TAGANITO HPAL
NICKEL CORPORATION

SAFETY AND HEALTH HANDBOOK

New Version rev.4

Contents

PREFACE

Safety is a top priority of Taganito HPAL Nickel Corporation, THPAL, and it is dedicated on enhancing workplace safety for all employees. This safety and health manual is a tool that is designed to help promote a safe working environment, give a firm understanding of the company concern for protecting its employees from job related injuries or illnesses, eliminate personal injuries and illnesses from occurring in the workplace, and inform and educate employees in areas of preventive safety and health.

We consider safety in the workplace to be a shared responsibility, requiring us all to do our part. And although the guidelines contained in this manual are excellent, they cannot cover every situation. We must use our own good common sense and realize that there is no one-size-fits-all approach to workplace safety.

CHAPTER 0 GENRAL INFORMATION

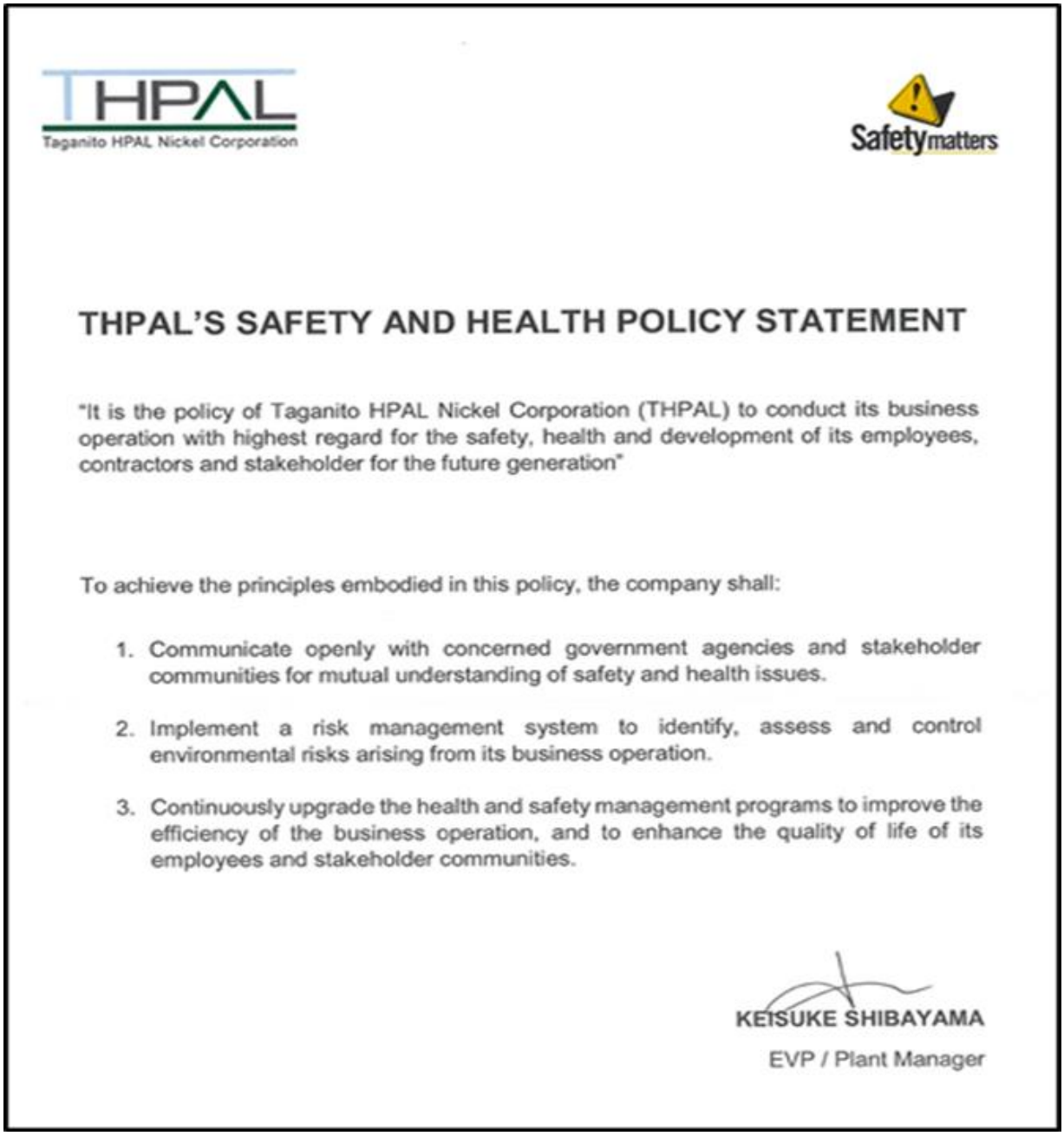
SECTION 1: INTRODUCTION

Every safety and health program has a single purpose - to keep people on the job by reducing accidents, injuries, and illness. However, safety programs are more than injury-prevention programs. They are designed to improve the life of all employees both at home and at work.

In order to make the safety program consistent, Safety Section and the respective department managers, supervisors, foremen, and rank and file employees have developed this safety manual. This safety manual contains safety rules and procedures which will help create a safer working environment. This will also give us assistance in recognizing hazardous conditions and what to do about them.

This safety manual, like any manual, cannot cover all situations but with a commitment to safety by all, our safety program can reach its full potential.

SECTION 2: THPAL SAFETY AND HEALTH POLICY STATEMENT



THPAL
Taganito HPAL Nickel Corporation

Safetymatters

THPAL'S SAFETY AND HEALTH POLICY STATEMENT

"It is the policy of Taganito HPAL Nickel Corporation (THPAL) to conduct its business operation with highest regard for the safety, health and development of its employees, contractors and stakeholder for the future generation"

To achieve the principles embodied in this policy, the company shall:

1. Communicate openly with concerned government agencies and stakeholder communities for mutual understanding of safety and health issues.
2. Implement a risk management system to identify, assess and control environmental risks arising from its business operation.
3. Continuously upgrade the health and safety management programs to improve the efficiency of the business operation, and to enhance the quality of life of its employees and stakeholder communities.

KEISUKE SHIBAYAMA
EVP / Plant Manager

SECTION 3: ENVIRONMENTAL POLICY

Environmental Policy

Taganito HPAL Nickel Corporation (THPAL) is committed to be the world's leading producer of Nickel and Cobalt Mixed Sulfides through the application of High Pressure Acid Leach Technology.

As a mineral processing company, THPAL is committed to protecting the environment, fulfilling compliance obligations and establishing, implementing, maintaining and continually improving Environmental Management System.

To minimize environmental impacts concerning our activities, products and services, we shall:

1. Include consideration of environmental issues in all business strategies and initiatives;
2. **Respond to global issues, using an environmental management system, on environmental preservation, including prevention of pollution, and biodiversity preservation;*
3. Comply with applicable compliance obligations **related to our* environmental aspects and requirements of relevant interested parties;
4. Continually improve the effectiveness of environmental management system to enhance environmental performance;

KEISUKE SHIBAYAMA
Executive Vice President and Plant Manager

SECTION 4: GENERAL PROVISION

4.1 ACCIDENT AND ILLNESSES

a. The Safety Engineer shall report to the Mines and Geosciences Bureau Regional Director within twenty-four (24) hours immediately after any accidents resulting to the death or serious physical injury of an employee. A detailed report following the prescribed MGB format shall be submitted within fifteen (15) days after the accident. All incident/accident shall be reported immediately at least within thirty (30) minutes to concerned supervisor, department manager and simultaneously to Safety/OSH office (Safety Inspectors/supervisors), Consultant and OSH manager whoever receive the information).
b. A Monthly Report of accident or sickness including damage to property shall be submitted within fifteen (15) days after every calendar month by the Safety Engineer to the Regional Director copy furnish the Department of Labor and Employment – Bureau of Working Conditions (DOLE-BWC).
c. A Monthly Statistical Data on Accident shall be accomplished and submitted by the Safety Engineer within the first fifteen (15) days after every calendar month to the Regional Director, copy furnish the Department of Labor and Employment – Bureau of Working Conditions (DOLE-BWC).

4.2 DUTIES AND RESPONSIBILTIES OF EMPLOYEES

The Employees shall:

a. Faithfully observe and comply with all rules and regulations, standard operating procedures and notices pertaining to safety and health.
b. Promptly report and warn fellow employees of all unsafe and unhealthy conditions that maybe encountered in the plant site complex;
c. Help management in the implementation of safety and health rules and regulations;
d. Report for duty well-rested, free from the influence of liquor or drugs or in such conditions as to enable him to use all ordinary precautions to avoid accidents;
e. Not carry intoxicating liquor or prohibited drugs into the working place;
f. Immediately administer first-aid, if qualified, to an injured fellow employee or get in touch with the nearest first-aid station or knowledgeable persons who shall make the necessary steps for the proper treatment of the injured employees;
g. Not commit nuisance nor loiter in any part of the plant site complex before and after the shift;
h. Not remove or destroy any safety and health device furnished for protection with the purpose of minimizing hazards.

4.3 ESTABLISHMENT OF A SAFETY AND HEALTH ORGANIZATION

The company shall establish and provide a safety and health office which is independent from other offices under the direct and immediate control and supervision of the Plant Manager who shall be primarily responsible for the formulation and effective implementation of the company's safety and health program and enforcement of these rules and regulations.

A Safety and Health Office shall be headed by a duly registered Safety Engineer.

4.4 THE SAFETY AND HEALTH COMMITTEE

The Safety and Health Committee shall consist of the following:

Chairman : Plant Manager
Secretary : Safety Engineer
Members : Managers and Foremen of Various Departments
Representatives from Contractors, **Union and Junior Supervisor Organization,*
Representative from THPAL Clinic

The Central Safety and Health Committee shall:

a. Provide a forum for consultation and cooperation between the management and employees in initiating, developing and implementing measures designed to ensure the safety and health of employees.
b. Be well informed of the safety and health standards and to review and recommend to the management the rules and procedures regarding the safety and health of the employees.
c. Recommend the maintenance and monitoring of programs, measures and procedures relating to the safety and health of employees.
d. Conduct a monthly safety meeting and the minutes of which to be submitted to MGB Regional Office and Bureau of Working Condition.
e. Review reports of inspection and accident investigations for proper implementation of mitigating measures.
f. Develop and conduct at least semi-annual drill and review of the emergency response and preparedness program of the company to test its effectivity to respond to every perceivable hazard that may arise.

CHAPTER I GENERAL PLANT RULES

SECTION 1: GENERAL RULES

1.1 ENTRANCE

a) All employees, contractors, suppliers and vendors are required to wear their proper identification cards (IDs) before being allowed entry inside the plant site complex. A "No ID, No Entry" policy shall be strictly enforced at all times.

b) All employees reporting for work shall submit himself for inspection by the guard before being allowed enter the Plant Site Premises. Wearing of slippers (or open shoes), sleeveless and short pants are strictly prohibited within the plant site complex area.

c) A safety and health orientation shall be given to all newly hired employees before being allowed to work at their respective working areas.

d) All visitors shall also undertake a safety and health orientation before being allowed to join the plant site tour. All visitors shall obey all safety instructions given by the THPAL Safety Officer or authorized personnel.

e) Contractors, suppliers and vendors of machines, machine parts and other equipment shall also undertake safety and health orientation before actual repair and related works will be done within the plant site complex. All contractors, suppliers and vendors of machines shall obey safety and health rules at all times. They shall also be required to conform to the work standards implemented within the THPAL plant site complex area. They shall likewise be required to report immediately all accidents, incidents and other abnormal situations that will arise from time to time to the concerned THPAL department PIC/Process owner and to the Safety Officer.

1.2 BEHAVIOR

a) Whenever applicable, employees shall always observe proper behavior in workplaces so that concentration of other employees will not be disrupted.

b) Proper housekeeping shall be practiced at all times in the plant site complex area.

c) As a warm-up exercise, all employees are encouraged to participate in the 5 minute Daily Physical Fitness Program every before the start of day shift. Whenever applicable, employees shall always observe proper behavior in workplaces so that concentration of other employees will not be disrupted.

d) Horse playing is strictly prohibited

e) Finger rings or other tight jewellery which is not easily removed should be avoided because of the danger of corrosive or irritating liquids getting underneath the piece and producing irritation.

f) Using Smart Phone and Handheld Radio while walking and inserting hands in the pocket inside the Plant is prohibited.

g) Working in an office involves spending a lot of time sitting in an office chair. This position adds stress to the structures in the spine hence in general, moving and stretching on a regular basis will promote an overall feeling of comfort, and ability to focus productively. Use a chair that provides good lumbar support and always sit upright against the back of the chair while maintaining good posture. Keep your shoulders relaxed (not tense or raised) and your elbows close to your body. Your hands, wrists, and forearms should be straight and about parallel to the floor.

h) To prevent stress and strain on the body, avoid remaining in the same seated work position for prolonged periods of time. Vary your work tasks and take short breaks throughout the day to rest muscles and increase blood circulation.

i) Be reminded that proper usage of office chairs usually does not pose risk but accidents happen when employees use office chairs without exercising proper care. All

concerned therefore are strictly prohibited to use office chairs including but not limited to the following picture.

j) Smoking inside the Plant is strictly prohibited except in the designated smoking areas which are approved by management and clearly identified as safe and controlled area. There are a total of five (5) smoking areas and commonly within the side of a building or structures.

1.3 CANTEEN

a) All employees shall only be allowed to eat at the plant site canteen. Drinking shall be done in areas where water stations are located.

b) Wearing of loose clothes shall be avoided and appropriate clothing shall be worn in the plant site complex area.

c) On changing clothes:

i. Employees before reporting at their respective work places shall first change from casual clothes to working clothes at the locker room inside the canteen building.

ii. Before taking meals. Employees before taking meals shall change soiled working clothes to clean working clothes at the locker room. He / She shall

leave his/her soiled working clothes inside laundry containers provided for washing.

iii. Before Going Home. Employees before going shall change from working clothes to casual clothes. Soiled working clothes shall be left at the laundry containers provided for washing.

d) All employees who are directly exposed to dust and chemicals shall take their shower before going home, or whenever necessary.
e) The doors of the individual lockers should be closed always to prevent personnel from bumping causing which could eventually result to injury.
f) Carrying of PPE inside the Canteen dining area is prohibited.

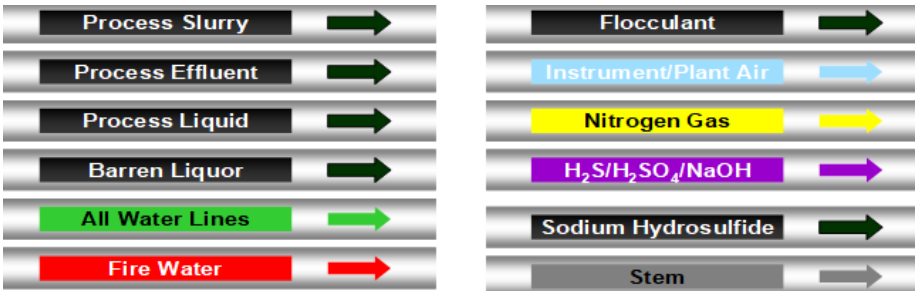
1.4 GENERAL SAFETY MANAGEMENT

a) Employees shall know the characteristics and the hazards involved in handling chemicals.
b) Employees who are assigned to handle hot materials shall be required to wear heat resistant safety paraphernalia.
c) Employees assigned to work in an area higher than two (2) meters shall be required to wear fall arrest/protection equipment attached to a fixed and stable support.
d) The shutter of Radioactive material sources shall always be off when operators or maintenance personnel are working in areas utilizing the said instruments during repair and maintenance activities.
e) Every employee should know the appropriate PPEs before entering his particular area of assignment and before starting activity.
f) No employee shall be allowed to enter any hot or confined working area for any purpose unless all requirements had been met.
g) Sufficient and suitable lighting, whether natural or artificial, shall be provided in any part of the workplace.
h) An artificial light source or reflective surface shall be positioned, screened, or provided with a shade to prevent glare or discomfort or the formation of shadows which may cause eye strain or risk of accident to workers.
i) When the visibility within a work area is restricted due to the presence of smoke, steam, or other substances in the atmosphere, and where this condition might result in workers being injured, suitable means shall be adopted to correct the hazard.
j) Maintenance Supervisor and maintenance personnel shall carry a pen dosimeter during maintenance activities involving radioactive material source.
k) Isolation procedures shall be implemented when doing repair works and internal inspection. All service contractors/employees shall secure permission from the supervisor before starting the work.
l) Inspection, cleaning and repairing of tanks, pipes and other equipment shall be performed under careful supervision of properly trained workers and provided further that no personnel nor any items has been left inside the tank, pipes, and other equipment after undertaking maintenance jobs.
m) Locations of all safety equipment like fire extinguishers, first aid kit, eye wash, safety showers and others shall be known to all employees at all times.
n) Parallel work in the vertical direction is prohibited.
o) Bonding wire should be attached to the flanges of pipes through which explosive fluids flow.

1.5 INDICATION and SIGNAGE

a) Warning signs carrying appropriate information relative to safety shall be posted in all working areas whichever is applicable.

b) All piping systems within the plant site complex area shall be color-coded accordingly. This shall be enforced to easily recognize the kind of material (steam, gas, acid, slurry, water) that each pipe carries. Proper pipe maintenance (repainting) shall always be carried out periodically or as required.



1.6 ENVIRONMENT

a) The plant site complex area shall be maintained below the maximum permissible limits of air pollutants, in mg per NCM as follows: Total Suspended particulates (TSP): 0.30; Sulfur Dioxide (SO2) : 0.47 ; Nitrogen Dioxide (NO2) : 0.375 ; Hydrogen Sulfide (H2S) : 0.10; and Carbon Monoxide (CO) : 500 as CO

b) All Distributed Control System (DCS) operators shall be duly authorized before being allowed to perform his/her task.

c) Control devices and emission detectors shall be regularly calibrated and checked for its conformity to the process and environmental requirements.

d) Leaks on tanks and piping shall be reported and repaired immediately.

1.7 INFORMATION CONTROL

a) Picture Taking shall be strictly prohibited in all areas. If need to take picture permission and approval from Plant manager is required.

b) The information related to work must be managed strictly. For example situation to prevent mis-communication and confusion.

c) In the event of an emergency, only the President or his designated spokesperson is the only authorized person to give information to the public on behalf of the company. No other person is allowed to disseminate information regarding the incident.

1.8 EMERGEMCY

a) An Emergency Response Team shall be created and shall be activated during emergency cases.

b) First Aid Kits shall always be available in all areas in the plant and that, no employee is allowed to take or remove it from its location unless permitted to do so.

SECTION 2: GATE CONTROL POLICY FOR PLANT SITE AND PIER SITE FACILITIES

2.1 Introduction

This policy is formulated for the proper management of THPAL Facility Areas purposely for safety and security of personnel and for control of the flow of equipment and materials.

2.2 Scope and Coverage

a) The policy shall apply to all concerned personnel whether direct THPAL employees or service contractors as well as canteen operators, service contractors and the vehicles they are using for area-related work.
b) This shall likewise cover the regulation in handling the movement or flow of any material/supply/spare parts/tools/scraps in and out the THPAL Facility Areas.

2.3 Requirements

2.3.1 On Personnel:

a) Company ID – for THPAL and major Contractors;
b) Contractor's ID – for other Contractors; ID of additional manpower especially during major shutdown should have prompt coordination with Security and OSH department
c) Complete Uniform and Basic PPE – for Agency workers upon entry at gates;
d) Guest Technician's ID – for especially arranged technicians;
e) Visitors shall coordinate with Administration, Security and OSH Department for visit approval and other requirement.
f) Necessary Arrangement with Administration – for Government Visitors and other VIPs.
g) Basic PPE: appropriate safety gadgets such as hard hat with straps; long pants; long sleeves; safety shoes; respirator; and eye goggles shall be used at all times while at work.

2.3.2 On Vehicle:

a) THPAL Sticker – for regular vehicle moving to and from THPAL Facility Area; to be released by Security Department with validity from the date of issuance until end of service or contract to concerned owner/user upon submission of following documents:
b) Registration of Vehicle
c) Driver's License of Authorized Driver/Operator
d) DDC certificate given by THPAL safety office
e) Material Entry/Exit Pass – as loaded with any material/supply/spare part/tools/scraps in moving to and from THPAL Facility Area.

e.1 Direct THPAL load – Gate Pass must be duly certified by concerned department and approved by Security Department;
e.2 Indirect THPAL load – Gate Pass must be duly certified by authorized contractor-representative and approve by Security Department.

2.4 Inspection Procedure

a) THPAL Employees, Contractors, and Visitors will be checked upon entry to THPAL Facility Area Gate in compliance with ID requirement.
b) Any incoming and outgoing vehicles or equipment will be checked at any gates for their valid sticker, authorized driver, passenger or any load.

c) Despite possession of all necessary requirements, guards reserve the right to conduct thorough check/inspection of incoming and outgoing personnel and their personal belongings or to bar entry/exit of all suspicious or undesirable personnel, vehicles/equipment and properties which may be direct or indirect threat to Company operation

2.5 On Anybody/Anything Suspected/Undesirable:

Despite possession of all necessary requirements, GSSI Guards reserve the right to conduct the usual check/inspection of incoming and outgoing personnel and their personal belongings or to bar entry/exit of all suspicious or undesirable personnel, vehicle/equipment and properties which may be a direct or indirect threat to Company operations.

SECTION 3: THPAL PLANT SITE VISITORS

3.1 Visitors shall be classified as follows:

a) Technical Employees and/or Representatives from other Private Companies.
b) Legal Employees and/or Representatives from the Government Sector
c) Educational Teachers and Students (High School and College)
d) Others: Employees and/or Representatives from NGO's and Religious Organizations and family members

3.2 Educational and other visitors who intend to visit THPAL plant site complex area shall first coordinate with the Administration Department through a letter or in any means of communication requesting for approval for such visit as much as possible 60 days prior to the planned visit.

3.3 Visitors who intend to go on plant site tour shall first undertake safety and health orientation. All visitors shall obey all safety instructions given by the THPAL Safety Officer or authorized personnel. A visitors' view platform located outside of the plant site complex area shall be provided.

3.4 Visitors shall not be allowed entry in Restricted Areas within the plant site complex area.

3.5 THPAL shall have full discretion to accept or deny entry of visitors.

3.6 All visitors shall be given a temporary ID which shall be worn at all times while inside the plant site complex area.

3.7 During the tour, all visitors shall wear the personal protective equipment provided by THPAL. These PPEs shall be returned before leaving the plant site complex area.

3.8 Picture taking shall be strictly prohibited in all areas.

3.9 No personal belongings, including food and drinks shall be allowed entry within the plant site complex area.

SECTION 4: HOUSEKEEPING

4.1 Proper housekeeping shall be practiced at all times in the plant site complex area. Garbage and waste shall be segregated and put in a designated trash bin.

4.2 Scattered hose which are no longer in use shall be housekeep and put in a designated hose rack.

4.3 Damaged plastic palette shall be disposed to secondary collection point by each section.

4.4 Slippery and muddy access way should be cleaned up to clear from slippery and tripping materials.

4.5 Leftover of maintenance works such as scraps, metal cuttings, scaffolding tube, scaffolding planks, clamps, unnecessary materials etc. should be cleaned up and housekeep during and after the activity.

4.6 Anything that is left behind and not intended in the area shall be removed and placed to its proper location or disposed to the designated waste collection facility.

4.7 Stacking of materials should be in the designated area for storage.

4.8 Tools and equipment shall be kept to the respective storage and/or parking area and should not be left in the area after using and completion of the activity.

4.9 Hallways or passageways, Emergency equipment and exit shall be kept free from any obstruction.

SECTION 5: PAGING SYSTEM

a. Paging system shall be installed and shall be heard anywhere in the plant site complex area. All employees shall be required to participate in the Emergency Response drills to be conducted by the Safety Officer

b. The THPAL Nickel Corporation maintains a state-of-the-art paging system to alert and guide its employees, contractors, visitors in emergency cases.

c. In case of fire, the fire alarm will register the exact location at the DCS room. The fire alarm system is activated automatically. DCS Operator will advise Field Operator to confirm actual status at location of fire alarm. DCS Operator will then inform Shift Foreman and then inform Safety for the activation of Firefighting Team. Notification procedures will vary depending on the magnitude of the situation. Shift Foreman shall inform Section Manager

d. In case of H2S Leak, the THPAL plant is equipped with one hundred twenty (120) H2S gas detectors installed at the different strategic areas of the plant that will automatically sets an alarm if H2S gas is detected, equipped with a Safety Instrument System (SIS) which automatically shuts down the H2S plant when reached a certain reading. If there is H_2S gas leakage detected by the H_2S gas detectors, the alarm in the DCS room and the siren are automatically activated. A continuous loud siren sound will be heard all over the Plant Site area.

e. Announcement is then initiated by DCS operator three (3x's) in English and Tagalog in the Plant site.

f. In actual emergency, THPAL will inform the nearest Community by announcement through paging system for the appropriate action of the residents in case they need for evacuation upon instruction of Plant Manager.

SECTION 6: PREVENTION OF DRUNK DRIVING

a. Management would like to inform all employees against Drunk Driving Policy. Management primary concern is the safety of all employees and their dependents.

b. The objective of this is to emphasize road safety and observance of responsible and ethical driving standards, to promote general welfare as essential for uplifting of living conditions and maintenance of public safety, and to value life and recognize that it should be accorded with great care as well as any property.

c. When employees drink alcoholic beverages while attending party and they like to drive their own vehicle is strictly prohibited. Everybody is advised and encourage to practice "SAFETY FIRST" even outside working premises.

d. It shall be unlawful for any person to drive a motor vehicle while under the influence of, dangerous drugs and/or similar substances.

e. Alcoholic condition, the driver can't drive safely and there is a risk of causing incident/accident.

f. In worst case the driver becomes a murderer. Driver must imagine the feelings of family left behind by victims of drunk driving.

CHAPTER II BASIC SAFETY RULE

SECTION 1: RISK MANAGEMENT

1.1 Job Hazard Analysis

1.1.1 PURPOSE

(JHA) is an important accident prevention tool that works by finding hazards and eliminating or minimizing them before the job is performed, clarification and hazard awareness, as a guide in new employee training, for periodic contracts, and for retraining of senior employees, as a refresher on jobs which run infrequently, as an accident investigation tool, and for informing employees of specific job hazards and protective measures.

Set priorities for doing JHAs: Jobs that have a history of many accidents, jobs that have produced disabling injuries, jobs with high potential for disabling injury or death, and new jobs with no accident history.

In THPAL, this is carried out when determining work procedures, and the results are reflected in the SOP.

1.1.2 SEQUENCE OF BASIC JOB STEPS

Break the job down into steps. Each of the steps of a job should accomplish some major task. The task will consist of a set of movements. Look at the first set of movements used to perform a task, and then determine the next logical set of movements. For example, the job might be to move a box from a conveyor and putting it on a hand truck is one logical set of movements, so it is one job step. Everything related to that one logical set of movements is part of that job step.

The next logical set of movements might be pushing the loaded hand truck to the storeroom. Removing the boxes from the truck and placing them on the shelf is another logical set of movements. And finally, returning the hand truck to the receiving area might be the final step of this type of job.

Be sure to list all the steps in a job. Some steps might not be done each time – checking the casters on a hand truck for example. However, that task is a part of the job as a whole, and should be listed and analyzed.

1.1.3 POTENTIAL HAZARDS

Identify the hazards associated with each step. Examine each step to find and identify hazards-actions, conditions, and possibilities that could lead to an accident.

It is not enough to look at the obvious hazards. It is also important to look at the entire environment and discover every conceivable hazard that might exist.

Be sure to list health hazards as well, even though the harmful effect may not be immediate. A good example is the harmful effect of inhaling a solvent or chemical dust over a long period of time.

It is important to list all hazards. Hazards contribute to accidents, injuries, and occupational illnesses.

In order to do part three of a JHA effectively, you must identify potential and existing hazards. That is why it is important to distinguish between a hazard, an accident, and an injury. Each of these items has a specific meaning.

HAZARD – A potential danger. Oil on the floor is a hazard.
ACCIDENT – An unintended happening that may result in injury, loss, or damage. Slipping on the oil is an accident.
INJURY – the result of an accident. A sprained wrist from the fall would be an injury.

Some people find it easier to identify possible accidents and illnesses and work back from them to the hazards. If you do that, you can list the accident and illness types in parentheses following the hazard. But be sure you focus on the hazard for developing countermeasure and safe work procedures.

1.1.4 COUNTERMEASURE

Using the first two columns as a guide, decide what actions are necessary to eliminate or minimize the hazards that could lead to an accident, injury, or occupational illness.

Among the actions that can be taken are:
1) engineering the hazard out;
2) providing personal protective equipment;
3) job instruction training;
4) good housekeeping;
5) good ergonomics (positioning the person in relation to the machine or other elements in the environment in such a way as to eliminate stresses and strains).

List of safe operating procedures on the form, and also list required personal protective equipment for each step of the job.

Be specific. Say exactly what needs to be done to correct the hazard, such as, "lift using part of your leg muscles." Avoid general statements like "be careful."

Give an action or procedure for every hazard.

If the hazard is a serious one, it should be corrected immediately. The JHA should then be changed to reflect the new conditions

1.2 RISK ASSESSMENT

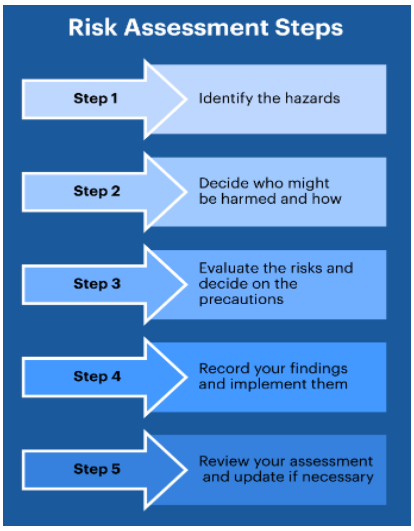
A risk assessment is a process used to identify potential hazards exist or may appear in the workplace and analyze what could happen if a disaster or hazard occurs. There are numerous hazards to consider, and each hazard could have many possible scenarios happening within or because of it or how they may cause harm and to take steps to minimize harm.

THPAL Management shall utilize this a tool for risk management to evaluate from probability and severity of occurrence.

The 5 steps to risk assessment:

1) Identify the hazards.
2) Decide who might be harmed and how.
3) Evaluate the risks and decide on precautions.
4) Record your significant findings and implement them.
5) Review your assessment and update if necessary.

This basic knowledge is also applicable in the formulation of KY Card, Unusual KY during actual execution of any activity.



1.3 WORK METHODOLOGY

Work methodology must be prepared for new project/special activity and need to be approved by management. Work Methodology must have the needed information required to proceed the project safely as provided in the following sequence:

a) Title **–** the name of the project specific.
b) Introduction – the name of the equipment, facilities and briefed description of the project to include location, access route and storage of materials.

c) Purpose – this will state a commitment to comply the safety requirements specially the requirements with regards to safety, health and environment. The purpose, scope and type of project will be presented.
d) Project Schedule- This is the plot of the schedule duration from start of the project until completion.
e) Details of Activities and Procedures
    i. Step by step procedures with pictures, lay-out plan, illustration and diagram.
    ii. On the page that introduces the actual work, include illustrations of the work, an explanation of what will be done, and short KY that should be keep in mind.
    iii. In the case of electrical work, check to see if there are any live parts, assess shock the risk of electrical shock, and provide explanation,
    iv. Preparation works
    v. Manpower Requirements
    vi. PPE Requirements
    vii. Lifting Plan
    viii. Scaffolding Plan and Location of Temporary Laydown
    ix. Tools and Equipment
    x. Hazard, Risk Assessment and Countermeasures
    xi. Environmental Waste Management
    xii. Emergency Communication Channel/Organization Chart
    xiii. Others –additional information to supplement details
f) Attendee during presentation of work methodology will be the following:
    i. Contractors management (Managers, Technical and Safety Staff)
    ii. THPAL concerned management (1. Concerned Department's DPM or Manager or Section Heads, 2. OSH Manager or Safety Manager/ Supervisor/Consultant, and 3. respective PIC's).
    iii. If lacking member, the meeting should be rescheduled.
g) The work methodology should be rectified immediately for the concerns of the attendees of the methodology presentation. This should be approved by DPMs or Plant Manager before execution of the project.
h) After approval, educate the workers on the work methodology.

1.4 SAFETY AUDIT

Safety audit must be held by the PIC of the project after completion of the activity. The attendee will be the same as Work Methodology presentation.

Before starting the audit, project PIC should explain about the project details and safety measures.

Substandards found on-site must be listed by the PIC and corrected immediately. After the correction is completed, PIC should obtain approval from DPMs or plant manager for the completion of the construction.

1.5 KY CARD (INDIVIDUAL KY CARD)

KY Card is derived from the Japanese words Kiken Yochi, which means hazard prediction or Job Safety Analysis/Job Hazard Analysis. Generally, it is called as Hazard Prediction Card. This card aims to help predict potential hazard in the job so as to enable us to carry out our job safely.

KY Card will be made before going to working places or before starting to work. By accomplishing this card, potential hazards in the work places will be studied carefully and countermeasures will also gear up. All employees will be required to fill up this card before the start of their shift activities. This card will take only about 5 minutes within the first hour of the shift. The card will be collected and reviewed by their supervisors. Supervisor

must feedback and advise them of the content. The most critical KY Cards will be discussed among crews led by the supervisor. By doing this, employee's ability in identifying potential hazards and setting countermeasures will be developed.

1.6 HHK CARD

HHK Card is derived from the Japanese words Hiyari Hatto Kigakari, which means a Near Miss Accident Report Card. This card is intended for reporting incidents encountered on the job and activities that will help improve those facilities, or call other workers' operating at the same level attention to those incidents thus assuring occupational safety.

If anyone encounters a near miss incident, he or she is required to report immediately, by using this card, for the awareness of the next person who will work in the same assignment/working place. The most critical HHK will be discussed during turnover meetings so that everyone must be aware of the near misses and effective countermeasures must be applied immediately to avoid recurrence.

1.7 UNUSUAL KY

Unusual KY card is an improvised KY card also for hazard prediction. As the name suggests, it will be intended for unusual activities, being done at low frequencies activities done not on daily basis like shutdown activities and others.

Unlike KY card, this is performed by the group of employees with a leader assigned to do the activity. Before the activity proceeds, the form is filled up taking into account the sequence of work, risk factors and object for action, and the necessary safety precautions and materials needed. The filled up form is reviewed by the shift foreman or the Lead man if the foreman is unavailable. Once approved, the team proceeds to the actual work area for further evaluation of the situation.

After the activity, filling up of unusual KY with identified hazards with counter measures to be implemented were discussed. Then, Foreman or Supervisor will review and approve the completed form. This document will serve as the basis of doing the same activity again.

This KY will be made when there is an unusual activity to be conducted which is not included in daily routine activity of any personnel on site.

Sample sequence in filling up the Unusual KY form.

Date – Date today
Activity – is the general Activity to be done (ex. 106VE01 descaling)
Content – is the specific activity to be done (ex. Tool preparation, flushing, descaling, housekeeping, etc.)
Leader – Shift Leader / Leader of group
Members –Other Supervisors, Production Operators
Work Procedure – Specific Procedure of the Activity
Tools – list of all tools to be used for the Activity
PPE – list of all PPE's to be used for the Activity
Basic PPE – Hard hat, Respirator, Uniform, Safety Shoes
LOTO – encircle (Yes) if it is conducted or (No) if not
Signage – encircle (Yes) if it is installed or (No) if not
Confined Space – encircle (Yes) if the activity has confine space and (No) if no confine space
O2– encircle (Yes) if oxygen was checked and (No) if not
H2S – encircle (Yes) if H2S was checked and (No) if not

1st round Risky Factor

Safety / Environmental – put S if risky factor relating to Safety and E if risky factor relating to environment

Risky Factor – are actual risky factor/s identified before the start of the activity. Try to answer the 5W and 1H so you will be more specific. (What, Why, Where, When, Who and How)

2nd round Risk Assessment

Possibility X Severity = Score with Risk rating criteria

3rd round Countermeasure

Countermeasures – are countermeasure/s to actual risky factor/s identified before the start of the activity. It should be specific and doable.

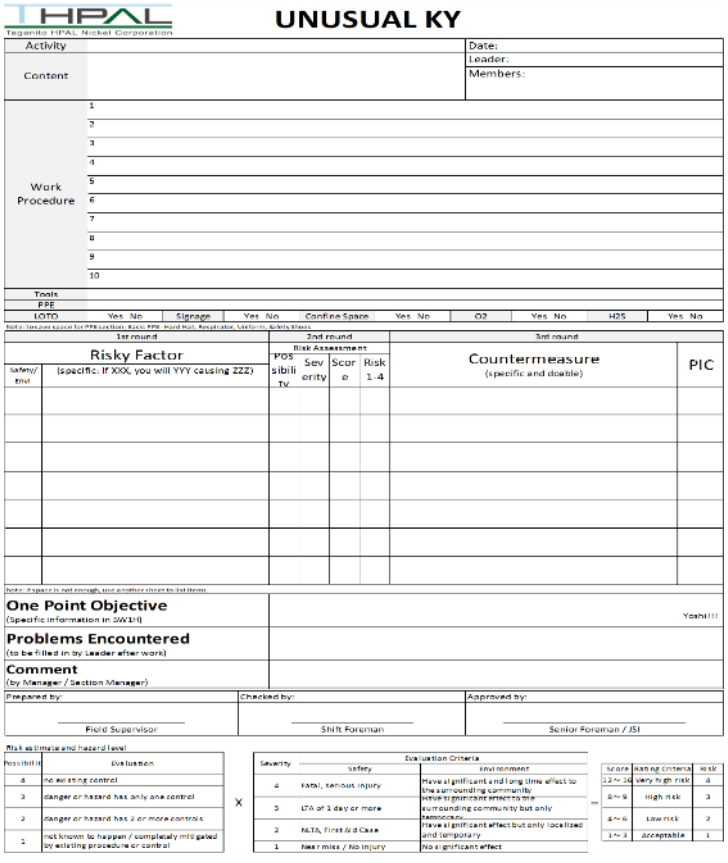
PIC – is the Person In-Charge of the Activity

One Point Objective – is the objective of the team to safely conduct the activity. Basically the best doable countermeasure.

Problems Encountered – list of problems to be filled by Leader after work

Comment – to be filled up by Section Manager and/or Department Manager

Signatories – Preparer (Field Supervisor), Checker (Shift Foreman) and Approver (Senior Foreman and/or JSI) – depends on each Section



HPAL
Taganito HPAL Nickel Corporation

UNUSUAL KY

Activity		Date:
Content		Leader:
		Members:
Work Procedure	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
Tools		
PPE		

LOTO	Yes No	Signage	Yes No	Confine Space	Yes No	O2	Yes No	H2S	Yes No

Note: Indicate space for PPE section: Basic PPE, Hard Hat, Respirator, Uniform, Safety Shoes

1st round	2nd round Risk Assessment			3rd round	
Risky Factor (specific: If XXX, you will YYY causing ZZZ)	Possibility	Severity	Score	Risk 1-4	Countermeasure (specific and doable)	PIC

Note: If space is not enough, use another sheet to list items

One Point Objective (Specific information in SW1H)	Yoshi!!!
Problems Encountered (to be filled in by Leader after work)	
Comment (by Manager / Section Manager)	

Prepared by:	Checked by:	Approved by:
Field Supervisor	Shift Foreman	Senior Foreman / JSI

Risk estimate and hazard level

Possibility	Evaluation
4	no existing control
3	danger or hazard has only one control
2	danger or hazard has 2 or more controls
1	not known to happen / completely mitigated by existing procedure or control

X

Severity	Evaluation Criteria: Safety	Evaluation Criteria: Environment
4	Fatal, serious injury	Have significant and long time effect to the surrounding community
3	LTA of 1 day or more	Have significant effect to the surrounding community but only temporary
2	MTA, First Aid Case	Have significant effect but only localized and temporary
1	Near miss / No injury	No significant effect

=

Score	Ranking Criteria	Risk
12 ~ 16	Very high risk	4
8 ~ 9	High risk	3
4 ~ 6	Low risk	2
1 ~ 3	Acceptable	1

Unusual KY sample for Production Department

1.8 KY Board

KY board is almost the same as KY card which is performed by the group of workers assigned to do the activity. Before the activity, they will fill the KY board completely and discussed to all workers the content. This KY board must be present in the activity area.

Contractor LOGO

KY BOARD

W.O. No.	Activity	Date:
Activity Contents		Workers Name:

No:	Risky Factors (specific: if XXX, you will YYY causing ZZZ)	Countermeasures (specific and doable)

Team Objective For Action					
One Point Objective (More specific information, 5W1H)					
THPAL Section / Department		Contractor SUPERVISOR		THPAL PIC	

1.9 4RKY

4RKY is a KY or hazard prediction with four rounds. 4RKY aims to setting a limit to a job and implementing hazard prediction in order to help highlight potential hazards in relevant jobs and produce countermeasures. It has four rounds with understanding the current state of affairs is the first, investigation into the true nature of the incident is the second, setting up countermeasures and setting up objectives are the third and fourth rounds respectively. 4RKY can be utilized if no Unusual KY was made. This is a training tool to enhance the KY skills.

Before this activity will start, visit a workplace and take a photo of the activity scenario for thorough investigation. This activity will be done in a group consisting up to five or six members. The group will have to nominate themselves the leader, facilitator, and scribe, and the rest will be the members.

The activity runs from studying the picture, identifying the potential hazards, narrowing the potential hazard by identifying the important and especially important potential hazards, setting up practical and effective countermeasures, making of a team objective, and finally the drawing out of a one-point objective. After the form is completed, the group will have to present their work according to the 4RKY Presentation Procedure.

This potential hazard analysis is made when a production or maintenance activity is believed to have the most critical identified potential hazard or an activity generates a near miss accident. The activity will not be pursued upon the evaluation of the supervisor that the activity must be at its maximum safety, thus, 4RKY must be made. This is also done periodically of at least once in a month per department.

4RKY competition will also be made during the last month of the year. It will be participated by all departments that involve in the direct operation such as Administration, Electrical, Mechanical, Production, Purchasing, Logistics, Civil & MEPEO, Security, Power Station & Utilies, Laboratory, Engineering. Number of participating teams in every department will depend on the size of manpower. Prices for the three winning teams will be included in the Safety and Health Budget.

Sample in filling up 4RKY form

1st round

Finding (extraction of)risky factors → Understanding the current state of affairs【Finger Pointing and calling】

Risky Factor – are actual risky factor/s identified before the start of the activity. Try to answer the 5W and 1H so you will be more specific. (What, Why, Where, When, Who and How)

2nd round

Mark for ①important （○）②especially important（◎） → Potential hazard【Finger pointing and Calling】

3rd round

Setting up countermeasures ... Concretely and practicable countermeasures

①It is possible to do yourselves by actual equipment ② the important countermeasure (◎) for each of items.

Countermeasures – are countermeasure/s to actual risky factor/s identified before the start of the activity. It should be specific and doable.

4th round

①Mark with (＊) those countermeasures linked to the team objective that need to be acted.

Establish the team objective for action from (＊) countermeasures. Finger pointing and Calling】

②Designate a one-point object from (＊) countermeasures .Identify 1 item.【Finger pointing and Calling 3 times】

One Point Objective – is the objective of the team to safely conduct the activity. Basically the best doable countermeasure.

4 ROUND－ＫＹ　REPORT（HIYARI・KIGAKARI・OTHERS）　DATE　／／

Illustration No.	Theme	Explanation of Situation

Group	Leader	Scribe	Presenter	Member

Target Time　1st round＋2nd round＝7min

1st round　：　Finding (extraction of)risky factors →　Understanding the current state of affairs【Finger Pointing and calling】

2nd round　：　①important　(○)　②especially important　(◎)　→ Potential hazard【Finger pointing and Calling】

○◎ mark	No.	Risky factors and Phenomenon　(the style of the incident)　If you do XXX, YYY will occur for ZZZ.
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	

Target Time　3rd round＋4th round ＝3min.

3rd round　：　Setting up countermeasures　…　Concretely and practicable countermeasures

①It is possible to do yourselves by actual equipment ② the important countermeasure (◎) for each of items.

2R No.	◎※ mark		2R No.	◎※ mark	
5			4		
3			9		

4th round　：①Mark with (＊) those countermeasures linked to the team objective that need to be acted.
Establish the team objective for action from (＊) countermeasures. Finger pointing and Calling】
②Designate a one-point object from (＊) countermeasures .Identify 1 item.【Finger pointing and Calling】
3 times

The team objective for action Attain XXX by putting YYY into action	
One-point objective	

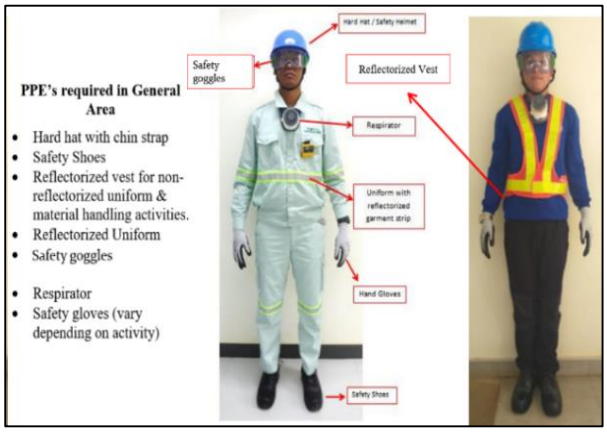
Touch and call 『Let's go for zero incident, Yoshi！』　【Finger pointing and Calling】

SECTION 2: PPE RULE

Taganito HPAL Nickel Corporation furnishes the workers with personal protective equipment (PPE) for the head, eyes, face, hands, and feet, as well as protective shields and barriers whenever necessary by reason of the hazardous nature of the process or environment, chemical, radiological, or other mechanical irritants or hazards capable of causing injury or impairment in the function of any part of the body.

2.1 Basic PPE

Basic PPE includes a hardhat, goggles, respirator (with H2S) that hangs on the neck, safety shoes, long sleeves and pants, and a reflectorized vest.



THPAL Area

- THPAL Plant
- Wharf
- Dorm
- Tailings Storage Facility

2.2 Special PPE

2.2.1 Eye and Face Protection

Eyes and face protective equipment are required to protect eyes and face against the hazards of flying objects, liquids, injurious radiation, glare or a combination of these hazards.

PPE	Need	Except	Photo
Goggle	**All area**	**Activities** • **Office Work** • **DCS Operators** • **Meetings** • **LOTO procedure at MCC and Substations**	
Face Shield	**Activities** • **Hotworks** • **Acid and Chemical handling and response**		
Welding Mask	**Welding activity and other hotworks activities**		

a) Acceptable specifications

Goggles should be tight-fitting that completely covers all sides of the eyes.
Face shield should be made to offer chemical resistance.
Welding mask should be fitted and connected to hard hat.

b) Inspection and management

Clean and sanitize the eye and face protection regularly to maintain visibility and prevent the spread of germs.

Inspect your eye and face protection for any signs of damage or wear and tear. Replacement of eye goggles with clip, safety goggles and face shields and acid bonnets will be upon the request of the worker due to damage.

Store the eye and face protection PPE in a clean and dry place when not in use to prevent damage and contamination. Do not modify or alter your head protection in any way, as this can compromise its effectiveness.

c) Proper wearing

Ensure that the eye and face protection PPE fits properly and comfortably.

Make sure that the eye and face protection provides adequate coverage and protection for the specific tasks you are performing.

In the event that the worker is wearing corrective glasses or safety glasses, safety goggles must be worn over that glass.

2.2.2 Respiratory Protection

Respiratory protection is required to prevent exposure of employees to air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, vapors, or sprays, and thus to prevent occupational illness.

Area	Respirator to Hang/Bring/Wear
Inside Plantsite	**Hang (with H_2S cartridge)**
Outside Plantsite	**Bring (with H_2S cartridge)**
Dusty Area	**Wear dust mask, Bring respirator (H_2S cartridge)**
Emergency	**Wear (depending of the gas)**
Specific Activity	**Dual respirator can be worn for dusty activity Depends on activity, need to select the type of the cartridge., Bring respirator (H_2S cartridge)**

Respirator Set 	Cartridge, H2S Gas, (CA 104 N II/HS)		For H2S gas
	Cartridge, OV/AG, (CA 104 N OV/AG)		For organic vapors and acid gases
	Cartridge, Dust (U2W)		For dust

Particulate Respirator

Dual Filter respirator

a) Acceptable specifications

Respirator – preferable same type as THPAL SHIGEMATSU Single Valve Half Face Reusable Respirator Mask Model GM76S **and cartridge.**
Cartridge – cartridge for H2S gas and Organic Vapors and Acid Gas (OV/AG)
Particulate respirator – should be N95

b) Inspection and Management

Inspect your respirator regularly for any signs of damage or wear and tear.
Replace any damaged respirator immediately.

i. Inspection
Respirator complete set of mask, retainer cap, inhalation valve and head harness, and disposable particulate respirator will be upon the request of the worker due to damage.

ii. Replacement of cartridge

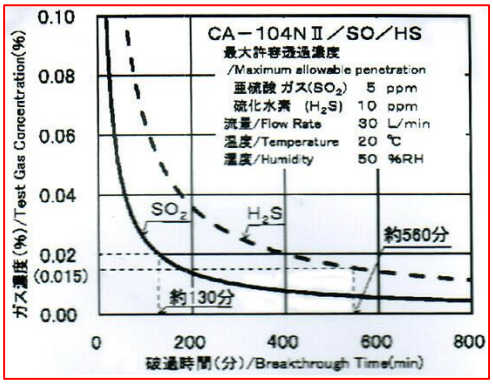
a) Immediately after an emergency H2S leak or the employee has used his/her respirator during such event, Cartridges for H2S gas will be replaced.

b) Production personnel assigned at H2S, MS and Scandium area especially workers involve in sampling activity should replace their cartridge at most 3 months from the date of the issuance.

c) Others are from 2 years from the date of manufacture, which is indicated in the cartridge, however if the worker's cartridge has already signs of rust due to wet condition, it will be replaced regardless of how long it has been issued.

d) When the accumulated record of used time reaches the predetermined breakthrough time(=The time it takes for the gas to leak to face side in an amount that exceeds the maximum allowable penetration concentration.)

- Cartridge for Sulfur Dioxide and Hydrogen Sulfide (CA-104NII / SO / HS) can withstand 10 ppm for 400 minutes
- Cartridge for Organic Vapors and Acid Gases (CA-104NII OV/AG) can withstand 5 ppm for 130 minutes.



Ex-1) When the cartridge is used for 400 minutes in an H2S atmosphere of 0.02% (200 ppm), 10 ppm of H2S gas will leak towards the face.
In a 2 ppm environment, it will leak after 100 times that amount, 40,000 min (667 h) of use.

Ex-2)When the cartridge is used for 130 minutes in an SO2 atmosphere of 0.02% (200 ppm), 5 ppm of SO2 gas will leak towards the face.
In a 2 ppm environment, it will leak after 100 times that amount, 13,000 min (217 h) of use.

e) When a wearer smells contaminants or feels irritant.
f) When inhalation resistance increases and breathing is difficult even if the accumulated record of used time has not reached the predetermined breakthrough time.

c) Proper wearing

Place the strap over your head and rest at the top back of your head or top of hard hat as long as it fits snugly to the face and has no leakage. If you have a second strap, place the bottom strap around your neck and below your ears. Do not crisscross straps.

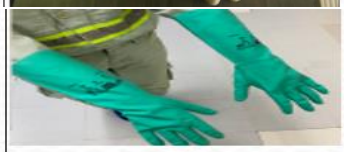
Wear respirator directly to the face skin and not on top of any other masks.

Use appropriate cartridge depending on the activity involve and the possible gas exposure. Management should manage workers' cartridge to use.

2.2.3 Hand Protection

Hand protection is required to protect hands of being exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes and electrocution.

Hand Gloves, "Best", Neoprene		Acid Gloves, They provide excellent protection from acids, caustics, oils, grease, alcohols, refrigerants, ketones, detergents, fertilizers and many solvents
Leather Gloves, yellow		abrasion protection and holding mild heat applications

Welding Gloves		For welding / hotworks activities
Jackson Gloves		- Ideal for heavy and masonry works • Crinkled finished latex coated palm provides excellent grip • High tear resistance providing high durability • Cut resistance level 2 for better hand protection • Seamless knitted cotton construction offering high breathability for comfort in extended use.
Ansell gloves		For high precision handling
Nitrasafe gloves		In sharp, oily, puncturing, and abrasive environments, outperform leather and cut-resistant automatic knit liners. • Fully nitrile coated • Five-piece jersey lining • Cut-resistant Kevlar® fibers • Safety cuff design
Electrical Gloves		
Chemical Gloves		Resistant to chemical such as, Saturated Hydorcarbons, Inorganic bases, Inorganic Mineral Acid (sulphuric acid 96%), Oxidizing, Organic Base, peroxide, Aldehyde

d) Acceptable specifications (refer to above photos of gloves)

e) Inspection and Management

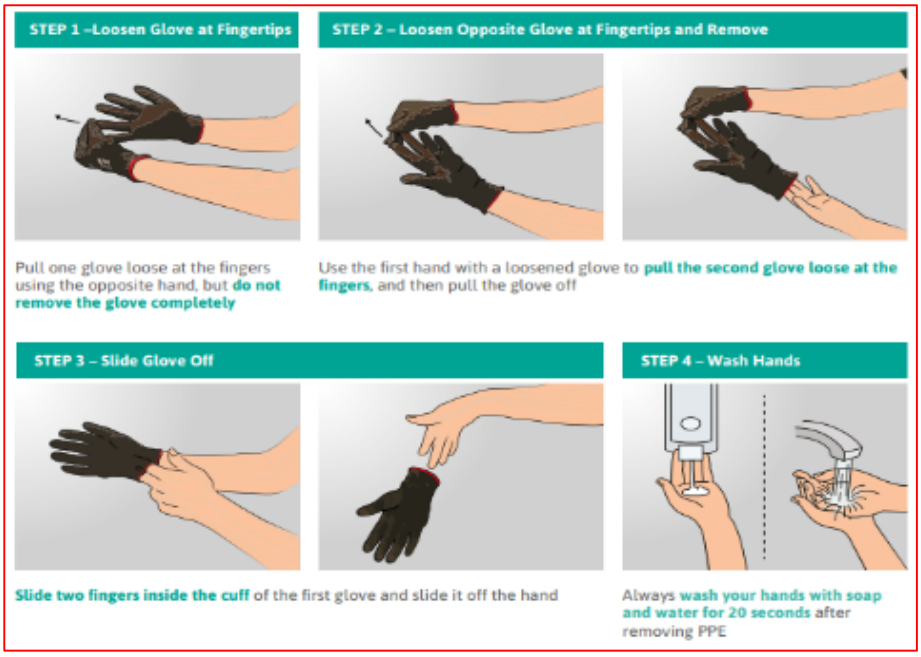
Regularly and before usage, inspect the hand protection PPE for any damage or wear and tear. Replace any damaged equipment immediately. Replacement of Hand Gloves will be upon the request of the worker due to damage.
Use Hand Gloves Clip to hold your Gloves.

f) Proper Wearing

Properly wearing safety gloves is important to ensure your hands are protected from potential hazards.

Choose the Right Gloves: Select gloves suited to the task and hazards.

- Inspect: Check gloves for damage and ensure they're clean and dry.
- Prepare Hands: Clean and dry your hands before putting on gloves.
- Put On Carefully: Insert fingers one by one and adjust for a snug fit.
- Check Coverage: Ensure gloves cover hands fully and provide adequate protection.
- Use Correctly: Avoid cross-contamination and replace damaged gloves promptly.
- Remove Safely: Peel off gloves carefully to avoid touching contaminated surfaces.



2.2.4 Foot Protection

Foot protection is required to protect feet from potential injury of falling or rolling objects, objects piercing the sole of the foot, electrical hazards, hot surfaces, slippery surfaces and surfaces with chemicals.

PPE	Protection	Photo
Safety Shoes	**For Foot Protection in all activities except Special Activities and wet condition**	
Rain Boots (Yellow Sole)	**Used to protect feet especially in wet environments**	
Acid Boots (Red Sole)	**Used to protect feet for Acid, Alkalis, Oil, Petrol, Fat and Pierce Resistant**	

Fire Boots	**Used to protect feet on high temperature surface and fire emergency**	

g) Acceptable specifications

All foot protection must feature a steel toe cap to protect against impact and compression.

h) Inspection and management

Regularly and before usage, inspect the hand protection PPE for any damage or wear and tear. Replace any damaged equipment immediately. Damaged worker's foot protection will be replaced regardless of how long it has been issued.

i) Proper Wearing

- Shoes should be worn such that the wearer does not step on the heel protection area.

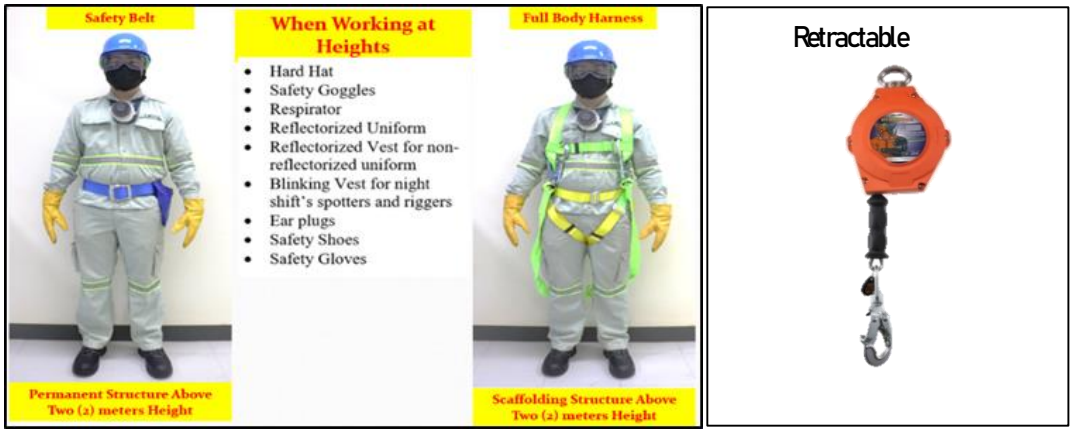
- Boots should not be cut by the user for the comfortability of wearing.

2.2.5 Fall Protection

Fall protection is required if any risk exists that a worker may fall from an elevated position. Fall protection should be worn above 2 meters from the ground. Detail fall protection is described more in Chapter 3.

Retractable Safety Belt should be worn on activities within the permanent platform such as during inspection or audit. Activities within temporary scaffolding structures and without any platform such as during installation of scaffolding full body harness is required.

Retractable lanyard should also be used when descending and ascending the ladder 5 meters high without access landing.



j) Acceptable specifications

Safety Belt - Must meet or exceed applicable safety standards such as OSHA, ANSI/ASSE, and CSA.

Full Body Harness - Must meet or exceed applicable safety standards such as OSHA, ANSI/ASSE, and CSA.

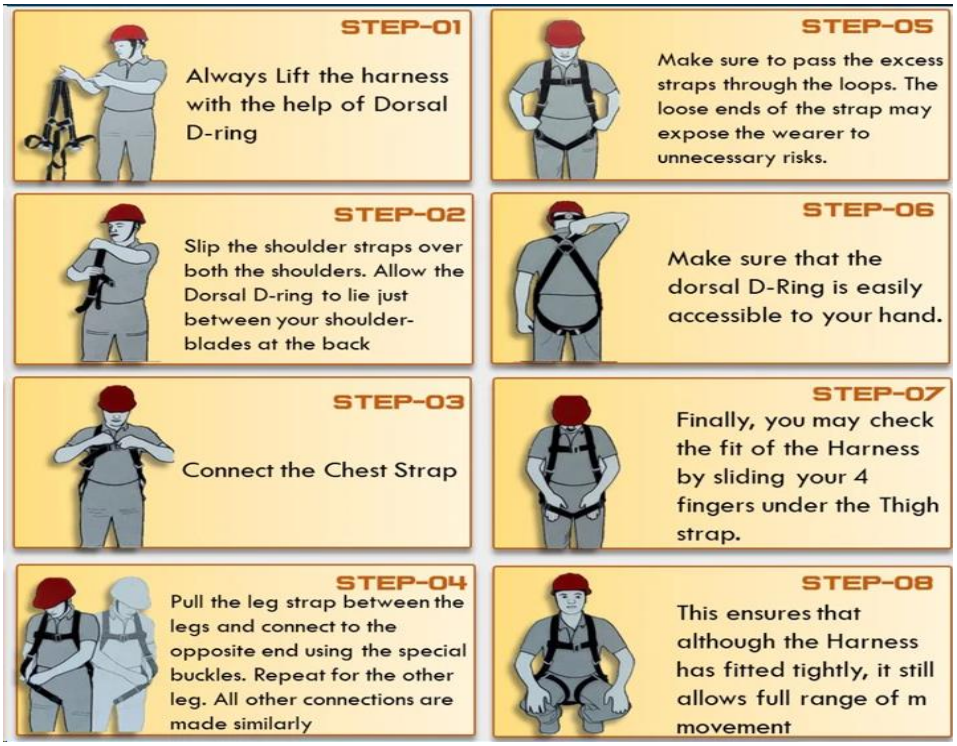
Retractable Fall Arrester - Must meet or exceed applicable safety standards such as OSHA, ANSI/ASSE, and CSA.

k) Inspection and management

Regularly and before usage, inspect the fall protection PPE for any damage or wear and tear. Replacement of full body harness and retractable safety belt will be upon the request of the worker due to damage. Inspected and tested fall protection PPE must have visible inspection color tagging attached. If the lanyard has been involved in a fall or severe impact, it should be taken out of service and inspected thoroughly by a qualified person.

l) Proper wearing

A safety harness is an essential piece of personal protective equipment designed to protect individuals working at great heights or in potentially dangerous environments. Its importance cannot be overstated, as it significantly contributes to the safety and well-being of workers. Do not entangle the harness lanyard.



2.2.6 Body Protection

Body protection is required to protect other parts of the body (e.g. legs, arms, back, chest) when there is a potential for contamination or exposure from heat, splashes from hot metals and liquids, impacts, cuts, chemicals, radiation and it is necessary in the acid and chemical area.

m) Acceptable specifications

Dust Suit – suit designed to protect against dust and other particulate matter
Chemical Suit – suit designed to protect from chemicals and diluted acid
Acid Suit – suit that is designed to protect acid
Long sleeves and pants – designed to protect the skin from being exposed to hazard

n) Inspection and management

Regularly and before usage, inspect the body protection PPE for any damage or wear and tear. Replace any damaged equipment immediately. Raincoat, chemical resistant suit, dust suit, and reflectorized vest will be replaced upon the request of the worker due to damage.
Chemical resistant suit and dust suit will be issued every activity.

o) Proper wearing (see photo above under body protection)

- Check the selected suit is the correct size. Incorrect sizing can cause the suit to tear.
- Ensure the dressing area is clean and free from any contamination.
- Remove the suit carefully from the packaging and check that it is not damaged.
- Remove any items from your pockets.
- Remove any safety footwear to make it easier to put the suit on.

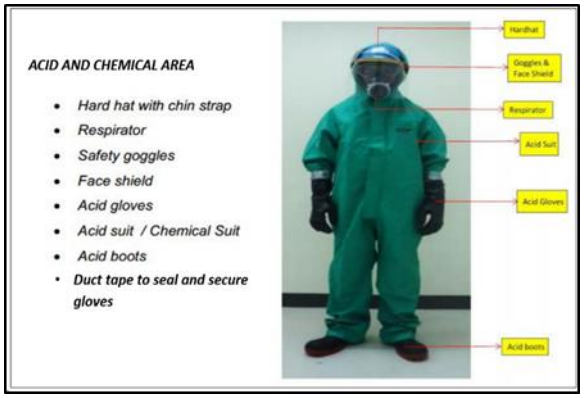
- Shake the suit to fully open it up.
- Start by stepping your legs into the suit leg area, one at a time.
- Put your arms in the suit sleeves slowly and carefully
- Step into each chemical resistant Wellington boot
- Always place the ankle hem of the protective suit over the safety boots. This allows static discharge and reduces the risk of contamination.
- To allow full range of movement, tape the ankle hem to your boots above the ankle.
- Do not tuck the suit legs into your safety Wellington boot
- If you are wearing a respirator, zip up the suit to the chest area (this will make it easier to put your hood up later).
- Hood must always be worn
- Wear your hardhat with face shield attached.
- Wear the gloves over the sleeve and secure with self-adhesive tape for a tight seal.
- Stretch yourself easily to confirm suitability before you enter the workplace.

2.2.7 Summarization

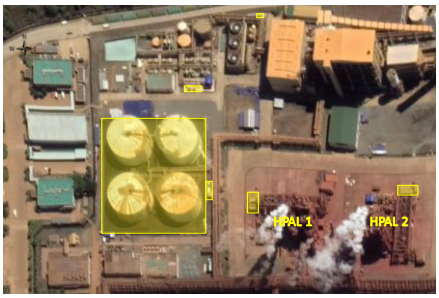
From the discussion of the special PPE, standard condition for each activity become like following;

1) Acid Treatment

- Concentrated acid contaminated treatment activity

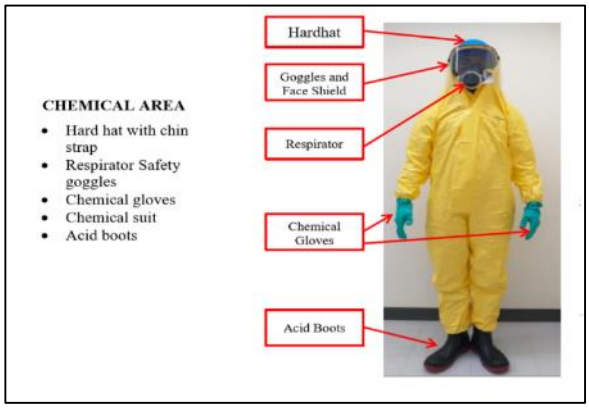


Acid suit area; If workers enter this area they must wear the PPEs even if they are not performing any work.



2) Chemical Treatment

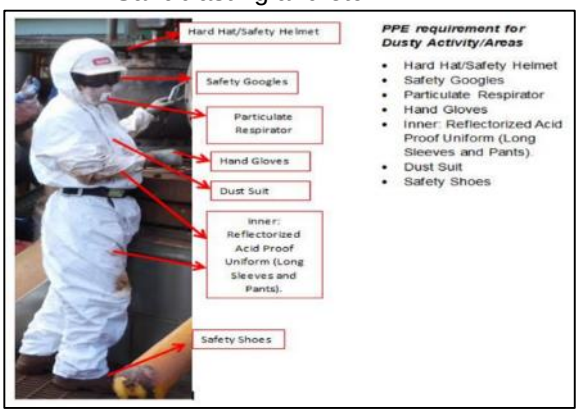
- Chemical Treatment Activity (involving Caustic Soda, diluted acid, Slaked lime re-bagging, other chemicals)



Chemical suit area; If workers enter this area they must wear the PPEs even if they are not performing any work.

3) **Dusty Activity**

- PSU cleaning activities involving coal dust particles
- Autoclave descaling activity
- Sandblasting and etc.



2.3 PPE REQUIREMENTS ON RESTING AREAS

2.3.1 MGB's INSTRUCTION

It was pointed out by MGB Validators during the annual validation of our compliance to the conditions of our MPP, that all resting areas should be provided with appropriate "RESTING AREA" signage and should be provide also with a separate signage that indicates the required PPE while at rest or inside the resting area.

Hence, it is needed that all Process Owners and Contractors to designate their respective resting areas and should provide with appropriate signage "RESTING AREA" and a separate signage indicating required PPE while at rest or while inside the resting area.

2.3.2 Guidelines for Wearing of PPE's inside temporary Standby/Resting Shelter

These guidelines will serve as reference for common understanding regarding the PPE's requirement inside the standby/resting shelter erected/placed within plant site premises during normal operation and shutdown period temporarily.

Standby/Resting Shelter are made in order the working personnel relieve the stress of wearing the PPE's during the activity. All standby/resting shelter needs approval for construction by THPAL top management.

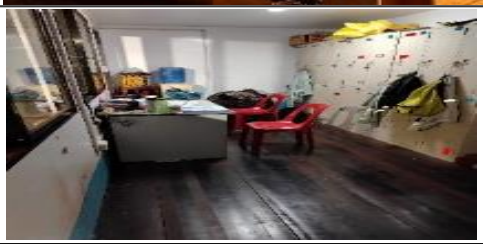
Item No.	Area	Steel Toe Safety Shoes	Hard Hat with Chin Strap	H2S Respirator Hanged on the Neck	Safety Goggles
1	Inside plant site with metal sheet roofing	Yes	NO	Yes	No
2	Inside plant site with blue sheet/tarpaulin roofing	Yes	Yes	Yes	No
3	OSBL area not prone from falling hazard to the shelter *(shelter roof made of metal sheet, blue sheet /tarpaulin)*	Yes	No	Yes	No
4	Satellite/Container Van standby shelter	Yes	No	Yes	No
5	Inside the workshop with enclose metal sheet or ply-board partition (e.g. inside RTTPI workshop)	Yes	No	Yes	No

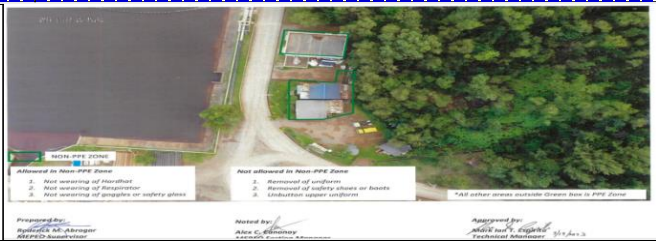
Note: 1. Temporary shelter shall be erected away from falling object and free from electrical hazard.
2. PPE's shelter requirements shall be laminated and hanged to shelter as a reminder for all individuals.

2.3.3 Permanent Resting area

Area	Area Picture	PPE Requirement
MS office (Container Van)		Uniform
MS CTS Shed (Scaffolding Shelter)		Hardhat (Carry) Goggles (Carry) Respirator (Carry) Uniform Safety Shoes/Boots

H2S DCS Room/ Office		Uniform
LS Office (Container Van)		Uniform
LS CTS Shed (Scaffolding Shelter)		Hardhat (Carry) Goggles (Carry) Respirator (Carry) Uniform Safety Shoes/Boots
FNTRL Office (Container Van)		Uniform
Underneath 101TH01 Ore Thickener Area Charging Station		Complete PPE: Uniform, Safety Shoes/boots, Hard hat, Goggles ; to install signage to remind PPE requirement
FNTRL CTS Shed (Scaffolding Shelter)		Hardhat (Carry) Goggles (Carry) Respirator (Carry) Uniform Safety Shoes/Boots
112TK00 CTS Shed (Scaffolding Shelter)		Hard Hat Goggles Respirator (Carry) Uniform Safety Shoes

Hopper Area CTS Resting Van		Uniform
DrumWasher Area Resting Van		Uniform
CTS Resting Area (beside resting van) w/ corrugated metal roofing		Uniform and Safety Shoes/boots only Note: No existing signage to inform on the required PPE Need to allign with MS, MNTC and Safety then intall signage of required PPE
HPAL Area Resting Van		Uniform
CTS Resting Area (beside HPAL Resting van) with corrugated metal roofing		Uniform and Safety Shoes/boots only Note: No existing signage to inform on the required PPE Need to allign with MS, MNTC and Safety then intall signage of required PPE
HPAL Toolkeeper Toolvan		Uniform
Hematite		Uniform

Underneath 104TH01 (East of 104PU02) CCD/NTRL Area Charging Station		Complete PPE: Uniform, Safety Shoes, Hard hat, Goggles o install signage to remind PPE requirement
Safety Painting Shop Resting portion		H2S Gas Respirator- hang only on the neck. Hard hat-put on the rack Safety Shoes
Sc area (East side of 171TK15)		N/A (Goaggles, Helmet can be put off inside room)
At the Groundfloor of Ore Building- for the CTS		N/A (Goaggles, Helmet can be put off inside room)
Moisture Analyzer Room @ the 2nd Floor of Ore Building- for the Operators		N/A (Goaggles, Helmet can be put off inside room)
Site Office 2 @ the 2nd Floor of Ore Building - for the JS		N/A (Goaggles, Helmet can be put off inside room)
Decant Pond Area		PPE Zone should wear complete PPEs Non-PPE Zone 1. allowed to have no hard hat, respirator, and safety glass/goggles 2. not allowed to remove the uniform 3. not allowed to remove the safety shoes 4. uniform should be buttoned at all times

Hazardous Waste Storage Facility		PPE Zone should wear complete PPEs Non-PPE Zone 1. allowed to have no hard hat 2. not allowed to remove the uniform and respirator 3. not allowed to remove the safety shoes 4. uniform should be buttoned at all times
Sanitary Landfill Area		PPE Zone should wear complete PPEs Non-PPE Zone 1. allowed to have no hard hat, respirator, and safety glass/goggles 2. not allowed to remove the lower uniform/pants. Upper uniform can be removed if have inner t-shirt 3. can remove safety shoes 4. not allowed to wear sleeveless
Nursery		PPE Zone should wear complete PPEs Non-PPE Zone 1. allowed to have no hard hat, respirator, and safety glass/goggles 2. not allowed to remove the lower uniform/pants. Upper uniform can be removed if have inner t-shirt 3. can remove safety shoes 4. not allowed to wear sleeveless
Material Recovery Facility		In MRF, for all area, should wear complete PPEs even at resting zone
Security Guard Post	  	Allowed no PPE Respirator will be hanged on the neck Once Security Guard will leave the area, PPE must be worn.

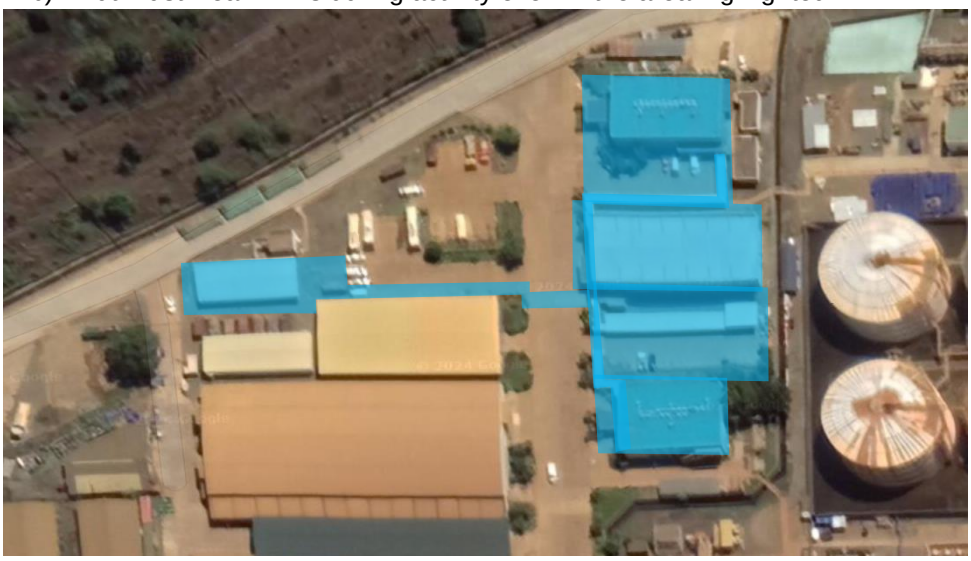
Chemical Sub-materials Resting Area		Respirator, hard hat must be wearing during the resting, , working uniform must be worn properly and Safety shoes
Chromite Container Van Yard Resting Area		Respirator - hang only on the neck, hard hat put on the table or rack, working uniform must be worn properly and Safety shoes
Jetty Berth no.1 Resting Area		Respirator - hang only on the neck, hard hat put on the table or rack, working uniform must be worn properly and Safety shoes
Jetty Berth no.2 Resting Area		Resirator - hang only on the neck, hard hat put on the table or rack, working uniform must be worn properly and Safety shoes
Receiving Warehouse Resting Area		Respirator, hard hat must be wearing during the resting, , working uniform must be worn properly and Safety shoes
112 Resting Area		Respirator - hang only on the neck, hard hat put on the table or rack, working uniform must be worn properly and Safety shoes

Place	Area Picture	Requirement of PPE
Administration department Resting area (for contractors and Admin. Gen. Affairs personnel) - North Avenue beside GOB	 	PPE requirement: Coverall uniform Safety Shoes

2.4 NO PPE AREA

a) PPE free area; Around GOB, Canteen, PSO, SCF/RDP office (Blue area) CB, each DCS room, each rest station, just in front of PSU DCS room.

b) But must wear PPEs during activity even in the area highlighted.



2.5 THPAL EMPLOYEES PPE ISSUANCE OR REPLACEMENT

THPAL employees will be provided with PPE and can request specific types from the Safety Section for particular activities. All issued PPE will be recorded in the PPE Issuance Record. Any PPE that is damaged or not functioning, it can be immediately replaced by presenting it to the Safety Section. It will be Safety Section to determine if the damaged PPE is subject already for replacement. Through the issuance record, PPE replacement can be traced.

2.6 CONTRACTORS PPE ISSUANCE OR REPLACEMENT

For workers of other contractors, their employer is responsible (as per Service Agreement) for providing the PPE required for the work they are performing. Other contractors are issued special PPE (e.g. Acid Suit, Chemical Resistant Suit, Acid Boots, Acid Gloves, Chemical Gloves, Respirator with Chemical or H_2S Cartridge, Face Shield). Issuance and replacement of PPE's for contractors will be through their Department PIC.

SECTION 3: WORK PERMIT SYSTEM

A work permit is document that identifies the work to be done, the hazard(s) involved, and the precautions to be taken. It ensures that all hazards and precautions have been considered before work begins. It is a written record that authorizes specific work, at a specific work location, for a specific time period. Permits are used for controlling and coordinating work to establish and maintain safe working conditions. They ensure that all foreseeable hazards have been considered and that the appropriate precautions are defined and carried out in the correct sequence.

The permit is an agreement between the issuer and the receiver that documents the conditions, preparations, precautions, and limitations that need to be clearly understood before work begins. It records the steps to be taken to prepare the equipment, building, or area for the work, and the safety precautions, safety equipment, or specific procedures that must be followed to enable the worker(s) to safety complete the work.

All workers using permits must completely understand the reasons for and requirements of the permit before work begins.

3.1. Steps of the attaining work permit,

a) Upon receiving the work order or request, responsible contractor will prepare and fill the work permit in triplicate form completely with respect to the applicable work category to be conducted.

Form 04:F-ME-00-000-016 Rev.02

THPAL
Taganito HPAL Nickel Corporation

Work Permit

Work Date: Company/Department:

Work Order No.	Fire Work	Work Title	Area	Supervisor Name	Nos of Personnel	Schedule Plan: Start	Schedule Plan: Completion
	☐ Yes ☐ No						

Work Description/			
		☐ Assembling Work	☐ Instrumental Work
		☐ Fire Work	☐ Cleaning Work
Housekeeping Status after work completion:	Contractor Supervisor:	☐ Pipng Work	☐ Civil Work
	THPAL Maintenance:	☐ Electrical Work	☐ Rework
	Production (if applicable):		

Work Order No./		Work Title & Description/	
Work Category		Precaution	Instruction / Notice
Work on heights	a	☐Yes (Height ___ m from Ground) ☐No	Instruction/ Always use full body harness / safety belt when working above 2m heights. Always use fall arrester when going up and down at ladder more than 5m.
	b	Scafollding ☐Yes ☐No	
	c	Stepladder ☐Yes ☐No	
	d	Safety Belt ☐Yes ☐No	
	e	Fall arrester required? ☐Yes ☐No	
	f	Additional ( )	
Fire Work (Welding, Cutting, Grinding)	a	☐Yes (Welding, |Cuting, Grinding) ☐No	Instruction/
	b	Fire extinguish Item (Fire Extinguisher, Water Bucket)	
	c	Cover Sheet (for Spatter, Spark)	
	d	Flammables ( )	
	e	PPE (	Notice/
	f	Additional (	
Heavy Weight handling	a	☐Yes ☐No	Instruction/
	b	☐ Wrecker (ton) ☐ forklift	
	c	Wire Rope Condition ☐ OK ☐ Replaced	
	d	Close to Traffic ☐ Necessary ☐ Unnecessary	Notice/
	e	Additional ( )	
Tagging / Isolation Name of Witness	a	☐Yes (Switch, Valve) ☐No	Instruction/
	b	Equipment Tag No. ( )	
	c	Tags	Notice/
	d	Additional ( )	
Special Work A	a	☐Yes (Confined Area, Dust, High Temp.) ☐No	Instruction/
	b	Ventilation ( )	
	c	PPE ( )	Notice/
	d	Additional ( )	
Special Work B	a	☐Yes (Acid, NaOH, Methanol, Poisonous Gas) ☐No	Instruction/
	b	PPE ( )	
	c	Additional ( )	Notice/
Environmental Hazard	a	☐Yes (Oil, Grease) ☐No	Instruction/
	b	☐Yes (Acid, NaOH, Methanol, Reagent, Process Liquor) ☐No	
	c	☐Yes (H2S, SO2 gas) ☐No	Notice/
	d	Additional ( )	
Others			Instruction/
			Notice/
Prepared by:		Noted / Approved By: (THPAL Maintenance)	Approved By: (THPAL Production)

b) Contractor will attach to the permit the required attachment (example, Environmental Hazard Analysis, Daily Safety Inspection Checklist, Hand Tools checklist and etc) by Section/Department work order or request issuer.

c) Confirmation of LOTOTO and Isolation by three parties (Process Owner, Maintenance and Contractor) will commence (if applicable).

d) Work permit will be approved by work order or request issuer and process owner.

i. When work permit includes hot works, responsible contractor will prepare and fill the hot work permit form, have it signed and approved by Process Owner, work order or request issuer and THPAL Safety.

Form 01 EMS-THPAL-SA-302 Rev. 06

THPAL Taganito HPAL Nickel Corporation

HOT WORK PERMIT

NOTE: this Hot Work Permit is required for any operation involving open flames or producing heat and / or activities where THPAL has the total

Work Order Number
Job Description
Name of Contractor
Date & Time of Execution
Validity

LOCATION: *(please check)*

- Plant Site — *please specify:*
- Wharf / Jetty Area — *please specify:*
- Dormitory — *please specify:*
- Tailings Dam — *please specify:*
- Other Areas — *please specify:*

FOR ACID LINE HOTWORKS PROCEDURE:

For Unloading
1. Activity will be stop before the unloading of acid
2. Discharge must reached 6.5 kg/cm2 and in stable condition (more or less 1 hr)
3. Inspection of acid pipe line (30 minutes) for any leaks
4. Cover pipe line with tranparent polypropylene and fire blanket

For Purging
1. Activity will be stop before the purging activity
2. Purging must reached 600 kg/cm2 and in stable condition
3. Inspection of acid pipe line (30 minutes) for any leaks
4. Cover pipe line with tranparent polypropylene and fire blanket

CONFIRMATION:

Contractor Supervisor
Printed Name and Signature — Date

Contractor Safety
Printed Name and Signature — Date

THPAL Safety
Printed Name and Signature — Date

THPAL Maintenance Inspector / PIC
Printed Name and Signature — Date

THPAL Supervisor (End user: Prod / Utilities / Log / Lab / etc.)
Printed Name and Signature — Date

REQUIRED PRECAUTIONS CHECKSHEET

OK	NO	N/A	
			Available sprinklers, hose streams and extinguishers are in service / operable
			Hot work equipment in good repair
			Requirements within 10 m of work
			Flammable liquids removed
			Explosive atmosphere in area eliminated
			Combustible floors wet down, covered with damp sand or fire blanket
			All wall and floor openings covered
			Fire blankets suspended beneath work
			Floors swept clean
			Work on walls or ceilings
			Construction is noncombustible and without combustible covering or insulation
			Combustible on the other side of walls moved away
			Work on enclosed equipment
			Enclosed equipment cleaned of all combustibles
			Containers purged of flammable liquids / vapors
			Pressurized vessels, piping's and equipment removed from service, isolated
			Fire watch / hot work area monitoring
			Fire watcher will be provided during work , 30 minutes after work, and during coffee or lunch break
			Fire watcher is supplied with suitable extinguishers
			Fire watcher is trained in use of this equipment and in sounding alarm
			Fire watcher may be required for adjoining areas above and below
			Other precautions taken
			Confined space entry permit required
			Area is protected with smoke or heat detection
			Ample ventilation to remove smoke / vapor from work area
			Lockout/tag out required
			Disable detectors

AFTER COMPLETION OF ACTIVITY

This is to inform that the hot work activity has been finished and the area had been examined to be safe to leave

Name and Signature — Date

End User: _____ _____
PIC: _____ _____
Contractor Supervisor: _____ _____
Safety: _____ _____

NOTE: Who will accomplish this checksheet?
(1) Accomplished by Contractors' Supervisor
(2) Confirm by all responsible sigantories

THPAL Taganito HPAL Nickel Corporation

CHECKLIST FOR HOT WORK ACTIVITIES

Area: _____
Work Order No. _____
Job Description: _____
Date: _____
Personnel Involved: _____

Item Description	YES	NO	N/A	Comments
Is there a Work Permit?				
Is there an accomplished Safety Checklist/JSA?				
Is there a sufficient number of Fire Extinguishers?				
Are personnel involved knowledgeable/trained on how to operate the fire extinguisher?				
Is the assigned/designated fire watchman knowledgeable of the location of fire fighting equipment other than the fire extinguisher in the workplace?				
Is there adequate ventilation?				
Is there a fume extractor or inductor?				
Is the hot work equipment properly inspected and with appropriate tag?				
Is the hot work equipment properly positioned?				
Is there a receptacle for welding rod ends ?				
Does gas cylinder have flash back arrestors fitted?				
Is there a leak test conducted for the gas cylinder?				
Are gas cylinders placed inside a cylinder trolley?				
Is the torch of the gas cylinder away of five (5) meters from the gas cylinder?				
Is there a blue sheet or fire blanket installed to isolate the				
Is the workplace properly prepared for the hot work?				
Is the gas level within the acceptable limit?				

ii. When work permit includes confine space, work order or request issuer will call THPAL Safety for the issuance of confine space permit, have it signed and approved by THPAL Safety, Process Owner, Work order or request issuer and contractor Safety.

THPAL Taganito HPAL Nickel Corporation

Confined Space Entry Clearance

This permit must be completed and signed prior to entry. Use permanent pen in filling up and signing up

Area/Location: _____ Date of Entry: _____

Equipment No.: _____ Time of Entry: _____

CHECKSHEET:	YES	NO	N/A	Remarks
1-A. All inlet and outlet valves to the vessels are closed				
1-B. All drain valves to the vessels are opened				
2. Pump/ agitators de-energized and lock out				
3. Blind installed				
4. Blowers/eductors installed for ventilation				
5. At least two (2) manhole are open				
6. Radioactive Material (RAM) source isolated/closed				
7. Area temperature below 40°C **(For PSU area up to 50°C but up to 10 mins. w*				
8. Nearest eyewash and safety shower in good condition.				
9. Area barricaded from unauthorized personnel.				
10. Visibility/lighting sufficient				
11. Draining/purging of vessel complete				
12. Gas test				

Concentration at Specific Point

		1	2	3	4	5
Oxygen	19.5- 23.5 %					
CO	< 10 ppm					
H_2S	< 1 ppm					
COMB Gas	0 ppm					

Note: Item 1-10 and 12 confirmed by Production/THPAL Safety
Item 11 confirmed by Maintenance/Contractor's Safety

AUTHORIZATION	Production/PSU/Logistics/SAFETY	Maintenance
	Printed Name and Signature Supervisor	Printed Name and Signature Maintenance Inspector/ PIC
	Printed Name and Signature THPAL Safety	Printed Name and Signature Contractor Safety
	Date	Date

This form must be returned to THPAL Safety Office after the activity.

Confined space permit

e) Once all permits were signed and approved, before carrying out activity, conduct KY card and KY Board implementation.
f) After completion of the activity, contractor will inform the work order or request issuer for final inspection and acceptance handover.
g) Proceed removal of LOTO for handover to process owner from the work order or request issuer.

3.2. Consideration from past incidents:

a) Any alteration or addition to the work permit will be informed first to all parties involved in the work permit and have it signed by all parties.
b) Any special instruction like a valve or pipeline not to remove will be inputted in the work permit signed by the personnel who gave instruction.

SECTION 4: ISOLATION POLICY

4.1 INTRODUCTION

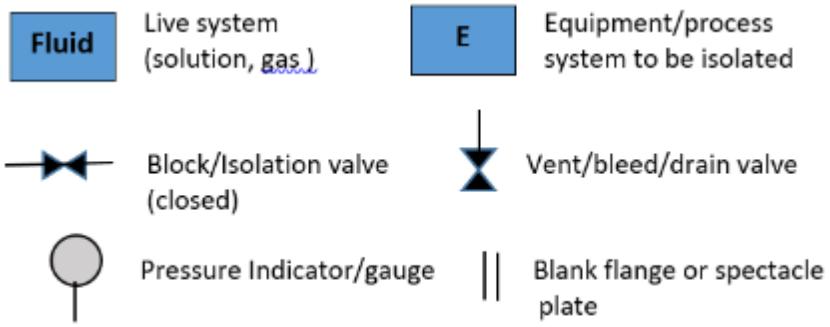
In order to carry out the activity involving Plant Piping and Equipment safely, this Isolation protocols shall be followed strictly to prevent personal injury, property damage, production losses and delay.

4.2 SCOPE

Process owner shall perform the following activities, If applicable, as part of the preparation for maintenance equipment/piping/ inspection/ repair activity: (i) draining, (ii) venting, (iii) purging (if applicable) and (iv) flushing (if applicable).

4.3 Category

Process owner shall assess the status of piping/equipment based on any of the following acceptable final Isolation categories in the table by using P&ID. Category and Feature AND Illustrative example;

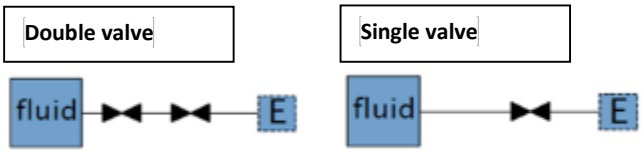


4.3.1 Non-Proved Isolation

Valved Isolation. No provision to confirm effectiveness of valve closure prior to breaking into system. Where possible, double Isolation should be used rather than single valve.

There is No way to check safe condition; Basically cannot hand over.

- For hand over, Process Owner MUST confirm that the isolation valves are NOT passing at equipment side or by any other means.
- Job hazard analysis for the checking activity, and the corresponding Countermeasures, and procedure approved by managers is necessary
- In case of breaking flange, initial breaking must be done by process Owner. For bigger piping need discussion with Maintenance.



4.2.2 Proved Isolation

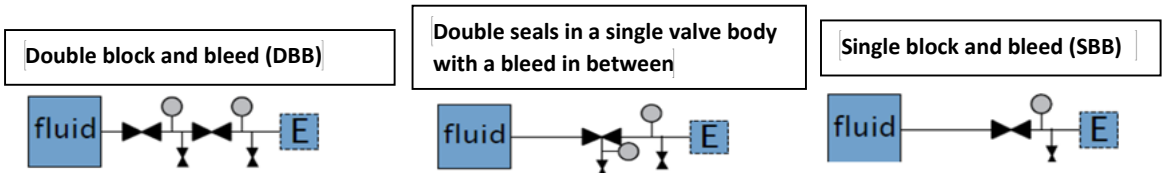
Valved isolation. Effectiveness of valve closure can be confirmed via Vent/bleed/drain points before intrusive work commence. Within this isolation category the level of mechanical security is greatest for DBB.

Need checking the following before hand over:

- *Basically Gauge Pressure should be zero.*
- *But due to accuracy of Pressure Transmitter, there are cases that it display the lowest peak value and difficult to achieve zero pressure.*
- *In that case Managers should check if depressurization condition is reasonably safe.*

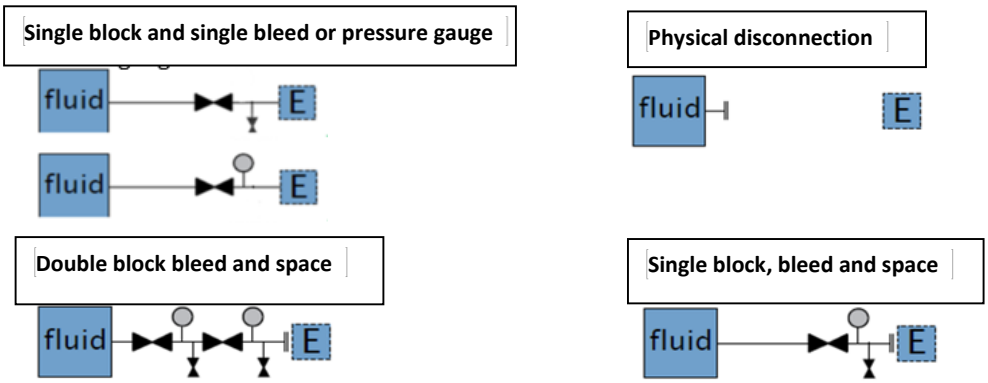
i.e. Autoclave Pressure (102/202PI010) ≤ 20 kPag. Note: The saturated vapor pressure at 105^{0}C is 20 kPag. (Reference document: Production-Maintenance Guideline for Handover of Autoclave-related Equipment During an Emergency Shutdown).

- No drain from drain line (*without clogging condition*)



4.2.3 Positive Isolation

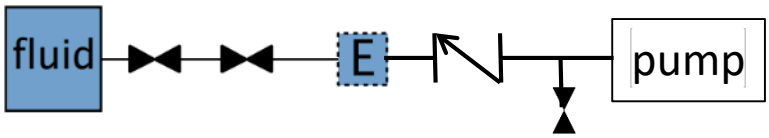
Complete separation of the plant/equipment to be worked on from other parts of the system. Completely safe to hand over the Equipment (But basically this condition is made after I or II).



4.4 Special case study

4.4.1 case-1**;** drain valve is located upstream of check valve

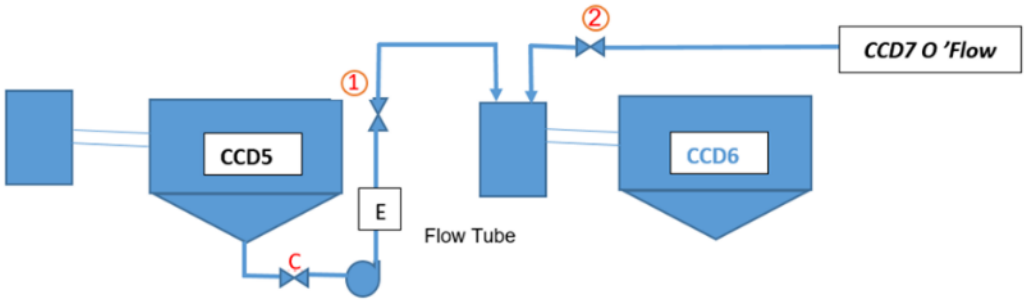
Pressure remains at the downstream of check valve even if no isolation valve passing. It is no meaning to check the drain condition at the following indicated drain line for the equipment handover. You have to release the pressure of fluid side for the handover.



4.4.2 case-2; CCD U/F (counter current decantation)

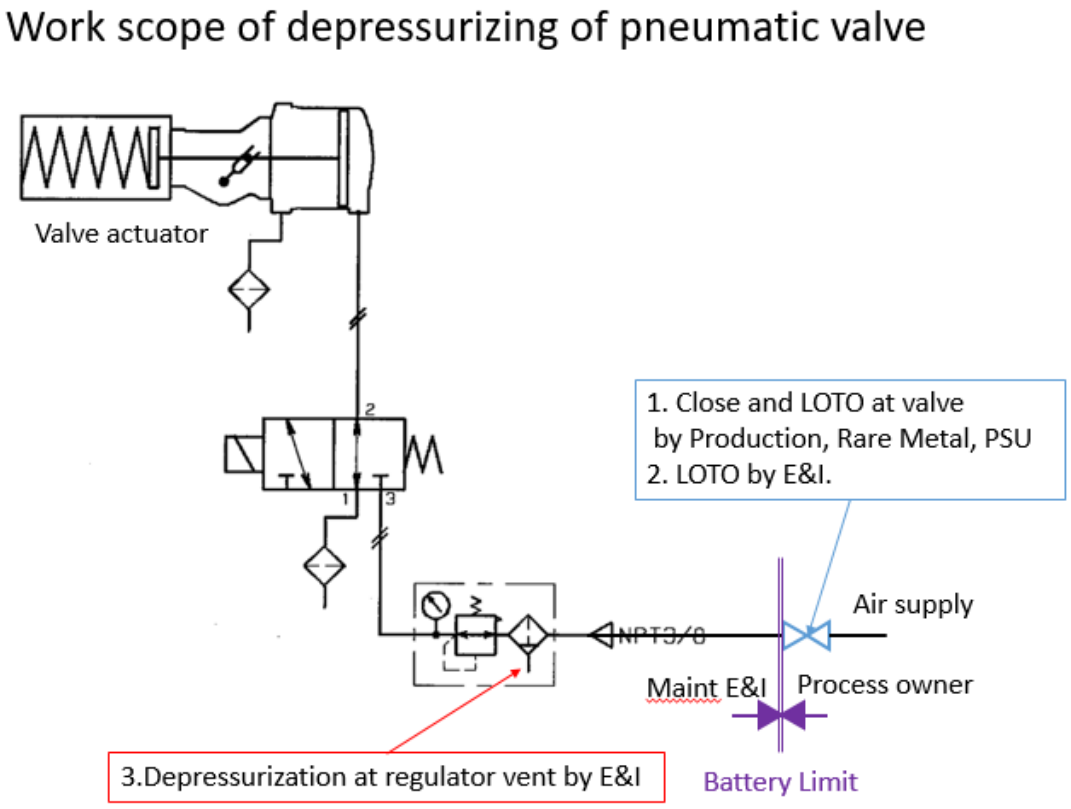
Consider to check and asses the isolation status, when you want to handover the flow tube. At first, pump suction valve must be closed. And for discharge side, if CCD7 O/F has flow to CCD6 mixing tank, you must close valve 1 to ensure the tank vapor will not back flow to the flow tube side.

If CCD6 is totally bypassed, it means valve 2 is closed. So closing valve 1 is not required. Another option to prevent the back flow of the tank vapor is to install ventilation fan to the tank. In any case, if vapor gas includes toxic gas it is dangerous hence, Process owner must consider what ensures the contact/exposure against it.



4.5 Battery limit for pneumatic valve

The isolation work scope of depressurizing of pneumatic valve is following;

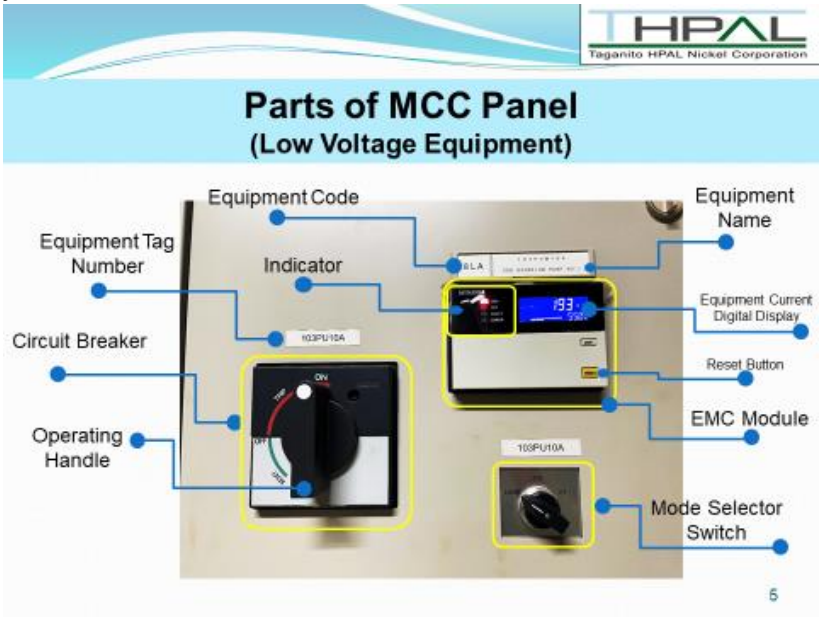


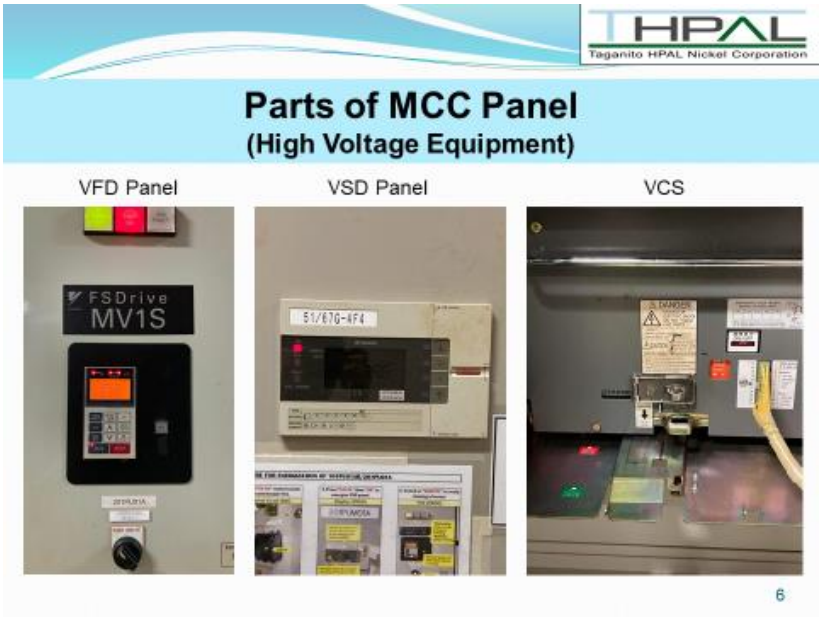
SECTION 5: LOCK OUT/TAG OUT PROGRAM

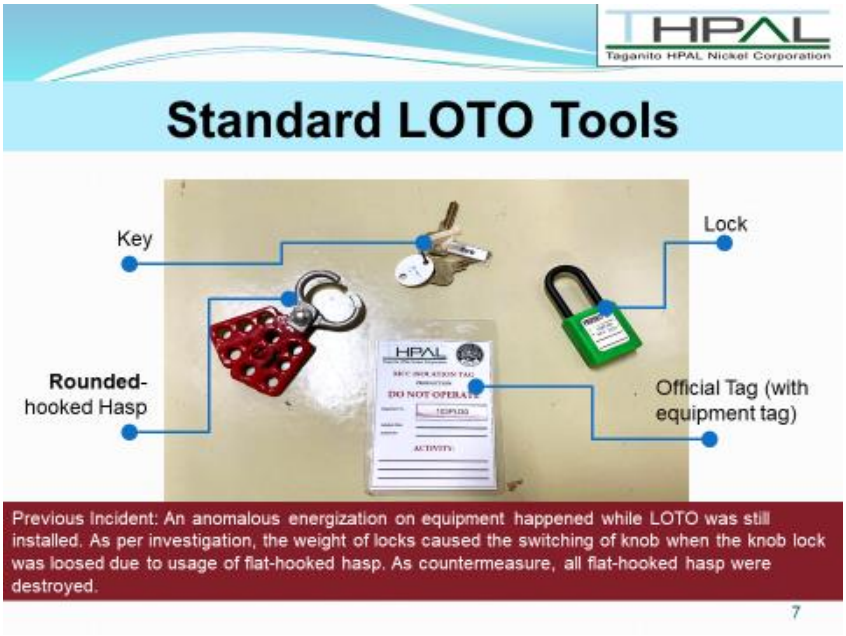
5.1 Purpose, Scope and Users

Effective Lockout Tag out or the Control of Hazardous Energy will protect employees during machine and equipment servicing and maintenance where the unexpected energization, start up or release of stored energy could occur and cause injury, as well as while working on or near exposed de-energized electrical conductors and parts of electrical equipment. Hazards being guard against include being caught in, being crushed by, being struck by, being thrown from, or contacting live electrical circuits/parts.

This procedure herein established will ensure that machines and equipment are properly isolated from hazardous or potentially hazardous energy sources during servicing, repair /maintenance, and cleaning. This procedure also aims to establish work responsibility of every department, section and/or contractors on proper Isolation and De-Isolation of machines and equipment under the company.







This policy applies to THPAL employees and contractor working within THPAL on activities that requires isolation, de-isolation /lock out/tag out of equipment's, valves and pipelines involve in the activity.

Reference Documents

1. The OSHA standard for The Control of Hazardous Energy (Lockout/Tagout), Title 29 Code of Federal Regulations (CFR) Part 1910.147
2. CBNC Safety and Health Handbook

5.2 Definitions:

1. Any Maintenance Work – the term shall include following activities,
   1.1. Inspection (except for running inspection)
   1.2. De-scaling work (any work which are carried out inside of tanks / vessels)
   1.3. Repair work (repair, rework, modification, adjustment, calibration etc.)
   1.4. Rectification work from view of engineering and construction defect
2. Energized - Connected to an energy source or containing residual or stored energy
3. Energy isolating device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.
4. Energy source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.
5. Lockout - The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.
6. Lockout device - A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

7. Requester – the representative or assigned person from the respective parties who request the tagging and isolation in order to conduct maintenance work. He/She play the role as a focal person in the respective parties for each maintenance activity
8. Respective parties – the section to which persons or group who conduct maintenance work are belonging.
9. Tag-out - The placement of a tag-out device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed.
10. Tag-out device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag-out device is removed.
11. Work Permit - communicating media and permit for any maintenance work
12. LOTO – Lock Out Tag Out
13. MCC –Motor Control Center - is an assembly of one or more enclosed sections having a common power bus and principally containing motor control units
14. Process Owners – Production and Power Station and Utilities Department

5.3 General Requirements:

1. Any maintenance activities shall not be carried out without tagging / isolation except for running inspection.
2. Any operation of switches and valves shall be done by Production/Power Station & Utilities.
3. Any operation of High Tension Voltage panel shall be done by only authorized person by THPAL maintenance department.
4. Lockout and tag-out devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.
5. Tag-out devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
6. Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.
7. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.
8. Tag-out devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tag-out device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
9. Lockout devices and tag-out devices shall indicate the identity of the employee applying the device(s).
10. Tag-out devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.
11. Lockout or tag-out devices shall be affixed to each energy isolating device by authorized employees
12. Where tag-out devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.
13. Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

14. After lockout or tag-out devices have been removed and before a machine or equipment is started, affected employees shall be notified that the lockout or tag-out device(s) have been removed
15. Each lockout or tag-out device shall be removed from each energy isolating device by the employee who applied the device. However, when the authorized employee who applied the lockout or tag-out device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it.

5.4 Procedures

1. Requisition of tagging and isolation

   Work permit shall be prepared by requester, prior to carry out the maintenance work. The requester must specify the following information in Work Permit.

   a) Equipment Tag Number
   b) Work Date
   c) Required Time of Tagging / Isolation
   d) Name of Company and Witness
   e) Work Subject
   f) Work description
   g) Work Order Number (If any)

2. Execution of Tagging / Isolation

   1) Electrical Tagging and Isolation

      a) Process owners (Production/PSU) may proceed in isolation of the equipment in the MCC even without the presence of Maintenance and its contractor in order to proceed the draining, depressurization and other preparation activities before hand-over to Maintenance.
      b) Maintenance will request to Process owners (Production/PSU) to sign the Work Permit.
      c) Production/PSU to confirm the equipment name and tag number to be isolated
      d) Process owners, Maintenance and its contractors will proceed to MCC to witness and confirm LOTO activity by Maintenance and its contractor before signing the Work Permit
      e) After approval of the work permit, Maintenance and its contractor will initiate LOTO.
      f) Maintenance and Maintenance Contractor is not allowed to install their LOTO without the witness of Process Owner.
      g) Both Production/PSU and requester shall put padlock with their own locks and place isolation tags which indicate the name and contact number, respectively. (Multi-lock mechanism device shall be utilized if necessary)
      h) The key for their own locks shall be kept by Production/PSU and requester, respectively.
      i) Both Production/PSU and requester proceed to the equipment in the field .
      j) Production/PSU confirms that the equipment is surely isolated by local switch operation.

   2) Valve tagging, isolation, blinding

      a) Process owners (Production/PSU) may proceed in isolation of the equipment in the MCC even without the presence of Maintenance and its contractor in order to proceed the draining, depressurization and other preparation activities before hand-over to Maintenance.

b) Maintenance will request to Process owners (Production/PSU) to sign the Work Permit.
c) Production/PSU to confirm the equipment name and tag number to be isolated
d) Process owner and Maintenance must proceed to the working area and confirm the actual condition. If all isolation procedure is done, then that is the only time that Production can sign the work permit.
e) Both Production/PSU and requester put padlock locks by chain/wire with their own locks and place isolation tags which are indicated the name and contact number, respectively.
f) After completion of the all required tagging and isolation, the equipment shall turnover to requester for their maintenance work

3) Electrical De- Tagging and De-Isolation
a) After completion of maintenance work, the maintenance will inform the Production/PSU that maintenance works already completed and ready for de-isolation.
b) Process owners, Maintenance and its contractor will proceed to MCC for de-isolation and removal of locks and tags
c) Production / PSU to confirm the equipment name and tag number to be de-isolated.
d) Both Production/PSU and requester remove their own locks and isolation tags, respectively.
e) Production/PSU to turn the switch “ON”
f) Process owners will sign the work permit to signify work completion once isolation tags and locks are removed by Maintenance and its contractors.
g) Maintenance and Maintenance Contractor is not allowed to remove LOTO without the witness of Process Owner authorized representative.
h) Both Production/PSU and requester proceed to the equipment
i) Production/PSU confirms that the equipment is ready for use.
j) If test run of equipment is necessary, Production/PSU will be the one to turn the switch “ON” to energize.
k) Maintenance must witness the test run and check equipment condition when the equipment is operated at the first time after maintenance work.

4) Valve De- Tagging and De-Isolation
a) Both Production/PSU and Maintenance proceed to valve for de-isolation of equipment
b) Both Production/PSU and Maintenance remove their own locks and isolation tags, respectively.
c) Maintenance and Contractor is not allowed to remove their LOTO without the witness of Production/PSU personnel.
d) Production/PSU to open the valve if necessary
e) Maintenance must witness test run and check equipment condition when the equipment is operated at the first time after maintenance work.

5) Confined Space Entry
a) Shall be in accordance to *EMS-THPAL-SA-303.*
b) Radioactive Source Isolation / De- Isolation Procedure
c) Shall be in accordance to *EMS-THPAL-SA-305.*

6) COLOR CODING

Tags shall be red and black in color in accordance with safety standard.

7) TRAININGS / RE-TRAINING

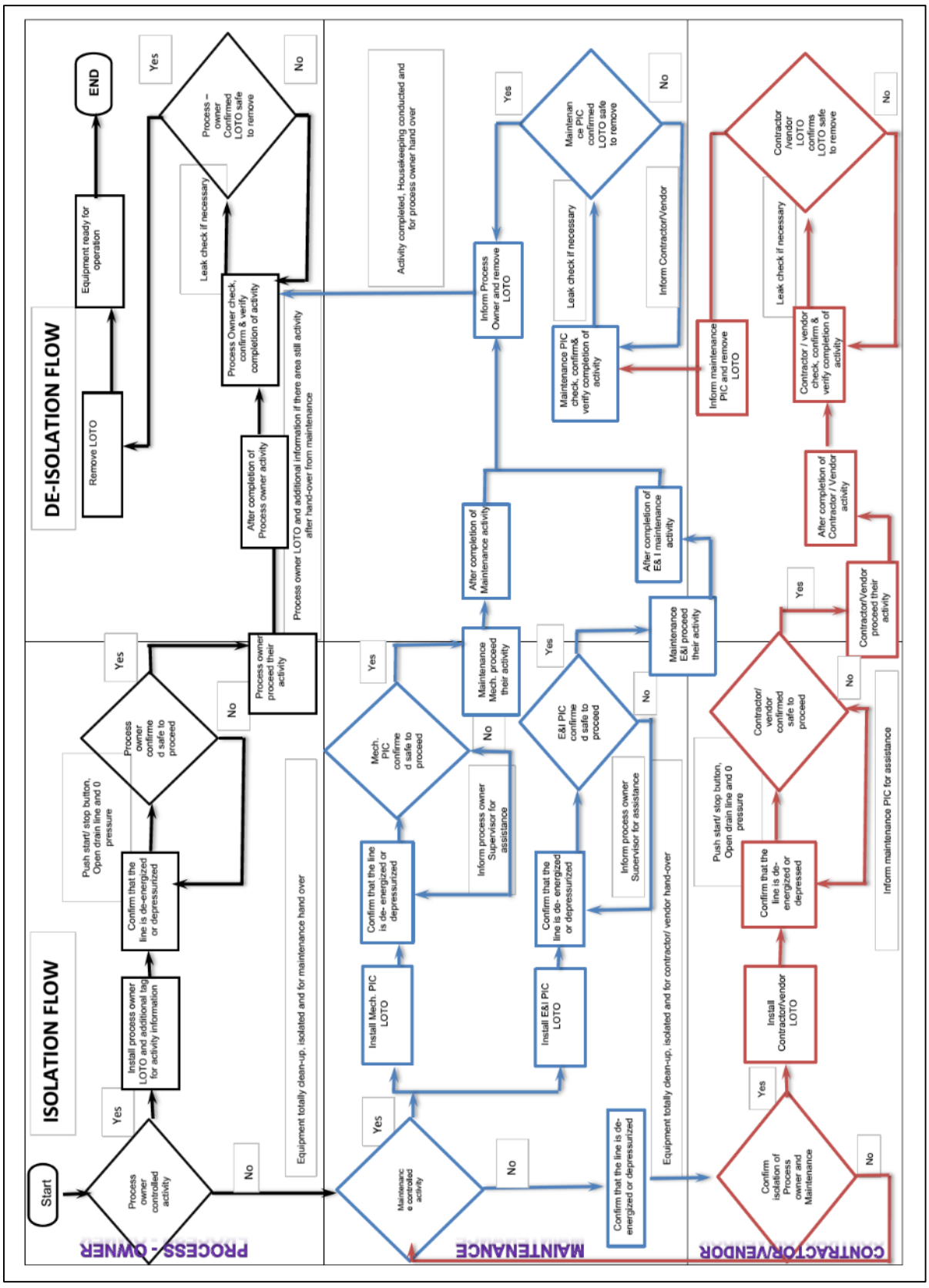
a) THPAL shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees.

b) Each authorized employee who will be utilizing the lockout/tagout procedure will be trained in the recognition of applicable hazardous energy sources, type and the magnitude of energy of energy available in the work place and the methods and means necessary for energy isolation and control.

c) Newly hired employees will be oriented by Safety Department on basic orientation on lockout tag-out procedures.

d) Each Department shall give additional orientation in detailed on LOTO procedures.

e) Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.


ISOLATION FLOW
DE-ISOLATION FLOW
Start
END
PROCESS - OWNER
MAINTENANCE
CONTRACTOR/VENDOR
Process owner controlled activity
Maintenance controlled activity
Confirm isolation of Process owner and Maintenance
Install process owner LOTO and additional tag for activity information
Install Mech. PIC LOTO
Install E&I PIC LOTO
Install Contractor/vendor LOTO
Confirm that the line is de-energized or depressurized
Confirm that the line is de- energized or depressurized
Confirm that the line is de- energized or depressurized
Confirm that the line is de-energized or depressurized
Push start/ stop button, Open drain line and 0 pressure
Push start/ stop button, Open drain line and 0 pressure
Process owner confirmed safe to proceed
Mech. PIC confirmed safe to proceed
E&I PIC confirmed safe to proceed
Contractor/ vendor confirmed safe to proceed
Process owner proceed their activity
Maintenance Mech. proceed their activity
Maintenance E&I proceed their activity
Contractor/Vendor proceed their activity
Inform process owner Supervisor for assistance
Inform process owner Supervisor for assistance
Inform maintenance PIC for assistance
Equipment totally clean-up, isolated and for maintenance hand over
Equipment totally clean-up, isolated and for contractor/ vendor hand-over
Process owner LOTO and additional information if there area still activity after hand-over from maintenance
Activity completed, Housekeeping conducted and for process owner hand over
After completion of Process owner activity
After completion of Maintenance activity
After completion of E& I maintenance activity
After completion of Contractor / Vendor activity
Process Owner check, confirm & verify completion of activity
Inform Process Owner and remove LOTO
Maintenance PIC check, confirm& verify completion of activity
Inform maintenance PIC and remove LOTO
Contractor / vendor check, confirm & verify completion of activity
Process – owner Confirmed LOTO safe to remove
Maintenance PIC confirmed LOTO safe to remove
Contractor /vendor LOTO confirms LOTO safe to remove
Leak check if necessary
Leak check if necessary
Leak check if necessary
Inform Contractor/Vendor
Remove LOTO
Equipment ready for operation
Yes
No

SECTION 6: HOT WORKS SUCH AS WELDING, OXY-ACETYLENE CUTTING, CHAMFERING, ETC>

6.1 Scope:

This procedure covers all hot works activities such as welding, gas cutting, grinding, disc cutting, etc. This provides guidelines for safe welding, cutting and grinding works in the entire THPAL Plant Site and on its related activities inside and outside of the Plant.

6.2 Coordination:

1. Any hot works should be coordinated to THPAL Production Personnel with the knowledge and consent from concerned THPAL Maintenance Supervisors and personnel.
2. Any hot works activity should require hot work permit included in the THPAL Work Request approved by THPAL Maintenance or any THPAL concerned personnel in coordination with THPAL Safety personnel.
3. For DeZn/MS and H2S Plant, Hotworks activity are restricted during normal operation due to presence of highly combustible materials like H2S Gas, H2 Gas, Methanol and Sulfur.There is high risk fire in case the said materials come in contact with the ignition material from hotworks activities.

   During Normal Operation:

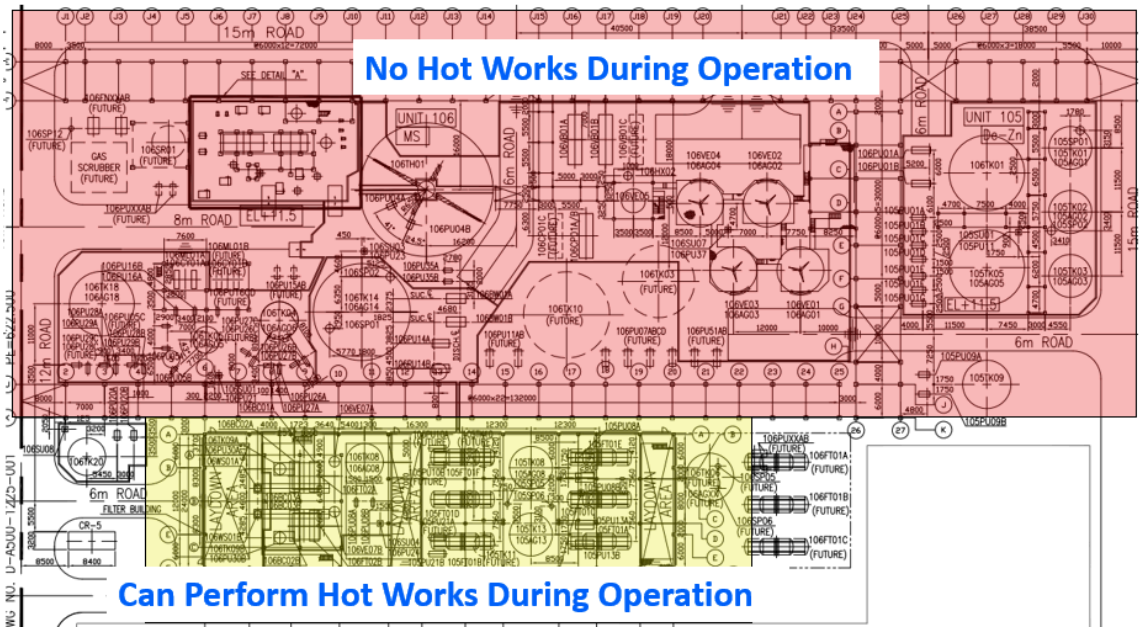
   1) No Hotworks (Open Flame and Sparks) in DeZn/MS Area except for MS Filter Building

      - Below are some of the hotworks activity performed in the MS Filter Building

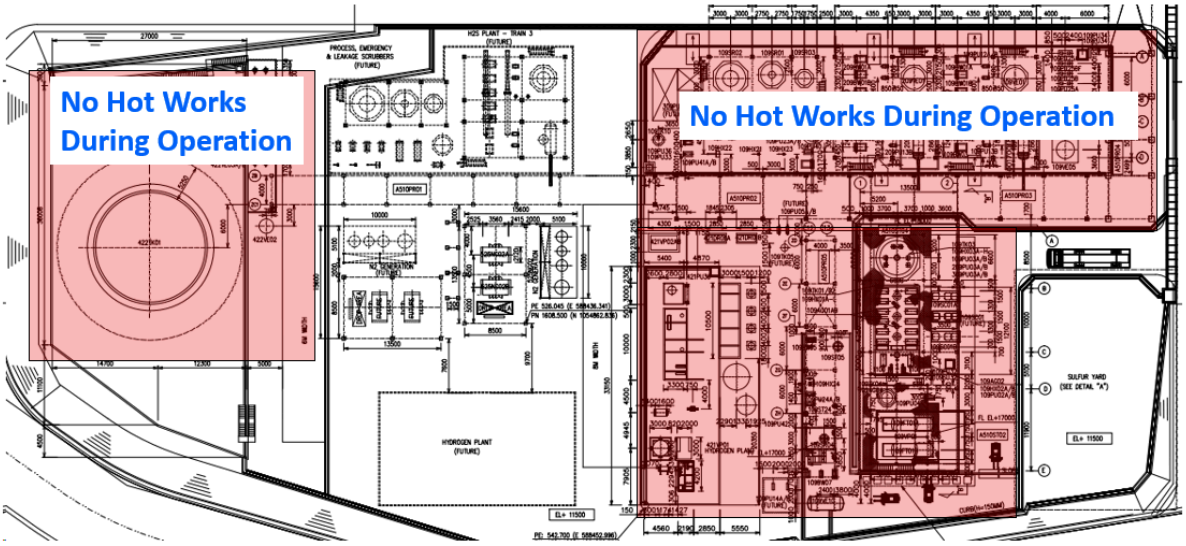
        *Cutting/Welding of Upper N2 manifold of Polishing Filter (if there are observed damage)

        *Cutting of seized bolts/nuts for Pressure Filter during Maintenance Servicing

        *Cutting and repair of floor drain pipes



2) No Hot Works (Open Flame and Sparks) for All areas in H2S Plant, H2 Plant and Methanol Area During Shutdown period, process owner allow hotworks after completion of inerting and depressurization of equipment.



If hot works during operation is specially needed, get approval of top management about it with reporting how to prevent combustion incident.

As a reference, risk level of Hotworks Activity that we perform in the plant arefollowing.

For example:

1) Arc Welding and tig welding -> produce open flames -> high risk for fire
2) Concrete Chipping -> No open flame but produce sparks -> medium risk for fire
3) PVC Welding -> No open flame/ no spark/ use of heat gun -> low risk for fire

In the past, PVC welding in MS Reactor area were allowed with specific measures because its risk to produce fire is considered low due to no open flame or sparks produced.

6.3 Protective Measures:

1. Hot works on piping, tanks or vessels containing/used with H2S gas, process fluid with flammable gas content and other flammable substances should be purged with inert gas such as nitrogen. If purging is impossible, water flushing should be done thoroughly.
2. Portable fire extinguishers, at least class ABC fire extinguisher, should be provided in work area.
3. Provide adequate water supply in the area for water shielding, running water is required when applicable.
4. Fire blanket or any fire proof material should be provided to prevent molten metal or sparks fall on flammable materials and nearby operating equipment when working on elevated area. Provide side cover or enclosure to trap hot metal.
5. Continuous gas monitoring should be done during the hot works by concerned contractor's safety personnel especially in the hot work restricted areas such as CCD, PSU, HPAL, MS, Caustic Soda Storage Tanks, H_2S Lines, Hematite,Acid Lines, Methanol Line (No Unloading), Scandium , Final Neutralization, Fuel Station. Hot works should be stopped immediately when flammable materials have been monitored. Note: Contractor's safety personnel should coordinate to THPAL Safety Office. Torch shall not be lighted or struck when combustible gases or vapors are present
6. Maintain adequate ventilation on working area especially on enclosed workplaces.
7. When doing hot works on elevated areas, at least 2m above the ground, barricade and warning signs must be installed around the area. Safety harness is also required for the person assigned.

8. Welding or cutting operation shall not be permitted in rooms or areas containing combustible materials or in proximity to explosives or flammable liquids, dusts, gases or vapors, until all fire and explosion hazards are eliminated.
9. Left over of hot works such as welding butts, pipes, rebars and the likes should not be left around. These will pose tripping hazard.
10. Cutting outfits for oxygen-acetylene should be at least have a minimum length of eight to ten meters long including cutting torch and regulators.
11. Always see to it that the distance from the gas cylinder to the user is at least of five meters. If the hot works is on elevated area, then the required distance should be five meters plus height. In the event that the location is narrow, the gas cylinders should be covered with welding blankets or any fire proof material prior to the activity.
12. Conduct regular checking of the hot work equipment prior to usage.
13. Welding or cutting operation on containers filled with explosive or flammable substances is strictly prohibited.

6.4 Personnel directly involved:

1. Only authorized person shall operate and use welding and cutting equipment. Any welding or cutting job shall be with the knowledge and consent of the supervisor.
2. Welders/cutters must wear appropriate personal protective equipment (PPE) such as welding gloves, welding apron, welding mask, safety goggles, face shield etc. during hot works. Personnel assisting the welders or cutters must also wear the required PPE.
3. On wet areas, welders shall stand on a dry wooden platform or rubber mat to avoid electrocution. Dry rubber boots and rubber gloves shall be worn.
4. Welders/cutters shall not undertake welding/cutting jobs on any container or tanks unless previous contents have been confirmed or ascertained first.

6.5 Equipment:

1. Defective cutting outfits and hoses shall never be used.
2. Cables and hoses must not cause tripping hazards and be secured properly to prevent damage.
3. Oxygen and acetylene cylinders before transport in field and known to be in good condition. No leakage from valves, gauges and regulators. Must be free from oil and grease.
4. Handling of gas cylinders should always be in an upright position and avoid rolling on the ground by its body. Use cylinder wheel carts for transport.
5. Mobile welding machines should always be in good condition and should not give environmental problem such as oil leakages, emission of carbon monoxide etc. Defective welding machine shall never be used.
6. During transport of gas cylinder for procurement and delivery, use cages or belt strap to secure all cylinders in place.
7. Prior to the activity, conduct leak test by soap test on the hose, fittings, cylinder valves etc.
8. Welding machines shall be located at a safe distance from the tank or wash tank containing oil
9. Only torch lighter shall be used for lighting gas cutting and welding equipment.
10. Every motor generator set or transformer used for arc welding and cutting operations shall be provided with an electrical safety disconnect switch of adequate amperage rating readily accessible in case of emergencies. Portable welding machine shall have quick detaching plug.
11. Electrode holder shall be installed in a designated location for putting the electrode when not in use. Hang or laid in a non-conducting surface to prevent contact with workers or electrically conducting materials.

6.6 Compressed Gas Cylinders:

1. Cutting outfits for oxygen-acetylene should be at least have a minimum length of eight to ten meters long including cutting torch and regulators.

2. Always see to it that the distance from the gas cylinder to the user is at least of five meters. If the hot works is on elevated area, then the required distance should be five meters plus height. In the event that the location is narrow, the gas cylinders should be covered with welding blankets or any fire proof material prior to the activity.
3. Oxygen and acetylene cylinders before transporting in field must be in good condition. No leakage from valves, gauges and regulators. Must be free from oil and grease.
4. Handling of gas cylinders should always be in an upright position and avoid rolling on the ground by its body. Use cylinder wheel carts for transport. Cylinders should have a valve cap.
5. During transport of gas cylinder for procurement and delivery, they shall be secured in a vertical position, use cages or belt strap to secure all cylinders in place.
6. Prior to the activity, conduct leak test by soap test on the hose, fittings, cylinder valves etc.
7. When cylinders are hoisted, they shall be secured on a cradle, slingboard, or pallet. They shall not be hoisted or transported by means of magnets or choker slings.
8. When work is finished, when cylinders are empty, or when cylinders are moved at any time, the cylinder valve shall be closed
9. No damaged or defective cylinder shall be used.
10. Flashback arrestor shall be provided at the outlet of the gas cylinders and the inlet of the torch

SECTION 7; BASIC RULES FOR TOOLS

7.1 Usage

a) Personally owned tools and equipment must not be brought into the workplace.
b) Tools and equipment used in the plant must be approved for use by each department manager.
c) Safety condition of the tool must be checked by management before starting to use new tools or equipment.
d) Tools and equipment must not be modified illegally.
e) Operation of machinery and electrical equipment must be performed by individuals who have been trained in how to use them and safety measures and who are authorized by management.

7.2 Inspection and storage

a) Tools and equipment must be inspected and maintained regularly to keep them in good condition.
b) Tools and equipment must be cleaned after use, stored in an organized manner, and the number of tools and equipment must be managed.
c) Before using machinery and electrical equipment, pre-use inspection (including checking of safety devices) must be performed. Any abnormalities must be repaired immediately.

SECTION 8; BASIC ELECTRICAL RULES

8.1 General Safety Precautions

8.1.1 Ground circuit shall be regularly checked at reasonable intervals. Records of the same shall be kept as part of the plant site records.

8.1.2 Power lines that are no longer in use shall be removed or disconnected and properly secured from accidental connection.

8.1.3 All electrical apparatus shall have adequate safeguard against fire and electrical shocks in case of failure of insulations.

8.1.4 The operation and setting of instantaneous relays shall be checked regularly and the records shall be maintained.

8.1.5 Parts of electrical equipment which produce arcs, sparks, flames or molten metals in normal operation shall be enclosed unless separated and isolated from combustible materials.

8.1.6 In hazardous jobs such as working with or close to live conductors, at least two men shall work together. When it is necessary for an employee to leave his companion, the person left behind shall work only outside the hazardous area.

8.2 Electrical Construction and Installations

8.2.1 Electrical construction and installations shall be made in accordance with the approved plan and shall be under the direct supervision of a Professional Electrical Engineer or Registered Electrical Engineer.

8.2.2 Temporary installations of electrical equipment, device, controllers, instruments and wiring shall be done under the direct supervision of an authorized person and the materials used shall conform to the approved specifications.

8.2.3 Installations of generators, motors, control equipment conductors, exposed live wires and moving parts shall be properly insulated and guarded.

8.2.4 Temporary covers**,** guards, warning signs and other safety devices shall be provided before leaving unfinished jobs.

8.3 Switchboards and Control Centres

8.3.1 Adequate illumination shall be provided both at the front and rear side of switchboards.

8.3.2 Entrances to the backspace of any switchboards with exposed live parts shall be provided with barriers that are kept locked.

8.3.3 Only duly authorized persons shall be allowed to work on switchboards and control rooms and warning signs shall be posted.

8.4 Motors, Generators and Controlling Devices

8.4.1 Switch control shall be installed within sight of the motor operator and the equipment he operates.

8.4.2 The control device of motors shall be placed at a safe distance from combustible materials.

8.4.3 Motors shall be of the type approved in accordance with the conditions where these are installed.

8.4.4 Overload device, starting controls and compensators shall not be used as circuit breakers.

8.4.5 Controls shall be identified or labeled and shall be equipped with indicating lights or meters to show when the motor loads are energized.

8.5 Working on Energized Equipment

8.5.1 No work shall be done on energized electrical equipment or conductor unless electrical supervisor allows it.

8.5.2 Metal ladders shall not be used while working in proximity to energized electrical equipment.

8.6 Testing and Energizing Electrical Equipment

8.6.1 Before starting to test-run electrical equipment, branch circuit protective device and circuit grounding system shall be checked if properly installed and any waste materials and tools removed.

8.6.2 Before energizing the power line of equipment, the protective device and the controller shall first be energized and checked for proper setting and operation.

8.6.3 Testing and energizing shall be carried out with proper instruments and tools such as ammeter, volt meter, insulating stick, insulation gloves and the like for protection against electrical hazard, accidental damage or injury.

8.6.4 The circuit shall be checked completely before power is applied for the first time by an authorized supervisor.

8.6.5 Motors and testing instruments shall be checked of its capacity before using.

8.6.6 High voltage circuit on the primary side shall be tested on the low voltage side of an instrument transformer.

8.6.7 Approved tester shall be used in testing ground or faulted windings and commutator segment assembly.

8.6.8 Circuits shall be tested with approved testing equipment before energizing.

8.6.9 Before breaking the circuit of current transformer secondaries, the loads shall be grounded and effectively short-circuited between the transformer coil and the points at which the circuit is to be broken.

8.6.10 Before power is applied for the first time to potential transformer, portable meters and the like whether connected temporarily or permanently, all necessary checks shall be undertaken.

8.7 Repairs and Maintenance

8.7.1 Power shall be shut off when making examinations, repairs or alterations of electrical installations. When this is impractical, the approval of the supervisor shall be obtained and all necessary precautions shall be taken.

8.7.2 Employees shall be required to “lock-out or block open” the control device, disconnect open type switches, and remove fuses before examining, repairing or working on circuits, electrical equipment and other electrical installations. The lock shall remain in an open position and shall be removed only after a thorough investigation by the supervisor-in-charge.

8.7.3 If motors are running, safety switch shall not be opened. The magnetic controller shall be de-energized first before opening.

8.7.4 Repairs and maintenance shall be made according to standard procedures and manufacturers specifications.

8.7.5 Removal and replacement of fuses shall be done with a fuse holder or with approved rubber gloves. Fuses and dis-connectors shall not be pulled unless loads on the circuit are de-energized. Only fuse in a cartridge shall be used.

8.7.6 During storm, it shall be prohibited to work or stay under any high voltage distribution lines or transmission lines.

8.7.7 Employees shall be prohibited to wear rings, jewelries, watches or metal chains and such other articles which may be caught in by moving parts of machineries of which may come in contact with electrical circuits.

8.7.8 Covers of protective devices of electrical circuit breakers and starters shall always be closed before switching to “on” position.

SECTION 9: BASIC MECHANICAL RULES

9.1 General Safety Precautions

a) Machine having a grinding, shearing, punching, cutting, rolling, mixing or similar action in which a person might accidentally come in contact with shall be properly guarded.
b) Machines shall not be operated unless these are in good order and all safeguards and safety devices are in place and in good working condition.
c) Safety devices must have regular inspection regularly by Maintenance, Process Owner and witnessed by Safety.
d) Safety and indicating device shall be properly maintained and checked periodically from damage and deterioration.
e) Machines to be repaired should be tagged and locked out before undergoing repairs.
f) Wear appropriate Personal Protective Equipment such as goggles, face mask, gloves (welding gloves, cotton gloves, rubber gloves, etc) welding apron etc..
g) Emergency stops must be provided to any rotating and conveying equipment
h) Display of safety signs should be placed in an easy to see places.
i) Operator must be educated about the operating/safety manual.

9.2 Workshop Equipment

All workshop machines have Standard Operating Procedure and operators must be educated about it.

9.2.1 On Milling Machines:

9.2.1.1 The table shall be moved with the work as far away from the cutter as possible while setting up.
9.2.1.2 Heavy cut or feed shall be avoided when using cutter in a vertical milling machine.
9.2.1.3 The speed shall be checked and feeding shall be done against the direction in which the cutter is rotating.
9.2.1.4 Hands shall be kept away from the cutter when machining.
9.2.1.5 The operator shall never reach over a revolving cutter, especially at the side of the cutter which cuts into the work.
9.2.1.6 The brush shall not be used in removing chips.

9.2.2 On Drill Press:

9.2.2.1 Inspect all drilling machines and similar equipment and see to it that these are properly installed.
9.2.2.2 Remove chuck wrenches from the drill chucks before starting the machine.
9.2.2.3 Clamp the work on the table.
9.2.2.4 Run the drill only at proper speed.
9.2.2.5 Change belt for speed regulation only when power is “OFF” and machine has come to a dead stop.
9.2.2.6 Refrain from wearing gloves while operating a drill.
9.2.2.7 Wear safety goggles when operating the equipment.

9.2.3 On Planer:

9.2.3.1 Check that the planer clears the cross-rails after the work is fastened and that stop pegs are in proper places and safety dogs are secured in position.
9.2.3.2 Have the planer idle when adjusting the length of the bed stroke and speed of the machine to suit work.
9.2.3.3 Clear the passageways of any kind of tools.

9.2.3.4 Hold the tool with one hand or place a wooden support under it when loosening the tool holder.

9.2.4 In Lathe Machines:

9.2.4.1 Check that the tailstock, tool holder and the job is properly clamped before turning on the power.

9.2.4.2 Use the hands only and never to use the power that operates the lathe when assembling or removing the chuck of face plate. A board shall be placed on ways.

9.2.4.3 Remove chuck wrench or any other tool in the chuck.

9.2.4.4 Switch off the power before measuring any revolving work or parts.

9.2.4.5 Stand to one side so that if the file is forced upward, it will go past the body rather than against it. It is advisable to file left-handed.

9.2.4.6 On Grinding Machine/Sander:

9.2.4.7 Check the abrasive wheel chuck before using. Confirm if it is tightened.

9.2.4.8 Wear goggles, dust mask, gloves and other appropriate PPE when working with this equipment.

9.2.4.9 See to it that nobody is beside you when using this equipment.

9.3 Pumps, Air Compressors and Other Stationary Equipment

1.1.1.On Pumps:

9.3.1.1 Exposed rotating couplings of pumps shall be adequately guarded and when guards are removed for oiling or repairing these shall be placed before the pumps are put in operation.

9.3.1.2 If repairs are to be made on a pump, controller should be properly isolated following THPAL's LOTO and Isolation procedures. Suction and discharge valves shall likewise be isolated, and confirmed that no remaining fluids and pressure in the pump casing and piping exist.

9.3.2 On Air Compressors:

9.3.2.1 Where an engine is used to drive a compressor, pipe of suitable length shall be provided to divert exhaust gases away from the compressor.

9.3.2.2 If repairs are to be made on a compressor, header valves shall be closed and that no air pressure remains in the cylinder and all the relief valves shall be opened. Controller shall be tagged and locked out.

9.4 On Other Stationary Equipment:

9.4.1 Repairs shall not be made on any machinery until the power has been shut off and the machinery blocked securely against all motion.

9.5 On Conveying Equipment:

9.5.1 Provide emergency stop for the conveying equipment.

9.5.2 Check belt, alignment, belt connection/lacing and secure motor guard of the conveying equipment.

9.5.3 If there is a need to remove the guard during alignment, they have to prepare management countermeasure.

9.5.4 Place safety railing around the conveying equipment if possible.

9.5.5 When making a repair, lock out the equipment.

9.5.6 Check rollers for defective bearing.

9.5.7 Avoid wearing lose garments when working near the conveying equipment.

SECTION 10: SAFETY SIGNAGE AND BARRICADES

10.1 SIGNAGE

All critical areas will be provided with safety signs which are legibly displayed in most pertinent locations. Safety signs will be fabricated and printed. It will be translated in English, and Bisaya language when necessary for easy understanding of the readers may it be foreigners or Filipino. Common Safety signs will be installed in strategic locations within plant site as well as in tailings dam and wharf areas. Safety signs will be posted to remind and informed the workers on how to recognize the different hazards and work safely in their respective working environment. Safety sign boards will be posted on key areas where everyone can read them. The message, the posters and boards implicate will remind everyone the safety consideration in doing their respective work assignment. Safety signage can be installed by respective departments/sections and can request Safety Section for permanent signage if needed. The content of signage must be specific for workers easy understanding.

10.2 GUIDELINE POLICY ON THE USE OF PROPER BARRICADE

10.2.1 Objectives:

10.2.1.1 To provide a guidelines and define a clear distinction on the use of caution tape and danger tape to have a common understanding on where and when it is applicable.

10.2.1.2 To warn and protect employees of existing hazard involve in the activity, barricade tape shall be used where appropriate.

10.2.1.3 To limit the usage of danger tape to only active danger activity or condition and to use the caution tape for all activity with inherent potential hazards and on standby condition.

10.2.2 Scope:

This policy applies to all THPAL employees and contractors working within THPAL complex on activities that require isolation and use of proper barricades on the working area.

10.2.3 Responsibility:

10.2.3.1 The Top Management of THPAL is responsible for the implementation of this policy.

10.2.3.2 The personnel (THPAL or Contractors) who will conduct the activities are responsible for the installation of barricade tapes to isolate the working area.

10.2.3.3 Supervisors' in-charge should ensure barricade tapes are installed properly.

10.2.3.4 Each workforce is responsible to ensure the tape and tags is maintained on areas which needs additional information for other personnel who will enter the barricade.

10.2.3.5 Control the area against unauthorized entry without coordination from personnel barricading the area.

10.2.3.6 THPAL safety is responsible to monitor and ensure the policy is properly carried out and implemented.

10.2.4 Guidelines on the Use of Caution Barricade Tape (yellow)

10.2.4.1 Caution tape is yellow as the predominant background color with the words "CAUTION" all along the tape. This is used to isolate and warn against potential hazards inside the barricaded area and usually on standby situation.

10.2.4.2 Caution tape must be installed on a barricade post and the caution tape height at least 1.0 meter from the flooring surface or approximately on a waist line level of a person and should have enough tension without sagging.

10.2.4.3 The installed caution tape should not sag too low in such a way that anybody can easily overstep and enter the barricaded area. If sagging occurs install additional post to maintain the desired height and tension of the caution tape.

10.2.4.4 The following conditions requires indication tag for information of other personnel if OK or not to enter the barricaded area:

a. Barricaded area without standby person assign as watchman with on going activity.

b. Barricaded area with existing potential hazard of fall, chemical contact mechanical contact, limited access and we need to pass the barricaded area.

The indication tag should be installed on a location visible to other personnel not involve on the activity.

c. Other areas not indicated and easy to identify no need to install indication tag.

10.2.4.5 Never remove the indication tag on barricaded area without coordination from the personnel involve on the activity.

10.2.4.6 Barricaded area should be provided with a removable portion of the caution tape for the access of personnel in getting inside with due permission from the person controlling the barricaded area and if no personnel in the area the entry will depend on the indication on the tag if ok to enter.

10.2.4.7 Minimize the area to be barricaded and always provide access of personnel outside the barricaded area.

10.2.4.8 Always keep clear access way of Fire Hydrants, Fire extinguisher and Safety Eye Wash Showers and do not include in the barricade.

10.2.5 Guidelines on the Use of Danger Tape (Red)

10.2.5.1 Danger tape is red as the predominant background color with the words “DANGER” all along the tape. This is used to isolate and barricade the active on going activity and equipment which are operating and running situation.

10.2.5.2 Danger tape barricade must be minimize with provision for access outside the barricaded area for safe pass way of other personnel.

10.2.5.3 Danger tape must be installed on a barricade post and the danger tape height at least 1.0 meter from the flooring surface or approximately on a waist line level of a person with enough tension without sagging.

10.2.5.4 Welding activity on elevated position and the flooring below is narrow should be fully barricaded with danger tape. Then assign watchman to advise other personnel to re-route the passage way in order not to distract the welders doing the activity.

10.2.5.5 Lifting activity must be barricaded with danger tape when the activity is ongoing while the Mobile Crane is operating and running situation. All entry points within the lifting radius must be installed danger barricade tape including upper level as in HPAL area, MS Reactors, H2S Plant and Utility area. During break time when the lifting activity is stop or standby reduce the danger tape area. Rigger or watchman must provide access to other personnel and when lifting activity resumes fully close the barricade.

10.2.5.6 Sandblasting equipment must be installed danger tape barricade within the limit of the sandblasting area when it is operating and running situation. When standby no need to remove the danger barricade because the equipment should not be operated by unauthorized person.

10.2.5.7 Ongoing flashing activity from high elevation the ground floor must be installed with danger tape. Remove danger tape after the activity.

10.2.5.8 Leaking hot acidic solution on high elevation the affected ground level must be installed with danger tape. Remove danger tape if the leaking is already controlled.

10.2.5.9 Danger barricaded area should be provided with a removable portion of danger tape for the access way of personnel involve in the activity.

10.2.5.10 The danger barricaded area should be provided with indication Tag of activity and strictly “NO ENTRY” for unauthorized person without coordination of the person in-charge of the activity.

10.2.5.11 Danger barricade tape must be remove completely after the activity and make sure no left over of tied danger tape in any structure to emphasize cleanliness in the area.

10.2.6 Activities that need Danger tape:

Activity	Hazard	During activity	After activity
1.Active on going Lifting and Rigging Activity	Falling materials.	Safe distance from the lifted load: 1-2 m height= 2m away 2-5 m height=3m away 5-10 m height=6m away 10 m height & above=10m away	Remove danger tape when standby or stop of activity.
2.Active Hot surface: By hand feeling can not sustain within 10 seconds.	Contact on any parts of the body.	Install danger tape on the expose area.	Remove danger tape when insulation materials are installed.
3. Draining of hot acidic liquor or slurry in HPAL and MS Area: Hot when the temperature is above 50°C; Acidic solution pH below 5.	Contact with acidic solution or slurry.	Install danger tape within the draining area. Put indication of the activity.	Remove danger tape after draining activity.
4. Open platforms above a top manhole of tanks and vessel; ex. autoclave, MS Thickener, Reactors and Washing Column.	Falling down.	Install temporary railings at the edge with danger tape and indication of activity.	Remove danger tape after the activity.
5. Descaling activity inside autoclave, MS Reactors and Vessels	Hit by de-scaling materials.	Install danger tape in all manhole opening on the affected area. Only assigned personnel allowed to enter. Put indication of the activity. Assign a watchman.	Remove danger tape after the activity.
6.Sandblasting Activity	Hit by sandblasted materials.	Install danger tape on sandblasting area. Put	No need to remove danger

		indication of the activity. Assign watchman.	tape because the equipment should not be operated by unauthorized person.
7. Acid /Caustic dosing system line rectification activity including dosing tank replacement at De-mineralized water system.	Chemical Burn	Install danger tape within the bounded wall area. Put indication of the activity.	Remove danger tape after the activity.
8. Hydro jetting/Pneumatic Testing/Hydro testing	Hit by high pressure water.	Install danger tape on areas directly below the equipment and 1.0 meter in all side of the equipment.	Remove danger tape after the activity.
9. Scaffolding Erection/Dismantling and Modification.	Hit by falling materials.	Install danger tape below the erection or dismantling area. Assign watchman. Put indication on the activity.	Remove danger tape after the activity.
10. Excavation Works	Falling down.	Install danger tape 1.0 meter from the edge of excavation.	Remove danger tape after the activity.
11. Hot Works Activity: Welding, Cutting, Grinding	Electricution and body injury.	Install danger tape 1.0 meter from the hot work area. Assign watchman. Put indication on the activity.	Remove danger tape after the activity.

10.2.7 Activities that need Caution tape:

Activity	Hazard	During Activity	After Activity
1.Conditions not included on the danger tape. Ex. Housekeeping substandard condition. Maintenance preparation materials.	Tripping and bumping	Install yellow caution tape anchored on a barricade post.	Remove caution tape after the activity.
2. Temporary Storage of Materials (Various Materials & Equipment spare parts).	Tripping and bumping	Install yellow caution tape anchored on a barricade post.	Remove caution tape after the activity.
3. Cable Pulling & Other E&I Related Works	Tripping and Falling	Install yellow caution tape on areas directly below the pulling	Remove caution tape after the activity.

		activity. Assign watchman.	
4. Areas directly below the activities on high elevation.	Hit by falling materials.	Install caution tape at lower area and put indication of the activity. Assign watchman.	Remove caution tape after the activity.

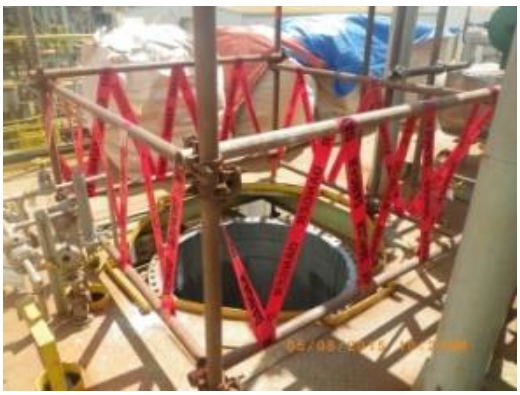
10.2.7 Activities that need Danger tape: Example

10.2.7.1 Danger Barricade

Proper- provided with post, indication tag and access way.

Proper- provided with post, indication tag and access way on excavation area.

Proper- on going activity with indication tag.



Proper- barricade on open column provided with post and railings.

Proper- ongoing welding activity full barricade with indication tag

Proper- on going lifting activity with signage and watchman

Proper – barricade with railings and provided with access way outside barricaded area.

Proper- barricade with post, indication tag and access way.

10.2.8 Caution Barricade；Example

Proper-barricade with indication tag of activity.

Proper- Full barricade with post and indication tag on temporary storage area.

Caution barricade with post, indication tag and access way.

Proper-barricade with indication tag and post with access way outside.

10.2.9 Improper Barricade；Example

Danger Barricade

Improper- Low and sagging anybody may overstep and enter the barricaded area.

Improper – no more activity should be removed.

Improper- Too wide barricaded area should be minimize within the ongoing activity only.

Improper – Small excavation area widely barricaded with danger tape should limit nearest to the opening.

Improper - no barricade post and no indication tag

Improper – No provision of access way for other personnel.

Improper – Should be caution tape only not danger tape. No barricade post

Improper – Should be caution tape only not danger tape. Not on going activity.

Improper – No access way for other personnel.

Improper – Should be caution tape not danger tape for storage materials.

Caution Barricade; Example

Improper – Not installed on a barricade post.

Improper – Low and sagging anybody may overstep and enter the barricaded area. Must install additional post and adjust tension.

Improper – On going water leaking on pipe rack barricaded with caution tape should be danger tape.

Improper – On going flashing activity barricaded with caution tape must be replaced with danger tape.

Improper – Remove completely do not left behind the cut portion of the caution tape.

Improper – After activity remove completely do not left behind the cut portion of the tied tape.

Improper – Not installed on a barricade post.

Improper – Barricaded parts extending outside.

Improper – Not installed on a barricade post.

Improper – Not installed on a barricade post.

SECTION 11: HIGH POWER TOOLS/RISK OF HIGH POWER

11.1 Background

The advent of a serious incidents that were encountered before and lately in the Plant arising from those activities conducted without specific standard operating procedures, lack of hazards identification and risks assessment of the personnel doing the job, inadequate protection or cover guard of the equipment to prevent flyover of wreckage material in the event of unexpected material failure which could eventually hit or pinch through the use of high powered tools resulting to injury, it is imperative to address this concerns accordingly.

11.2 Management

In order to prevent the recurrence of these unfortunate incidents and to keep the safety condition at a highest degree of protection and wellbeing of workers, the following must be implemented and followed:

1. The high powered tools and equipment intended to use must have approved procedure. Examples: Hydraulic Torque Wrench, Hydraulic Press, Impact Wrench, Hydrotesting machine etc.
2. The personnel involve on the use of those high powered tools and equipment must be educated with the approved procedure before assign to a particular activity.
3. Supervisor or Foreman must closely supervise the activity, check and monitor that the procedure is strictly followed.
4. In case of difficulty or problem encountered in the course of the activity must inform to immediate superior (THPAL Maintenance PIC, Maintenance Section Head and Assist. Manager).
5. Manual activity involving high torque with the application of extremely strong force are considerably high risk in nature (e.g. unbolting or tightening of nuts) the following must be applied:
   - 5.1. Use specific tool to fit snugly specifically to that mechanical part (e.g. not adjustable wrench but box wrench with same condition).
   - 5.2. Confirm holding position before applying force gradually.
   - 5.3. Position or stand in a stable working platform.
   - 5.4. Examine the rotation orientation and direction.
6. Pressurized equipment shall also be treated with similar risk.

SECTION 12; MANAGEMENT AT CHANGING POINT

Most incident occur in changing point (e.g., changing tools, procedures, facilities, personnel, etc.). Safety management for changing point is quite important to prevent incident/accident to happen.

1. Changing Procedure during activity
   1.1. When workers encounter a situation where they have to change/adjust from the original plan, they should first stop the activity.
   1.2. Ask the supervisor about the changes/adjustments.
   1.3. The supervisor will assess the risk of the new procedure and advise on countermeasures to prevent trouble.
   1.4. If the supervisor cannot evaluate, the Senior Supervisor/foreman/manager must provide instruction about it.
   1.5. Any changes made to the permit, activity, procedure, and any other necessary documents related to the activity must be communicated and properly coordinated with the process owner and other concerned departments.

2. Changing/Demolition/Installation of Facility/Equipment
   2.1 Compliance with Occupancy Requirements:
   Ensure that all occupancy requirements are fully complied with before occupancy or use of the building.
   2.2 Permit Issuance:
   Obtain all necessary permits required for occupancy, construction, and operation of the building.
   2.3 The section manager/head must prepare a new/revised procedure and educate workers on it before they start using it.
   2.4 Management must assess the risks generated by the changes and take action before implementation.

3. Changing Personnel
   3.1 When assigning new personnel to activity, management must conduct necessary education beforehand.
   3.2 When changing shift, essential information must be relayed to the incoming shift, and the personnel in the incoming shift must confirm the information with each other, especially for continuing activity.

4. Changing, Renovating and Demolition of Building
   4.1 Compliance with Occupancy Requirements:
   Ensure that all occupancy requirements are fully complied with before occupancy or use of the building.
   4.2 Permit Issuance:
   Obtain all necessary permits required for occupancy, construction, and operation of the building.
   4.3 Posting of Policies and Requirements:
   Post essential documents such as EMS (Environmental Management System) Policy, Safety Policy, and any other relevant requirements within the building premises.
   4.4 Chemical Handling and Safety Measures:
   If the building contains chemicals, ensure compliance with safety protocols, such as providing GHS (Globally Harmonized System) labels and Safety Data Sheets (SDS) for each chemical present.
   4.5 Signage and Information Display:

Display all required signage and information relevant to the building's operation, safety procedures, emergency exits, and contact information.

4.6 Documentation and Record Keeping:
Maintain accurate documentation of permits, policies, safety procedures, and any changes made during the construction and occupancy phases.

CHAPTER III RULES FOR SPECIAL WORK AND TOOLS/EQUIPMENT

SECTION 1: PALLET UTILITZATION AND MANAGEMENT

1.1 Storage and Piling

a) Pallet must be properly piled in a designated location for storage to be determined and approved by the process owner which need these material in their operation.

b) The height of piling should not exceed sixty (60) inches or 10 pieces' pallets per pile. Please see below

c) Should not leave anywhere unused pallet after using. It should be keep and stored immediately in the stockpiling area or designated location with corresponding signage.

d) Do not use defective pallet with cracks and/or detached parts.

e) When hauling of materials placed on pallet by Forklift the Fork must be properly inserted to the chamber and the height of the load must not obstruct the visibility of the Forklift operator.

f) One tonner bag placed on pallet can be in two tier but the second tier should put directly over the other without a pallet. (ex. Piling of Sulfur Bag at Sulfur Storage). Two tonner bag should not be put on pallet (ex. Piling of MS Bag at MS Product Warehouse0). During hauling of tonner bags two tier is not allowed.

g) Wooden pallets are used in indoor and mostly reuse from delivered materials while plastic pallets are used in either indoor or outdoor that should not exceed the racking load of 2tons.

h) Never stock pallets on their sides. When standing upright, the unstable pallet can fall over and can injure workers.

i) Pallets must be piled in a stable manner to avoid collapse or sliding of pallets

j) Use protective gloves when handling pallets

k) Ask a for assistance when having a hard time in manually handling/lifting empty pallets.

l) Pallets used for access way going for submerged area (ex. bund wall with water) should be in good condition and no damage. But pallets should not be used as working platform.

1.2 Disposal of Damaged Pallet

a) Damaged and contaminated pallets must be disposed and send to the Hazardous Waste Storage Facility following the procedure of solid waste disposal by concerned process owner or department.

b) Protruding nails of wooden pallet should be remove by process owner before storing and disposal to hazardous waste storage facility.

APPENDIX

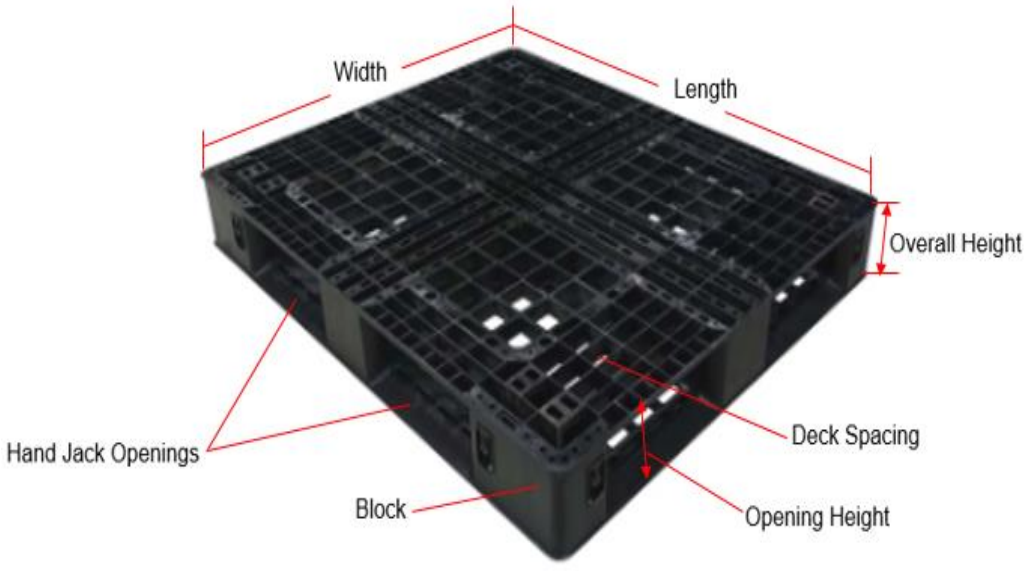
Plastic pallet are rigid structures that provide stability to goods during transportation or storage.
Dimensions, 1100 mm L x 1100 mm H, 150 mm W, 11.5 kg. Racking Load, 2000 kg
High-Density Polyethylene Pallets
HDPE pallets are the most widely used plastic pallets because of their versatility, cost-effectiveness and strength.

Plastic Pallet Form Specification

A plastic pallet's form is a square, which affects how the pallet is handled and used. Pallets may be designed to be stacked on top of each other when they are fully loaded in order to make efficient use of transportation or may be designed to nest inside each other so that they take up very little space when empty.

Below is commonly used pallet in THPAL. Other pallets around is from the materials we received from our vendor/supplier that exceeds our minimum weight limit which required assistance during manual handling.

Figure 1-Parts of Pallet



SECTION 2: WORKING AT HEIGHTS

2.1 On Falling Objects Protection:

a) Barricade the area below ongoing scaffolding erection or dismantling to prohibit entry with informative signage.
b) Use panels or screens if material is stacked higher than the toe board
c) Build a canopy or erect a net below the scaffold so that they will contain falling objects and cover all possible opening on working area including railings nearby.
d) Guardrail systems must be maintained when working 6 ft. above lower level, or when working above dangerous equipment and sharp objects
e) Damaged or missing guardrails must be fixed immediately by competent person.
f) All workers must be protected from falling onto sharp materials or onto dangerous equipment.
g) All open excavations and pier holes must be guarded or protected.
h) No employee shall be allowed to work in test pits, trenches and any excavation works in unstable ground or where depth exceeds 1.5 m/4.9 ft. without the necessary support or shoring.
i) Place handy tools and equipment in bags or buckets with lanyard and tie with rope.
j) Proper housekeeping shall be practiced at all times remove unnecessary materials and transfer to proper place.
k) Tools and other items with risk of fall must be secured (ex. Lanyard, bag etc.).

2.2 On Power and Elevating Work Platforms:

a) Platform must be inspected prior to use and to be operated by duly authorized personnel.
b) The operator must be stationed at the control panel and the other personnel on the working platform.
c) Always make sure the personnel have proper fall protection and the personnel are authorized to operate a powered and elevated platform.
d) Only use equipment that is designed for lifting personnel and suitable for the assigned task.
e) Keep the basket gate closed and locked while working inside the basket.
f) Wear a full body harness attached to an anchorage point inside the basket.
g) Place all tools and equipment in bags or buckets.
h) Proper housekeeping shall be practiced at all times remove unnecessary materials and transfer to proper place.

2.3 On Scaffolding

a) Scaffolding structure must be inspected weekly and every after natural calamity like typhoon or earthquake and inspection tag are updated by competent person.

Fig. 1 **Scaffolding Inspection Tag**

b) Scaffold bases must rest on a base plate and a mud sill.
c) Only work from scaffolds that are properly constructed and supported.
d) When working on scaffolds 6' above lower level, guardrail systems must be installed
e) Never use scaffolds that do not have a proper guardrail system installed.

Guardrails consist of 3 components:

1. **Top Rail**: 38"- 45" from the platform surface
2. **Mid Rail**: midway between top rail and the platform surface
3. **Toeboard**: 3 ½" high and secured to the platform surface

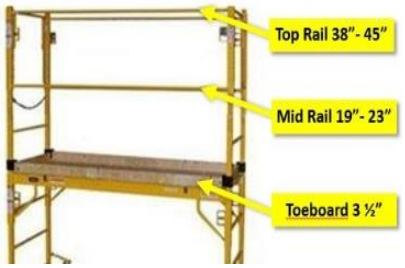


Fig. 2 Standard Guardrail

f) Never stack blocks, bricks, or use ladders on top of scaffolds for extra height.
g) Workers must have a safe way access along the scaffold.
h) Use only ladders designed for use with scaffolds and must be firmly secured to the scaffold
i) Keep walkways free of obstacles, tools and equipment.
j) Use a crane, hoist or winch to carry materials up to and down from the scaffold.
k) Never exceed the Rated Load capacity of Scaffold specified by the Scaffolding Inspector.

Rated Load Capacity of scaffold	**Intended Load should be**
Light-duty "Standard"	**25 pounds per square foot (122kg/m^2) applied uniformly**
Medium-duty "Brick masons"	**A. 50 pounds per square foot (244kg/m^2) applied uniformly**
Heavy-duty "Stone setters"	**75 pounds per square foot (366kg/m^2) applied uniformly**

l) Never stand or sit on the rails of the scaffolding structure.
m) Place all tools and equipment in bags or buckets.
n) Proper housekeeping shall be practiced at all times.

2.4 On Stairs

a) Stairways must have a stair rail along each unprotected side or edge
b) Stairs that have walls on both sides must have at least one handrail on the right side when climbing down
c) Never use stairs that are not complete or unsafe
d) Hold the handrail while using staircase.
e) Proper housekeeping shall be practiced at all times.
f) Avoid unnecessary materials in stairs that can cause obstruction.

2.5 On Ladders

a) Ladders must be inspected prior to use and follow the 4m to 1m (13.1 ft. to 3.3 ft.) 75-degree angle.

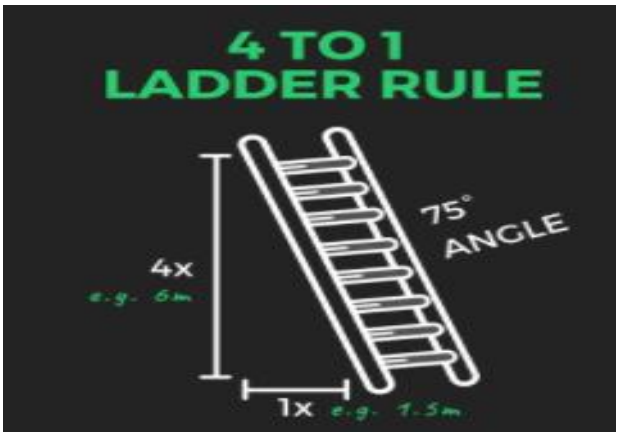


Fig. 3 Ladder Safety Rule

b) Ladders must be kept in a good condition and safe location.
c) Do not stand on the last three (3) top rungs of a ladder.
d) Always maintain good footing on a ladder.
e) Use the correct size ladder for the work that is to be done.
f) Never straddle or sit on top of a step ladder.
g) An A-frame ladder must be fully opened and locked into position.
h) Use ladders only for their designed purpose.
i) Only use ladders on stable and level surfaces to prevent accidental movement.
j) Ladders must be positioned at a safe angle to avoid potential fall hazards when climbing.
k) Extension ladders must extend 3 ft. over the landing for safe access while someone is holding at the bottom side.
l) Connecting two (2) ladders for length extension is not allowed.
m) Extension and single ladders must extend 3 ft. over the landing for safe access while someone is holding at the bottom side.
n) Maintain at least 3-point contact with the ladder.
o) Never climb a ladder while carrying any materials.
p) Inspection of ladder should be done before every usage. Inspect the ladder's visual, functionality, Capacity and overall condition prior usage. If you discover any issues during inspection, refrain from using the ladder until it has been repaired or replaced.

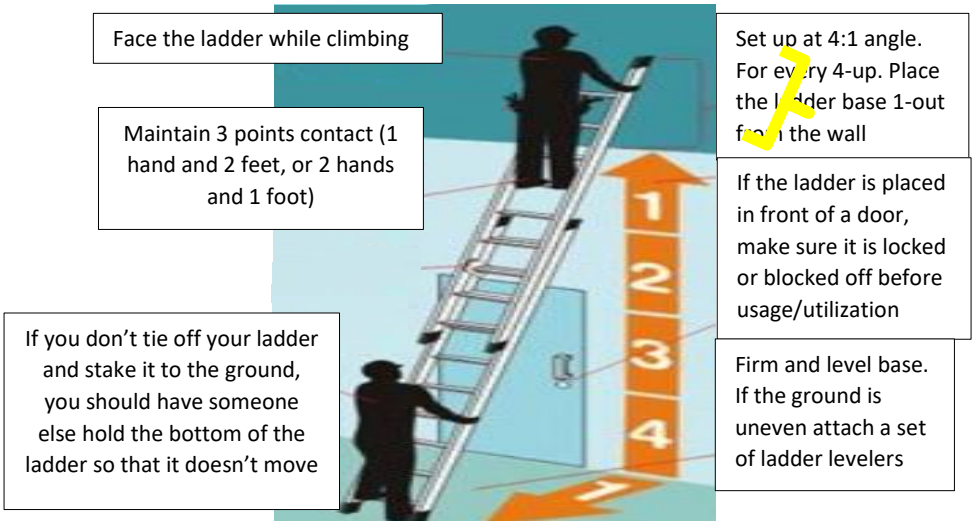


Fig. 4 **Ladder Safety DOs and DON'Ts**

2.6 On Personal Fall Arrest Systems

a) Every access ladder 16.4 ft./5 m above landing platform, Self-retracting Lifeline (FAD-Fall Arrest Device) must be installed.

Fig. 5 **Fall arrest device properly**

b) Fall body harness with double lanyard must be worn properly, every time 100% tie off must be carried out when working and inspecting at a temporary or permanent platform above 6 ft./1.8 m with danger of falling.
c) Safety belt must be worn during audit and inspection at elevated permanent structure.
d) D-ring must rest between the shoulders and the chest strap must be secured.
e) Lanyards must be in good condition and free from visible damage.
f) Never anchor or tie off to pipes, wood structures, electrical wires, or other areas not designed for anchorage points.
g) The anchorage point is the place where you tie off to or hook to.
h) The anchorage point must support the force of a person falling.
i) Life lines must be used to allow a worker to stay tied off while He moves through the work area.

Figure 5

Figure 6

WITH SAFETY BELT **WITH FULL BODY HARNESS**

Fig. 6 Proper wearing of PPE and Personal Fall Arresting System

2.6 Requirements for working at heights with life line

a) Cannot use the rope made of natural fiber. And install it in appropriate anchorage position as shown in illustration below.

Fig. 7 **Ideal position of Life Line Installation**

b) The rope must be protected against damage by cuts or abrasions.
c) Safety belts currently used in THPAL is MIDORI MSK 222 made of chemical fiber fabrics, linen webbing, or other suitable materials at least 5 cm. (50 mm) width and 0.25 cm (2.5 mm) thick. Occupational Safety and Health Standard (OSHC) provisions with a sufficient strength to support a weight of 114 kg. (250 lbs.) without breaking.
d) Hardware used for safety belts should have a strength of approximately equal to the full strength of the waist band. Buckles shall hold securely without slippage or other failure. This holding power should be achieved by only a single insertion of the strap through the buckle in the normal or usual way.
e) Belt anchors shall be made of metal machined from bar stock, forged or heat treated, capable of supporting a pull of 2730 kg. (6,000 lbs.) without fracture applied in the direction which the anchor must withstand should a man fall. All anchors and fastenings shall be provided with means to prevent turning, backing off or becoming loose. Anchor fittings with single thread section which is merely screwed into reinforcing plates shall not be used. Metals recommended for belt anchors are nickel copper alloy and stainless steel.

f) Life lines shall be made of good quality manila rope of at least 1.9 cm. (3/4 in.) diameter or equivalent material such as nylon rope of at least 1.27 cm. (1/2 in.) diameter and shall be of sufficient strength to support a weight of 1140 kgs. (2,500 lbs.) without breaking.

g) Safety nets shall not be less than 0.94 cm. (3/8 in.) diameter mesh ropes and not less than 1.9 cm. (3/4 in.) diameter border ropes (perimeter) made of manila rope or other material that can absorb the impact of a falling body equally as nets fabricated from manila rope of the dimensions specified. The mesh shall be arranged not to exceed 15.25 cm. (6 in.) on canters positively and securely attached to avoid wear at each crossing points of contact with the border.

h) Safety nets shall be equipped with adequately padded thimble sockets or equivalent means of attachments. Supports and anchorages shall be of sufficient size and strength to catch any falling worker. The nets shall be attached to sufficient supports outside and beyond the area of possible fall and supported at sufficient heights to prevent sagging to any solid object beneath when cushioning the fall of a worker.

i) Safety belts, life lines and safety nets shall be inspected before use and at least once a month. Defective belts, lines or nets shall be immediately discarded and replaced or repaired before reuse.

2.7 Other information Anchorage for Fall Protection

A. Free fall distance, total fall distance and system elongation

Personal fall arrest systems must be selected and rigged to ensure that potential free fall distances will never exceed 6 ft. (1.8m) as required by OSHA. See manufacturer's instructions for connecting subsystems to determine the deceleration distance and elongation that must be taken into consideration.

Total fall distance is the sum of free fall distance and deceleration distance. Dynamic elongation of the system (temporary elastic stretch of connecting components and subsystems) and the worker's height must be added to total fall distance and the user must allow for clearance. It is prudent to allow for an additional safety factor of 3 ft. (0.9m) below the fallen worker's feet.

Potential fall distance must be calculated to determine how to rig the system, and selection of the appropriate type of connecting device. For example, when using a 6-foot lanyard, the illustration shows a typical calculation of total estimated fall distance. For the example shown:

- When fall clearance is under 18.5 ft. (5.6m), an alternative solution such as a shorter lanyard length, or a different connecting device such as a self-retracting lanyard or fall limiter, is needed to reduce the total fall distance.

- When fall clearance is over 18.5 ft. (5.6m) there is sufficient total fall distance available and the 6 ft. lanyard is acceptable to use. Note that energy absorbing lanyards can expand up to 3.5 ft. (1.1m). Consult manufacturer's instructions.

Note: Never tie a knot in any lanyard to make it shorter, as it reduces the strength by more than 50%. Instead, purchase an adjustable lanyard and adjust it to proper working length.

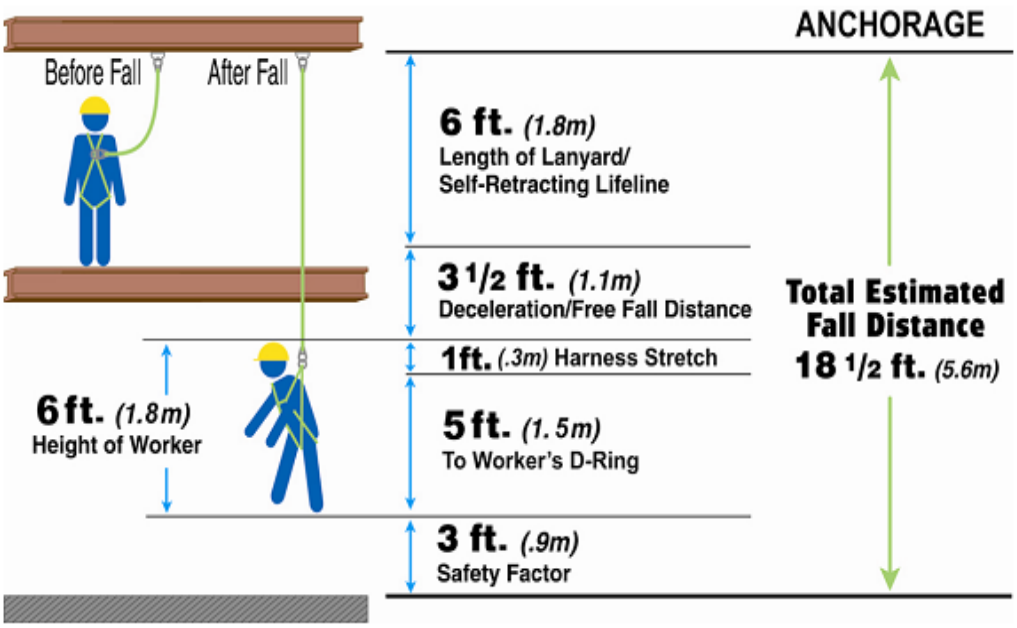


Fig. 8 Determining of Potential Fall Clearance

B. Fall Restraint System

A fall restraint system is recommended when guardrails or personal lift devices cannot be used. When properly used, a fall restraint system prevents the worker from falling off an edge. Lanyards must be of fixed length to prevent the worker from reaching an area where they could fall. This system is applicable in our roofing/roofing repair and water proofing activity.

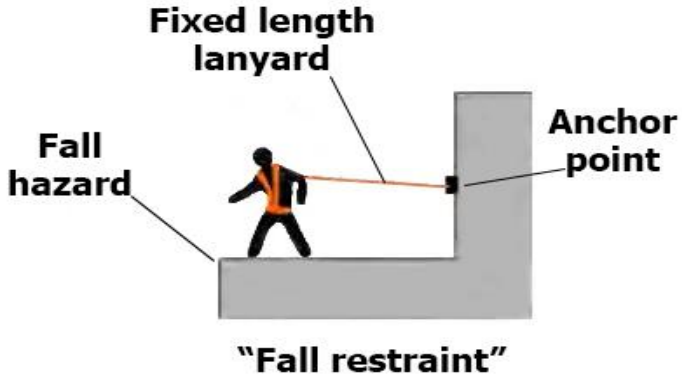


Fig. 9 Fall Restraint

C. Pendulum Falls

Swing falls can occur when the system is not anchored directly above the user. The force of striking an object in a pendular motion can cause serious injury. Always minimize swing falls by working as directly below the anchorage point as possible.

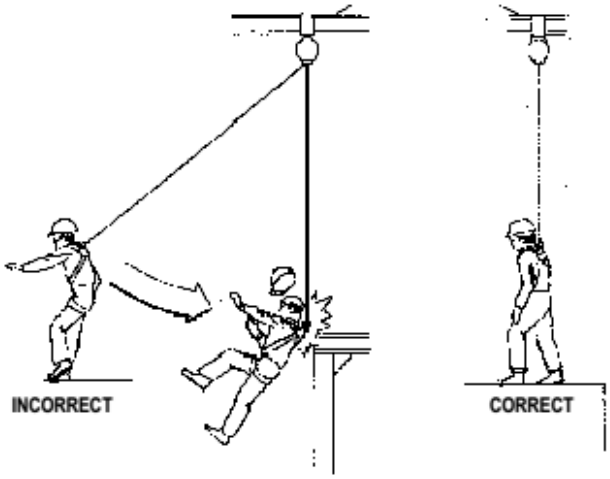


Fig. 10 Proper and Improper Anchorage point

D. Safety Belt Falls

If you fall, the high force of the fall is concentrated at your waist rather that the 6 points of a full body harness. It can crush intestines, kidneys, spleen, liver and other internal organs. Never use safety belt when conducting working at heights activity in temporary working platform. *(Note: Safety belt is intended only for safety audit and inspection purposes on permanent platform).*

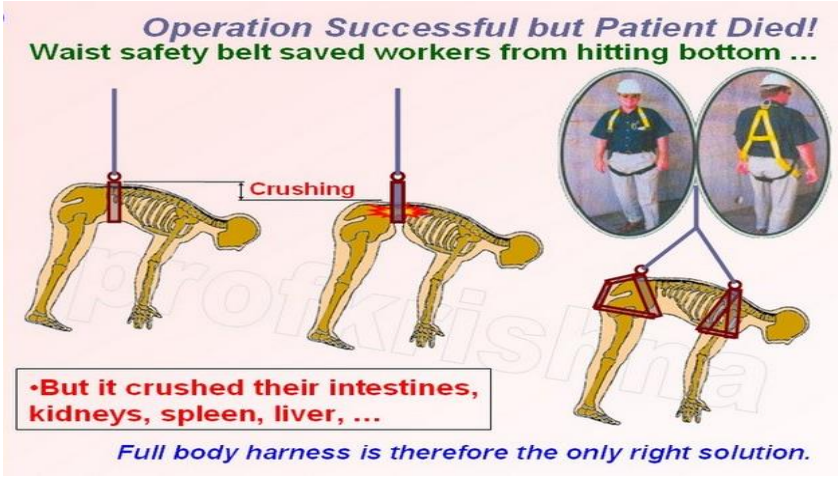
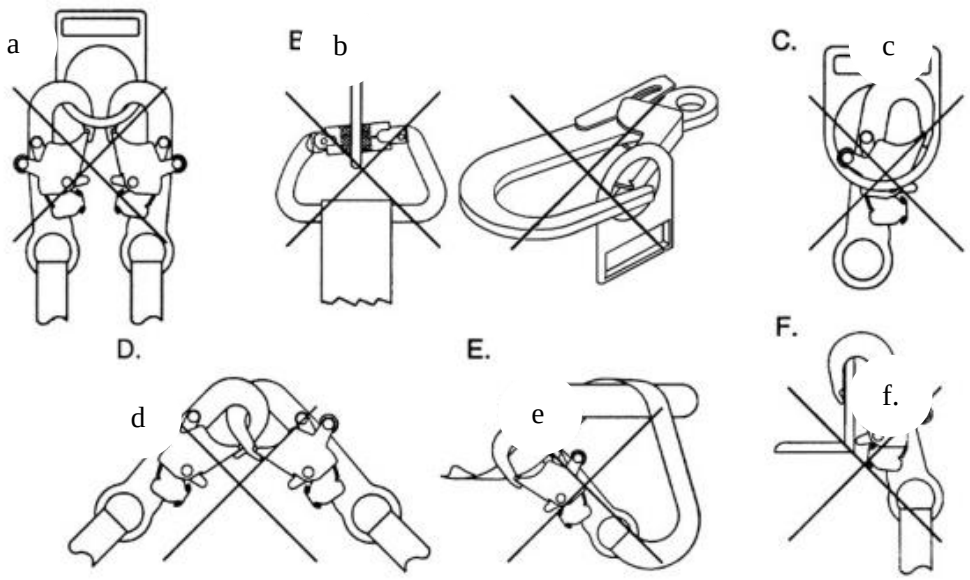


Fig. 11 Illustration of a person falling using safety

E. Examples of Improper Connections

a) Just as a chain is only as strong as its weakest link, the integrity of a fall protection system depends on proper connection of all its components. The following are some examples of improper connections: Do not attach two or more snap hooks or carabineers to a single D-ring.
b) Do not load a carabineer or snap hook at the gate.
c) Ensure that connections are compatible and secure.
d) Do not attach two snap hooks or carabineers together.
e) Do not tie back on a lanyard unless specifically designed to do so by the manufacturer.
f) Ensure that the snap hook is closed and locked.



F. Inspection of Fall Protection System

Fall protection equipment must be visually inspected before each use. Regular inspection by a competent person for wear on the equipment should be performed at least every month. Severe service or wear will require more frequent inspections.

Inspection procedures should be written and each inspection should be documented. It is also important to follow any specific instructions that are provided with the equipment at the time of purchase. Instructions should be stored in a location where they are readily available to the users.

Inspect all equipment according to the manufacturer's instructions. If required by the manufacturer, return the equipment to the manufacturer for inspection, repair, or recertification.

Remove equipment from service if a stress indicator or warning system has been activated. Follow manufacturer's instructions for disposition of the equipment.

If a fall has been arrested, remove all components of the system from service and follow the manufacturer's instructions for disposal.

G. Cleaning, Maintenance and Storage

Basic care of your fall protection equipment will prolong the durable life of the unit and will contribute toward the performance of its vital safety function. Proper storage and maintenance after use are as important as cleansing the equipment of dirt, corrosives or contaminants.

- Nylon or Polyester – Remove all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion; then wipe with a clean cloth. Hang freely to dry, but away from excessive heat.
- Housing – Periodically clean the unit using a damp cloth and mild detergent. Towel dry.
- Drying – Equipment should dry thoroughly without close exposure to heat, steam or long periods of sunlight.

When not in use, fall protection equipment should be stored in a cool, dry and clean place out of direct sunlight. Avoid areas where heat, moisture, light, oil, chemicals (or their vapors) or other degrading elements may be present.

Equipment that is damaged or in need of maintenance should NOT be stored in the same area as usable equipment. Heavily soiled, wet or otherwise contaminated equipment should be properly cleaned and dried prior to storage.

Prior to using equipment which has been stored for long periods of time, a formal inspection by a competent person should be performed.

SECTION 3: SCAFFOLDING ACTIVITY

This guideline will serve as reference and is specially formulated for the installation of scaffolding pipes on fittings and the use and setting-up of a ladder that will be use during scaffolding activities. Procedure is following:

3.1 Erection

a) Personnel will be prohibited to hold a ladder on the ground during erection of scaffolding only. For other activities using ladder still follow the existing rules.
b) If no anchorage point to position a ladder, then temporary scaffolding platform must be erected & used as Working platform to carry-out the required task.
c) The procedure shall be to set up a ladder at a position where the joint between the piping and the clamp can be visually confirmed and work shall be performed. If a ladder cannot be installed due to obstruction with existing equipment, another scaffold should be temporarily erected
d) For scaffolding structure erected and existed for 3 or more months, process owner must consider installing permanent platform.

3.2 Installation

a) Scaffolding pipe must overlap a minimum of at least 10mm (thickness of a finger) from the edge of the clamp with an excess a bit from both sides and must be visible to the worker (scaffolder) who tightened the clamp. This is applicable on narrow access where hazard cause by protrusion can be minimized.
b) A handgrip overlap (100mm) from the edge of clamp is more acceptable in an area not normally access by the passers or in elevated area or no risk of bumping or tripping due to protrusion.
c) Ladder must be secured to a suitable anchorage point either to be secured from top portion & mid portion of the ladder using lashing wire or tie/putlog.
d) Ladder must be installed in a manner observing the 4:1 ratio or 75 degrees – base of the ladder is set away from the wall at one-quarter of the working length of the ladder.
e) Do not carry any tools or materials in your hands' when ascending/descending on a ladder. Place all tools and equipment in bags or buckets.
f) Access Ladder must be erected with at least three (3) rungs extended above the landing platform
g) Keep walkways free of obstacles, tools and equipment.
h) Proper housekeeping shall be practiced at all times.

3.3 Using of scaffolding ladder

a) Face the ladder when climbing up & down
b) Maintain & observe three (3) Point Contact by keeping two (2) hands and one foot or two feet and one hand on a ladder.
c) Use rungs instead of side rails when ascending & descending a ladder. Rung provide proper grip rather than side rails
d) Keep your body centered between side rails. Avoid overreaching. Risk of falling as the center of gravity transferred outside the center between the side rails
e) Do not stand on the last three (3) top rungs of a ladder
f) End User must check the condition whether rungs are in good condition & ladder is properly secured & stable prior to its usage
g) Inspection & tagging of ladder as per Monthly Inspection & Color Code Scheme
h) Connect the full body harness to the fall arrester installed when ascending and descending to the ladder installed on a scaffold whose landing is 5 meters and above.

SECTION4: WORKING NEAR VEHICLE OR EQUIPMENT

4.1 HAZARD ASSESSMENT ANSD HAZARD ELIMINATION GUIDELINE

CONDUCT WORK AREA ASSESSMENT

1. AROUND WORK SITE

a) Take note of any work vehicles or mobile equipment you need to be aware of.
b) Consider if work vehicles will be entering or exiting the work site over the course of the day.
c) Store your equipment and supplies in an area where they won't get hit and you can safely access them.

2. ON THE ROAD

a) Establish if your work zone is set up near a busy intersection with traffic coming from multiple directions.
b) Measure how much space you have between work site and the roadway.
c) Be aware of your location vis-à-vis traffic, cyclist, and pedestrians as you work.
d) Be aware of the visibility of approaching drivers. Check to see if there are any curves or parked vehicles.
e) Be aware of other roadside work or traffic control going on nearby.

3. TRAFFIC ASSESSMENT

a) Be aware of the type of traffic that is passing by – passenger vehicle, buses, large trucks (heavy equipment)
b) Heavy equipment's are often wider than nominal vehicles and may have protruding side mirrors and other blind parts to the drivers/operators of the equipment.
c) Identify bicycle lanes and the volume of passers.

To eliminate hazards mentioned above. Here are guidelines that should be followed.

PREPARATION and GUIDELINES

1. WORK ZONE AND LAYOUT

a) Ensure that there is a plan for the work zone layout. This could be a simple diagram, showing where signs, cones and other devices are to be placed. The traffic control plan must include the use of signs to alert drivers to your presence. Cones alone are not enough. Signage are at least 3.5m from the Safety barricade and should have assigned spotter.
b) Ensure that the work zone layout addresses the site-specific hazards (e.g., signage and cone placement takes into blind area, curves in the road, etc.). Consult with your supervisor to modify the layout as necessary.

2. WORK ZONE SET UP AND TAKE DOWN

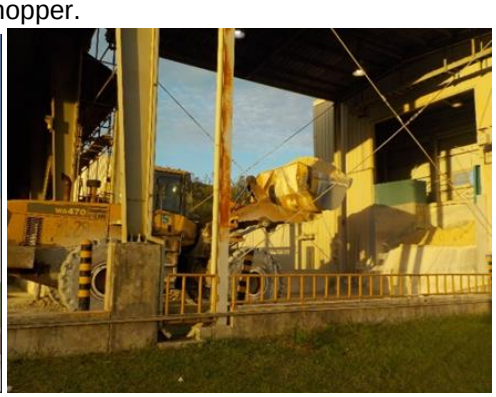
a) Ensure you have the required equipment such as signs, cones and barriers. All equipment should be clean, and in good condition.
b) Set up the work zone devices in the order that drivers will encounter them. Begin with the sign or device farthest away (upstream) from the work area. Do not turn your back to traffic as you set up the work zone.
c) Once the work zone is set up, travel through the work zone to view it from a driver's perspective. Do signs, cones and other devices provide clear guidance to road users? Could they find anything confusing? Are workers clearly visible?
d) Periodically throughout the day, make sure signs, cones and other devices are still in position.
e) Dismantle the work zone as soon as the work is completed and signs and devices are no longer needed. In general, devices should be removed in opposite order of installation with cones and other devices removed first, followed by signs.

f) Conduct housekeeping. Remove and dispose wastes materials (detach caution/danger tape, Spare bolts and nuts, piece of wooden materials, etc.

4.2 Working on Areas with Wheel Loader operation

1. Loader Operator shall dump only to the hopper when the green signal light is “ON”. Note: Green light = Go Sign; Orange Light= on going operation; Red Signal light is “STOP”.


2. Never dump to the hopper when the Red signal light is “ON”.
3. Nobody is allowed to go inside the working limit of the wheel loader operation both personnel or other vehicle.
4. The operator should not leave the standby Wheel Loader while the engine is running.
5. During maintenance work at the hopper area full barricade with danger tape and signage “DO NOT ENTER MEN AT WORK” must be installed to prevent accidental dumping of materials with Wheel Loader.
6. On standby wheel loader bucket must be down to the ground back at the bottom position and the bucket opening facing upward.
7. Limestone Shade and Limestone Hopper Area Dump Truck should not enter while the Wheel Loader is ongoing Feeding in the hopper.

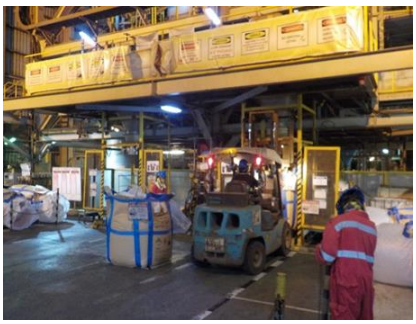
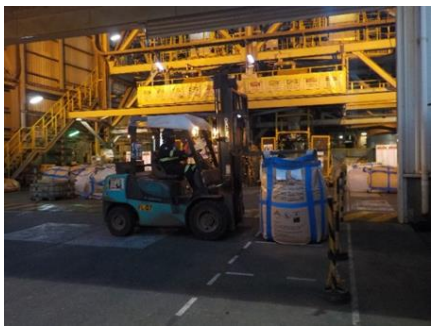



8. During dumping of limestone delivery inside hopper wheel loader operation must be stop and there should be an assigned spotter to give signal for the dump truck.
9. During wheel loader operation at limestone Shade/Hopper area nobody is allowed to enter within the working limit of the wheel loader.
10. Loader Operator must check if the Green signal light is ON which means go signal to dump in the hopper and ongoing operation.
11. When personnel would like to talk to Loader Operator specifically in Limestone area, production personnel must inform to logistics personnel that they will give instruction to the Loader Operator. Logistics personnel must request loader operator to turn OFF the engine before the production personnel can proceed in giving instruction to the loader operator.

4.3 Working on Areas with Forklift Operation

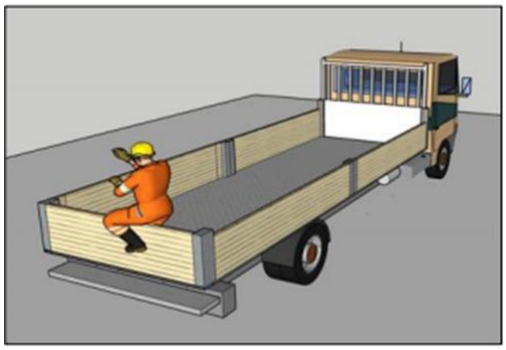
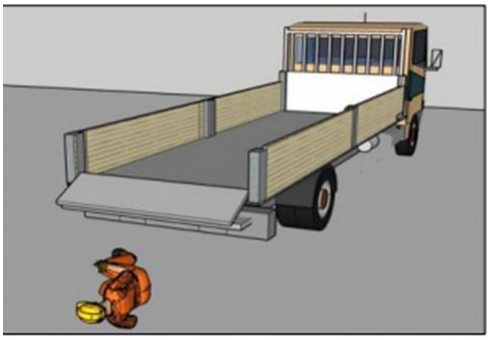
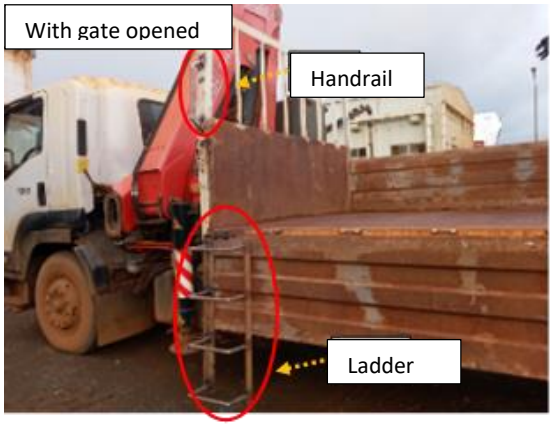
1. Keep a distance one and half (1.5) meter away from an operating Forklift.
2. When somebody wants to talk or give instruction to the operator, signal to stop the Forklift operation, stop the engine and lower down the fork before getting closer

3. Even if there is MS Flexible Container between the fork and the operator, personnel are not allowed to stand in front of the forklift.
4. Nobody is allowed to enter the area within the working limit or route of the Forklift while in operation. Keep a distance in item1.

4.4 Working on Flat Truck

1. To go up and down of Truck bed, open the gate, use the ladder and handrail.
2. Do not climb over the Tail gate at the rear portion or over the side cover guard in going down from the Flatbed truck to prevent from accidental opening resulting to falling down of personnel. See picture below. Except if is modified with the installation of access step board and hand rail they can be allowed.

Proper access in climbing Hauling Vehicle

SECTION5: THE USE OF HOSES

5.1 Hose Application

5.1.1 Industrial Suction & Discharge Hose

Suction & Discharge hoses can be found in a variety of applications: fuel & oil delivery, flour, grain & beverage dispensing, and material handling. It is our most popular product for storm drainage and water discharge. In addition to the numerous applications in the field, discharge hose can be found in various sizes, ranging from as small as 1/8" to as large as 12" and, in some cases, even larger.

It is important to realize that there are many factors involved in choosing the correct hose for your specific needs. One easy way to provide the information required, is to use the "STAMPED" method – Size, Temperature, Application, Material being conveyed, Pressure, Ends, & Delivery. Knowing these factors, will allow our expert staff to lead you in the right direction.

What is Camlock Fitting?

Camlock fittings are used as end connectors of the suction hoses, discharge hoses, and other low-pressure flexible hoses delivering water, and chemicals, and other fluid. Please see picture below;

CAMLOCK

Hose Selection and Safety measures

a) Hoses should be properly matched to its intended application.
b) Check hose specifications for suitability and compatibility to chemicals, pressure and temperature before purchase and/or using the hose by the concerned department.
c) In laying the hose to the desired area, hose must not be obstructing the access way that can cause tripping hazard when laid down on the ground or flooring.
d) In the event that the hose obstruct the access way, barricade shall be installed to avoid by passers on using the access way.
e) In the event that the hose shall be laid down on the ground or flooring, caution tape should be installed to the hose for more visibility to give caution to by passers.
f) In air hoses connection, whip checks should be installed to the hose in equal distance before the fittings in fully extended position. Please see picture below;

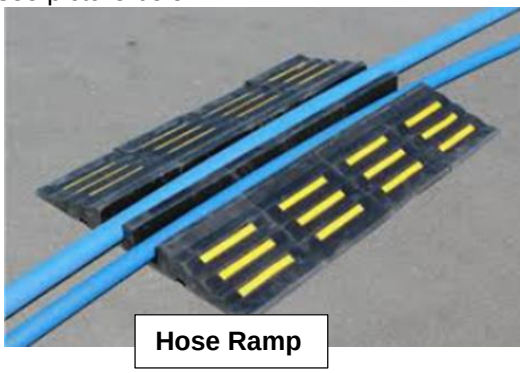
Whipcheck fully extended

The following safety precautions are to be taken with regards to air hoses and water hoses connection:

g) Ensure all hoses and components are appropriately rated to handle the maximum operating pressure of the air compressor.
h) Ensure that hoses are protected from mobile vehicles and traffic with suitable position or covered with ramps.
i) Always release the pressure inside air hoses and tools prior to uncoupling.
j) Never kink or squash a hose to permit it, or a tool attached to it, to be uncoupled.
k) Always close the valve to which the hose is connected when not in use.
l) All airlines are to be stored off the ground so that no dirt entry is possible at hose ends.
m) Always secure couplings used, whip checks, and check to confirm if properly fix.
n) Do not use compressed air hoses for other products such as oils or fuels.
o) Always ensure that the output hose is secured prior to turning on the air supply.
p) Do not fit a tail-tail component to extend air hoses. Always use appropriate couplings.
q) Bolted clamps or hose clips, that are appropriately secured, shall always be used to secure hoses to hose fittings.
r) For inspection and maintenance, activities are required to be documented and any defects promptly taken out of service and repaired or replaced.
s) No maintenance work is to be undertaken on air compressors or compressed air tools unless the equipment has been completely de-energized, locked out/tag out and properly isolated the discharge and suction lines.
t) Hoses should be returned to its hose rack after its use or stored to proper storage area.
u) In a live pressurized air hose whip check should be installed in every hose coupling connector to prevent from accidental dis-connection.
v) Whip checks should not be installed with slack in the safety cable. Please see picture below;

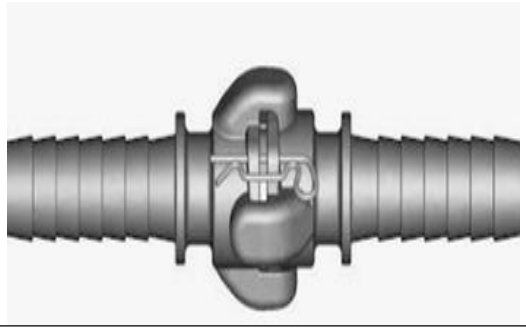
Whip check should not be installed with slack in the safety cable

w) Hose installed crossing in an access way of vehicles should be provided with hose ramp or similar modified protection to prevent from direct overrun of the wheel of the vehicles. Please see picture below.



Hose Ramp

x) Secure Cam lock by putting pin or tie wire to prevent accidental disconnection of the pressurized hose.
y) Ensure pin or tie wire is install in a Chicago hose connector before introducing air pressure to the line.



Chicago-style universal hose coupling

SECTION6: MANUAL LIFTING

6.1 Introduction

Manual handling means transporting or supporting a load by hand or bodily force. It includes lifting, lowering, pushing, pulling, moving or carrying a load. A load is a moveable object, such as a box or package, a person or an animal, or something being pushed or pulled, such as a roll cage or pallet truck.

6.1.1 The problem

Manual handling injuries are part of a wider group of musculoskeletal disorders (MSDs). The term 'musculoskeletal disorders include injuries and conditions that can cause pain to the back, joints and limbs.

This procedure focuses on manual handling, which is one of the main causes in the development of musculoskeletal disorders, particularly back pain.

Manual handling risks can be found across all kinds of workplaces on farms and building sites, in factories, offices, warehouses, hospitals and while making deliveries. Heavy manual labor, repetitive handling, awkward postures and previous or existing injuries or conditions are all risk factors for developing MSDs. Work may also make worse an injury which was not caused at work, such as a sports injury.

6.1.2 Regulation

The Manual Handling Regulations set out a clear hierarchy of measures you must follow to prevent and manage the risks from hazardous manual handling:

a) **avoid** hazardous manual handling operations, 'so far as reasonably practicable.
b) **assess** the risk of injury to workers from any hazardous manual handling that can't be avoided;
c) **reduce** the risk of injury to workers from hazardous manual handling to as low as reasonably practicable.

6.1.3 Workers have duties too. They should:

a) follow systems of work in place for their health and safety;
b) use properly any equipment provided for their health and safety;
c) cooperate with you on health and safety matters;
d) inform you if things change or they identify hazardous handling activities;
e) take care to make sure their activities do not put others at risk.

Consult and involve your workforce. Your workers and them, representatives know first-hand what the risks in the workplace are and can often suggest practical solutions to control them.

6.1.4 Avoid hazardous manual handling

Eliminate handling the load

a) Can you eliminate hazardous manual handling by not moving loads? for example, by looking at whether the work could be done in a different way:
b) Does the item really need to be moved, or can the activity be? done safely where it already is by redesigning the task?
c) Can products or materials be delivered directly to where they will be used?

Automation or mechanization

If handling the load cannot be avoided, consider whether the operations can be automated or mechanized to eliminate the manual part of the handling. The best time to make decisions about this is when plant or systems of work are being designed.

a) Can you use materials handling equipment or mechanical aids? to eliminate or reduce the risks you identify in your risk assessment? Can you use, for example, a conveyor, a chute, an electric-powered pallet truck, an electric or hand-powered hoist, or a lift truck to reduce the risk of injury? See Making the best use of lifting and handling aids for more information.

b) Can you use robotics technology, for example, in production lines?
c) When introducing automation or mechanization, make sure you avoid introducing new risks (for example, when maintaining equipment or when things break down).
d) Make sure your workers are trained to use any equipment you introduce; such as lift trucks.

6.2 Assess the risks

6.2.1 Risk Factor

Where you identify risks from hazardous manual handling in your workplace that cannot be avoided, you must do a manual handling risk assessment to help you decide what you need to do to manage these risks. Make sure your workforce is fully involved in the risk assessment process.

Consider risks arising from:

a) the task;
b) the load;
c) the working environment;
d) individual capacity;
e) any materials handling equipment or handling aids used;
f) how you organize and allocate work;
g) the pace, frequency and duration of the work.

6.2.2 People at high risk(Physical)

Make sure you take account of the individual requirements of workers who may be especially at risk, for example:

a) new or expectant mothers;
b) people with disabilities, which may make it more difficult to do a particular task;
c) those returning to work after a recent manual handling injury, who may be on a phased return to work;
d) inexperienced new, young or temporary workers;
e) older workers;
f) contractors, homeworkers or lone workers;
g) Migrant workers who may not have English as the first language.

6.2.3. People at high risk(Mental)

You also need to take account of psychosocial risk factors. These may affect workers' psychological responses to their work and workplace conditions. Examples are high workloads, tight deadlines and lack of control over the work and working methods, which may make people more likely to develop MSDs.

6.3 Personal risk assessment detailing

6.3.1 Identify low- and high-risk tasks

The amount of detail required by your manual handling risk assessments will depend on a number of factors, including the level of risk and complexity of the tasks being carried out. Using HSE's simple risk filter(s) as a first step can help you to initially identify low- and high-risk tasks. This will help you decide your priorities for more detailed assessments of your higher-risk tasks.

6.3.2 Simple filters

Use the guideline filters for lifting and lowering in Figure 1 to help you identify low-risk tasks. The Manual Handling Regulations do not set specific weight limits, so the guidelines are not 'safe limits' for lifting and carrying. They use broad assumptions or generalizations where, if met, the risk of injury is considered to be low. But working outside the limits is likely to increase the risk of injury, which can lead to ill health. The guidelines are derived

from lifting capacity data which show differences between men and women in the population (rather than individuals).
The filter for pushing and pulling in Figure 2 looks at the posture of your workers during pushing or pulling operations.
Where the handling task falls within the filter guidelines, you do not normally need to do any other form of risk assessment unless you have individual workers who may be at significant risk. If you are unsure, complete a more detailed assessment.

6.3.3 Lifting and lowering risk filter

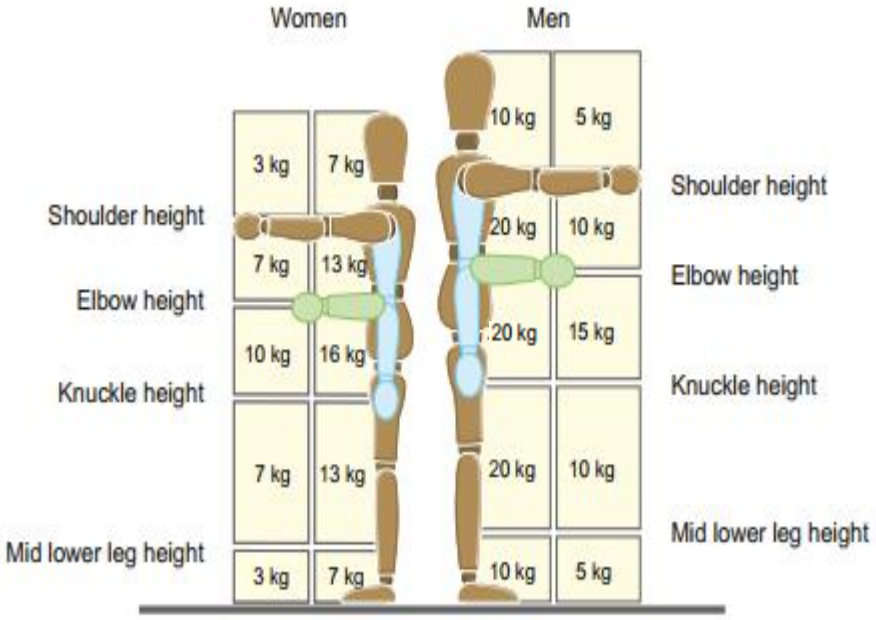


Figure 1 Lifting and lowering risk filter

a) Figure 1 indicates maximum lifting is 20 kg for men so that the load is easily grasped with both hands and is handled in reasonable working conditions, with the worker in a stable body position.
b) Each box in Figure 1 contains a filter value for lifting and lowering in that zone. The filter values in the boxes are reduced if handling is done with arms extended, or at high or low levels, as that is where injuries are most likely to happen.
c) Observe the work activity you are assessing and compare it to Figure 1. First, decide which zone or zones the worker's hands pass through when moving the load. Then assess the maximum weight being handled. If it is less than the value given in the matching box, it is within the guidelines.
d) If the worker's hands enter more than one zone during the operation, use the smallest weight. Use an in-between weight if the hands are close to a boundary between zones.

6.3.4 Lifting and lowering: Do I need to make a more detailed assessment?

a) the handling operation must take place with the hands outside
b) the zones in Figure 1;
c) the weight exceeds those in Figure 1;
d) the handling involves torso twisting;
e) the handling is more frequent than one lift every two minutes;
f) the handling is done by a team;

g) the handling operations are complex, for example, the weights
h) vary significantly or there are several start and finish locations;
i) the lift does not meet the conditions given for using the
j) guidelines, for example, if the load is difficult to grasp or handle;
k) the person lifting may be at significant risk, for example, new or
l) expectant mothers, young workers, those new to the job, or
m) Those with a disability, significant health problem or recent injury.

Figure 2 Correct Body Posture during lifting

6.3.5 Carrying risk filter

You can apply the filter weights for lifting and lowering in Figure 1 to carrying operations where the load:

a) is held against the body;
b) is carried no further than about 10 m without resting;
c) does not prevent the person from walking normally;
d) does not obstruct the view of the person carrying it;
e) does not require the hands to be held below knuckle height or much above elbow height.

Where you can carry the load securely on the shoulder without lifting it first (for example, by sliding it onto your shoulder), you can apply the filter values up to 20 m.

6.3.6 Pushing and pulling risk filter

In pushing and pulling operations, the load might be slid, rolled or moved on wheels. Observe the worker's general posture during the operation. Figure 2 shows some acceptable push/pull postures. The task is likely to be low risk if:

a) the force is applied with the hands;
b) the torso is largely upright and not twisted;
c) the hands are between hip and shoulder height;
d) The distance moved without a pause or break is no more than about 20m.

Figure 2 Acceptable push/pull postures

Handling while seated

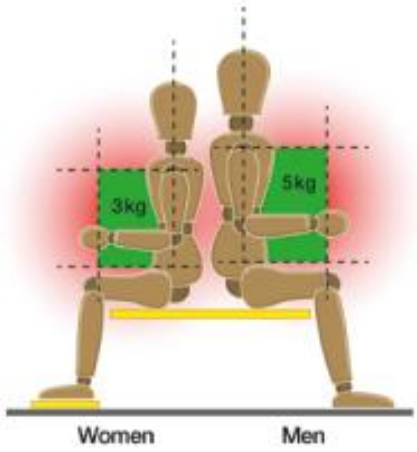


Figure 3 Handling while seated

The filter values for handling operations carried out while seated, as shown in Figure 3, are **Men: 5 kg** and **Women: 3 kg**. These values only apply for two-handed lifting and when the hands are within the green zone shown. If handling beyond the green zone is unavoidable, you should make a full assessment.

6.4 Record and review

a) Make a record of your significant findings – the hazards, how people might be harmed by them and what you have in place to control the risks. Any record should be simple and focused on controls. If you have fewer than five employees you do not have to write anything down, but it is useful to do this so you can review it later, for example, if something changes.

b) Regularly review your work activities to make sure the risks are being adequately controlled and that your risk assessment remains relevant – few workplaces stay the same because production processes or workers may change.

6.5 What about manual handling training?

Providing information and training alone will not ensure safe manual handling. The first objective should always be to design the handling operations to be as safe as reasonably practicable. Manual handling training is important to further manage the risk of injury if the task cannot be avoided and you have already taken action to reduce the risk. However, on its own, it can't overcome.

a) a lack of mechanical aids;
b) badly designed tasks;
c) unsuitable loads;
d) An unsuitable working environment.

The information covered by manual handling training should be specific to the job and should include:

e) manual handling risk factors and how injuries can happen;
f) appropriate systems of work for the individual′s tasks and environment;
g) use of mechanical aids;
h) how to carry out safe manual handling, including good handling techniques;
i) practical work relevant to the job to allow the trainer to identify and put right anything the trainee is not doing safely;
j) How to report symptoms and injuries.

6.6 Risks and control

Table 1 includes some practical advice on what to look for when making an assessment and suggests ways to control the risks.

Table 1 Risks and how to control them

Risks to look for when making an assessment	Ways of reducing the risk of injury
The tasks Do they involve: ■ holding loads away from the body? ■ twisting, stooping or reaching upwards? ■ large vertical movement? ■ long carrying distances? ■ strenuous pushing or pulling? ■ repetitive handling? ■ risk of sudden movement of loads? ■ insufficient rest or recovery time? ■ a work rate imposed by a process?	Can you: ■ use a lifting aid? ■ change workplace layout to improve efficiency? ■ reduce the amount of twisting and stooping? ■ avoid lifting from floor level or above shoulder height, especially heavy loads? ■ reduce carrying distances? ■ use powered handling devices to eliminate pushing and pulling? ■ avoid repetitive handling? ■ take steps to reduce fatigue? ■ vary the work, allowing one set of muscles to rest while another is used?
The loads Are they: ■ heavy or bulky? ■ difficult to grasp? ■ unstable or likely to move unpredictably? ■ harmful, eg sharp or hot? ■ awkwardly stacked? ■ too large for the handler to see over?	Can you make the load: ■ lighter or less bulky? ■ easier to grasp? ■ more stable? ■ less harmful? ■ evenly stacked? If the load comes in from elsewhere, have you asked the supplier to help, eg by providing handles or smaller packages?

Risks to look for when making an assessment	Ways of reducing the risk of injury
The working environment Are there: ■ restrictions on posture? ■ bumpy, obstructed or slippery floors? ■ variations in floor levels? ■ hot/cold/humid conditions? ■ gusts of wind or other strong air movements? ■ poor lighting conditions? ■ restrictions on movements from clothes or personal protective equipment (PPE)?	Can you: ■ remove obstructions to free movement? ■ provide better flooring and/or slip-resistant footwear? ■ avoid steps and steep ramps? ■ prevent extremes of hot and cold? ■ improve ventilation? ■ improve lighting? ■ provide suitable protective clothing or PPE that is less restrictive?
Individual capacity Does the job: ■ require unusual capability, eg above average strength or agility? ■ pose a risk to those with a health problem or learning/physical disability? ■ pose a risk to new or expectant mothers? ■ pose a risk to new or young workers? ■ call for special information or training?	Can you: ■ consider the design of the task? ■ pay particular attention to those who have a physical weakness? ■ take extra care of, eg new or expectant mothers and new/young workers? ■ give your workers more information, eg about the range of tasks? ■ provide more training? ■ get advice from an occupational health advisor if you need to?

Risks to look for when making an assessment	Ways of reducing the risk of injury
Handling aids and equipment Consider: ■ is the device the correct type for the job? ■ is it well maintained? ■ are the wheels on the device suited to the floor surface? ■ do the wheels run freely? ■ is the handle height between the waist and shoulders? ■ are the handle grips in good condition and comfortable? ■ are there any brakes? If so, do they work?	Can you: ■ provide equipment that is more suitable for the task? ■ carry out planned preventive maintenance to prevent problems? ■ change the wheels, tyres and/or flooring so that equipment moves easily? ■ provide better handles and handle grips? ■ make the brakes easier to use, reliable and effective?
Work organisation factors Consider: ■ is the work repetitive? ■ is the work machine or system-paced? ■ do workers feel the demands of the work are excessive? ■ do workers have little control of the work and working methods? ■ is there poor communication between managers and workers?	Can you: ■ change tasks to increase variety? ■ adjust the work rate? ■ make more use of workers' skills? ■ make workloads and deadlines more achievable? ■ involve workers in decisions? ■ encourage good communication and teamwork? ■ provide better training and information?

SECTION7: Lifting and Slinging

Lifting and slinging involve the use of specialized equipment and techniques to safely elevate and relocate heavy loads. This process ensures secure handling and movement of materials, following to safety protocols and operational standards.

7.1 Equipment and Tools

Overhead cranes, Forklift, Boom Trucks and Mobile Cranes are example of common equipment used for lifting. Each type has its own capacity. Therefore, before lifting the load, selection of equipment should be determined.

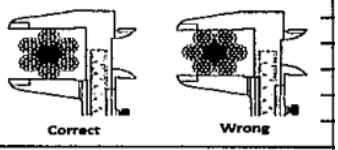
Wire rope, chains and synthetic web slings are commonly used for lifting accessories. Shackles, hooks, lifting beams and spreader bars are used also. The selection of the lifting accessories to be used will be depending on the load weight and shape. Fabricated accessories must be checked and load tested for their capacity by Engineering.

7.2 Inspections

Regular inspection for these equipment and accessories must be implemented. In THPAL, aside from inspection before usage;

- Accessories will be inspected monthly by the process owner witnessed by safety, which will be color-tagged if safe to use, and if found damaged, immediately recover out of service and dispose. Accessories must be kept always in good condition.
- Overhead cranes will be inspected by maintenance together with process owner witnessed by safety, which will be color-tagged if safe to use, and if found not safe to use, overhead crane usage is prohibited and subject for re-inspection after repair.
- Forklift, boom trucks and mobile cranes will be inspected by the process owner monthly, and if it is found to be unsafe to use, equipment usage is prohibited.
- For wire rope inspection, criteria are below

	Cranes with Wire Rope
1	**Wire Rope**
	1.1 Check lubrication of the rope
	1.2 Check cleanliness of the rope
	1.3 Check if the rope is covered with service dressing of grease or oil
	1.4 Check any part of the rope exposed to heat
	1.5 Check rope suspension
	1.6 Inspection Rope Guide
	1.8 Check wire rope diamater (Criteria: 6% of max. wire rope diameter as per ASME B30.2 2005)
	Original reading: _____mm Criteria: _____mm
	Present Reading: _____mm
	1.7 Inspect broken wires. (Criteria: 10% damaged of rope lay, where rope lay=6.5 x rope diameter)



7.3 Lifting Process

- Assessment of the load must be conducted to determine its specific weight and dimensions to select appropriate equipment and accessories to be used.
- Assessment of the area of activity is necessary to determine any obstacles, clearance height, wind speed (acceptable less than 10m/s) and any potential hazards.
- Clear communication must be established for all involved personnel in the lifting. Rigger must have a clear visibility towards operator, if not, provide another rigger. For radio communication between rigger and operator, the lifting group must provide other personnel to provide emergency stop signal in cases where the radio battery is depleted during the process of lifting.
- Production 3-3-3 Safe Lifting Rule; **3**0 cm the bag to be lifted, **3** seconds to observed the bag is moving and slipping and **3** meters away during lifting.

7.4 Safe Working Practices

- For overhead crane, maintain safe distance from the lifted load following the 1 to 5meters in height – 3 meters away, 5 to 10 meters in height – 6 meters away and 10 meters and above – 10 meters away.

- Avoid standing under suspended load or in the path of potential falling.
- Using softener to protect the slings from being cut or damage by sharp corners of lifted loads.
- Prohibition of diagonal lifting.
- Barricade of the lifting radius.

7.5 Training, License and Certification

For training, licenses and certification of operators and heavy equipment, follow Chapter 5 of this handbook.

SECTION8: HANDLING CHEMICALS AND COMPRESSED GAS

8.1 CHEMICAL SAFETY RULES

1.1 General Safety Precautions

1.2 Follow basic safety practices to minimize risk when working with chemicals.

1.3 Pay attention to the health hazards and physical hazards of the materials you use.

1.4 Never work alone when hazardous chemicals are involving.

1.5 Some chemicals are regulated by PDEA and PNP. See list.

Types of chemical hazards

Chemical hazards include:	Physicochemical hazards include:
Skin irritants	Chemical explosions and fire
Carcinogens	Corrosion
Respiratory sensitizers.	Chemical reactions.

For the list of chemicals of Each Process Area See. S:\EDICC\04 Level 4-Records\045 Chemical List. For the SDS of each Chemicals see. S:\EDICC\06 External Documents\063 SDS.

Maintain an organized and orderly facility / Work area (storage and Laboratory), Proper communication of hazards in the workplace labels in accordance to GHS symbols.

1.6 Hazard Classification System

Class 1 – Explosives
Class 2 – Gases
Class 3 – Flammable liquids (and Combustible liquids (U.S.)
Class 4 – Flammable solids; Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances
Class 5 - Oxidizing substances and Organic peroxides
Class 6 – Toxic substances and infectious substances
Class 7 – Radioactive materials
Class 8 – Corrosive substances
Class 9 – Miscellaneous hazardous materials/Products, Substances or Organisms

1.7 Basic Safety Procedures

1.1.1. Evaluate the hazards; refer to SDS before start of any activity

1.1.2. Do not eat, drink, store food, smoke, or apply cosmetics in areas where chemicals are in use except in clearly marked Clean Areas. Wash your hands frequently and before eating.

1.8 Engineering Controls

Use chemical fume hoods in laboratory and other engineering controls as needed such as scrubbers. See scrubber system.

1.9 Use appropriate PPE when handling chemicals (acid gloves, chemical goggles etc.).

1.10 Know the locations of emergency equipment and chemical spill kit, eye wash shower, Fire extinguisher and follow basic emergency preparedness response in case of incidental emergencies.

8.2 COMPRESSED GAS SAFETY RULES

2.1 General Safety Precautions

This standard is intended to provide general guidance on how to safely work with compressed gases. This general use standard only addresses safety issues specific to compressed gases.

For the list of compressed gasses of each process area see. S:\EDICC\04 Level 4-Records\045 Chemical List

For the SDS of each compressed gasses see. S:\EDICC\06 External Documents\063 SDS

2.2 Control of Hazards- General

2.2.1 Check connections and hoses regularly for leaks using a specific monitoring instrument or soapy water (or equivalent).
2.2.2 When using highly flammable or toxic gases specifically H2S, sulfides, and hydrogen, check the concentration in the delivery system and purge with inert gas such as nitrogen to ensure the system are free from oxygen that might form explosive gas mixture with aforementioned gases.
2.2.3 When using compressed acetylene: (i) do not exceed a working pressure of 15 psig, and (ii) do not use vessels, piping, or other materials that contain a significant amount of copper (usually considered to be more than 50% copper).
2.2.4 Put valve caps when cylinders are not in use or before moving.
2.2.5 Remove damaged or defective cylinders from service (contact the cylinder vendor for assistance).
2.2.6 Check that two sets of flashback arrestors are installed in an oxy-acetylene assembly (one for oxygen and one for acetylene). It shall be installed after the cutting fit and after the regulating valve.
2.2.7 Only an approved sparker shall be utilized.

2.3 Engineering / Ventilation Controls

If the process does not permit gas use and/or storage in well-ventilated areas (i.e., lab ventilation having a minimum of 6 air changes per hour), contact Environmental Health and Safety at x3-0448 to determine necessity of an oxygen-deficiency monitor or other alarm

2.4 Personal Protective Equipment

In addition to proper street clothing (long pants (or equivalent) that covers legs and ankles, and close-toed non-perforated shoes that completely cover the feet), wear the following Personal Protective Equipment (PPE) when performing lab operations/tasks involving compressed gases: • Safety goggles • Lab coat

2.5 Special Handling Procedures and Storage Requirements

Safe Handling:

2.5.1 Compressed gas cylinders must be transported using hand-trucks or other appropriate means. NEVER TRANSPORT UNSECURED COMPRESSED GAS CYLINDERS!
2.5.2 Cylinders should be transported upright whenever possible (always transport acetylene in an upright (vertical) position).
2.5.3 In PSU, Elevators can be a confined space – NEVER ride in an elevator with compressed gas cylinders. Have one person send the elevator and another person receive the elevator.

2.6 Safe Storage

2.6.1 Secure compressed gas cylinders (>26″ tall) to an anchored rack using two metal chains (at 1/3 and 2/3-cylinder height).
2.6.2 Cylinders storage should be in vertical position and secured by chains or straps.
2.6.3 Segregate and clearly mark full and empty cylinders.
2.6.4 Store compressed gas cylinders away from heat sources, and flammable and highly combustible materials (such as oil and greases).
2.6.5 Segregate according to hazard class and chemical compatibility. Ensure to separate flammable and oxidizing gases.
2.6.6 Store flammable gases away from flammable solvents, combustible material, ignition sources (including unprotected electrical connections), and oxygen gas cylinders and liquid oxygen (at least 20 feet if possible).
2.6.7 Store separately empty oxygen-acetylene cylinders from cylinders with full content.

2.7 Waste Disposal

2.7.1 Coordinate with vendor for return of empty cylinders.

8.3 CHEMICALS AND SUB-MATERIALS

3.1 Sulfuric Acid (H_2SO4 98%)

– It is corrosive. Poisonous if inhaled. Contact could cause burns to skin and eyes.

A large amount of heat dilution is generated when sulfuric acid is mixed with water. In case of necessary to dilute high concentration acid by water, gradually add acid into bulk of water with stirring to prevent bumping.

For emergency response procedure, refer to EMS-THPAL-PD-320-102-003 Emergency Preparedness and Response for Sulfuric Acid Leak Pipeline.

3.2 Slaked Lime

Physical and Chemical Properties:

Chemical Formula:	Ca(OH)2
Synonym:	Calcium Hydroxide, Hydrate Lime, Slaked lime
CAS#:	1305-32-0
Physical Appearance:	Crystalline Powder
Color:	White
Odor:	Odorless
Taste:	Bitter/Alkaline/Chalky
Specific Gravity:	2.24 (water=1)
pH (1% sol'n/water):	14 (Basic)
Melting Point:	580 ºC
Boiling Point:	Not Available

Solubility:
Soluble in water: 0.185g/100 ml @ 0 ºC; .077g/100 ml @ 100 ºC; 1.73g/1000 ml @ 20 ºC
Soluble in ammonium salts, glycerol, sugar or ammonium chloride solution, soluble in acids with evolution of much heat.

First Aid Measures:

Eye contact: Check for any contact lenses and remove. In case of contact immediately flush eyes with plenty of water at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact: Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment if irritation persists or later develops.

Inhalation: Remove to fresh air seek medical help if coughing and other symptoms do not subside.

Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

3.3 Caustic Soda

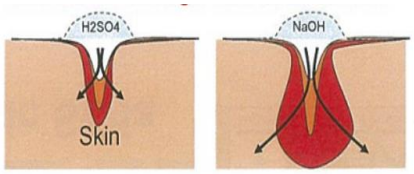
Physical and Chemical Properties:

Chemical Formula:	NaOH
Synonym:	Sodium Hydroxide
CAS#	10043 – 52 – 4
Physical Appearance:	Solid/Crystalline Powder
Color:	White, Off-white
Odor:	Odorless
Taste:	Alkaline Taste
Specific Gravity:	2.1 (water=1)
pH (1% solution/water):	13.5 (Basic)
Melting Point:	323º C
Boiling Point:	1388º C

Solubility:

Solubility in water (20º C):	55% by weight (Sat. Soln.)
Solubility in Organic Solvents:	Soluble in ethanol & glycerol

Health Hazards

Routes of Entry:	Skin contact, eye contact, Inhalation, Ingestion.
Acute Health Effects	
Skin:	Skin burn resulting to inflammation and blistering. Caustic Soda in skin causes corrosion and burns because it will absorb the moisture in the skin and hydrolyzed/destroy the cell. Same will happen when it comes in contact with the eyes (Protein Hydrolysis). Much faster and stronger than Sulfuric Acids.
Eyes:	Results to redness, watering of eyes. Severe contact with solution to eyes results to corneal damage or blindness.
First Aid Measures	
Eye contact:	Check for and any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may use. Get medical attention.
Skin contact:	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as collar, tie, belt or waistband.

3.4 Methanol

COMPOSITION/INFORMATION ON INGREDIENTS

Product Name	:	Methanol
Formula	:	CH_3OH
Synonyms	:	MeOH
CAS No.	:	67-65-1
EINECS No.	:	200-659-6
Massa Molar	:	32.04 gr/mol

Specification

No	Component	Specification
1	Purity,% weight on dry basis	Min 99.85
2	Specific Gravity, 20/20º C	0.792 - 0.793
3	Water Content, %wt	Max 0.1
4	Distillation Range at 760mm Hg, ºC	Max 1ºC, to include 64.6º ± 0.1º

5	Color, Pt-Co Scale	Max 5
6	Odor	Characteristic, free of foreign odor
7	Appearance	Clear, free from suspended matter
8	Potassium Permanganate Time Test at 15ºC, minute	Minimum 60
9	Acetone, mg/kg	Max 30
10	Acidity as Acetic Acid, mg/kg	Max 30
11	Alkalinity as NH_3, mg/kg	Max 30
12	Carbon sable substance (Sulfuric Acid Wash Test), Pt-Co Scale	Max 30
13	Chloride as Cl^-, mg/kg	Max 0.1
14	Ethanol, mg/kg	Max 10
15	Hydrocarbon	Pass Test
16	Non Volatile Matter, mg/1000ml	Max 8
17	Total Iron, mg kg	Max 0.1
18	Tri Methyl Amine, mg/kg	Max 0.05
19	Sulfur	Max 0.5

EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Limit(s)

Ingredients

Basis Value Threshold Remarks limits

Methanol 67-56-1

ACGIH	Time Weighted Average 200 ppm (TWA) Short Term Exposure 250 ppm Limit (STEL): Skin designation can be absorbed through the skin
NIOSH/GUIDE	Recommended 200ppm Exposure limit (REL) 260 mg/m^3 Skin designation can be absorbed through the skin Short Term Exposure 250ppm Limit (STEL): 325mg/m^3
OSHA_TRANS Z1A	PEL: 200ppm 260 mg/m^3 Time Weighted Average 200 ppm (TWA): 260mg/m^3 Skin designation can be absorbed through the skin Short Term Exposure 250 ppm Limit (STEL): 325mg/ m^3

3.5 H2S Gas

H_2S gas in THPAL plant is produced by the reaction of Sulphide gas from molten sulfur and Hydrogen gas from Methanol and dimeralized water through PSA (Pressure Swing Absorption) process.

For the emergency response procedure, refer to EMS-THPAL-PD-320-102-110 Emergency Response for H_2S Gas Leak.

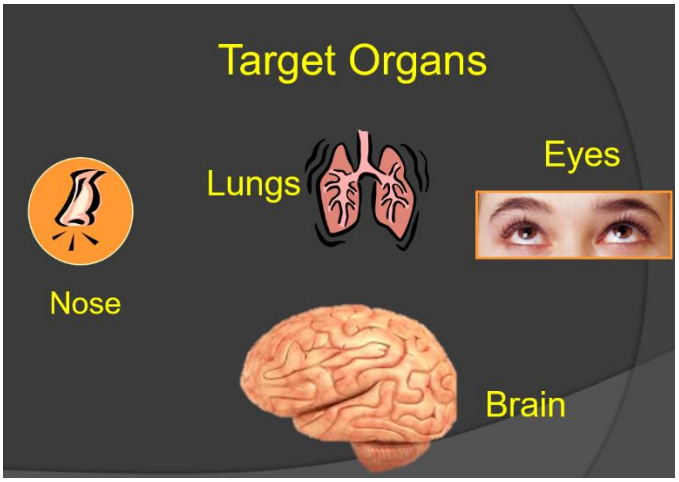
Hydrogen Sulphide gas (H_2S) is one of the deadliest occupational hazards in the Plant operation. When inhaled, it is rapidly absorbed through the lung into the blood which initially induces rapid breathing. This is followed by respiratory inactivity. At higher concentration, H_2S exerts an immediate paralyzing effect on the respiratory center. Death due to asphyxia is a certain outcome, unless artificial respiration is promptly provided. This sequence of events represents the most important toxic effect of H_2S.

Hydrogen sulphide in low concentrations is easily recognized by its characteristic foul odor similar to rotten eggs. However, continued exposure will temporarily eliminate one's ability to smell the gas. This leads a person to believe that the gas is gone when probably is still present Therefore, a person should always check with the gas detectors for actual gas concentration the atmosphere.

To determine the presence of H_2S within the plant site complex area, eighty-seven (87) H_2S Gas Detectors were strategically installed and linked to the DCS (Direct Control System) at the Central Building.

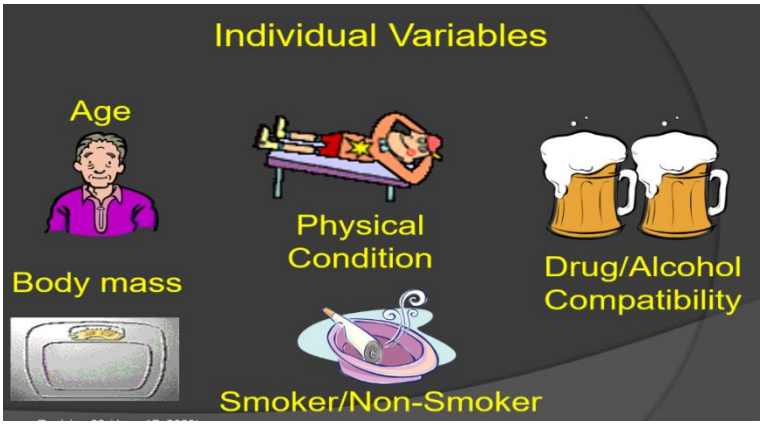
Safety Data Sheet

NFPA Ratings:	Health = 4; Fire = 4; Reactivity = 0
Color	Colorless
Physical Form	gas
Odor	rotten egg odor at lower concentration, Unpleasant. At higher concentrations H2S can deaden your sense of smell.
Taste	sweet taste
Specific gravity	1.192 @ 32º F (Air = 1) Direction of H2S gas will go down since, it is much heavier than air
	Hydrogen Sulfide will automatically ignite at 500º F. Comparing to the end of lit cigarette which will ignite at 1400º F



Variables that determine the effects of H_2S Exposure

- Time (How long)
- Concentration (How much)
- Frequency (How often)
- Variables associated with the individual



Exposure Levels

1) 0.0047 ppm- is the recognition threshold, the concentration at which 50% of humans can detect the characteristic odor of hydrogen sulfide, normally described as resembling “a rotten egg”
2) 10 ppm- OSHA has established a permissible exposure limit PEL (8-hour time-weighted average (TWA)
3) 10-20 ppm- is the borderline concentration for eye irritation.
4) 50-100 ppm- leads to eye damage.
5) 100-150 ppm- the olfactory nerve is paralyzed after a few inhalations, and the sense of smell disappears, often together with awareness of danger.
6) 320-530 ppm- leads to pulmonary edema with the possibility of death.
7) 800 ppm- is the lethal concentration for 50% of humans for 5 minutes of exposure (LC50).
8) 530-1000 ppm- causes strong stimulation of the central nervous system and rapid breathing, leading to loss of breathing.
9) Concentrations over 1000 ppm cause immediate collapse with loss of breathing, even after inhalation of a single breath.

How do THPAL Control this Gas? → See Chapter Ⅶ

a) Engineering Controls
b) Monitoring and Detection Equipment
c) Personal Protective Equipment

3.6 CARBON MONOXIDE (CO GAS)

1) Carbon monoxide is a colorless, odorless, tasteless, flammable gas that is less
2) dense than air. Carbon monoxide consist of one carbon atom and one oxygen atom.
3) It is the simplest molecule of the Oxo carbon family. In coordination complexes the
4) carbon monoxide ligand is called carbonyl.
5) Carbon monoxide has no smell, no taste and no sound. Neither people nor animals can tell when they are breathing it, but it can be fatal. Carbon monoxide (CO) is a byproduct of combustion. Common household items- such as gas fires, oil burning furnaces, portable generators, and charcoal grills- put people at risk to this poisonous gas.
6) Carbon monoxide has no smell, no taste and no sound. Neither people nor animals can tell when they are breathing it, but it can be fatal. Carbon monoxide (CO) is a byproduct of combustion. Common household items- such as gas fires, oil burning furnaces, portable generators, and charcoal grills- put people at risk to this poisonous gas.
7) Maximum Carbon Monoxide (CO) for tank entry is 30 ppm.
8) The table below is for regulation for environment only and stricter for health. And "Average time “in the table is duration for measurement of gas concentration.
9) Please refer National Ambient Air Quality Guideline for Criteria of pollutants below.

	Short Term[a]			Long Term[b]		
Pollutants	Averaging Time	µg/NCM	ppm	Averaging Time	µg/NCM	ppm
Suspended Particulate						
Matter[c] - TSP	24 hours	230[d]		1 year[c]	90	--
- PM-10	24 hours	150[f]		1 year[e]	60	--
Sulfur Dioxide[c]	24 hours	180	0.07	24 hours	80	0.03
Nitrogen Dioxide	24 hours	150	0.08	24 hours	--	--
Photochemical Oxidants	1 hours	140	0.07	1 hour	--	--
As Ozone	8 hours	60	0.03	8 hours	--	--
Carbon Monoxide	1 hours	35mg/NCM	30	1 hour	--	--
	8 hours	10mg/NCM	9	8 hours	--	--

National Ambient Air Quality Guideline for Criteria of pollutants

SECTION9: USING CUTTER AND SHARP TOOLS

9.1 Introduction:

The use of cutter is basically prohibited in THPAL due to high risk of incident. Therefore basically, for cutting work, other tools instead of cutter must be used. However, for activities that cannot be replaced with other tools, the only option is to use cutter or other sharp tools.
In that case, the activities can only carried out after applying to Safety and obtaining permission from Plant manager, and it is necessary to establish safe procedures and management procedures. There, the general concepts are mentioned.

9.2 Scope:

These guidelines apply to THPAL employees and Contractors authorized by management to use Retractable Blade Knife Cutter and Other Sharp Tools on the conduct of their activities. All department must follow this rule strictly.

Reference documents:

DAO 2000-98 Mines Safety and Health Standards

1. ANSELL Products Specification

Definition of Terms:

Manager - the person responsible for the overall direction, control and supervision of the entire operation.

Supervisor - any person to whom the employer has delegated authority and responsibility for the direction and control of workmen.

Service Contractors – any person or entity that has a contract for a specific job to undertake any services with a mining contractor, permittee or his duly authorized representative.

Cutting – is the separation or opening of a physical object, into two or more portions, through the application of an acutely directed force. Implements commonly used for cutting are the knife and saw, or in medicine and science the scalpel and microtome.

Blade – is the portion of a tool, weapon or machine with an edge that is designed to puncture, chop, slice or scrape surfaces or materials. Blades work by concentrating force on the cutting edge.

Authorized Person – inducted, trained and qualified to use and operate retractable blade knife cutter.

OSG – Abbreviation for Office Support Group.

9.3 Required PPE for Cutting Activity:

Nitrasafe Ansell 28-359 Gloves or Kevlar Gloves.

Kevlar Gloves

Kevlar gloves are a **type of personal protective equipment (PPE) made of Kevlar**, a strong synthetic fiber used to protect workers from cuts, abrasions and heat. The gloves are also lightweight, flexible and comfortable. 13 Jun 2019

9.4 General Guidelines on the Activities and Locations:

A. Activities.

Any activity that involves cutter/knife and other sharp tools to separate or to open a physical object, such as but not limited to cutting of peeled-off parts of conveyors, opening of boxes, cable peeling and splicing, cutting of nylon and other ropes, and gasket cutting. Refer to **ANNEX A** for the list of activities that are permitted to use cutter/knife and other sharp tools. Use cutter for purposes other than these operation is strictly prohibited.

B. Location of Usage.

The area or location where the use of cutter/knife and other sharp tools is needed. Sample location of usage are the conveyors at Ore Prep Area, MS Filter Building, and PSU Area. Refer to **ANNEX A** for the list of location of usage. The department must manage so that cutter is used for the permitted activity only and prevent losing of cutter.

C. Storage location.

The place to store or safe keep the retractable knife cutter and other sharp tools. The storage location varies per department, for instance, the storage location for the Mechanical- Maintenance is in the Toolcrib and in the Cutting Tools Locker of Central Building for Production. Refer to **ANNEX A** for the list of storage locations per department.

D. Authorized user.

They are the Personnel who have undergone education/orientation on safety procedures for utilization of cutter/knife and other sharp tools conducted by the Office Support Group.

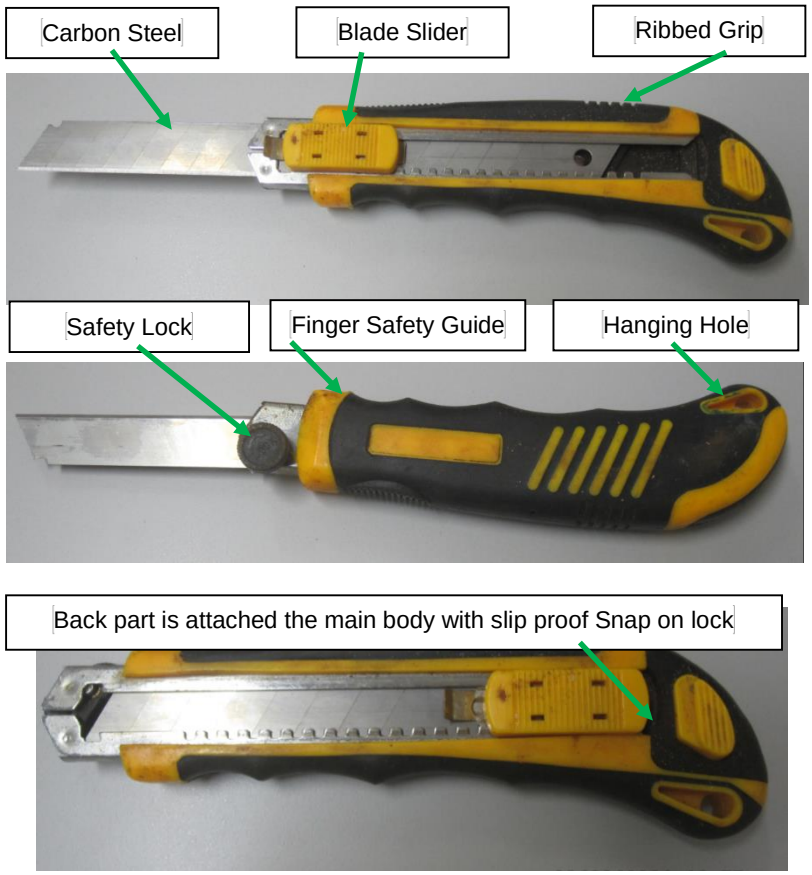
E. Approver

The person who will approve the use of cutter/knife and other sharp tools such as the Section Managers, PICs, and Field Leaders. Refer to **ANNEX A** for the list of approvers per department.

F. Additional Activity

When there is new additional activity which requires the use of cutter, need to inform Safety and get approval from Plant manager.

9.5 Parts of the Retractable Blade Knife Cutter



9.6 General Procedure to Follow:

1. Before Cutting.

1.1 Users must wear cut resistance gloves (Nitrasafe Ansell 28-359 or Kevlar).
1.2 Provide disposal container with cap/cover in which used blade and other sharp tools are safely keep and stored.
1.3 Spare blade and other sharp tools must be stored on a storage box or any alternative container with cap/cover.
1.4 Check the physical condition of the cutter or other sharp tools assembly prior to use.
1.5 Use cutting board/plate to have a better control when cutting.
1.6 Use thick and hard material as cutting guide.
1.7 Change old and rusty blade.
1.8 Use sharp blade, dull blade can cause more accidents because they are harder to work and required more pressure. Sharp blade does not slip as easily and can cut easier.
1.9 Keep cutter and other sharp tools assembly from grease/oil or other slippery substance to prevent unwanted movement of cutter when cutting.
1.10 Retractable Blade Cutter Knife and other sharp tools should have a designated proper location for safe keeping and should not be left anywhere in the working area.

2. During Cutting.

2.1 Do not extend the blade by more than one segment (Fig. 1).
2.2 The direction of cutting must away from your body parts, fingers and the other hand must not on the cutting path (Fig. 2).
2.3 Fully lock the Safety locking screw to prevent unwanted retracking movement of blade upon cutting (Fig. 3).
2.4 Do not hold materials to be cut by hand only. Use cutting board/plate (Fig. 4) in flat surface.
2.5 Use segment cutter must be immediately placed inside the disposal container with cap(Fig. 5).
2.6 Do not engage any conversation when cutting already commence. Concentrate to focus on the job and always have presence of mind.
2.7 Cutting of loaded and hanging flexcon bag for discharging the content should be done by one hand only and no need to hold the bag with another hand to avoid incidental contact with the sharp blade.
2.8 Cutting of tubes, hoses and flexible container should be properly position in such a way that the direction of the blade will not in contact with any of the body parts of the person doing the activity.

Figure 1

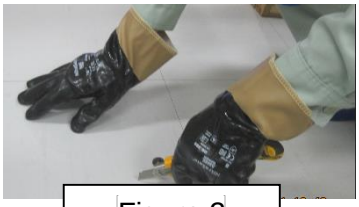


Figure 2

Figure 3

Figure 4

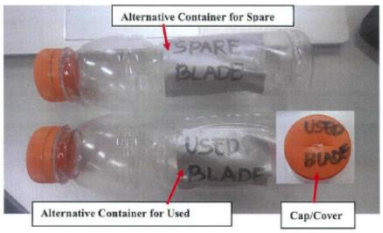


Figure 5

3. After Cutting

1.1 Fully retract the blade immediately after cutting or when not in use(Fig.6)

1.2 Segregate and dispose properly the waste according to its classification.

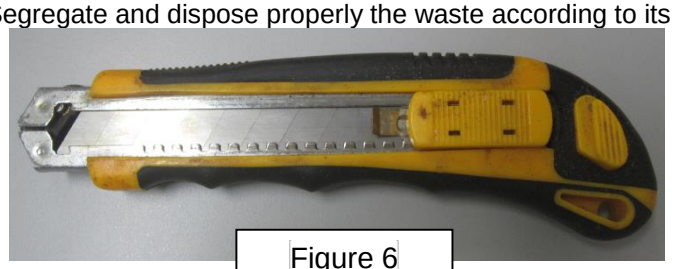


Figure 6

9.7 Precautionary Measures

1. Never throw a box of cutter blade or cutter assembly or any sharp tools instead pass it hand to hand personally.
2. Never pass a blade or any sharp tool if only wrap with paper/plastic, instead placed it to a storage box/container or alternative container, then secure it with cap/cover.
3. In case of maintenance/contractors Cutting works should be specified in the work permit.
4. For the other sharp tools, SOP or Safety Guidelines requires approval of the Manager.

9.8 ANNEX A(List of Activities and Locations that needs the use of Cutter/knife or other Sharp Tools):

1.Mechanical-Maintenance Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL/Contractor	Approver
1. Cutting of peeled-off part of conveyors	Conveyors at Ore prep, MS Bagging, Limestone area and PSU	Tool crib	Maint- Mech'l PIC, Mech'l Contractor	Yes / No	Section Manager
2. Cutting of side skirt for conveyor belt	Conveyors at Ore prep, MS Bagging, Limestone area and PSU	Tool crib	Maint-Mech'l PIC, Mech'l Contractor	Yes / No	Section Manager
3. Cutting of Gland packing	At Warman pumps	Tool crib	Maint-Mech'l PIC, Mech'l Contractor	Yes / No	Section Manager

4. Cutting of safety net and tarpaulin	Working area at higher location a fall protection for materials.	Tool crib	Maint-Mech'l PIC,Mech'l, Fabrication, Scaffolder contractors	Yes / No	Section Manager
5. Fabrication of gasket	Fabrication Shop	Tool crib	Maint-Mech'l PIC, Mech'l Contractor	Yes / No	Section Manager
6. Removal of stuck – up and entangled filter cloths on rollers and impellers.	At Warman pumps	Tool crib	Maint-Mech'l PIC, Mech'l Contractor	Yes / No	Section Manager
7. Cutting of lifter bar for 111ML01	111ML01 Limestone Ball Mill	Tool crib	Maint-Mech'l PIC, Fabrication Contractors	Yes / No	Section Manager

2. E&I Engineering Maintenance Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL/Contractor	Approver
1. Cable Peeling/Splicing/Dressing	Field	Tool bags in Respective Locker	E&I SV/Assistant/Technician/ Fabrication/Support Group/Contractor	Yes / No	E&I Maintenance
2. Fabrication of EPDM/PTFE/ Garloc/Carbon Gasket	Workshop	E&I Tool Crib	E&I SV/Assistant/Technician/ Fabrication/Support Group/Contractor	Yes / No	E&I Workshop

3. Rare metal (Scandium) Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL	Approver
1. Resin Charging (25L resin bag)	Scandium Filter Bldg.	Cutting Tools Locker at 2nd Floor of CB, Scandium DCS area	Field Leader or Field Operator	Yes	Scandium DCS or Shift supervisor
2. Soda Ash Charging	Scandium Filter Bldg.	Cutting Tools Locker at 2nd Floor of CB, Scandium DCS area	Field Leader or Field Operator	Yes	Scandium DCS or Shift supervisor
3. Oxalic powder Charging	Scandium Filter Bldg.	Cutting Tools Locker at 2nd Floor of CB, Scandium DCS area	Field Leader or Field Operator	Yes	Scandium DCS or Shift supervisor

4. Engineering Mechanical Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL/Contractor	Approver
1. Cutting of rubber for vibrating screen rubber curtain	PSU Vacant area	Contractors storage area	JGC	Yes / Yes	Maintenance PIC
2. Cutting of rubber for equipment protection during handling, assembling and mobilization	PSU Vacant area	Contractors storage area	JGC	Yes / Yes	Maintenance PIC
3. Cutting of heavy duty tarpaulin for Vibrating Screen Storage Protection	PSU Vacant area	Contractors storage area	JGC	Yes / Yes	Maintenance PIC
4. Cutting of EPDM and PTFE Sheets for Valve gasket	106SR03-04	Contractors storage area	RBER	Yes / No	Maintenance PIC
5. Preparation of chop strand mat for FRP installation	106SR03-04	Contractors storage area	RBER	Yes / No	Maintenance PIC
6. Cutting of EPDM sheets for pipe supports	106SR03-04	Contractors storage area	SMCC	Yes / No	Maintenance PIC

5. THPAL-Civil Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL/Contractor	Approver
1. Cutting of nylon and other ropes	Common area	Contractors storage area	SMCC	Yes / No	Civil PIC
2. Acid lining-removal of damaged acid lining	Common area	Contractors storage area	Local Contractors RBER	Yes / No	Civil PIC

6. Production Process A Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL	Approver
1. Flexcon bag cutting preparation for residue bagging	Common area - Process A (HPAL)	HPAL Tool Van	JS & Operator	Yes	Section Manager
2. Cutting of Rope (If it is hard to cut by scissor)	Common area - Process A (HPAL)	HPAL Tool Van	JS & Operator	Yes	Section Manager

3. Cutting of black/sunny hose	Common area - Process A (HPAL)	HPAL Tool Van	JS & Operator	Yes	Section Manager
4. Geotextile Cloth cutting	Common area - Process A (HPAL)	HPAL Tool Van	JS & Operator	Yes	Section Manager
5. Blue Drum Cutting	HPAL Area	HPAL Tool Van	JS & Operator	Yes	Section Manager
6. Vacuum Hose Cutting	Common area - Process A (HPAL)	HPAL Tool Van	JS & Operator	Yes	Section Manager

7. Production Process B Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL	Approver
1. Cutting of old filter cloths and Polypropylene (PP) rope of spent cloths.	Polishing Filter area GF- Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
2. Cutting of top portion of Sulfur Bag for use by other areas	H2S Plant/Sulfur Building	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
3. Cutting of bottom portion of bag for MS Reprocess.	MS Thickener-Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
4. Cutting of bag for charging Slaked Lime	Slaked lime-Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
5. Cutting of bag for charging only if untying is difficult with Foreman's approval.	Flocculant-Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
6. Cutting of bag for S charging - cutting of hard to untie rope	Sulfur-Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
7. Cutting of top portion of Sulfur bag for use by other areas.	H2S Plant/Sulfur Building	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
8. Cutting of Limestone bag (tonner bag) for recovery of limestone	Lime stone shelter-Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
9. Cutting of Flexible bag with Limestone residue	Lime stone shelter-Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
10. Cutting damaged portion of 1.5 in. hose or air hose.	Tool Van area- Process B (MS)	Cutting Tools Locker in	JS & Operator	Yes	Section Manager

		Central Building			
11. Cutting of rope for newly delivered vacuum hose.	Tool Van area- Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
12. Flexcon bag preparation for residue bagging	Common- Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
13. Cutting of rope (If it is hard to cut by scissor)	Common- Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
14. Cutting of black/sunny hose/plastic liner	Common- Process B (MS)	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
15. Cutting of nylon rope of spent clothes during washing (CLOTH MGT.)	MS Filter Building	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
16. Cutting of corner of empty slaked lime bag in preparation for MEPEO pick up (SLAKED LIME)	Slaked Lime Area	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager
17. Cutting of signage for printing at Central building (SCISSORS)	Central Building	Cutting Tools Locker in Central Building	JS & Operator	Yes	Section Manager

8. PSU Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL	Approver
1. Bottom ash/coal tonner bag loading to truck for disposal or coal hopper.	PSU area	DCS	JS and RF	Yes	Section Manager
2. Gasket cutting	PSU area	DCS	JS and RF	Yes	Section Manager
3. Resins tonner bag cutting	PSU area	DCS	JS and RF	Yes	Section Manager

9. PLD-Logistics Cutting Activities:

Activities	Location o Usage	Storage Locatior	Authorized User	Management Procedure THPAL/Contractor	Approver

1. Cutting of Hard Slaked Lime during crushing work	Slaked Lime and Limestone Shelter area	Safe keep by Logistic PIC at Storage Room	Authorized Logistics personnel and RDP Helper	Yes / No	Senior Supervisor & Logistics Consultant

10. Technical – Laboratory Cutting Activities:

Activities	Location of Usage	Storage Location	Authorized User	Management Procedure THPAL/Contractor	Approver
1. Hose Cutting (special activities)	Sample Prep Room	Office - SM	Laboratory Aide, Technician	Yes	Supervisor, SM
2. Hard Cardboard cutting (special activities)	Analysis Room	Office - SM	Laboratory Aide, Technician	Yes	
3. Hard plastic tubings cutting (special activities)	Analysis Room	Office - SM	Laboratory Aide, Technician	Yes	Supervisor, SM
4. Hose and tubings cutting during shutdown (normally conducted by service technicians/ vendors)	Instrument Room 1 and 2	Vendor's Toolbox	Service Technician (Vendor)	Yes / No	Supervisor, SM

11. OSH-Safety Cutting Activities:

Activities	Location of Usage	Usage Location	Authorized User	Management Procedure THPAL/Contractor	Approver
1. Cutting of Lettering pattern in painting activity	Painting Shop	Locker of Painter at Painting Shop	Painter (SCF)	Yes / Yes	Senior Supervisor

SECTION10: RAM SOURCES MANAGEMENT

10.1 RAM SOURCES ISOLATION/DE-ISOLATION AND RELATED ACTIVITY GUIDELINE POLICY

1. OBJECTIVE :

The purpose of this policy is to set a system that will ensure proper communication for isolation and de- isolation of radioactive materials sources and for proper occupational radiation protection during monitoring of radiation level including effective dose of personnel working around or in contact near the RAM sources in the course of their activity.

2. SCOPE :

This policy applies to all ARPO personnel involves on the proper isolation / de- isolation, monitoring of RAM sources reading and other THPAL or Contractors personnel who are working within the surroundings and proximity of 30 cm distance to the radioactive material source.

3. PROCEDURE:

1) General

A. Isolation and de-isolation of radioactive materials should be handled by all Assistant Radiological Protection Officers (ARPO) and gauge operator.

B. The RAM Sources Isolation/ de-isolation and Related Activity Monitoring form PDF format shall be available on-line for easy acquisition (Form 03 EMS-THPAL-SA-305 Rev. 01)

C. ARPO should be equipped with Pen dosimeter, survey meter and LOTO.

D. The Pen dosimeter shall be collected after use and submitted to PNRI every year for effective dose reading evaluation.

E. No person is allowed to work on RAM sources without the provision of pen dosimeter. He /she only allowed to work with the use of pen dosimeter or radiation survey meter (Radiagem) as an alternate equipment to record the effective dose incurred during the duration of exposure.

2) Procedure in Details

A. Identification of Radioactive materials to isolate or de-isolate.

i. End-user shall identify radioactive materials to be isolated or de-isolated and shall coordinate with ARPO for isolation or de-isolation of identified Radioactive Materials Source

ii. ARPO and THPAL safety personnel shall check the area/equipment for safety compliance.

B. Isolation and de-isolation of radioactive material source.

i. ARPO shall accomplish RAM activities monitoring form before and after isolation or de-isolation of radioactive source.

ii. Production, Maintenance PIC, Contractor's Safety Personnel and THPAL Safety Personnel shall attached and remove LOTO before and after the activity respectively.

iii. ARPO who shall isolate or de-isolate the RAM sources shall keep the monitoring form to himself and record the radiation reading until the end of the isolation / de-isolation activity.

C. Keeping of RAM Activities Monitoring form and recording of absorbed dose.

i. ARPO who isolated or de-isolated the RAM source shall submit the accomplished RAM Activities Monitoring form to Safety Office for record keeping.

ii. Use a Survey meter (Radiagem) to determine the effective dose during the time the Pen dosimeter are not available.

iii. In case a survey meter (Radiagem) is used.

- RPO/ARPO should take actual reading of the areas near the sources where the personnel will be working using survey meter at the start and end of the activity.

- Record in a record book or RAM monitoring form the survey meter reading, the name and duration the person worked near the location of the device or RAM source.
- The exposure of the person logged in the record book will be part of the computation for their total dose for the given period together with the Pen dosimeter readings.
- If survey meter is used, the effective dose is RAM source reading multiplied by the estimated time of radiation exposure (mSv/Hr. X no. Of Hr. exposure).

iv. In case a Pen Dosimeter is used.

- Pen Dosimeter will be assigned to personnel who will be working near a radioactive source.
- It is possible for one dosimeter to be assigned for a group of personnel. For example one dosimeter for a crew of 2-4 who will be actually working near the source.
- Record the reading of the Pen Dosimeter at the start and at end of the activity. The reading from the Pen Dosimeter will be representative of the assumed actual effective dose for each of the individuals of the crew who worked in the area.
- If Pen dosimeter is used, the effective dose is Final reading less the initial reading and the unit is directly in mSv.

Note:

The filled up monitoring THPAL Form with the record of the readings and actual exposure time of the people who are working within RAM sources shall be submitted to Safety Office for record keeping.

Computation of effective dose:

1. If survey meter is used RAM source reading multiply to estimated time of radiation exposure (mSv X Hr.). Estimated Time of radiation exposure is working time or time out less by time in.
2. If Pen dosimeter is used, radiation effective dose is computed by Final reading less by initial reading in mSv.

Occupational dose Limit:

1. An effective dose of 20 mSv per year averaged over five consecutive years.
2. An effective dose of 50 mSv in any single year.

4. ROLES AND RESPONSIBILITY

1) End User Supervisor
   A. Coordinates with ARPO for isolation and de-isolation for radioactive source and provide LOTO.
   B. Confirm with DCS the working condition of radioactive source.

2) ARPO
   A. Confirm with DCS the status of radioactive materials if energized and or de-energized.
   B. Conduct monitoring on the surrounding of radioactive materials using survey meter.
   C. Conduct isolation / de-isolation of radioactive source and provide LOTO.
   D. Fill-up RAM activities monitoring form.

3) Maintenance PIC
   A. Provide LOTO on radioactive materials during shutdown activities and normal operation that involve RAM sources.

4) Contractor Safety
   A. Provide LOTO on radioactive materials during shutdown activities and normal operation that involve RAM sources.

5) Safety Office
   A. Provide LOTO on radioactive materials during shutdown and or normal operation that involve RAM sources.
   B. Keep the RAM activities monitoring as record of the activity done.

5. SUPPLEMENTARY INFORMATIONS:

Definition of Terms

1) Radioactive Materials (RAM)
   - Any material that emits high radiation higher than background radiation, these includes RAM sources at HPAL , Ore Preparation, Neutralization, MS and FNTRL area.
2) ARPO
   - Assistant Radiation Protection Officer, a person that is authorized to handle RAM sources.
3) End User:
   - The department/section or process owner responsible in the process area where the activity is done.
4) PIC
   - Person in Charge
5) Pen dosimeter
   - Is a radiation protection device use to measure the effective dose during the exposure time of the concerned personnel and can be read either in mSv or µSv.
6) Reference document: EMS – THPAL-SA-503 –Standard Procedure for Radioactive Materials Activities

10.2 GUIDELINE FOR RAM SOURCE REMOVAL/INSTALLATION DUE TO REPAIR OF RELATED PIPELINE, EQUIPMENT OR VESSEL

The maintenance and calibration of the RAM Source level meter and density meter are basically handled and under the responsibility of E&I maintenance. All activities which involves pull-out or removal and installation of RAM Source from the point of installation, the E&I maintenance should coordinate to process owner, Radiation Safety personnel (RPO and ARPO).

In order to ensure not to exceed the occupational dose limit of 50mSv/year to the personnel doing the activity and to prevent accidental damage of RAM Source due to mis-handling it must satisfy the following:

1) The E&I maintenance will submit the details of RAM Source removal/Installation activity example (pipe line repair/replacement, relocation, base plate/spacer installation etc.) and the specific location of RAM Source (equipment tag number, Ore Prep, Chromite, HPAL 1&2, NTRL, FNTRL, H2S Plant etc.) to Safety Office Radiation Safety personnel(RPO/ARPO). Simultaneously furnish a copy to process owner and other concerned section/department with activity in the affected area.
   Refer to the Information Sheet for RAM Source Removal/Installation due to Repair on a separate sheet to be filled up by section/department person in-charge.
2) Work Methodology of contractor and E&I maintenance should be presented to concerned section/department, Radiation Safety personnel (RPO and ARPO) for review of procedures, hazard and risk assessment, coverage of area to cordon, other related issues for the specific activity. Revise the procedure to incorporate the concerns during the presentation and finalize the procedure for approval by maintenance manager, RPO and duly noted by OSH manager.
3) The RPO or assigned ARPO to conduct RAM Source Pre-Removal and Post-Removal monitoring taking radiation level reading before and after removal / installation.
4) The E&I maintenance PIC request to Production DCS operator to conduct announcement one (1) hour before and thirty (30) minutes before the start activity. Also request DCS Operator to announce after the activity has completed.

1. Purpose, Scope and Users

The objective of this procedure is to protect and ensure the safety of THPAL employees and contractors personnel who may be in contact or exposed to the various radioactive sources installed in the Plant Site.

This procedure is also made to set a procedure on the activities relating to radioactive sources like:

1.1 During the receiving of Source
1.2 During storage
1.3 Before Installation
1.4 Transportation
1.5 During Installation
1.6 After Installation
1.7 Removal of Source
1.8 Inspections
1.9 Energization
1.10 De-energization

Users of this documents are **ARPO, RPO*, contractors who will be in contact with the Radiation sources.

Materials

a) Calibrated Survey Meter
b) Monitoring Forms
c) Signage, Labels, Placards
d) Leak test kit
e) Computer
f) Pens
g) Orientation Materials

2. Definition

2.1 Activity or Radioactivity - the number of spontaneous nuclear transformations per unit time of a radioactive material. The unit of activity is becquerel (1 Bq = 1 disintegration per second);

2.2 Certificate of Transport (CT)- means the document certifying that the package meets the requirements for the safe transport of radioactive material in accordance with this Part;

2.3 CPR or Code - the Code of PNRI Regulations

2.4 Dose or Radiation dose - a measure of the radiation received or absorbed by a target. Modifying terms associated with this quantity include absorbed dose, organ dose, equivalent dose, effective dose, committed equivalent dose, or committed effective dose, depending on the context.

2.5 Over-pack - means an enclosure such as box or bag which is used by a single consignor to facilitate as a handling unit a consignment of one or more packages for convenience of handling, stowage and carriage

2.6 Packaging - means the assembly of components necessary to enclose the radioactive contents completely. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks. The vehicle, tie-down system, and auxiliary equipment may be designated as part of the packaging;

2.7 RAM Radioactive Material - means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the basic radionuclide values specified in this Part;

2.8 Personnel monitoring device / Dosimeter- a device designed to be worn or carried by an individual for the purpose of measuring the dose received by that individual;

2.9 Radiological **Protection Officer (RPO) / Assistant Radiological Protection Officer (ARPO)* - an individual who has the knowledge and responsibility to apply appropriate radiation protection regulations and has been assigned such responsibility by the licensee.

2.10 Transport Index - means the dimensionless number assigned to a package, over-pack or freight container, or to unpackaged LSA-I or SCO-I, which is used to provide control over radiation exposure during transport or storage in transit;

2.11 Type A Package - means a package, over-pack or freight container wherein the activity of the radioactive content shall not be greater than A1, for special form radioactive material; or A2, for all other radioactive material;

2.12 OSL - Optically stimulated luminescence, it is more advance technology in terms of accuracy, handling and evaluation of exposure receive.

3. Radioactive Material on Receipt

As soon as possible after receipt of each package of radioactive material other than those exempted below, the licensee shall monitor the package for radioactive contamination on the external surfaces and for the radiation levels outside of the package (CPR Part 2 Section 32 a).

3.1 *ARPO* shall confirm / coordinate to the Logistics Department the expected arrival of the sources.

3.2 Prior to the delivery, **ARPO* shall provide Radiation Orientation to employees who will be handling the sources.

3.3 **ARPO* shall use her/his personal dosimeter.

3.4 Verify the package was properly labelled, marked and packaged.

1) Criteria as per PNRI CPR 2

i. The packaging is proper and appropriate for the contents to be shipped;

ii. The outside of the packaging is conspicuously and durably marked with its serial/ID number, gross weight, appropriate type (e.g., "Type A") the package design conforms to, and an identification of either the consignor or consignee, or both;

iii. The package is in an unimpaired physical condition except for superficial defects such as marks and dents

iv. External radiation levels around the package and around the vehicle, if applicable, will not exceed 2mSv/h at any point on the external surface of the package at any time during transportation. The transport index (TI) shall not exceed 10.0;

v. The package shall be so designed in relation to its mass, volume and shape that it can be easily and safely transported; and that it can be properly secured in or on the conveyance during transport.

vi. The design shall be such that any lifting attachments on the package will not fail when used as intended and, if failure of the attachments should occur, the ability of the package to meet the other requirements of this Part would not be impaired. The design shall take account of appropriate safety factors to cover snatch lifting.

vii. Attachments and any other features on the outer surface of the package which could be used for lifting shall be designed either to support its mass or shall be removable or otherwise rendered incapable of being used during transport.

viii. As far as practicable, the external surfaces of the packaging's shall be free from protruding features and can be easily decontaminated.

ix. As far as practicable, the outer layer of the package shall not allow the collection and retention of water.

x. Any features added to the package at the time of transport that are not part of the package shall not reduce its safety.

xi. The package shall be capable of withstanding the effects of any acceleration or vibration such that nuts, bolts and other securing devices shall not become loose or be released unintentionally, even after repeated use.

xii. The materials of the packaging and any component or structure shall be physically and chemically compatible with each other and with the radioactive contents.

xiii. All valves through which the radioactive contents could otherwise escape shall be protected against unauthorized operation

xiv. The package design shall take into account the other dangerous properties of the radioactive content, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness.

4. Determination of Transport Index

4.1. The transport index (TI) for a package, overpack, or freight container, or for unpackaged LSA-I or SCO-I, shall be the number derived in accordance with the following procedure:

4.2. Determine the maximum radiation level in mSv/h at a distance of one (1) meter from the external surfaces of the package. The determined value shall be multiplied by 100 and the resulting number is the transport index.

4.3. After Determining the Transport Index, Categories of Packages and Overpacks can be determined.

1) Categories of Packages and Overpacks.
2) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use and under the provisions of the appropriate means of conveyance. Refer to Table below:

Table 1 Categories of Packages and Overpacks

CONDITIONS		CATEGORY
Transport Index	Maximum radiation level at any point on external surface	
0[a]	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1[a]	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III-YELLOW[b]

[a] If the measured TI is not greater than 0.05, the value quoted may be zero.
[b] Shall also be transported under exclusive use.

5. Marking, Labeling and Placarding

5.1 Each package shall be legibly and durably marked on the outside of the packaging with an identification, consisting of the name and address of either the consignor or consignee, or both, or any information identifying a way-bill or transport document which contains this information. Other required markings include the type of package that it conforms to (e.g. “TYPE A”, “TYPE B(U)”, “TYPE B(M)”, etc.).

5.2 Each package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging.

5.3 Each package, overpack and freight container shall bear the labels which conform to the models in Figure 2, Figure 3 and Figure 4. (Refer to Appendix 1 Figures for Packaging Labels for Transport)

5.4 The labels conforming to these model figures shall be affixed to the two opposite sides of the outside of a package or overpack or on the outside of all four sides of a freight container or tank.

5.5 When an empty packaging is transported as an excepted package under this Part, the previously displayed labels shall be removed or covered and shall not be visible.

5.6 Each consignor (licensee) who transports radioactive material to and from one authorized location to another by land, air, or sea shall prepare a Certificate of Transport which contains the necessary information for assuring that the package can be transported safely in accordance with this Part.

5.7 Monitoring on the Packages of Radioactive Material

5.8 Shall use the Calibrated gamma portable survey meter. **ARPO* shall ensure that the calibration is updated.

5.9 **ARPO* shall use Form in Appendix 2 Monitoring Form of Packages of Radioactive Material on Receipt.

5.10 Conduct reading on the surface of the 4 sides of the box and shall have radiation levels not exceeding 2 mSv/ h and 0.1 mSv/h at one meter from the surface.

5.11 If removable contamination in excess of 4 Bq/cm 2 (0.01 µCi/100 cm2) or radiation levels exceeding 2 mSv/h (200 mrem/h) at the surface of the package or 0.1 mSv/h

(10mrem/h) at one meter from the surface are found, the licensee shall immediately notify the final delivering carrier and the Institute. A written report should be submitted to the Institute within 30 days. (CPR Part 2 Section 32 a)

6. Transportation of Radioactive Material Sources

6.1 Transport workers shall receive appropriate training on radiation safety and the precautions to be observed in order to ensure restriction of their exposure and that of other individuals who might be affected by their actions. The radiation doses to these individuals involved in the transport activity must be periodically assessed to ensure that the system of protection and safety employed in the activity complies with regulations for radiation protection. (PNRI CPR Part 4 Section 8)

6.2 Prior to the transportation, the **ARPO* shall conduct reading to the vehicle using the form in Appendix 3 for Radiation Monitoring in Vehicle for Transportation.

6.3 (PNRI CPR Part 4 Section 30) Road vehicles carrying labeled packages, overpacks or freight containers, or carrying consignments under exclusive use, shall display the placard shown in Fig. 6 of Appendix 1 on each of:

1) The two external lateral walls and the external rear wall in the case of a road vehicle.
2) The radiation level shall not exceed to 2 mSv/h at any surface on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and the lower external surface of the vehicle.
3) The radiation level shall not exceed to 0.02mSv/h in any normally occupied positions of the vehicle, except that this provision does not apply to private motor carriers when persons occupying these positions are provided with special health supervision, personnel radiation exposure monitoring devices, and training in radiation safety.
4) In the case of road vehicles, no persons other than the driver and assistants shall be permitted in vehicles carrying packages, overpacks, or freight containers bearing Category II - YELLOW or III - YELLOW labels
5) **ARPO* shall conduct reading before and after the transportation.

7. Storing Ram Sources

PNRI CPR Part 3 Section 20 commends that:

7.1 Each licensee shall secure from unauthorized removal of or access to licensed radioactive materials that are stored in controlled areas.

7.2 Padlocks shall be provided in the area where the RAM sources are stored.

7.3 PNRI CPR Part 3 Section 26a states that: All radioactive waste that are for disposal shall be appropriately stored in on0site facilities under controlled conditions. Interim storage of unconditioned waste shall be as short as possible and not to exceed five (5) years.

7.4 **ARPO* representative shall keep the keys until the entire RAM sources are installed.

7.5 The room in which the sources are kept shall display a warning symbol such as that recommended by the International Organization for Standardization (ISO), and appropriate instructions at access points and other appropriate locations within controlled areas. Refer to Appendix 4 for the Caution Signs and Labels.

7.6 Posting of Radiation Areas. The licensee shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA" **ARPO*

7.7 Shall conduct daily monitoring on the surface / wall of the room/building where the RAM sources are stored. Refer to Appendix 5 for the Monitoring Form of Stored RAM Sources.

8. Leak Testing

8.1 (PNRI CPR Part 16 Section 25) A licensee in possession of a radioactive source contained in an industrial device shall test the source for leakage before its first use and annually thereafter, or as recommended by the manufacturer. If the licensee has a certificate from the supplier indicating that the source was leak tested within twelve (12) months before it was delivered to the licensee, the leak test before first use is not required.

8.2 If the licensee performs the entire leak-test procedure himself/herself, the licensee shall describe and submit the procedure for taking the test sample and the instrumentation that will be used for measurement for approval by PNRI.
8.3 Follow the leak test procedures stated in Appendix 6.
8.4 Shall use Leak /Wipe Testing Record in Appendix14.

9. Installation of Sources

9.1 (CPR Part 16 Section 23) Only persons specifically authorized or licensed by the PNRI in accordance with CPR Part "Licenses for Commercial Providers of Nuclear Technical Services" shall:
9.2 Install, remove or relocate industrial device that contained radioactive source
9.3 Prior to the Installation, **ARPO* shall conduct orientation on Radiation Safety to Workers who will assist in the installation works.
9.4 Personal Dosimeter shall be issued to workers.
9.5 If issuance of Personal dosimeter is impractical due to short time exposure, Dose assessment shall be manually computed.
9.6 The computation shall be based on: D=DR x time (where: D = Total Dose; DR = Dose rate as displayed by the survey meter; time = total exposure time of the worker)
9.7 **ARPO* shall conduct Preliminary Survey (See Appendix 7 RAM Source Pre-Installation Monitoring to the sources before transferring into the vehicle.
9.8 Follow Section 6.0 of the procedure for the transportation of RAM sources.
9.9 For installation requiring lifting works, follow procedures stated in EMS-THPAL-SA-304 SOP for Lifting Works Activities Inspection.
9.10 **ARPO* shall conduct Post Installation survey (See Appendix 8 RAM Source Post-Installation Monitoring) to the sources after the installation to compare if there are abnormal readings from Preliminary to Post Survey.
9.11 Background reading refer to the area wherein there are no RAM Source installed.
9.12 All readings were conducting with shutter close. Location must be taken at 30 cm from the source holder to the outer surface of the survey meter. Radiation should be less than 50µSv/hr. If readings are found to be higher the 50µSv/hr, time – distance and shielding principle shall be executed.

10. Removal of Ram Sources

10.1 Prior to the Removal, **ARPO* shall conduct orientation on Radiation Safety to Workers who will assist in the removal works.
10.2 Personal Dosimeter shall be issued to workers.
10.3 If issuance of Personal dosimeter is impractical due to short time exposure, Dose assessment shall be manually computed.
10.4 The computation shall be based on: D=DR x time (where: D = Total Dose; DR = Dose rate as displayed by the survey meter; time = total exposure time of the worker)
10.5 **ARPO* shall conduct Preliminary Survey (See Appendix 15 RAM Source Pre-Removal Monitoring) to the sources before removal and transferring into the vehicle.
10.6 Follow Section 6.0 of the procedure for the transportation of RAM sources.
10.7 For installation requiring lifting works, follow procedures stated in EMS-THPAL-SA-304 SOP for Lifting Works Activities Inspection
10.8 **ARPO* shall conduct Post Removal survey (See Appendix 16 RAM Source Post-Removal Monitoring) to the sources after the source(s) was/were relocated to its temporary storage to compare if there are abnormal readings from Preliminary to Post Survey.
10.9 Background reading refer to the area wherein there are no RAM Source installed.
10.10 All readings were conducting with shutter close. Location must be taken at 30 cm from the source holder to the outer surface of the survey meter. Radiation should be less than 50µSv/hr. If readings are found to be higher the 50µSv/hr, time, distance and shielding principle shall be executed.

11. Inspection and Monitoring

11.1 Quarterly Monitoring and Inventory
11.2 **ARPO* shall use Quarterly Inventory and Radiation Monitoring Form in Appendix 13
11.3 **ARPO* shall see to it that the survey meter that will be used is calibrated.

11.4 All readings must be taken while the shutter Is open and the distance from the probe and the source holder must be at about 1 inch.

11.5 **ARPO* shall wear his/her personal dosimeter while conducting the activity.

12. Energization / De-Energization

12.1 During Isolation

1) ARPO / RPO shall use his/her personal dosimeter while conducting the activity
2) After receiving request from the process owner, ARPO shall proceed to the area for the isolation of the sources.
3) Except for radiation Pump / agitators and other sources of energy must be de-energize / isolate, locking and tagging must be conducted by the authorized personnel.
4) Assistance from the Production / Maintenance Personnel will be needed during the activity.
5) Survey meter must be calibrated and fully charged.
6) ARPO shall conduct reading in the Source before and after (30 cm) to compare the reading between energized and isolated.
7) Shall unlock the key attached in the source.
8) ARPO shall then put the lever into “OFF” position
9) ARPO shall coordinate to the Production DCS Operator if the Source was isolate in their monitor.
10) ARPO shall fill-up Radioactive Materials Isolation/ Energization Form in Appendix 9.
11) Generated form shall be forward to the Document Controller for the safe keeping.

12.2 During Energization

1) ARPO / RPO shall use his/her personal dosimeter while conducting the activity
2) After receiving request from the process owner, ARPO shall proceed to the area for the energization of the sources.
3) Assistance from the Production / Maintenance Personnel will be needed during the activity.
4) Survey meter must be calibrated and fully charged.
5) ARPO shall conduct reading in the Source before and after (30 cm) to compare the reading between energized and isolated.
6) ARPO shall then put the lever into “ON” position
7) Shall lock the key attached in the source.
8) ARPO shall coordinate to the Production DCS Operator if the Source was energized in their monitor.
9) ARPO shall fill-up Radioactive Materials Isolation/ Energization Form in Appendix 9.

13. Calibration

13.1 Survey Meter

1) THPAL shall have such Survey Meters calibrated prior to its first use and annually thereafter. In case the Survey Meter is repaired or undergoes maintenance, THPAL shall also have the Survey Meter calibrated prior to its re-use.
2) For the calibration of equipment shall be in accordance to EMS-THPAL-213 Environmental Monitoring, Measurement & Analysis Evaluation and shall use Form 02 EMS-THPAL-213 Equipment Master list and Calibration Schedule Rev. 01 in Appendix 10.
3) As required by PNRI CPR Part 16 Section 23b that the records of the results of each instrument calibration shall be maintained for three (3) years after the date of calibration.

13.2 Personal Dosimeter

1) As required by PNRI CPR 3 Section 13.8 that Personnel monitoring devices shall be provided to workers working near RAM sources, Pen dose meter will be issued to workers who are working near the RAM sources. OSH/Safety Section shall collect employees' Pen dosimeter every 6 months of use and shall forward to PNRI for the reading.
2) Pen dosimeters shall be calibrated every year.
3) ARPO shall be responsible in monitoring the acquired dose of concerned employee.
4) Results of monitoring and exposures must be recorded and reported to the PNRI annually (PNRI CPR Part 3 Section 27 c). Refer to Appendix 11 for the Annual Monitoring Report of Worker's Dose.

14. Emergency Case

If incidents / accidents happened during the activity mentioned in this procedure, procedures stated in EMS-THPAL-GD-3203 Emergency Preparedness and Response for Radiation Leak shall be followed.

15. Appendices

Appendix 1 Packaging Labels for Radiation Materials Transport
Figure 1 for Packaging Labels for Transport

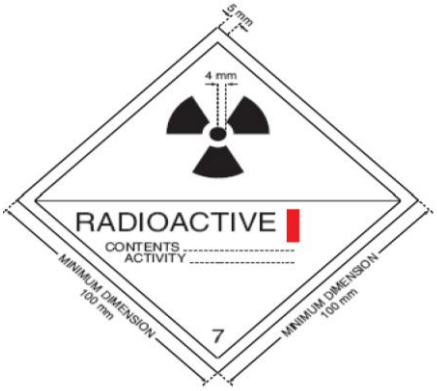


Figure 2. Category I-WHITE label. The background color of the label shall be white, the color of the trefoil and the printing shall be black, and the color of the category bar shall be red.

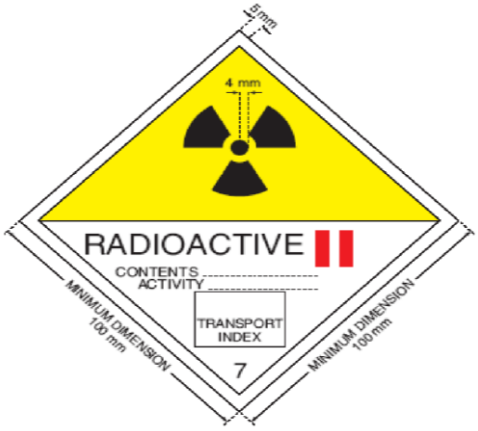


Figure 3. Category II-YELLOW label. The background color of the upper half of the label shall be yellow and the lower half white, the color of the trefoil and the printing shall be black, and the color of the category bars shall be red.

Figure 4. Category III-YELLOW label. The background color of the upper half of the label shall be yellow and the lower half white, the color of the trefoil and the printing shall be black, and the color of the category bars shall be red

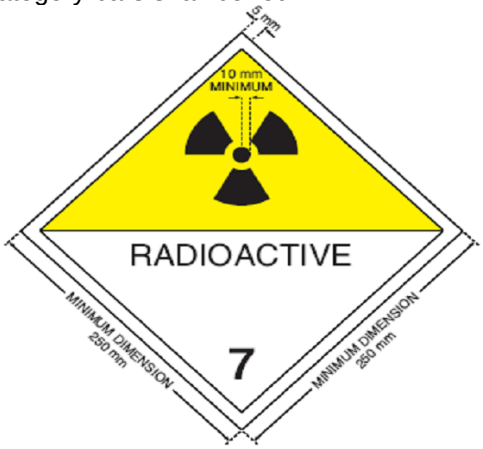


Figure 5. Placard. The number '7' shall not be less than 25 mm high. The background color of the upper half of the placard shall be yellow and of the lower half white, the color of the trefoil and the printing shall be black. The use of the word "RADIOACTIVE" in the bottom half is optional to allow the alternative use of this placard to display the appropriate United Nations number for the consignment.

Appendix 2 – Monitoring Form of Packages of Radioactive Material on Receipt.

Form 04 EMS-THPAL-SA-305 Rev.01

THPAL
Taganito HPAL Nickel Corporation

MONITORING FORM OF PACKAGES OF RADIOACTIVE MATERIAL ON RECEIPT

No.	Package No.	Source Tag No.	RAM source (Cs 137 / Co-60)	Activity	Reading (µSv/hr)					Remarks	Date Conducted
					1 meter	1 left side	2 right side	3 Top	4 Bottom		

Points 1 -4 are in the surface of the RAM package / box
1,2,3,4 reading shall not exceed to 2 mSv/h
Reading on 1 meter shall not exceed to 0.1 mSv/h

Survey Meter Specification:
Brand:
Model:
Serial No.:
Manufacturer:
Calibration Date & Factor:

Conducted by: _____ Date: _____
Checked by: _____ Date: _____
Noted by: _____ Date: _____
Approved by: _____ Date: _____

Appendix 3 Radiation Monitoring of Vehicle for Transportation

Form 06 EMS-THPAL-SA-305-Rev.02

THPAL
Taganito HPAL Nickel Corporation

RADIATION MONITORING OF VEHICLE FOR TRANSPORTATION

Trip No.	RAM	Tag No.		Readings (µSv/hr)							Remarks	Date Inspected
				Pt.1 Front	Pt2. Right	Pt.3 Left	Pt. 4 Rear	Pt. 5 Upper	Pt. 6 Lower	Passenger side		
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									
			A									
			B									

Points 1 -6 are in the surface of the vehicle wherein the RAM sources are to be transported
Point A - Radiation Reading before transporting
Point B- Radiation Reading after transporting
The radiation level shall not exceed to 2 mSv/h at any surface on the outer surfaces of the vehicle
** The radiation level shall not exceed to 0.02 mSv/h in any normally occupied positions of the vehicle*

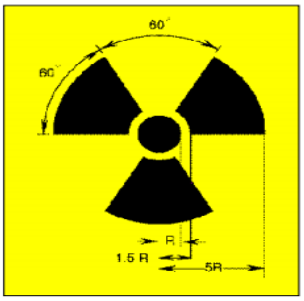
Prepared by: _____ Date: _____
Checked by: _____ Date: _____
Approved by: _____ Date: _____

Survey Meter Specification:
Brand:
Model:
Serial No.:
Manufacturer:
Calibration Date & Factor:

1 of 1

Appendix 4 Caution Signs and Labels.

1. Signs and labels prescribed by this section shall use contrasting colors. The radiation caution symbol prescribed by this section is the conventional three-bladed design:



RADIATION SYMBOL

(i) cross-hatched area is black, and
(ii) background is to be yellow.

2. In addition to the contents of signs and labels prescribed in this section, the licensee may provide on or near such signs or labels any additional information which may be appropriate in aiding individuals minimize their exposure to radiation or to radioactive material.

Appendix 5 Monitoring Form of Stored RAM Sources

Form 07 EMS- THPAL-SA-305 Rev. 01

THPAL
Taganito HPAL Nickel Corporation

MONITORING FORM OF STORED RAM SOURCES

DATE	Measuring Points(µSv/hr)						PIC	REMARKS
	A	B	C	D	E	F		

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

Approved by: _____ Date: _____

Survey Meter Specification:
Brand:
Model:
Serial No.:
Manufacturer:
Calibration Date & Factor:

Appendix 6 Leak/Wipe Test Procedure

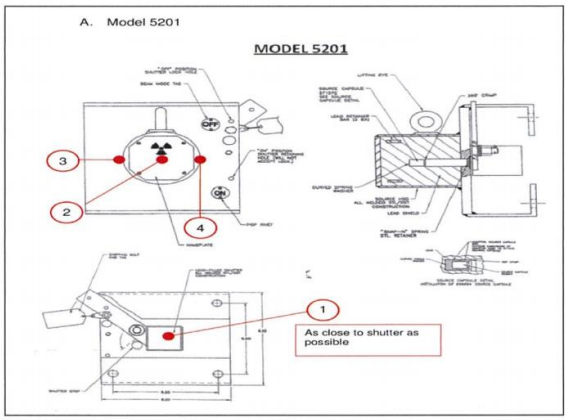
1. Objective
   To conduct Wipe Testing of Radioactive Sources contained in industrial devices used by Taganito HPAL Nickel Corporation (THPAL) in compliance with CPR 16 Sec. 25.
2. Scope
   This procedure is applicable to all Cesium 137 (Cs 137) and Cobalt (60) radioactive sealed sources that are contained in their respective source holders that THPAL is licensed by PNRI to possess, own and use for density and level monitoring purposes.
3. Frequency of Testing
   A. As per CPR 16 Sec. 25 (a), wipe testing is to be conducted annually or as recommended by the manufacturer.
   B. Wipe Testing should also be conducted following an incident that could have damaged a sealed source.

4. Materials Needed
   A. Personal Protective Equipment (Disposable rubbergloves)
   B. Pads (cotton, cloth or filter paper) typically at least 25mm in diameter
   C. Handling Tongs or Tweezers
   D. Ethyl Alcohol or Water
   E. Plastic/cellophane bags to serve as container for wipes
   F. Sealer or tape
   G. Marker
   H. Envelope or mailing envelope
   Contamination meter or dose rate meter
   J. Form 02 EMS-THPAL-SA-305 Rev.01

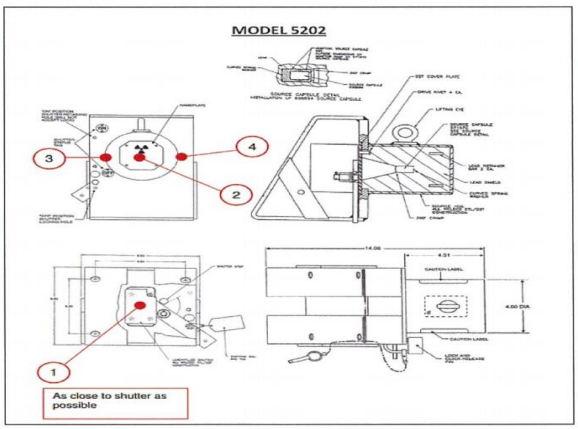
5. Procedure Details
   A. Prepare the materials needed for wipe testing of sealed sources.
   B. Prepare and label plastic bags with the Serial Number of each source.
   C. While wearing the rubber gloves, moisten/wet the filter paper or tissue pad with ethyl alcohol
   D. With the tongs or tweezers, wipe the surface of the shutter of the sealed source with the moistened filter paper/cotton swabs/tissue pad. Take three swipe/smear samples.
   E. Put the wipe samples in the designated plastic/cellophane bag.
   F. Repeat steps C, D, E for each sealed source.
   G. Check the wipe samples for gross contamination using a dose rate meter or contamination monitor. The meter should be set to its most sensitive range and used in an area away from the nuclear gauge to minimize background radiation. Move the wipe sample in its plastic bag to the meter, not the meter to the swab.
   H. If there is no indication on the meter, or if the indication is no more than twice the background radiation, send/mail the samples to PNRI, Radiation Protection Services for more sensitive assessment.
   I. If the wipe samples show twice the background or more, do not mail. Contact PNRI for specific instructions.
   J. Keep or File the records of the results.

6. Wipe Test Points

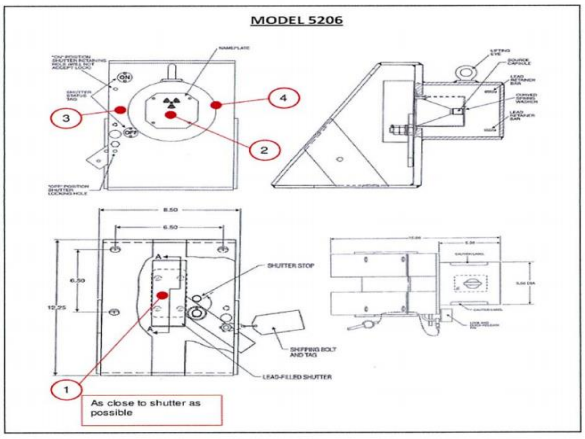
A. Model 5201



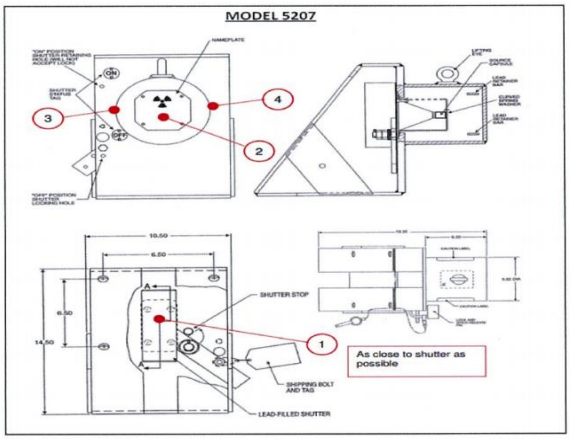
B. Model 5202



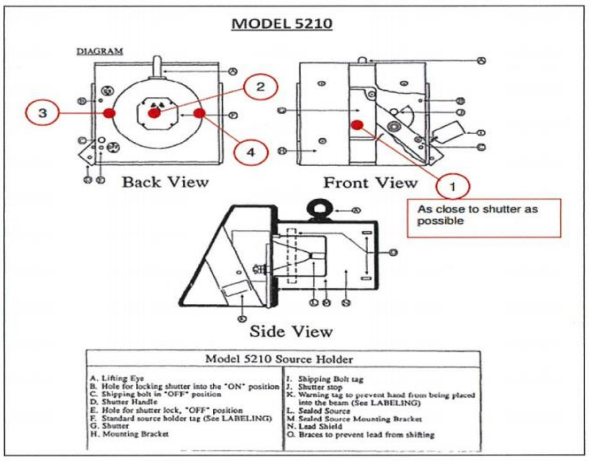
C. Model 5206



D. Model 5207

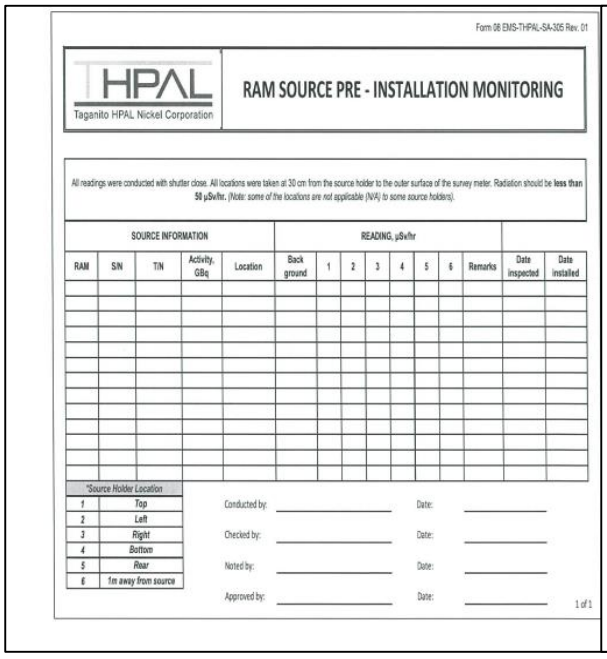


E. Model 5210



Appendix 7 RAM Source Pre-Installation Monitoring

8 RAM Source Post-Installation Monitoring



Form 08 EMS-THPAL-SA-305 Rev. 01

THPAL Taganito HPAL Nickel Corporation

RAM SOURCE PRE - INSTALLATION MONITORING

All readings were conducted with shutter close. All locations were taken at 30 cm from the source holder to the outer surface of the survey meter. Radiation should be **less than 50 µSv/hr.** *(Note: some of the locations are not applicable (N/A) to some source holders).*

SOURCE INFORMATION					READING, µSv/hr								
RAM	S/N	T/N	Activity, GBq	Location	Back ground	1	2	3	4	5	6	Remarks	Date inspected	Date installed

*Source Holder Location	
1	Top
2	Left
3	Right
4	Bottom
5	Rear
6	1m away from source

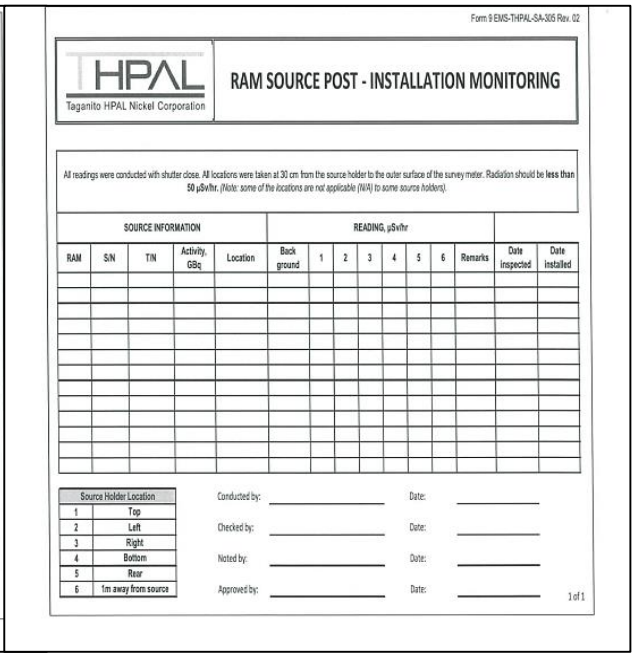
Conducted by: _____ Date: _____

Checked by: _____ Date: _____

Noted by: _____ Date: _____

Approved by: _____ Date: _____

1 of 1



Form 9 EMS-THPAL-SA-305 Rev. 02

THPAL Taganito HPAL Nickel Corporation

RAM SOURCE POST - INSTALLATION MONITORING

All readings were conducted with shutter close. All locations were taken at 30 cm from the source holder to the outer surface of the survey meter. Radiation should be **less than 50 µSv/hr.** *(Note: some of the locations are not applicable (N/A) to some source holders).*

SOURCE INFORMATION					READING, µSv/hr								
RAM	S/N	T/N	Activity, GBq	Location	Back ground	1	2	3	4	5	6	Remarks	Date inspected	Date installed

Source Holder Location	
1	Top
2	Left
3	Right
4	Bottom
5	Rear
6	1m away from source

Conducted by: _____ Date: _____

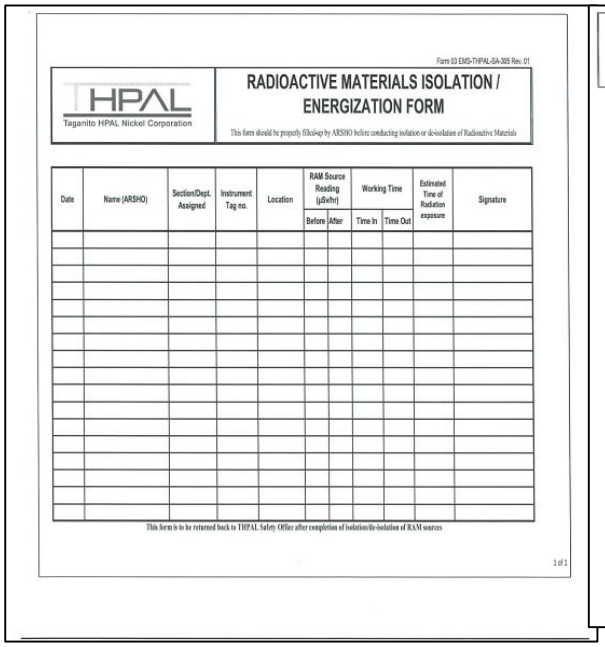
Checked by: _____ Date: _____

Noted by: _____ Date: _____

Approved by: _____ Date: _____

1 of 1

Appendix 9 Radioactive Materials Isolation- Energization Form 10 Equipment Masterlist and Calibration Schedule Form



Form 03 EMS-THPAL-SA-305 Rev. 01

HPAL
Taganito HPAL Nickel Corporation

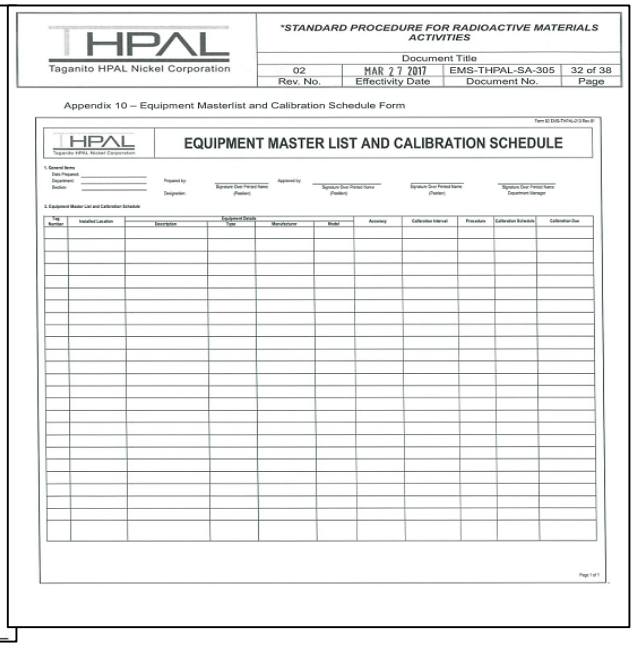
RADIOACTIVE MATERIALS ISOLATION / ENERGIZATION FORM

This form should be properly filled-up by ARSHO before conducting isolation or de-isolation of Radioactive Materials

Date	Name (ARSHO)	Section/Dept. Assigned	Instrument Tag no.	Location	RAM Source Reading (µSv/hr)		Working Time		Estimated Time of Radiation exposure	Signature
					Before	After	Time-In	Time Out		

This form is to be returned back to THPAL Safety Office after completion of isolation/de-isolation of RAM sources

1 of 1



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STANDARD PROCEDURE FOR RADIOACTIVE MATERIALS ACTIVITIES

Document Title

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Appendix 10 – Equipment Masterlist and Calibration Schedule Form

Form 02 EMS-THPAL-SA-305 Rev. 01

HPAL
Taganito HPAL Nickel Corporation

EQUIPMENT MASTER LIST AND CALIBRATION SCHEDULE

1. General Items
Date Prepared:
Department:
Section:

Prepared by:
Signature Over Printed Name
(Position)

Approved by:
Signature Over Printed Name
(Position)

Signature Over Printed Name
(Position)

Signature Over Printed Name
Department Manager

2. Equipment Master List and Calibration Schedule

Tag Number	Installed Location	Equipment Details					Calibration Interval	Procedure	Calibration Schedule	Calibration Due
		Description	Type	Manufacturer	Model	Accuracy				

Page 1 of 1

Appendix 11 Annual Monitoring Report of Worker's Dose 12 Quarterly Inventory and Radiation Monitoring

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STANDARD PROCEDURE FOR RADIOACTIVE MATERIALS ACTIVITIES

Document Title

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Appendix 11 – Annual Monitoring Report of Worker's Dose.

Form 05 EMS-THPAL-SA-305 Rev.01

HPAL
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ANNUAL MONITORING REPORT OF WORKERS DOSE

NO	NAME	DEPARTMENT / SECTION	POSITION	DOSE (JAN - DEC)	REMARKS

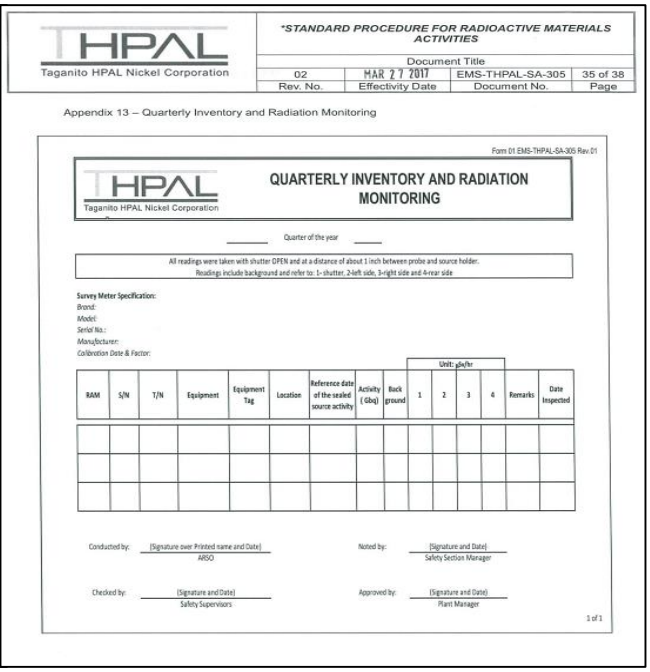
*Attached Personal Dose Monitoring Report from PNRI

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

Approved by: _____ Date: _____

1 of 1



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STANDARD PROCEDURE FOR RADIOACTIVE MATERIALS ACTIVITIES

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Appendix 13 – Quarterly Inventory and Radiation Monitoring

Form 01 EMS-THPAL-SA-305 Rev.01

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QUARTERLY INVENTORY AND RADIATION MONITORING

_____ Quarter of the year _____

All readings were taken with shutter OPEN and at a distance of about 1 inch between probe and source holder.
Readings include background and refer to: 1- shutter, 2-left side, 3-right side and 4-rear side

Survey Meter Specification:
Brand:
Model:
Serial No.:
Manufacturer:
Calibration Date & Factor:

RAM	S/N	T/N	Equipment	Equipment Tag	Location	Reference date of the sealed source activity	Activity (Gbq)	Back ground	Unit: µSv/hr 1	2	3	4	Remarks	Date Inspected

Conducted by: [Signature over Printed name and Date]
ARSO

Noted by: [Signature and Date]
Safety Section Manager

Checked by: [Signature and Date]
Safety Supervisors

Approved by: [Signature and Date]
Plant Manager

1 of 1

Appendix 13 Leak/Wipe Testing Record

Form 02 EMS-THPAL-GD-3202 Rev 01

THPAL
Taganito HPAL Nickel Corporation

LEAK / WIPE TESTING RECORD

No.	Location	Source Tag No.	RAM source (Cs 137 / Co-60)	Reference date of the sealed source	Activity	Reading (µSv/hr)					Remarks	Date Conducted
						Background	1	2	3	4		

Survey Meter Specification:
Brand:
Model:
Serial No.:
Manufacturer:
Calibration Date & Factor:

Conducted by: _____ Date: _____
Checked by: _____ Date: _____
Noted by: _____ Date: _____
Approved by: _____ Date: _____

1 of 1

14 RAM Source Pre-Removal Monitoring

Form 10 EMS-THPAL-SA-305 Rev. 01

THPAL
Taganito HPAL Nickel Corporation

RAM SOURCE PRE - REMOVAL MONITORING

All readings were conducted with shutter close. All locations were taken at 30 cm from the source holder to the outer surface of the survey meter. Radiation should be **less than 50 µSv/hr.** *(Note: some of the locations are not applicable (N/A) to some source holders).*

SOURCE INFORMATION					READING, µSv/hr								
RAM	S/N	T/N	Activity, GBq	Location	Back ground	1	2	3	4	5	6	Remarks	Date inspected	Date removed

Source Holder Location	
1	Top
2	Left
3	Right
4	Bottom
5	Rear
6	1m away from source

Conducted by: _____ Date: _____
Checked by: _____ Date: _____
Noted by: _____ Date: _____
Approved by: _____ Date: _____

1 of 1

Appendix 16 RAM Source Post-Removal Monitoring

All readings were conducted with shutter close. All locations were taken at 30 cm from the source holder to the outer surface of the survey meter. Radiation should be **less than 50 µSv/hr.** *(Note: some of the locations are not applicable (N/A) to some source holders).*

SOURCE INFORMATION					READING, µSv/hr								
RAM	S/N	T/N	Activity, GBq	Location	Back ground	1	2	3	4	5	6	Remarks	Date inspected	Date Removed

Source Holder Location	
1	Top
2	Left
3	Right
4	Bottom
5	Rear
6	1m away from source

Conducted by: _____ Date: _____
Checked by: _____ Date: _____
Noted by: _____ Date: _____
Approved by: _____ Date: _____

1 of 1

SECTION11: CONFINED SPACE ENTRY CLEARANCE POLICY

11.1 OBJECTIVE:

The purpose of this policy is to set a system that will ensure proper communication for issuance of confined space entry clearance

11.2 SCOPE:

This policy applies to all confined space under cleaning, inspection, maintenance and repairs.

11.3 PROCEDURE:

General

A. Confined Space clearance will be issued by THPAL safety officer/inspector
B. Laminated form should always available at safety office and e-file form should be available at fileserver for easy acquisition.
C. Safety officer should equip with multi-gas detector (for O2, h2s, CO, Combustible detection) and isolation tags for radioactive materials.

Procedure in Details

A. Confined Space Entry Clearance (Please see Form 01 EMS-THPAL-SA-303) shall be accomplished by supervisor, safety officer, maintenance PIC, and contractor safety before entering the confined space vessels or tank.

B. Supervisor or foreman and THPAL safety shall fill up items 1 to 10 and item 12 while item 11 should be confirmed by maintenance and contractor's safety prior to signing. Gas test shall be done by Safety personnel and checking of other necessary items/materials.
C. When all of the requirements for confined space entry are complied, a copy of the laminated clearance will be posted at the main entrance of the vessel and it will be return to safety after finishing the work inside confined space.

Roles and Responsibility

1.1 End User Supervisor

A. Coordinates with Maintenance for blinding/de-blinding of all blinding points
B. Coordinates with safety officer for confined space entry clearance.
C. Coordinates with ARPO for RAM source isolation (if needed).
D. Provide LOTO for all equipment affected in the activity.

1.2 ARPO

A. Confirm with DCS the status of radioactive materials if energized and or de-energized.
B. Made monitoring on surrounding of radioactive materials using survey meter.
C. Conduct isolation/de-isolation of radioactive source.
D. Fill-up RAM activities monitoring form.

1.3 Maintenance PIC

A. Provide LOTO for all equipment affected in the activity.
B. Coordinates contractor for the confined space activity.

1.4 Contractor Safety

A. Double checked safety requirement on confined space prior to entry.
B. Provide daily gas check monitoring form.

1.5 Safety Office

A. Provide confined space entry clearance
B. Check and confirm all safety requirement for confined space prior to issuance
C. Conduct gas check on confined space and make sure that all are in safe level.
D. Accomplished the Issued Confined Space Entry Logsheet (Form 2 EMS-THPAL-SA-303 Rev. 00)

11.4 SUPPLEMENTARY INFORMATIONS:

1.1 Definition of Terms

4.2.1 Confined Space

- any space that has limited or restricted means of entry or exit, large enough for a person to enter to perform tasks, and is not designed or configured for continuous occupancy

4.2.2 ARSHO

- Assistant Radiographic Safety and Health Officer, a person that authorized to handle RAM sources.

4.2.3 End-user:

- the department/section responsible for which the activity is done for

4.2.4 PIC

- Person in Charge

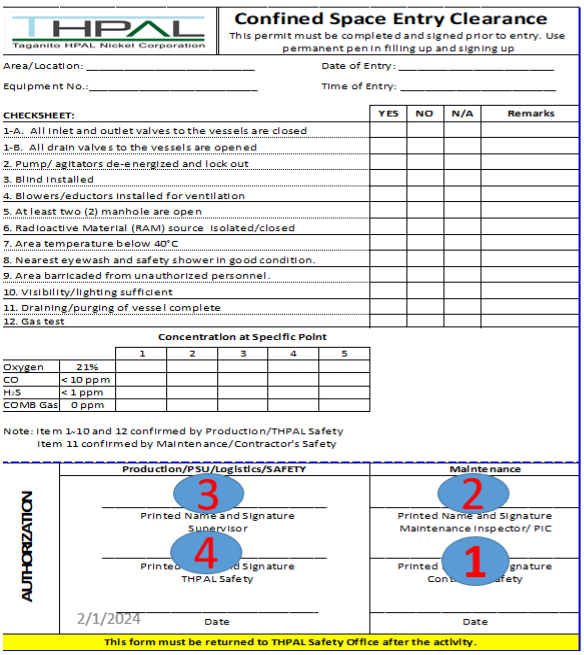
REFERENCE DOCUMENT:
EMS-THPAL-SA-303 Rev.00 SOP FOR CONFINED ACTIVITIES INSPECTION

11.5 STANDARD AND MANAGEMENT

1. Confined spaces include, but are not limited to, tanks, vessels, silos, storage bins, hoppers, vaults, pits, manholes, tunnels, equipment housings, ductwork, pipelines, etc.
2. Confined Space Permit is required when:
    1. Enclosed or Partially enclosed
    2. Limited/restricted means for entry / exit
    3. It is not designed or intended for continuous human occupancy
    4. Contains or has known potential to contain a hazardous atmosphere

OXYGEN LEVEL
For confine space entry = 19.5% to 23.5%
For confine space = Area Temperature below 40° C (For PSU area up to 50° C, up to 10mins. Work)
For sustaining fire ≥ 16.0%

Confined Vessels Entry Clearance



THPAL — Taganito HPAL Nickel Corporation

Confined Space Entry Clearance

This permit must be completed and signed prior to entry. Use permanent pen in filling up and signing up

Area/Location: _____ Date of Entry: _____

Equipment No.:_____ Time of Entry: _____

CHECKSHEET:	YES	NO	N/A	Remarks
1-A. All inlet and outlet valves to the vessels are closed				
1-B. All drain valves to the vessels are opened				
2. Pump/ agitators de-energized and lock out				
3. Blind Installed				
4. Blowers/eductors installed for ventilation				
5. At least two (2) manhole are open				
6. Radioactive Material (RAM) source Isolated/closed				
7. Area temperature below 40°C				
8. Nearest eyewash and safety shower in good condition.				
9. Area barricaded from unauthorized personnel.				
10. Visibility/lighting sufficient				
11. Draining/purging of vessel complete				
12. Gas test				

Concentration at Specific Point

		1	2	3	4	5
Oxygen	21%					
CO	< 10 ppm					
H_2S	< 1 ppm					
COMB Gas	0 ppm					

Note: Item 1-10 and 12 confirmed by Production/THPAL Safety
Item 11 confirmed by Maintenance/Contractor's Safety

AUTHORIZATION

Production/PSU/Logistics/SAFETY	Maintenance
3 Printed Name and Signature Supervisor	2 Printed Name and Signature Maintenance Inspector/ PIC
4 Printed Name and Signature THPAL Safety	1 Printed Name and Signature Contractor Safety
2/1/2024 Date	Date

This form must be returned to THPAL Safety Office after the activity.

- Lack out Tag out
- Purging is complete
- Blinds
- Mechanical Ventilation
- Manholes
- Temperature
- Radioactive Material
- Visibility
- Barricade / Hole watcher
- Gas Test
- Work Sequence and KY cards

3. Management for confined space

3.1 No employee shall be allowed to enter any hot or confined working area for any purpose unless all requirements had been met.

3.2 The confine space entry clearance check sheet and confine space permit should be accomplished and compiled accordingly by the process owner.

3.3 The confine space permit must be updated every 12 Hours or every shift by THPAL Safety.

3.4 In hazardous jobs such as maintenance or repair works of process tanks, at least two men shall work together. When it is necessary for an employee to leave his companion, the person left behind shall work only outside the hazardous area. Before getting inside the tanks or any confined space, measure oxygen content and prepare a good draft. Confined spaces shall be restricted to all employees unless properly supervised.

3.5 Watchman should be installed outside the manhole entry for management of the entrance.

SECTION12: GUIDELINES FOR WOKS WITHIN AREAS WITH SOLVENT NAPHTHA (PETROLEUM)

12.1 Objective:

To establish a safe guidelines in carrying out works on areas with solvent naphtha (petroleum), heavy arom for maintenance and operation activities.

12.2 Scope:

This guidelines covers the activities inside the Scandium Plant SX Building specifically within the Pump Mixer and Settler vessel area.

12.3 Reference document:

Safety Data Sheet (SDS)
Chemical product name: SWASOL 1800
Manufacturer Company Name : Cosmo Matsuyama Oil Co.,LTD.
Distributor Company Name: Maruzen Petrochemical Co., LTD.

Occupational Safety and Health Standards – Table 8 Threshold Limit Values of Airborne Contaminants

12.4 Definition of Terms:

ppm – parts of vapor or gas per million parts of air plus vapor by volume at 25^0 C and 760 mm. Hg pressure.
Mg/M^3 – approximate milligrams of particulate or substance per cubic meter of air.
TLV – Threshold limit values refer to time weighted concentrations for an 8-hour workday and a total of forty-eight (48) hours of work exposure per week.
TWA - Time weighted average
STEL – Short Time exposure limit
Flash Point - The lowest temperature in which the solid or liquid produces a concentration in proper proportion with air a flammable vapors at the surface of the solid or liquid.
Combustible Liquid – Liquids which have a flash point greater than 60 °C (140 °F) and below 93 °C (200 °F). U.S. regulations permit a flammable liquid with a flash point between 38 °C (100 °F) and 60 °C (140 °F) to be reclassed as a combustible liquid.

12.5 Exposure Controls/Personal Protection

Threshold Limit Values of Airborne Contaminants Table 8-OSH Standard page 198

Substances	PPM	Mg/M^3
Naphtha (Cool Tar)	100	400
Naphtha (Petroleum distillates)	**500**	**2,000**
Naphthalene	10	50

Note: The Solvent Naphtha (Petroleum), heavy arom is the same as Naphtha (Petroleum distillates).

Allowable exposure limit :	Recommendation of The Japan Society of Occupational Health (2009)	Unknown
ACGIH (20120	TLV – TWA 10 ppm (naphthalene) TLV – STEL 15 ppm (naphthalene)	

OSH Standards; Rule 1072.02: page 28.

All employees exposure to any material specified in Table 8 and Table 8a of this Rule shall be limited in accordance to following:

1) Materials with name preceded by “C”
Ceiling Values:

An employee's exposure to any material in Table 8-Threshold Limit Values for Airborne Contaminants, the name which is preceded by "C" (e.g. Boron triflouride), shall at no time exceed the ceiling value given for that material in the Table.

2) Other Materials, 8-hour Time Weighted Average:
An employee's exposure to any material in Table 8, the name of which is not preceded by "C" and any material listed in Table 8a in any 8-hour workshift shall not exceed in 8 hour time weighted average limit given for that material in the table. However, for a short period of time an excursion in the TLV value may be allowed but should not exceed the following:
   a. from 0 to 1 concentration by 3 times;
   b. from 1 to 10 concentration by 2 times;
   c. from over 10 to 100 concentration by 1 ½ times;
   d. from over 100 to 1000 concentration by 1 ¼ times;

Safety Measures:

1. After opening the mixer check concentration of solvent naphtha (Petroleum) in the mixer vessel by Scandium personnel using the special instrument from Technical Department. Refer to the Threshold Limit Values on the above table.
2. During walkthrough on September 29, 2020 actual data on concentration was taken with the manhole open and odor also physically observed about one foot from the surface of the liquid. The odor is noticeable but tolerable by human sense even without respirator for short time exposure. The OV/AG chemical cartridge is suitable up to 5ppm (meaning more than 5 ppm you can still sense the odor. Below were the readings:

   Reading one (1) foot distance from the surface of the solvent above the open manhole of the Settler was 30.6 ppm as shown in the picture below.

   Reading one (1) meter distance from the open manhole of the Settler was 0.3 ppm as shown in the picture below.

   Reading two (2) meter distance from the open manhole of the Settler was 0.1 ppm as in the picture below.

3. Hazard Identification GHS Classification on Physical hazard under Flammable liquid is Category 4- Flammable solids; Substances liable to spontaneous combustion; Substances which, in contact with water, emit flammable gases**. Note:** prohibit the use of water anytime in the area during the activity.

4. Combustible (ex. Difficult to burn but once burnt, combustion reaction is rapid. Heat, spark and flame sources are prohibited.
5. Heating may induce explosion of containers.
6. Fire may produce irritant, corrosive or toxic gases.
7. Risk of vapor explosion indoors/outdoors or in sewage ditches.
8. The flash point of this product is 79 ºC.
9. In case of leakage without fire, wear airtight impermeable protective equipment.
10. Ventilate before entering tightly closed places. Exhaust fan at the wall may continue running to lower concentration at the surroundings inside the building.
11. Remove all fire sources promptly. (Prohibit smoking, sparks and open flames in surrounding areas.

Facility measures:

1. For indoor handling, install equipment to tightly enclose the source or local exhaust. Keep the gas concentration in the air below the allowable exposure limit.
2. Use explosion-proof electrical/ventilating/lighting equipment.
3. Take precautionary measures against static discharge.
4. Install an eye-washing facility and emergency shower in the storage or work area. Clearly indicate the location of the facility.

Protective equipment:

Breathing equipment - Gas masks against organic gases, air supplied masks and air respirator.
Protection of hand - Oil-proof protective gloves.
Eye protection - protective goggles, protective facemask.
Skin and body protection – Protective boots, protective clothing and Protective apron.

12.6 Physical and chemical properties:

Appearance (physical state, Shape, etc.)	Colorless liquid
Odor	Aromatic odor
pH	No data available
Melting point, freezing point	-6 ºC or below
Boiling point, initial boiling point	195 – 250 ºC
Initial boiling point	195 ºC
Flash Point	79 ºC
Upper/lower flammability or explosive limits	No data available
Vapor pressure	No data available
Vapor density	4.8 (air =1)
Specific gravity (relative density)	0.93 g/cm³ (15 ºC)

Solubility	Poorly soluble in water. Easily soluble organic solvent
Spontaneous ignition temperature	465 ºC

12.7 Stability and Reactivity

Reactivity/chemical	stable under normal handling conditions.
Stability	Static electricity maybe generated by fluxion or stirring.
Possibility of hazardous Reactions	Violently reacts with strong oxidizers and creates fire or explosion risk. Since its vapor Is higher than that of air, it is likely to linger low places and form an explosive gas mixture with air.
Conditions to avoid	High temperature.
Incompatible materials	Strong oxidizers

12.8 Simple Rules in Scandium Area for Maintenance activity:

- Wear gas mask with OV/AG chemical cartridge inside SX building same as operation personnel.
- If the person wants to eliminate completely its organic smell you can use air line mask instead of gas mask during the activity.
- If there is change in physical condition, they should immediately inform their Leader (It has been confirmed that there are some cases of abnormalities).
- The Leader should inform safety and their managers when they confirmed the abnormalities.
- Pull out the pump mixer one by one to further minimize the odor;
- After lifted immediately install cover at the mixer side.

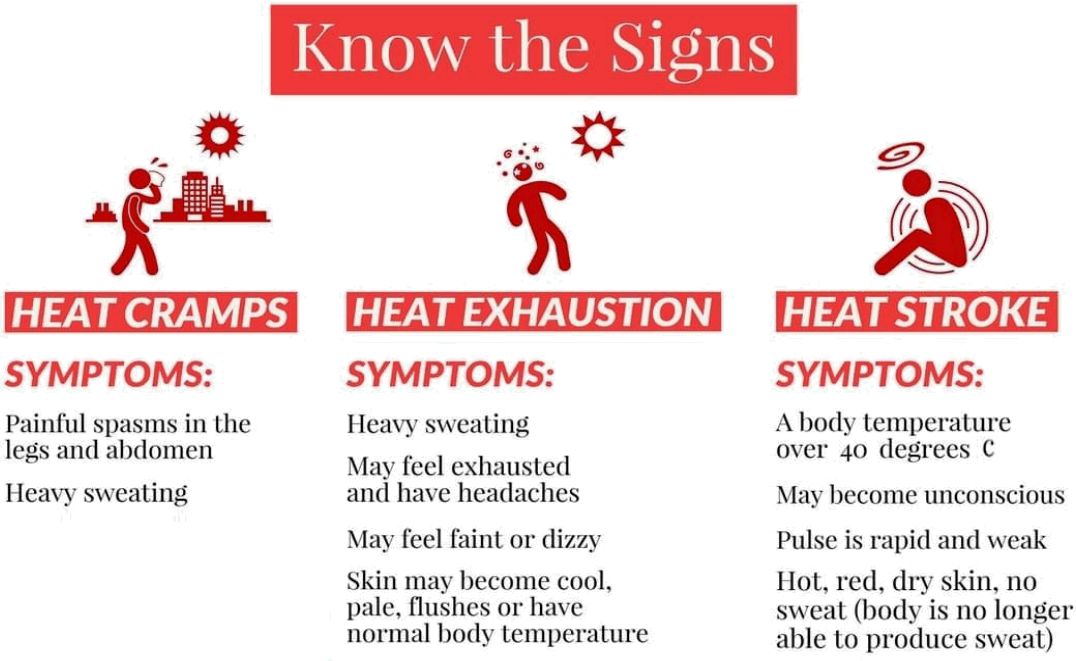
SECTION13: PRVENTION OF HEAT ILLNESS

13.1 HEAT ILLNESS

Heat Illness means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope, and heat stroke.

Three types of heat-related illnesses:

1. Heat Cramps
2. Heat Exhaustion
3. Heat Stroke



13.2 Education and Training:

Ensure that all employees are educated about the risks of heat illness and trained on how to prevent it. This includes recognizing the symptoms of heat-related illnesses and knowing how to respond. Remind everyone during morning meetings about the risk of prolong exposure to direct sun light in high heat index weather condition without sufficient water intake and rest.

13.3 Countermeasure to prevent heat illness

1) Hydration:
   Encourage employees to drink plenty of water throughout the day, even if they do not feel thirsty. Supervisors must instruct the frequency and amount of hydration. Provide easy access to water sources and remind employees to take regular water breaks. Avoidance of iced tea, soda, coffee, or alcoholic drinks especially if you will be doing fieldworks.
2) Shade and Rest Breaks:
   Provide shaded areas where employees can take breaks from the sun and heat. Encourage frequent rest breaks as necessary depending on the task physical workload and environment condition to allow the body to cool down.
3) Personal Protective Equipment:
   Provide employees with appropriate clothing and gear to protect them from the sun and heat, such as hats, eye protection, and light-colored, breathable clothing.
4) Work Scheduling:
   Consider adjusting work schedules to avoid the hottest parts of the day, if possible. Encourage tasks that require physical exertion to be done during cooler times of the day. On

the adjustment of work-rest regimen, the worker can do the mild or light work in a shaded area or in a well-conditioned area to cope up to the productivity of the work.

5) Monitoring:
   a) Encourage employees to report any symptoms they may be experiencing in the workplace. On days when it suddenly gets hot or the day after a day off, the body is not acclimatized to the heat. Especially for such employees, supervisors should be careful when allocating their work and strengthen monitoring of their physical condition.
   b) Based on the Heat Index forecast issued by PAGASA and regular monitoring of the Heat Index, activities and preparations should be adapted according to the Heat Index value.
   c) Regularly measure the Wet Bulb Globe Temperature (WBGT) and take management action based on the measured values relative to the permissible WBGT levels corresponding to the intensity of work.
6) Spread the Six-Points to prevent heat stroke:
   a) When you feel any abnormality, inform immediately co-workers and Supervisor
   b) Frequent drinking of water for hydration
   c) Body condition management by yourself everyday
   d) Consider the PPE you use when you use WBGT value
   e) In Early time /Overtime shift, avoid activity exposing to heat as much as possible
   f) Improvement of heat environmental condition of the activity via shade and ventilation and other cooling measures

13.4 Emergency Response:

Contact ERT/Safety section for the employee to be brought THPAL Clinic immediately.
If any of these symptoms are observed, it is important to take the following first aid measures while waiting for the Emergency Response Team (ERT) to arrive:

   a) Move the person to a shaded, cool area, and provide ventilation.
   b) Remove the person's outer clothing.
   c) Apply cold compresses, ice packs, cold water, or cold wet cloth against the skin, especially the head, face, neck, armpits, wrists, ankles, and groin.
   d) If the patient is conscious, encourage frequent slow sips of cool water.

13.5 Criteria for heat condition

1) Definition of Terms:

   a) Allocation of Work – percentage of worktime duration to the actual working shift
   b) Acclimatized – gradual physiological adaptation that improves an individual's ability to tolerate heat stress
   c) SCHSE – Screening Criteria for Heat Stress Exposure
   d) WBGT – Wet-Bulb Glove Temperature

WBGT = Wet-Bulb Globe Temperature Index
[Outdoor with sunlight] WBGT=0.7NWB+0.2GT+0.1DB
[Indoor or Outdoor without sunlight] WBGT=0.7NWB+0.3GT
*NWB(natural wet-bulb temperature), GT(globe thermometer temperature), DB(dry-bulb temperature)

   e) ACGIH – American Conference of Governmental Industrial Hygienists
   f) Heat index – Also known as the apparent temperature, is an index that combines air temperature and relative humidity, in shaded areas, to posit a human-perceived equivalent temperature, as how hot it would feel if the humidity were some other value in the shade

$$Index_{heat} = -42.379 + (2.04901523 \times T) + (10.14333127 \times rh) - (0.22475541 \times T \times rh) - (6.83783 \times 10^{-3} \times T^2) - (5.481717 \times 10^{-2} \times rh^2) + (1.22874 \times 10^{-3} \times T^2 \times rh) + (8.5282 \times 10^{-4} \times T \times rh^2) - (1.99 \times 10^{-6} \times T^2 \times rh^2)$$

air temperature (T) relative humidity (rh)

g) Allocation of work in a cycle of work and recovery– Refers to the distribution or assignment of tasks or duties over a period that includes both periods of work and periods of rest or recovery

2) Difference between Heat Index and WBGT

The heat index is calculated for shady areas and the WBGT is calculated for areas in direct sunlight. You can see that both are useful depending on where you plan to spend your time outside. If you are primarily in the shade, then use the heat index. If you work outside or plan on any sort of vigorous outdoor activity in the full sun, use the WBGT.

3) Heat Stress Standards

a) WBGT

Screening criteria for heat stress exposure based on ACGIH standard (WBGT values in °C). This standard, used in Work Environment Measurement in the Philippines, is referenced by the Department of Labor and Employment, including private establishments.

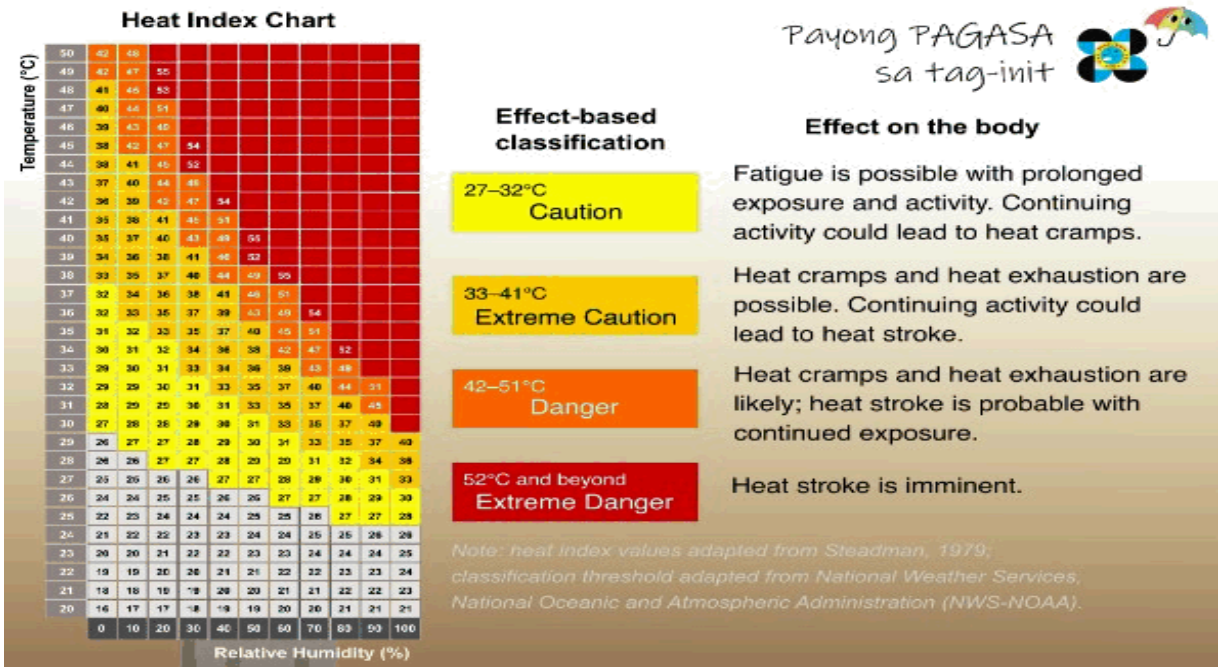
SCREENING CRITERIA FOR HEAT STRESS EXPOSURE (WBGT, °C)				
Allocation of Work in a Cycle of Work and Recovery	**Light**	**Moderate**	**Heavy**	
75% to 100%	31.0	28.0	-	**TLV***
	28.0	25.0	-	**Action Limit**
50% to 75%	31.0	29.0	27.5	**TLV***
	28.5	26.0	24.0	**Action Limit**
25% to 50%	32.0	30.0	29.0	**TLV***
	29.5	27.0	25.5	**Action Limit**
0 to 25%	32.5	31.5	30.5	**TLV***
	30.0	29.0	28.0	**Action Limit**

SCREENING CRITERIA FOR HEAT STRESS EXPOSURE (WBGT, °C)
**Threshold Limit Value for Acclimatized Workers* These TLVs are based on the assumption that nearly all acclimatized, fully clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 38°C (100.4° F). They are also based on the assumption that the WBGT of the resting place is the same or very close to that of the workplace. Where the WBGT of the work area is different from that of the rest area, a time-weighted average should be used.

Metabolic Rate Categories with Example Activities	
Category	**Example Activities**
Rest	Sitting
Light	Sitting with light manual work with hands and arms, and driving. Standing with some light arm and occasional walking.
Moderate	Sustained moderate hand and arm work, moderate arm and leg work, moderate arm and trunk work, or light pushing and pulling. Normal walking.
Heavy	Intense arm and trunk work, carrying, shoveling, manual sawing; pushing and pulling heavy loads; walking at a fast pace.
Very Heavy	Very intense activity at fast to maximum pace

b) Heat Index

Screening criteria for heat stress exposure based on ACGIH standard (WBGT values in °C). This standard, used in Work Environment Measurement in the Philippines, is referenced by the Department of Labor and Employment, including private establishments.

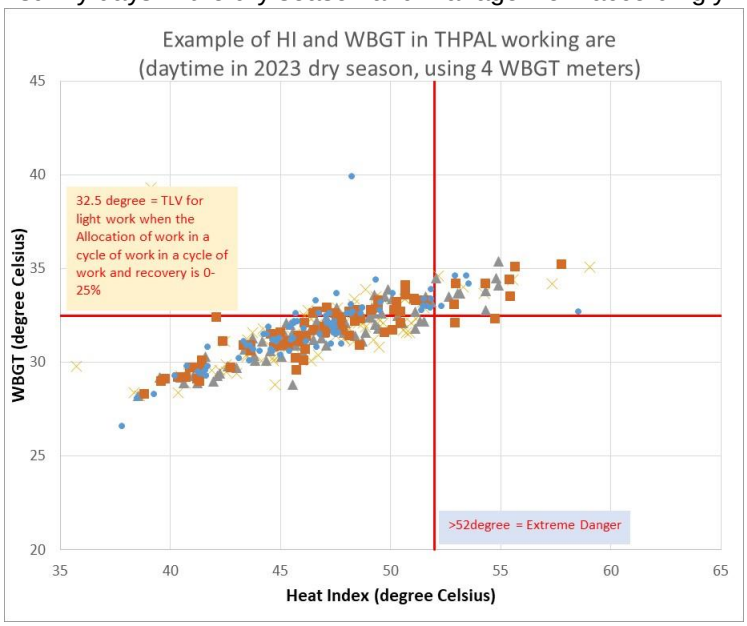


c) Example of measurement

The figure below shows the results of measuring WBGT and Heat Index (HI) in some work areas in THPAL during daytime in the dry season of 2023.

The Heat Index sometimes exceeds the Extreme Danger criteria. Furthermore, there are many WBGT scores that exceed the TLV for light work (when the Allocation of work in a cycle of work and recovery is 0-25%).

It is important to recognize that there is a high risk of heat illness during the daytime on sunny days in the dry season and manage work accordingly.



CHAPTER IV SPECIAL CAUTION IN EACH AREA

SECTION1: ORE PREPARATION AND CHROMITE AREA

1.1 In ore feeding and oversize discharge area, if any activity will be conducted, area must be barricaded to isolate it from moving equipment.

1.2 This area has moving and rotating parts and equipment from the conveyors, drum washer and vibrating screen. During operation the risk of caught in, caught on, caught between is present when loose clothing, jewelry, or body parts are not securely restrained or if workers are inattentive to their surroundings.

1.3 Loose clothing or accessories shall not be permitted in areas where such clothing can be caught in moving parts of equipment.

1.4 Do not enter inside safety cover guard during operation or without LOTO.

1.5 Do not remove any safety cover guard during operation or without LOTO.

1.6 Safety device must be properly manage secured and maintained its operability and intended purpose. LOTOTO should be implemented in accordance to its procedure.

1.7 All persons working at or near conveying equipment should be instructed in the location and operation of emergency stop devices.

1.8 Radioactive materials are present in the below Drum Washer area, and there is a risk of radiation exposure. Always coordinate with the process owner for any activities near or related to radioactive materials.

1.9 Some areas emit a considerable level of noise that can potentially cause chronic hearing loss, thus wearing hearing protection is required.

1.10 In the event that the area becomes dusty, personnel must wear respiratory protection.

SECTION2: HIGH PRESSURE ACID LEACH OPERATIONS AREA

2.1 This area contains high temperature and pressure, high concentration of sulfuric acid, acidic slurry leak or discharge and the risk of severe chemical burns, inhalation hazards, and environmental contamination in the event of a sulfuric acid leak or discharge of acidic slurry. Workers may be exposed to corrosive fumes, vapors, or liquids, leading to immediate skin and eye damage upon contact. Worker must wear appropriate personal protective equipment according to type of activity and area of activity.

2.2 High temperature and pressure conditions exacerbate the potential for rapid dispersion of hazardous materials, posing a significant risk to both personnel and the surrounding environment. Unconcerned personnel should not approach the area.

2.3 Some areas emit a considerable level of noise that can potentially cause chronic hearing loss, thus wearing hearing protection is required.

2.4 Radioactive materials are present in most of this area. Activity at radiation material must be treated properly.

SECTION3: PRE-NEUTRALIZATION AND COUNTERCURRENT DECANTATION AREA

3.1 This area contains the risk of acidic and hot slurry leaks or discharges, along with CO2 generation, posing potential hazards such as chemical burns, inhalation risks, and environmental contamination. CO2 possess risk of chocking. Effective and adequate ventilation is required.

3.2 Safety measures such as proper handling of chemicals and equipment, careful process operation, and wearing required PPEs must be implemented to mitigate these risks effectively.

3.3 Presence of complicated connection of piping, isolation must be checked carefully to prevent splashes of solution or vapors.

SECTION4: NEUTRALIZATION AREA

4.1 This area contains the risk of acidic and hot slurry leaks or discharges, posing potential hazards such as chemical burns, inhalation risks, and environmental contamination. Safety measures such as proper handling of chemicals and equipment, careful process operation, and wearing required PPEs must be implemented to mitigate these risks effectively.

4.2 Radioactive materials are present in most of this area. Activity at radiation material must be treated properly.

SECTION5: ZINC REMOVAL AREA AND SULPHURIZATION AREA

5.1 This area contains elevated slurry temperature and H2S gas which the risk of an acidic slurry and H2S gas leaking is present, posing potential hazards such as chemical burns, inhalation risks, and environmental contamination. Appropriate action is needed.

5.2 H2S gas leak is possible in the area. Gas inerting is needed to displace H2S gas in the line. In case of leakage, everyone must wear respirator. And in case of heavy leakage, response personnel must wear Self Contain Breathing Apparatus (SCBA).

5.3 In this area, H2S concentration must be monitored always.

5.4 Equipment treating H2S must be conducted leak check before H2S injection.

5.5 Hotworks in this area is prohibited (detail is in the hotworks permit section).

5.6 Inerting of H2S is required before maintenance activity.

5.7 Oxygen must be removed before the H2S gas injection.

5.8 Zinc Sulfide precipitate in dry condition easily get burn. Keep it in wet condition.

5.9 In sulfurization area, the risk of Caustic Soda (NaOH) and NaSH solutions exposure is present, in case of treating this solution, appropriate PPE's must be worn. NaSH must not mixed with acidic solution to prevent generation of H2S gas.

5.10 In the bagging area, there is a present of Chemical dust, workers needs to wear respirator.

5.11 Forklift operation is present; the operation must be controlled.

5.12 Do not enter inside safety cover guard during operation or without LOTO.

5.13 Do not remove any safety cover guard during operation or without LOTO.

5.14 Safety device must be properly manage secured and maintained its operability and intended purpose. LOTOTO should be implemented in accordance to its procedure.

5.15 Radioactive materials are present in most of this area. Activity at radiation material must be treated properly.

SECTION6: FINAL NEUTRALIZATION AREA, SLAKED LIME CHARGING, AND DRY STACKING AREA

6.1 This area contains elevated slurry temperature and the risk of an acidic and basic slurry leak and basic powder are present, posing potential hazards such as chemical burns, inhalation risks and environmental contamination. Safety measures such as proper handling of chemicals and equipment, careful process operation, and wearing required PPEs must be implemented to mitigate these risks effectively.

6.2 Radioactive materials are present in most of this area. Activity at radiation material must be treated properly.

6.3 In the vicinity of the FNTRL blower (108WO1AB) area a considerable level of noise is present that can potentially cause chronic hearing loss, thus wearing hearing protection is required.

6.4 This area has the risk of CO2 generation possesses risk of chocking. Effective and adequate ventilation is required.

6.5 The use of a forklift in transporting slaked lime bags to the rollers is a common activity in the area. Extra caution in walking or patrolling the area should be practiced. Watch out for moving forklift, maintain a safe distance, and do finger pointing and calling when crossing the street.

SECTION7: H2S PLANT

1.1 This area contains elevated slurry temperature and H2S gas which the risk of an acidic slurry and H2S gas leaking is present, posing potential hazards such as chemical burns, inhalation risks, and environmental contamination. Appropriate action is needed.

1.2 H2S gas leak is possible in the area. Gas inerting is needed to displace H2S gas in the line. In case of leakage, everyone must wear respirator. And in case of heavy leakage, response personnel must wear Self Contain Breathing Apparatus (SCBA).

1.3 In this area, H2S concentration must be monitored always.

1.4 Equipment treating H2S must be conducted leak check before H2S injection.

1.5 Hotworks in this area is prohibited (detail is in the hotworks permit section).

1.6 Inerting of H2S is required before maintenance activity.

1.7 Oxygen must be removed before the H2S gas injection.

1.8 In this area, the risk of Caustic Soda (NaOH) and NaSH solutions exposure is present, in case of treating this solution, appropriate PPE's should be worn. NaSH must not mixed with acidic solution to prevent generation of H2S gas.

1.9 High temperature and pressure conditions exacerbate the potential for rapid dispersion of hazardous materials, posing a significant risk to both personnel and the surrounding environment. Unconcerned personnel should not approach the area.

1.10 Methanol, hydrogen and H2S gas are highly combustibles materials. Sulfur dust when mixed with air can pose a fire hazard or explosion. Prevention of sparks must be avoided. Responders must wear self – contained breathing apparatus (SCBA).

1.11 Radioactive materials are present in the below Drum Washer area, and there is a risk of radiation exposure. Always coordinate with the process owner for any activities near or related to radioactive materials.

1.12 The use of a forklift in transporting the bags from the Sulfur Yard to the rollers is a common activity in the Sulfur Melting and Handling area. Extra caution in walking or patrolling the area should be practiced. Watch out for moving forklift, maintain a safe distance, and do finger pointing and calling when crossing the street.

SECTION8: LIMESTONE PROCESSING AREA

8.1 In limestone feeding area, if any activities will be conducted, area must be barricaded to isolate it from moving equipment.

8.2 This area has moving and rotating parts and equipment from the conveyors, ball mill, crusher and vibrating screen. During operation the risk of caught in, caught on, caught between is present when loose clothing, jewelry, or body parts are not securely restrained or if workers are inattentive to their surroundings.

8.3 Loose clothing or accessories shall not be permitted in areas where such clothing can be caught in moving parts of equipment.

8.4 Do not enter inside safety cover guard during operation or without LOTO.

8.5 Do not remove any safety cover guard during operation or without LOTO.

8.6 Safety device must be properly manage secured and maintained its operability and intended purpose. LOTOTO should be implemented in accordance to its procedure.

8.7 All persons working at or near conveying equipment should be instructed in the location and operation of emergency stop devices.

8.8 Some areas emit a considerable level of noise that can potentially cause chronic hearing loss, thus wearing hearing protection is required.

8.9 In the event that the area becomes dusty, personnel must wear respiratory protection.

SECTION9: FLOCCULANT AND CAUSTIC SODA AREA

9.1 This area contains flocculant dust and particles and caustic soda solution and the risk of severe chemical burns, inhalation hazards, and environmental contamination in the event of a leak or discharge of slurry. Workers may be exposed to corrosive fumes, vapors or liquids, leading to immediate skin and eye damage. Safety measures such as proper handling of chemicals and equipment, careful process operation, and wearing required PPEs must be implemented to mitigate these risks effectively.

9.2 The use of a forklift in transporting the flocculant bags from the Chemical Warehouse to the lifting area is a common activity in the area. Extra caution in walking or patrolling the area should be practiced. Watch out for moving forklift, maintain a safe distance, and do finger pointing and calling when crossing the street.

9.3 In the event that the area becomes dusty, personnel must wear respiratory protection.

SECTION10: SCANDIUM PLANT AREA

10.1 This area contains various chemicals such as organic solvents, acids and bases including Oxalic Acid, Sulfuric Acid, Caustic Soda and Soda Ash in different percentage and quantities, posing significant hazards including burns, respiratory issues, digestive problems, systemic toxicity, dermal effects, eye damage, carcinogenicity, and reproductive/developmental effects. Safety measures such as proper handling of chemicals and equipment, careful process operation, and wearing required PPEs must be implemented to mitigate these risks effectively.

10.2 Barren liquor contains H2S in this area, conduct countermeasure to prevent leakage and wear respirator accordingly during treatment of barren liquor.

10.3 Safety device must be properly manage secured and maintained its operability and intended purpose. LOTOTO should be implemented in accordance to its procedure.

10.4 In SX building treatment of organic solvent is present, and activities that will produce sparks are strictly prohibited (see Chapter 3 NAPHTHA SOLVENT)

SECTION11: POWER STATION, UTILITY AND COAL STORAGE AREA

11.1 This area presents high temperature and pressure conditions, coal dust, and chemicals such as caustic soda and sulfuric acid posing inhalation hazards and potential environmental contamination if released into the air or waterways. Safety measures such as proper handling of chemicals and equipment, careful process operation, and wearing required PPEs must be implemented to mitigate these risks effectively.

11.2 In coal handling area, if any activity will be conducted, area must be barricaded to isolate it from moving equipment.

11.3 This area has moving and rotating parts and equipment from the conveyors, drum washer and vibrating screen. During operation the risk of caught in, caught on, caught between is present when loose clothing, jewelry, or body parts are not securely restrained or if workers are inattentive to their surroundings.

11.4 Loose clothing or accessories shall not be permitted in areas where such clothing can be caught in moving parts of equipment.

11.5 Do not enter inside safety cover guard during operation or without LOTO.

11.6 Do not remove any safety cover guard during operation or without LOTO.

11.7 Safety device must be properly manage secured and maintained its operability and intended purpose. LOTOTO should be implemented in accordance to its procedure.

11.8 All persons working at or near conveying equipment should be instructed in the location and operation of emergency stop devices.

11.9 Some areas emit a considerable level of noise that can potentially cause chronic hearing loss, thus wearing hearing protection is required.

11.10 In the event that the area becomes dusty, personnel must wear respiratory protection.

11.11 In Boiler Area, high temperature and pressure conditions exacerbate the potential for rapid dispersion of hazardous materials, posing a significant risk to both personnel and the surrounding environment.

11.12 Some areas emit a considerable level of noise that can potentially cause chronic hearing loss, thus wearing hearing protection is required.

11.13 In this area the risk of Sulfuric Acid and Cautic Soda exposure is present, in case of treating this chemicals, appropriate PPE's must be worn.

11.14 Accumulation of coal dust on equipment can increase the risk of fires. Coal dust is combustible and can ignite spontaneously under certain conditions, leading to fires that are difficult to control and extinguish. Regular cleaning of the area must be taken in place.

11.15 The formation of coal hotspots is not avoidable; thus, hotspots must be dispersed immediately if observed to prevent the spread of fire.

SECTION12: LABORATORY ANALYSIS AREA

12.1 This area contains various chemicals, posing risks of eye and skin contact, inhalation, ingestion hazards. Exposure to chemicals through these routes can lead to irritation, burns, respiratory problems, poisoning, or other adverse health effects. Safety measures such as proper handling of chemicals and equipment and wearing required PPEs must be implemented to mitigate these risks effectively. Worker must be trained and educated regarding the safety treatment of the chemicals including SDS before assignment.

12.2 Safety measures such strict adherence to safety protocols, proper handling and disposal of chemicals, and awareness of potential hazards such as spills, fires, and exposure to toxic substances. Additionally, maintaining a clean and organized workspace, utilizing personal protective equipment, and promptly reporting any unsafe conditions are essential precautions to mitigate risks in a laboratory setting.

12.3 Lab coats are designed to protect the clothing and skin from chemicals that may be spilled or splashed. It should be fitted to the wearer and is best if it is knee length. They should be worn at all times in the lab areas. Due to the possible absorption and accumulation of chemicals in the material, lab coats should not be worn in the lunchroom or elsewhere outside the laboratory.

12.4 Aprons provide an alternative to the lab coat. It is usually made of plastic rubber to protect the wearer against corrosive or irritating chemicals. An apron should be worn over the lab coat when handling corrosive chemicals.

12.5 Safety shoes shall be worn at all times in the laboratory. Sandals, open-toed shoes, and shoes with woven uppers, shall not be worn because of the danger of spillage of corrosive or irritating chemicals.

SECTION13: WHARF AREA

13.1 Workers face hazards related to drowning or submersion, exposure to hazardous chemicals, and the potential for fires and explosions, especially in areas with flammable materials. Safety measures such as proper handling of chemicals and equipment and wearing required PPEs must be implemented to mitigate these risks effectively.

13.2 During docking, loading and unloading activity, communication must be established between Logistics personnel and Ship crew.

13.3 During unloading, communication among Logistics ship and process owner must be clear. And during unloading, piping must be inspected and monitored for any leaking.

13.4 The use of a forklift, wheel loaders and dump trucks during loading and unloading of materials is a common activity in the area. Extra caution in walking or patrolling the area should be practiced. Watch out for moving equipment, maintain a safe distance, and do finger pointing and calling when crossing the street.

13.5 All docking/undocking must be coordinated to logistics shipping team prior to the barge move.

13.6 When docking/undocking to Quay no.1, make sure that no barge is at Quay no.2 prior to proceed the docking/undocking activity.

13.7 ASC Master/Patron should conduct assessment to find out if there are unsafe situations of the area prior to maneuvering for docking/undocking.

13.8 ASC Master/Patron should check and maximize barges fenders as well as the tug fenders prior to proceed the docking/undocking activity.

13.9 All docking/undocking of barges in Quay 1 & 2 will depend on the weather condition as well as the sea current conditions, Tug Master/ Barge Patron is responsible to decide.

13.10 If any incident will happen during docking/undocking at Quay/Jetty area Asian Shipping Tug/Barge Masters or crew will report immediately to THPAL Logistics shipping team and or to Logistics SV / Area PIC.

13.11 ASC Tug Master / Barge Patron will provide detailed Incident report to Logistics if accident will occur during docking/undocking activity on the same day.

13.12 Best start time for docking/undocking at Quay area on day time will start at 06:00 – 07:00 hours, until 16:00 – 17:00 hours for favorable sea condition.

SECTION14: TSF AREA

14.1 Basic hot slurry is transferred to tailings dam through OSBL. The risk of environmental contamination and skin irritation are present. Wearing required PPEs must be implemented to mitigate these risks effectively.

14.2 Exposure to tailings dust or contaminated water can pose health risks to workers including respiratory issues. Workers must wear respiratory protection in case of dusty condition.

14.3 During hot weather conditions exacerbate the potential for health illness, posing a significant risk to personnel. Preparation of resting sheds and frequent hydration are needed.

14.4 Presence of heavy equipment in the area pose the risk of collision. Extra caution in walking or patrolling the area should be practiced. Watch out for moving equipment, maintain a safe distance, and do finger pointing and calling when crossing the street.

SECTION15: WORKSHOP AND WAREHOUSE AREA

15.1 The area contains various chemicals, such as solvents, lubricants, paints, and cleaning agents exposing workers to hazards such as skin irritation, respiratory issues, and potential health problems. Proper handling and ventilation protocols should be implemented.

15.2 Flammable chemicals pose fire and explosion hazards if not properly controlled, with combustible materials exacerbating the risk. Accidental spills can also lead to environmental contamination. Safety measures including proper chemical handling, careful attention during loading, unloading, and handling operations to prevent accidents, collisions, or injuries to workers. and the use of required personal protective equipment (PPE) are essential to mitigate these risks effectively.

15.3 Warehouse personnel must be educated in handling chemicals.

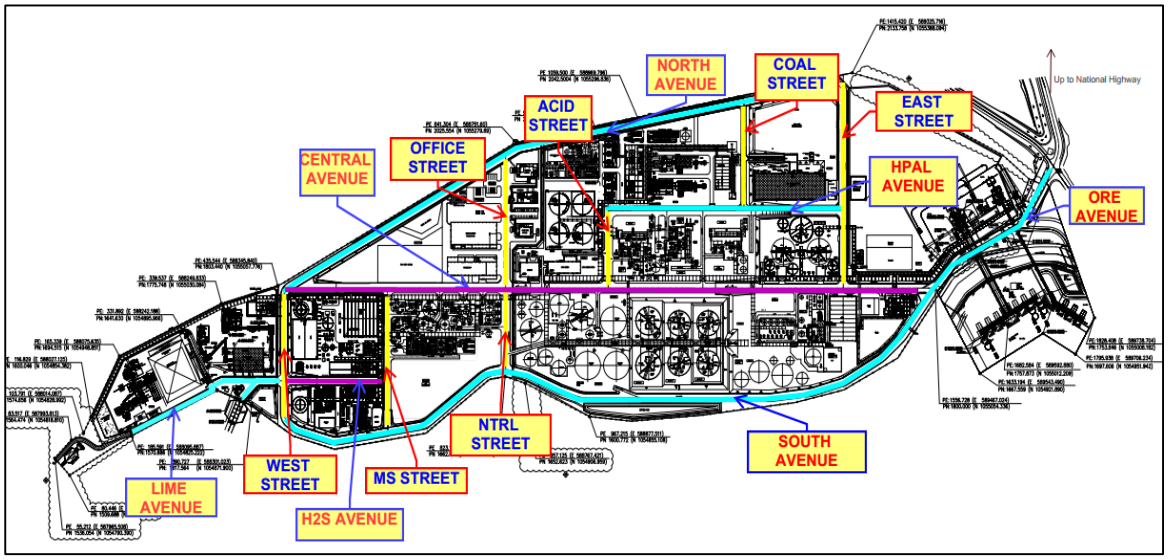
15.4 The manual for each machinery must be educated to worker and only authorized personnel can operate the machine.

CHAPTER V VEHICLE MANAGEMENT AND TRAFFIC RULES

SECTION1: ROAD MAP

All streets within the plant site complex shall be named to easily identify access roads or areas.

THPAL COMPLEX ROAD MAP



SECTION2: VEHICLE/MOBILE EQUIPMENT

2.1 GENERAL RULES

1. Only authorized and qualified personnel shall be allowed to operate any mobile equipment. Authorized personnel shall be a holder of Land Transportation Office (LTO) driver's license.

2. Drivers shall observe road courtesy at all times.

3. Company vehicles/equipment should be thoroughly checked (including walk around inspection) before being utilized by the assigned authorized driver/operator, any damages or abnormalities observed should be reported immediately to their superiors for immediate action (Equipment/service vehicles with mechanical problems should not be utilized). The driver /operator who fail to follow this instruction will be liable for the damage of the equipment.

4. Seatbelt should be worn when driving/operating equipment, in case of damage seatbelt, the concerned THPAL/Contractor's supervisor in charge will be responsible for the immediate request for repair. The drivers of service vehicles will be responsible to implement the wearing of seatbelt to their passenger. (Passenger who refused to comply should be reported immediately to the safety section). Drivers who fail to implement this rule will be given disciplinary action.

5. During backing maneuver, a spotter is required to guide the driver "No spotter No Backing" policy should be strictly implemented. If in case the driver is alone he/she should disembark and check the rear portion and surrounding for any hazard and obstruction before backing.

6. During backing maneuver the driver/operator is required to follow the horn three (3) times as a sign that the vehicle will be maneuvering backward.

7. When the vehicle/ equipment will be parked, the driver/ operator is required to observe the following rules:
   - 7.1 Parking brakes should be engage, (forklift unit should lower the fork to the ground as for wheel loaders the bucket should be lowered to the ground.
   - 7.2 Engine key should be remove and never be left unattended at any cost on unattended vehicles/ equipment.
   - 7.3 Wheel chocks or tire blocks should be place at the front driver side closely against vehicles wheel to prevent accidental movement.

8. If the operator had to talk or discuss something with other personnel while doing the activity, the engine should be switched off, hazard lights should be turned on and parking brake engage.

9. If the drive/ operator had to leave the vehicle/ equipment for a while, the engine should be turned off (key removed), hazard lights should be turned on, chocks (tire blocks) should be place on the wheel and the engine key should not be left on unattended.

10. All drivers with expires driver's license or do not have their driver's license with them are not allowed to drive/ operate any vehicle/ equipment within the company premises.

11. Operating/ driving company equipment/ vehicle which is not covered by the restriction code of operator/ driver driver's license is strictly prohibited.

12. Traffic control shall include traffic signs, barricades, and early warning devices made necessary by the prevailing circumstances.

13. In the event of a request for road closure, the Maintenance PIC/process owner will notify the Admin department of the closure due to maintenance activity. Access will be prohibited for unauthorized personnel, and the area will be barricaded for safety purposes. Admin will then cascade this information to the THPAL Transportation PIC and SCF, and will inform all THPAL workers via email at the Taganito Site. The email will include the following details:

a) What**:** Description of the activity to be performed
b) When**:** Date and duration of the activity
c) Where**:** Location of the activity and affected part of the road to be closed and barricaded.
d) Type of Closure**:** Indication if it's a half road closure or full road closure
e) Possible Re-route**:** Information on possible alternative routes for vehicles affected by the closure.

14. Early warning devices shall be put into operation before the commencement of operation and shall be removed when the need for protection has terminated.

15. Responsible flagmen, signalmen, or spotters shall be employed to direct the traffic and aid the drivers/operators in dangerous and poor visibility areas. Shall be required to wear reflectorized vest in the performance of the job whether day or night time.

16. When using the hand signal to control mobile equipment, responsible flagmen, signalmen or spotters shall position preferably on the driver's side where he will be clearly visible. Shall be required to wear reflectorized vest in the performance of the job. Whether day or night time.

17. Where traffic is diverted onto dusty surfaces, good visibility shall be maintained by the suppression of dust through the periodic application of water to the grade surface as required.

18. The Safety Department will confiscate engine keys that are left on unattended service vehicles/equipment, and the said item will be surrendered to the Department Manager concerned together with the issued safety memorandum. The company authorization to drive /operate company service vehicle /equipment's will be revoked for the third (3rd) time offenders. Supervisors (THPAL and Contractors Supervisors) is responsible for the strict implementation of this rules and regulations.

19. No drivers shall be allowed to drive when he is under the influence of liquor and drugs.

20. The driver shall stop when there is a need to use handheld radios, cellular phones, and other similar communication devices.

21. While driving company vehicles, using cell phone, handheld radio, eating and smoking is strictly prohibited in and outside plant premises.

22. When driving at night, headlights shall be dimmed when approaching another vehicle.

23. No driver shall sound the horn of a vehicle except when necessary to warn a person of danger.

2.2 **SPEED LIMIT**

1. A speed limit of 20 kph within the plant site complex and a safe driving distance shall always be observed. Safe following distance shall be one (1) truck length for 10 kph speed, two (2) truck length for 20kph and three (3) truck length for 30kph or 10 meters away for 10kph, 20 meters away for 20kph, 30 meters away for 30kph respectively.

2. THPAL SPEED LIMITS:
    1. Plant site = 20 Kph
    2. Plant site to Dormitory / Wharf = 30 Kph
    3. Wharf to Parang Gigaquit = 40 – 50 Kph
    4. Wharf to Punta Naga = 40 – 50 Kph
    5. Parang Gigaquit to Surigao / Butuan = 60 – 80 Kph

2.3 **OVERLOADING**

1. The driver shall be thoroughly acquainted with the vehicle's maximum safety capacity in order to avoid overloading.

2. Overloading of the required vehicle's capacity of passenger (all service vehicles and equipment/s) should be strictly observed.

3. Hauling trucks shall NOT be used to push or pull other vehicles.

4. Empty trucks shall yield the right of way to loaded units. Likewise light VEHICLES SHALL ALSO yield to heavy equipment.

2.4 Authorization, Testing, Inspection and Certification

1. INTRODUCTION:

   Mobile Crane, Overhead Crane, Forklift, Boom Truck, Backhoe, Wheel Loader, Manlift, Prime mover and Trailer Truck, Dump Truck, Vacuum Truck, Jet Truck, Fire Truck, ELF Truck, Armroll Truck, Dump Truck and Buses are heavy equipment considered as critical occupation so the operation shall be handled and operated by a competent trained and authorized personnel only from the concerned section/department and a designated competent trained and authorized personnel from contractors to do the task.

   All concerned section/department and contractors must ensure that all heavy equipment in their jurisdiction, possession, and responsibility are duly tested, inspected and certified annually as per OSH Standard. Accordingly, all heavy equipment operators assigned at the project site must be tested and certified in accordance with a standard trade test prescribed by Technical Education and Skills Development Authority (TESDA) in coordination with its accredited organization/s.

2. SCOPE:

   This guidelines covers all heavy equipment in the preceding paragraph used and operated within THPAL Plant and its allied facilities including the Overhead Crane, Chain hoist inside the Plant which falls within the specification of heavy equipment (minimum weight rating of 1,000.0 kgs and 10HP horsepower rating, respectively).

3. DEFINITION OF TERM:

   a) Mobile Crane- is a cable-controlled crane mounted on crawlers or rubber-tired carriers or a hydraulic-powered crane with a telescoping boom mounted on truck-type carriers or a self-propelled models.
   b) Overhead Crane- is a machine or piece of equipment that allows you to lift and move heavy materials from one location to another in a precise manner. It is also known as a bridge crane.
   c) Authorized Operator- is a person that complies and submitted all the requirements, undergone the Safety Orientation for Operators ,Defensive Driving Course and passed the Written and Actual Examination given by Safety and has been issued an Authorization ID "authorized to operate" for the specific type of heavy equipment.
   d) **From D.O. 13 Section 1. l)Heavy Equipment** - refers to any machine with engine or electric motor as prime mover used for lifting, excavating, levelling, drilling, compacting, transporting and breaking works in the construction site, such as but not limited to crane, bulldozer, backhoe, grader and road compactor, prime mover and trailer, with minimum operating weight and horsepower rating of 1,000.0 kgs and 10HP, respectively.

4. REQUIREMENTS:

   a) Valid LTO Driver's License – mandatory for all heavy equipment drivers/operators (no need for Overhead Crane operator, mandatory for Mobile Crane operator.)

b) TESDA NCII 0r NCIII Certificate- mandatory for heavy equipment operators and drivers.
c) Endorsement from Section/Department request for Crane Safety Orientation, Testing/evaluation (written & actual Exam for Overhead Crane authorization by THPAL Safety.
d) Endorsement from Section/Department and contractor request for Safety Orientation, Defensive Driving Course, testing/evaluation (written and actual examination) by THPAL Safety.

REQUIRED LICENSE AND TRAININGS

Heavy Equipment	ORIENTATION BY SAFETY	Authorization ID by THPAL	NC II	NCIII	DRIVER'S LICENSE from LTO
1. Overhead Crane	Overhead Hoist Crane Oprtn. and Inspection	√	No need	No need	No need
2. Mobile Crane	DDC, Crane & Rigging Training	√	√	Need for rough terrain Crawler type	√
3. Manual Chain Hoist	Ovehead Hoist Crane Oprtn. And Inspection	√	No need	No need	No need
4. Electric Chain Hoist	Overhead Hoist Crane Oprtn. And Inspection	√	No need	No need	No need
5. Forklift	DDC & actual testing	√	√	No need	√
6. Prime mover & Trailer	DDC & actual testing	√	supersede	√	√
7. Truck Dropped side body	DDC & actual testing	√	√	No need	√
8. Boom truck Dropped side body	Boom Truck Safety	√	√	No need	√
9. Manlift Truck	DDC & Actual testing	√	√	No need	√
10. Fire Truck	DDC, Fire Truck Operation	√	√	No need	√
11. Water Truck	DDC & actual testing	√	√	No need	√
12. Fuel Truck	DDC & actual testing	√	√	No need	√
13. Vacuum Truck	DDC & actual testing	√	√	No need	√
14. Jet Truck	DDC & actual testing	√	√	No need	√
15. Worker's Bus	DDC & actual testing	√	supersede	√	√
16. Mechanical Sweeper	DDC & actual testing	√	√	No need	√
17. Mini- dump truck	DDC & actual testing	√	√	No need	√
18. Armroll Truck	DDC & actual testing	√	√	No need	√
19. Backhoe	DDC & actual testing	√	√	No need	√

5. REQUIRED LICENSES AND TRAININGS:

a) The concerned section/department and contractor shall submit specific endorsement request for mobile crane, overhead crane, Forklift, Boom truck, Backhoe, Wheel Loader, Manlift, Prime mover and Trailer Truck, Dump Truck, Vacuum Truck, Jet Truck, Fire Truck, ELF Truck, Armroll Dump Truck, and Buses Safety Orientation for operators and Defensive Driving Course with the required document stated in item IV to Safety Office.
b) After receiving the request and documents Safety will schedule Heavy Equipment Safety Orientation, Defensive Driving Course to the requester.

c) The requester shall take the written and actual test examination at the end of the Orientation and when he passed the exam he/she will be authorized and issued with authorization ID.
d) The authorization ID must be carried always by the operator during operation of the heavy equipment unit.
e) The authorization ID is valid for one year and before renewal the operator shall undergo refresher Orientation, Defensive Driving Course.
f) Authorization will be revoked and confiscated once the proponent meet an accident.
g) He/ She may apply for re-issuance after countermeasures of the accident are addressed accordingly and depending on the section/department who will endorse for reconsideration to Safety.

6. INSPECTION AND CERTIFICATION:

Refer to Rule 10.2.3 Routine Inspection inclusive in this memo.

1) Regardless of the type of equipment, inspection shall be carried regularly:
   a) Daily Inspection – by designated authorized competent Driver/ Operator of concerned section/department and contractors using Heavy Equipment Operators Checklist to be prepared by the concerned section/department and contractors (Internal by section/department and contractor respectively).
   b) Monthly Inspection :
      i. Overhead crane the responsibility for maintenance and inspection is by designated maintenance person in-charge (PIC), the process owner is incharge for the implementation and coordination of specific schedule of inspection and witness by Safety.
      ii. Chain hoist same with overhead crane inspection.
      iii. Other specific heavy equipment by concerned section/department designated competent operator or mechanic (Inspection items will be based on checklist prepared by section/department and contractors). Records of inspection must be recorded in logbook as required by the OSH Standard for reference in the conduct of annual inspection.
   c) Every six (6) months Inspection: Hoists, chain, rope and lifting gears by designated competent person of section/department and Contractor. Inspection items will depend on checklist prepared by section/department and contractor. The result of such tests and examination shall be recorded in the logbook maintained for the purpose.
   d) Annual Testing, Inspection and Certification – performed by DOLE accredited professionals in accordance to standards set by DOLE recognized equipment suppliers (Third Party).
   e) The maintenance department shall coordinate to DOLE and/or accredited professionals (Third Party) to conduct the testing, inspection and certification according to the preferred schedule and arrangement. Production, Logistics, Admin and MEPEO to synchronize the schedule as per arrangement and submit the list of heavy equipment for testing, inspection and certification to maintenance.
   f) The maintenance department is incharge for the annual testing, inspection and certification for Overhead crane and shall arrange schedule off the purpose same for heavy equipment in their responsibility.

Further, refer to the statutory rules from OSH Standards and Department Order 198-18 “Implementing Rules and regulations Of RA 11058 Entitled “An Act Strengthening Compliance with the Occupational Safety and Health Standards and Providing Penalties for Violations Thereof”’.

INSPECTION AND CERTIFICATION

HEAVY EQUIPMENT	Daily Inspection by User (before Use)	Monthly Inspection by Owner	Every 6 Months Inspection by Owner	Annual Inspection by DOLE/TESDA or its Accredited Provider
1. Overhead Crane	√	√	√	√-(maintenance)

2. Mobile Crane	√	√	√	√-(Maint., Logistic)
3. Manual Chain Hoist	√	√	√	No need
4. Electric Chain Hoist	√	√	√	√-(Maintenance)
5. Forklift	√	√	√	√-(Logistic, Maint.,Production)
6. Prime mover & Trailer	√	√	√	√-(Logistic)
7. Truck Dropped side body	√	√	√	√-(Maint.,Admin)
8. Boom truck Dropped side body	√	√	√	√-(Maint.,MEPEO,ADMIN)
9. Manlift Truck	√	√	√	√-(Maintenance)
10. Fire Truck	√	√	√	√-(Safety)
11. Water Truck	√	√	√	√-(MEPEO, Safety, Maint.,Admin)
12. Fuel Truck	√	√	√	√-(MEPEO)
13. Vacuum Truck	√	√	√	√-(Production)
14. Jet Truck	√	√	√	√-(Production)
15. Worker's Bus	√	√	√	√-(Admin)
16. Mechanical Sweeper	√	√	√	√-(MEPEO)
17. Mini- Dump truck	√	√	√	√-(MEPEO)
18. Armroll Truck	√	√	√	√-(MEPEO)
19. Backhoe	√	√	√	√-(MEPEO)

2.5 Riding on Vehicle

4.2.1.1 All THPAL-direct and contractors employees are prohibited to ride outside of THPAL-owned vehicles at the space intendedfor cargo/freight including contractors vehicles. This includes back of pick-up trucks, boom trucks, elf, trailers, dump trucks, and similar vehicles. For avoidance of doubt, converted/ modified vehicles of contractors may be used in transporting WORKERS TO AND FROM The plant site but shall NOT be used for work activities AND/OR during working hours. The attached photo below demonstrates an unsafe practice. A worker could potentially be injured as a result of this situation.

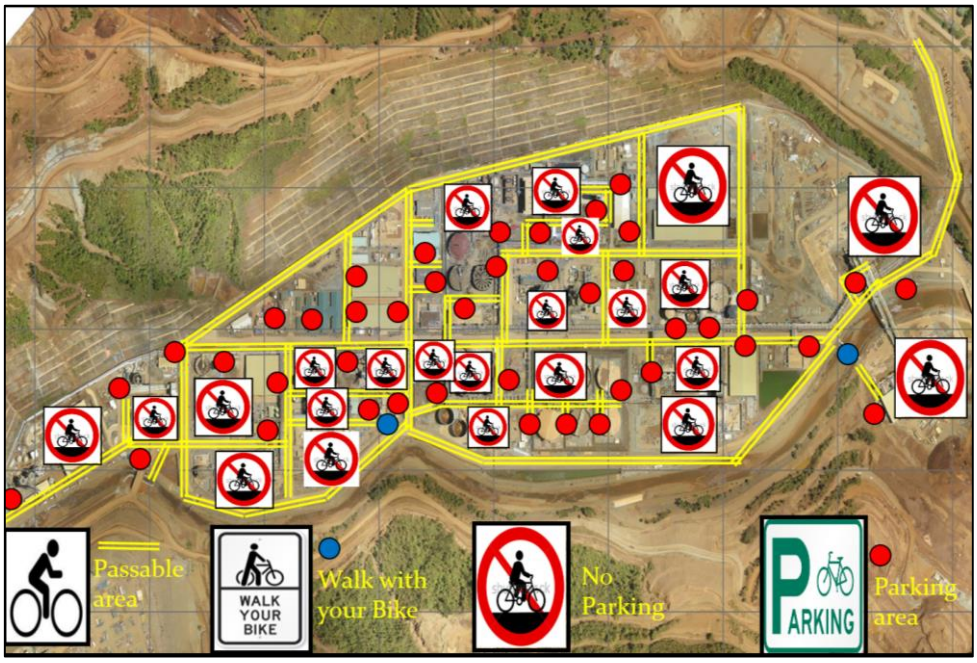
4.2.1.2 No driver of a bus shall pick-up or discharge passenger on a street except at a bus stop designated by THPAL management.

4.2.1.3 No person shall be allowed to get on or off a moving vehicle

SECTION3: TRAFFIC RULES FOR BICYCLE

1. Only authorized bicycle riders are allowed to use the company issued bicycles.
2. To become a Company authorized bicycle user, a recommending approval from the General Supervisor is essential for the final approval of the Department Manager. Upon final approval, the requester shall inform Safety office for the scheduling of the Orientation, after Safety approval of the schedule, the employee may proceed to Safety Section Office for the bicycle general safety orientation.
3. All authorized Company bicycle users are required to undergo the bicycle general safety orientation to be conducted by the Safety Section.
4. Authorized Company bicycle users can only use the bicycles inside plant site and wharf premises. Utilization of bicycles to and pro tailings dam and other areas are strictly prohibited.
5. The Company reserves the right to revoke the authorization given to any authorized Company bicycle users for any violation of these guidelines.
6. All authorized Company bicycle users shall maintain not more than the regulated 10 kph speed limit. (Although bicycles have no speedometer, reference will be vehicles and heavy equipment).
7. All authorized Company bicycle users shall strictly follow the designated bicycle Passable Areas and Passable Areas by Pushing. Violators shall be dealt with accordingly. Please be guided with the attached map of Passable Areas and Passable Areas by Pushing.
8. All concerned authorized Company bicycle users must pass through designated routes and crossings in the Plant Site premises. Authorized Company bicycle users must not cross the road diagonally and shall drive along the edge of the road.
9. All authorized Company bicycle users with worn out / without reflectorized cloth attached in their uniforms are required to wear reflectorized vest while using the bicycles.
10. All authorized Company bicycle users should never drive against traffic flow.
11. All authorized Company bicycle users should not ride too close to parked or stationary vehicles. (Doors may open suddenly)
12. All authorized Company bicycle users must maintain a distance of at least two (2) meters between the rear and three (3) feet distance on the side of any motor vehicles.
13. All authorized Company bicycle users should always ride with both hands on the handlebars, if a biker needs to use their radio, cellphone, and other related gadgets, the biker should stop, park on the safe side of the road, and check for traffic in both directions before using their radio, cellphone, and other related gadgets.
14. All authorized Company bicycle users passing other bikers or people on the road shall always pass to their left side.
15. All authorized Company bicycle users should observe the proper road signals.
16. All authorized Company bicycle users must secure any loads to their bicycle in a way that does not cause the bicycle to be unstable.
17. All authorized Company bicycle users must always observe that their load does not stick out from the bicycle in a way that is likely to injure a person, obstruct the path of other drivers or pedestrians, or damage a vehicle or anything else.
18. All authorized Company bicycle users shall avoid hanging things off the Handlebars.
19. Each bicycle shall be labeled (Department assignment and control number) for proper identification.
20. All authorized Company bicycle users shall be recommended by the General Supervisor and duly approved by the Department Manager.
21. All authorized Company bicycle users are not allowed to pick-up passenger/hitchhikers.
22. All bicycles shall be parked at the specified parking location. Please see attached map for the designated bicycle parking areas.
23. All bicycles shall be kept in good condition by its assigned user

24. Hand Signals helps cars and trucks know what you will do next, so they don't run into you. Please see attached Hand Signal for Bicycle users to use.



SECTION4: TRAFFIC RULE FOR WALKING

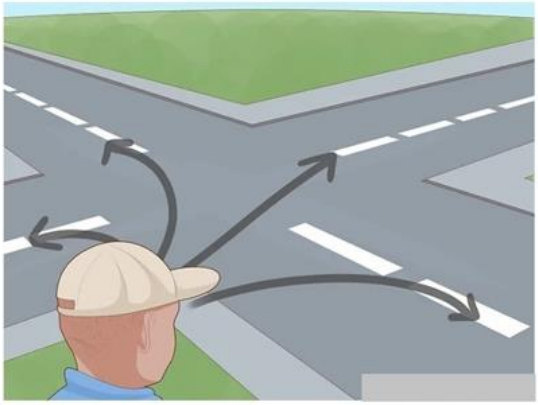
1. Always keep left while walking along the road.

2. Confirm both sides of approaching vehicles before crossing the road.

3. Always use a crosswalk when crossing. A 'crosswalk' is an important one, as this is the only location where a pedestrian may have the right of way. If you strike out into the middle of the road and you are not at a crosswalk (with or without traffic control signals) then vehicles cannot be expected to stop for you. If no pedestrian lane must do finger pointing and calling.

4. The pedestrian also has responsibility to look after his own safety. For example, you should not step out into the road unless you have assessed that it is safe to do so. If you cross the road in front of a vehicle that could not reasonably be expected to stop in time, then you may be partly at fault for any injuries you sustain.

5. Similarly, if you do not look around for oncoming traffic before (or while) crossing the road and you are involved in an accident, there could be a case of 'contributory negligence'. This is particularly true if the accident happened while it was dark and/or weather conditions were adverse.



6. Visibly signal your intention. Make eye contact, wave or nod at the driver so you know they see you and wait for them to wave or nod back as acknowledgement. While drivers are supposed to stop for you, they may not see you. Keep in mind that drivers may be distracted or could have poor visibility. Some drivers may refuse to yield the right-of-way and this is a safety violation in our company but it's more important for you to be safe than right. Don't try to cross the street if someone is driving dangerously but take note and report to the concerned office.

7. Apply the Finger Pointing and Calling. Check left, right, then left again then confirm before crossing the street. Look around as you cross the street so you can spot oncoming cars. Don't stop watching for oncoming cars after you check left and right, as vehicles can come upon you quickly. Monitor your surroundings as you cross so you can stop and get out of the way if a vehicle approaches. For instance, check to your right again when you reach the center of the road, just in case a car is coming.

8. No person shall enter or cross a roadway at any point where signs, fences, barriers, or other devices erected to prohibit such crossing or entry.

CHAPTER VI HEALTH MANAGEMENT

SECTION1: THPAL HEALTH EXAMINATION POLICY

(Refer Document: EMS-THPAL-GD-3401 THPAL Health Examination Policy)

1. OBJECTIVES

THPAL, as ISO 14001:2015 certified and compliant agency, acknowledges the company's obligation and responsibilities to ensure the protection for our workers and employees against injuries, illnesses and death through safe and healthy working conditions and environment. It recognizes labor as a primary social and economic force, and that a safe and healthy workforce is an integral aspect of nation building.

In accordance with Rule 1966.02 under the Occupational Health Services of the DOLE Occupational Safety and Health Standard (as amended), Taganito HPAL Nickel Corporation (THPAL) hereby creates and promulgates this THPAL Health Examinations Policy.

1.1. THPAL aims to:

1.1.1. Protect the safety and health of all THPAL employees by preventing work-related injuries, ill health, diseases and incidents;

1.1.2. Promote medical surveillance for early detection and management of occupational and work related diseases;

1.1.3. Assess the employees' physical, emotional and psychological assets as well as their liabilities in order to facilitate their proper placement and ensure the suitability of individuals according to their physical capacities, mental abilities and emotional make up in work which they can perform with an acceptable degree of efficiency without endangering their own health and safety and that of their co-employees.

1.1.4. Encourage personal health maintenance and physical fitness and proper nutrition practices.

1.1.5. Comply with relevant OSH national laws and regulations regarding the right to heath of all employees to which the company subscribes.

1.2. Programs shall include the following:

1.2.1. Requiring all employees to undergo a baseline or initial medical health examination prior to assigning to a potentially hazardous activity or at such intervals as may be necessary.

1.2.2. Providing support to workers who are have health risks and facilitate access to medical services;

1.2.3. Promoting workers' well-being towards healthy and productive lives.

2. Procedures

2.1. All employees shall undergo Physical Examination (PE):

2.1.1. Before entering employment for the first time.

2.1.2. Annually or periodically, or at such intervals as may be necessary on account of conditions or risks involved in the work;

2.1.3. When transferred or separated from employment; and

2.1.4. After being sick for a minimum of three (3) days or always absent due to sickness.

2.2. All physical examinations shall be performed at THPAL Clinic, except when referred to other health facilities for further work-up.

2.2.1. Pre-Employment PE, Regularization PE, Annual PE

2.2.1.1. Shall include the following laboratory tests:

2.2.1.1.1. Complete Blood Count with Platelet Count (CBC w/ PC)
2.2.1.1.2. Urinalysis
2.2.1.1.3. Fecalysis/Stool Examination
2.2.1.1.4. Chest X-ray
2.2.1.1.5. Hepatitis B Serum Antigen (HBsAg)
2.2.1.1.6. Fasting Blood Sugar
2.2.1.1.7. Blood Uric Acid
2.2.1.1.8. Liver Function Test (SGPT and SGOT)
2.2.1.1.9. Lipid profile

2.2.1.2. Physical Examination including:
2.2.1.2.1. Visual Acuity: Snellen's Chart/Tumbling E Chart
2.2.1.2.2. Ishihara Color Vision Test
2.2.1.2.3. Hearing Test: Audiometry

2.2.2. Transfer to Another Department/Section Examination (TPE)

2.2.3. Other Special Examinations (SPE)

2.2.4. Return to Work Examinations (After Sick Leave)

2.2.5. Separation from Employment Examination/*Exit PE

2.3. Based on the results of the physical examination the worker need to follow the recommendation of the physician if there are significant findings. Some will undergo medical treatment for a period of days or months then will have to repeat medical examination after completing the medication and getting back to normal physical condition.

2.4. The direct superior of the concerned employee with significant findings will advise the employee to proceed to clinic if need further evaluation or repeat examination. Those employees whose results needs to limit the exposure to risk affecting the physical condition will be considered to assign in the area or work of less exposure.

SECTION2: HEARING LOSS PREVENTION PROGRAM

(Reference Document: EMS-THPAL-GD-3404 Hearing Loss Prevention Policy & Program)

1. PURPOSE

   The implementation and interpretation of this Policy shall be guided by the following purposes:

   1.1. To protect employees from the effects of exposure to excessive noise at THPAL plant site and comply with the OSH Standards of prevention against Safety and Health hazards.

   1.2. To better respond to the potential hearing hazards and hearing loss risk of the employees through the implementation of the THPAL Hearing Loss Prevention Policy;

   1.3. To prevent and control noise-induced impairments to the employees by exposure assessment, provision of protective equipment, assessment of hearing with appropriate management and follow-up actions, worker education and training, and continuous evaluation of program effectiveness.

2. To guide the Central Safety and Health Committee in the implementation of this Policy.

   2.1. The Company shall ensure that the noise emitted at the workplace is reduced as practicable as possible.

   2.2. In cases where the noise received by the employees in the workplace is above the prescribed standard, the company shall ensure that;

   2.2.1. Appropriate engineering noise control is introduced to reduce the noise level or peak noise level or;

   2.2.1.1. If such is not practicable, limit the exposure of employees receiving the noise according to its standard.

3. ENGINEERING AND ADMINISTRATIVE CONTROL WORK PRACTICES

   3.1. To extent feasible, engineering controls, administrative controls, and work practices shall be used to ensure that workers are not exposed to noise at or above 90 dBA as an 8-hour TWA.

   3.2. The use of administrative controls shall not result in exposing more workers to noise

   3.2.1. Hearing Protectors

   3.2.1.1. Employees exposed to excessive noise level shall be required to wear suitable device when engage in work that exposes them to noise that equals or exceeds 90 dBA as an 8-hour TWA.

   3.2.1.2. The company shall be utilizing the following hearing protector.

   3.2.1.2.1. Earplugs

   3.2.1.2.1.1. Noise Cancelling Foam, EC-1005A-C PU Earplug

   3.2.1.2.2. Ear Muffs

   3.2.1.2.2.1. Honeywell CLARITY C3H Helmet Earmuffs or

   3.2.1.2.2.2. Honeywell Howard Leight, Verishield VS110 DH Dielectric Helmet Earmuff

   3.2.1.3. Hearing protectors shall attenuate noise insufficiently to keep the employee's "real-world" exposure (i.e., the noise exposure at the employee's ear when hearing protectors are worn) below 90 dBA as an 8-hour TWA

   3.2.1.4. Employeed whose 8-hour TWA exposure exceed 100 dBA shall wear double hearing protection (i.e., they shall wear earplugs and earmuffs simultaneously).

   3.3. THPAL employees are issued with ear plugs from safety to wear in areas identified with high noise level to lower the effect of their exposure below the allowable threshold limit value. Monthly noise monitoring is conducted by assigned safety officer and the areas identified with high noise level are posted with the noise level information signage for awareness of the personnel working in the area. Respective departments are responsible to remind and implement to their subordinates to wear ear plug or earmuff in high noise level location or activities.

SECTION3: COVID-19 PREVENTION

(Reference Document: Admin Memorandum Order No. 2024-09 Updated THPAL COVID19 Policy Under Post New Normalism)

While the COVID-19 pandemic was declared an ongoing health issue that no longer constitutes a public health emergency of international concern since July 2023, it remains a serious concern for certain subpopulations (high-risked individuals) up to the present.

In view thereof and of the Claver Municipal Health Office's Health and Safety Advisory dated February 6, 2024, the THPAL Management shall implement the following minimum safety and health protocols effective immediately.

1. Regular Testing
   - 1.1. Non-vaccinated THPAL employees are required to take one (1) RT-PCR test per month chargeable to the Company. Comply with the standing Executive Orders (EO) and/or Health and Safety Advisories of the Province of Surigao del Norte (SDN) and the Municipality of Claver.
   - 1.2. Unvaccinated employees shall inform the HR about the schedule of the RT-PCR test per month.

2. Procedures for Returning Employees
   - 2.1. Comply with the standing EOS and/or Health and Safety Advisories of SDN and Claver. (See the attached Health Advisory of Claver for reference).
   - 2.2. Unvaccinated employees must consistently wear face mask upon entry to THPAL and when boarding THPAL vehicles

3. Procedures for arriving vendors, suppliers, guests, shutdowners, trainees, employees, new among others who will stay or conduct business inside THPAL.
   - 3.1. Only those personnel who have completed a primary vaccine series (2-dose or a single dose COVID-19 vaccine) are allowed to enter in THPAL;
   - 3.2. Concerned department shall endorse the arrival of guests/vendors/applicants to Administration Department and Health Section in advance;
   - 3.3. Proceed to the THPAL Clinic for health assessment; and
   - 3.4. Present the original copy of the issued vaccination card or a downloaded copy of the Digital Vaccine Certificate (DVC) from *https://vaxcert.doh.gov.ph/#/*
   - 3.5. In compliance with the Health Advisory of Claver, personnel without the COVID-19 booster vaccine are required to wear the N95 mask within Claver at all times.

4. Movement restrictions for nonvaccinated individuals
   - 4.1. They shall follow the existing EO and/or Health and Safety Advisories of Surigao del Norte and/or Claver for their movements and restrictions.
   - 4.2. Unvaccinated employees will be:
     - 4.2.1. Returned to their original accommodation assignment;
     - 4.2.2. Allowed to go out of THPAL premises; and
     - 4.2.3. Allowed to entertain visitors at housing or dorm following the existing company procedures.

5. Wearing of Face Masks
   - 5.1. Vaccinated employees optional
   - 5.2. Employees w/ comorbidity and symptomatic highly recommended
   - 5.3. Unvaccinated employees are Mandatory

6. Unvaccinated employees are prohibited from mingling with colleagues under these items.

6.1. KTV Utilization (Clubhouse)
6.2. Gym Utilization (SD1)
6.3. Contact Sports

Note: Back to normal operations for fully-vaccinated employees.

7. Submission of Health Declaration Form (HDF)
   7.1. Each employee shall be required to continue submitting the HDF during their drop-off at the THPAL canteen area

   Note: Any employee who will be found in violation of being dishonest in filling-out the HDF shall be dealt with accordingly.

8. Employees with COVID19-like symptoms
   8.1. Unvaccinated employees manifesting COVID-19-like symptoms verified after the assessment of the company physician shall undergo RT-PCR test.
      8.1.1. The RTPCR test for unvaccinated employee in case recommended by the Physician shall be charged to the employee.
   8.2. Employees who have COVID-19 like symptoms are strongly advised not to report for work.
      8.2.1. If an employee has been recommended for isolation, the meals during the isolation period will be charged to the employee.
   8.3. If an employee reported to work and displayed COVID-19 like symptoms, he/she shall be advised to go home and take rest.
      8.3.1. Absence at work due to COVID19 like symptoms is chargeable to Sick Leave (SL).
   8.4. The employee may be tested with RT-PCR upon the recommendation of the company physician (chargeable to Company if fully-vaccinated and 100% chargeable to employee if non-vaccinated).
      8.4.1. If the employee has no more SL credit, the absence may be charged to VL or HTL as long as the conditions stipulated in the Admin Memorandum Order No. 2022-41 Authorized SL Conversion are met.
   8.5. If positive, the employee shall follow the updated DOH isolation protocols. Accordingly, close contacts shall follow the updated DOH quarantine protocols. existing isolation protocols.
      8.5.1. The company will follow the DOH Clinical procedure of allowing an employee to report for work only after 24 hours of being asymptomatic.

9. Disinfection activities in THPAL premises (offices, dorm, housing, others)
   9.1. Hand Fogging Machine Disinfection shall be conducted weekly while the UV Light Disinfection shall be conducted once a month.

10. Handwashing and hand sanitizing/disinfecting
    10.1. All employees are strongly reminded to practice the minimum public health standards.

11. Business Trips
    11.1. Follow the EO and/or Health and Safety Advisories of SDN and Claver, if any.

These policies are subject to change at any time depending on the condition/situation attributable to the release of new government issuances and upon the discretion of the management. Any violation of the rules and policies stipulated herein shall be dealt with maximum penalty

SECTION4: DRUG-FREE WORKPLACE PROGRAM

(Reference Document: EMS-THPAL-GD-3403 Drug-Free Workplace Policy & Program)

1. Company Policy on Drug-Free Workplace
   THPAL explicitly prohibits:

   1.1. The use, possession, solicitation for, or sale of dangerous drugs on company premises or while performing an assignment.
   1.2. Being impaired or under the influence of dangerous drugs away from the company, if such impairment or influence adversely affects the employee's work performance, the safety of the employee or of others, or puts at risk the company's reputation.
   1.3. Possession, use, solicitation for, or sale of dangerous drugs away from the company premises, if such activity or involvement adversely affects the employee's work performance, the safety of the employee or of others, or puts at risk the company's reputation.
   1.4. The presence of any detectable amount of dangerous drugs in the employee's system while at work, while on the premises of the company, or while on company business. "Dangerous Drugs" include those listed in the Schedules annexed to the 1961 Single Convention on Narcotic Drugs, as amended by the 1972 Protocol, and in the Schedules annexed to the 1971 Single Convention on Psychotropic Substances as enumerated in the attached annex of R.A. 9165.

2. Drug Testing Program for Employees
   2.1. MANDATORY DRUG TEST
      2.1.1. To ensure that only those qualified shall be screened and recruited to prevent the detrimental effects (e.g. lower productivity; poor decision making; increased accidents; more compensation claims; and reduced team effort) which drug use and abuse may cause in the workplace, the conduct of mandatory drug test shall be required for pre-employment.

3. OFFENSES AND PENALTIES
   3.1. Employee who uses, possesses, distributes, sells or attempts to sell, tolerates, or transfers dangerous drugs or otherwise commits other unlawful acts as defined under Article II of RA 9165 and its Implementing Rules and Regulations shall be subjected to the pertinent provisions of the said Act.
   3.2. All employees must submit himself/herself and undergo the drug test. Failure or refusal to do so shall be dealt with by the Company in accordance with the Company Rules and Regulations.
   3.3. Any officer or employee found positive for use of dangerous drugs shall be dealt with administratively in accordance with the provisions of Article 282 of Book VI of the Labor Code and under RA 9165 and the Company Rules and Regulation.
   3.4. Additionally, the enumerated prohibited acts below and its corresponding penalties shall be strictly implemented and shall not be refreshable.

4. Random Drug Test
   The company will conduct random drug test to ensure a drug free workplace in THPAL.

SECTION5: MENTAL HEALTH POLICY AND PROGRAM

(Reference Document: EMS-THPAL-GD-3117 THPAL Mental Health Policy and Program)

THPAL recognizes mental health as a very important role in a person's overall well-being, and is equally important to physical health. An employee suffering from mental illness is likely to be less happy, less collaborative professionally, and less productive in the workplace. Mental health problems may also lead to regular absenteeism, accidents in the workplace and potential increase in violence or harassment in the workplace.

In accordance to the provisions of the Department of Labor and Employment issued Department Order No. 208 Series of 2020 (Guidelines in the Implementation of Mental Health Workplace Policies and Programs), Department Order No. 19 Series of 2023 (Supplemental Guidelines on the Implementation of The Mental Health Policy and Program in the Workplace) as well as to Article 5 of the Labor Code of the Philippines, Republic Act No. 11036 (The Mental Health Act), in relation to Republic Act No. 11058 (An Act Strengthening Compliance with Occupational Safety and Health Standards and Providing Penalties for Violations Thereof) and Republic Act No. 11223 (Universal Health Care Act) along with their implementing rules and regulations, this policy was created and shall serve as the Company's Mental Health Workplace Policies and Program.

1. OBJECTIVES

   THPAL aims to:

   - ✓ Regard mental health as a serious subject of concern;
   - ✓ Be at the forefront in identifying and resolving underlying causes;
   - ✓ Show genuine empathy and support to employees who face mental health problems;
   - ✓ Work in collaboration with senior managers and labor organization leaders to create a pleasant work atmosphere that promotes mental health and job satisfaction.

   Programs shall include the following:

   - ✓ Raise awareness, prevent stigma and discrimination, provide support to workers who are at risk and/or with mental health condition and facilitate access to medical services;
   - ✓ Promote workers' well-being towards healthy and productive lives.

2. Mental health management

   Workers should exercise openness and practice good harmonious relation to co-workers and superior. Overcome any problem or stresses respective to each individual that will result to mental health by personal attributes. Maintain good condition and have enough rest, sleep at least 6-8hrs and eat foods rich of vitamins and minerals. The company shall consider relaxation and stress relieving activities like sports, Zumba dancing, singing and swimming schedules during off hours or off duty. If there are individual suspected of mental health problem shall consider for counselling by specialist doctor or psychologist.

SECTION6: BREASTFEEDING POLICY

(Reference Document: EMS-THPAL-GD-3116 Breastfeeding Policy)

1. PURPOSE, SCOPE AND USERS

This Policy is established in accordance to Republic Act No. 10028, otherwise known as the Expanded Breastfeeding Act of 2009, in support to the government's promotion of breastfeeding and provision of facilities for breastfeeding.

The implementation and interpretation of this Policy shall be guided by the following purposes:

1.1. To encourage, protect and support the practice of breastfeeding, and
1.2. To protect working women by providing safe and healthful working conditions, taking into account their maternal functions, and such facilities and opportunities that will enhance their welfare and enable them to realize their full potential

Users of this policy are all THPAL nursing/lactating employees and the Administration - GA/HR *and OSH-Health Section.

2. OVERVIEW

Taganito HPAL Nickel Corporation recognizes the importance of breastfeeding for both mother and baby and hereby supports and promotes breastfeeding as provided in REPUBLIC ACT NO. 10028 OR THE EXPANDED BREASTFEEDING PROMOTION ACT OF 2009. Taganito HPAL Nickel Corporation also provides facilities and the support necessary to enable mothers in their employment to balance breastfeeding/ breastmilk expression with their work**.**

With this, Taganito HPAL Nickel Corporation adopts the following policies and programs:

2.1. Allows nursing / lactating employees NO LESS THAN FORTY (40) MINUTES PAID LACTATION BREAK FOR EVERY 8 HOUR WORK PERIOD divided into two to three (23) milk expressions (exclusive of meal breaks);
2.2. Provides a lactation station for nursing lactating employees in accordance with guidelines set by Department of Labor and Employment (DOLE);
2.3. Orient / reorient all employees on breastfeeding and RA 10028 (at least on a yearly basis) as part of the company's Human Resources Development activities;
2.4. Encourage mothers to breastfeed exclusively for six (6) months (no water, no solids, no other liquids except breast milk) and to continue breastfeeding for two (2) years or beyond along with the introduction of appropriate and adequate complementary food after six (6) months;
2.5. Prohibit activities promoting use of breast milk substitutes, teats, and pacifiers within the lactation station;
2.6. Prohibit posting of marketing or sales materials on infant formula and / or breast milk substitutes within the lactation station; and
2.7. Post guidelines of the lactation station at the entrance of the said station.

3. CB Lactation Room

The company maintain a lactation room for those mother who needs to extract mother’s milk for breastfeeding to their baby and those mother whose breast are getting full of milk which need to be released or extracted.

SETION7: Contractors' Check up at the THPAL Clinic

(Reference: Admin Memorandum Order No. 2023-07)

THPAL Clinic caters to the following cases of Contractors' and Sub- contractors' employees only:

- WORK-RELATED CASES
- EMERGENT or URGENT CASES

With this, non-emergency and non-life-threatening cases or consultations must be done at another medical or health facility other than THPAL Clinic.

CHAPTER VII ENVIRONMENTAL MANAGEMENT

SECTION1: Overview of Environmental Management System

(Reference Document: EMS-THPAL-108 Overview of Environmental Management System)

THPAL's Environmental Management System (14001) is an established and maintained documented system that will ensure achieving balance between the three pillars of sustainability: environment, society and the economy. The commitment to protecting the environment, fulfilling compliance obligations and continual improvement shall permeate through the whole organization to the highest levels of management to where the responsibility for total environment management shall belong.

To fully understand the organization and its context, THPAL determined the external and internal issues that are relevant and that affects its ability to achieve the intended results of the Environmental Management System.

This Environmental Management System encourages us to a holistic approach to the management of environmental aspects and issues, with integration into organizational strategy and business processes. The outcome should be one that encourages the adoption of environmentally sustainable practices to deliver sustainable business.

This Environmental Management System shall be made up policies, procedures and other related documentation which shall be in conformance with the requirements of ISO 14001:2015. The system addresses the management of environmental aspects, compliance obligations, the actions to address and risks and opportunities. The management of interactive processes provides for the achievement of continual improvement and focus on efforts leading the prevention of undesirable outcomes.

THPAL shall adopt a process-based approach in managing of the Environmental Management System and its processes through the application of a "Plan-Do-Check-Act" methodology and a focus on "Risk-Based Thinking" leading to the prevention of undesirable outcomes.

SECTION2: AIR MANAGEMENT

1.1 AIR QUALITY MANAGEMENT

(Reference Document: EMS-THPAL-TM-301 Air Quality Management Procedure)

4.1.1 PROCESS STANDARD FOR THE PLANT

a) All emission of the plant pollution sources installed shall comply with the regulatory requirements as set in DAO 2000-81, the Implementing Rules and Regulations of the Philippine Clean Air Act of 1999.
b) Emission sources such as the Power Plant, H2S Plant, HPAL Plant and MS Plant are equipped with Continuous Emission Monitoring System to have a real time readings of the emissions.
c) Pollution control facilities are installed in all sources of emission as mitigating measures for air pollution and are controlled with the Distributed Control System.
d) Plant is equipped with gas detectors to monitor ambient gas levels within the plant.
e) H2S Plant and MS Plant will automatically shut down in case of Hydrogen Sulfide (H2S) high level detection. If gas concentration reaches 5ppm for more than 3 detectors, an emergency shutdown through Safety Interlock System (SIS) will initiate.
f) An alarm will be sounded if reading of 0.1 ppm around the plant site periphery is detected. If two detectors registered 0.2 ppm readings for more than 2 detectors, emergency shutdown will be implemented.
g) MEPEO coordinate regular emission test for stacks by 3rd party twice a year (semi-annual). EMB MC 2007-03 – Periodic or routine compliance testing of existing sources, a large or significantly existing sources should be tested twice per year for each year of its operation by the permittee/facility operator to verify its compliance. Each test shall consist of three sampling runs.

1.2 CRITERIA OF POLLUTANTS

THPAL Emission Standards

No	Pollutants	THPAL STANDARD based in EPRMP				DENR STANDARDS	
		Alert Level		Action Level			
		mg/NCM	PPM	mg/NCM	PPM	mg/NCM	PPM
1	Carbon Monoxide	440	384	460	402	500	436
2	Nitrogen Oxides (Coal-fired Boiler)	700	372	800	425	1000	531
3	Nitrogen Oxides (Diesel Generator)	1700	903	1800	957	2000	1063
4	Particulate Matters (Coal-fired Boiler & Diesel Generator)	120	28	130	30	200	46
5	Sulfur Oxides (Sox) (Coal-fired Boiler & Diesel Generator)	550	210	600	229	700	267
6	Opacity (%)	14	-	16	-	20%	-
7	Hydrogen Sulfide, H_2S	4	2.9	5	3.6	7	4.6
8	Arsenic	7	2.3	8	2.6	10	3.3
9	Cadmium	7	1.5	8	1.7	10	2.2
10	Copper	70	27	80	31	100	38
11	Mercury	2	0.24	3	0.36	5	0.60
12	Nickel	17	7.1	18	7.5	20	8.3
13	Lead	7	0.71	8	0.81	10	1.0

Reference: Table 2 of DAO 2000-81 (National Emission Standards for Source Specific Air Pollutants - NESSAP). Alert and Action Levels are based on THPAL's Environmental Monitoring Plan (EMoP)

THPAL Ambient Air Quality Standards

No	Pollutants	THPAL STANDARD based in EPRMP			DENR STANDARDS
		Unit	Alert Level	Action Level	
1	Nitrogen Dioxides	PPM	0.05	0.06	0.08 (24-hrs)
			0.08	0.11	0.14 (60 mins)
		ug/NCM	90	120	150 (24-hrs)
			156	208	260 (60 mins)
2	Sulfur Dioxides	PPM	0.04	0.05	0.07 (24-hrs)
			0.08	0.10	0.13 (60 mins)
		ug/NCM	108	144	180 (24-hrs)
			204	272	340 (60 mins)
3	Hydrogen Sulfide, H_2S	PPM	0.04	0.06	0.07 (30 mins)
		ug/NCM	60	80	100 (30 mins)
4	Total Suspended Particulates	ug/NCM	180	240	300 (60 mins)
			138	184	230 (24-hrs)
5	Particulate matters 10 (PM10)	ug/NCM	120	160	200 (60 mins)
			90	120	150 (24-hrs)

Reference: Table 3 of DAO 2000-81 (National Ambient air Quality Standards for Source Specific Air Pollutants - NAAQSSAP) and National Air Quality Guideline (NAAQG) for Criteria Pollutants. Alert and Action Levels are based on THPAL's Environmental Monitoring Plan (EMoP)

Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu g/m^3$).

1.3 H2S GAS MANAGEMENT

1.2.1 H2S GAS in THPAL

H_2S gas in THPAL plant is produced by the reaction of Sulphide gas from molten sulfur and Hydrogen gas from Methanol and dimeralized water through PSA (Pressure Swing Absorption) process.

For the emergency response procedure, refer to EMS-THPAL-PD-320-102-110 Emergency Response for H_2S Gas Leak.

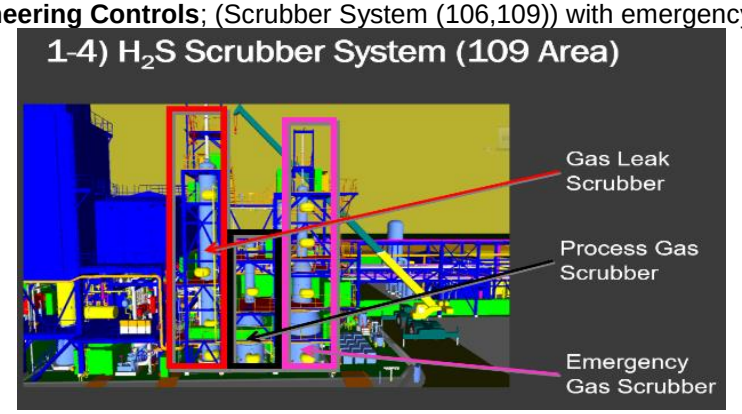
Hydrogen Sulphide gas (H_2S) is one of the deadliest occupational hazards in the Plant operation. When inhaled, it is rapidly absorbed through the lung into the blood which initially induces rapid breathing. This is followed by respiratory inactivity. At higher concentration, H_2S exerts an immediate paralyzing effect on the respiratory center. Death due to asphyxia is a certain outcome, unless artificial respiration is promptly provided. This sequence of events represents the most important toxic effect of H_2S.

Hydrogen sulphide in low concentrations is easily recognized by its characteristic foul odor similar to rotten eggs. However, continued exposure will temporarily eliminate one's ability to smell the gas. This leads a person to believe that the gas is gone when probably is still present Therefore, a person should always check with the gas detectors for actual gas concentration the atmosphere.

To determine the presence of H_2S within the plant site complex area, eighty-seven (87) H_2S Gas Detectors were strategically installed and linked to the DCS (Direct Control System) at the Central Building.

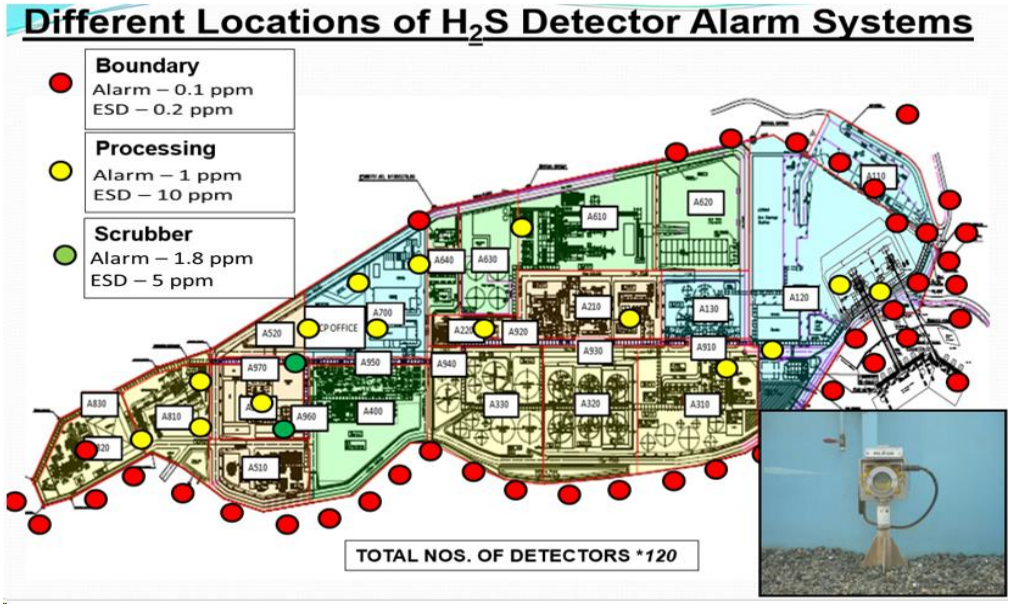
1.2.2 Engineering Control and Monitoring

a) **Engineering Controls**; (Scrubber System (106,109)) with emergency power supply



b) **Monitoring and Detection Equipment**

The Scrubber outlet readings of H2S gas to the atmosphere are being monitored in real time record at DCS graphics by the DCS operator which are controlled. Actual sampling and reading of H2S gas at the scrubber stack sampling point is done every shift with the use of Gastec Tube. All H2S detectors inside the Plant and boundary detectors are monitored in the DCS.

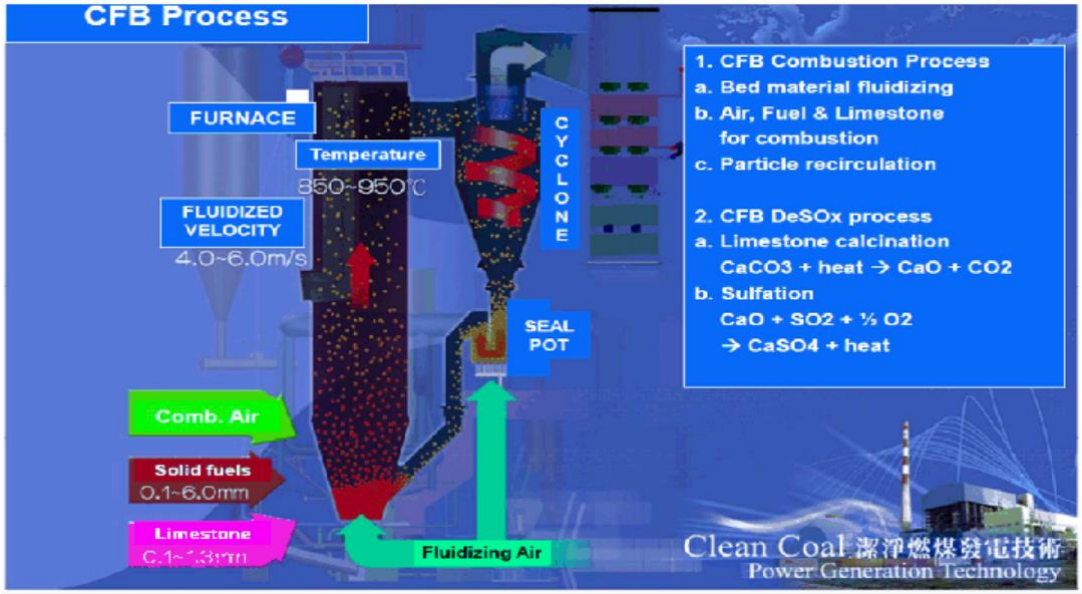


1.3 SO2, Opacity

The Opacity of boiler exhaust is being controlled by ESP (Electrostatic Precipitator) since it captures dust or fly ash that was produced after burning coal. Normally Opacity is maintained less than 20% (twenty percent) and it is monitored at PSU DCS. In case it will increase, the operation is to adjust the ESP transformer current limit settings to increase more the collecting of dust.

The SO2 is controlled with addition of limestone to limit below 267 ppm regulation. At the DCS the process value of SOX is monitored and the DCS operator can adjust the limestone injection to furnace depending on SOX fluctuation or trend.

Below is the CFB De-SOX process.



SECTION3: WATER MANAGEMENT

2.1 INTRODUCTION

Water management and monitoring in the workplace are essential for maintaining operational continuity and mitigating potential hazards, such as water leaks or contamination. This process allows for the early detection of abnormalities, preventing costly damage and ensuring the safety of employees and facilities. To ensure effectiveness in water monitoring, a procedure has been established to properly manage wastewater from plant operations and ambient waters within the company's area of responsibility. (See *EMS-THPAL-TM-302 Water Quality Management Procedure* for reference*).*

2.2 Standards

The Philippine Water Quality Guidelines and General Effluent Standards refer to regulations set by the Philippine government to control the quality of wastewater discharged into water bodies such as rivers, lakes, and coastal areas. These standards are crucial for protecting the environment and ensuring public health by limiting the pollutants that can be released into water sources.

Effluent coming from the Tailings Storage Facility are discharge simultaneously to Taganito Bay (Class SB - Marine Water) and Hayanggabon River (Class C - Freshwater). While effluent from within the main plant premises are discharged to Taganito River (Class C – Freshwater).

THPAL General Effluent Standards (Class SB –Taganito Bay)

Parameters	EQPL RANGE		
	Alert	Action	Limit
Manganese	3.8	3.88	4 mg/L
pH (high)	8.8	8.73	9.0
pH (low)	8.55	6.65	6.5
TSS	66.5	67.9	70 mg/L
Oil and Grease	4.75	4.85	5 mg/L
NH3-N	2.85	2.91	3 mg/L
PO4-P	1.9	1.94	2 mg/L
Color	95	97	100 mg/L
Fecal Coliforms	190	194	200MPN/100mL

Reference: General Effluent Standards of the Philippine Clean Water Act of 2004. Alert and Action Levels are based on THPAL's Environmental Monitoring Plan (EMoP)

THPAL General Effluent Standards (Class C –Taganito River & Hayanggabon River)

Parameters	EQPL RANGE		
	Alert	Action	Limit
Manganese	1.9	1.94	2 mg/L
pH (high)	8.8	9	9.5
pH (low)	6.5	6.65	6
TSS	95	97	100 mg/L

Oil and Grease	4.75	4.85	5 mg/L
NH3-N	3.8	3.88	4 mg/L
PO4-P	3.8	3.88	4 mg/L
Color	142.5	145.5	450 mg/L
Fecal Coliforms	380	388	400MPN/100mL

Reference: General Effluent Standards of the Philippine Clean Water Act of 2004. Alert and Action Levels are based on THPAL's Environmental Monitoring Plan (EMoP)

2.3 pH MONITOR AND WATER CONTAINMENT PONDS LOCATION

In case of emergency such as process solution/chemicals leakage occur, to mitigate the environmental impacts resulting from an emergency the following are the controls:

In case of High pH Highly basic and /or Very Low pH Acidic Slurry

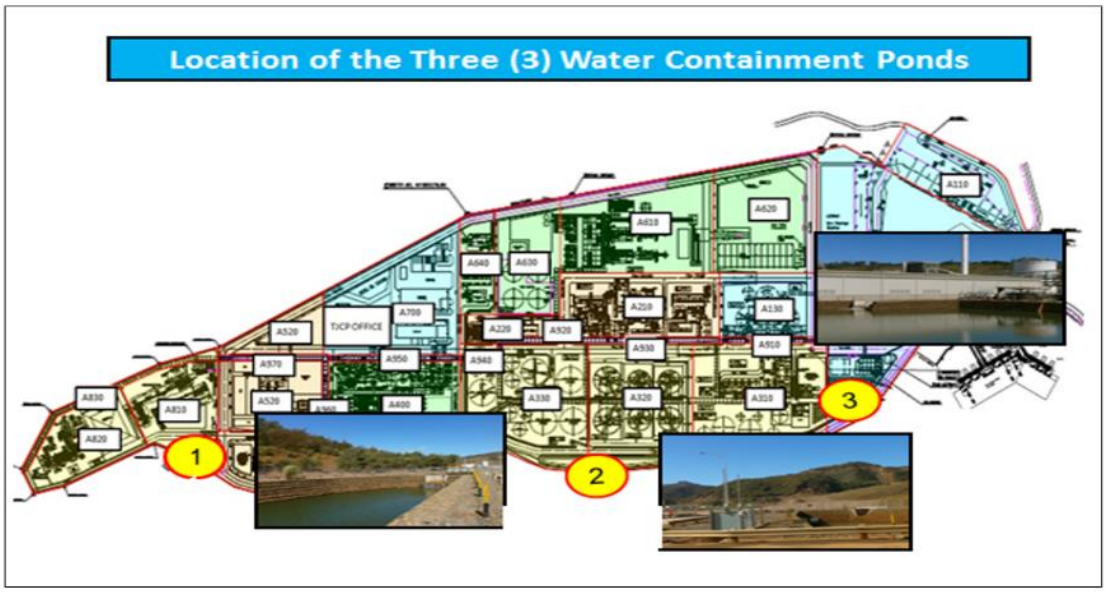
There are eighteen (22) pH detectors installed on a strategic location at the ditches within Plant site which are connected on the line of the DCS Control Monitor. When present value low (PVL) at pH 7.0 and present value high (PVH) at 8.8 it will sound the alarm and pop up at DCS monitor. When the present value is low (PVLL) pH 6.5 and /or present value high (PVHH) 9.0 pH on the ditches going either to P1 Ore Prep Area Siltation Pond, P8 CCD Area Siltation Pond and P12 Limestone Area Siltation Pond the ditch Gate are automatic control and will automatically closed as per interlock sequence setting on the DCS
The acidic and/or basic solution or slurry at the respective Siltation Pond are recovered by the engine pumps which are installed at P1, P8 and P12 Siltation Pond and pump to 131TK01 tank for temporary storage then subsequently sent to the Final Neutralization Tank for treatment and finally discharge to the Tailings Storage Facility (TSF). Please refer to the attached Plant Layout Map.

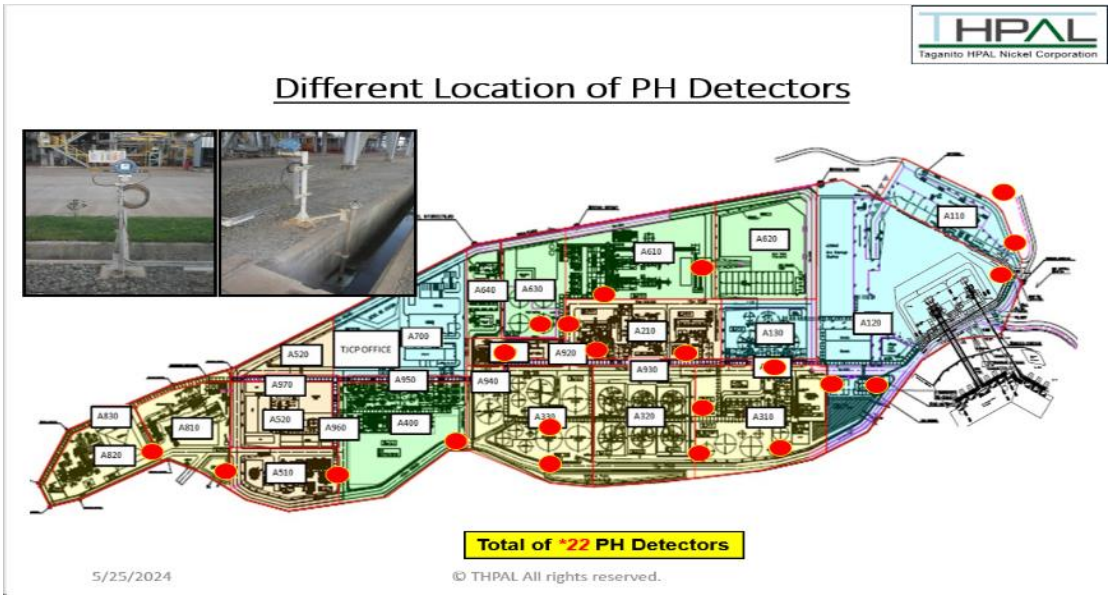
Limestone Bin and emergency spill kit are installed in strategic locations to block the affected ditch and the basic or acidic solution are recovered by available Vacuum Trucks in the Plant and the recovered solution or slurry is discharge to Final Neutralization Tanks through sump pumps.

At the intake of P1 Siltation Pond right after the ditch Gate going to the pond there is an automatic dosing unit of Ferrous Sulfate solution to adjust the pH of water flowing into the siltation pond at normal range of pH 7.0 and a sensor at the ditch installed to send signal for the radio control of Ferrous Sulfate flow rate against the water flow rate flowing on the ditch. There is also a sensor at discharge point of the siltation Pond number 1 in series with sensor at the intake which will account for the overall ratio control of the Ferrous Sulfate Dosing unit thus ensures that water pH that goes to the river are within the normal pH range.

In Case of Oil Spill that goes to the ditch within the Plant site

There are three (3) Oil Detectors which are installed near the ditch gate of the three siltation pond respectively. When the Oil sensor detects on the ditch it will give signal to the controller and when it registers 50% presence of oil it will alarm which can be seen through DCS monitor. The sensor signal high detection is also interlock with the ditch gate when it reaches to High (HH) at 80% reading the gate will automatically close the oil is then treated with liquid soap to disperse the oil.


Location of the Three (3) Water Containment Ponds
1
2
3


THPAL
Taganito HPAL Nickel Corporation
Different Location of PH Detectors
Total of *22 PH Detectors
5/25/2024
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SECTION4: WASTE MANAGEMENT

To ensure systematic and efficient solid waste management, a procedure has been developed to encourage greater participation from direct employees and contractors, aiming to strictly implement and ensure the protection of public health and the environment. Additionally, efforts are made to minimize residual waste generation, eradicate problems involving segregation, collection, disposal, and management, and reduce risks in handling domestic and industrial wastes. Upon identifying waste sources and classification, below are the procedures that should be followed.

1. In houses wastes.

    - Segregation of waste according to its classification is compulsory. All waste shall be disposed in a separate and properly labeled receptacle. A collection point will be designated in each office and dormitory building to facilitate easy collection and hauling.
    - Only segregated solid waste will be collected in line with the strict implementation of “No segregation, no hauling policy”. Each process owner shall be responsible for the proper waste segregation of all solid wastes generated in their respective processes and activities.
    - Establishment of own primary station is allowed provided that proper waste management is followed.
    - Room occupants in all Dormitory buildings shall be responsible for segregation in their respective primary station and same is applicable to clubhouse personnel.
    - Utility workers under administration department and each facility owner shall be responsible for transferring of segregated wastes from primary stations to the nearest secondary stations.
    - Employees working directly in handling of solid wastes must be regularly trained and should wear appropriate Personnel Protective Equipment (PPE) during handling of wastes. They must have an understanding on the proper identification and segregation of solid wastes and the Pollution Control Officer (PCO) as being responsible in identification, characterization, and labelling of all solid wastes shall guide them through.

2. Contractors Inside HPP
    - All contractors inside the plant must abide with the strict implementation of “no segregation, no hauling policy”. Each contractor shall be responsible for the proper waste segregation of all solid wastes generated in their respective processes and activities.
    - They shall ensure proper management and disposal of all their generated wastes from their primary stations to the nearest established secondary stations inside the plant.
    - MEPEO will not haul wastes from the designation secondary pick-up points assigned to them if found not segregated.

3. Contractors Outside HPP

    - All contractors of THPAL residing outside of the plant shall establish their own waste pick-up points in their dormitory and/or barracks area following the established waste classifications.
    - NPMSI and ACI Camp occupants shall abide with the strict implementation of “no segregation, no hauling policy”. Each occupant as being the source of their own generated wastes shall segregate accordingly.
    - Proper management and disposal of all generated wastes shall be ensures, from their primary stations to the nearest established secondary stations in the camp.
    - MEPEO will not haul wastes from the designation secondary pick-up points assigned to them if found not segregated.

See *EMS-THPAL-GD-3502-Solid Waste Management Procedures*.

CHAPTER VIII EMERGENCY PREPAREDNESS PROGRAM

SECTION1: EMERGENCY RESPONSE TEAM

An Emergency Response Team shall be created for certain emergency situations. This team shall be headed by the Emergency Response Team Head and to be assisted by different managers as Sub-Heads.

Reference Document: EMS-THPAL-212-Emergency Response and Preparedness Program Rev. 10

a) Head: Plant Manager

b) Sub Head: Deputy Plant Manager

c) OPERATION TEAM (PLANT SITE): H2S GAS LEAK & ACID LEAK PIPELINE/LORRY
   Head : Production Manager
   Sub-head : Assistant Production Manager

d) FIRST AID AND FIRE FIGHTING TEAM
   Head : Safety Section Manager/Head

e) PUBLIC RELATION TEAM
   Head : Community Relations Manager

f) GUIDANCE TEAM & LOG RECORDER
   Head : MEPEO

g) MEDICAL TEAM
   Head : Company Doctor/Physician

h) Other TEAMS
   For activity related to each department, a team will be dispatched from each department and the section manager shall act as head.

SECTION2: EMERGENCY DRILL

For the success of Emergency Response and Preparedness Program (EPRP), not only training will be organized but Drills shall also be organized. Drills will help to understand the role to be played by everyone during the emergency. Purposes of drill are to move smoothly as described in emergency procedure and to check and improve the procedure.

2.1 FIRE FIGHTING DRILL

Fire Fighting Drill is scheduled twice a year as per requirements by the OSH Standard and in the Fire Fire Code of the Philippines. This is coordinated with the Bureau of Fire and the BFP personnel will observe and evaluate the execution of the drill.

2.2 EARTHQUAKE AND TSUNAMI DRILL

Earthquake is prevalent and almost every year it is occurring in the region of Surigao. The purpose of the drill is to familiarize all personnel on what to do during conceivable emergency as a consequence of the earthquake and tsunami in order to proceed on a safe orderly evacuation to a designated evacuation area.

Earthquake Preparedness guide

Before:

1. Familiarize yourself with the exit routes.
2. Know where the fire extinguishers, first aid kits, alarm, and communication facilities are located. Learn how to use them beforehand.
3. Conduct and participate in regular earthquake drills.

During:

1. Stay calm
2. When you are INSIDE a structurally sound building or home…. STAY THERE.
3. If you're OUTSIDE …. Move to an open area!
4. If you're in a moving vehicle, STOP and get out! Do not attempt to across bridges, overpasses, or flyovers which may have been damaged.

After:

1. Be prepared for aftershocks, once shaking stops, take the fastest and safest way out of the building.
2. Don't use elevators, entered in damage buildings, use telephones unless necessary and don't PANIC.
3. If you need to evacuate your residence, leave a message stating where you are going and bring your emergency supply kit.
4. Keep updated on disaster prevention instructions from battery-operated radios.

2.3 H2S EMERGENCY DRILL AND ACID LEAK DRILL

Different scenarios are planned in the conduct of the drill considering cases if there is an H2S Leak or an Acid Leak in order to exercise the response action of the emergency responder and the actions of other personnel for safe and orderly evacuation to a designated location.

Guidelines:

1. Communication: transceiver radio or company cell phone
2. The discoverer calls and informs the DCS operator that an acid leak occurred; specify the exact location and nature of problem.
3. All announcements must be made in English, Tagalog or Bisaya Dialect thru DCS operator (3x)
4. DCS operator immediately informs the on duty Production General Foreman and confirm the situation thru investigation on the area.
5. After the confirmation to the area Gen. foreman report it to Production Manager. Then, Production Manager will inform the situation to the PM.

2.4 FIRST AID DRILL

The skills and capability of the trained First Aider are exercise on this drill to enhance and develop the response action in terms of safe handling and the quickest time of rescue and treatment of patient before sending to medical attention.

Roles and Responsibilities of the First Aider:

1. Bridge that fills the gap between the victim and the physician.
2. It is not intended to complete with, or take the place of the services of physician.
3. It ends when the services of a physician begin.
4. Ensure safety of him/herself and that of bystanders.
5. Gain access to the victim
6. Determine any threats to patient's life
7. Summon more advanced medical care as needed.
8. Provide needed care for the patient
9. Assist more advanced personnel
10. Record all findings and care given to the patient.

Objectives of First Aid

1. To alleviate pain / suffering
2. To prevent added / further injury or danger
3. To prolong life.

First Aid equipment's:

(a) Spine board
(b) Sets of splint
(c) Blankets
(d) Rubbing alcohol
(e) Povidone Iodine
(f) Cotton
(g) Gauge pads
(h) Tongue depressor
(i) Penlight
(j) Band aid
(k) Gloves
(l) Scissor
(m) Forceps
(n) Bandages
(o) plaster

SECTION3: MANAGEMENT OF ALL SAFETY EQUIPMENT

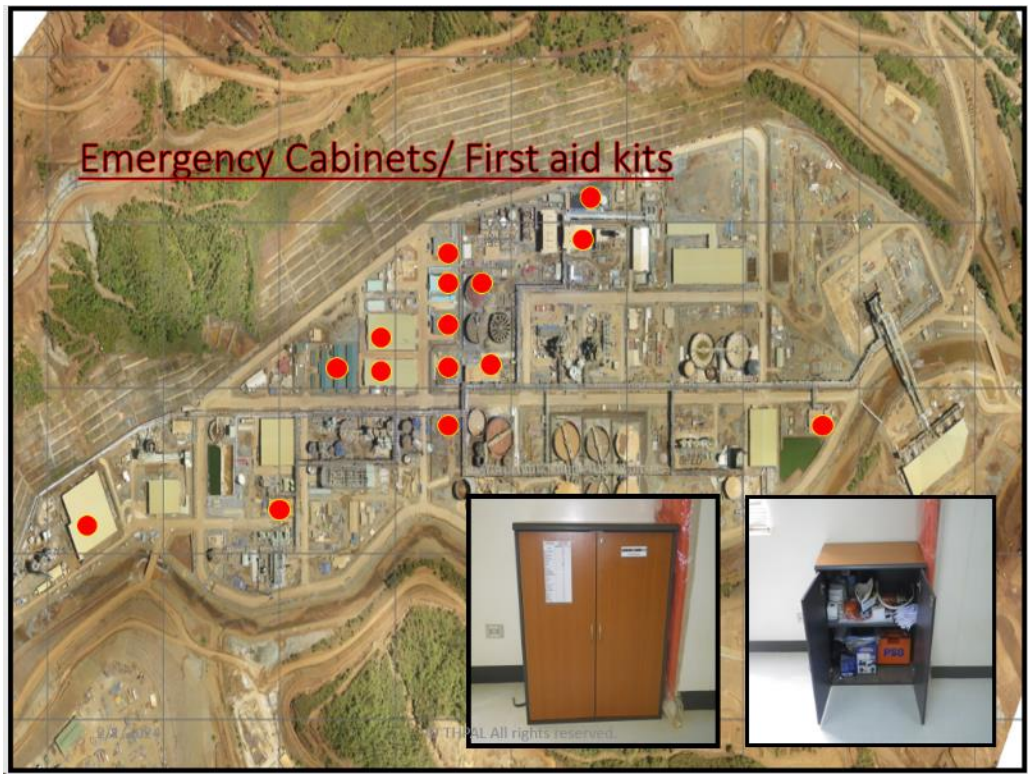
Locations of all safety equipment like fire extinguishers, first aid kit, eye wash, safety showers and others shall be known to all employees at all times. It serves as the primary line of defense in preventing injuries and fatalities in the event of an accident. Having these tools readily available can significantly reduce the severity of injuries and, in many cases, save lives.

3.1 FIRST AID KITS

A first aid kit was installed and is readily available to allow immediate treatment of minor injuries like cuts, scrapes, and burns, preventing them from becoming more severe. Below are basic guidelines to maintain effectiveness of the installed kits and preventing the use of ineffective or unsafe items. These are used for urgent dressing injuries to prevent any infection, stop bleeding, and further complication before sending the person to medical treatment in the clinic.

1. First aid kits, which should be located in conspicuous places (with location clearly marked) to be used for the immediate response to minor injuries, such as cuts or minor burns.
2. Minor injuries requiring first aid shall always be reported to a supervisor.
3. A designated party shall be assigned for monitoring and maintaining the first aid kit(s). There should be a log attached to the kit indicating the last inspection date and by whom the kit was inspected. Safety section is responsible in the monthly inspection and refilling of kits if ever necessary.
4. First aid kit contents should include items such as Band-aids, sterile gauze pads, bandages, scissors, antiseptic wipes or ointments, and a first aid card. All kits should also contain examination gloves for accidents in which blood is present.
5. First aid kit should be inspected monthly to ensure that all necessary supplies are present and in adequate quantities. Check for damage or contamination of items such as bandages, gauze, and medical instruments.

See annex for first aid kits/cabinets workplace map.



3.2 FIRE HYDRANTS

Fire hydrants were installed to provide a readily available water source, allowing firefighters to quickly connect their hoses and to have immediate extinguishing on fire. It is strategically placed around the workplace to significantly increase the chances of controlling a fire before it spreads, thereby protecting the lives of employees as well as workplace properties. Fire Hydrants are used to suppress large fire occurring inside the plant and other facilities or buildings

For effective emergency preparedness and response.

1. Ensure that hydrants are easily accessible and not blocked by debris, parked vehicles, or stored materials that could cause delay during emergency response relating to fire.
2. Visual inspection of components of the hydrant box shall be done once every month, Quarterly for hydro pressure and Flow testing, and Semi-annually for Fire hose testing. The assigned safety personnel is responsible for the inspection and checking.
3. *EMS-THPAL-SA-309 Standard Procedure for Monitoring & Inspection of Emergency Equipment & Materials* shall be followed for the criteria of inspection and procedure.
4. In case of liquid or organic fire, foam is used for extinguishment.

<u>For maintenance and repair</u>

Fire Hydrant is a vital component facility in the plant comprising of Fire water pumps, fire water lines, discharge valves, discharge port with corresponding fire hydrant boxes, complete accessories of fire hoses, spray nozzle, spanner and axe. The operation of the fire water pump is continuous 24 hours daily by the process owner (PSU) and a water pressure of 1100 kpag is maintain to ensure 100% availability in case of fire emergency.

Stopping of this facility is considered highly critical condition in the Plant in terms of Fire Emergency Response, hence, any repair which entails stoppage of operation of the fire water system should be properly coordinated to all concerned process, communicated to OSH/Safety and will requires the following:

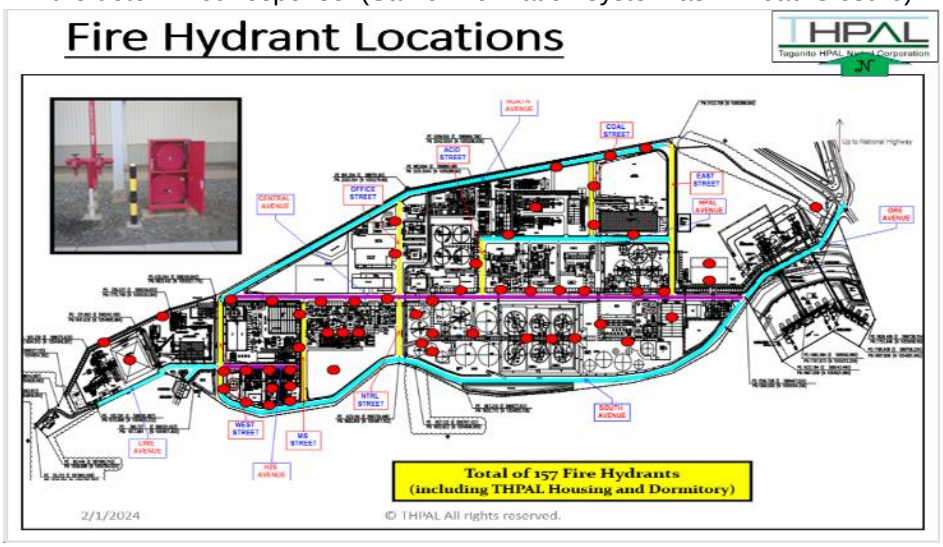
a) The relevant section will submit the repair details, specific period (time) to do the repair, the specific location and affected area to OSH/Safety. Simultaneously furnish a copy to the section managers and department managers of the affected area.

b) For Safety concerns, clarify the content to be handled during the repair. Basically all hot works should be avoided for this period.

c) Submit the above contents to OSH manager and obtain permission.

d) Safety will notify all employees that permission has been obtained and the details of the determined response. (Same information system as in Road Closure).

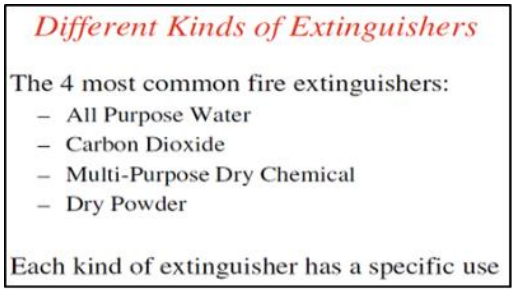
e)

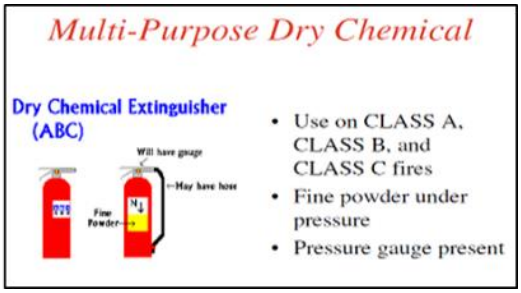


3.3 FIRE EXTINGUISHER

Fire extinguishers are installed in different locations at the plant site to provide immediate response in controlling small fires before they escalate into large, destructive ones, thus safeguarding lives, property, and the environment. Procedures have been established to ensure effectiveness and efficient response during emergencies using fire extinguishers. Fire extinguishers are used to suppress fire which is still in its incipient stage and small fires. Big fire can no longer suppress by fire extinguisher.

1. Inspection is carried-out once every month.
   For F.E installed in a moving vehicle.
   - The equipment operator of the moving vehicle will submit to THPAL Safety the fire extinguisher installed on his operated unit every month, before the 15th day of the month, for the safety inspector to inspect the condition and record the information accordingly.
   - The equipment operator of the moving vehicle will consolidate all the fire extinguishers of the moving equipment on a designated area and request to safety for inspection of the condition and record to the monitoring accordingly.
   - The equipment operator shall take full responsibility for the storage and shelter conditions of the fire extinguisher and avoid mishandling.
   - Any abnormalities in the condition of the fire extinguisher must be reported to THPAL Representative in order to avoid the maintenance of substandard emergency equipment, such as the fire extinguisher installed on the equipment.
   - Others mentioned on *EMS-THPAL-SA-309 Standard Procedure for Monitoring and Inspection of Emergency Equipment and Materials*, specifically on Pages 17-18 (Item 7. Fire Extinguisher), shall be carried out accordingly. Monthly inspection is handled by the assigned safety personnel/inspector.
2. Ensure that the fire extinguisher is clearly visible and not blocked or hidden by equipment, coats, or other objects that could interfere with access in an emergency. The process owner in the area must ensure the fire extinguisher access are clear and not obstructed.
3. Fire extinguisher shall be maintained in a fully charged and operable condition and shall be kept in their designated places at all times when they are not being used.
4. Location of the fire extinguisher is easily identifiable.
5. Signage is intact and readable.
6. When conducting inspection, Inspector shall use the checklist of fire extinguisher checklist inspection form in APPENDEX 12 of *EMS-THPAL-SA-309 Standard Procedure for Monitoring & Inspection of Emergency Equipment & Materials.*
   Other procedures and standards will also be based on the stated SOP mentioned above. Safety Section is responsible for the replacement and initiating of the PR for purchase of fire extinguisher.
   (For special activities with risk of fire a coordination of the process and safety is required for the provision of fire extinguisher).
   For contractor's activities, they should provide fire extinguishers by themselves.



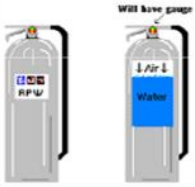


Carbon Dioxide

Carbon Dioxide Extinguisher

- Use on CLASS B and CLASS C fires
- Hard, plastic nozzle
- No pressure gauge

All Purpose Water



- Use on CLASS A fires
- Pressurized water
- Pressure gauge present

How Does a Fire Work?

- Three components
- Need all three components to start a fire
- Fire extinguishers remove one or more of the components

Types of Fires

- **Class A** - Wood, paper,cloth, trash
- **Class B** - Flammable liquids, oil, gas, grease
- **Class C** - Electrical, energized electrical equipment
- **Class D** - Combustible metals

How to Use a Fire Extinguisher

P.A.S.S. Method

Pull the pin

This will allow you to squeeze the handle in order to discharge the extinguisher

P.A.S.S. Method

Aim at the base of the fire

Aiming at the middle will do no good. The agent will pass through the flames.

P.A.S.S. Method

Squeeze the handle

This will release the pressurized extinguishing agent

P.A.S.S. Method

Sweep side to side

Cover the entire area that is on fire. Continue until fire is extinguished. Keep an eye on the area for re-lighting.

Fire Extinguisher Locations

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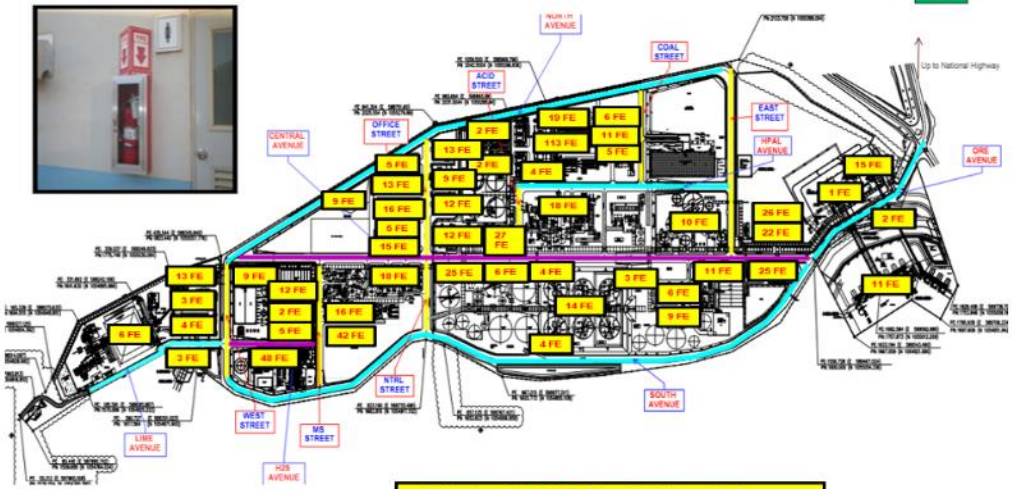


Total of *1003 Fire Extinguishers
(including vehicles and equipment)

2/1/2024

3.4 EMERGENCY EYEWASH SHOWER

Emergency eyewash and shower station was installed in different location of the plantsite including wharf area to prevent or minimize injuries caused by chemical splashed, burns, or other accidents. It is use when somebody is splashed by acidic or basic solution and when there is a foreign materials that enters into the eyes should be flushed for at least fifteen minutes before sending for further medical attention.

To ensure condition and readiness of emergency eyewash/shower station.

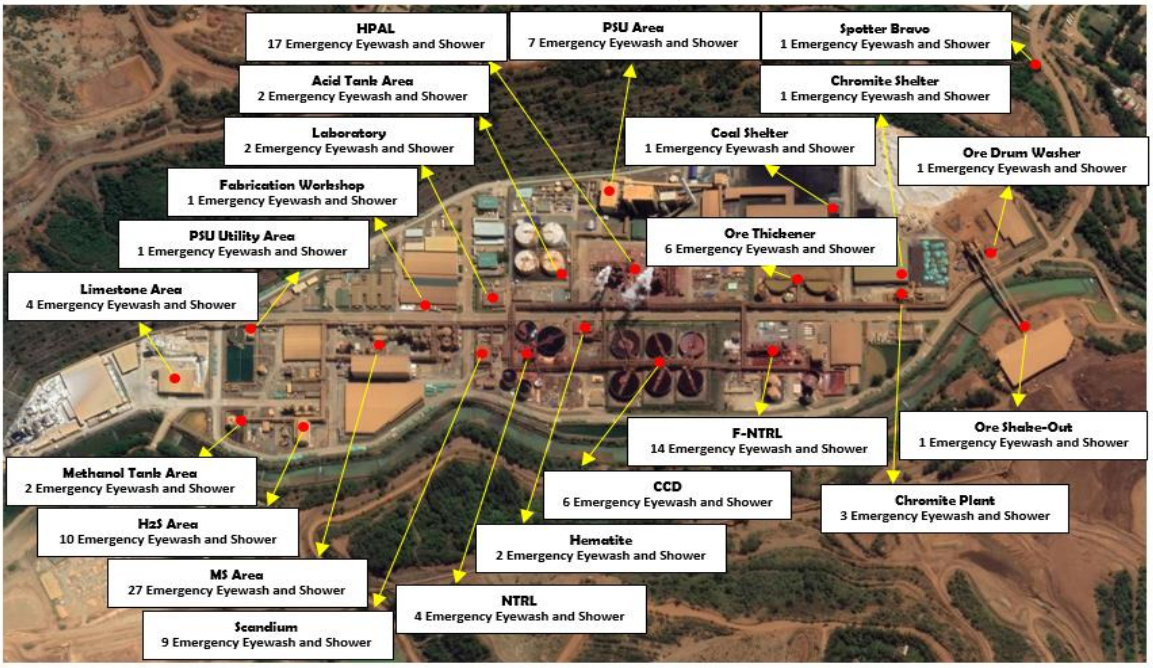
1. Inspection shall be done once a month by Safety Personnel.
2. Nearest shower/eyewash shall be check and inspected by the safety personnel prior to the approval of confined space work permit and other work activities that may require the said equipments.
3. The criteria, procedures and others needed for inspection shall be based on the *EMS-THPAL-SA-309 Standard Procedure for Monitoring & Inspection of Emergency Equipment & Materials, Item 4.*

Maintenance and Repair.

1. Safety section/Process owner shall generate a work request to Maintenance if some parts of the safety eyewash/ shower are found defective/ non-operational during the inspection. Scalding valve and chain are provided by the safety section while other repairs and replacement are for concern process owners.

See below for the image and map of emergency eyewash/shower station:

Locations of Safety Eyewash/ Shower Station:



Total of Emergency Eyewash and Shower at Plant Site 122
Total of Emergency Eyewash and Shower at Pier Site 5
Overall Total of Emergency Eyewash and Shower 127

3.5 AIRLINE MASK

Airline masks provide a continuous supply of clean, breathable air from a remote source, ensuring that workers are protected from airborne contaminants such as dust, fumes, gases, and vapors. In MS area Airline mask is a standard equipment to use during clean up activity inside MS Thickener, during flange breaking of H2S gas lines at DeZn and MS Reactors and used by MS personnel during mitigation of H2S leakage in an emergency. At PSU Airline mask is used in the clean-up activity inside ESP (Electrostatic Precipitator), Cyclone and in confined space with presence of very fine dust particles.

Airline sources have been established and readily available in different locations, especially at production area, to ensure responders can quickly don respiratory protection and respond to the situation safely and effectively in emergency situations such as chemical spills or gas leaks. Both Production MS and PSU has its own Airline mask.

3.6 SCABA (self-contained breathing apparatus)

SCBAs provide breathable air in environments where the air quality is compromised due to smoke, toxic gases, or chemical spills. This is essential for preventing inhalation of harmful substances that can cause serious health issues or death especially when responding a fire. SCABA is worn by rescue workers, fire fighters and others to provide breathable air in an immediately dangerous to life or health atmosphere (IDLH).

IDLH (H2S gas) = 100 ppm
IDLH (CO2 gas) = 40,000 ppm

A total of 22 sets of SCABA have been maintained and inspected once a month to ensure effectiveness and preparedness during response. (All SCABA units are owned by THPAL Safety which are distributed on the following locations with corresponding serial numbers:

SCBA # 1 Production DCS Central Building/BRED-2604
SCBA # 2 Production DCS Central Building/BRED-2626
SCBA # 3 Production DCS Central Building/BRED-2616
SCBA # 4 Maintenance PSO 1st Floor/BRED-2597
SCBA # 5 Maintenance PSO 1st Floor/BRED-2612
SCBA # 6 (MS Temporary area)/Maintenance PSO 1st Floor/BRED-2631
SCBA # 7 3rd Floor PSU STG Building/BRED-2602
SCBA # 8 3rd Floor PSU STG Building/BRED-2618
SCBA # 9 3rd Floor PSU STG Building/BRED-2627
SCBA # 10 (H2S Temporary area) PSO 2/F Exit Door/BRED-2612
SCBA # 11 (H2S Temporary area) PSO 2/F Exit Door/BRED-2619
SCBA # 12 (H2S Temporary area) PSO 2/F Exit Door/BRED-2608
SCBA # 13 Production MS Container Ban/12101101
SCBA # 14 Production MS Container Ban/1085960
SCBA # 15 Production MS Container Ban/1196400
SCBA # 16 Production H2S DCS Building/1193184
SCBA # 17 Production H2S DCS Building/12100718
SCBA # 18 Production H2S DCS Building/1194212
SCBA # 19 PSO 2/F Exit Door
SCBA # 20 PSO 2/F Exit Door
SCBA # 21 PSO 2/F Exit Door
SCBA # 22 PSO 2/F Exit Door

The Safety section is responsible for the filling up of the SCABA Cylinders. Purchase of this equipment is handled by OSH department. Routine monthly inspection is carried out by the assigned safety inspector.

Allowable pressure in cylinder tank: ≥ 50bar = 5 Mpa

To ensure safe standard procedure for safe operations in the use of SCBA and refilling of Self-Contained Breathing Apparatus (SCBA Tanks using Air Compressor). Refer *EMS-THPAL-SA-301 Standard Operating Procedure in the Use of Self-Contained Breathing Apparatus (SCBA) & Refilling of Tanks Using Air Compressor.*

3.7 PTV (Patient Transport Vehicle)

There are three (3) PTV in THPAL namely: PTV1, PTV2 & PTV3.

PTV 1 is basically on standby ready for dispatch at Plant site area. This is used to transport for Emergency or work related case, very urgent case and the case which cannot be judged both by supervisor and safety officer to the THPAL Clinic.

PTV2 and 3 are used to transport non-emergency requests of THPAL employees in going to THPAL Clinic such as PE, follow-up check and reassessment while on duty.

3.8 FDAS (Fire Detection Alarm System)

THPAL Buildings & Facilities are equipped with Fire Alarm & Detection System to ensure the fast response to any fire incident in the area covered. These facilities were listed below with the responsible departments.

Owner	Building & Facilities
Admin Department	Canteen Bldg, General Office Bldg (GOB), Plant Site Office Bldg (PSO), Staff Dormitory 1 (SD1), Staff Dormitory 2 (SD2), Guest Lodge, Vendor's Dormitory, Club House, Technical Advisor Dormitory, Wharf Admin Office, HOUSING Units, Bomb Shelter 1, Bomb Shelter 2, Bomb Shelter 3, Bomb Shelter 4, SCF Building, RDP Building, CTS Building, Clinic Building, Security Building
Maintenance Department	Scandium Substation, Scandium Filter Building, Scandium SX Building, Chromite Substation, H2S Sulfur Shelter, Workshop Office Building, Spare Parts Warehouse Building, Cubicle Substation, Deep Well Substation, Limestone Substation, MS/H2S Substation, MS Filter Building, Demi-System, Utilities Building, DEG Shelter, ESP/FLY Ash MCC, Product Warehouse Building, Chemical Warehouse Building, Laboratory Building, Central Building/Substation, Ore Substation, Coal Handling Substation, Boiler Island, Limestone/Sand Shelter, Decant Pond Substation, Pontoon, ACI Camp and NPMSI Camp

To ensure the Fire Alarm and Detection System is functional and can perform of its purpose, THPAL perform Annual FDAS inspection and function testing in 2nd quarter of the year. This function testing is carried out with accredited 3rd party. All smoke and heat detector should be tested using smoke canister or heat gun. Also, all manual push buttons for fire alarms are also included in function testing, as well as the local panels and alarm bells. E&I will arrange the inspection. Any finding of abnormalities during the function testing of the FDAS system will be replaced or rectified immediately by E&I.

A yearly separate inspection and function testing is during Annual Inspection by the Bureau of Fire Protection (BFP) to check the functionality of the THPAL. The coordination of the inspection of BFP to THPAL is through Administration department and also the coordination to all department for representatives during inspection.

CHAPTER IX ACCIDENT / INCIDENT / REPORT AND INVESTIGATION

SECTION1: INTRODUCTION

Any dangerous occurrence, major accident resulting to death or permanent total disability, shall be reported by the company to MGB RO XIII & DOLE RO XIII within twenty-four (24) hours from occurrence using the prescribed form (Work Accident / Incident Notification).

After the conduct of investigation, the company shall prepare and submit work accident report using the prescribed form (WAIR & COVID WAIR). Moreover. Other work accidents resulting to disabling injuries such as Permanent Partial Disability and Temporary Total Disability shall be reported to the MGB RO XIII & DOLE RO XIII within 15 days after the date of occurrence of accident using the DOLE & MGB prescribed form (WAIR) and COVID WAIR.

All incident/accident shall be reported immediately at least within thirty minutes (30) from the finder to supervisor, department manager and simultaneously to Safety Office and to OSH manager. Concerned department manager shall report to Plant Manager.

All near misses shall be reported and recorded. A system for notification and reporting of work accidents including near misses within the company shall be developed and reviewed by OSH Committee as necessary.

The procedure is established to set standard and steps required for incident, accident and near miss reporting and investigation process. The primary objectives of incidents investigation are to find out the root cause, how to prevent recurrence of similar incidents through data gathering, analysis and how to implement the identified countermeasures.

This procedure will be applied for all incidents including near-misses involving operations and activities occurring in THPAL premises, facilities or properties and applicable to all THPAL contractors, subcontractors, vendors, visitors and agency personnel. For major incidents, authorities below will be involved depending on the incident and decision of the Plant Manager.

The relevant abbreviations are:

1. DENR – Department of Environment and Natural Resources
2. MGB – Mines and Geosciences Bureau
3. PNRI – Philippine Nuclear Research Institute
4. DPEA – Philippine Drug Enforcement Agency
5. DOLE – Department of Labor and Employment
6. BWC – Bureau of Working Condition
7. PEZA – Philippine Economic Zone Authority
8. NCIP – National Commission on Indigenous People
9. PNP – Philippine National Police
10. PENRO – Provincial Environment and Natural Resources
11. CENRO – Community Environment and Natural Resources
12. PEMO – Provincial Environment Management Office
13. PPDO – Provincial Planning & Development Office
14. PRC – Philippine Red Cross
15. BFP – Bureau of Fire Protection

SECTION2: INVESTIGATION

2.1 INVESTIGATING BODY

All accidents of serious magnitude need a thorough investigation. The accident site and the victim have to be properly investigated to assess the cause and impose immediate countermeasures to prevent recurrence of accident. To be able to do this, the investigating body needs to preserve the site cordoning of the area is required to prevent contamination of evidence. All lost time and fatal accident should be reported to the Mines and Geosciences Bureau within twenty-four hours (24) of its occurrence.

2.1.1 Direct Supervisor / Department

The immediate supervisor of the victim will conduct the preliminary investigation of the accident. The initial investigation report must be submitted to Safety Office to confirm the cause of the accident with all evidences intact. The applicable countermeasures must be provided immediately. THPAL Safety Section will also conduct its own investigation independently, testimonies of individuals who are present on the time of accident should also be considered

2.1.2 Medical Doctor and Police

If ever there will be a fatal accident, the company doctor or any medical doctor (if the company doctor is un-available) should declare the condition of the victim then police man should also be present to conduct initial investigation before the body can be remove from the scene. All personnel involved / present should cooperate during the investigation.

In non-fatal case, Doctor will give his/her opinion based on medical assessment and advises the result of the examination to the concerned investigating party.

2.1.3 MGB and DOLE Caraga Provincial and/or Regional Office

MGB and DOLE will conduct also an investigation when the victim suffered serious injuries or a fatal accident. They will also collect testimonies of the personnel involved. The accident site, nature, cause of the accident, and how the victim is rescued are some of the important points that will be considered in the investigation.

2.2 INVESTIGATION

In describing the causes of accident, there will be three aspects that must be considered: working condition, worker unsafe acts and management failure. The cause of accident must be investigated thoroughly to identify the cause according to the mentioned aspects. Each of the identified causes must be given effective and applicable countermeasures.

In order to be more specific in determining the root cause of the accident apply the why-why analysis subjective to the following factors:

Human Factor
Equipment Factor
Management Factor

Once the root cause is determined need to establish specific countermeasure corresponding to each identified root cause. The root cause must be specifically described so that the countermeasure will be effective. The report must be submitted to Safety within seven (7) days after the occurrence of incident.

2.3 CORRECTIVE ACTIONS

Countermeasures of the accident will be made immediately. Engineering or/and Admin Control will have to be implemented at once to prevent or eliminate the works hazard.

If the machine or work environment can be changed physically to prevent employee exposure to the hazard, then hazard can be eliminated with an engineering control. Examples of this control

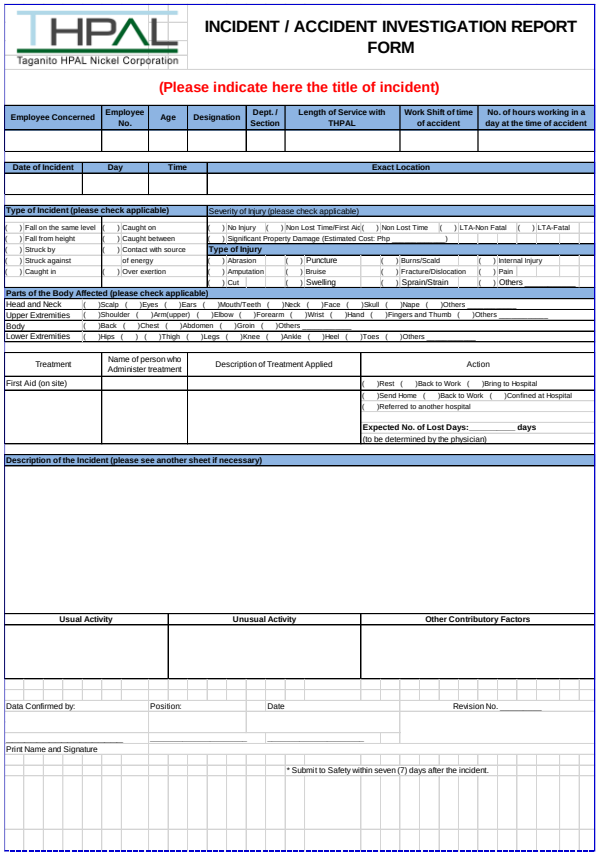
are: initial design specifications; substitution with less harmful material; changing/ enclosure/ isolation of the process, and ventilation. While on going formulation of permanent countermeasures, sections must conduct temporary countermeasures to prevent recurrence until the permanent countermeasure are in place.

2.4 REPORTING

All accident of serious magnitude (fatal or non-fatal) must be reported properly. Reporting formats differ according to the institutions where the report will be submitted.

2.1.4 Supervisor's Report

Accident report made by the immediate supervisor will be according to the standard reporting format. Investigation report must pass through the Department concerned, Safety Section Head, OSH Manager and finally to the Plant Manager for their comments about the accident.



THPAL
Taganito HPAL Nickel Corporation

INCIDENT / ACCIDENT INVESTIGATION REPORT FORM

(Please indicate here the title of incident)

Employee Concerned	Employee No.	Age	Designation	Dept. / Section	Length of Service with THPAL	Work Shift of time of accident	No. of hours working in a day at the time of accident

Date of Incident	Day	Time	Exact Location

Type of Incident (please check applicable)

( ) Fall on the same level ( ) Caught on
( ) Fall from height ( ) Caught between
( ) Struck by ( ) Contact with source of energy
( ) Struck against ( ) Over exertion
( ) Caught in

Severity of Injury (please check applicable)

( ) No Injury ( ) Non Lost Time/First Aic( ) Non Lost Time ( ) LTA-Non Fatal ( ) LTA-Fatal
( ) Significant Property Damage (Estimated Cost: Php _____)

Type of Injury

( ) Abrasion ( ) Puncture ( ) Burns/Scald ( ) Internal Injury
( ) Amputation ( ) Bruise ( ) Fracture/Dislocation ( ) Pain
( ) Cut ( ) Swelling ( ) Sprain/Strain ( ) Others _____

Parts of the Body Affected (please check applicable)

Head and Neck ( )Scalp ( )Eyes ( )Ears ( )Mouth/Teeth ( )Neck ( )Face ( )Skull ( )Nape ( )Others _____
Upper Extremities ( )Shoulder ( )Arm(upper) ( )Elbow ( )Forearm ( )Wrist ( )Hand ( )Fingers and Thumb ( )Others _____
Body ( )Back ( )Chest ( )Abdomen ( )Groin ( )Others _____
Lower Extremities ( )Hips ( ) ( )Thigh ( )Legs ( )Knee ( )Ankle ( )Heel ( )Toes ( )Others _____

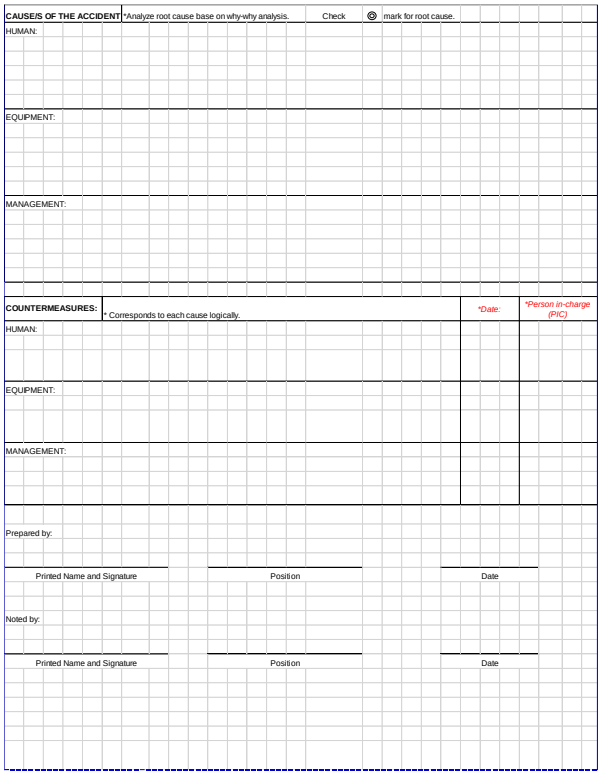
Treatment	Name of person who Administer treatment	Description of Treatment Applied	Action
First Aid (on site)			( )Rest ( )Back to Work ( )Bring to Hospital ( )Send Home ( )Back to Work ( )Confined at Hospital ( )Referred to another hospital **Expected No. of Lost Days:** _____ **days** (to be determined by the physician)

Description of the Incident (please see another sheet if necessary)

Usual Activity	Unusual Activity	Other Contributory Factors

Data Confirmed by: Position: Date Revision No. _____
Print Name and Signature

* Submit to Safety within seven (7) days after the incident.



CAUSE/S OF THE ACCIDENT *Analyze root cause base on why-why analysis. Check ◎ mark for root cause.

HUMAN:
EQUIPMENT:
MANAGEMENT:

COUNTERMEASURES: * Corresponds to each cause logically. *Date: *Person in-charge (PIC)

HUMAN:
EQUIPMENT:
MANAGEMENT:

Prepared by:

Printed Name and Signature	Position	Date

Noted by:

Printed Name and Signature	Position	Date

2.1.5 MGB, DOLE & BFP Report

All serious accidents shall be reported immediately by any available quickest means to MGB &DOLE CARAGA Regional Office within 24 hours after its occurrence. Dafety Section will prepare the necessary document pertaining to the accident. Reports from the concerned department will also be serve as basis for the report.

A final written report will be submitted within 15 days immediately following the occurrence of the accident.

The Plant Manager will sign the final accident report duly endorsed to the MGB and DOLE Caraga Regional Directors and copy furnished the MGB and DOLE Directors in the Head Offices.

2.5 ACCIDENT DISCUSSION

After a serious / fatal accident had occurs, the operation of the particular section/department must be stopped temporarily. All personnel (THPAL / Contractors) involved on that day particular operation will be pulled out to discuss the accident. Discussion will focus to identify the root cause of the accident and to determine the immediate temporary countermeasure while still on the process to establish the permanent countermeasure to prevent recurrence and it will be facilitated by the immediate supervisor. The accident will be presented and discussed during the Central safety and Health Committee Meeting and Contractors Safety Coordination Meeting.

2.6 Past Incident review/Regular Education/ Introductory training

The THPAL, contractors and manpower agencies are required to attend a re-education of past accidents. All the past accidents and other accidents related to their working environment are discussed and explain clearly how the accident occurred and different ways that should be done to prevent it from happening again.

The said scheduled of re-education is coordinated to their respective departments so it will not affect the production schedule.

A review of the accidents shall be conducted by each concerned process to check if the countermeasures are implemented and effective. Additional permanent countermeasure maybe establish to prevent recurrence.

After the review shall proceed to re-education.

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