation equipment
- Trauma kits (splints, braces, etc.)
- Rescue stretches
- Chemical resistant suits

The Emergency Response Team shall be trained in the use of the equipment on the vehicle and on the vehicle's use.

## **10.4 Evacuations**

### **10.4.1 General Responsibilities**

Evacuation provisions are applicable to fires and all other occurrences for which evacuation of staff from buildings to Muster Points is appropriate, such as major plant failure, major H<sub>2</sub>S releases, etc.

All building emergency exits are labeled with the green sign EXIT.

All personnel should familiarize themselves with the locations of ALL emergency exits from their work area and the location of their nearest Muster Point.

All Muster Points are sign posted "Muster Point" and are allocated a distinct letter for identification purposes. (These tie up with marked areas on site layout maps.)

Always assemble at the designated Muster Point closest to your point of work.

### **10.4.2 Evacuation Procedures**

In the event of a fire, major H<sub>2</sub>S release, major plant failure, explosion, bomb threat or the need to evacuate the plant, the actions listed below should be followed.

- On the continuous sound of the alarm siren (bells), STOP all activities and vacate the building or area without delay, by the nearest exit.
- Site Leader to initiate appropriate Emergency Operating Procedures (EOP), and where possible, confirm the Muster Point is in safe state prior to vacating the workplaces.
- Move quickly, but do not run.
- Do not return to a work area to collect belongings.
- Keep left in corridors and stairs.
- Do not overtake others along the route.
- Assemble in the designated Muster Point.
- At Muster Point report to the responsible Warden.
- Do not enter the work area under any circumstances until the instruction of "all clear" is given by the ERT-L or ERT-STL.

All new staff, as part of their induction into the Company, shall be given instructions on the evacuation procedures for the site.

All visitors and contractors are to be advised of the site's Evacuation Procedure and the location of Muster Points when they are admitted to the site.

#### 10.4.3 *Specific Responsibilities*

##### 10.4.3.1 Duties of Warden (Fire)

- Study and become familiar with evacuation procedure.
- Turn-off power and gas supplies.
- Check all rooms including toilets, showers, offices, etc. to ensure that all personnel are evacuated from their area/department.
- Ensure all doors are closed but not locked to partitioned areas, strong-rooms, and main doors. Do not turn off lights.
- Advise Control Centre whereabouts of fire, or threat in your area.
- Check all personnel from your area are at the Muster Point. A precise head count is very important and mandatory to cross-check among team members responsible for head count.
- Mark Evacuation Control Board at Control Centre that the area of responsibility is clear.

##### 10.4.3.2 Duties of Control Officer (may be the ERT-STL)

- Report to designated Control Center Area.
- Await wardens to report.
- Review Evacuation Control Board status.
- Direct personnel accordingly.
- On all clear, issue instructions to return to work.

#### 10.4.4 *Muster Points*

Designated Muster Points are marked on site layout maps, and are displayed on noticeboards throughout the site next to the Evacuation Procedure.

For some sites, wind socks are placed throughout the site. Observe the wind direction (sock direction) during the evacuation. Personnel should assemble at the safe upwind Muster Point.

##### 10.4.4.1 All Clear

Instructions to return to work will be given by the Control Officer.

#### 10.4.4.2 Control Centre

- The most senior staff member of the shift will be the Control Officer. All Area Wardens will report to the Control Officer.
- The Evacuation Control Board will be held at the Control Centre.

A flow diagram showing the Evacuation Procedure is presented in Figure 10.1. This flow diagram will be placed on noticeboards throughout the site next to the site plan showing designated Muster Points.

Regular drills (once every year) are held to ensure that staffs are familiar with the Evacuation Procedures.

### 10.5 Fire Procedures

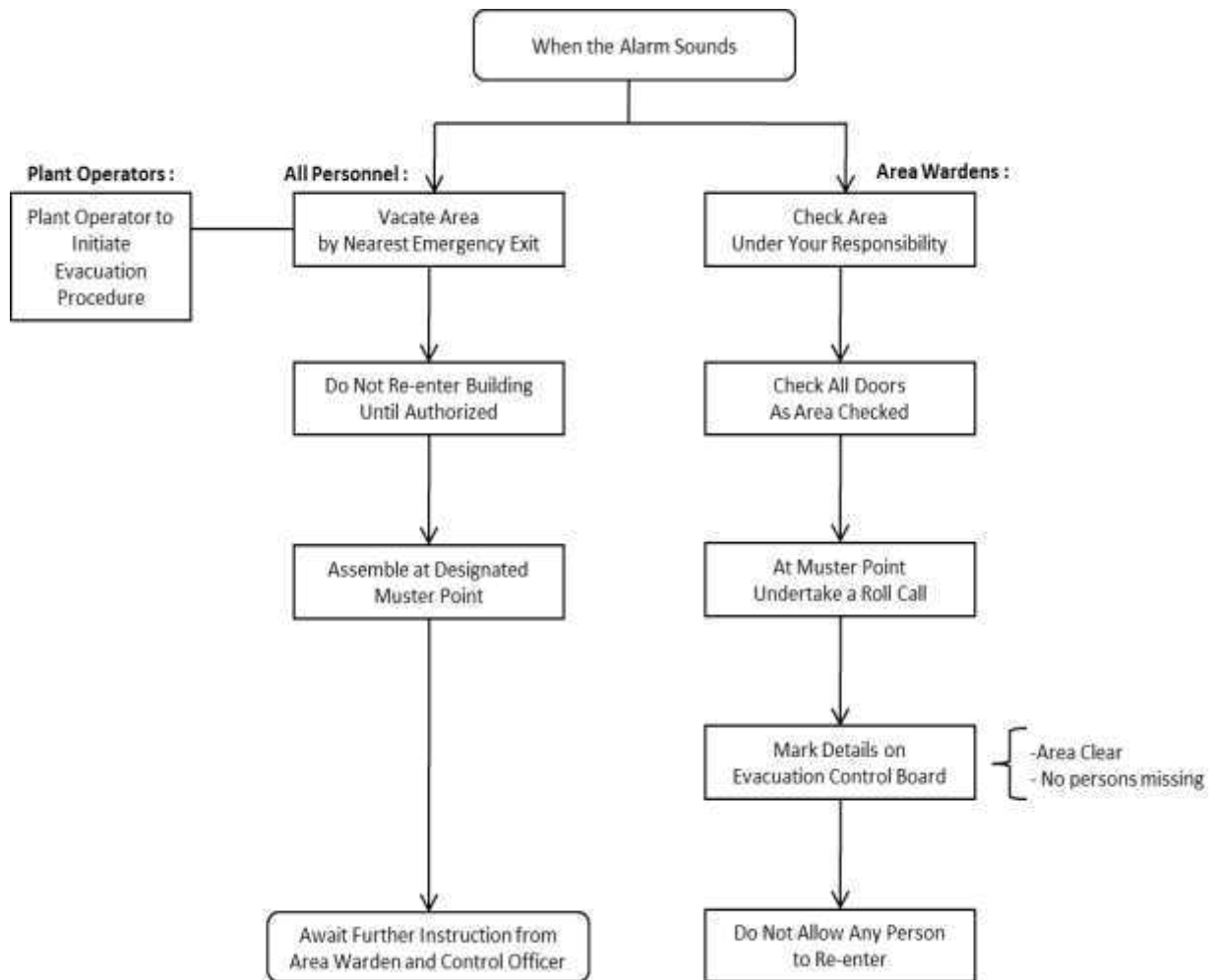
If you discover a fire, immediately carry out the actions listed below :

- Activate the nearest manual alarm (break glass and operate the switch).
- Ring Site Security and give relevant details.
- Site Security to alert Site's Fire Service / Emergency Response Team (as appropriate to site).
- Alert other personnel in your area and remove any injured person(s) from immediate danger.
- If no personal risk is involved, an attempt should be made to extinguish the fire using nearest fire extinguisher or hoses.  
Note: In the case of electrical fires, hoses should not be used, use dry powder or CO<sub>2</sub> extinguishers instead.
- If in doubt, evacuate the premises and leave fire fighting to the experts.
- Evacuate building following the Evacuation Procedure.
- Go to your Designated Muster Point.
- Follow instructions from Area Warden.

Figure 10.2 presents the Fire Procedure as an action flow diagram.

**Figure 10.1: Evacuation Procedures**

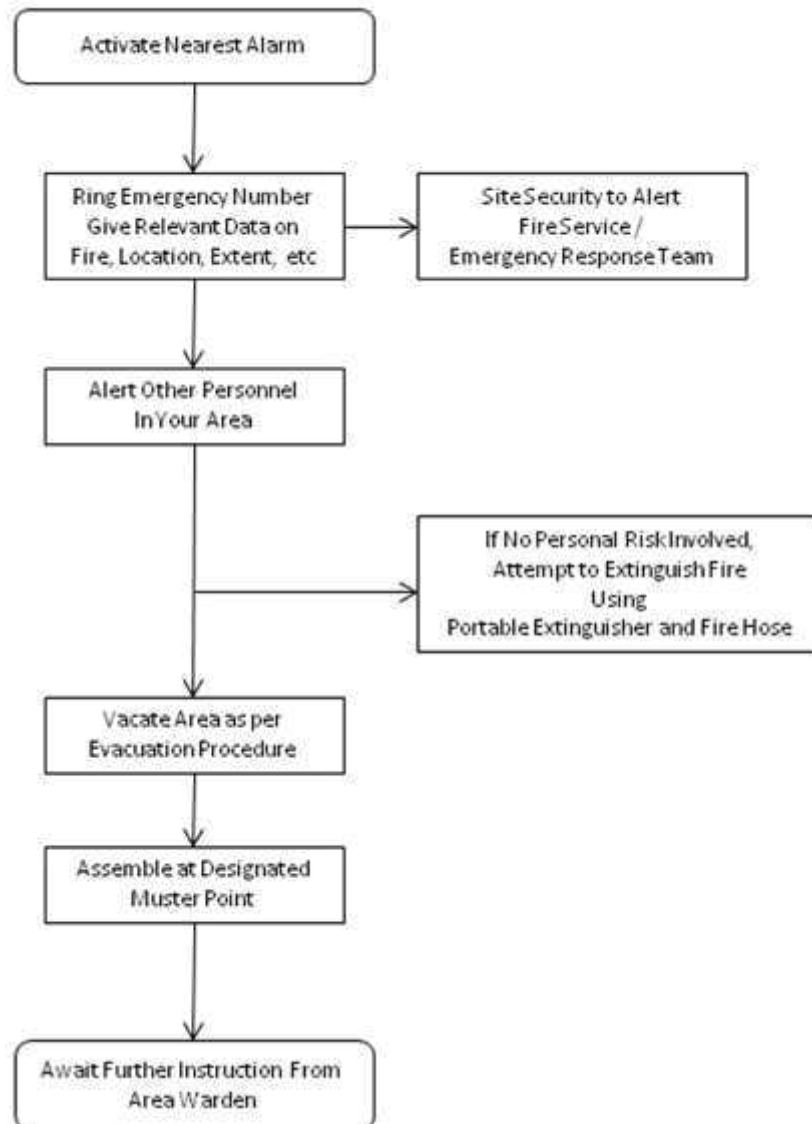
**In the Event of a Fire or the Need to Evacuate the Plant  
the Following Actions Should Be Taken:**





**Figure 10.2: Fire Procedure**

**If You Discover a Fire, Immediately Carry Out the Following Actions**



## **10.6 Natural Hazards**

### **10.6.1 Earthquake Procedure**

When an earthquake starts:

- Stay calm and take cover under a desk.
- Brace yourself in a doorway (hold onto the door to prevent personal injury from the door slamming).
- Crouch behind a solid structure, e.g. wall.
- If under furniture which moves, move with it.
- Stay away from glass doors and windows, tall shelves, light fittings, or objects that might topple.
- If travelling in a lift, stop and get out at the next floor.
- Do not leave the building or try to leave the immediate area.
- If outdoors, take cover in a doorway or other safe place away from falling objects and electrical hazards.

After an earthquake:

- Stay calm, stay together. Account for everyone in the work area and immediate vicinity.
- Area Wardens take control and co-ordinate actions in areas of responsibility and:
  - assess all persons for injury
  - check for hazards, fire, gas or chemical leaks
  - move people away from windows and outside walls
  - leave doors to rooms open, pull curtains across broken windows
  - turn off and unplug all unnecessary electrical equipment.
- Do not evacuate unless the building has sustained major structural damage.
- Put signs up identifying dangerous areas.
- Do not use lifts - put signs in the lift lobby.
- Conserve water.
- Do not use the toilets. Make other arrangements that do not involve relying on the sewerage system.
- If communications system has failed, try to pass notes to rescue personnel.

Listen carefully to any announcements over Public Address or other announcement system. If an evacuation is necessary:

- proceed carefully, expect to find exit routes blocked or damaged.
- never use lifts.
- when outside, stay well away from buildings and power lines.
- stay together in your work or floor group to assist with record keeping.
- if it is safe to do so, go to your Designated Muster Point.

*Remember, that there are almost always aftershocks following a major earthquake - sometimes quite significant. They can go on for weeks or even months. Be prepared for them to happen.*

#### 10.6.2 Landslide Procedure

When a landslide starts:

- if outdoors attempt to get out of its path
- if in a building, do not attempt to leave until movement has ceased.

After the landslide:

- Stay calm, stay together, account for everyone in the work area / work team.
- Evacuate buildings caught in landslide.
- Raise the alarm by contacting Security.
- Provide details:
  - extent of landslide.
  - location.
  - buildings, equipment damaged.
  - number of persons missing / trapped, etc.
- If facilities damaged, initiate Emergency Operating Procedures to make equipment safe and to shut-down affected areas.
- Emergency Response Team to initiate search and rescue of the affected areas to find / locate missing persons.
- Isolate area affected by landslide to prevent unauthorized persons being trapped in landslide debris, etc.
- Notifying Government authorities for assistance in rescue, etc.

### 10.6.3 *Geothermal Eruptions*

A range of hazardous events can result from geothermal activity, these include:

- explosive eruptions / blasts of rock and ash
- pyroclastic flows
- lava flow
- lahars (cold lava)
- volcanic gases (CO<sub>2</sub>, SO<sub>2</sub>, H<sub>2</sub>S, water vapor and hydrogen).

In most situations, large volcanic activity is usually predictable and contingencies can be put in place to mitigate the effects on areas of population.

In the event of sudden geothermal activity take the actions listed below:

- If you are near a water body stream or base of a valley move to higher ground, as lahars and lava flows tend to flow down valleys (path of least resistance).
- Move indoors to get away from falling rocks and ash.
- Under direction from Management, evacuate the site.

### 10.6.4 *Flooding*

In the event of flooding, the precautions listed below should be followed:

- Do not try to cross swollen rivers in vehicles or by foot.
- Stay indoors, move up to higher building levels if flood levels rise.
- If working in a valley with a stream, move up to higher ground, especially during periods of heavy, sudden rain.
- Before key plant items are submerged and could cause shock hazards or more severe damage, initiate Emergency Operating Procedure (EOP).
- Maintain communication where possible.
- Listen to the instruction of the responsible warden.

## 10.7 **Blow Outs / H<sub>2</sub>S Releases**

In the event of a well blow and/or a major H<sub>2</sub>S release, the steps listed below should be followed.

- All personnel to vacate the area to upwind Muster Points. Remember to observe the direction of the wind socks.
- Roll call taken to ensure all persons accounted for.

- Essential staff to don personal protective equipment, including SCBA and attempt to shut-down well.
- If attempt to shut-down well are unsuccessful, consider initiating evacuation of site.

## **10.8 Explosions**

In the event of an explosion at the site:

- initiate evacuation procedure.
- all staff to assemble in Muster Points.
- account for all personnel, visitors, contractors.
- if fire, initiate fire procedure.
- Control Officer to initiate EOP to minimize plant damage, if able to do so safely.
- await further instructions from Control Officer.

## **10.9 Plant Failures**

In the event of a major plant failure:

- initiate evacuation procedure.
- account for personnel assembled in Muster Point.
- determine the need for Emergency Response Team to perform a rescue.
- if fire, follow the Fire Procedures.
- initiate EOP to limit damage to the rest of the plant.

## **10.10 Chemical / Fuel Spillage**

In the event of a chemical / fuel spillage or leak, the priority actions listed below should be taken (see Figure 30.3.)

### **1 Ensure personnel are safe**

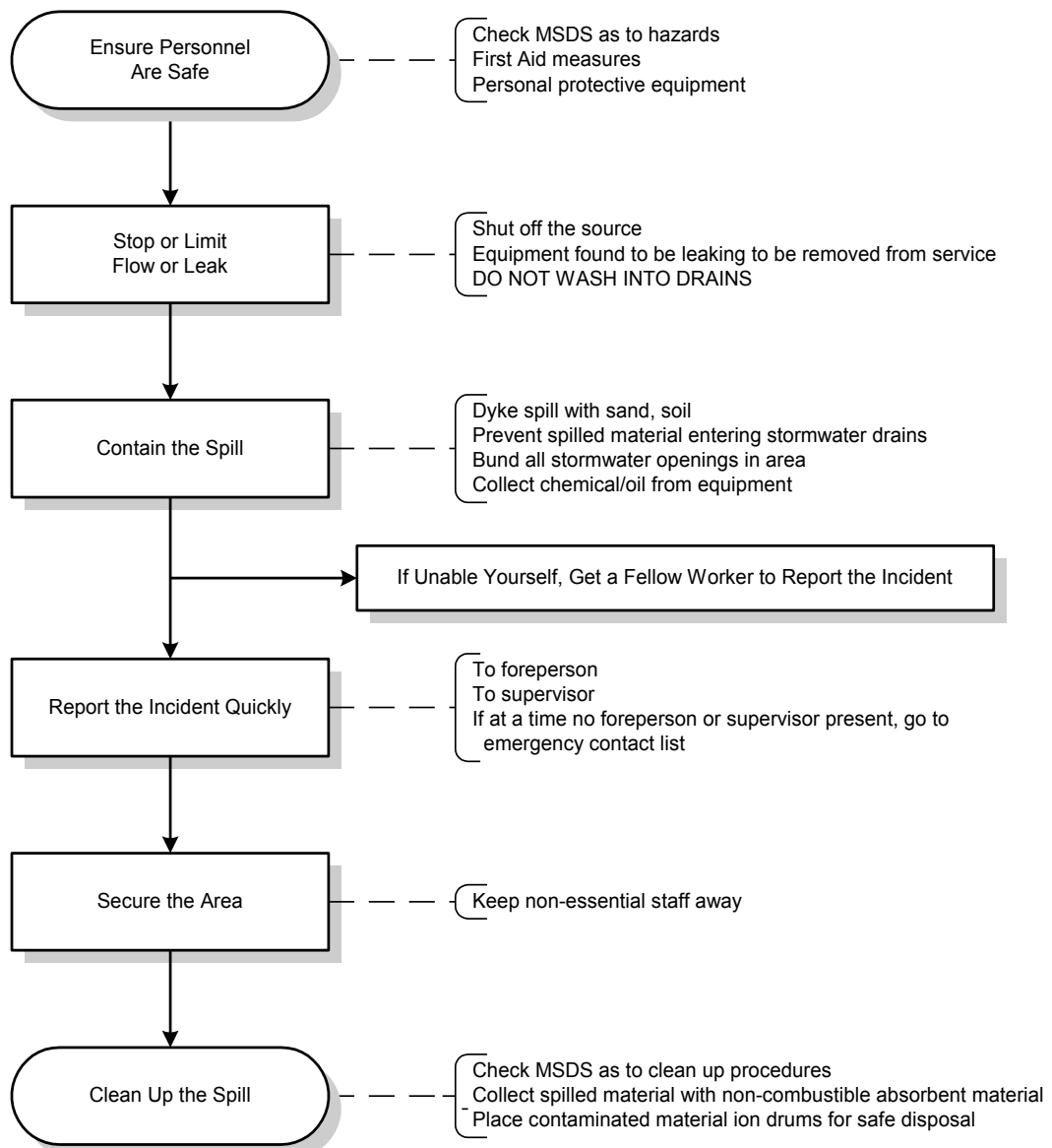
- If personnel are injured and can be removed from the area safely, do so.
- Check Material Safety Data Sheets as to hazards and first aid measures.

### **2 Stop the flow of leaking material**

- Reposition the drum to stop the flow.

- Shut off the source of the leak.
- Equipment filled with the material that is found leaking should be removed from service as soon as possible.

**Figure 10.3: Chemical / Fuel / Oil Spillage Emergency Procedure**



### **3 Contain the spill**

- Dike / bund major spills with soil or other material.
- Protect all open grates, sumps, manholes that discharge into the drains, waterways or onto the ground.
- If the chemical has entered the drains, advise Supervisor and SHE Representative immediately.
- Where it is not possible to remove equipment from service immediately, some means of preventing the pollution and collecting the leaking material should be used, such as metal trays, buckets, polyethylene sheeting.

### **4 Protection of Personnel**

- Personnel entering the leak or spill area shall be provided with and use appropriate protective equipment, as set out in the Material Safety Data Sheet (MSDS) for that particular chemical.
- All non-essential personnel shall be kept out of the immediate leak or spill area.

### **5 Report the Spill**

- Report the incident once the spill is contained or get a fellow worker to report the incident to the Foreman or Supervisor.

### **6 Actions of Responsible Person**

- The Foreman and/or Supervisor is to assess the situation quickly to determine the need for external help.

### **7 Clean Up**

- Minor spills or leaks can be cleaned up using absorbent material, sand, or sawdust. Check MSDS to see what is the correct material.
- All liquid and contaminated material must be collected for disposal.
- Transfer contents of leaking drum to new clean drum.
- Ensure collected material is placed in a container which will not leak during transportation off site for disposal.
- Check MSDS of what safe disposal is appropriate.

## **8 Incident/Investigation**

- Foreman / Supervisor to prepare a brief report on incident.
- Comment on contingency plans: Were they effective in dealing with the situation?
- If any improvements identified, inform the responsible personnel.
- Complete the appropriate / required report / forms from government authorities (ESDM EBTKE, etc.).
- Forward the completed report / forms to government authorities (ESDM EBTKE, etc.).

### **10.11 Vehicle Accident**

In the event of a vehicle accident, the actions listed below should be followed:

- Ask / call for help if anyone is injured.
- Try to prevent other accidents from happening by warning other vehicles of the vehicle accident by placing accident hazard warning signs.
- Administer first aid to injured person(s).
- As soon as possible, record details of the accident.
- Report accident to Superior, Security Supervisor and SHE Officer as soon as possible.

### **10.12 Bomb Threat**

Treat all bomb threats seriously. Investigation may reveal a hoax, but until certain there is no risk, act with extreme caution.

Telephone threats :

- Keep calm. It is not possible to think clearly when panicking.
- If possible, attract attention of another person, and have that person contact the Security / Police.
- Delay the caller. The more the caller talks, the more chance there is of obtaining useful information.
- Try to elicit as much information as possible.
- Note any specific characteristics of the caller, e.g. sex, accent, speech (fast, soft, well-spoken, etc.), background noises (music, street noises, aircraft, etc).
- If caller hesitates for more than a few minute, ask another question.



When caller hangs up:

- Do not hang up, keep the line open.
- Evacuate premises if there is only a short time until stated explosion time.

Suspicious object found:

- Leave the object alone. DO NOT interfere with it in anyway.
- DO NOT TOUCH JAR, OR MOVE THE OBJECT.
- DO NOT cover it with water, or put water on it.
- Inform the Security / Police.
- Open all doors and windows to minimize the blast damage.
- If appropriate, have fire extinguisher ready.
- Evacuate the premises.

Evacuation

When directed to leave the building:

- act quickly and quietly.
- leave the building via exits as directed.
- take personal belongings which are handy in work areas, but do not go to other parts of the building to collect them.
- assemble at a Safe Briefing Area.

### **10.13 Flooding**

In the event of a flooding, the actions listed below should be followed:

- Ask / call for help if anyone is injured.
- Administer first aid to injured person(s).
- As soon as possible, record details of the accident.
- Go to safe place or designated Safe Haven, i.e : near company's hotel or accomodation.
- Report accident to Superior, Security Supervisor and SHE Officer as soon as possible.

#### 10.14 Emergency Contact List

A contact list of key SUPREME ENERGY personnel and other organizations to contact in the event of an emergency will be made available. The list will include after-hour contact numbers, cell phones numbers, etc.

The list will include:

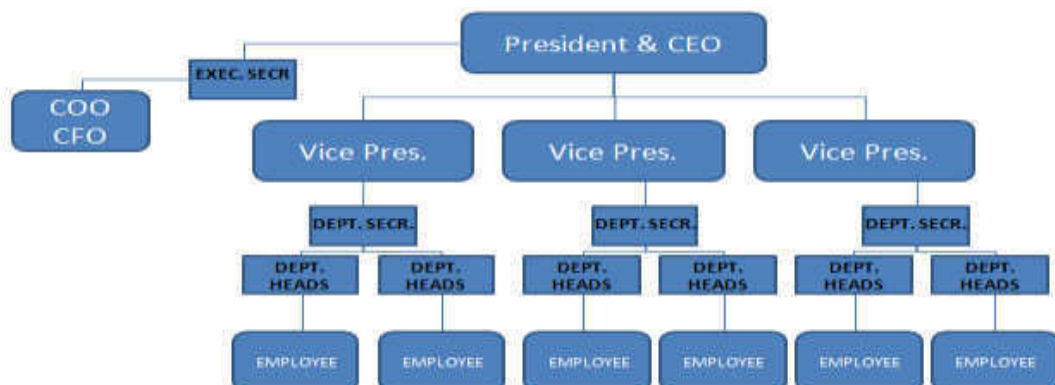
- Technical Head of Geothermal (KTPB-Kepala Teknik Panas Bumi)
- Senior SUPREME ENERGY personnel at site and Head Office
- Paramedics / First Aid Team
- SUPREME ENERGY SHE Representative(s)
- Emergency Services
  - Fire
  - Medical (Hospital) and Ambulance
  - Police
- Statutory Government Agencies
  - ESDM / EBTKE
  - Other related Government Agencies

A copy of the emergency contact list will be held at the Security gatehouse and in the Site SHE Procedures. It will be revised and updated on a six monthly interval, or as appropriate, to account for changes in personnel, etc.

#### 10.15 Emergency Phone Tree

On occurrence of the emergency that affected Jakarta Office and/or Supreme Energy's worksite, the flow for emergency phone may start from the direction of Senior Management to employees through Department Heads. The status of the emergency will be stated within the information delivered through the emergency phone tree system.

**Figure 10.4 : Emergency Phone Tree**



## 10.16 Training

Training requirements are based on the duties and functions to be performed by each responder who participates or is expected to participate in emergency response activities. All SUPREME ENERGY personnel involved in emergency response field operations shall have a minimum of awareness training.

All levels of responders shall be trained concerning the facility or area of operations Emergency Response Plan. This training shall be given initially, annually, and/or when the responsibilities or designated actions under the Emergency Response Plan change and when the Emergency Response Plan is changed.

Administrative staff and support contract employees shall have awareness skills and knowledge about the following:

- An understanding of what hazardous substances are, and the risks associated with them in an incident.
- An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.
- The ability to recognize the presence of hazardous material in an emergency.
- An understanding of the role of first responders in the Emergency Response Plan including site security and control.

Operations and Maintenance employees and contractors shall have the skills and knowledge about the following:

- Knowledge of the basic hazards and risk assessment techniques.
- Knowledge of how to select and use proper personal protective equipment provided to Operations level responders.
- An understanding of basic hazardous materials terms.
- Knowledge of how to perform basic control, containment, and confinement operations within the capabilities of the resources and personal protective equipment available.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating and termination procedures.

Safety, Health, and Environmental (SHE) support personnel, Operations and Project Supervisors shall have the skills and knowledge about the following:

- Knowledge of how to implement the facility's Emergency Response Plan.
- Knowledge of the classification, identification, and verification of known and unknown substances by using field survey instruments and equipment.
- Knowledge of how to function within an assigned role in the Incident Control System.
- An understanding of basic chemical and toxicological terminology and behavior.
- Knowledge of how to select and use proper specialized chemical personal protective equipment provided to Technician responders.
- An understanding hazard and risk assessment techniques.
- Knowledge of how to perform advanced control, containment, and confinement operations within the capabilities of the resources and personal protective equipment available.
- An understanding of how to implement decontamination procedures.
- An understanding of termination procedures.

Safety, Health, and Environmental (SHE) personnel shall have the skills and knowledge about the following:

- An understanding of classification, identification, and verification of known and unknown substances by using field survey instruments and equipment.
- Knowledge of how to select and use proper specialized chemical personal protective equipment provided to Specialist responders.
- An understanding of in-depth hazard and risk assessment techniques.
- Knowledge of how to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
- Knowledge of how to determine and implement decontamination procedures
- The ability to develop a site safety, health, and control plan.
- An understanding of chemical, radiological, and toxicological terminology and behavior.

ERT-L such as Technical Head of Geothermal (KTPB-*Kepala Teknik Panas Bumi*) or Site Support Manager or Manager of Operations or Project's Site Construction Manager should have the skills and knowledge level equivalent to the SHE personnel plus the following:

- The ability to implement the Incident Command System.
- Knowledge of how to implement the facility or area of operation Emergency Response Procedure.
- Knowledge of the Procedures and Response Teams of appropriate local and national governmental agencies.
- Knowledge and understanding of the hazards and risks associated with personnel working in chemical protective clothing.
- Knowledge and understanding of the importance of decontamination procedures.

Operations and Maintenance personnel shall be given an initial briefing at the facility or area of operation before their participation in emergency response operations. This briefing shall include training in the following:

- Wearing appropriate personal protective equipment.
- The chemical hazards involved.
- The duties to be performed.

Regular drills shall be conducted and documented to ensure the continued effectiveness of the Emergency Response Procedure. Properly documented and critiqued drills may serve as annual training.



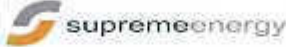


## **SHE Procedure Incident Command System - Emergency Management and Crisis Management Plan**

October 2014

ML/RB/RD-RSH/SHE-MAN-SOP11-Rev 0

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Rev	Date	Prepared By	Approved By	Issued For
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<p>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.</p> <p>Any document applicable to PT Supreme Energy Muara Laboh contains the characters "ML" in the document reference.</p> <p>Any document applicable to the PT Supreme Energy Rajabasa project company contains the characters "RB" in the document reference.</p> <p>Any document applicable to the PT Supreme Energy Rantau Dedap project company contains the characters "RD" in the document reference.</p> <p>If a document applies to all three Supreme Energy companies, the term "Supreme Energy" may refer to any and all of these companies.</p> <p>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.</p>
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Chief Financial Officer - Muara Laboh and Rajabasa	4
Sr VP Support and Services	5
VP Relations & Safety Health and Environment	6
VP Operation	7
VP Explorations and Sub Surface Engineering	8
VP Business, Strategy and Development	9
VP Finance	10
Sr. Manager Supply Chain Management	11
Manager General Services	12
Manager Human Resources	13
Legal Counsel	14
Manager Project - Muara Laboh	15
Manager Project - Rajabasa	16
Manager Project - Rantau Dedap	17
Manager Production and Well Testing	18
Manager Drilling	19
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Sr. Manager Field Relations	21
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Sr. SHE Engineer	24
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## 1. Introduction, Purpose, Concept and Philosophy

### 1.1 Introduction

In the event of any emergency occurring at a facility owned by, or on lease to SUPREME ENERGY, it is paramount that all personnel involved in the management and control of the emergency have a clear understanding of their roles, and are trained in the performance of their duties. SUPREME ENERGY's Emergency and Crisis Management Plan describes organizational lines of responsibility and guidelines to be used during all emergencies that can occur within SUPREME ENERGY.

This Plan contains guidelines, instructions and procedures to be followed as closely as they are applicable to the actual situation

The Plan is presented in four main sections:

**Section 1** : is an introduction covering the purpose and scope and general philosophy of this Plan.

**Section 2** : describes the Operational Emergency Management Organization, details of the SUPREME ENERGY callout procedures, Emergency Management Team and their duties and internal and external communication during an emergency.

**Section 3** : roles, responsibilities and checklists for the Team.


**Appendices** : contain the emergency contact list.

From time to time the content will need to be revised and amended to reflect changes in personnel in the Organization, new knowledge, skills and techniques. The Plan will also benefit from constructive criticism by the people who use it. Comments and recommendations should be directed to the Sr Manager SHE who will coordinate the implementation of the revisions and amendments with the approval of the President Director & CEO. Upon receipt of the amended plan, the holder should return the previous edition to the Sr. SHE Engineer.

### 1.2 Purpose of the Plan

The purpose of this Plan is three-fold:

1. To identify and record a list of tasks which should be carried out in an emergency, together with some guidance on priorities.
2. To establish, before an emergency occurs, the assignment of such tasks and the appropriate delegation of authority.

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3. To provide communication and interface patterns to ensure an efficient coordination of efforts in the Management and control of an emergency.

### ***SUPREME ENERGY Priorities***

1. The safety of personnel and the preservation of life
2. The protection of environment, equipment and property
3. The protection of investment
4. The reputation of the Company

### ***1.3 Concept and Philosophy***

The Emergency Response, Emergency Management and Crisis Management arrangements are based on three tiers as outlined in *Figure 1* with the Emergency Response Team (ERT) is located at each site facilities whereas the Emergency Management Team (EMT) together with the Crisis Management Team (CMT) are located in Jakarta.

The concept of operations of these groups / teams is that the site ERT, led by the Site Support Manager or his deputies as ERT Leader (ERT-L), will undertake the normal tactical role of life-saving, fire fighting and repair and response in an emergency. The ERT-L is also responsible for the coordination of immediate support and liaison with other facilities and contractors.


The ERT-L will retain overall command and control during an emergency. It should be noted that the ERT-L must clearly delegate responsibility to his deputy when that is required.

The ERT-L will have full responsibility for all personnel and equipment in the site. However, during drilling activities, the SUPREME ENERGY Drilling Supervisor (Company Man), in cooperation with the Contractor Rig Superintendent, will act as On Scene Commander / ERT Shift Team Leader for the pad where the drilling activities are on-going and has full responsibility on the Drilling Rig and the integrity of the well being drilled. He will also report all events for any emergency that occur on the Rig. He will report directly to his Line Manager at the SUPREME ENERGY office in Jakarta and advise / coordinate with ERT-L at the site.

If the nature of the emergency requires additional support in terms of involvement of Government or Non-government agencies, information to relatives, technical advice and planning assistance then the ERT-L will inform Emergency Management Team Leader (EMT Leader) and the EMT may be partially or fully mobilized.

The EMT will deal with the provision and coordination of support, planning assistance and technical advice to the ERT-L while at the same time identifying strategic issues that may need to be dealt with by the CMT. In addition, the EMT is responsible for the liaison with Government Agencies, the Media and relatives.



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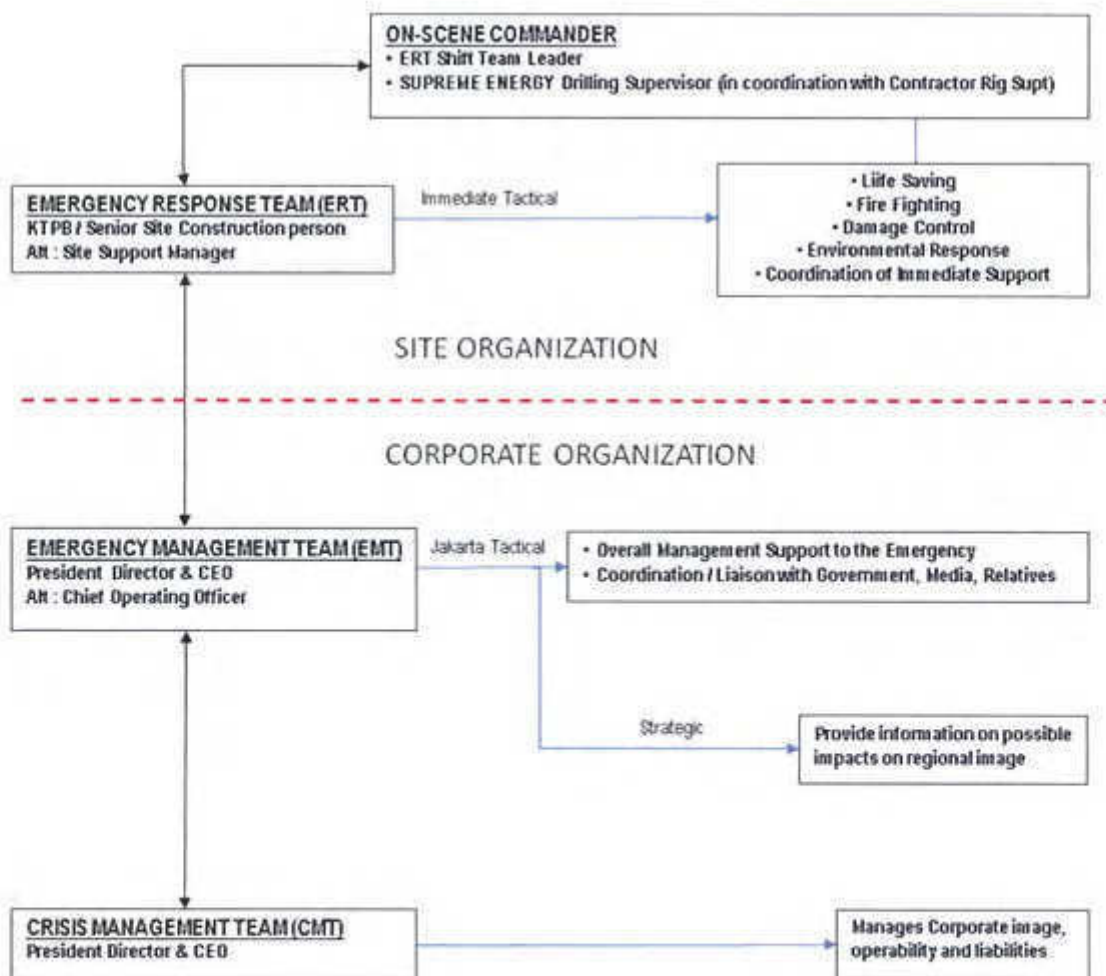
It should be noted that these provisions equally apply to other emergency that may occur such as Civil Unrest, Extortion etc.


The CMT will generally only be mobilized in order to deal with strategic and broader issues affecting SUPREME ENERGY.

Figure 1 describes the Emergency Management Team concept and support arrangements that exist within SUPREME ENERGY. It also describes how the Plan is activated, designates team members and describes what action they will take when it is required to support an emergency.

This Plan affects and applies to all employees of SUPREME ENERGY and the employees of contractors working on facilities owned by or leased to SUPREME ENERGY.

**Figure 1 : Concept and Philosophy**




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#### 1.4 Abbreviations

ESDM	Kementerian Energi dan Sumber Daya Mineral (Ministry of Energy and Mineral Resources)
EBTKE	Direktorat Jenderal Energi Baru Terbarukan dan Konservasi Energi (Directorate General of Renewable Energy and Energy Conservation)
HIUBLA	Direktorat Jenderal Perhubungan Laut (Directorate General of Sea Transportation)
BASARNAS	Badan SAR Nasional (National Search and Rescue)
ER	Emergency Response
ERT	Emergency Response Team
ERT-STL	ERT-Shift Team Leader
OSC	On Scene Commander
ERT-L	ERT-Leader
EMT	Emergency Management Team
EMT-L	EMT-Leader
CMT	Crisis Management Team
CMT-L	CMT-Leader
ECR	Emergency Control Room
SHE	Safety, Health and Environmental
POB	Persons on Board
PIC	Person in Charge
KTPB	Kepala Teknik Panas Bumi (Technical Head of Mining or Geothermal)



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## 2 Emergency and Crisis Management Organization

### 2.1 Introduction

The ability of SUPREME ENERGY to respond quickly and efficiently to an emergency must be the principal objective in the development of an emergency management and support plan.

The importance of ensuring that the appropriate support is available to the emergency area at the time required is paramount.

In addition, it should be recognized that there would also be a need to respond to enquiries from distraught relatives, representatives of government departments, representatives of the press, TV, pressure groups and other organizations.

SUPREME ENERGY provides training for its personnel in the skills and techniques necessary to handle a fire, an explosion, search and rescue of personnel, the care and evacuation of casualties, lifesaving appliances and all emergencies that could occur at the SUPREME ENERGY facilities including H<sub>2</sub>S Leak, Earthquake, Civil Unrest, etc.

Drills are held regularly at site and Jakarta facilities, where these skills and techniques are practiced, along with the use of the communication systems and procedures necessary for these activities.


A live, real-time Emergency Management exercise is planned to be conducted yearly. A comprehensive debrief which follows the exercises, is recognized as an integral part of the exercise plan.

Other (e.g. walkthrough) exercises may be conducted anytime to check the resources readiness to respond to an unexpected emergency.

### 2.2 Possible Emergencies Within SUPREME ENERGY

Possible Emergencies that could occur within SUPREME ENERGY are as follows:

- Fire / Explosion
- Well Control Situation
- Failure of Equipment / Damage
- Hydrogen Sulfide Leak
- Abandon Rig
- Serious Injury / Fatality
- Severe Car Accident
- Helicopter Crash
- Missing Person
- Extortion

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- Other Drilling Emergency
- Earthquake
- Volcano Eruption
- Flood
- Civil Unrest
- Terrorism / Sabotage

### **2.3 Site Emergency Response Team (ERT)**

The Technical Head of Mines (KTPB) or Site Support Manager as alternate is appointed as ERT-L and will coordinate all emergencies that occur in the site and has full responsibility for all personnel and equipment in the site. Any other responsible person on installations / facilities at site will report directly to this ERT-L who will coordinate all emergency response activities.

### **2.4 Emergency Management Team (EMT)**

The EMT is structured in accordance with the current SUPREME ENERGY organization structure. The EMT is located in Jakarta under the direction of EMT Leader. The EMT structure is shown in *Figure 2*.

The EMT will be assembled in the Emergency Control Room (ECR) in Equity Building 18<sup>th</sup> Floor (SUPREME ENERGY Office). Alternate ECR location will be designated later at a safe place as advised by EMT Leader.

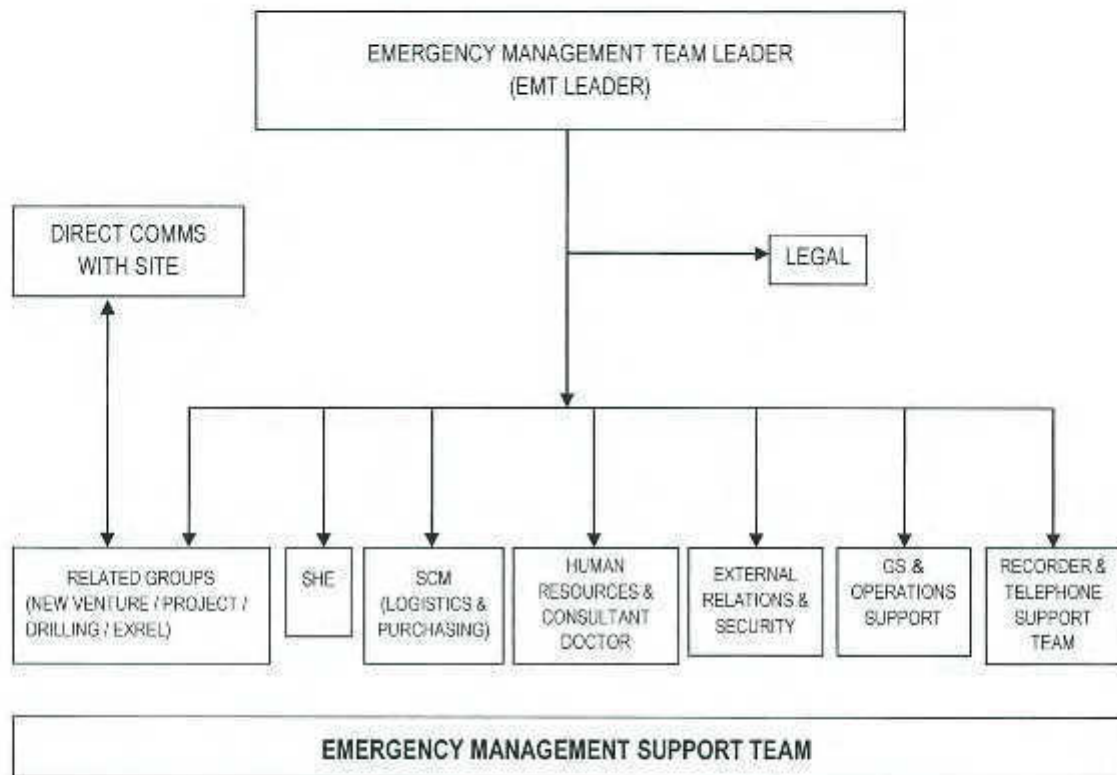
#### **2.4.1 Emergency Management Support Team**

The EMT is assisted by an Emergency Management Support Team and they are to be included in the "Call-Out" Procedure. This group of personnel must be readily available to support their respective EMT Member.

The purpose of this Support Team is to provide necessary assistant to the EMT members and to prevent over-load of the members.

The EMT is also assisted by a Telephone Support Team who will answer all external telephone calls regarding the emergency and direct these calls to the appropriate person or provide such details as directed by HR or External Relations personnel. This system ensures that no calls, other than internal SUPREME ENERGY calls, are made direct to the EMT.

**Figure 2 : Emergency Management Team**



These Primary positions will be filled by the following personnel:

- **EMERGENCY MANAGEMENT TEAM LEADER**

The President & CEO will be responsible as the Emergency Management Team Leader (EMT-L). If he is not available, he will be replaced by the Chief Operating Officer.

- **RELATED GROUPS (NEW VENTURE / PROJECT / DRILLING)**


The Head of particular group (depending on the type of incident) or his alternate will act as the direct line of contact with their Person In Charge (PIC) at the affected site.

Should it be a Drilling Emergency, the Drilling Manager will communicate with the SUPREME ENERGY Drilling Supervisor (Company Man) at site.

- **SAFETY, HEALTH and ENVIRONMENTAL (SHE)**

This position will be filled by the Sr Manager SHE and, if not available, he will be replaced by the Sr. SHE Engineer and/or Sr. Environmental Engineer.



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- **SUPPLY CHAIN MANAGEMENT (SCM)**

The Sr Manager SCM will fill this position and, if not available, he will be replaced the Head of Logistics. SCM shall maintain updated list of Contractor representative in each operating area.

- **RECORDER / SCRIBE**

A personnel will be selected to serve this position.

- **HUMAN RESOURCES**

The Human Resources Manager or selected HR personnel will be on call to provide assistance to handle all Human Resources matters and medical assistance during an Emergency.

- **GENERAL SERVICES and OPERATIONS SUPPORT**

The General Services Manager or his appointed personnel will be on call to provide assistance to handle services matters during the emergency.

- **EXTERNAL RELATIONS**

The Sr Manager Field Relations and Manager of Business Relations or their alternates will fill these positions. They will be responsible and assist the field in handling Community and External Government Agencies related matters.

- **SECURITY**

The Security Manager will fill this position to provide assistance in the movement of Security personnel.

**Note:**

There will be other groups of personnel, which will be required to assist in the handling of the emergency and will be directed when required by the Emergency Management Team.


These groups include but are not limited to:

**PROCUREMENT AND FINANCE**

Selected Procurement and Finance employees will be on call to provide assistance on obtaining any supplies during emergency.

**COMMUNICATION EQUIPMENT SERVICES**

Selected Communication / Information Technology employees will be on call to handle communication equipment and computer services.

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## **REPRESENTATIVE FROM MAIN CONTRACTORS**

The representatives from main contractors may be called and will be stationed in the Meeting Room close to the Emergency Control Room.

### **2.5 Crisis Management Team (CMT)**

The CMT is structured in accordance with the current SUPREME ENERGY organization structure. The CMT is located in Jakarta under the direction of CMT Leader.

The CMT Leader is the President & CEO and is assisted by the Director of Operations / Chief Operating Officer (COO). For crisis in Muara Laboh and Raja Basa facilities, the Director and Chief Financial Officer (CFO) of SEML and SERB is the member of this CMT. For crisis in Rantau Dedap, the Director and Chief Financial Officer (CFO) of SERD is the member of this CMT.

### **2.6 Emergency Control Room (ECR)**

The Emergency Management facility in the Jakarta Office is located in the **Board Room**, 18<sup>th</sup> Floor of Equity Tower, Sudirman Central Business District (SCBD) Lot 9, Jl. Jenderal Sudirman Kav 52-53, Jakarta 12190.


The Emergency Control Room (ECR) is provided with :

- Printer
- Fax Machine
- 3 - 5 direct phone lines, capable to deliver conference call
- In focus
- Television
- 2- 3 computer plugs and wi-fi facility for data
- Recorders (visual and sound)
- Flip charts
- Emergency Manuals
- Individual Team Member's Packs that contains Individual Check Lists and an Internal SUPREME ENERGY Telephone Directory.

Diagrams / maps of the affected site will be immediately provided by the related department(s) upon an emergency.

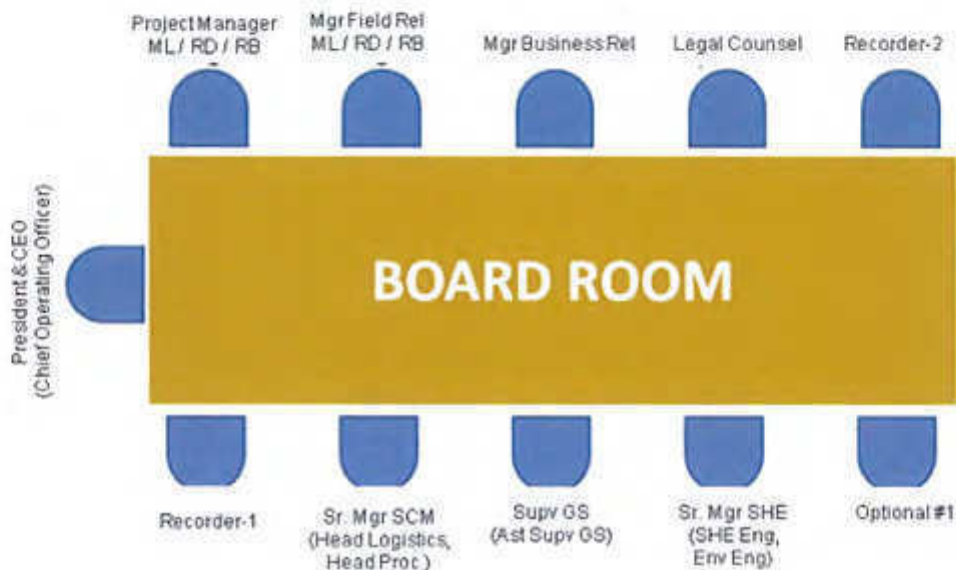
Lap-Top Computers will be issued by the IT Group.

The Recorder / Scribe will record a Chronological Log of events as they occur. In addition the Recorder can also be used to send / receive email.

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It is the responsibility of the first person to enter the room to distribute individual team member's packs and to check that the telephone extensions and other equipment are working.

**Figure 3 : Emergency Control Room Arrangement for EMT**



**Optional :**

- Drilling Manager
- Drilling Superintendent
- Production & Well Testing Manager
- Senior Geologist
- Senior Reservoir Engineer
- Security Supervisor


## 2.7 Call Out Procedure

Each member of the EMT shall have the EMT-L and other members phone numbers. In the event of an emergency, the person-in-charge at site will notify the appropriate Line Manager and give full details of incident and request appropriate support.

The Line Manager will:

- Notify the EMT-L and if required, EMT-L will mobilize the EMT. If he cannot contact the EMT-L then he will call out the EMT direct.
- Establish and maintain communications with the EMT-L.
- Upon arrival of the EMT-L, brief him on current status.



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After receiving notification of an emergency by the Line Manager, the EMT-L will:

- Initiate the mobilization of the Emergency Management Team. This will be done by calling the Group Emergency Team Number.
- On receipt of the call, all duty Emergency personnel will report to the Emergency Control Room.

The call out system is shown in *Figure 4*.


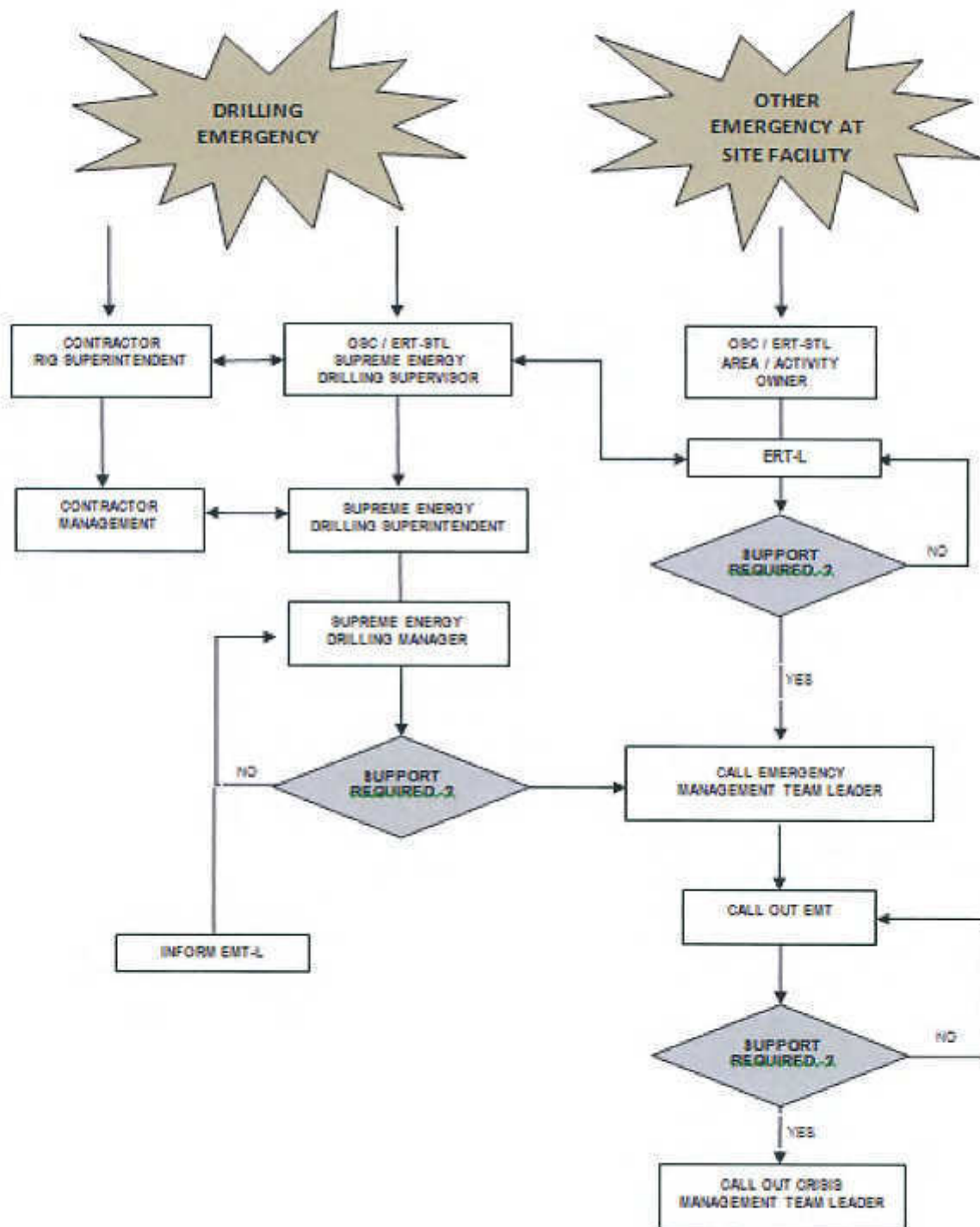

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Figure 4 : Emergency Call Out Procedure





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## **2.8 Emergency Duty**

In case any condition whereas both Primary and Alternate members in one department / group are not available, it is the responsibility of the Vice President / Department Manager concerned to appoint a replacement for standby duty. This condition is the part of "Delegation of Authority" system.

## **2.9 Roles of Government Agencies**

### **Directorate General of Renewable Energy and Energy Conservation (EBTKE)**

The highest authority at site e.g. the Technical Head of Mining or Geothermal (Kepala Teknik Panas Bumi / KTPB) and their deputies are responsible to provide safe system of work and safe working condition at site. These persons have the responsibilities to report and communicate directly to the Sub-Directorate of Technical, Safety, Health and Environment in EBTKE for any report related to safety and environment.

The KTPB shall report a serious incident to the Sub-Directorate of Technical, Safety, Health and Environment in EBTKE. Emergencies such as an oil spill in excess of 15 barrels, damage to property estimated to be in excess of US\$ 500,000, serious casualty and a fatality must be reported.

Any accident involving a fatality or major disaster, the EBTKE Inspector will usually conduct an inspection.


Note :

- EBTKE may assist in coordination or in seeking the assistance from other government agencies if required.
- EBTKE might be interested in obtaining detailed information for their Media Releases and Response. SUPREME ENERGY may provide this Agency with Draft Media Releases.

### **Directorate General of Sea Transportation (HUBLA)**

For Oil Spill on the ocean, the HUBLA has the responsibility as the On Scene Commander for major oil spills (Tier III) when the National Contingency Plan is activated.

For smaller spills, (Tiers I and II), this Agency will monitor the activities performed by the SUPREME ENERGY. Contact with and reporting to this Agency may be coordinated by EBTKE.

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### **National Search and Rescue (BASARNAS)**

The Basarnas will be responsible for personnel evacuation if required. Normally, the evacuation will be associated with an accident where the location is remote and difficult to be reached. The involvement of this Agency will also be coordinated through EMT-L.

### **Police**

The Police may become involved in the accident or emergency that results in fatality, or is the consequence of a criminal or subversive act (such as bomb threat).

For fatality cases, the investigation by Police at the location may be required. Usually it will be conducted by the Local Police, who should issue a "statement letter" to be used to transport the casualty from the field to his/her Morgue / Hospital either in Jakarta or at other places.

The statement letter from the Police is also required should an autopsy be required.

It is a legal requirement that two registered doctors to sign a statement saying that in his/her opinion the person is deceased. In the case of site operations this can be achieved by the Doctors at the nearest hospital. Until such time as both Doctors have signed this statement then the person concerned is referred to as "Casualty Showing No Vital Signs". This would normally occur when the fatality is evacuated from the field.

When air evacuation is required, there must be close coordination between the Police, the Jakarta and Field appropriate resources (e.g. HR, Security, and Operations Support). This will ensure that the relatives are given timely advice of the arrival time of the fatality at Airport.

EBTKE must also be informed and they may require that an appropriate Inspector from their department inspect the site. Close coordination of transportation of these personnel should also be considered.

The Police may also request access to the site for criminal acts or as they determine necessary. Therefore the scene of the incident should remain undisturbed and marked off. Digital photographs should also be taken at the scene and sent to the EMT in Jakarta.

### **National Electric Company (PLN)**

PLN, as the client of Geothermal Operations shall be informed and reported on any emergency situations especially that could affect power generation availability. SUPREME ENERGY will coordinate with PLN P3B Riau Dispatcher and PLN Switchyard whenever power generation disrupted. PLN could be requested for power back-feeding for plant start-up.

### **Army**

In an event of emergency, Army may become involved if Police request them for security back-up. Yet all security coordination should go through Police first.



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### 3 Team Roles and Checklists


#### 3.1 Roles and Checklist of EMT

The main role of the Emergency Management Team is to coordinate the “operational support” and mobilize resources **to support and assist the site in dealing with the emergency**, including the deployment of physical assets and to alert relevant emergency services.

##### 3.1.1 Roles of EMT

The general roles of EMT include the following activities:


- Ensure that the relatives of casualties are informed and kept updated by the HR Team Member.
- Manage communications with other relatives, media, contractors and other outside agencies.
- Make technical appraisal and assessment of the emergency situation and, if required, provide advice to the site of the emergency on possible remedial action and intervention.
- Notify and liaise with the emergency services, including notification and reports to the government agencies.
- Notify and update information to EBTKE and make arrangements for transporting representatives of the government agencies as requested by them.
- Provide an effective response to public interest in the emergency by preparing a draft media statement and follow-up draft statements for EBTKE.
- Notify other SUPREME ENERGY operational areas which may be affected by, or hear of, the emergency.
- Identify the strategic implications of the emergency on corporate image, operability and commercial position, both short and long terms and provide information to the Crisis Management Team (CMT).
- Assist the emergency site in the recovery phase of the emergency.
- Initiate an internal enquiry and investigation into the causes of the incident and assessing the implications for current operations, identifying remedial and rehabilitation actions required.

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### 3.1.2 Checklist for EMT Activities

<u><i>Checklist for EMT activities</i></u> (1 of 1)	<u><b>Check Box</b></u>
Obtain full details of the emergency in terms of the threat / damage to People, Environment and Property, and actions in hand. Log details.	
Evaluate the need for, and level of EMT activation. Arrange "Call-Out" of the EMT and call out specialist support staff if required e.g. Drilling, Project.	
Provide details as known to the EMT members.	
Coordinate the overall planning and management of strategic issues and provide Tactical support to the emergency site.	
Coordinate overall emergency management operations and ensure that they are carried out in a manner which is consistent with Company policy, government requirements and the needs and concerns of the affected site.	
Develop overall response objectives to guide emergency response operations (prioritize).	
Ensure that contact is established and maintained with key players, contractors, emergency services, government agencies. Refer to relevant team member.	
Ensure all EMT members and support team are briefed and understand their Individual and team responsibilities.	
Request regular status updates (approximately every 30 minutes or as determined) from the affected site.	
Provide support to the affected site in the planning and implementation of the Recovery phase.	
Hold regular update sessions (or when there is a major change to the situation) with the EMT members in order to ascertain what support actions have been/are being provided by each member of the team, provide directions and guidance. On completion provide overall assessment.	
Ensure Support team members are regularly briefed by the appropriate person.	
Ensure that a risk analysis of the emergency is carried out.	
Assess the need for additional specialist support at the site.	
Ensure availability of adequate human, financial and technical resources.	
Liaise with appropriate National Embassies in Jakarta if required.	
Regularly review the ongoing support and that action is being taken.	
Determine media strategies in consultation with the CMT. Ensure that the Media Statement and follow up reports are drafted in a timely manner. Review draft media statement for final approval by the CMT.	
Be prepared to physically brief the CMT if required.	



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### **3.2 Specific Roles of EMT Members**

#### **3.2.1 Specific Roles of EMT-L**

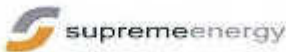
The specific roles of EMT-L includes, but not limited to:

- Provide tactical and strategic support to the affected site.
- Provide Leadership and Guidance to all members of the Emergency Management Team (EMT) and Support personnel.
- Responsible for the development and implementation of an emergency support strategy that promotes the safe, efficient and cost control of, and response to, an emergency.
- Approves the ordering and release of resources and monitors the performance of the site Emergency Response Team (ERT).
- Responsible for the development and implementation of a response recovery strategy, which will minimize the impact of the emergency on Company operability and liabilities in the future.

##### **3.2.1.1 EMT Update Procedure**

The EMT-L is responsible for ensuring this procedure is carried out:

- At the onset of the emergency, consider the appropriate intervals for updates. This should normally follow the update from the ERT-L. Updates should be brief and concise.
- Give all EMT members a 5-minute warning prior to each update.
- Check the Recorder and readiness to update the status boards.
- Invite each team member to identify key issues and report progress on any action item. Do not allow questions or debates until everyone has reported.
- Provide opportunity for clarifying questions and brief discussion.
- Summarize the update, set priorities and if necessary allocate responsibilities for actions.
- Ensure that action items / decisions taken are recorded and displayed to the team.
- Set time for the next update.

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### 3. 2.1.2. Format of Media Release / Statement

The format of Draft Media Release / Statement should be as follows:


SUPREME ENERGY can confirm that a *(type of incident)* occurred at *(location)* at *(time / date)*.

A detailed media statement will be issued as soon as more information becomes available. This is anticipated within (...) hours.

SUPREME ENERGY has mobilized its Emergency Management Team and is in control of the Emergency. A media and public enquiry number has been opened on (...).

If any member of the public is concerned about relatives, they should phone this number (...).

**End of Statement**

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### 3.2.2. Project / Drilling / Operations

The roles of the representatives from Project / Drilling / Operations are to serve as the single vocal point of situation assessment by establishing direct contact with the PIC to obtain clear and concise details on the nature and seriousness.

- Maintain regular communications (as the only PIC among the EMT members), with the PIC at the scene of the emergency.
- Assist the EMT-L with the evaluation of the emergency situation and provide specific technical support.
- Ensure that the EMT-L is informed of the status of the emergency, actions being taken at the scene, and remedial actions being undertaken and special implication.
- Note what support has been requested and ensure that this is passed to the appropriate team member.
- Obtain the latest weather forecast and monitor updates. Advise EMT members.

<b><u>Checklist for EMT member activities : Project / Drilling / Operations</u></b> (1 of 1)	<b><u>Check Box</u></b>
Contact the EMT-L and determine the requirement for a Call-Out of the EMT.	
Establish and maintain communications with the PIC / Company Representative at the scene of the emergency.	
Obtain full details of the emergency in terms of threat to people, damage to the environment and property and check actions in hand. Log details.	
Check what support is required at the site. Action the required support.	
Act as the EMT-L until relieved of these duties by the nominated person.	
Commence compilation of the chronological log of events. Ensure that the Recorder receives copies of completed log sheets on his/her arrival at the ECR.	
Request regular updates from the PIC / Company Representative at the Emergency Site.	
Provide updates to the EMT-L ; giving information on the likely extent and implications of damage and necessary resources to recover and control the emergency.	
Call out additional support / technical personnel as required.	
Arrange transportation of additional personnel to the affected site if requested.	
Ensure appropriate drawings, plans, charts and maps are readily available for display.	
Develop alternative / worst case scenario for the current situation and plan to mitigate this if possible.	
Consider mutual assistance from neighbouring operations.	



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### 3.2.3. *Safety, Health and Environment*

The roles of the representatives from SHE are :

- Provide advice to the EMT-L on all aspects of SHE.
- Prepare written SHE reports as required by regulations.
- Organize an investigation team at an appropriate time.
- Act as the liaison team member with the Police.
- Provide support to establish communication link to EBTKE.

<u><i>Checklist for EMT member activities : SHE</i></u> (1 of 1)	<u>Check Box</u>
Assist other team members on matters associated with SHE.	
Prepare written reports as required by regulations.	
Liaise with the Jakarta Company Consultant Doctor (if any) on associated SHE matters.	
In the case of an Oil Spill, monitor actions being taken and advise team members as appropriate.	
Prepare to brief the inspection / investigation team.	
Monitor all actions being taken by the Recorder and ensure that accurate information is being displayed on the information white board.	
Act as liaison with the Security team and ensure that the SUPREME ENERGY Office Building is secured at the 18 <sup>th</sup> floor and that remaining staff is kept advised.	
Consider the need for Search and Rescue participation and if requested by the EMT-L, alert the appropriate authorities.	
Provide support to establish the communications link between the EMT, EBTKE, and other Government agencies.	




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### 3.2.4 Logistics

The roles of the representatives from Logistics are :

- Obtain information on the availability of any required external resources (e.g. heavy equipment, helicopter, etc) and make essential contacts to alert / mobilize them if necessary, depending on the nature of the emergency.
- Liaise with the EMT-L regarding the requirements for transport, materials and services. Ensure efficient transport of materials, etc. to the scene of emergency.
- Following directions from the EMT-L assess the availability of mutual assistance from other emergency resources around the affected site and advise the EMT-L. Track cost to the best of your ability.

<b><u>Checklist for EMT member activities : Logistics</u></b> (1 of 1)	<b><u>Check Box</u></b>
Have the list of major logistics support contractors complete with contact person, phone numbers, and fax numbers as required.	
Following the update from the EMT-L, provide communications link and alert related contractors (providers of transport, material, service, etc) of the emergency.	
Work with other EMT members to determine the level of support services required.	
Inform other resources of emergency for the possibility in using their equipment and manpower when needed.	
Assist with Medivac procedures by arranging transportation and liaise with HR and Consultant Doctor, if any.	
Determine the location of equipment and personnel to assist in the support of the Emergency and coordinate their deployment to the affected site.	
Liaise with the HR representative to provide transportation for relatives if required.	


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### 3.2.5 General Services

The roles of the representatives from General Services are:

- Ensure provision of sufficient support (transport, accommodation, logistics, meals, and others) to the affected site.
- Ensure provision of necessary supports to Company employees and their families and/or support team members and/or government employees

<u><i>Checklist for EMT member activities : General Services</i></u> (1 of 1)	<u><b>Check Box</b></u>
Ensure sufficient transport for emergency services are available.	
Ensure sufficient logistics are provided at the affected site.	
Ensure that cash is available to assist the transportation of relatives and/or support services and/or government employees.	
Liaise with Logistics Coordinator to ensure that travel and accommodation facilities are available for relatives.	
Ensure there are sufficient members in the Support Team (e.g. IT, Receptionists, Office Boys) to assist GS roles and ensure that there is a good communications link among this GS team.	
Maintain an up-to-date log of events and pass each sheet to the Recorder when completed.	


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### 3.2.6 Human Resources

The roles of the representatives from Human Resources are:

- Advise and support the EMT on all human resources matters relevant to the emergency.
- Provide current Person-On-Board (POB) lists and lists of the addresses of employee's relatives. Ascertain if casualties are contractors or Company personnel. Advise the Recorder and the EMT-L.
- Use the resources of HR Support Team to achieve your aim, if necessary.

<u><i>Checklist for EMT member activities : Human Resources</i></u> (1 of 1)	<u><b>Check Box</b></u>
Obtain a full briefing on the emergency paying particular attention to personnel matters. Log details.	
Provide copies of the POB lists and employees' relatives' lists.	
Liaise with the contractors HR personnel to ensure that both SUPREME ENERGY and contractor have the correct details.	
Record the addresses of SUPREME ENERGY personnel relatives. Do not inform them until approved by the EMT-L. Prompt him.	
When approved by the EMT Leader, coordinate the notification to the family of any casualty or fatality. For a fatality, discuss the matter with the EMT-L before any action is taken. This must be in a timely and compassionate manner. Do not disclose matters about fatalities on the telephone, if at all possible.	

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### 3.2.7 Recorder

The roles of the Recorder are:

- Maintain an accurate chronological log of events as they occur.
- Maintain an up to date list of “Significant Events” and “Casualty Data” and project this data onto the Projector Screen.
- Responsible that team members pass their completed log sheets to him/her.

<u><i>Checklist for EMT member activities : Recorder</i></u> (1 of 1)	<u>Check Box</u>
Obtain a full briefing of the emergency.	
Take over the “Log of Events” role from the EMT-L.	
Ensure up to date information has been recorded. Check members’ log sheets.	
Check main events board and ensure that information displayed is recorded in Log.	



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### 3.2.8 Legal

The roles of the representatives from Legal are:

- Provide Legal advice to the EMT-L particularly in the drafting of Media Releases.
- Provide the EMT-L with advice on Contractual arrangements.
- Provide Legal advice to the CMT.

<u><i>Checklist for EMT member activities : Legal</i></u> (1 of 1)	<u>Check Box</u>
Review all draft Media Releases.	
Ensure applicable contract documents are readily available.	
Provide strategic advice to the CMT.	
Liaise with the SHE Team Member to ascertain if there are any Legal Implications regarding the emergency.	


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### 3.2.9 External Relations (Field Relations and Business Relations)

The roles of the representatives from External Relations are:

- Following the EMT-L approval, make sure that all related Government Agencies are well informed and notified about the emergency.
- Keep Support Team Members updated on information that they can pass to incoming public telephone calls.

<u>Checklist for EMT member activities : Relations</u> <u>(Field Relations and Business Relations)</u> (1 of 1)		<u>Check Box</u>
Manage the "Outside Agencies Coordinator" to ensure that consistent and precise information is being transmitted and received. Advise the EMT-L.		
Liaise with the EMT-L to ensure that consistent information is released to the media. Prevent the release of casualty personal details until after the families have been informed.		
Accommodate and entertain the out-side's inquiries.		
Assist for the salvage & rescue of the community affected by the emergency situation.		


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### 3.2.10 Security

The roles of the representatives from Security are:

- Following the EMT-L approval, make sure that all related Government Agencies are well informed and notified about the emergency.

<u><i>Checklist for EMT member activities : Security</i></u> (1 of 1)	<u>Check Box</u>
Upon request from the Site Security Supervisor or his assignee, liaise with the EMT-L on strategy on how to secure the incident location and/or prevent unauthorized entry and/or evacuate community members. When received EMT-L approval, manage the communication to the Site Safety Supervisor.	
Upon request from the Site Security Supervisor or his assignee, liaise with the Police and/or Army and/or Security Provider.	

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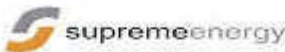
### 3.2.11 Consultant Doctor (if any)

The roles of Consultant Doctor are:

- Provide medical opinions and expertise to the EMT-L, ERT-L and Field Medics (if any).
- Consult Field Medics, if any, with medical diagnoses of casualties.
- Liaise with Doctors / Hospitals regarding the admittance of casualties.

<u><i>Checklist for EMT member activities : Consultant Doctor (if any)</i></u> (1 of 1)	<u><b>Check Box</b></u>
Assist the ERT-C and Field Medics in the pre-Medivac procedures.	
Ascertain location of suitable Hospital Facilities particularly with regards of the diagnosis.	
Act as the liaison Doctor between the Field and the designated Hospital.	
Arrange for transport (ambulance / commercial flight / helicopter) of the casualties / fatalities.	
Liaise with the HR Team Member particularly with regards the description of the medical diagnoses of the casualty.	
Liaise with the HR Team Member regarding transportation of relatives.	




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### 3.3 *Crisis Management Team Strategic Planning Check List*

The SUPREME ENERGY Crisis Management Team (CMT) has the responsibility to proactively identify and manage strategic issues associated with the emergency. The CMT will be assisted in this task by the EMT.

The EMT and CMT shall act in strategic and timely manner to manage the emergency as early as possible (i.e. shall ask itself what can it do now / today) to minimize the impact of the current emergency on SUPREME ENERGY and its joint ventures in short, medium and longer terms.


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<b><u>Checklist for CMT Strategic Planning</u></b> (1 of 2)	<b><u>Check Box</u></b>
<b>A. KEY CONSIDERATIONS</b>	
• Safety and welfare of people and environment.	
• Business interruption.	
• Investment.	
• Threats to license to operate.	
• Resource and implementation of agreed strategies.	
<b>B. LIABILITY ISSUES</b>	
• Analyze emergency details and agree an interim basis upon which SUPREME ENERGY will respond.	
• Clarify legal relationships and ensure SUPREME ENERGY discharges all contracted obligations in these agreements.	
• Decide whether to recommend immediate shutdown of similar / connected operations pending emergency investigation.	
• Ensure accurate logging of response.	
<b>C. INTERNAL / EXTERNAL INVESTIGATION</b>	
• Review composition of investigation team and consider use of independent third party.	
• Gather facts and evidence (photographs, diagrams, witness statements, etc.) while fresh.	
<b>D. MANAGEMENT OF HUMAN RESOURCES RESPONSE</b>	
• Ensure that efficient, effective and compassionate support is given to personnel involved.	
• Ensure that efficient, effective and compassionate support is given to relatives and friends.	
• Ensure all personnel (including response personnel) are not exposed to health and safety hazards arising from the emergency.	
• Ensure that all employees are kept informed, including contractors and consultants.	
<b>E. MANAGEMENT OF ENVIRONMENTAL IMPACT</b>	
• Long term clean up of Major Oil Spill.	
• Long term monitoring.	
• Cooperate with the government and regulatory bodies.	
• Ensure that rapid containment and clean up is effected.	
• Ensure immediate and long term monitoring of affected / potentially affected area is implemented.	
• Consider how environmental agencies / pressure groups might react and implement plans to manage their responses.	
<b>F. MANAGEMENT OF REPUTATION</b>	
• Consider the likely response from pressure groups, regulatory agencies and neighbors.	
• Ensure the Company spokespeople receive a good briefing.	
• Ensure that the key influencers who could be approached by Media for comment are regularly briefed.	
• Proactively brief politicians - preferably by SUPREME ENERGY personnel that have pre-existing relationships.	
• Review emergency impact on pre-existing relationships and implications for future projects.	

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<b><u>Checklist for CMT Strategic Planning</u></b> (2 of 2)	<b><u>Check Box</u></b>
<ul style="list-style-type: none"> <li>• Monitor the response from Media, other outside sources and employees.</li> <li>• Consider the implications of current issues and prevailing public environment on management of the emergency.</li> <li>• Consider impact of new information on each key stakeholder prior to its release.</li> </ul>	
<b>G. RESUMPTION OF OPERATIONS</b>	
<ul style="list-style-type: none"> <li>• Consider the impact of shutdown on local community / colleague companies in the region - need for strategies to mitigate?</li> </ul>	
<b>H. CLAIMS FOR COMPENSATION</b>	
<ul style="list-style-type: none"> <li>• Publicize guidelines as early as possible, especially on how to claim compensation without prejudicing ultimate liability.</li> <li>• Commit resources to processing requests quickly.</li> <li>• Prepare public statement on the issue of compensation.</li> </ul>	
<b>I. CUSTOMER AND SUPPLIER IMPACTS</b>	
<ul style="list-style-type: none"> <li>• Ensure there is adequate communication regarding impacts / plans.</li> <li>• Decide on the ability to assist with alternate supply to customers.</li> <li>• Consider the inability to accept supplies or cargo in the short or long term.</li> </ul>	
<b>J. BOTTOM LINE IMPACTS</b>	
<ul style="list-style-type: none"> <li>• Quantify forgone revenue from lost production. Consider internal advice requirements.</li> <li>• Review the impact of expenditures to repair the damaged emergency site on other SUPREME ENERGY projects.</li> <li>• Review internal budgets and financing arrangements.</li> <li>• Assess likelihood of penalty or fine.</li> <li>• Review insurance claim options. Ensure compliance to claim procedure.</li> <li>• Consider the impact on operations (e.g. Impact on equipment and property-denial of use, consequential loss, and inability to meet demand).</li> </ul>	
<b>K. EMT ROLE</b>	
<ul style="list-style-type: none"> <li>• Ensure that the EMT is supportively managing the strategic and tactical response.</li> <li>• Ensure that information flow between EMT, CMT and key stakeholders is satisfactory.</li> <li>• Ensure that unaffected parts of SUPREME ENERGY operations are receiving management resources for continued unimpeded operation.</li> </ul>	



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## Appendix A EMT Members

	<b>POSITION</b>	<b>EXT. #</b>	<b>MOBILE #</b>	<b>HOME #</b>
<b>EMT LEADER</b>				
Triharyo Indrawan Soesilo	President & CEO	2107	0811-1410-46	
Victor van der Mast	Chief Operation Officer	2008	0811-9592395	
<b>DRILLING</b>				
Bambang Roesdyoko	Manager Drilling	2062	0811-104514	
Paul Asaari	Superintendent Drilling	2149	0811-1662989	
<b>SHE</b>				
M. Arief T	Sr. Manager SHE	2091	0811-858361	
Andreas Hartono	Sr. Engineer Environmental	2093	0812-13007870	
<b>SCM</b>				
Win Sukardi	Sr. Manager SCM	2081	0811-1554565	
Hary Wibowo	Head Procurement	2084	0811-865944	
Novan Erstyawan	Head Logistics	2083	0812-17287973	
<b>GENERAL SERVICES</b>				
Risnia Handayani	Supervisor GS	2025	0811-1000136	
Bagus Permadi	Asst. Supervisor GS	2056	0811-1625212	
<b>HUMAN RESOURCES</b>				
Hardinald Aslam	Manager HR	2033	0818-488355	
<b>RECORDER</b>				
Faishal Dwi Ismail	Procurement	2087	0812-81168086	
Demas Seto	Procurement	2183	0817-156599	
<b>LEGAL</b>				
Hapsari Sulistyorini	Head of Legal	2007	0813-10424265	
Mustika Anglingsari	Legal	2095	0878-81266525	
<b>EXTERNAL RELATIONS</b>				
Yulnofris	Sr. Manager Field Rel.	2028	0818-08708888	
Ismoyo Argo	Manager Business Relations	2022	0811-188027	
<b>SECURITY</b>				
M. Yunus	Manager Security	2023	0811-2110468	
Hery Agus Susanto	Supt. Security	2072	0811-971863	
<b>CONSULTANT DOCTOR</b>				
XXX				
<b>TELEPHONE SUPPORT</b>				
Sella Ayu Ningtyas	Receptionist	2100	0821-13001000	

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## APPENDIX B CMT Members

	POSITION	EXT. #	MOBILE #	HOME #
<b>CMT LEADER</b>				
Triharyo Indrawan Soesilo	President & CEO	2107	0811-1410-46	
Victor van der Mast	Chief Operation Officer	2008	0811-9592395	
<b>CMT MEMBERS</b>				
Yasuki Sato (for SEML & SERB)	Director / CFO SEML & SERB	2060		
Yoshikazu Egawa (for SERD)	Director / CFO SERD	2069		
Radikal Utama	Sr. VP Operations Support	2002	0811-1950-28	
Prijandaru Effendi	VP Relations & SHE	2021	0811-8492-66	
Nisriyanto	VP Business, Strategy & Development	2003	0812-8136912	
Jufri Hadi	VP Explo and Sub-surface Eng	2041	0811-9792-21	
John Sinaga	VP Finance	2111	0811-8408-37	

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## Appendix C

### Important Emergency Telephone Numbers

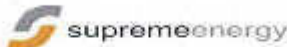
SUPREME ENERGY OFFICES		Phone
Equity Tower, 18th Floor Sudirman Central Business District (SCBD) Jl. Jend. Sudirman Kav 52-53 Jakarta 12190	Hunting Line	021-5155-222
	Receptionist	021-2934-2000 / 2100
	Corporate Fax	021-5155333
	email : emergency-response@supreme-energy.com	

POSITION	NAME	PHONE #	ADDRESS
DIRECTORATE GENERAL NEW RENEWABLE ENERGY AND ENERGY CONSERVATION (EBTKE)			
Director General	Ir. Rida Mulyana		Jl. Pegangsaan Timur No. 1A, Jakarta Pusat
Director of Geothermal	Ir. Tisnaldi		
Head of Sub-Director of Technical and SHE	Ir. Eddy Rivai MT	0821-1192-5157	
DRILLING EMERGENCY RESPONSE PROVIDER			
Alert Disaster Control (Asia) PTE LTD	mall@alert.com.sg	+65-6545-5088	Box 5008, Block B#01- 00, Loyang Offshore Suplly Base 508988
Wild Well Control Inc	wildwell@wildwell.com	+1-281-784-4700	Drilling Technology Center 2202, Oil Center Court Houston, TX 77073
Boots & Coots IWC	Danny Clayton	+1-800-blowout	7908 N. Sam Houston Parkway W., 5th Floor, Houston, TX 77064
INSURANCE			
Marsh Insurance Broker (PT. Marsh Indonesia)	Wisnu Basuki (CP)	021 5797 8177 021 5797 8250 0815 8531 0030	Sentral Senayan II, 15th Floor, Jl. Asia Afrika No. 8, Jakarta 10270, Indonesia
BANK			
Mandiri Cab Plaza Mandiri			




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<b><i>CUSTOMS</i></b>			
SYAHBANDAR (Ka. Syahbandar, Jl. Palmas No. 1 Tanjung Priok)			
Customs Batam			
Dept. of Sea Transportation			
Dept of Air Transportation	Keselamatan Penerbangan Subdit Pelayanan & Pengamanan Darurat	021-3506551 021-3506554	
<b><i>PARTNERS</i></b>			
GDF Suez			
Sumitomo			
Marubeni			
<b><i>BASARNAS (NATIONAL SEARCH AND RESCUE)</i></b>			
Communication Center Jl. Merdeka Timur No. 5, Lt. 3, Jakarta basarnas@indo.net.id	Operator on duty (24 hours)	021-3483 2901 021-352 1111	
Head of Operations		021-3483 2872	
Kepala Pusat Bina Operasi		021-3483 2873	
Head of Basarnas (Jakarta Office)		021-3483 2869	
<b><i>OTHER GEOTHERMAL COMPANY</i></b>			
Pertamina Geothermal Energy	Field Manager		
OTP Sorik Merapi (Sorik Merapi Geothermal)	Field Manager	021-7278 7336	
Sarulla Medco Power	Field Manager		
Chevron Geothermal Salak Field	Field Manager	0266-2255 40	
Pertamina Geothermal Kamojang	General Manager	022 -7806 882/3 0262-2332 44; 0262 -2332 20	
Chevron Geothermal Darajat Field	Field Manager	0262 -2355 67	
PT. Geodipa	Operation Manager	022 -7313 375	
<b><i>PLN</i></b>			
P3B Sumatera, Pekanbaru	Sudirman (PLH. General Manager Pengembangan Sistem Transmisi)	0761-6700 011 0761-6700 015 (fax)	Jl. Nangka Ujung, Pekanbaru
General Manager P3B Sumatera		0761-6700 011 0761-6700 015 (fax)	Jl. Nangka Ujung, Pekanbaru

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<b>MEDICAL PROVIDER</b>			
Pertamedika (PT Pertamina Bina Medika)	Dr. Pram	0817-4859615	Jl. Kyai Maja No. 43 Kebayoran Baru Jakarta Selatan 12120
	Sabar (PIC)	0812-8294599 021-7219057 021-7247006 (fax)	
Global Doctor	Dr. Agung Triyatno (Business Development Manager)	021-7182-029 021-7194-565 0811-9481-47	Jl. Kemang Raya no. 87, Jakarta 12730
Global Assistance and Health Care		021-7257-962 021-7257-961 (fax)	Jl Patimura No. 15 , Kebayoran Baru , Jakarta Selatan
International SOS Medika		021-750 5973 021-750 5980	Jl. Puri Sakti no 10, Cipete, Jakarta Selatan
Medika Plaza PT Kartika Bina Medikatama	Jacky Arjono	0811-9575-57	Menara Kuningan, 5th floor Jl. HR Rasuna Said Kav. X-7 no 5, Jakarta 12940
Blue Dot Assistance		021-5696-1177 021-3041-8777	Total Bld, 6th floor Jl. LetJend S Parman
<b>HOSPITAL</b>			
RS. Siloam Gleaneagles (Helipad available)		021-546 0055 (hunting)	Jl. Siloam No. 6, Lippo Karawaci 1600 Tangerang 15811
RSP. Pertamina, Jakarta (Helipad available)		021-720 0290 (hunting)	Jl. Kyai Maja No. 43, Kebayoran Baru Jaksel
RS. MRCCC Siloam Hospitals		021- 2997 2789 021-2996 2777 (emergency)	Jl. Garnisun Kav 2-3, Karet Semanggi, Setiabudi, Jakarta.
RS. Pondok Indah, Jakarta		021-765 7525	Jl. Metroduta, Kav. UE, Pondok Indah, Jakarta Selatan.
RS. Medistra, Jakarta		021-521 0200 (hunting)	Jl. Gatot Subroto, Kav. 59, Jakarta Selatan
RS. Jantung Harapan Kita		021- 568 4093 021-568 2424 emergency	Jl Letjen S Parman, Kav. 87, Slipi, Jakarta Barat
RS. MMC, Jakarta		021-520 3435 (hunting) 021-527 3473 emergency	Jl Rasuna Said, Kav. C21, Kuningan, Jakarta Selatan
RS. UKI, Cawang		021-8092317 021-8092445	Jl. Mayjend Sutoyo, Jakarta Timur




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## APPENDIX D SITE TELEPHONE NUMBERS


### A.D.1 Muara Laboh

#### SITE EMERGENCY RESPONSE GROUP - SEML

POSITION / NAME		PHONE	OTHERS
<b>SUPREME ENERGY</b>			
Technical Head of Mines (temp.)	Amiruddin Tenrisau	0813-42742768	<b>ERT-Leader</b>
Site Support Manager	Jefriando	0811-821059	Alternate ERT-L
Site SHE Representative	Nofril Riza	0812-6807-6300	
	Syeflaizar	0812-76209170	
Spvr. Security	AKP Firman	0878-8620-3406	
Field Reps	Bujang Joan	0812-6739-954	
Assistant Field Rep	Roza	0852-7405-5855	
Maintenance	Amiruddin Tenrisau	0813-4274-2768	
SCM	Wahyu	0813-1593-2634	
	Sofyan Handi	0813-50273699	
Drilling Material Man			
<b>LOCAL AUTHORITIES / AGENCIES</b>			
Bupati	Muzni Zakaria	0811-66xx-xxxx	
Kapolres	AKBP Joko Trisulo	0812-72xx-xxxx	
Camat	Oyong		
Kapolsek	Iptu Nasirwan	0813-74xx-xxxx	
Kodim			
Koramil			
ESDM	Amril Bakri (Kadis)	0812-6723310	
KLH	Hapison (Kadis)	0852-6383-1475	
	Riko (Wasdal)	0812-6601-780	
BNPB	Alwis (Sekretaris)	0755-7575123	
Fire Service	M Zen (Kadis)	0813-7478-0300	
Adm. Perkebunan Pekonina			

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POSITION / NAME		PHONE	OTHERS
<b>HOSPITAL</b>			
RSUD Muara Labuh	Drg. Hj. Aminah Jailani MM	0852-6347-7309	
RS Siti Rahmah, Padang	Yori Rahmadiani	0815-1937-6783 0751-463059	Jl Raya Bypass km 15, Padang
RSUP Dr. M Djamil		0751-32371 0751-32373	Jl Perintis Kemerdekaan, Padang
RS Yos Sudarso		0751-30323 0751-33230	Jl Situjuh no. 1, Padang
Hotel Umi Kulsum, Muara Labuh		0755-70068	
Hotel Mercure, Padang		0751-891891	
Hotel Pangeran Beach, Padang		0751-51333	
Hotel Grand Inna Muara, Padang		0751- 35600	
<b>PT SEMEN PADANG</b>			
Operations Director	Ir. Toto Sudibyo	0751-815250	
Head of Quality Control	Durain Parmanoan, ST. MT	0813-6384-6058	

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## A.D.2 Rajabasa


### SITE EMERGENCY RESPONSE GROUP - SERB

POSITION / NAME		PHONE	OTHERS
<b>SUPREME ENERGY</b>			
Site Construction Manager / Technical Head of Mines (temp.)	Ridha Mulia	0811-7517-717	
Site Support Manager	Franky M. Tungka	0812-8782-1064	
Site SHE Representative	Akhmad Wahyudi	0812-8563-798	
Spvr. Security	Sunarno		
Field Reps	Syamsul Haq	0811-7214-213	
Assistant Field Rep	Rally Satria Y	0813-7957-3800	
<b>LOCAL AUTHORITIES / AGENCIES</b>			
Bupati Lampung Selatan	Rycko Menoza	0811-xxxxxxx	
Polres Lampung Selatan	Bayu (Kapolres)	0727-322110	
Polsek Kalianda	SPK	0727-322141	
Dandim Lampung Selatan	Ketut		
ESDM	Sujak Prawirancgara	0821-8025-1059	
BLHD	Jamal N	0813-6938-0071	
Camat Rajabasa	Syamsul		
Camat Penengahan	Lukman Hakim		
Camat Kalianda			
Camat Bakauheni	Sabilal		
Fire Service / BNPBD	Call Centre	0727-322244	
	Joko (Sekretaris)	0823-7919-5589	
BPLHD Prov. Lampung	Ir. Fahrizal Darminto MA	0811-722-516	
ESDM Prov. Lampung	Office	0721-486983	
Bina Marga Prov. Lampung	Office	0721-702684	
Administrator Pelabuhan Panjang	Office	0721-31149	
<b>HOSPITAL</b>			
Puskesmas Way Muli	Dr. Heriyadi S.Kep	0819-9687-5867	Jl. Raya Pesisir, Way Muli
Puskesmas Pembantu Desa Canti	Abdul Haris	0819-2781-6699	Jl. Raya Pesisir Canti

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RSUD Bob Bazaar, Kalianda	Rio Sihombing	0812-7213-667	Jl. Lettu Rohani, Kedaton
RS Immanuel, Lampung	Dr. Budi Suanto	0813-6919-7226	Jl. Soekarno Hatta, Lampung
	Dr. Dono Endarto	0818-0455-0776	
RSUD H. Abdul Muluk, Lampung	Dr. Yusmaidi	0812-7327-6543	
<b>HOTEL</b>			
Hotel Grand Elty Kalianda Resort		0727-322-392 0821-8559-9770	Jl. Trans Sumatera km 45
Wisma Belerang Kalianda		0727-321-189	Jl. Way Belerang
Hotel Sheraton Lampung		0721-486666	Jl. Wolter Monginsidi no.157, Bandar Lampung
Hotel Novotel Lampung			Jalan Gatot Subroto no. 136 Bandar Lampung




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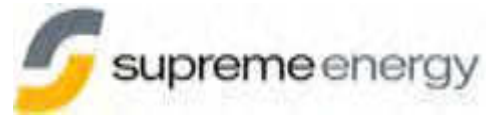
### A.D.3 Rantau Dedap

#### SITE EMERGENCY RESPONSE GROUP - SERD

POSITION / NAME		PHONE	OTHERS
<b>SUPREME ENERGY</b>			
Technical Head of Mines (Temp.)	Erwin Guminda	0812-8935813	
Site Support Manager	Asharry Sofyan	0811-150995	
Site SHE Representative	Dian Amali	0813-12019695	
	Rifqi Alfaizi	0813-98259769	
Site Security Supervisor	Sajjadi	0812-9185185	
Field Reps	HM. Goerillah Tan	0813-19773117	
<b>LOCAL AUTHORITIES / AGENCIES</b>			
Bupati Lahat	H. Saifudin Aswari Riva'i, SE	0811-xxxxxxx	
Dandim Lahat	Tri Hapsoro	0811-xxxxxxx	
Polres Lahat	Budi (Kapolres)	0731-321507	Jl. Bhayangkara I, Lahat
Polsek Kota Agung	Janari (Kapolsek)		
Camat Kota Agung	Fauzan		
Bupati Muara Enim	H. Muzakir Sai Sohar	0811-xxxxxxx	
Dandim Muara Enim	Ruslan	0811-xxxxxxx	
Polres Muara Enim	Aris (Kapolres)	0731-321507	
Polsek Semendo Darat Ulu (SDU)	Haryanto (Kapolsek)		
Camat SDU	Tasman		
Walikota Pagar Alam	dr. Hj. Ida Fitriati	0811-xxxxxxx	
Dandim Pagar Alam			
Distamben (Mines and Energy Office) – South Sumatera	H. Robert Heri (Kadis)	0817-03332925	
	Marwan Saragih (Kabid LPE)	0813-67757289	
	Ira Rihatini (Kasie EBT)	0856-69522960	
Dinas LH (Environmental Office) – South Sumatera	Lukitariati	0811-xxxxxxx	
Dinas Kehutanan (Forestry Office) - South Sumatera	Ir. Sigit Wibowo	0811-xxxxxxx	

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<b>HOSPITAL</b>			
Pustu at Desa Segamit	Bidan Ica	0812-1051-0724	
Puskesmas Fajar Bulan	Dr. Dwi	0819-3338-9078	Jl. H Djabar, Fajar Bulan
RSUD DR. HM Rabain, Muara Enim		0734-424345 0734-422738	Jl. S. M. Badarudin II no.49, Muara Enim
	Dr. Yogi - Surgeon	0852-2000-5126	
RS PTBA Muara Enim	Ka.RSPTBA	0734-451096 ext.5008	Jl. Raya Bukit Asam, Tanjung Enim
	Dr. Nirwan Firdaus, S.Pb	0734-451096, ext. 5018 or 5035	
RSUD Lahat		0731-322081	Jl. Mayor Ruslan I no.28, Lahat
RSUD Palembang		0711-354088	Jl. Jend. Sudirman, Palembang
	Dr. Yusril Hrn - Surgeon	0812-7865-7842	
RS Charitas Palembang		0711- 350426 0711-353374	
RS Pusri Palembang		0711-712024 ext 3374	
<b>HOTEL</b>			
Hotel Grand Zuri, Lahat		0812-7534-2691	
Hotel Aston, Palembang		0711-388999	
Hotel Novotel, Palembang		0711- 369777	



## **Chapter 2: Section 12 : Accident/Incident Reporting and Investigation**

## Content

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## **12. Incident/Accident Reporting**

### **12.1 Introduction**

This section sets out the policy and practices for notifying, and reporting investigating on incidents / accidents that occur at SUPREME ENERGY facilities (workplace) in which SUPREME ENERGY personnel, contractor personnel, visitors, the public and SUPREME ENERGY property are involved.

SUPREME ENERGY policy requires all personnel, contractors and visitors to report any incidents that occur, including fire, explosion, natural disaster, equipment failure, plant, vehicle or other accident, other incidents or near misses. When an incident is reported, the practices stated in this section shall be followed.

### **12.2 Definitions**

#### *Incident*

An unplanned event, of either minor or significant consequence, that may or may not result in an injury, illness, property loss or environmental impact. In this procedure the term “incident” refers to an injury or occupational illness; motor vehicle accident; fire or explosion; environmental release to soil, water, or air; property loss; or near miss.

#### *Lost-Time Accident (LTA)*

Any incident/accident that results in serious harm to an individual with that person is not being able to perform any duties at the next working day after the incident/accident or miss the next shift.

#### *Occupational Injury or Illness*

Any death, injury or illness suffered by personnel which results from work activity or exposure in the work environment. Examples of injuries are fractures, cuts, burns, snake-bites, one-time over-exposure to chemicals, etc. Examples of illnesses are dermatitis, hearing loss, cumulative poisoning or a cumulative trauma disorder.

#### *Recordable Injury (Medical)*

A Recordable Injury is one which results in loss of consciousness, restriction of work or motion, transfer to another job or medical treatment (other than FA). Any case which involves lost workdays beyond the day of the incident (lost time or restricted duty) is recordable.

### *Recordable Illness*

A Recordable Illness is any abnormal condition or disorder, other than one resulting from an occupational injury that is caused by exposure to environmental factors associated with employment. Illness includes diseases or rashes which may be caused by inhalation, absorption, ingestion or direct contact. Any properly diagnosed occupational illness is recordable, regardless of whether or not the case involves lost workdays or medical treatment.

#### Exceptions:

- The following illnesses are NOT recordable:
- Common cold or flu
- Mental illness
- Illnesses that surface at work, but result solely from a non-work related event or exposure that occurs outside the work environment.

### *First Aid (FA) Case*

FA treatment is limited to one-time treatment and subsequent observation of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care or treatment is provided by a physician or a registered professional person.

### *Near Miss*

An unplanned event in which there is no injury to personnel, minor damage to equipment or property, and no interruption to production, but which possesses the potential to cause an LTA or Recordable Injuries or FA or near miss.

### *Property Damage*

Damage to equipment, plant or property resulting from an incident/accident. The level of property damage will define it as either Lost-Time Accident (LTA), Occupational Injury or Illness, Recordable Injury, Recordable Illness, FA, or near miss (see definitions above).

## **12.3 Responsibilities**

### **12.3.1 Personnel**

Personnel are responsible for the following:

- Immediately report all injuries or suspected injuries to their Supervisor. In cases where the personnel thinks medical attention is unnecessary at the time, he/she should report the injury/illness no later than the end of the shift. Seemingly insignificant injuries can require medical attention at a later date.

- Keep all medical appointments and follow the instructions of the treating physician.
- Keep their Supervisor advised of their work status and subsequent doctor appointments.

#### 12.3.2 *Supervisors*

Supervisors must give immediate attention to a personnel who sustains an occupational injury or illness. Supervisors are responsible for the following:

- Ensure the personnel receive prompt medical attention and follow-up care as necessary. Depending on the disposition of the case, ensure transportation to quarters or back to work is arranged.
- Go to the clinic (if warranted and practical) or stay in contact with the clinic to keep abreast of the personnel's condition and the disposition of the case (hospitalized, held at the clinic, sent to quarters or returned to work).
- Immediately advise the Department Manager and SHE Manager if the injury is serious.
- Notify the injured personnel's family in cases of serious injury if he/she is unable to do so.
- Conduct an immediate on-scene investigation into the root cause(s) of the injury / illness and report the findings via memo and/or the appropriate report form to the Department Manager by the end of the following day.
- Take and document corrective action to prevent recurrence.

#### 12.3.3 *Paramedic*

Attend to the injured person's needs. Record at a later date the extent of the injuries and the treatment administered. Record accident in the Site Accident Register. Complete Government Agency (EBTKE bentuk IIIi) injury notification form.

#### 12.3.4 *Site Sr. Leader (Manager / Superintendent)*

Manager / Superintendent are responsible for the following:

- Approving incident reports and managing implementation of remedial action items specified on incident reports and ensure accident is investigated and recommendations implemented.

- Reporting potentially serious incidents to the General Manager-Operations and/or the Managing Director/President, as appropriate and obtaining guidance concerning necessary Company and external notification requirements.

#### **12.3.5**     *Health Safety and Environmental Team*

- Review work injury /illnesses classification to ensure it is correct
- Review the root cause(s) identified and the corrective actions taken, to confirm that both appear to be sound
- Ensure the incident is documented in Company incident statistical data base and prepare the report to Government Agency (EBTKE)
- To receive contractor's incident notifications.

#### **12.3.6**     *Contractors*

Contractors are responsible to prepare and submit the report to Site Leader (Manager / Superintendent) all incidents, including near misses within one day of the incident that occur while working at the site. Contractors are responsible for investigating any incident and reporting the incident to the Site SHE Representatives. The report shall be completed within five (5) days of the incident.

### **12.4**     **Procedural Steps in the Event of an Incident**

#### **12.4.1**     *Procedure in Event of an Incident*

In the event of an incident or near miss, the steps listed below should be followed.

- At the time of the accident, a person should first ensure their own safety, and then ensure the safety of others.
- Assess the situation.
- Minimise the risk of further injury by shutting down plant and equipment, turning off the power supply, extinguishing fires (if this is possible without taking undue risks), etc.
- Give appropriate FA, or get the nearest trained first-aider to administer first-aid.
- Ring (call) for emergency services (Paramedic) or get someone else to; this can be attended to earlier depending on manpower availability.

- Secure the area and do not interfere in any way with the accident scene (unless this is necessary to save life, prevent injury, maintain essential services or to prevent further damage or property loss).
- Should a person receive injury that requires treatment, above that which can be provided by the equipment contained in a first-aid box or by a trained first-aider, the site's Paramedic must be immediately notified.
- Report the accident/incident/near-miss to the immediate supervisor.

#### 12.4.2 *Handling Work Injuries/Illnesses*

Injured personnel should be driven to Medical for examination and treatment unless he/she is seriously injured, in which case he/she should be taken by ambulance to the Clinic.

##### Serious Injuries

- Make the personnel comfortable. Do not move him/her unless conditions are such that on-going exposure to the surrounding area may result in further injury (fire, release of toxic chemicals, etc.).
- Call Medical immediately to dispatch the ambulance or respond by helicopter to the injury site.
- Administer First-Aid treatment as feasible, and if trained to do so.

##### Non-Serious Injuries

Provide transportation for, the personnel to the clinic. The injured personnel should not take the bus or provide his/her own transportation.

##### Lost Time Accident (LTA) Procedures

This section applies to an personnel due to a NON-LIFE THREATENING injury or injury requiring offsite treatment:

- The injured personnel should be accompanied to the clinic by his/her supervisor, or someone designated by supervisor, for consultation with Doctors and discussion of the injured person's situation. The supervisor or designee will ensure that the personnel do not leave camp without proper authorization. The personnel's supervisor or designee should remain with the personnel while at the clinic until the personnel is either released to return to work, held for observation, or given time off for recovery.

- Medical will contact the personnel's supervisor or the supervisor's designee (or SHE, if neither are available) to discuss the personnel's condition relative to his job functions before prescribing time off from work. Supervisors will be responsible to advise their respective management.
- When appropriate, the injured person will be held overnight at the clinic (whenever possible) or will be sent home for the rest of the day only, and will report to the clinic the next day for a follow-up examination. Patient will then either be released to work or given time off.
- The Medical doctor (if available) and the injured personnel's supervisor or designee (or SHE, if neither are available) should be informed before any personnel is prescribed time off from work. The patient should not be released from the clinic until the supervisor or designee (or SHE) has communicated with the doctor about the patient's condition.
- If restricted duty is prescribed, management will have to decide if, for the benefit of a personnel's rehabilitation, there is a restricted duty job that can be done.

## **12.5 Incident Reporting/Recording**

- All incidents, including near misses to personnel, plant and equipment damage, must be reported to the person's immediate supervisor or foreperson.
- The immediate supervisor will ensure the incident (LTA, Recordable Injuries, FA or near miss) is recorded in the site's Accident Register (see Form 12.1 at end of this section) and will complete the initial sections of the Preliminary Incident Investigation Report Form (see Form 12.2 at end of this section).
- The Accident Register is held at each site under the control of the Site Sr. Leader (Manager / Superintendent). The register is divided into five parts:
  - i) Lost Time Accidents.
  - ii) Recordable Injuries.
  - iii) First Aid
  - iv) Near Misses.
  - v) Property Damage

It records:

- the date and time of the incident
  - briefly what happened
  - personnel involved
  - extent of injuries to personnel
  - extent of damage to equipment.
- Once those personnel involved in the incident have received adequate medical treatment, or are recovered sufficiently to be questioned as to the cause(s) of the incident, then initial statements should be recorded by the immediate supervisor.
  - Incidents / accidents reportable, or likely to be reportable to Government Agencies (ESDM), must be immediately brought to the attention of the Site Superintendent or deputy.
  - The Paramedic shall record all details on the extent of the injuries received on the SUPREME ENERGY Paramedic Accident Injury Report Form (Form 12.3) on the Government Agency doctor report Form (Surat Keterangan Dokter) (Form 12.4). These completed forms shall be forwarded to the Sr. Site Leader (Manager / Superintendent) and a copy to the SHE Committee.
  - For incidents that are reportable to Government agencies (ESDM), the scene of the accident shall be secured to allow it to remain in an undisturbed state until further notice, except where it constitutes a further safety hazard, then the supervisor in charge of the area must use their discretion in order to protect personnel and equipment.
  - The Sr. Site Leader (Manager / Superintendent) will decide on who shall undertake the Incident Investigation, generally by work groups, the immediate supervisor and the Site SHE Representatives.
  - The investigation shall be recorded on the Incident Investigation Report Form (Form 12.2) including all recommendations including improvements, work practice changes, disciplinary actions, etc.
  - The Incident Investigation Report shall be forwarded to the Site Superintendent and to the SHE Committee for their review.
  - The report shall be presented to the SHE Committee by the Site SHE Representatives.
  - Report recommendations shall be reviewed by the committee and a programme to implement the recommendations developed. This programme will specify tasks, responsibilities and a timeframe for implementing the recommendations.
  - The outcome of these discussions will be recorded in the minutes of the meeting and on the Incident Investigation Report.

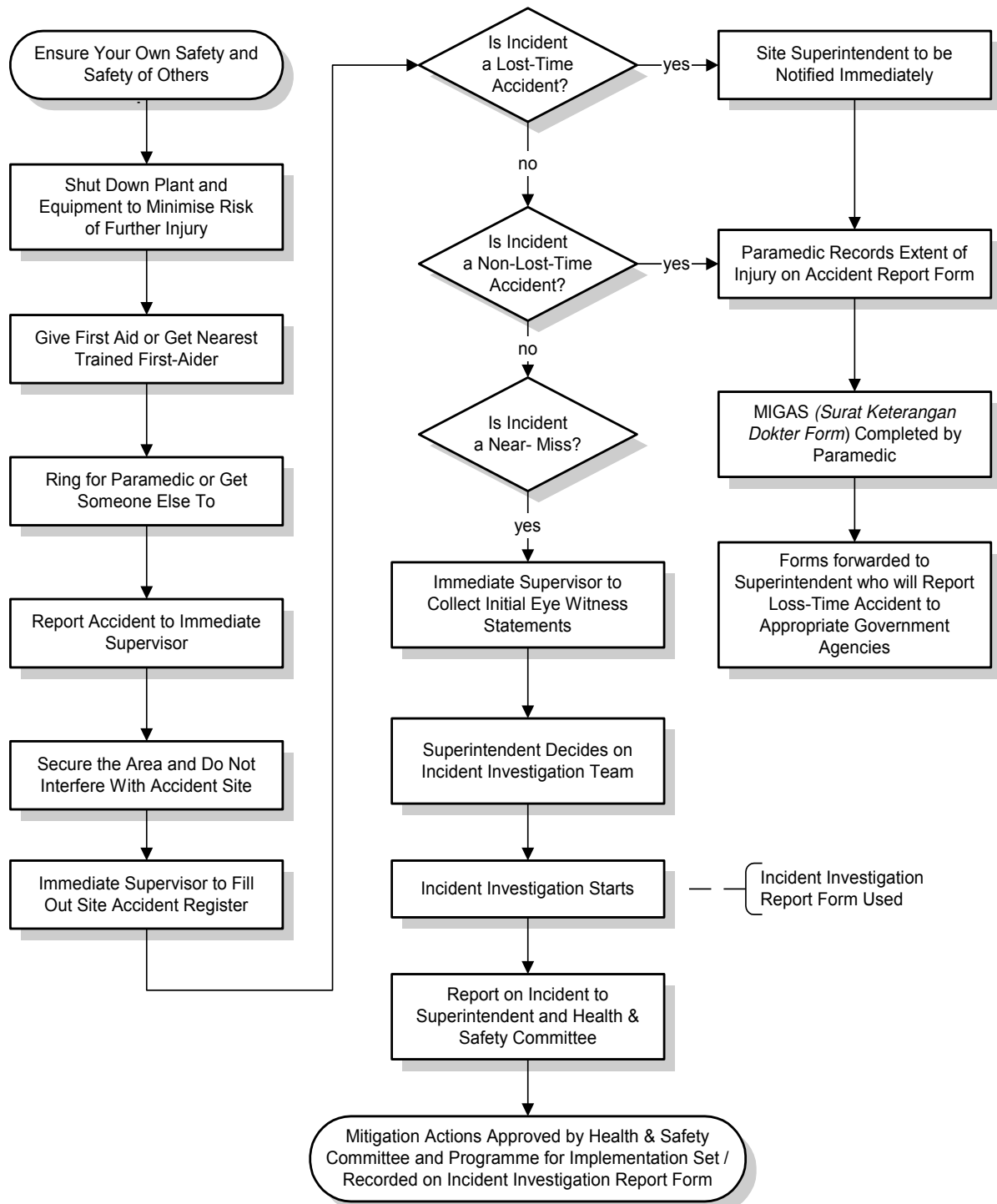


- Progress as to implementing the recommendations will be tracked by the SHE Committee.
- Disciplinary action will be at the sole discretion of the Sr. Site Leader (Manager / Superintendent), in discussion with Corporate Human Resources Manager.
- Within 48-hours the Sr. Site Leader (Manager / Superintendent) will send to Government Agency (ESDM) details of the LTA on the appropriate forms. A copy will be sent to SUPREME ENERGY SHE Manager.
- A copy of the completed LTA investigation shall be forwarded to Government Agency (ESDM) and SUPREME ENERGY SHE Manager

The steps in the Incident / Accident Reporting are summarized in Figure 12.1

**Figure 12.1: Incident / Accident Reporting**

**In The Event Of An Incident The Following Steps Should Be Followed:**



## 12.6 Contractor Incident Reporting

Contractors working under the jurisdiction of SUPREME ENERGY, in addition to their own incident reporting procedure shall:

- report the incident to the Site Superintendent
- ensure the incident is recorded in SUPREME ENERGY' Site Accident Register
- complete the Accident Report Form (12.3) if injury has occurred and the Incident Investigation Report Form (12.2).

The completed reports shall be forwarded to the Site SHE Committee.

## 12.7 Accident Investigation

### 12.7.1 Accident Investigation Responsibilities

The aim of the investigation is to establish the cause of the incident, **not the guilty person**, and to determine whether or not the incident was caused by, or arose from, a significant hazard.

For every incident (LTA, Recordable Injuries, FA or near miss) reported, an incident investigation shall be undertaken and an Incident Investigation Report completed.

The incident investigation shall be carried out by the immediate supervisor in conjunction with the Site SHE Staff. They shall complete the Preliminary Incident Investigation Report (Form 12.2).

### 12.7.2 Points to Consider in the Investigation

Key points to include in the investigation are:

- Date and time of the occurrence
- People, materials, and equipment involved in the incident
- The location of the accident
- The general conditions that prevailed at the time of the incident;
  - the weather
  - road conditions
  - duties being conducted
  - lighting details

- type of safety equipment being used
  - practices being followed, eg Permits-to-Work.
- Describe how the accident occurred; give minute to minute account of what happened.
- List actions taken and by whom, include all emergency details.
- Describe the severity of the injury and the likelihood of the accident happening again.
- Collect statements from witnesses clearly identifying the person making the statement.
- Establish underlying cause(s) of the accident and whether the accident arose from a 'significant hazard'.
- Analyse and evaluate all non-trivial causes:
  - evaluate if the incident is traceable to an identified hazard
  - determine the critical and specific causes.
- Develop and take control measures that may reduce the risk of recurrence:
  - take temporary actions immediately;
  - take permanent actions as soon as possible;
  - consider alternative controls;
  - document all details through a written report.
- Review findings and recommendations:
  - have the report reviewed;
  - decide who should be notified.
- Follow-up:
  - monitor preventive and/or remedial actions;
  - add any new hazards identified to the Hazard Register.
- List remedial actions to prevent a recurrence of the incident recording all recommendations on the form.
- Take photographs and make sketches whenever practicable.

Remember the main tool of the incident investigation is the interview and it is important to ask the right questions.

### 12.7.3 *Witness Statement*

Usually a witness statement is taken, and may be produced in Court or at a legal hearing (whenever applicable). Persons involved in, or witnessing an accident, may be asked for a statement.

Statements must be both 'relevant', that is have direct relationship with the matter in hand, and 'admissible'. There are certain rules that govern if evidence is admissible. Without going into too much detail, it is important to note that hearsay evidence is generally not admissible. That means that a person cannot report what they did not actually see, because the facts obtained are not their own, but gained through conversation with another person, e.g. Rudi said that he had been bitten by a dog, is hearsay as the author did not see a dog bite Rudi.

A statement should clearly identify who is making the statement, usually by providing the full name, occupation and address, and shall be signed and dated by both the person making the statement and a witness.

## 12.8 **Medical Emergency Procedures**

The SUPREME ENERGY Medical Emergency Procedures shall be followed in the event of an unexpected serious illness or injury which needs hospital treatment.

## 12.9 **Death or Serious Injury Notification Procedures**

Death is an unexpected event that may occur because of an accident or an illness. When this occurs, the Human Resource Procedures which cover the notification of nearest relatives, the transfer of the body to relatives, etc. will be followed. These procedures are beyond the requirement of this SHE Procedures which are to prevent injury and death, and to investigate those incidents which could result in death.

Reference should be made to the relevant procedures for notifying relatives of a death or serious injury.

## 12.10 **Government Agency (ESDM) Accident Reports**

Government Agency (ESDM) forms that shall be used to report accidents and accident data to Government Agency (ESDM). Further detail will be inserted into this procedure that currently applied for Geothermal and Power Company.

### Form 12.1: SUPREME ENERGY

#### Incident Register

1. Particulars of Incident

---

---

---

LTA	<input type="checkbox"/>	Recordable Injury	<input type="checkbox"/>	First Aid (FA)	<input type="checkbox"/>
Near Miss	<input type="checkbox"/>	Property Damage	<input type="checkbox"/>		

2. Location of Place of Work

---

---

3. Personal Data of Injured Person:

Name: \_\_\_\_\_ -  
Residential Address: \_\_\_\_\_  
Date of Birth: \_\_\_\_\_ Sex (M/F) \_\_\_\_\_

4. Occupation or Job Title of Injured Person

---

5. Period of Employment by SUPREME ENERGY of Injured Person:

1st week	<input type="checkbox"/>	1st month	<input type="checkbox"/>	1-6 months	<input type="checkbox"/>	6 months	<input type="checkbox"/>
1-5 years	<input type="checkbox"/>	over 5 years	<input type="checkbox"/>	non-personnel	<input type="checkbox"/>		

6. Treatment of Injury:

None	<input type="checkbox"/>	First Aid Only	<input type="checkbox"/>
Doctor but no hospitalization	<input type="checkbox"/>	Hospitalization	<input type="checkbox"/>

7. Time and Date of Incident

Time \_\_\_\_\_ am/pm  
Date \_\_\_\_\_

8. Mechanism of Incident
- |                    |                          |                                   |                          |
|--------------------|--------------------------|-----------------------------------|--------------------------|
| Fall, trip or slip | <input type="checkbox"/> | Hitting objects with part of body | <input type="checkbox"/> |
| Sound or pressure  | <input type="checkbox"/> | Being hit by moving objects       | <input type="checkbox"/> |
| Biological factors | <input type="checkbox"/> | Chemicals or other substances     | <input type="checkbox"/> |
| Mental stress      | <input type="checkbox"/> | Near miss                         | <input type="checkbox"/> |
9. Agent of Incident
- |                                                                   |                          |
|-------------------------------------------------------------------|--------------------------|
| Machinery or (mainly) fixed plant                                 | <input type="checkbox"/> |
| Mobile plant or transport                                         | <input type="checkbox"/> |
| Powered equipment, tool, or appliance                             | <input type="checkbox"/> |
| Non-powered handtool, appliance or equipment                      | <input type="checkbox"/> |
| Chemical or chemical product                                      | <input type="checkbox"/> |
| Material or substance                                             | <input type="checkbox"/> |
| Environmental exposure (e.g. dust, gas)                           | <input type="checkbox"/> |
| Animal, human or biological agency (other than bacteria or virus) | <input type="checkbox"/> |
10. Body Part:
- |            |                          |                    |                          |                          |                          |            |                          |
|------------|--------------------------|--------------------|--------------------------|--------------------------|--------------------------|------------|--------------------------|
| Head       | <input type="checkbox"/> | Neck               | <input type="checkbox"/> | Trunk                    | <input type="checkbox"/> | Upper Limb | <input type="checkbox"/> |
| Lower Limb | <input type="checkbox"/> | Multiple locations | <input type="checkbox"/> | Systemic internal organs |                          |            | <input type="checkbox"/> |
11. Nature of Injury or Disease
- |                          |                          |                                  |                          |
|--------------------------|--------------------------|----------------------------------|--------------------------|
| Fracture of spine        | <input type="checkbox"/> | Puncture wound                   | <input type="checkbox"/> |
| Other fracture           | <input type="checkbox"/> | Poisoning or toxic effects       | <input type="checkbox"/> |
| Dislocation              | <input type="checkbox"/> | Multiple injuries                | <input type="checkbox"/> |
| Sprain or strain         | <input type="checkbox"/> | Damage to artificial aid         | <input type="checkbox"/> |
| Head injury              | <input type="checkbox"/> | Disease, nervous system          | <input type="checkbox"/> |
| Internal injury of trunk | <input type="checkbox"/> | Disease, musculoskeletal system  | <input type="checkbox"/> |
| Amputation, inc eye      | <input type="checkbox"/> | Disease, skin                    | <input type="checkbox"/> |
| Open wound               | <input type="checkbox"/> | Disease, digestive system        | <input type="checkbox"/> |
| Superficial injury       | <input type="checkbox"/> | Disease, infectious or parasitic | <input type="checkbox"/> |
| Bruising or crushing     | <input type="checkbox"/> | Disease, respiratory system      | <input type="checkbox"/> |
| Foreign body             | <input type="checkbox"/> | Disease, circulatory system      | <input type="checkbox"/> |
| Burns                    | <input type="checkbox"/> | Tumour (malignant or benign)     | <input type="checkbox"/> |
| Nerves or spinal cord    | <input type="checkbox"/> | Mental disorder                  | <input type="checkbox"/> |

12. Where and How did the Incident Happen?  
(If not enough room attach separate sheet(s))

---



---

13. Has an Investigation been Carried Out? Yes/No  
Was a Significant Hazard Involved Yes/No  
Employer or employer's representative (delete which is not applicable)

Signature and Date: \_\_\_\_\_

Name and Position: \_\_\_\_\_



## Form 12.2: SUPREME ENERGY

### Preliminary Incident Investigation Report

1 SUPREME ENERGY SITE	2 DEPARTMENT		
3 EXACT LOCATION	4 DATE OF OCCURRENCE	5 TIME AM PM	6 DATE REPORTED

LOST-TIME ACCIDENT		NON-LOST-TIME ACCIDENT		NEAR MISS INCIDENT	
7 INJURED'S NAME		13 INJURED'S NAME		19 PERSON REPORTING INCIDENT	
8 OCCUPATION	9 PART OF BODY AFFECTED	14 OCCUPATION	15 PART OF BODY AFFECTED	20 OCCUPATION	21 COST (IF APPLICABLE) \$
10 NATURE OF INJURY/ILLNESS		16 NATURE OF INJURY/ILLNESS		22 NATURE OF INCIDENT	
11 OBJECT/EQUIPMENT/SUBSTANCE/INFLECTING INJURY/ILLNESS		17 OBJECT/EQUIPMENT/SUBSTANCE/INFLECTING INJURY/ILLNESS		23 OBJECT/EQUIPMENT/SUBSTANCE/RELATED	
12 PERSON WITH MOST CONTROL OF ITEM 11		18 PERSON WITH MOST CONTROL OF ITEM 17		24 PERSON WITH MOST CONTROL OF ITEM 23	

25 DESCRIBE CLEARLY HOW THE INCIDENT OCCURRED ( Continue on other sheets of paper as required)

26 WHAT ACTS, FAILURES TO ACT AND/OR CONDITIONS CONTRIBUTED MOST DIRECTLY TO THIS INCIDENT?

27 WHAT ARE THE BASIC OR FUNDAMENTAL REASONS FOR THE EXISTENCE OF THESE ACTS AND/OR CONDITIONS?

<b>EVALUATION: 28 SEVERITY POTENTIAL</b>  MAJOR    SERIOUS    MINOR	<b>29 PROBABLE RECURRENCE RATE</b>  FREQUENCY    OCCASIONAL    RARE
---------------------------------------------------------------------------	---------------------------------------------------------------------------

30 WHAT ACTION HAS BEEN, OR WILL BE, TAKEN TO PREVENT RECURRENCE? NUMBER ALL ITEMS IN SEQUENCE ( Attach Additional Pages as Required)

12 CIRCLE NUMBER AND GIVE DATE OF INTERMEDIATE ACTION. CROSS OUT NUMBER (AND GIVE DATE) WHEN COMPLETED

INTERMEDIATE    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ 8 \_\_\_\_\_

COMPLETED    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ 8 \_\_\_\_\_

32 INVESTIGATED BY	33 DATE	34 REVIEWED BY	35 DATE
--------------------	---------	----------------	---------

The revision and distribution of this SHE Procedures is strictly controlled and copies shall only be made upon the authority of SUPREME ENERGY

To: SUPREME ENERGY  
Attn:  
From:  
Subject: Medical Accident Report  
Copy: SUPREME ENERGY Safety Group

**Form 12.3**

Ref No.:

**Paramedic Accident Injury Report**

Name of Injured: \_\_\_\_\_

Date of Birth \_\_\_\_\_

Company/Position: \_\_\_\_\_

Date of Accident \_\_\_\_\_

Time of Accident: \_\_\_\_\_

Location of Accident: \_\_\_\_\_

Type of Injury: \_\_\_\_\_

Cause of Injury: \_\_\_\_\_

Treatment: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Recommendation:	1. Return to Work	Yes/No
	2. No of Rest Days	_____
	3. Further Treatment	Yes/No

Report by: \_\_\_\_\_

**Paramedic**

**(Lampiran Bentuk III)**  
**TENAGA KERJA YANG MENDAPAT KECELAKAAN TAMBANG KARENA HUBUNGAN KERJA**

Dokter yang harus melaporkan keadaan korban dalam 2 (dua) hari sesudah diperiksa

Keterangan tentang luka-lukanya.  
Sebutkan bagian badan yang cedera dengan sifat lukanya.  
(Tunjukkan juga pada gambar).

Kehilangan hari kerja.  
Akibat lukanya apakah yang bersangkutan diperlukan istirahat untuk dapat melaksanakan kembali pekerjaannya. (Sebutkan kira-kira berapa hari).

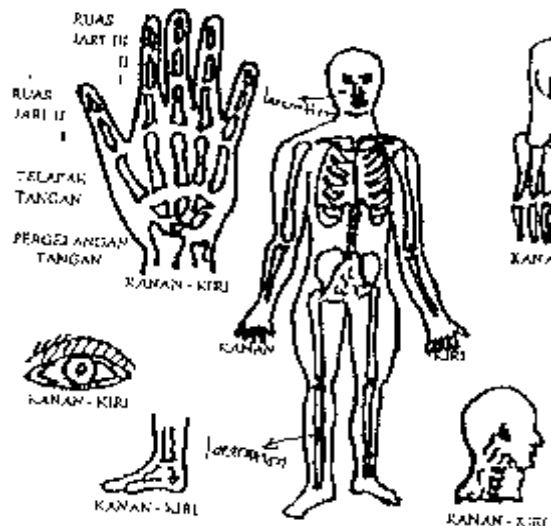
Keterangan lain-lain.

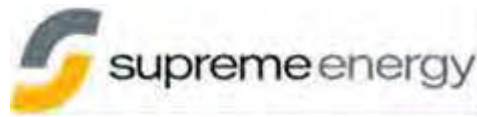
Tanggal pemeriksaan : ..... 20 .....

Diperiksa oleh Dokter : .....

Tanda tangan : .....

Alamat : .....





## **Chapter 2: Section 13 : Confined Space Entry**

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## 21.

### 21. Confined Space

#### 21.1 Introduction

This section covers the precautions necessary for safely entering and working in confined spaces. It is the intention of SUPREME ENERGY to minimize the need for personnel to enter confined spaces through the use of careful job planning and good design.

This procedure does not apply to entering atmospheres Immediately Dangerous to Life and Health (IDLH), including asphyxiating atmospheres containing inert gases. Until proved otherwise, however, untested confined spaces should be considered as being IDLH. Entries involving IDLH atmospheres require local management's authorization to initiate special entry procedures.

Note that an atmosphere containing a gas concentration exceeding the recognized exposure limit is not automatically considered IDLH.

Related requirements and safe work practices for ensuring general occupational health and safety (for example, welding safety, safe use and care of respiratory protective equipment, and gas testing) are covered in more detail in other sections of this procedure.

#### 21.2 Definitions

##### *Attendant*

An individual stationed outside a confined space, who monitors the authorized worker to enter a confined space and assists in maintaining their safety.

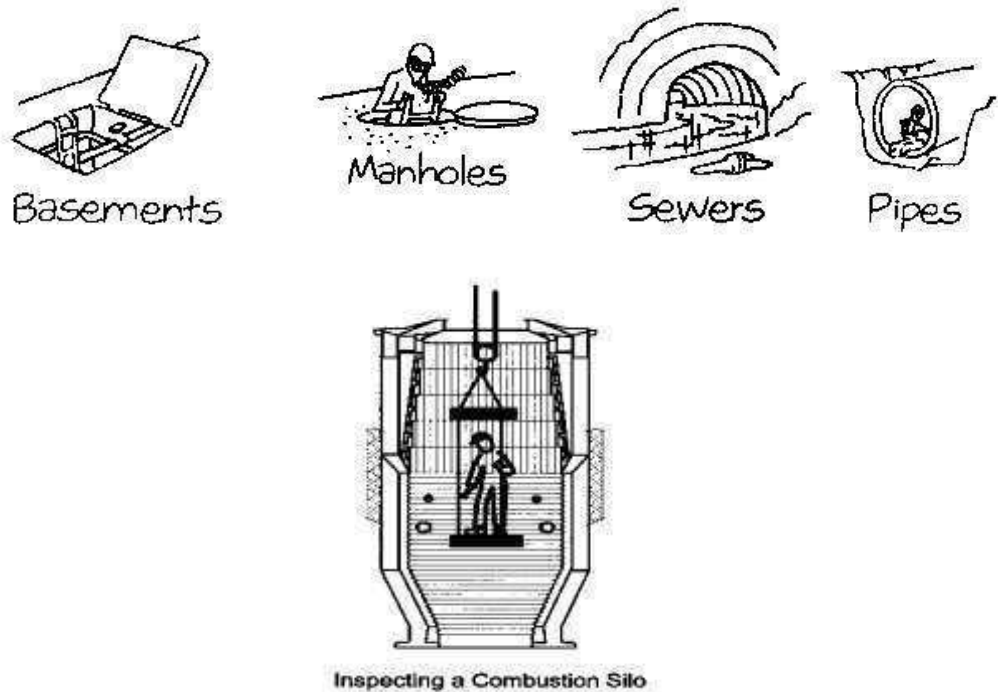
##### *Confined Space*

Any enclosed or partially enclosed space, either above or below ground, where there is some risk of reduced oxygen supply or accumulation of toxic, flammable or explosive materials, or where means of entry or exit are limited.

Confined spaces may include, but are not limited to:

- storage tanks, tank cars, process vessels, bio-filters, pressure vessels, silos and other tank like compartments
- open topped spaces such as pits, sumps, cellars or booths
- pipes, sewers, shaft and sumps

- cargo, ballast or void spaces of marine vessels.



**Figure 21.1: Examples of Confined Spaces**

#### *Recognized Exposure Limit (REL)*

An exposure standard for chemical or physical hazards is defined as one that is:

- Adopted by a government agency with jurisdiction over the work operation
- Recommended by a consensus or scientific organization (such as the American Conference of Governmental Industrial Hygienists, ACGIH), based on sound scientific judgment

#### *Entry*

Entry into a confined space should be classified as either general or special.

#### General Entry

An entry should be considered general when testing establishes that:

- It contains neither significant hazards nor the risk of developing them.
- Ventilation is adequate.
- Oxygen levels are between 19.5 percent and 21.5 percent.
- Toxic materials (such as  $H_2S$ , chlorine, ammonia, benzene) do not exceed RELs.
- Flammable gases or vapors do not exceed 10 percent of the lower explosive limit (LEL).

- Other air contaminants which may be present have warning properties (odor; taste; eye, nose, or throat irritation; etc.) below the REL.

#### Special Entry

An entry should be considered special when testing establishes that:

- A significant hazard exists or has the potential of developing but at levels below IDLH.
- Ventilation is insufficient to remove dangerous air contamination.
- Flammable gases or vapors are present or anticipated in excess of 10 percent of the Lower Explosive Level (LEL).

*Note: Entry is prohibited above 20 percent of the LEL.*

- Oxygen deficiency (<19.5 percent) or enrichment (>21.5 percent) exists or may develop.

*Note: Entry is prohibited below 16 percent and above 21.5 percent.*

- Toxic materials such as H<sub>2</sub>S, chlorine, benzene, carbon monoxide, ammonia are present or may become present in concentrations greater than the REL but less than the IDLH level.

#### *Atmospheres*

##### Hazardous

A hazardous atmosphere is one that may cause a person injury or illness due to the presence of one or more of the following:

- Flammable or combustible vapor
- Toxic substances in concentrations exceeding safe limits
- An oxygen deficiency or enrichment
- Ionizing radiation
- Heat
- Noise

##### Immediately Dangerous to Life or Health (IDLH)

IDLH is any condition that would

- Pose an immediate or a delayed threat to life
- Cause irreversibly adverse health effects
- Interfere with an individual's ability to escape the IDLH area unaided

##### Other Atmospheres

For guidelines about atmospheres not covered here, refer to the applicable material safety data sheet (MSDS); TLV booklet; or contact local SHE groups.



#### *Flammability Range*

Gives a measure of the proportion of flammable vapor to air and/or oxygen necessary for combustion (explosion) to be possible. The limits of flammability (or explosive) range is the range between the lower explosive limit (LEL) and upper explosive limit (UEL), (% by volume) in the form of an explosive / flammable mixture.

#### *Gas Test Certificate*

A signed statement by an authorized gas tester who is experienced and qualified in gas monitoring (toxic, flammable and oxygen) that tests have been undertaken within the confined space to be entered.

#### *Isolation/Clearance*

The process by which the confined space and systems within the confined space are removed from services, and completely protected against the inadvertent release of energy by placing them in a neutral mechanical / electrical state. (Refer to work control section of this procedure.)

#### *Purging/Ventilation*

The method by which contaminants are displaced from the confined space.

#### *Safe Oxygen Level*

A minimum oxygen content of 19.5% by volume and a maximum oxygen content of no greater than 21.5% by volume are the normally accepted limits. However these figures do not take account the effects of altitude. The lower limit for oxygen is set by physiological effects on the human body. It is the absolute oxygen level that is important and the true lower limit must be expressed as a partial pressure.

The accepted lower level of oxygen before alertness is affected is 183mbar. It can be seen from the table overleaf that altitude has a marked effect on the actual oxygen level if percentage (%) volume readings only are taken into account. To ensure a suitable margin for instrument inaccuracies, a minimum partial pressure of 195mbar shall be used where possible. Above 600m altitude, the minimum safe oxygen level in a confined space shall be deemed to be the normal ambient level reading taken in fresh air.

**Table 21.1: Approximate effect of altitude on actual oxygen level**

Approximate effect of altitude on partial pressure of oxygen (Read down column to find partial pressure of O <sub>2</sub> for a given percentage)						
Height (ft.)	Height (m)	Standard Atmospheric Pressure (mbar)	Partial Pressure of Oxygen mbar			
			20.93% O <sub>2</sub> by vol.	20% O <sub>2</sub> by vol.	19.50% O <sub>2</sub> by vol.	19% O <sub>2</sub> by vol.
0	0	1013	212	203	198	192
1000	305	977	204	195	191	186
2000	610	942	197	188	184	179
3000	914	908	190	182	177	173
4000	1219	875	183	175	171	166
5000	1524	843	176	169	164	160
6000	1829	812	170	162	158	154
7000	2134	781	163	156	152	148
8000	2438	752	157	150	147	143
9000	2743	724	152	145	141	138
10000	3048	697	146	139	136	132

## 21.3 Responsibilities

### 21.3.1 General

Entry into a confined space is part of the SUPREME ENERGY' Permit-to-Work system and local management shall ensure that personnel entering confined spaces are trained in the entry permit practices stated in this system.

### 21.3.2 Entrants

Entrants shall

- complete the confined space training course to ensure competency
- use personal protective equipment as directed by the Entry Permit
- verify that atmospheric tests have been conducted and the results are known
- enter the confined space only after ensuring all the precautions listed on the Entry Permit have been completed

- sign the Entry Permit to verify that requirements of the permit have been reviewed and followed
- alert the attendant and exit confined space whenever:
  - any warning sign or symptoms of exposure to a dangerous situation is recognized
  - a prohibited condition is noted.
- exit confined space if attendant orders an evacuation.

#### 21.3.3 *Attendants*

The duties of the attendant(s) or standby person(s) outside the confined space are specifically related to those inside the enclosed space and include:

- checking person(s) into, and out of, the confined space
- being alert to all situations which may adversely affect those inside, including the danger of leaving the space unattended
- maintaining continuous contact (visually or verbally) with personnel inside
- summoning help if anyone inside gets into difficulties, e.g. via phone or radio communications
- being aware of possible behavioral effects of exposure to low oxygen or toxic chemicals
- ordering entrants to evacuate confined space if:
  - a condition is detected that the Entry Permit forbids
  - symptoms or behavioral effects of exposure are detected
  - a situation that could endanger the entrants is detected inside or outside the confined space.
- warning unauthorized person(s) to keep away from the confined space
- trained in first aid and cardiac pulmonary resuscitation.

#### 21.3.4 *Supervisors*

For each entry, a supervisor requesting that work be carried out in a confined space should assure that personnel involved with the entry are trained adequately and competent in:

- Safe entry procedures
- Rescue methods

- Testing of space
- Safety requirements

Supervisors should assure that:

- all applicable, workplace, hazard evaluations have been identified on the permit and these hazards should include but are not limited to:
  - Oxygen
  - Toxic materials such as H<sub>2</sub>S, carbon monoxide, ammonia
  - Physical agents such as heat, noise, ionizing radiation
  - Rotating equipment
  - Flammable gases and vapor tests
- All permits are issued properly and ensure entrants and attendant(s) read the Entry Permit and sign it
- post the approved Entry Permit in a conspicuous location near the entrance of the confined space. Use the Entry Permit to ensure necessary safety precautions have been taken.
- verify that the confined space and equipment within the confined space have been appropriately isolated and locked-out/tagged-out in accordance with the General Work Permit (see Section ...: Permit To Work System).
- atmospheric tests have been conducted and that the results meet the acceptable environmental standards
- verifying the required alarms, ventilation equipment, monitoring equipment, communications equipment, and rescue equipment are present and operational
- entry operations are consistent with the terms of the Entry Permit and that acceptable environmental conditions are present
- sign the Entry Permit, thereby affirming that all the safety measures listed on the Entry Permit have been taken and that they allow for safe entry into the confined space.
- All personnel involved are provided with proper protective and safety equipment as listed on the entry permit
- the standby person/attendant remains outside of the confined space at all times during the entry operations
- action taken to cancel the Entry Permit and terminate entry if acceptable environmental conditions are not present or if the conditions or work procedures described on the Entry Permit change.

- take the necessary measures to conclude the entry operation, such as closing off the confined space and cancelling the Entry Permit once the work inside the confined space has been completed.

## 21.4 Confined Space Hazards

Before entering confined spaces, the following particular hazards need to be considered and safeguarded against:

- oxygen deficiency/enrichment
- flammability, fire and explosion
- chemical hazards
- physical hazards
- other hazards such as noise or inert gases.

### 21.4.1 Oxygen Deficiency/Enrichment

Oxygen deficiency in the air results in loss of alertness, light headedness, degraded performance and asphyxiation. Typical causes of low oxygen levels are the presence of CO<sub>2</sub> or other gases replacing oxygen, or the use of oxygen by personnel working in a confined and poorly ventilated space. It is of note that persons suffering from lack of oxygen will not be aware of the onset of problems.

Other common causes of reduced oxygen levels are slow oxidation of metals (rusting), combustion, welding, and the displacement of oxygen by other gases (inerting with nitrogen or CO<sub>2</sub>) and the use of inert gas welding with inadequate ventilation.



**Figure 21.2: Oxygen Deficiency**

Since the rate of combustion is closely dependent upon the concentration of oxygen present, an enriched oxygen atmosphere (greater than 21.5% by volume) becomes a hazard. (Note: at 22% O<sub>2</sub> spontaneous ignition can occur in some situations.)

There are four main causes which may result in oxygen enrichment:

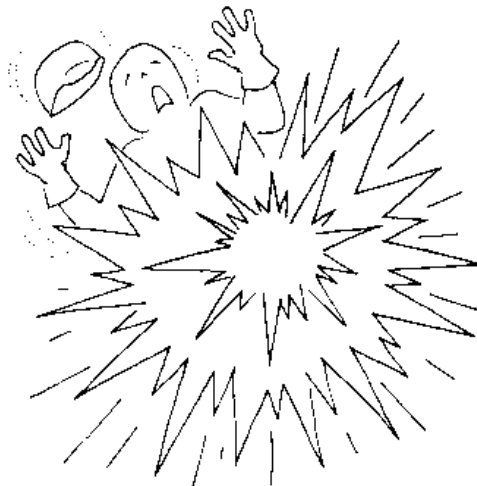
- i) Leaks from oxygen containing equipment
- ii) Inadvertent use of oxygen instead of air or inert gas
- iii) Deliberate addition of oxygen
- iv) Oxygen generation from chemical reactions.

The most common oxygen containing equipment is that used in cutting operations. Storage cylinders, gas hoses, and valves must be handled with care and should be inspected daily for damage.

Gas cylinders must not be taken into confined spaces. Cutting and welding equipment must always be removed from confined spaces during breaks and at the end of the working day.

#### 21.4.2 *Flammability, Fire and Explosion*

Fires and explosions can result from accumulations of flammable vapors and/or dust in the presence of a source of ignition.



**Figure 21.3: Explosion or Fire Hazards**

Mixtures of flammable vapors and air can be ignited only if the hydrocarbon to air ratio is within flammable range, i.e. between the Lower Explosive Limit (LEL) and the Upper Explosive Limit (UEL). LEL and UEL are identical to the terms, Lower and Upper Flammable Limits (LFL, UFL) which are defined in section 21.2.

Explosive/flammable mixtures may develop typically during the emptying of vessels or tanks and the opening of confined spaces, due to air entering and mixing with the residual gases.

A source of ignition can be any heat source having enough energy to ignite the flammable gas/air mixture or to raise the temperature above the auto-ignition temperature. In addition to naked flames, other possible sources of ignition include:

- sparks or arcs produced by electrical equipment, lightning and electrostatic charges
- grinding sparks
- cigarettes
- hot surfaces raising the temperature above the auto-ignition temperature (e.g. hot pipes, hot exhausts)
- thermic reactions from aluminum, or other alloy tools striking against rusted iron or steel
- heat of friction during drilling or other non-flame cutting operation
- pyrophoric materials (e.g. iron sulphide)
- any other highly reactive material capable of producing sufficient heat for combustion (e.g. strong oxidizing substances such as hydrogen peroxide, or chemicals undergoing self-accelerating exothermic reactions when a critical temperature is reached, such as ethylene oxide).

**Note: On no account should a confined space be entered if the explosive meter reading is equal to or greater than 5% LEL (LFL).**

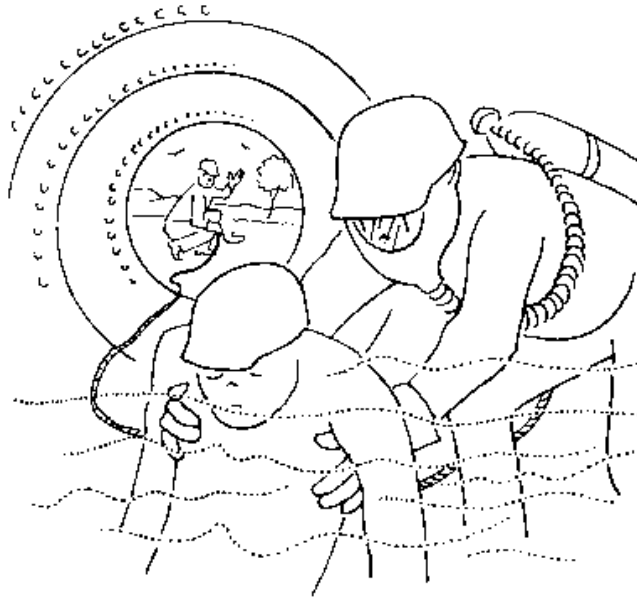
**Hot work must not be undertaken if the explosive meter reading exceeds 1% LEL (LFL).**

#### 21.4.3 Chemical Hazards

Chemical substances can be toxic. These substances can cause injury, acute or long-latency illness, or death, depending on the concentration and duration of exposure and the characteristics of the substances.



Operations previously carried out in a confined space may have produced toxic gases or vapor which still remains. Some toxic gases are particularly dangerous because they cannot be detected by sight or smell.



**Figure 21.4: Toxic Gases or Vapors**

A toxic substance can cause harm by inhalation, ingestion, skin or eye contact. It can affect the tissue at the point of contact, or organs elsewhere in the body. Corrosives destroy the tissue and may leave permanent injury or scars.

Toxicity information (e.g. Material Safety Data Sheets) about specific substances should be sought from the supplier of materials, and local and state regulatory bodies. They are to be made available on site.

The Occupational Exposure Standards (OES) referred to in this document are those published annually by the American Conference of Government Industrial Hygienists. Unless there are different national/local requirements, it is recommended that a level not greater than 50% of the relevant published occupational exposure standard is adopted as a safe limit. This additional safety margin is recommended because readings are based on regular spot sampling.

Typical toxic substances are carbon monoxide, hydrogen sulphide, hydrocarbon gases, sulfuric acid, ammonia, chlorine, biocides, caustic substances such as lye (sodium hydroxide), solvents and refrigerants

Contaminated personal protective equipment forms a hazard that should not be neglected.

#### 21.4.4 *Physical Hazards*

Physical hazards may exist in confined spaces and include:

- structural failure, e.g. the internal floating cover or roof may not support a worker's weight
- falling tools and materials
- improper shoring, e.g. cave-ins may occur while personnel are working in trenches or excavated areas
- failure to positively isolate confined spaces, e.g. blank-off or break pipe connections
- failure to disconnect or make inoperative electrical or mechanical equipment
- migration of gases from adjacent places, e.g. sumps
- restricted working space and obstructions
- slippery surfaces
- inadequate lighting
- inadequate or faulty personal protective equipment
- noise levels in excess of site standards, e.g. hammering in confined spaces
- temperature extremes (high or low temperatures)
- sharp edges
- difficult access.

#### 21.4.5 *Other Hazards*

These include:

- poor visibility, e.g. due to misty or dusty conditions
- persons being trapped in the event of an accident or loss of consciousness
- live electrical contacts (circuits) with the risk of electrocution
- high energy systems
- odors
- un-drained fluids
- unrelated medical conditions leading to incapacity.

## **21.5 Practices for Entry into a Confined Spaces**

### **21.5.1 Entry Permit**

Conditions necessary for safe work in or around a confined space will vary greatly depending on its location, configuration and use.

Entry into a confined space is controlled via the SUPREME ENERGY confined space entry permit (for more details, refer to Section ...: Permit To Work System). As part of this system a specific work permit must be completed which authorizes entry into the confined space and records that the necessary precautions have been actioned?

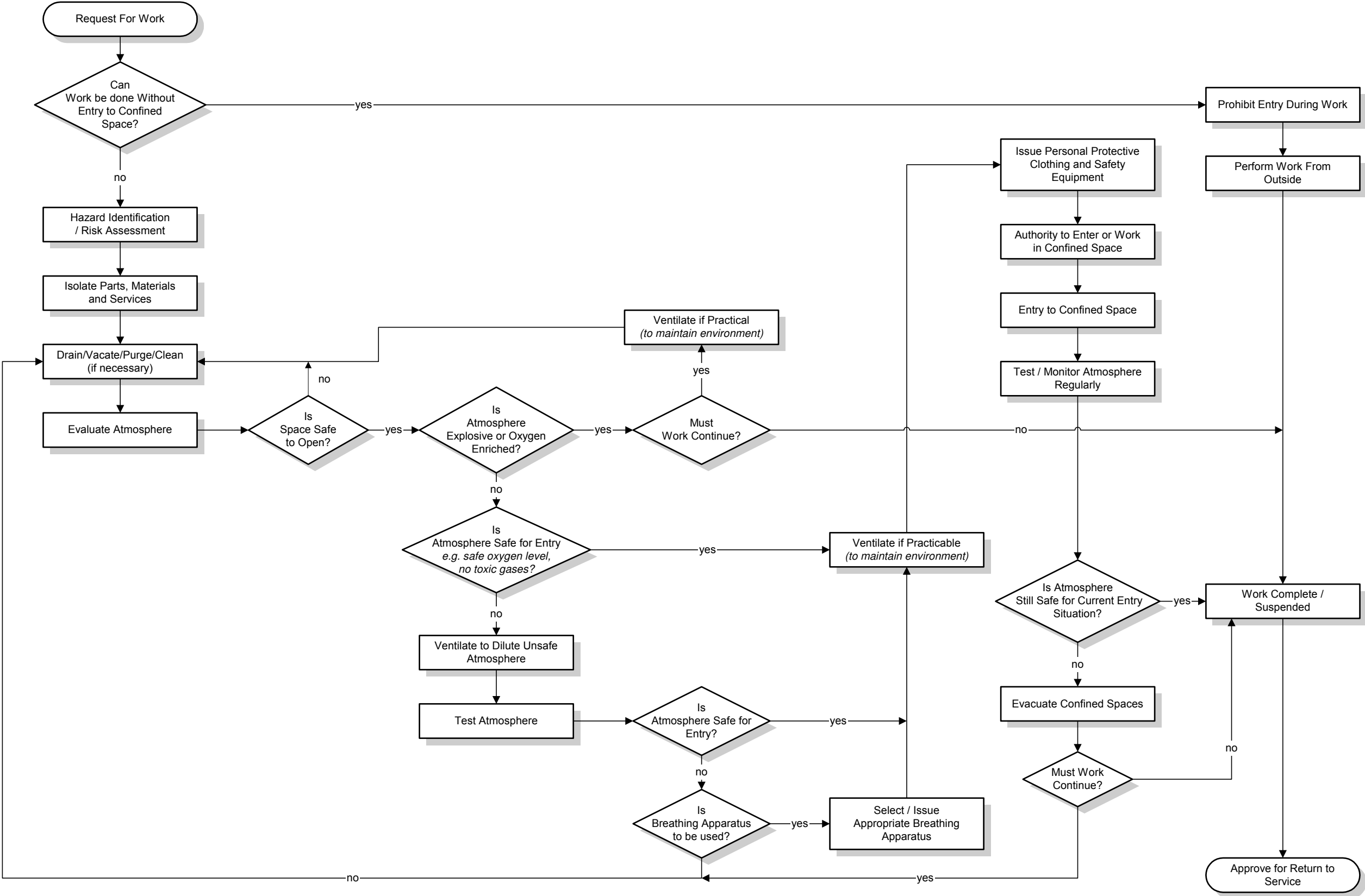
The entry permit:

- identifies the job and the associated hazards
- indicates the date and duration that the permit is valid
- links the entry to a specific General Work Permit (GWP)
- bears the appropriate signatures authorizing entry and showing that the safe work practices have been followed.

A copy of the completed entry permit shall be displayed in a prominent position outside the entry point to the confined space. The original will also be held with the GWP.

A flow chart showing the steps to be followed in filling out an entry permit is presented in Figure 21.5.

Figure 21.5: Confined Space Entry Process



### 21.5.2 *Prerequisites for Entry*

Prior to personnel entering the confined space the provisions listed below shall be met. (Refer also see 21.5.3)

- The Permit Applicant has verified that entry into the confined space is necessary. (See Section ...: Permit To Work System for definition of permit applicant).
- The potential hazards of the confined space and work to be performed in the confined space have been identified, assessed and recorded on the Entry Permit.
- All persons involved in the confined space entry (entrants, attendants, standby) are trained in these procedures, that training is verified, and they have been briefed.
- A Lock-out/Tag-out is in place as required by the General Work Permit. This should ensure that:
  - i.) the confined space is isolated from potential dangers by blinding, disconnecting and blanking or ties connected to the space; and
  - ii.) all electrical equipment in the confined space has been de-energized and locked/tagged out.
  - iii.) SUPREME ENERGY Lock-out/Tag-out practices shall be followed. Personnel shall confirm Lock-out /Tag-out is properly enforced.
- All ignition sources are removed if there are flammable or combustible materials in the vicinity of the work area.

#### 21.5.2.1 *Atmospheric Testing (Gas Test)*

- The atmosphere both in and around the confined space must be tested before entry to determine if entry is permissible.
- Gas test results are to be entered on the Gas Test Certificate Form (See "Atmospheric Testing Certificate" Form - Section...: Permit To Work System) and posted at the entry point to the confined space (see Check List at 21.8).
- The initial tests for flammable gases, toxic gases, and oxygen deficiency should be made from outside the confined space, using a long probe or tube extension.

- Gas testing should be carried out only by authorized personnel who have been trained in the use of the equipment and who can interpret the results correctly.
- The confined space may be deficient in oxygen. Check the air with an oxygen meter. If oxygen concentration is outside the safe range **DO NOT ENTER UNDER ANY CIRCUMSTANCES** without wearing an external air-supplied respirator or self-contained breathing apparatus. (Canister-respirators must not be worn).
- If oxygen level is within the safe range it is permissible to enter but, the atmosphere should be continuously monitored while in the confined space.
- Before entering, also test that the confined space does not contain flammable vapors with a flammable gas or explosive meter. These vapors may not be picked up as a reduced oxygen level. Continuously monitor for flammable vapors while in the confined space if liquid residues are present.
- On no account should a confined space be entered if the explosive meter reading is equal to or greater than 5% LEL. Between a reading of 1% to 5% of LEL self-contained breathing apparatus (SCBA) will be required to be worn by those entering the confined space.
- Before entering the confined space, test for the presence of toxic gases (e.g. hydrogen sulphide) using personal detectors and/or continuous monitors.
- On no account should a confined space be entered when the level is within 50% of the Occupational Exposure Standard (TLV-TWA) for that containment without appropriate respiratory protective equipment being worn. (Refer to ACGIH publication on Threshold Limit Values and Biological Exposure Indices.)

Gas tests must be carried out in such a way that the result obtained is representative of the condition of the **entire** space paying particular attention to locations where toxic or flammable gases may accumulate e.g., sumps.

It is essential that all testing equipment used is:

- suitable for the test required
- of approved type, e.g. intrinsically safe
- correctly maintained and calibrated
- frequently checked against standard samples.

The results shall be recorded on the entry permit, but a separate written record must be kept of all test results.

Monitoring should be repeated at regular intervals as required by the entry permit while work is in progress and always after a work break, especially prior to re-entering the work area. The use of continuous monitoring equipment may be considered, but care should be taken in its positioning.

#### 21.5.2.2 *Ventilation*

- If necessary, the confined space should be purged continuously or force ventilated for some period prior to entering. The Entry Supervisor shall verify by signing the entry permit that this task has been completed.
- Atmospheric tests should be repeated and the results recorded (after purging/ventilating).
- Ventilation of the space may be continuous in some situations.
- Never attempt to 'sweeten' air that is deficient in oxygen by introducing pure oxygen from a cylinder.

#### 21.5.2.3 *Safety Equipment*

- A self-contained breathing apparatus escape set (ELSA) should be carried by each person entering the confined space.
- Each person entering the confined space should wear a safety harness. A lifeline shall be available by the entry point.
- Personal monitors for gas and/or flammability shall be worn by persons entering confined spaces.

NOTE: The Entry Supervisor is to ensure that all equipment to be taken into the confined space is suitable (electrical equipment connected to earth leakage breakers, etc.).

#### 21.5.3 *Prior to entry*

- An observer (attendant) has been appointed and stationed outside the confined space.
- The attendant has verified that all communications equipment is present and operational.



- The attendant has verified that rescue equipment is present and operational.
- The Entry Supervisor has verified on the entry permit, that all required ventilation equipment, monitoring equipment, communication equipment and rescue equipment is present and operational.
- Personal protection equipment has been inspected by the entrants.
- The standby person has been instructed by the Entry Supervisor to remain outside the confined space at all times during entry operation.
- The calibration date on monitoring equipment has been checked and verified by the Gas Tester.
- The general work area is marked off with hazard tape or temporary barriers to prevent unauthorized access.
- The authorized entrants, attendants and Entry Supervisor have signed the Entry Permit to confirm that the requirements of the Entry Permit have been followed to allow for safe entry.
- The attendant is positioned outside the confined space and records the time and date of those authorized persons who enter and exit the confined space.
- The Entry Supervisor posts the Entry Permit in a conspicuous location close to the entrance of the confined space.

The Entry Supervisor is responsible for ensuring that all the requirements specified on the Entry Permit have been followed prior to entry.

If the conditions or work conditions described on the Master Permit-to-Work or Entry Permit change, the existing Entry Permit is no longer valid and a new Entry Permit shall be completed and approved.

#### 21.5.4 *Entry into Gas-Free Spaces*

Immediately after the authorized entrant has entered the confined space, the following action shall be followed:

- Communications between the entrant and attendant are to be tested to confirm effectiveness, e.g. voice, radio, etc.

- Throughout the duration of the Entry Permit the requirements listed below should be met.
- Regular gas tests will be carried out to check atmosphere conditions at intervals specified on the Entry Permit.
- The gas test results will be recorded on the Entry Permit.
- Continuous ventilation of the confined space shall be monitored.
- Communications between the entrant and attendant shall be maintained to ensure the safety of entrant.

If any of the conditions specified on the Entry Permit changes or the nature of work in the confined space changes, the entrants must exit the confined space and a new Entry Permit completed and approved prior to re-entering.

#### 21.5.5 *Entry into Non-Gas Free Spaces*

- When every effort has failed to gas-free the confined space as specified in Section 21.5.2, entry may still be permitted subject to very stringent precautions.
- Entry to a space with the following oxygen and explosive meter readings is permitted only with an appropriate self-contained or compressed air line-fed breathing apparatus:
  - oxygen content: out of safe range
  - explosive meter reading: greater than 1% but not more than 5% of LEL
  - toxic gas concentration exceeds 50% of TLV (H<sub>2</sub>S, etc.).
- Details of the gas test(s) should be entered on the Entry Permit and Gas Test Certificate.
- Continuous gas testing is required while entrants are in the confined space to ensure there are not significant changes in atmospheric conditions.
- Persons must wear air-supplied breathing apparatus and a lifeline/guideline. Air-purifying respirators cannot be used.
- A suitable number of attendants must be on duty. Some of whom shall be fitted with the appropriate equipment (SCBA) and so be effectively prepared to undertake an immediate rescue if necessary.

- In certain circumstances, such as work inside spheres or tall columns, it may be necessary to use a safety harness in conjunction with a special winch or pulley, or additional manpower, to ensure prompt response in an emergency requiring the removal of person(s) from the confined space.
- The number of persons permitted to enter a confined space should be limited according to the available space, the number of escape routes and the rescue facilities.
- The Entry Permit will specify the precautions necessary for the entry, the subsequent work to be carried out, and knowledge of emergency procedures also the period of validity.

Note: Where there is a life threatening situation, or in case of extreme emergency, or to prevent the development of a potentially dangerous situation, it may be necessary to permit entry under less stringent conditions. In such circumstances special authorization is required and appropriate breathing apparatus must be worn.

#### 21.5.6 *Completion of Work*

At completion of the work within the confined space, the actions listed below shall be performed.

- The attendant shall verify and record in their log that all entrants have exited the confined space.
- The entrants and Entry Supervisor shall restore or arrange to put the item of equipment back into service.
- The Entry Supervisor shall cancel the Entry Permit and forward the completed permits to the Senior Supervisor's office.

### 21.6 Training Requirements

#### 21.6.1 *SUPREME ENERGY*

All SUPREME ENERGY employees and contractors involved with entry into, and working in, confined spaces shall be trained in confined space entry. A certificate stating the person(s) level of competency shall be issued on completion of the training and the training records noted.

Training shall familiarize authorized personnel with the following:

- types of confined space found at the site
- physical and chemical hazards involved and the signs and symptoms of exposure to the hazards
- the need for atmosphere testing and use of personal monitors
- atmosphere testing and monitoring of the confined space
- cleaning, purging and ventilation techniques
- isolation and lock-out/tag-out procedures
- personal protective equipment, in particular correct use of respiratory protective equipment
- responsibilities of attendant, entrant, Entry Supervisors, Senior Supervisor
- rescue and emergency response actions
- the Entry Permit requirements.

#### 21.6.2 *Contractors*

SUPREME ENERGY shall ensure that all contractors involved with confined space entries shall have had confined space training within the last two years. In addition, these contractors shall have attended a SUPREME ENERGY specific work site induction course prior to commencing work at the site.

Contractors shall produce evidence proving their employees who have completed Confined Space Entry Training and the dates when training was completed.

#### 21.6.3 *Refresher Training*

Refresher training for all personnel who may be required to enter confined spaces shall be completed every two years.

#### 21.6.4 *Training Records*

Training records and competency levels shall be documented and submitted to the appropriate SUPREME ENERGY Human Resources Department and SHE Group.

## 21.7 Emergency and Rescue Action

The procedures listed below must be followed during an emergency and rescue action.

- On no account must the attendant(s) stationed at the entrance attempt to enter the space until additional help has arrived.
- No rescue must be attempted without wearing self-contained breathing apparatus and a harness. Whenever possible, a lifeline/guideline should be used.
- The restoration of the casualty's air supply at the earliest possible moment is of paramount importance. An ELSA may prove useful for the first few minutes whilst a proper breathing supply is prepared for use.
- The victim must be brought out with the least delay and then their physical injuries can be attended to.
- Every moment is vital but this should not induce the rescue team to take unnecessary risks.
- Unless the person is gravely injured, e.g. a broken back, any physical injury which has been sustained is of secondary importance to maintaining a safe air supply. The victim must be brought out with the least delay.
- To rescue personnel from an in-ground manhole, a man winch, fitted to a tripod will be required.
- If air is being supplied to the person(s) in the space through an air-line, a check that the supply of air is being maintained at the correct pressure must be made continuously by the attendant(s)
- Any attempt at rescuing a person who has collapsed within an enclosed space should be based on a rescue plan developed for the site, having regard to the site location and any peculiarities or special requirements of each individual space.
- If the rescue operation is a long one, the continued supply of fully charged air cylinders for the self-contained breathing apparatus of the rescue team and/or the provision of a continuous air supply to those at the scene of the accident from a reliable source of compressed air of breathing quality is an essential requirement.
- Drills must be held at regular intervals to prove the capability of the rescue team under different and difficult conditions. The need to allocate personnel to relieve or back-up those first in action must always be anticipated.

- Pre-planning is essential if any success at all is to be achieved since survival after loss of air supply is dependent on time. Restoring the victim's oxygen requirements is a first priority.

Every site and task will have its own special problems, each of which may require a different rescue procedure. Notwithstanding this, many procedures have common elements which are universally applicable as the following paragraphs illustrate.

- The successful rescue of any person(s) from an enclosed space is dependent on a pre-existing plan, trained personnel and good, well maintained equipment. All breathing apparatus, safety harnesses, lifelines and resuscitation equipment provided for use in, or in connection with, entry into confined spaces and particularly for use in emergencies **must be properly maintained**. This must be controlled by a planned maintenance system.
- All items of breathing apparatus should be periodically examined, and as soon as possible after every occasion on which the apparatus has been used.

## 21.8 Check List

**To be completed/checked by the Entry Supervisor before starting work.**

	Yes	No
Have all entrants/attendants received training for this task?		
Is (are) there the necessary work-permit(s)?		
Are you familiar with the company's procedures for entering confined spaces?		
Do you fully understand your specific responsibilities for this task?		
Are you and the work force wearing the appropriate personal protective clothing?		
Have you arranged for the appropriate fire protection and safety equipment?		
Are all connections to the confined space isolated/removed?		
Are all electrical/hydraulic connections in and outside the confined space locked-out and tagged (see MWP)?		
Are there radiation or other unusual hazards?		
Is the confined space gas free?		
Is the oxygen level satisfactory?		
Are there physical hazards in the confined space? If so, what has been done to minimize their effect?		
Is (are) the necessary attendant(s) for standby responsibility assigned?		
Is the work force (those who enter the space and attendant(s)) familiar with the necessary safety procedures?		
Is the work force physically and mentally fit?		
Have you tested that all breathing apparatus and other safety equipment is functioning properly?		
Have lifeline(s) or harness(es) been provided?		
Does the electrical equipment meet requirements?		
Is the attendant/standby person(s) aware of his/her duties regarding communication with and rescue from the confined space?		
Is access and egress adequate for persons entering or leaving the confined space?		
Will continuous monitoring take place during work to ensure confined space is gas free and has sufficient oxygen?		
Is there a contingency plan (rescue plan) available and are all relevant personnel familiar with it?		
Have precautions been taken to make unauthorized access impossible, especially when work is temporarily suspended?		
Do you know whom to refer to in case of uncertainty?		

**To be checked jointly by the attendant(s) and persons to enter the space after relevant checks in the above have been made.**

	Yes	No
Have you been trained in enclosed space entry procedures and the responsibilities of an attendant?		
Have you been given instructions or permission by the Supervisor, or person in charge, to enter the space?		
Are you satisfied all relevant checks in the above have been completed?		
Do you understand the arrangements made for communication?		
Are you aware that you should leave the space immediately in the event of ventilation or communication failure?		

**Where breathing apparatus is to be used, this section must be checked jointly by the Supervisor and the persons who are to enter the space.**

	Yes	No
Are you familiar with the apparatus to be used?		
Have you checked the communications equipment?		
Have you checked the apparatus as follows:		
i) Adequacy of air supply?		
ii) Low pressure audible alarm?		
iii) Face mask - air supply and tightness?		
iv) Availability of emergency air supply when working in inert atmosphere?		
v) Operating time limits calculated and checked?		
Have the emergency signals and other emergency arrangements been agreed?		

Person(s) entering the confined space should show their completed checklist to the attendant before entering.





## **Chapter 2: Section 14 : Hot Work**

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## **20. Hot Work**

### **20.1 Introduction**

This section outlines 'hot work' safe work practices that will be followed at SUPREME ENERGY worksites. Hot work is any work that involves the generation of intense heat such as welding, grinding, and flame cutting, etc. that could cause ignition. Hot work can present a significant hazard if not planned and controlled.

In particular, this section covers SUPREME ENERGY' safety requirements for:

- electric arc welding
- gas welding and cutting
- hazardous hot work on tanks and drums.

Personnel performing hot work activity should obtain a hot work permit before starting any work involving a source of ignition. This permit should state in writing all appropriate precautions to be taken for the specific work, including:

- The type of equipment involved in the hot work
- The type of hot work to be performed (e.g., cutting, welding, grinding)
- The protective equipment required
- Special hazards relating to the hydrocarbon product, hot work location, or type of hot work to be performed, and measures taken to mitigate the hazards
- Standby fire-suppression equipment and fire watches required
- The expiration date and time of the hot work permit

### **20.2 Training**

Welding or gas cutting equipment shall not be used by personnel unless they are adequately trained and familiar with its safe use. Training is to include all safety related aspects as well as welding procedures. Welders must be qualified for the application. If being trained, then the trainee must be under strict, qualified supervision. A person should never operate equipment that they do not understand.

All printed rules and operating instructions supplied by the manufacturer of either the welding/grinding equipment or that being worked on or situated nearby are to be followed.

### **20.3 General**

The work area must be kept free of flammable liquids or combustible material (such as oil, wood, paper, or piles of rubbish in which sparks could smolder and burst into flame. Any oil spillages should be cleaned up and the area 'sponged' or 'mopped' with sand or a proprietary cleaner.

Suitable and sufficient fire extinguishing equipment must always be stationed in the immediate vicinity of the work area. All workers should know how to operate the fire extinguishing equipment. Firewatchers must be appointed in locations where any fire risk exists.

Hot work should not be carried out while an automatic fire sprinkler system or drench system is out of action in the area that the work will be carried out, (refer to Section...: *Fire Prevention and Fire Fighting Equipment*) unless the system may be activated by the hot work itself.

Never use an empty drum, tank or container as a work platform or as a support for welding, cutting or grinding, etc. The torch flame or sparks may ignite vapors or solid residues inside it. Either use a proper support or clean the container as described in Subsection 20.12: *Hazardous Hot Work on Tanks and Drums*.

Physical protection, and chalked warnings, is to be used if there is any danger of other people touching or standing on work pieces that are, or may become, hot.

Care must be taken that heat, sparks and slag from welding or cutting operations do not damage existing or surrounding surfaces and equipment or injure people.

Before using any welding or cutting equipment, it must be checked that everything appears to be in good condition and in operating order. If this is not the case then the equipment must not be used until repaired (Refer also to Subsections 20.9: *Gas Welding and Cutting* and 20.10: *Electric Arc Welding* for specific checks that should be done prior to using welding/cutting equipment).

Special care must be taken when welding pesticide spray equipment as many insecticides decompose and produce the toxic phosgene gas when heated.

## 20.4 Firewatchers

Firewatchers are required whenever any fire hazard exists, and whenever the 'hot work permit' states that one is required. It is the responsibility of the 'person in charge' that the firewatcher understands the dangers of hot work, the hazards involved with the work to be undertaken, the duties of the firewatcher, and how to use the appropriate firefighting equipment.

Deciding the requisite number of firewatchers required on the installation for a job is the responsibility of the 'person in charge' in conjunction with the supervisor who authorizes the hot work permit. The decision should be based upon what is reasonably practical while ensuring safety, as well as the time period involved.

The sole duty of the firewatcher(s) during the work shall be to act as firewatcher. The duties of a firewatcher shall never be combined with that of a welders mate.

### 20.4.1 Firewatcher Training

Firewatcher assigned to fire-watch duties should be given initial basic training on the general aspects of fire prevention and first aid firefighting. Further training should include the following:

- types of portable fire equipment available
- general procedures and permit-to-work systems applicable to hot work operations
- Firewatchers' duties.

### 20.4.2 Fire-watch Duties

The duties of the assigned firewatchers include the following:

- checking all hot work area for possible ignition sources and/or presence of combustible materials prior to, during and after, hot work operations,
- ensuring that suitable portable fire extinguishers, fire hose reels, fire blankets, etc. are located and readily available for emergency use at all hot work sites. A fire extinguisher is to be at immediate hand.
- maintaining a constant watch during actual hot work operations for possible sparks, hot slag, or hot spots etc. which could cause fire. This duty may require inspection of both sides of walls, under floors, and in roof spaces.

- initiating emergency action in the event of the start of a fire. This includes immediately warning the welder and nearby workers, and attempt to extinguish it while it is still small. If the fire is not quickly put out the firewatcher is to ensure that the site alarm is activated.
- re-checking the area after completion of hot work to ensure that all work surfaces have been cooled to normal temperature and that no hot slag, smoldering debris or any other ignition source remains and then if necessary, thoroughly wetting down the area and all areas in which a spark may have penetrated. Re-inspection of an area may have to be continued regularly for an extended time. In the case of controlled cool-down of the work place this period may run into many hours.

## **20.5 Ventilation**

The work area should always be well ventilated when welding. Ultraviolet light from welding changes oxygen in the air to ozone that irritates the lungs. There are toxic substances in fluxes, filler rods, coatings and cleaning agents. Other poisonous fumes are produced by welding, cutting or grinding metal coated with paint, resin or varnish. Carbon monoxide is also produced; it is odorless and leads to unconsciousness and even death at concentrations of greater than 50ppm.

## **20.6 Elevated Welding**

(Refer also to Section ...: *Working at Height*.)

Welding or cutting in elevated positions shall be conducted only under safe conditions. A full safety body harness connected to safety lines shall be worn at certain heights and above (see Section ...: *Working at Height*). Warning signs, warning tape and ceramic rugs shall be placed below areas where welding or cutting is being conducted where slag and sparks would fall down and may injure personnel, damage equipment, or cause ignition.

## **20.7 Pre-heating and Post-heating**

Extra planning is required where it is required to pre-heat and/or post-heat a work piece as part of the welding procedure. In particular the need to provide safety cover for the total work period, including the natural cool-down phase must be borne in mind. In many cases, where heavy gauge plate work or large sections are involved, it may be many hours before all heat has been dissipated and the temperature is low enough to be considered safe.

## **20.8 Hot Work in a Confined Space**

This procedure for entering and working in a confined space is set out in Section ...: *Confined Space Entry*

Never enter a tank or vat to carry out cleaning or hot work unless you are suitably trained. Any work in confined spaces is extremely dangerous and should not be attempted by inexperienced people.

Do not attempt to weld, cut or grind if the presence of explosive vapors or dusts is suspected. Test the atmosphere with a suitable gas detector.

Keep welding plant outside the confined space and run leads only to the work area.

When welding in a confined space ensure that the attendant understands the welding plant being used and is able to shut it down properly and quickly in an emergency.

Remove gas torches and hoses or leads from the space every time that work stops - even for tea breaks. A small leak, even for a short time, could result in an explosion when work re-starts.

## **20.9 Gas Welding and Cutting**

### **20.9.1 General Safety**

Never use oxygen to blow dust off clothing as the increased oxygen concentration trapped in the fabric can cause clothing to become highly flammable, burning as if were soaked in petrol. Likewise never use oxygen to 'sweeten' the air.

Acetylene forms an explosive mixture with oxygen at concentrations ranging from 2% - 82%. Leaking acetylene is easily identified by its garlic or onion smell.

Copper forms an explosive compound (copper acetylate) with acetylene which is likely to explode on impact. For this reason never use copper or any material containing more than 70% of copper to join acetylene hoses. The proper fittings must always be used.

Acetylene is an unstable gas and dangerously so at pressures over 100kPa. For this reason the regulator on the gas equipment must never be set higher than this pressure.

LPG (used in cutting) is heavier than air and will therefore collect in low-lying places. For this reason it should not be used in trenches, holes or places where it can spill down to a lower level. LPG forms an explosive mixture with oxygen at concentrations of between 2% and 10%.

When lighting up gas welding and cutting equipment always use friction or electric lighters, never use a cigarette lighter or matches. Correct light-up and shut-down procedures and sequences must always be followed.

Flashback arresters must be used on all gas welding and cutting equipment.

Key spanners shall be left in position on cylinders when in use so that they can be closed quickly in an emergency.

Hoses must not be wrapped around cylinders or regulators, as a leak or flashback could cause even more damage. Instead, they should be looped around a hook or similar.

Gas equipment should be regularly (see the site Planned Maintenance Schedule for details) checked for leaks by using soap and water or a proprietary leak finding solution such as 'Snoop'.

Care should be taken to keep hoses and other equipment from obstructing passageways, ladders and stairways.

Never use oxygen to run pneumatic power tools as any oil or grease in the tool may burst into flames or explode.

Never fill oxygen cylinders with compressed air from an oil lubricated compressor. This is because residual oil in the air will be deposited in the cylinder. If the cylinder were then refilled with oxygen, an explosion will occur. Any oxygen equipment that has been used with compressed air must be downgraded and not used for oxygen again.

Never lubricate with grease or oil, any equipment that will be used for oxygen service. These substances can ignite violently in the presence of oxygen, and if the oxygen is under pressure an explosion may result.

#### **20.9.2     *Storage and Handling of Cylinders***

Do not use unlabeled or unmarked cylinders. If cylinders are unlabeled or unmarked then they must be returned to the supplier.



Cylinders are to be stored safely and securely in such a way that they are prevented from falling. Cylinder Caps must always be fitted before a cylinder is moved, unless it is secured in a purposed made trolley. Do not store cylinders near elevators, stairs or gangways or in unventilated enclosures such as cupboards. All cylinders must be kept away from electrical apparatus, heat and other sources of ignition.

Oxygen cylinders shall be stored separately from fuel gas cylinders and empty cylinders must be stored separately from full ones and with their valves closed and caps on.

Cylinders must be handled one at a time and if necessary, lifting assistance should be provided only by means of rope slings, not by chains or magnetic lifts.

Keep all oxygen cylinders and fittings in a place where they cannot be contaminated by oil or grease.

Always store and use acetylene cylinders in the upright position. Acetylene cylinders are filled with a porous material that contains acetone into which the acetylene is dissolved. The acetone keeps the acetylene stable. If the valve is opened when the cylinder has been on its side, the liquid acetone will be withdrawn with the gas. If a cylinder has been on its side, stand it upright for at least one hour before use.

Similarly, LPG cylinders should be stored and used upright as LPG is a liquid which is likely to seep through the valve.

For more details on the storage of gas cylinders, refer to Section 13: *Hazardous Substances*.

#### 20.9.3 Checks

All gas cylinders, supply hoses and ancillary equipment must be checked regularly to ensure they remain in good condition. Special attention should be given to ensuring that supply hoses are free of any signs of cracking of the rubber coating.

### 20.10 Electric Arc Welding

All care must be taken through the use of appropriate shielding to protect personnel, including passersby, from the hazards of 'arc-eye'.

Under normal operating conditions it is not possible to get an electric shock from an electric welder. Should anyone receive one, the power supply must be shut off and disconnected. The machine must not be restarted until it has been cleared by a registered electrician.

Always treat all electrical equipment as 'live'. Do not take chances. Keep water and other liquids away and keep yourself dry. Do not arc weld in wet conditions. A reliable automatic control must be fitted to reduce the no-load voltage if it is unavoidable for AC welding to be performed under wet conditions. This is to prevent shock.

- Use an isolating transformer with all portable electrical equipment.
- Keep leads and cables clear from obstructing passageways, ladders and stairways.
- Use only cables of a sufficient capacity to carry the current used. Do not overload.
- Use only a proper earthing clamp or bolted terminal. Never earth to pipelines carrying gas or flammable liquids, or to conduits carrying electric wires.
- Use only standard cable connectors.
- Use only an insulated hook or other suitable device to hold the electrode holder when it is not actually being used.
- If using a welding generator driven by an internal combustion engine inside a building or confined area, the engine exhaust must be ducted to the outside air.
- Input cables and extension leads should be kept tidy and as short as practical (try to use suitable lengths with as few connectors as possible).
- Take particular care in earthing portable welding machines driven by an internal combustion engine. Where an earthing connection is provided, it must be used in accordance with the manufacturer's instructions. (This is also very important when using ancillary power supply for drills, grinders and other equipment.)

#### 20.10.1 Checks

The checks listed below should be carried out before using electric welding equipment.

- If the machine has become wet, disconnect the primary power and dry out before use
- Check the welding cable for insulation damage
- Reject all welding lead spliced within 3m of the holder
- Check MIG or TIG gas hoses and fittings for leaks
- Check electrode holders for loose or exposed connections to reduce shock hazard
- Check the welding machine is earthed, paying particular attention to the condition of the earth connections.

## 20.11 Hot Work Permit

Before any hot work can be carried out in a designated area or on tanks and drums a 'Hot Work Permit' must be obtained. This will always be under cover of a General Work Permit (Refer to Section ...: *Permit To Work System*). The Hot Work Permit is presented at the end of this section.

Before hot work requiring a permit is carried out, the need for hot work should be questioned. If it is practical to carry out the jobs without hot work then hot work should not be done.

The 'hot work permit' identifies whether a firewatcher is required and, if so, how many.

A 'hot work permit' **is required** for the following situations:

- any hot work within the power plant
- any hot work within buildings
- any hot work near or adjacent to operating mechanical equipment, pressure piping or pressure vessels, hydrocarbon pumps, producing wells, gas compressors or any other fuel source
- any hot work in a hazardous area
- any hot work on vehicles
- any hot work on tanks or drums no matter the location
- any hot work anywhere that a 'confined space permit' has been raised
- any other time when a relevant hazard is perceived to exist.

A 'hot work permit' **is not required** under the following situations:

- normal hot work within the workshop
- hot work in non-hazardous open-air situations
- hot work in approved areas designated as safe for unrestricted hot work.

#### 20.11.1 *Safe Hot Work Areas*

These areas will be identified by the site safety committee and communicated in map form in the appropriate arrangement for Site Specific Safety.

#### 20.11.2 *Considerations*

A shift or department supervisor who is satisfied that it is safe to proceed with the work is the only person able to approve a 'hot work permit'.

Prior to performing any hot work in other than an approved safe hot work area, the 'person in charge' shall review the operations to be performed with the relevant supervisor.

#### 20.11.3 *Precautions*

The following precautions must be taken.

- When working on pipe systems, all lines in the work area shall be traced to confirm both that the correct system has been identified, and that there is no risk from other systems nearby. Associated hazards are to be considered carefully.
- All lines on which welding is to be performed shall be blown down. In certain cases where it may be unsafe to blow down the line being worked on, a hot tap procedure approved by the Operations Senior Supervisor or Production Senior Supervisor may be used.
- Operation of valves, on effected systems, is prohibited during welding operations.
- Portable gas detectors shall be used to ensure no combustible mixtures are present before and frequently while, performing hot work around tanks, pressure vessels, compressors, all enclosed areas or other areas where gas may be present.

- Where hot work is to be carried out near to ventilation intakes and compressor suctions, ensure that the equipment is shut down and tagged off under the relevant General Work Permit. Do not un-tag the equipment until the fumes and smoke have cleared.

A copy of hot work permit form and a hot work checklist can be found at the end of this section.

## **20.12 Hazardous Hot Work on Tanks and Drums**

### **20.12.1 General**

Severe explosions and fires can be caused by the application of heat to pipes, tanks, drums and similar vessels which have contained flammable materials. In some cases only a pin point of heat or a spark can be enough to set off an explosion.

Personnel should be wary of trusting what container labels say. A label may not correctly indicate the contents, as a container may have been used to store other substances.

If one compartment of a two-compartment tank has to be repaired, cut or ground, then both compartments must be made safe.

### **20.12.2 Hazardous Hot Work Substances**

Substances that pose a hot work threat are and may have been in tanks or drums:

- any volatile liquid that releases flammable vapor at atmospheric pressure (e.g. petrol, acetone, white spirits, etc.)
- any non-volatile oils or solids that release flammable vapor when heated (e.g. diesel oil, tar, greases, linseed oil, tallow, soap, etc.)
- any acids that react with metals to form hydrogen (e.g. sulphur acid, nitric acid, hydrochloric acid, etc.)
- any combustible solids or finely divided particles which may be present in the form of an explosive dust cloud (e.g. fiberglass, milk powder, sulphur, etc.)
- any chemical compound that decomposes and forms a hazardous vapour when heated.

### 20.12.3 *Cleaning of Tanks and Drums*

There are essentially three cleaning methods which are:

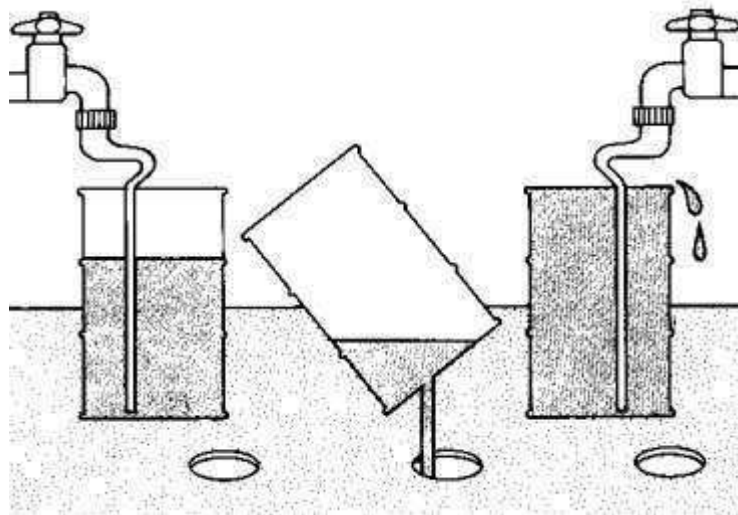
- the 'washing method' for soluble substances
- the 'boiling method'
- the 'steaming method' for insoluble substances.

Care must be taken to ensure that a container is properly cleaned before hot work is carried out. Shortcuts at this stage may be fatal.

Prior to cleaning, the container must be thoroughly emptied of the substance which must be disposed of carefully check Material Safety Data Sheet (MSDS). If caps or bungs need to be removed then non-sparking type tools (e.g. those made of bronze) are to be used. If the container has held a corrosive or toxic substance then, rubber or PVC gloves and a face shield or goggles to protect eyes from splashes are to be worn.

#### 20.12.3.1 *Washing Method*

The container must be filled with water and drained several times. This method is suitable only for water soluble substances. This method is particularly suitable for acids such as hydrochloric or sulphur acid.



**Figure 20.1: Washing with Water**

### 20.12.3.2 *Boiling Method*

The item to be cleaned must be completely immersed in the boiling water so that water fills, as well as surrounds, it. It is essential that proprietary degreasing detergent (not household detergent) is added to the water, particularly if the tank has held petrol, paraffin, diesel, oil, grease, etc.

Strong alkalis such as caustic soda will attack aluminum and its alloys, producing hydrogen. If containers need to be treated with alkalis, then one of the weaker cleaners should be used. Overall, a PVC apron, gloves and safety glasses or a face shield must be worn to prevent strong alkaline cleaners being splashed onto skin or into eyes.

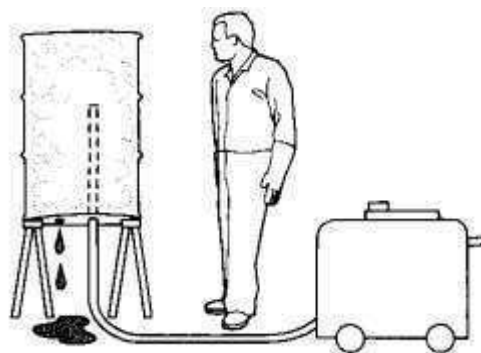
Fabric or leather gloves should be worn when handling containers that have been steamed or boiled as the metal becomes very hot.

### 20.12.3.3 *Steaming Method*

Steam volatilizes oils and greases and is particularly suitable for tanks and drums that have held these substances.

If the container has held a highly flammable substance, then precautions must be taken to prevent the accumulation of static electricity. The tank and steam pipe should be earthed and the steam pipe should be electrically bonded to the tank.

It is important that an outlet be provided for the steam so that pressure does not build up and to allow condensates and sludge to drain away.



**Figure 20.2: Steaming**

Containers should be steamed for no less than 30 minutes after every part of the container has become too hot to touch. Checking that the condensate is free of oil or other material is a good indication of whether cleaning is complete.

#### 20.12.3.4 *Trichloroethylene (or 1,1,1-Trichloroethane)*

(These products must be used with great care as they are highly toxic and are generally not recommended)

Stubborn oil sludge deposits may be washed out with trichloroethylene (or 1,1,1-trichloroethane) but these products must be used with caution in well ventilated areas as they have a narcotic effect. Treatment must be followed by a further cycle of steaming because of the possible fire or toxic hazards and the risk of forming poisonous phosgene gas when heat is applied.

#### 20.12.3.5 *Cleaning Methods NOT to be Used*

Blowing out with compressed air as this method does not remove solids and residual deposits that are capable of producing fumes.

Cleansing with carbon tetrachloride as this solvent is inherently toxic and may form poisonous phosgene gas when heat is applied. It may also react with the metal on the drum.

Cleansing with trichloroethylene or 1,1,1-trichloroethane is not recommended and must only be used as a last resort as discussed previously.

#### 20.12.3.6 *Checking*

Following cleaning, the inside of the container must be checked for residual vapors or solids. It should be noted that any equipment such as torches etc. must be safe for use in flammable atmospheres.

An item can be considered safe for hot work when no solid residues or vapors can be detected by sight or smell. If an instrument such as an explosimeter is used, the absence of a reading does not necessarily mean that the container is safe to weld. This is because the meter tests at atmospheric temperature, not at welding or grinding, etc. temperatures.

If following cleaning flammable vapors or sludge deposits are detected, then the cleaning process should be repeated or the vessel should be 'inerted' prior to carrying out hot work.

#### 20.12.4 *Additional Precautions - 'Inerting'*

##### 20.12.4.1 *General*

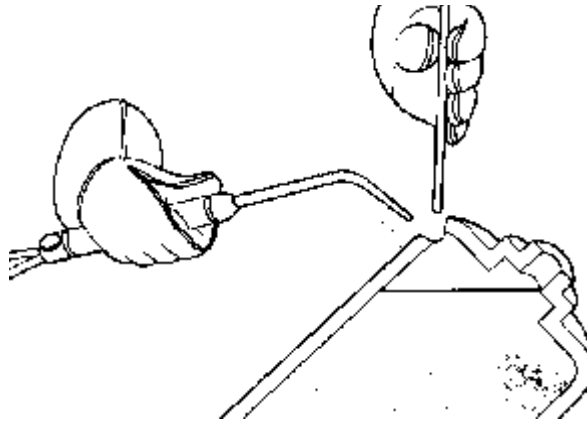
As an additional precaution, but not instead of cleaning, the vessel can be 'inerted' by replacing the air in the vessel with water, steam or an inert gas.



#### 20.12.4.2 *Filling with water*

If using electric welding gear to make a repair, then the vessel should be completely filled with water. A vent should be fitted to relieve any pressure generated by steam. Care must be taken to ensure the welding equipment does not get wet.

If making a repair by soldering, brazing or oxy-acetylene welding near an opening in the vessel, the vessel should be filled with water leaving a small free air space at the point where the repair is to be made.



**Figure 20.3: Filling with Water**

#### 20.12.4.3 *Continuous Steaming*

This procedure is essentially the same as for steam cleaning, except that steam is allowed to continually flow through the tank during the welding operation.

#### 20.12.4.4 *Filling with Carbon Dioxide*

Care needs to be taken that all the air in the tank is displaced and also that the carbon dioxide does not leak from an exit point at the bottom of the tank as carbon dioxide is heavier than air.

As a general guide at least 0.5kg of dry ice should be added per 250 liters of tank capacity to ensure that the tank is completely filled with CO<sub>2</sub>. Note that dry ice is very cold and should only be handled with gloves or tongs. This method is only suitable for small tanks (up to about 1,000 liters). In larger tanks, the CO<sub>2</sub> gas will be so cold and heavy that only the atmosphere at the bottom of the tank will be inerted.

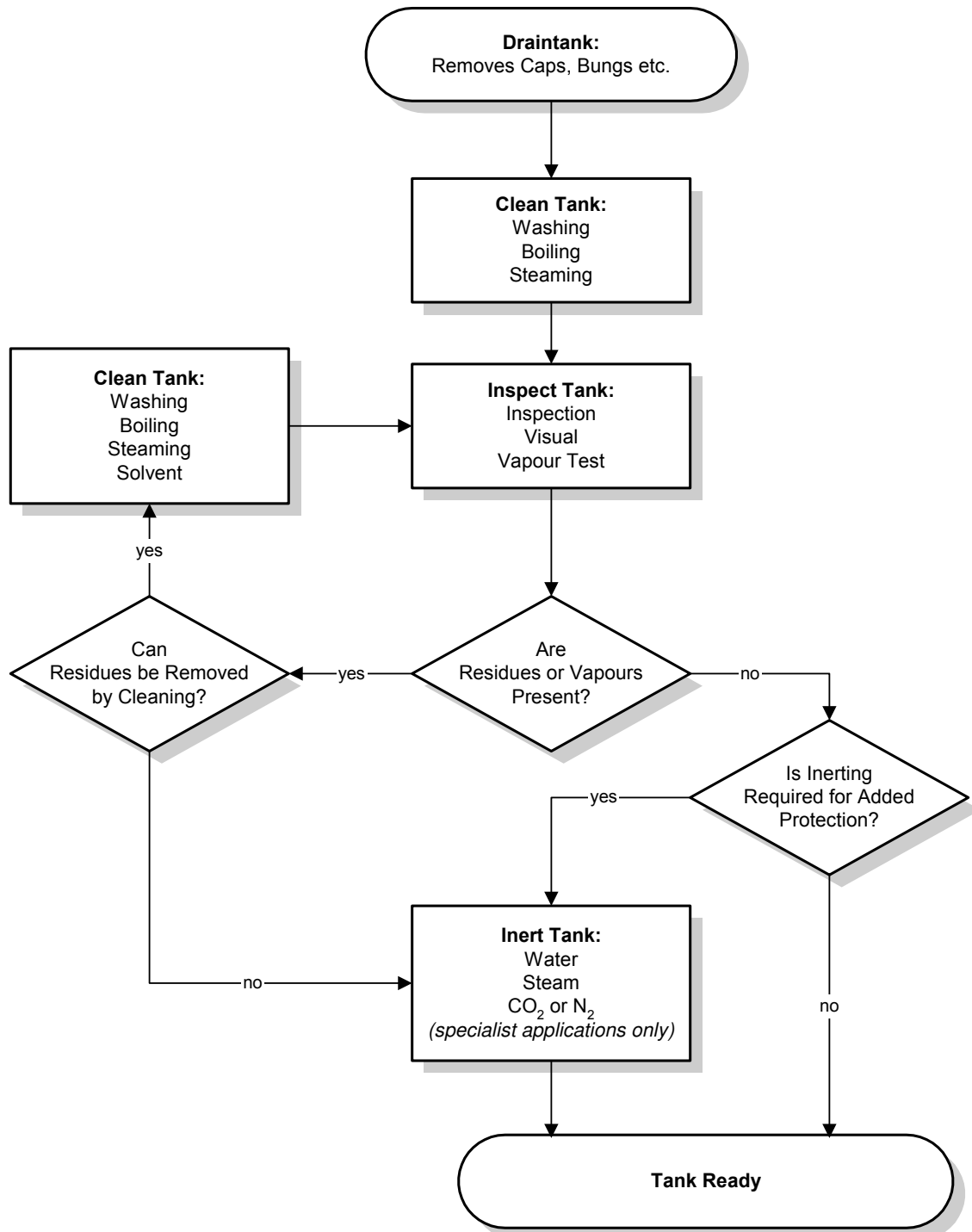
While CO<sub>2</sub> is not toxic, it does not support life and no one without breathing apparatus is to enter a tank containing it. Adequate ventilation must be provided in the area or vicinity of the tank.

#### *20.12.4.5 Filling with Nitrogen*

It is recommended that only people with the necessary expertise use this method. Nitrogen is suitable for inerting the atmosphere in large tanks (e.g. in the oil industry). It is important that the tank is completely filled with nitrogen. A light flow of gas must be maintained throughout the welding operation and during breaks.

While nitrogen is not toxic, it does not support life and no one without breathing apparatus is to enter a tank containing it. Adequate ventilation must be provided in the area or vicinity of the tank.

Figure 20.4: Cleaning of Tanks and Drums for Hot Work



#### 20.12.5 *Returning to Service*

In addition to the usual closing up checks tanks, drums, or vessels should be checked for residues of chemicals, solvents and cleaners as, they may react with the substances that the vessel is to hold (check the MSDS).

### 20.13 **Safety Equipment**

Goggles, face shields or protective glasses shall be worn when burning, welding, grinding, or striking metal, no matter how small the job may be. Also, all persons employed as assistants to a welder, or those who have to work near the welding point, shall wear suitable eye protection. Helmets or shields that have cracks, splits or pinholes shall not be used. Similarly, a cracked or broken filter glass shall not be used even for the smallest job.



**Figure 20.5: Safety Equipment**

Safety goggles must always be worn for chipping or grinding, or when in an eye danger area.

All welding operations in the open air and close to fellow workers or other people shall be suitably screened to prevent eye injury, ingress of wet weather, to contain flying sparks and to protect others from ultraviolet radiation and the effects of 'arc-eye'.

Hearing protection must be worn when performing noisy operations such as grinding and chipping. Refer to Section ...: *Personal Safety Equipment (PPE)*.

Industrial, overalls (made from flame resistant fabrics such as cotton) and appropriate eye protection shall always be worn when engaged in welding and cutting operations. Overalls should be kept fastened up to the neck, with the sleeves down and fastened about the wrist. Gloves or gauntlets shall be worn for arc welding, as protection against shock, burns and radiation burns.

If fumes given off from the work are highly toxic, such as those from cadmium, chromium, or beryllium, then some form of respiratory protection, such as an air-supplied helmet, is still necessary even if the work is in a well-ventilated area.

## Hot Work Checklist

Before approving any cutting and welding work the General Work Permit Holder and where appropriate, the area supervisor is to inspect the work area and confirm that precautions have been taken to prevent fire.

### PRECAUTIONS

- ☐ Sprinklers in service (or disabled if work may cause mal-operation of system)
- ☐ Cutting and welding equipment in good repair

### WITHIN SURROUNDING AREA

- ☐ Area clear of combustibles
- ☐ Combustible floors wetted down, covered with damp sand, metal or other shields
- ☐ No combustible material or flammable liquids
- ☐ Combustibles protected with covers, guards or metal shields
- ☐ All wall and floor openings covered
- ☐ Covers suspended beneath work to collect sparks
- ☐ Covers over sensitive equipment

### WORK ON OR NEAR WALLS AND CEILINGS

- ☐ Construction non-combustible and without combustible covering
- ☐ Combustibles moved away from opposite side of wall

### WORK ON ENCLOSED EQUIPMENT

(Tanks, containers, ducts, dust collectors, etc.)

- ☐ Equipment cleaned of all combustibles
- ☐ Containers purged of flammable vapors

### FIRE WATCH

- ☐ To be provided during and at least 30 minutes after operation
- ☐ Supplied with extinguisher, sand bucket, small hose or other suitable equipment
- ☐ Trained in use of equipment and in sounding fire alarm

### FINAL CHECK-UP

- ☐ To be made 30 minutes (or greater period if applicable) after completion of any operation