Imperial | Sarnia

# Site rules and regulations

## Sarnia manufacturing site

Product solutions

| | |
|---|---|
| **Emergency number Imperial land lines** | **2222** |
| **Emergency from outside phones (mobile)** | **519-336-ESSO(3776)** |
| **Non-life threatening injury/illness** | **519-339-2143** |

Responsible Care®

**Annual inspection colour code:**

2023 blue; 2024 yellow; 2025 purple; 2026 green; 2027 white; repeat

## Life saving actions (LSA)

Rev. Oct. 2024
WB00467 23 10

# 2024 Sarnia site calendar

Recognized holiday | Wage lieu day/ salary EDO | Wage lieu day only | Fixed holiday for shift employees | Fixed holiday wage only

## January

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## July

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## September

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## October

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## November

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## December

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| 29 | 30 | 31 | | | | |

## Contents

# Introduction

The contents of this booklet describe the Imperial, Sarnia manufacturing site rules and regulations.

The material presented in this booklet, is by design, brief in nature. The rules and/or requirements are primarily the result of regulations under the Occupational Health and Safety Act as well as site standards.

It is recommended that you carry the booklet when on the site.

***You are required to read this booklet, understand its content and certify that you have received a copy. Your supervisor will assist in answering any questions or concerns.***

## Safety policy

It is the policy of Imperial and the ExxonMobil companies in Canada to conduct their business in a manner that protects the safety of employees, others involved in their operations, customers and the public. The companies will strive to prevent all accidents, injuries and occupational illnesses through the active participation of every employee. The companies are committed to continuous efforts to identify and eliminate or manage safety risks associated with their activities.

Accordingly, the companies' policy is to:

- Design and maintain facilities, establish management systems, provide training, and conduct operations in a manner that safeguards people and property.
- Respond quickly, effectively and with care to emergencies or accidents resulting from their operations, in cooperation with industry organizations and authorized government agencies.
- Comply with all applicable laws and regulations, and apply responsible standards where laws and regulations do not exist.
- Work with government agencies and others to develop responsible laws, regulations and standards based on sound science and consideration of risk.
- Conduct and support research to extend knowledge about the safety effects of their operations, and promptly apply significant findings and, as appropriate, share them with employees, contractors, government agencies and others who might be affected.
- Stress to all employees, contractors and others working on the companies' behalf their responsibility and accountability for safe performance on the job, and encourage safe behaviour off the job.
- Undertake appropriate reviews and evaluations of their operations to measure progress and to foster compliance with this policy.

## Corporate security guideline

Security is everybody's business

Imperial Oil Limited takes reasonable precautions in its operations to:

- Ensure that employees can work securely.
- Protect the company's assets, including property, facilities, equipment, and information against damage, loss or misuse.
- Minimize security risks to customers, suppliers, sales associates and the general public, resulting from their association with the company.

To achieve these objectives, the company provides and maintains effective preventive security systems appropriate to the risks.

Employees are expected to:

- Support the security programs related to their specific work.
- Know their security responsibilities.
- Promote sound security practices.

It is through the ongoing commitment of all employees that the company's personnel, property, and information will be secure.

## Security

- Everyone entering company property at an electronic control point must:
  - swipe their access card when coming in and when leaving
  - present their ID badge if requested to do so by security, a receptionist, or person in charge of a building or area
- Do not lend your access card to anyone. If you have lost it, report the loss immediately to security. The lost card will be flagged and you will be issued a new card.
- If access card access does not work, contact security 519-339-2703.

## Drive in site access through automated gates

- Do not allow 'tail gating' (allowing someone to follow behind you through a control point):
  - until gate closes, block access, or, ensure vehicle behind has green light indicating Lenel swipe is authorized and they have care and control of the access point
  - do not allow others to pass through entrances without scanning their ID badge, including vehicles
- Anyone transporting company property out of company premises must have authorization for doing so.
- Company vehicles must have a company logo or company name clearly displayed.
- Everyone entering/exiting company property at a gate without a swipe card reader with security present must stop and provide security with site approved identification to be documented.
- Only vehicles displaying appropriate passes are allowed on company property (exception is delivery vehicles, transport trucks and vacuum trucks).
- Everyone entering or exiting company property with a vehicle, or equipment must permit security to examine the vehicle or equipment on request.
- Perimeter gates are to be kept closed and locked when not attended by security.
- Security incidents of wrongdoing, or suspected wrongdoing, are to be reported directly to your immediate supervisor or to security.

Guidelines for conducting contraband inspections:

- Participation in inspections is a term and condition of employment for employees and a function of contract for contractors. Failure to cooperate and/or participate in an inspection may result in denial of

entry or removal from company property, and may result in discipline up to and including termination for employees, and for contract workers may result in permanent disqualification of access to any and all company properties.

## Violence in the workplace

Imperial workplace violence guideline is posted around the site. Not only is violent behaviour in the workplace unacceptable, it is unlawful.

The company prohibits any form of workplace violence by or toward employees, contractors, suppliers, or customers. Forms of workplace violence include, but are not limited to:

- Threatening to attack a person.
- Leaving threatening notes at or sending threatening emails to a person.
- Shaking a fist in a person's face.
- Striking or attempting to strike a person.
- Throwing an object at a person.
- Kicking an object a person is standing on such as a ladder.
- Trying to run down a person using a vehicle or equipment such as a forklift, or
- Sexual violence against a person.

All employees, including managers, will be subject to corrective action up to and including termination of employment for committing, condoning or failing to report any form of workplace violence. Review the complete guideline for reporting requirements.

## Health policy

It is the policy of Imperial and the ExxonMobil companies in Canada to:

- Identify and evaluate health risks related to their operations that potentially affect their employees, contractors or the public.

- Implement programs and appropriate protective measures to control such risks, including appropriate monitoring of their potentially affected employees.
- Communicate in a reasonable manner to potentially affected individuals or organizations and the scientific community knowledge about health risks gained from their health programs and related studies.
- Determine at the time of employment and thereafter, as appropriate, the medical fitness of employees to do their work without undue risk to themselves or others.
- Provide or arrange for medical services necessary for the treatment of employee occupational illnesses or injuries and for the handling of medical emergencies.
- Comply with all applicable laws and regulations, and apply responsible standards where laws and regulations do not exist.
- Work with government agencies and others to develop responsible laws, regulations and standards based on sound science and consideration of risk.
- Conduct and support research to extend knowledge about the health effects of their operations.
- Undertake appropriate reviews and evaluations of their operations to measure progress and to foster compliance with this policy.
- Provide voluntary health promotion programs designed to enhance employees' well being, productivity and personal safety. These programs should supplement, but not interfere with, the responsibility of employees for their own health care and their relationships with personal physicians. Information about employees obtained through the implementation of these programs should be considered confidential and should not be revealed to non-medical personnel except: at the request of the employee concerned, when required by law or when dictated by overriding public health considerations.

## Environmental policy

It is the policy of Imperial and the ExxonMobil companies in Canada to conduct their business in a manner that is compatible with the balanced environmental and economic needs of the communities in which they operate. The companies are committed to continuous efforts to improve environmental performance throughout their operations to Protect tomorrow. Today.

Accordingly, the companies' policy is to:

- Comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist.
- Encourage respect for the environment, emphasize every employee's responsibility in environmental performance, and foster appropriate operating practices and training.
- Work with government and industry groups to foster timely development of effective environmental laws and regulations based on sound science and considering risks, costs, and benefits, including effects on energy and product supply.
- Manage their business with the goal of preventing incidents and of controlling emissions and wastes to below harmful levels; design, operate, and maintain facilities to this end.
- Respond quickly and effectively to incidents resulting from their operations, in cooperation with industry organizations and authorized government agencies.
- Conduct and support research to improve understanding of the impact of their business on the environment, to improve methods of environmental protection, and to enhance their capability to make operations and products compatible with the environment.

- Communicate with the public on environmental matters and share their experience with others to facilitate improvements in industry performance.
- Undertake appropriate reviews and evaluations of their operations to measure progress and to foster compliance with this policy.

## Responsible Care®

Imperial is one of Canada's oldest and largest producers of petrochemicals. The company is acutely aware that Canadians are more concerned than ever about the effects of chemicals on their health and the environment.

Recognizing this, we have integrated Responsible Care® into the business practices of Imperial's Chemicals division. This means we dedicate ourselves, our technology and our business practices to sustainability - and to the betterment of society, the environment and the economy.

In short, we are guided by these Responsible Care® principles:

- Prevent harm and help improve people's lives and the environment.
- Be accountable and response to the public.
- Take preventative action to protect health and the environment.
- Innovate for safer products and processes that conserve resources.
- Act as stewards of our products throughout their lifecycle.
- Understand and meet expectations for social responsibility.
- Work with stakeholders for public policy and standards that enhance sustainability.
- Promote the awareness of Responsible Care®.

Imperial's safety, security, health and environmental policies and practices fully align and support the Responsible Care® ethic and principles for sustainability.

## Accident prevention responsibilities

### Management shall:

a. Provide the equipment, materials and protective devices as prescribed.
b. Ensure that the equipment, materials and protective devices provided by the employer are maintained in good condition.
c. Ensure that the measures and procedures prescribed in the act and its regulations are carried out in the workplace.
d. Ensure that the equipment, materials and protective devices provided by the employer are used as prescribed.
e. Provide information, instruction and supervision to a worker to protect the health or safety of the worker.
f. Appoint a competent person as a supervisor.
g. Acquaint a worker or a person in authority over a worker with any hazard in the work and in the handling, storage, use, disposal and transport of any article, device, equipment or a biological, chemical or physical agent.
h. Afford assistance and cooperation to a health and safety committee in the carrying out of their functions.
i. Take every precaution reasonable in the circumstances for the protection of a worker.
j. Post, in the workplace, a copy of the act and any explanatory material outlining the rights, responsibilities and duties of workers.
k. Prepare and review at least annually a written occupational health and safety policy and develop and maintain a program to implement that policy.
l. Post at a conspicuous location in the workplace a copy of the occupational health and safety policy.
m. Provide to the health and safety committee, the results of a report respecting occupational health and safety.

n. Advise workers of the results of a report referred to in clause (m).

o. Accurately keep and maintain and make available to the worker affected such records of the exposure of a worker to biological, chemical or physical agents as may be prescribed.

p. Comply with a standard limiting the exposure of a worker to biological, chemical or physical agents as prescribed.

q. Where so prescribed, provide a worker with written instructions as to the measures and procedures to be taken for the protection of a worker.

r. Carry out such training programs for supervisors and committee members as may be prescribed.

## Leadership teams/supervisors shall:

a. Ensure that a worker works in the manner and with the protective devices, measures and procedures required by this act and the regulations.

b. Ensure that a worker uses or wears the equipment, protective devices or clothing that the worker's employer requires to be used or worn.

c. Advise a worker of the existence of any potential or actual danger to the health or safety of the worker of which the supervisor is aware.

d. Where so prescribed, provide a worker with written instructions as to the measures and procedures to be taken for protection of the worker.

e. Take every precaution reasonable in the circumstances for the protection of a worker.

f. Lower risk tolerance (you and your workgroup)
   - know the standards and enforce the standards
   - set the bar high for your workgroup
   - walk the talk
   - if you see your workgroup not following the standards you must intervene – coach and get commitment to change
   - know your people and their risk tolerance

g. Make sure **every** job has a plan
   - review the JLA/JSA with your workgroup before starting work and whenever something changes
   - make sure you understand what task level your job is and what are all of the requirements that come with it *(see Safe job plan requirements)*
   - is the job plan available to and understood by the field workers
   - if you are unsure of a requirement, **stop**! Ask for help from your Imperial contact or safety advisor

h. Encourage you workgroup to speak up
   - promote the blue near loss/hazard ID cards
   - if your workers have concerns, don't ignore them... get an answer!

i. Communicate, communicate, communicate
   - always use the sandwich approach – positives, coach and finish with a positive
   - make sure every shift starts out strong – make sure your message is clear, don't read from a sheet

j. Manage change
   - if the plan changes, stop and re-group – make sure your team understands this!
   - make sure you get the right people involved before moving on, after a change
   - reinforce LPSA use as the job progresses through each step of the plan and when a change is required

   **If you do not believe you can be a supervisor and do it safely, you should not proceed.**

k. Supervisors considerations with worker training

   As a supervisor you are responsible to know what training is required for all of your workers

Equipment/tool training:

- do you know what training is required for each piece of equipment being used by your workers? If not, find out before starting work
- do you know if each worker has the training that is required to use the equipment they are operating? If not, find out before starting work
- do your workers know how to do a pre-use inspection on the tools they are using? If not, you need to stop work, talk with your supervisor and determine how to do the inspection
- do you know what training is required to do the work that your crew is about to perform? If not, you need to find out

l. Supervisor guidance - fit for duty

What does fit for duty mean?

- all workers have all the correct training to complete the jobs they are being asked to do
- all workers are mentally and physically fit to do the work you are asking them to do
- no workers are under the influence of drugs or alcohol
- all workers understand are committed to following the sites standards
- as a supervisor you are responsible to ensure all of your workers are fit for duty
- you need to know your workers; are any of them stressed or thinking about something other than the task at hand? If so, you need to consider having that person do a modified job or even sending them home

m. Supervisors and work approval

- no mechanical work is to be started without an approved and released work order
- all working being executed by sub-contractors requires the primary contractor to be aware of the work activity and be the contact for the sub-contractor prior to the start of work

n. Contractor supervisors RMP guidance
   - RMPs are documents created jointly between Imperial and a contractor company. They document a plan to improve safety and have specific action items that the contractor company is going to work over the next year. All contractor supervisors should be knowledgeable in their companies RMP
   - if you haven't seen your RMP you should talk with your manager and ensure you have a chance to review it and help drive the improvements

o. Hours of work – worker fatigue
   - all workers on our site will follow the guidelines within the employment standards act
   - no worker shall work more than 13 hours in a day unless it is deemed urgent/emergency
   - callouts are considered urgent
   - all workers will have 1 day off in 7 or 2 days off in 14 includes maintenance work (maintenance - where the work assists in preserving the functioning of a system but does not involve a repair)
   - consistent with the employment standards act, exemption, for construction work (repairs where the work is necessary to restore a system or part of a system which has ceased to function or function economically), 13-days on and 1-day off criteria is permissible with SLS approval
   - contract employers, refer back to ESA for exceptions and additional stipulations that may apply, Imperial employees can refer back to Sarnia site leadership guide for more information

## Workers shall:

a. Work in compliance with the provisions of the act and the regulations.
b. Use or wear the equipment, protective devices or clothing that the worker's employer requires to be used or worn.
c. Report to his/her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker.
d. Report to his/her employer or supervisor any contravention of this act or the regulations or the existence of any hazard of which he/she knows.

## No worker shall:

a. Remove or make ineffective any protective device required by the regulations or by his/her employer without providing an adequate temporary protective device and when the need for removing or making ineffective the protective device has ceased, the protective device shall be replaced immediately.
b. Use or operate any equipment, machine, device or thing or work in a manner that may endanger himself, herself or any other worker.
c. Engage in any prank, contest, feat of strength, unnecessary running or rough and boisterous conduct.

## Employer and worker responsibilities

Under the Workplace Safety and Insurance Act of Ontario

- The Workplace Safety and Insurance Act of Ontario and Imperial Policy require reporting of all injuries and obtaining the appropriate medical treatment.
- Contact the health centre and your supervisor promptly if you have been injured at work.
- Contact your supervisor if:
  - you are unable to return to regular work

- Under the act, both the employer and the injured person shall cooperate in an early and safe return to work following an injury. The act requires that:
  1. Both parties contact each other as soon as possible after the injury occurs and maintain a communication throughout the injured person's recovery period;
  2. The injured person informs the employer as soon as he/she is medically able to return to work in a modified or full capacity;
  3. The supervisor and/or employer develop a modified work program which is consistent with the injured person's functional abilities;
  4. The injured person assists his/her supervisor in identifying modified work that is consistent with his/her current medical limitations and returns to modified work as soon as medically feasible.

## Horseplay/Fighting

- Horseplay or fighting is prohibited onsite and will lead to disciplinary action.

## Discipline

- Violation of Sarnia manufacturing site rules or the Occupational Health and Safety Act and its Regulations will be considered just cause for disciplinary action.

## Alcohol/Cannabis/Unauthorized drugs (A&D)

- All persons are prohibited from being unfit for work due to the effects of alcohol, cannabis, illegal drugs, non-prescribed drugs, prescribed drugs or the intentional misuse of medications. See the Imperial or applicable company Alcohol and drug policy for full details. When/if taking prescribed drugs that may impact you at work, discuss this with your employer's occupational health representative or manager if this position doesn't exist.

- Employees and contractors are not to use, possess, or be under the influence of prohibited substances, including cannabis, while at work. All of these actions would be considered policy violations.
- Contractor supervision/management are responsible to ensure A&D policies are administered, including determining when to test. Site access will be determined by Imperial management in cases involving violation of contractor A&D expectations. All contractors A&D policies are subject to Imperial compliance auditing. The Imperial front line supervisor/ point of contact is not responsible to decide for a contractor company when A&D post incident or reasonable grounds testing is required. If an Imperial FLS/POC is asked to decide, they should simply advise the contractor representative to follow their own company A&D program.

## **Aerogel** *(For more details, see: SMSM S.8.23)*

- Aerogel is an insulation material used on-site as it offers better insulating properties compared to other materials and has lower environmental impact. Health hazard information on Aerogel can be found in the product SDS.
- To minimize eye, skin, and respiratory irritation from dust exposure, a half mask respirator with P100 cartridges, and dust-tight goggles should be used when in direct contact with the insulation (e.g., cutting the material, application of the material, or otherwise generating significant dust levels). Additional PPE requirements include disposable or dedicated coveralls and impermeable gloves are also required. See "Dust controls and work practices" in section 24.6 of the *Sarnia mechanical safe work practices manual* for further PPE requirements when handling Aerogel.

## **Asbestos** *(For more details, see: SMS Asbestos management program)*

- Two types of asbestos are found in Sarnia site: Amosite and Chrysotile. Both types can be friable or non-friable. Friable asbestos can be found across the site, in pipe, vessel or building insulation and sprayed-on fireproofing. Non-friable asbestos is also found **across the site** in some types of gaskets and packing, old vinyl floor covering, cement board and pipe (e.g., Transite), some structural steel fireproofing, mastic coatings, some tracer tape.
- Refer to complex and building asbestos communication boards for detailed information of asbestos insulation and important contacts.
- Blue tags and metal elbows identify non-asbestos material.
- Red tags and mastic coatings identify asbestos-containing material.
- **Most importantly, if it is not clear that the material you may disturb is non-asbestos, stop work, secure the area and contact an Imperial representative.**

## Insulation – non-asbestos insulation removal procedures

- Insulators are the only trade allowed to remove or disturb mechanical insulation. The insulators have been trained to handle insulation products and identify asbestos containing materials (ACM).
- The insulators will be required to wear a half-face respirator with P100 respirator cartridges whenever they are removing non-asbestos insulation in order to be protected from the potential that ACM may be located under the non-asbestos insulation.

## Benzene *(For more details, see: SMS Benzene control program)*

For streams that contain greater than 0.1% by weight benzene, respiratory protection is required when opening equipment until benzene air tests verify the airborne concentration. If the airborne concentration is known the following chart can be used to select the appropriate respirator.

| Respirator type | Benzene airborne concentration (ppm) |
|---|---|
| No respirator required | ≤0.25 |
| Half mask air purifying respirator with organic vapour cartridge* | Up to 2.5 |
| Full face air purifying respirator with organic vapour cartridge* | Up to 25 |
| Pressure demand supplied air respirator | 25 or greater |

*Combination filters appropriate for organic vapours may also be used.

Respirator cartridges must be changed after one shift of use (eight hours).

Benzene resistant gloves are required when handling liquids ≥ 0.1 percent benzene when there is a likelihood of skin contact. The chart below outlines the glove requirements.

| Benzene concentration (%) | Glove material |
|---|---|
| ≥0.1 to ≤20 | Nitrile rubber (industrial thickness) |
| ≥20 | Silver Shield or Viton |

Eye protection is required if a potential for splashing exists. The chart below outlines the requirements.

| Benzene concentration (%) | Eye protection* |
|---|---|
| ≥0.1 to ≤3 | Chemical goggles |
| ≥3 | Chemical goggles with face shield |

*A full face respirator offers eye protection equal to goggles and a face shield.

For more information on benzene PPE, see the SMSM Benzene control program.

## Hazardous materials/WHMIS controlled products

- When entering hazardous material locations, or working with hazardous materials, follow all safe work procedures and use the required protective equipment.
- Know the location of the safety shower facilities, eye baths, SCBA equipment and fire extinguishers.
- If sprayed with a hazardous material, use a safety shower and/or eye bath immediately for at least 15 minutes.
- Safety data sheets (SDS) are available on the ExxonMobil/Imperial intranet (PSIMS) SDS website or in printed form on request from personnel with Imperial computer access, i.e., FLS, permit issuer, planner, etc. SDS must be available for any hazardous material that has been brought onsite.

- When a valve, fitting, line or piece of equipment which has been in contact with any process stream is removed from a unit to be worked on, or sent to any off-site shop, it must be neutralized and/or washed/purged thoroughly and identified by a WHMIS workplace tag.
- Hazardous materials must be kept only in compatible containers – consult the SDS.
- When any hazardous material is placed in another container, it must be labeled using a WHMIS workplace label. Non-hazardous material in another container must be marked with the name of the material in the container.

## WHMIS 2015 groups the hazards into physical and health hazard pictograms

**Exploding bomb**
(for explosion or reactivity hazards)

**Gas cylinder**
(for gas under pressure)

**Health hazard**
(may cause or suspected of causing serious health effects)

**Flame over circle**
(for oxidizing hazards)

**Skull and crossbones**
(may cause death or toxicity with short exposure to small amounts)

**Flame**
(for fire hazards)

**Corrosion**
(for corrosive damage to metals, as well as skin, eyes)

**Exclamation mark**
(may cause less serious health effects or damage the ozone layer*)

**Environment***
(may cause damage to the aquatic environment)

**Biohazardous infectious materials**
(for organisms or toxins that can cause diseases in people or animals)

## Heat stress trigger points *(For more details refer to SMSM 08:04)*

| Increasing ↓ | Humidex ranges | Actions | Liquids | ↑ Decreasing |
|---|---|---|---|---|
| | 33 to < 38 | Issue recognition/alerts | Drink water | |
| | 38 to < 40 | Reduce physical activity to 45 minutes/hour. Slower pace | Drink one cup of water every 20 minutes | |
| | 40 to < 42 | Reduce physical activity to 30 minutes/hour. Slower pace | Drink one cup of water every 20 minutes | |
| | ≥ 42 | Stop all non-emergency work. Emergency work can proceed using emergency work heat stress prevention procedures. | Drink one cup of water every 20 minutes | |

### Instructions for use:

Depending on type of work, clothing and sunlight – adjustments to the announced alert may be required (see below):

**Light conditions:** light exertion like sitting or standing with light arm work - low or intermittent sunlight - *decrease one colour level*.

**Moderate conditions:** moderate exertion with normal work clothing in intermittent sunlight - *no adjustment.*

**Heavy conditions:** intense arm and leg work, carrying, shoveling, pushing or work at fast pace - or- wearing additional protective clothing, such as disposable coveralls, over standard PPE –or – working in continuous direct sunlight or in close proximity to other radiant heat source, such as a furnace or boiler – *increase one colour level*. In cases where there is additional protective clothing and radiant heat sources – *increase two colour levels*.

*See SMS Safety manual section 8:04, Heat stress policy for details.*

We monitor the humidex ranges with a stationary instrument and have the ability to cross check humidex with hand held calibrated instruments. Humidex is used to describe how hot the weather feels to the average person, by combining the effect of heat and humidity.

**Wet bulb globe temperature (WBGT)** for location specific measurements may be requested. WBGT is influenced by air temperature, radiant heat (i.e., direct sun, nearby hot equipment, etc.), air movement and humidity and is considered a better indicator of worker comfort than humidex which only considers air temperature and humidity. It is recommended that WBGT be used in instances where there is significant radiant heat from process equipment; i.e. When working in close proximity to furnaces, boilers and steam lines. Imperial industrial hygiene or safety should be consulted on the use and application of localized WBGT readings.



## Lead and PCBs in coatings *(For more details, see: SMSM 08:14)*

- Lead containing (0.01 percent by weight) paint and galvanized coatings are present at Sarnia site.
- PCB contaminated materials include equipment or any substance that is coated with or contains PCBs at or above 50 ppm (liquid or solid).
- The presence of lead and PCBs in a coating must be determined prior to the start of work or treated as lead containing for the duration of the work and determination of lead and PCB content made prior to disposal. In situations where presence of lead and PCB cannot be determined in advance; consider using tools with effective dust collection systems equipped with a HEPA filter and completing work according to Type 1 Control Level. Depending on the nature of work different procedures are required to mitigate the lead hazard. Classification of the work is to be completed by the mechanical FLS.
- A safe job plan must be developed prior to completing any work on lead or PCB-containing coatings.
- Prior to working on lead or PCB coating, workers involved must receive awareness training.

- Engineering, procedure and PPE control requirements for handling lead or PCB-containing coatings are outlined in Health hazards section 08.14 of the SMSM.
- Refer to Sarnia waste disposal guide Section 7.13 for PCB waste handling, storage, and disposal requirements.

## Legionella *(For more details, see SMSM 08:13)*

- Airborne water droplets from cooling towers (CT) may contain bacteria called Legionella. These bacteria can be inhaled by people working around the CT. As a precaution, workers who are on or within the tower structure and are in direct contact with the CT mist shall wear a half-face P100 filter respirator.

## NORM *(For more details, see: SMSM 08:10)*

- Naturally occurring radioactive materials (NORM), may be present in some process equipment. Most commonly found in the following units – AVIS, FCIS, CCIS, HOIS and GCIS in streams associated with unprocessed product such as crude, propylene and ethylene. See NORM standard for details on hazards, testing, PPE, training and roles and responsibilities related to work activities with potential NORM. The main hazard is the inhalation or ingestion of NORM contaminated dusts. Specialized training is required to work with NORM. Three levels of training are defined below:
  - **NORM worker awareness training:** All persons who work in a NORM contaminated area must receive NORM worker awareness training.
  - **NORM meter user/friskers training:** All persons taking NORM measurements must complete hands-on training for the use of the instruments they will be using and be signed off by Imperial industrial hygienist or a designated NORMs representative (DNR). This training will build on information provided in NORM worker awareness

training and review techniques to be used when scanning equipment for NORM contamination as well as required frisking techniques.

- **Advanced/Designated NORMs representative (DNR) training:** All persons who serve as DNR for NORM controlled worksites must have received advanced NORM training (in addition to NORM worker awareness training). This training will provide knowledge and skills required to effectively manage a NORM contaminated work site.

## NORM thresholds

| Type of radiation | NORM contaminated | Clean (de minimis) | Unit of measurement | Measurement device |
|---|---|---|---|---|
| Alpha or Beta particles | ≥ 200 | < 200 | Counts per minute (CPM) | Pancake probe |
| Gamma waves (photons) | ≥ 0.5 @ 0.5 meters | < 0.5 @ 0.5 meters | (Microsievert) µSv/hr | Scintillation probe |

## NORM control levels

| NORM control level | Inhalation hazard | Transfer potential? | Examples of typical activities | Personal protective equipment | Work zone |
|---|---|---|---|---|---|
| Level 0 | No | No | ▪ Working >10 feet from active work involving NORM contaminated equipment.<br>▪ NORM evaluations with little or no direct contact required.<br>▪ Handling ***CLOSED/SEALED***:<br>- equipment<br>- NORM waste containers or<br>- pipe with potential internal contamination | ▪ Normal PPE<br>▪ Respirator not required<br>▪ Frisking is not required | None |
| Level 1 | Low | No | ▪ Working within 10 feet of active NORM work but not handling contaminated equipment.<br>▪ Completing internal inspections of vessels/ tanks with ***FIXED*** NORM.<br>▪ Handling ***OPEN*** equipment with ***FIXED*** NORM such as piping, vessel internals, exchanger bundles, etc. including use of hand tools that result in limited mechanical abrasion. | ▪ Half face APR with P100 filter<br>▪ Frisking is not required | Hot and cold |

| NORM control level | Inhalation hazard | Transfer potential? | Examples of typical activities | Personal protective equipment | Work zone |
|---|---|---|---|---|---|
| Level 2 | Low/ Medium | Low – limited to immediate work area | ▪ Handling OPEN equipment with FIXED or LOOSE NORM with ***limited exposed surface*** area such as cutting 2" pipe with a sawzall, changing process filters, screens and strainers, valve removals, etc. | ▪ Half face APR with P100 filter<br>▪ Gloves impermeable to particles with a nitrile layer underneath.<br>▪ ***Frisking required*** where tool or PPE had direct contact with NORM contaminated equipment and of respirator prior to removal | Hot and cold |
| Level 3 | Medium/ High | Medium/ High | ▪ Internal inspections of vessels / tanks with ***LOOSE*** NORM<br>▪ Handling ***OPEN*** equipment with ***LOOSE*** NORM contamination such as:<br>- piping, vessel components or tank cleanouts<br>▪ Moving or removal of NORM scale/sludge into waste containers such as during tank or vessel cleaning.<br>▪ Use of power tools or activities resulting in mechanical abrasion such as chipping, scraping, sanding, abrasive blasting, grinding, drilling, polishing, cutting or welding on surfaces contaminated with ***FIXED*** or ***LOOSE*** NORM. | ▪ Half face APR with P100 filter<br>▪ gloves impermeable to particles with a nitrile layer underneath.<br>▪ A disposable layer impermeable to particles.<br>▪ ***Frisking required for full body, tools and equipment leaving NORM Hot Zone***<br>At the discretion of the DNR:<br>▪ Tape should be used to secure boots and gloves | Hot and cold **and** consider Warm zone |

## **Radiation** *(For more details, see: Sarnia site radiation safety manual)*

- Imperial uses fixed radiation devices (also called fixed gauges) mounted on pipes, vessels and on conveyors to perform quantitative measurements. Fixed gauges are only located at Area 3, SPEP.
- Radiation devices are clearly identified by signage in the field.
- Only those individuals trained as authorized users are allowed to perform lock outs or any other maintenance activities on the fixed radiation devices.
- The RSO individually authorizes those staff that have received radiation safety training and passed the *Authorized user radiation safety training* course test to use radiation devices.

## **Silica** *(For more details, see: SMS Silica control program)*

- Silica procedures on Sarnia site are modelled after the MOL guidelines for construction activities.
- The presence of silica must be determined prior to the start of work. The *SMS silica control program* outlines uses of silica as well as procedures and PPE required when handling silica.

## Solvents

- The use of gasoline or similar light hydrocarbons capable of giving off hazardous vapours at ambient temperatures is **forbidden** for cleaning clothing, motors, engines or other equipment.
- Solvents may be used for cleaning and degreasing. In a shop area, a metal solvent degreasing bath with fusible link on the lid catch must be used. The solvent bath must have a WHMIS label.
- Portable containers must be CSA, UL or ULC approved and equipped with a pouring spout, flame arrestor, spring loaded cap and have the correct WHMIS label.
- Appropriate ventilation must be provided when using solvents.

## Food

- No food, drink or tobacco shall be taken into or left or consumed in any room, area or place where any substance that is poisonous by ingestion is exposed. Water for heat stress is allowed.

## Entanglement

- Long hair shall be suitably confined in order to remove exposure hazard to heat sources as well as rotating tools and equipment.
- Loose or dangling clothing (e.g., strings on hoodies), jewelry or rings, shall not be worn when working near live electrical sources, any rotating shafts, any gears or any other source of entanglement.

## Hazard identification or hazard ID cards

- Hazards identified must be reported to the identifier's supervisor and responsible area owner. In many cases, hazards are resolved immediately, sometimes requires SAP or (Emerg notification) entry for work planning and a temp mitigation.
- OHSA states:
  - **duties of workers**: 28 (1) A worker shall, report to his or her employer or supervisor the absence of or defect in any equipment or protective device of which the worker is aware and which may endanger himself, herself or another worker...
  - **duties of supervisor:** 27 (1) (c) take every precaution reasonable in the circumstances for the protection of a worker
- Hazard ID cards: primarily used by the contract workforce as a communication tool. Where additional action is required for hazard ID cards, SAP (or Emerg as applicable) work notifications are entered (following GRS work planning and execution) Imperial employees most often leverage our SAP work notification process where work needs to be coordinated via SAP.

- The hazard ID card, asks for the "Immediate response actions/mitigations to prevent the loss from occurring"
  - if using the hazard ID card to identify a hazard, effectively addressing this question is critical. The FLS/POC and area owner (i.e., operating unit, or building warden, etc.) must always be made aware

In any case, when leveraging the hazard ID card or other ways to address hazards:

1. Where we identify a hazard, we need to mitigate it.
   - either personally where feasible, this could include effective temporary barriers
   - or by getting a more appropriate work group to mitigate, i.e., asking electricians to energy isolate a damaged street lamp while ensuring no one can be hurt by the hazard until a mitigation is in place. Efforts shall be made by individuals that identify hazards to mitigate the hazard (i.e., barricade tape) as soon as possible. If unsure what mitigations are required, please consult your supervisor or a safety advisor
2. In every case
   - the responsible supervisor needs to be made aware
   - supervisor is then responsible to take action to help resolve, either personally or by effective transfer to a more appropriate resolution owner
3. If resolution is temporary, i.e., barricade tape and tags, the right area owner needs to be made aware and agree to ensure long term mitigations are implemented.

## Inclement weather

- The DESL will make the determination of what precautions to take concerning inclement weather like lightning or snow storms, based on information from our site policy.

Safety

- Site will communicate precautions, i.e., when to take shelter due to weather extremes.
- Site will also communicate when it is safe to return to outdoor work once the risk of lightening has passed, notifications may typically echo: a) "Lightning outer perimeter stop limited egress work", b) "Lightning inner perimeter – stop outdoor work", c) Lightning all clear inner perimeter resume general work, d) "Lightning all clear - outer perimeter".
- The objectives of lightning notifications are to have personnel stop non-essential work outside and come off of structures where lightning strikes are more likely. Such notifications aren't cause to huddle within buildings and trailers beyond the scheduled end of shift. Contact your FLS/POC if there are concerns about conditions that work areas may have been left. Personnel are welcome to stay within buildings and trailers until an all clear is issued/ weather subsides, however will not be required to stay beyond the end of their shifts due to weather.
- **For severe weather notifications, limited egress means:**
  An area where return travel to ground level takes greater than five minutes. Some examples that might take the "average person" five minutes are climbing down numerous ladders from the top of a tall tower, or climbing down stair structures from the top of the cat and coker structures. Some self-assessments may be necessary where an individual's physical ability may inhibit their ability to exit in the same amount of time as an "average person".

## Winter safety *(For more details, see SMSM 12.03)*

The site has three winter levels/colours depending on significant winter weather conditions:

**Green = Normal** Site snow removal crews **not activated**. Base safe job planning/LPSA.

**Yellow = Moderate** Snow crews are **activated**. Review winter JSA or JLA before starting or resuming work. Also initiated by extreme cold.

**Red = Severe** Excessive snowfall, unable to maintain common walkways. Review "path forward" with your Imperial supervisor - based on the current/ forecasted weather and the tasks that are to be done, a decision will be made if work is to continue. Communications and guidance will go out to all applicable Imperial supervisors. Work that **does** continue must reference a specific JLA/JSA.

For inclement weather, we have a call in number 1-888-261-4911.

- The call in number will only be updated for winter conditions when elevated to winter level red.
- In severe weather, non-essential personnel may not be required to work and should consider calling this number before travelling to site, i.e., to determine if it is winter weather level red.
- Recommend to review in advance with your supervisor to determine if you are considered "essential personnel". Reference *Sarnia site leadership guide* (09:09).
- Follow the prompts within the recorded message to learn about conditions at the Sarnia site. The number can be used for any type of inclement weather conditions (or any other type of mass communication).

## Jewelry/Rings

- Do not wear exposed jewelry or rings while:
  - climbing ladders
  - working near electrical sources including welding machines
  - working near/with rotating equipment or any other source of entanglement

## Life saving rules (serious violations)

*(For more details, see SMSM 02:07)*

1. Failure to follow 100 percent tie-off requirements.
2. Violating work permit procedures.

Safety

- entering a confined space without approval or a valid permit or standby present where required
- issuing or receiving a work permit without a required gas test being conducted
- working without a valid permit on jobs that require a permit
- issuing or receiving a permit without job-site verification where required by site safety standards

3. Failure to follow hazardous energy control procedures.
   - conducting maintenance on equipment without all hazardous energy isolated and controlled
   - unauthorized removal or tampering with hazardous energy control devices (lock-out/tag-out devices)
   - opening process equipment without verifying the equipment is properly cleared, isolated, and de-energized or without wearing proper PPE
4. Defeat of SHE critical device without proper authorization.
5. Failure to follow cranes and lifting requirements.
   - working without or falsifying any required cranes and lifting T1BP checklists
   - defeating a crane safety function to complete a lift
   - entering an established drop or crush zone during an active lift without authorization

   **Notes**:

   I. An "active lift" is defined as: The period of time when the load is held by the lifting equipment without an independent means of preventing movement

   II. Cranes and lifting requirements for "Manual hoisting and shifting" requirements apply with loads >1000lbs, this could include operation of a chain-fall or come-along

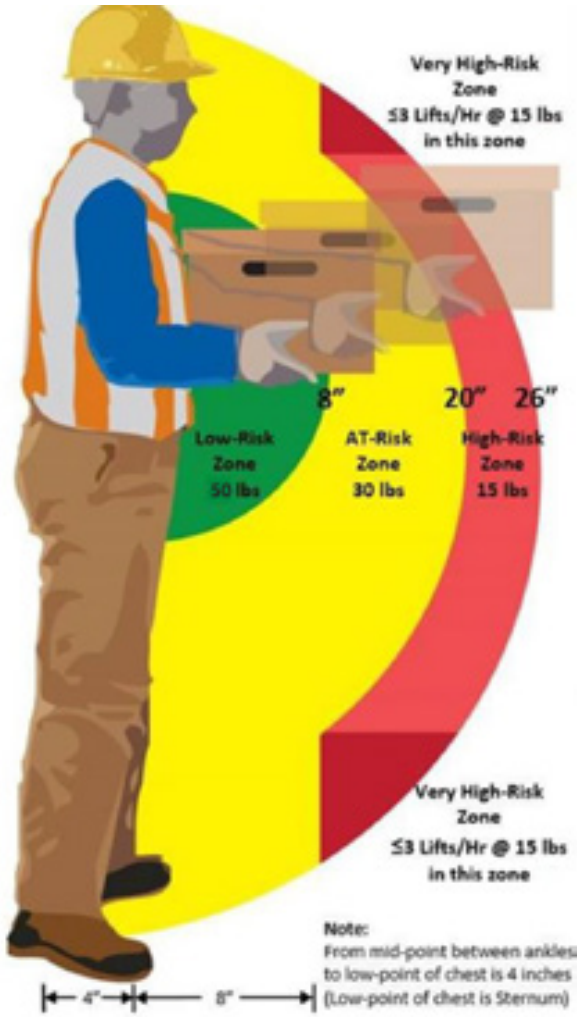
III. This does not apply to hand hoisting with a rope, gin-wheel or any manual lifts with mechanical assist below 1000lbs
   - Where the cranes and lifting requirements for "Manual hoisting and shifting, Appendix G" does not apply, potential for falling objects should be addressed as a tiered work activity, as described in the working at heights standards

## Lifting and carrying *(For more details, see SMSM 2:14)*

- Never throw objects down from upper levels or up to someone in elevated areas.
- Use mechanical material handling equipment for lifting heavy objects.
- Use approved containers to lift tools and/or loose materials to an elevated work area.
- When rolling a drum, push with hands against the side. Do not grasp the ends or push it with the feet.
- Never carry an object that prevents you from seeing where you are going. Always keep one hand free for holding the handrail when carrying an object while ascending or descending stairs.
- Seek assistance for loads that are too heavy or awkward to lift alone. A person must not lift anything more than 50 pounds. Seek assistance and consider mechanical lifting devices.
- Proper lifting methods:
  1. Test for weight.
  2. Keep back straight.
  3. Lateral distance between feet should be shoulder width.
  4. Position yourself as near to load as possible.
  5. Bend with the knees and lift with your legs.
  6. Turn with your feet, do not twist the back.

7. Consider personnel manual lifting, handling and carrying table:

| Vertical Zone | Horizontal Zone* | | |
|---|---|---|---|
| | Close: < 12 ins | Mid: 12 ins to 24 ins | Far: 24 ins to 31 ins |
| 12 inches above shoulder to 3 inches below shoulder | 35 lbs | 15 lbs | No known safe limit for repetitive lifting |
| Below shoulder to knuckle height | 50 lbs | 35 lbs | 20 lbs |
| Knuckle height to mid-shin height | 40 lbs | 30 lbs | 15 lbs |
| Mid-shin height to floor | 30 lbs | No known safe limit for repetitive lifting | No known safe limit for repetitive lifting |




## Management of change (MoC) *(For more details, see: SMSM 14)*

- The management of change process must be followed to gain approval for deviations from any of the rules and regulations identified in: this booklet, the Occupational Health and Safety Act for Industrial Establishments and Construction Projects, the *Sarnia manufacturing safety* manual, the *Mechanical safe work practices* manual or other site standards, i.e., health programs, designated substance control programs, unit specific standards, etc.

- We have a temporary deviation standard SMSM 14-08. This standard defines a process for one-time temporary deviations which are managed outside of the electronic gMOC system. The intent is to offer a review process equivalent to the electronic gMOC while requiring less time investment to prepare, review and approve.

## Matches/Lighters

Only safety matches and enclosed mechanism type lighters are allowed to be carried across the site. Disposable (including child-proof models) and single action type lighters are prohibited within operating units, and must not be kept in the pocket when performing welding and grinding activities anywhere onsite.

## Office safety/Cyber security

- Keep desk and file drawers closed when not in use.
- Never stand on drawers, folding and rolling chairs, desktops, waste cans, or similar objects.
- Never hurry or run around blind corners, on stairs or in corridors. Use caution in approaching doorways, closed doors or swinging doors.
- Use handrail and move one step at a time when ascending or descending stairs.
- Know the location of fire extinguishers and exits.
- Secure extension cords, phone lines, computer cables, etc. so that they do not become a tripping hazard.
- Don't read printed materials or hand held device while walking.

### Cyber security

- Removable media such as USB drives, CD/DVDs or portable hard drives are not permitted. Their use is strictly enforced and requires an approved exception.

Safety

- Connecting non-company laptops or third-party devices to company owned computer equipment is not permitted. Their use is strictly enforced and requires and approved exception.
- Do not enter any computer rooms without proper authorization.
- Do not attempt to circumvent any access locks or security controls that may be in place on any computer equipment.
- Do not install any software on company owned computers without proper authorization.
- Do not use web-based email such as Gmail or Yahoo mail from company computers unless you have obtained an approved exception.
- Report suspicious emails by clicking the Suspicious E-mail Reporting button in Outlook.
- Screen-lock your computer or remove your Smart Card and ensure your computer is locked when it is unattended, even for short periods.
- Use strong passwords or pass phrases and do not share passwords or PINs with anyone.
- Report any security concerns or misuse of computer equipment to your supervisor or the IT Help Desk immediately.

## **Railroads** *(For more details, see: SMSM 20:06, SMSWP 9.4)*

- Do not pile materials, build scaffolds or erect any structure closer than 2.5 metres (eight feet) from the centre line of any railroad track.
- Use caution when crossing railroad tracks and cross at an angle.
- Do not walk between or under rail cars except when connecting/ disconnecting the car for loading/unloading.

## Safety attendants

- Safety attendants for confined spaces, mobile equipment signalers and any worker who may be endangered by vehicle traffic must wear a vest

or equivalent garment that is a fluorescent blaze or international orange in colour, highly visible with retro-reflective and fluorescent stripes as defined in O.Reg.213/91 S.69.1 & S. 106. *(Refer to CSA Std. Z96-15 for more details, pictorial examples, and certifications).*

- Confined space safety attendant must: *(For more details, see: SMSM 5:06)*
  - be trained in safety attendant training
  - log in and log out all entrants (the entry log must be available at the point of entry)
  - record the results of continuous monitoring where required
  - have a way to communicate, a radio or air horn
- Hot work safety attendant must: *(For more details, see: SMSM 11:01)*
  - be trained in safety attendant training
  - understand the general safety concerns associated with hot work and the potential impact of a gas test result on the work's continued safe execution
  - know the meaning of the emergency alarms and how to obtain assistance
  - be trained in the use of fire extinguishers
- Mobile equipment safety attendant (signaler) is required when:
  - the equipment operator's view of the intended path of travel is obstructed
  - any portion of the equipment could come within the electrical limits of approach to live power lines ≥ 480 volts; or
  - operation of the equipment or its load could endanger any person
  - whenever moving equipment inside an operating unit
  - signaler shall not perform other work while acting as a signaler *Reg 213/91 S.106*

## Short service workers (SSWs)

- SSWs shall wear an orange hard hat.
  - will have a documented SSW plan and an assigned mentor who inputs progress into the SSWs plan weekly
  - the SSW and the mentor need to be aware of their responsibilities

## Smoking/Vaping *(For more details, see: SMSM 02:03)*

- Smoking/vaping is prohibited on the Sarnia site except in designated outdoor smoking/vaping areas.
- Smoking/vaping is not permitted in any vehicle owned or operated by the Sarnia site. This restriction applies to vehicle use away from the site.

## Static discharge *(For more details, see: SMSM 11:07)*

- Control potential static discharges with proper bonding and/or grounding.
- Avoid dropping objects into tanks, tank cars or tank trucks (such as tools, pens, glasses or flashlights) as this may cause a static arc through the vapour space.
- Preventing ignition: draining small amounts of liquid from valved low points.

  **Use a bonded metal pail with a non-insulated metal handle.**
  - **never** use a plastic pail with a metal handle or an all-plastic pail
    - preferred disposal is to pour contents of pail into a closed sump if available
    - **note:** there is no safe conductivity inside a plastic container
  - **never** suck a pail/pan out while draining
  - allow minimum 15 minutes of relaxation time prior to vacuuming, and ground the vacuum truck first. Move pail to a safe location if possible first

**When spidering open a flange** to drain equipment with no low point drain:

- use either a bonded metal pan, or
- use a berm filled with absorbent material (floor-dry or absorbent pads)
- never use a plastic pan or swimming pool
- never suck a pail/pan out while draining
- allow 15 minutes relaxation time prior to vacuuming, and ground to vacuum truck first. Vacuum trucks must use a conductive hose. Have fire extinguishers on standby while pan or berm contains hydrocarbon

## Training and training equivalency

If a contractor would like to have training programs recognized for confined space entry, working at heights, respiratory protection other than those already approved by the site or the Industrial Education Cooperative of Sarnia as an equivalent program, that contractor's management must first perform a gap assessment of the program; deem it to be equivalent and then have the assessment deeming equivalency approved by an Imperial safety advisor before the program will be recognized.

## Unoccupied buildings/Trailers/C-cans

- Unoccupied buildings: Any building onsite that is not intended for occupancy must not be entered, unless it is to perform tasks associated with the building or its contents:
  - conducting activities that are necessary for maintenance of the building itself
  - dropping off or retrieving materials which are stored in the building
  - conducting checks or to obtaining status of any equipment or instrumentation located inside the building
- For all of the above activities, persons must not stay any longer than required to complete the task. This is to prevent injury from the potential collapse of the building if a vapour cloud explosion occurs.

Barriers

## Barricades/Taping *(For more details, see: SMSM 12:04)*

### Hard barricade

Shall meet the definition of a guard rail *(see Guard rail section for definition).*

### Soft barrier

May include a sign, ropes, chains, barrier tape, wooden saw horses, snow fence, traffic cones, painted ground markings, saw horses, gate, concert fence that is not properly secured to meet the intent of a hard barricade per guard rail requirements.

Note: Soft barriers must be 6.5 feet (two metres) from a fall hazard.

### Barrier information tags

Barrier signs and/or information tags will be used to communicate hazards information.

Tags should have following information:

- The date the barrier was erected.
- The description of the hazard.
- The responsible person's name and company.

### Yellow "Caution" tape

Used to alert others of increased hazards in the work area, such as hoses laying on that ground which could cause a tripping hazard. A person may enter the area as long as they are aware of the hazard and take precautions necessary to avoid adverse exposure to the hazard.

### Red "Danger" tape

Indicates the presence of an immediate health and safety hazard.
Red taped areas have an immediate danger to health and safety with potential for serious injury (e.g., high pressure water cleaning, falling objects.) Access is only permitted via permission from the individuals responsible for the barrier area; a safe work permit may also be required.

Do not unnecessarily block walkways or more area than required for ease of barricade installation in high traffic areas. Consider using temporary stands or tall pylons to establish a barricade perimeter.

## Buddy manager/embedded contractor companies

The following list of contractor companies as of January 2020 are considered embedded contractors. These are Buddy manager and embedded contractor companies. Changes to this list may occur throughout the year which is reflected on the approved contractors list (ACL):

- Ceda Reactor Ltd.
- CIMS LP
- Curran Contractors Ltd.
- HSE Integrated Ltd.
- Integra Technologies
- Interface Testing Solutions (ITS)
- Kel-Gor Limited
- Mammoet Canada Inc.
- Mellon Enterprise
- Paladin Security Services
- Precision Concepts Inc. (PCG)
- GFL Environmental
- Safway Services Canada Inc.
- SGS Canada Inc.
- TASC - Total Access Solutions Corp.
- Matrix

## Confined spaces *(For more details, see: SMSM 05)*

A confined space is any enclosed or substantially enclosed space, which has the following characteristics:

- Is not designed to be normally occupied and;
- Has limited ventilation or could potentially contain hazardous levels of gases/vapours; or could contain other hazards (e.g., engulfment, potential exposure to radiation sources).

The live (active) *Confined space entry safe job plans* must be at the permit counter until the job is complete.

- No entry is permitted until the confined space has been gas tested, a safe work permit has been issued, a safety attendant is present, and the Sarnia manufacturing site *Confined space entry protocol* requirements are met.
  - all workers must be trained in confined space entry
  - the confined space assessment and rescue plan must be reviewed and signed off by the workers prior to entry
  - all workers must be logged in and out of the confined space (by name, time in and out)
- A confined space entry warning sign must be posted at each entry point when the space is open and a safety watch is not present.
- The *Confined space assessment/checklist* must be reviewed as often as necessary to ensure that the relevant plan remains adequate.
- If a new hazard not originally considered is identified:
  - stop the job
  - assess/mitigate the new hazard
  - document the changes in the *Safe job plan/safe job pack*
  - communicate the changes as necessary
  - proceed with the task following the revised plan

- Oxy-acetylene, propane and other gas cylinders are not permitted inside confined spaces.
- Torches (tiger torches, rosebuds, etc.) and hoses used in confined spaces shall:
  - be placed (not thrown) through the opening
  - have valves fully closed and removed when not in use
  - be removed and the flow of all gases shutoff at the regulators/ cylinders, when the entrants leave for breaks or if leaving in the confined space, disconnect hoses from the cylinders


Confined spaces

## Contacts from Imperial

| Complex | Permit desk | Control room |
|---|---|---|
| A | 519-339-5774 | 519-339-7103 |
| B | 519-339-2485 | 519-339-2430 |
| C | 519-339-2380 | 519-339-2660 |
| D | 519-339-4809 | 519-339-4057 |
| E | 519-339-4133 | 519-339-5679 |
| U | 519-339-5774 | 519-339-2158 |
| BIOX | 519-339-2312 | 519-339-2158 |
| GCIS | 519-339-2533 | 519-339-2540 |
| NSIS | 519-339-2106 | 519-339-2106 |
| SRTF | 519-339-2183 | 519-339-7103 |
| P&A | 519-339-5771 | 519-339-5767 |

- SERL – Site emergency response leader 519-339-2214
- DESL – D/E shift leader 519-339-4890
- RSS – Refinery ops shift supervisor 519-339-2993
- PNA shift ops shift supervisor 519-339-5770
- BC&I ops shift team leader 519-339-2267
- Security gate #318 519-339-5500
- Security gate #2 519-339-5666
- Power distribution group cell 519-490-5834
- Electrical SME, Darryl Pole 519-339-2451
- Site lift specialist – Chris Robbins 519-339-2840 or 519-339-4415
- LPS and training – Carl Macmillan 519-339-4424
- Emergency response/Security advisor – Brandon Williams 519-339-2122
- Safety advisor – Michael Desotti 519-427-0308
- Fire marshal – Steph Tully 519-339-4178

- Environmental specialist – Andrew McLeod 226-254-7423
- CBRE – Site emergency call centre 1-877-289-9325
- Contract concerns – Ron Houser 519-339-2405
- Safety group leader – Shane Ferneyhough 587-476-4419
- I.H. Industrial hygiene concerns – Natasha Burt 519-339-2219
- Research reception 519-339-2712
- SSH&E advisor – Matt Balog 519-339-2321
- Training/Security centre 519-339-4888
- MOB reception 519-339-2760
- Site medical centre 519-339-2546
- Asbestos Abatement Coordinator – Paul Hallet 519-464-7516

## Daily shift start toolbox safety talk

- Daily shift start toolbox safety talks are facilitated by crew supervisors and held at the start of each shift.
- Personnel must be fit for work, dressed and ready for work at start of the safety talk.
- Facilitate meetings in way that evokes crew discussion and participation.
- Throughout the week during toolbox talks (in place of standalone safety meetings), discuss relevant emerging issues/concerns, site info sharing, impactful weather conditions, unit operation changes and daily activities.
- For effectiveness and retention, these meetings should be ≤15 minutes. This could mean don't cover all of the safety huddle material in one day, and only cover what is relevant to the work group.
- Assign key jobs, which may include high level LPSA discussion before detailed LPSA performed in the field.

## Cranes and mobile hoisting equipment

*(For more details, see: SMSWP 5:36 and 13)*

1. Manufacturers minimum requirements must be satisfied. Do not deviate from manufacturers manuals/guidelines. If a conflict between site standards and a manufacturers manual is identified, default to the most stringent requirement.
2. For fix cab/carry deck machines (i.e., Brodersons & Shuttle Lifts), apply parking brake as well extend outriggers before exiting machine.
3. Machines with hand brake applications, verify brake tension prior to exiting the cab (refer to owners/service manual).
4. For mobile cranes (i.e., Link Belt, Grove, Tadano, boom truck, etc.) that have air brakes or equivalent electric brakes that fail safe; do not require a secondary means of securement.
5. All lifts require a documented lift plan (either a Mobile crane checklist or Fixed cab checklist).
6. A lift director must be assigned for all lifts.
7. All personnel involved (i.e., operators, riggers, signalers, spotters, lift directors) with lifting activities need to complete the T1BP training modules for their assigned role(s), defined in MSWPM 5.36.
8. Lifts are classified as either 'basic' or 'complex', based per MSWPM 5.36.
9. Basic lifts can be estimated for loads up to two tons (4,000 pounds).
10. Complex lifts include (See MSWPM 5.36 for full lift classification criteria):
    a. lift >80 % of crane capacity
    b. loads >50 ton (100,000 pounds), (when referring to ton (t) in this standard = 2000 pounds)
    c. any lift requiring more than one crane
    d. lifts performed while crane is working on rubber charts (except for fixed cab cranes)
    e. site lift specialist approval is required for all 'complex' lift plans

11. Lifting near overhead power and communication lines checklist is required if work zone is closer than 20 feet (6.1 metres) to an overhead power line.
    a. if any part of the 'work zone' that is going to be closer than the legal limits of approach [O.Reg 213/91 S. 188.(2)], contact power distribution and site lift specialist
    b. work zone means: the two-dimensional area (plan view) representing the furthest extent any part of the crane or load (including rigging) is planned to reach during assembly, disassembly, reconfiguration, and lifting,based on the planned crane configuration(s) and load orientation(s)
12. Controls need to be in place to manage personnel access to the work zone (including defining exclusion zone, drop zone, load crush zone, and counterweight crush zones). For more information, refer to Barricades/Taping section.
13. No one is to climb on a crane or enter the counterweight crush zones without permission from the crane operator.

# Emergencies/First aid/Incident response

## Emergencies

- Immediately report all emergencies using:
  **Emergency telephone number 2222**
- Dialing 2222 on an in-plant telephone notifies emergency responders. "2222" is used to report:
  - Hydrocarbon releases/fire/toxic vapour releases/serious injuries or health problems
    - serious health problems could be non-work related, i.e., signs of a stroke, heart attack, seizure, anaphylactic shock, difficulty breathing
    - if your gut-check would tell you to call an ambulance and you're at site, dial 2222 for medical response
  - Provide the following information: **What** is the emergency? **Where** is the emergency? *(be specific)* **Who** is calling? **Where** are you? *(number and location)*
  - Stay on the phone to answer questions, and wait for help to arrive
- In the event of a fire or serious injury, take prompt action to render assistance after reporting the emergency (by calling 2222). Once the site emergency response personnel arrive, move to a safe location unless requested to assist.
- Cell phones/external phones cannot be used to call 2222.
  If calling to report an emergency from a cell phone/external phone, call 519-336-ESSO(3776).
- Inform gate 318 of abnormal conditions (i.e., excessive flaring, loud continuous noise, significant odours, etc.) that have the potential for offsite impact, contact @ 15666.

## Non-life threatening injury

- Call security before going to medical (519-339-2143).
- Ensure the worker is okay to move under their own power.

- Bring the injured person to Sarnia Site Medical Centre (main office building back door).
- If medical centre is unable to treat the injured person and it is not an emergency, ask your supervisor if you have a preferred medical provider to see the injured person.
  - typically this doctor will be able to treat the patient more quickly when pre-arrangements have already been made

## Emergency warning system

The site has one emergency warning tone. If the emergency warning system (EWS) sounds:

- While you are working/visiting this site there is also a potential hazard from industry neighbours in the form of hydrofluoric acid, chlorine, bromine or a fire/explosion.
- Whether the hazard is from a neighbouring facility or within this site, the warning system and your response should be the same as an on-site emergency.
- Stop all work and shut down all equipment.
- **Pull over and shutdown vehicles.**
- Proceed to the nearest/designated safe haven, or muster point.
- Follow the instructions posted in the safe haven.
- Notify your company accountability representative. If signed in on the unit entry log, you must also notify the applicable control room.
- After internalizing work group accountability, report if personnel are unaccounted for.
  Note: It's very important to discuss within your work group emergency response plan and how head counts are coordinated before a real emergency.
- Stay at the safe haven or muster point until the "all clear" is announced via the cross patch and/or communicated by the command centre.

- The emergency warning system is tested weekly on Monday at 12:30 p.m.

**Unit alarm**

  - should a unit alarm sound while you are in it, safe out your work location and then safely leave the unit area and report to operations for further instructions

## First aid/Injuries *(For more details, see: SMSM 2:2)*

- Sarnia manufacturing site requires that any worker who is injured, or exposed to hazardous substances, promptly seek first aid and report the injury. The worker's supervisor is responsible for notifying the applicable Imperial contact and the permit issuing area.
- All injuries/exposures shall be reported, as soon as possible to security (phone 519-339-2143), who will then contact the Sarnia emergency response leader (SERL) (12214). The SERL will arrange for assessment at the health centre. If emergent/urgent, immediately report the incident with the emergency telephone number (2222).
- Do not drive yourself to the health centre.

## Incident reporting and investigations

*(For more details, see: SMSM 15:01)*

- All incidents (losses and near losses) must be reported immediately to your supervisor. The initial step for all incidents is to prevent further injury, environmental, or equipment damage.
- Investigations begin within 24 hours of the incident via preliminary fact gathering. Initial incident report is used for notification, preliminary investigation and categorization, analysis, follow-up, and submitted to the next level supervisor as soon as possible.
- Complete loss/Near loss investigation
- Follow company Alcohol and drug policy, see R&R section on Alcohol/Cannabis/Unauthorized drugs (A&D)

- Supervisors, inform the following applicable people if someone gets hurt:
  - Imperial first line supervisor
  - operations area control room
  - contractor superintendent/safety advisor
  - Imperial safety advisor for injuries
- Supervisors - what to do if a worker reports non-personal safety incident? (i.e., property damage, vehicle incident)

  Inform the following applicable people:
  - Imperial first line supervisor
  - operations area control room
  - contractor superintendent

## Safe havens *(For more details, see: SMSM10:11)*

- Safe havens are secure enclosures that workers enter in the event of a fire or vapour release. Buildings designated as safe havens are identified by signage, in the shape of a house or a safe haven sign. They are equipped with HVAC shutoffs, communication devices and duct tape, and safe haven instructions.

## Spills/Releases/Odours

- Any spill or air release must be reported to your supervisor immediately. Your supervisor will work with the shift superintendent to take the steps required to control the situation and notify the appropriate authorities.
- Do not intentionally allow hydrocarbon or chemicals to go into a water treatment system sewer. Collect the material and dispose of it in accordance with the site waste disposal guide.
- Report to your supervisor any abnormal or unusual discharge or odours, including fugitive leaks (hydrocarbon, chemical or water) to a sewer or the air.

## Electrical lockout/tagout

*Full details of the LOTO (For more details, see: SMSWP 8.26)*

- Only persons authorized by operations personnel (who are responsible for the equipment) may start electrically driven process equipment.
- Locks and tags will be used as follows:
  - operations – white lock and EID/EVP (energy isolation device/energy verification point)
  - electrical – blue lock and blue tag
  - all Imperial personal locks – red lock and red tag
  - contractors – brass or silver lock and yellow tag
  - orange tags are for information only
  - Contractor electrical group – blue/yellow locks and tags
  - E&PS (formerly GREF)
    - use personal locks (brass or silver) if the job is one day or less
    - if energy isolation will remain in place longer than one day an E&PS group lock is used (blue with a red band)
    - for tags they use the process EID tag (energy isolation switch) and EVP tag (stop start button/proof of zero energy)
- Note: For 480 Volt "PDC" (Power Distribution Centre type breakers) the owner operator will need to work with the electrical group to isolate these devices. These will be clearly marked on the doors of the supply breakers. See procedure for 480 Volt PDC style – mechanical or electrical lock out.
- Electrical and equipment lockout procedures must be followed before inspecting or working on electrically operated or electrically driven equipment.

## Energy isolation (EI) *(For more details, see: SMSM 17)*

- Equipment owners are responsible to ensure hazardous energy sources are isolated from all equipment, equipment drivers and their associated system. (i.e., in an operating unit, operations is responsible for energy isolation).
- All forms of energy, i.e., pneumatic, hydraulic, electrical, thermal, chemical, kinetic (fans) and potential (gravity, coiled springs) shall be isolated.
- Isolation points are documented on the *Energy isolation log*, this list also documents valves used to prove zero energy.

Note: an EI list is required for all energy isolation including electrical isolation.

- Energy isolation devices (EID):
  - as far as practical, energy isolation shall be made at the point(s) closest to the mechanical work
  - the preferred method of isolation is manual block valves
  - EI valves shall be tagged and secured with a red nylon tie wrap or a kubinec strap
  - quarter turn valves must be secured in a manner to prevent inadvertent movement, quarter turn valves equipped with locking mechanisms is the preferred method to secure a valve. If the valve does not have a locking mechanism, install a 'specialty' handle cover device to secure the valve, if a 'specialty' device is not feasible, consider removing the handle. As a last resort secure the handle using high tensile strength nylon tie wraps
  - the following valves cannot be used for isolation – air to close valves, check valves, safety valves, hydraulically driven valves without a position control locking system
- Energy verification points (EVP) (bleeders, drips, vents) shall be tagged.

- Steps need to be taken to ensure the valve is clear/not plugged.
- Zero energy valves must be open to atmosphere – cannot be connected to a closed system.
- The valves should be open while work is performed and then closed immediately for material class 1 and within two hours for material class 2 and 3.
- Valves within the energy isolation points (inline valves):
  - there needs to be an open path between the energy isolation points, the zero energy point and the location work is being performed
  - if there are inline valves (pathway valves) they shall be tagged and recorded on the energy isolation log
  - pathway valves can remain open for the duration of the work
- A joint job visit (JJV) with a member of the work crew performing the work is required for jobs involving energy isolation.

## **Excavations** *(For more details, see: SMSWP 22.2)*

- An excavation checklist is to be completed before digging/drilling any hole or pit deeper than 35 centimetres (12 inches). This completed checklist must be attached to the work permit.
- Any excavated soil must be immediately tested and field labelled, by the group conducting the excavation. The soil can only be moved and stored in one of the following designated areas. A permit must be obtained from the unit, before the soil is moved and stored.
  - Area 1: Tank lot across NSIS mechanical shop; obtain permit from NSIS
  - Area 2: Complex A Gate 207; obtain permit from complex A
  - Area 3: Old TK-4015 lot or south of TK-4030; obtain permit from Area 3
  - Storage or dumping of soil in areas other than the above designated storage areas is **strictly prohibited**, unless MoC approval is obtained from the business unit
- Railings or barricades must be used to guard all excavations or trenches. A flashing warning sign or reflectors must be posted when the excavation is near a roadway or a walkway.
- When the walls of the excavation are not supported or sloped, a professional engineer must certify that the walls have sufficient stability.
- A level area at least one metre (three feet) from the edge of the excavation must be kept clear of equipment or debris.
- If manhole covers or gratings are removed or an opening made in the ground or floor, the open area must be securely covered or guarded with solid barricades and warning sign posted. *(For more details, refer to Barricades and taping section.)*
- All trenches, holes or pits 1.2 metres (four feet) or deeper, that a person will enter must be assessed to determine if it is a confined space.

- The Ministry of Labour, Construction Health and Safety Branch, must be notified by telephone if a person will enter a trench more than 1.2 metres (four feet) and 300 metres long.
  Note: a **trench** is a ditch or furrow that is deeper than it is wide.
- When a fall hazard is present greater than six feet, fall restraint, fall protection or proper guardrail must be used.

Locate and expose utilites before using machinery

## **Fall protection** *(For more details, see: SMSM 20:04)*

- CSA approved full body safety harness and self-retracting lanyard with double locking hooks must be worn if a worker may fall while working at heights (see Working at heights definition).
- When loading/unloading flammable materials, lanyards/harnesses are not to be used. Only work from an approved guarded platform. Flammable materials are defined as any material with a flash point <38°C (100°F).
- To limit slack within fall arrest systems, lanyards onsite must be self-retracting lanyards (SRLs). Standard fixed six foot and four foot shock absorbing, etc. are not permitted to be used onsite, except:
  - travel restraint applications on roof tops and similar leading edges, may elect to use ropes and rope grabs with slack always maintained to restrict access past a leading edge
  - traveling vertically with a rope and rope grab (with a short lanyard, i.e., three feet), i.e., inside of a pipe or tower with rope grab always positioned above the "D" ring
- When work requires the use of personal fall arrest, ensure a means of communication and capability for prompt rescue;
  - while wearing personal fall arrest, ensure visual contact or alternative communication methods to ensure capability of prompt rescue
  - understand the rationale and how to initiate timely rescue to prevent suspension trauma
  - alternative communication to summon prompt rescue could include knowing who to contact, having a radio secured in a holster, or, a phone in pocket, etc.

- Anchor selection:
  - anchor points are required to support the following shock load:
    - personal fall arrest system and positioning: 2,200 pounds (1,000 kilograms) per person
    - restraint:1,000 pounds (450 kilograms) per person
- Examples of adequate anchor points:
  - structural beams six inches depth or greater for one or more persons
  - uninsulated pipes four inches or greater for one person
  - uninsulated pipes six inches or greater for two people
  - lifting lugs on fixed or mobile equipment with a rated capacity equal to or greater than 2,200 pounds (1,000 kilograms) for each person
  - a scaffold ledger or rosette secured by two tie points, maximum one person per component
  - for guidance on using fixed ladder rungs for fall protection anchorage, consult working at heights subject matter expert
  - exception to 2,200 pounds anchorage requirement: Anchorage to cooling tower structure internals capable of supporting 1,800 pounds is sufficient while applying GIP251, inspection protocols and using SRLs with shock absorbers
- Do not over-reach. Definition of over-reaching: both feet not firmly planted within the guarded work area and where the center of gravity is outside of the guarded area. Accessing areas on equipment (e.g., deck, windshield, and engine) without adequate guarding.

Note: Equipment operator may enter/exit the cab using a designated walkway designed by the manufacturer without a personal fall arrest system.

**Fall protection techniques pipe racks**

- Walking/work on pipe racks should be by exception only. Scaffolding, rope access and work platforms are the preferred method of working

in and from pipe racks where these methods can be attained without standing or weight bearing on process pipes, instruments and insulation.

- To address safety risk by exemption, an Imperial first line supervisor must approve a specific safe job plan for this activity considering the 'Walking on pipes risk table'.

## Walking on pipes risk

| Confirm N/A or applicable and mitigated for each, before considering approvals. Walking and working on pipe racks can present unique risks, including but not limited to: | Applicable and/or mitigated | Confirmed N/A | No mitigation = stop |
|---|---|---|---|
| **Personnel injuries** | | | |
| Feet slipping between pipes with the body moving in a different direction = bad injuries, leg breaks. (known industry and company circuit incidents). | | | |
| Slips occur more often on smooth round surfaces. | | | |
| Pipes, may not be capable of supporting weight and buckle increasing risk of falling on harness. | | | |
| **Personnel illness -** damage to insulation cladding could: | | | |
| Expose workers on the rack to asbestos hazards. | | | |
| Cause asbestos falling to grade, causing wide spread issues. (Regulatory requirement is to prevent falling/dropped asbestos). | | | |
| **Process release -** walking on pipe racks could: | | | |
| Damage insulation cladding and open pathway for water to accelerate corrosion under insulation risks. | | | |
| Depending on size, design, weight baring capacity, condition, a person's weight could comprise pipe. | | | |

## Working at heights

### *Definition of working at heights (WAH):*

Where a worker is exposed to any of the following hazards:

a. Falling more than 1.8 metres (six feet).
b. Falling more than 1.2 metres (3.9 feet), if the work area is used as a path for a wheelbarrow or similar equipment.
c. Falling into operating machinery.
d. Falling into water or another liquid.
e. Falling into or onto a hazardous substance or object.
f. Falling through an opening on a work surface.
g. In close proximity (1.8 metres/six feet or less) to the edge of elevated structures, floor openings, unprotected ladder openings, docks, truck ramps, excavations, open holes and pits (sewers, API separators, coke pits, etc.).

Note: (b to f) above is per *Ontario regulation 213/91 S.26.*

### *Examples that expand on WAH definition include when a person is:*

h. On a roof without adequate barrier protection.
i. Over-reaching (both feet not firmly planted within the guarded work area) and center of gravity is outside the guarded area.
j. Accessing areas on equipment (e.g., deck, wind shield, engine) without adequate guarding. (Note: Equipment operator may enter/exit the cab using a designated walkway designed by the manufacturer without a personal fall arrest system. However, the operator needs to ensure the equipment is properly setup and on a firm foundation).
k. In a changing work environment resulting in an exposure for a potential fall of > 1.8 metres (six feet) (e.g., removal of guard rails or pipe or equipment).

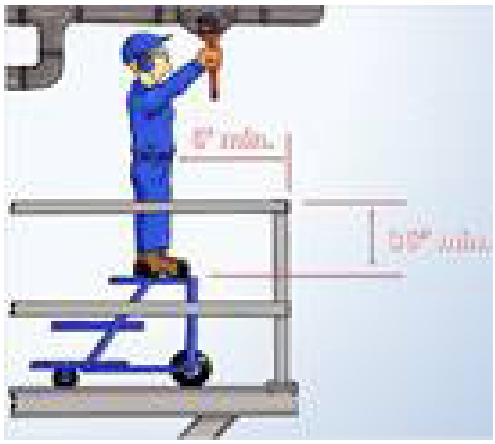
l. Working from a ladder at a height of > 1.8 metres (six feet) above surrounding ground or work surface.

m. Working from personnel lifts.

n. On a structure or temporary platform where a fall hazard exists with any one of the following:
   - opening on side wall >21 (high) by 18 (wide) inches (0.53 by 0.46 metres) not protected by handrail
   - A manway or opening with an inside diameter >21 inches on side wall
   - opening on the working surface (base) of >12 by 12 inches (0.3 by 0.3 metres)

o. An opening on a walking or working surface >12 by 12 inches (0.3 by 0.3 metres) where a fall hazard exists (i.e., open sewer manhole, open railcar/truck hatch, top entry way of a vessel, etc.).

p. On a step-up or ladder, etc. defeating guard rail effectiveness within two metres (six feet) to the edge of a platform.
   - for a guard rail 'as defined' to be adequate, a person's feet should never be less than 36 inches from the top rail of a guard rail, to constitute effective protection from working at heights

Heights

## *Working at heights – leading edges (LE) and sharp edges (SE)*

### Leading edge (LE)

- The unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed. PFAS (i.e., lanyard, lifeline) are anchored below the harness back D-ring and a fall potential exists over an edge.

### Sharp edge (SE)

- Edges (with a radius of less than that of a pencil (≤0.062″) with a potential to cut most types of lifelines.

### LE/SE job planning requirements

- During the working at heights job planning stage, evaluate fall protection elimination opportunities/Personal fall arrest system (PFAS) needs:
  - the preferred approach is to ensure a quality WAH plan is developed and to avoid having a worker exposed to leading edge/sharp edges situations
  - where the only practically available anchor point is below waist level, use PFAS system rated for "horizontal" applications

### Selecting LE/SE rated lanyards

- Ensure PFAS have been tested to appropriate LE/SE standards i.e., ANSI Z359.14 or CSA Z259.2.2-17 or equivalent).
- When working in leading edge situations, select PFAS rated equipment for leading edge (LE), suitable for anchor point(s).
- When working in sharp edge situations, use sharp edge (SE) rated PFAS if surface edge may fray, damage, or sever lanyard.
- Ensure that appropriate PFAS is selected for the hazards associated with the jobs being planned. Consider consulting supervisors, safety advisors, subject matter experts and fall arrest suppliers.

- LE with smooth edge:
  - below D-ring or foot level tie off
  - can be tied off at feet – as long as it's not on sharp edge (SE)
- LE with sharp edge:
  - below D-ring or foot level tie off and edge with a radius of less than a pencil (≤0.062″) with a potential to cut most types of lifelines
- suppliers are continuously improving and incorporating new technological advances into the design and functionality of fall protection devices. At the time of writing, some models good for LE/SE protection include but are not limited to:
  - Miller's TurboLite Edge Personal Fall Limiters
  - DBI-Sala's Nano-Lok™ Edge Twin-Leg Quick Connect Self Retracting Lifeline-Cable

***Working at heights – rescue planning***

Assess if a fall occurred and you would be arrested by your fall protection, how a rescue could be performed. Identify all reasonable fall scenarios (see below) and if a rescue is required what category (of the two below) would it fall into:

- Simple, unencumbered and easy to complete.
- Complicated (i.e., high angle).

**Simple rescue plan:** applies to a straight forward rescue, unencumbered and easy to complete.

For example: A fallen worker is within easy reach of co-workers or is able to self-rescue to a nearby platform, can easily be swung to a safe position or can be reached by use of a ladder or a nearby available elevated work platform that can be easily positioned to assist the fallen worker.

Simple rescue plans require verification of mitigations (to get individual to grade), including:

- Work with a spotter that has the ability to initiate additional support, or, worker may work alone if able to ensure alternative means of communication and capability for prompt response/rescue exists.
- A fallen worker is within easy reach of co-workers or is able to self-rescue to a nearby platform or can easily be swung to a safe position.
- Use onsite equipment (if needed), including: rolling stairs, portable ladder, power elevated work platform that can be easily positioned to assist the fallen worker.
- Reference to be made to the working at heights simple rescue planning JSA/JLA.

No additional documentation is required unless the applicable scenarios are considered a complicated rescue, see below. These considerations should be incorporated into an LPSA.

**Complicated rescue plan:** is required for a complicated rescue scenario such as; when the fallen worker is beyond reach of available equipment (i.e., stack/flare inspection, rope access). These rescues require a request for additional resources; ensure availability and a documented rescue plan.

Complicated rescue plans require emergency responders review and approval.

**Guard rails** *(For more details, see: SMSM 20:02)*

The following are the site specifications that define a guardrail system:

a. It shall have a top rail, an intermediate rail and a toe board/ (kick plate).
b. It shall provide protection against a 200 pound (90 kilogram) force applied.
c. The top of the guardrail system shall be located at least three feet (0.9 metres) but not more than 3.6 feet (43.3 inches/1.1 metres) above the surface on which the system is installed.

d. The intermediate rail shall be located midway between the top rail and the toe board. There shall be no openings within the guard rail ≥21 inches high by 18 inches wide (0.53 by 0.46 metres) that are not protected.
e. The toe board shall extend from the surface to which the guardrail system is attached to a height of at least 3.5 inches (89 millimetres).
f. A guardrail system shall be capable of resisting anywhere along the length of the system the following loads when applied separately, without exceeding the allowable unit stress for each material used.

Sarnia site definition for guard rails is compliant with the most stringent requirements between Ont. Reg. 213.91 S. 26.3(4) and the ExxonMobil Tier 1 Best Practice for WAH Version 2b.

## Rope access *(For more details, see: SMSM 20:09)*

- Rope access tasks are categorized into three categories: High, Medium, Low, each category needs to be executed according to task level matrix requirements.

## Scaffolds *(For more details, see: SMSM 20:06)*

- This site operates under a scaffold tag system. A tag shall be displayed at each access point to the scaffold and must be re-inspected monthly.

  Green tags – SAFE FOR USE

  – green tags will be hung on all scaffolds that have been inspected and are safe to use
  – no fall arrest equipment required when working on green tagged scaffold platforms

  Yellow tags – CAUTION

  – yellow tags will be hung on all scaffolds that by design or location may pose a hazard to the end user (i.e., missing hand rail, hole in decking, not meeting a specific regulatory requirement, etc.)

- special requirements for use of the scaffold are noted on the tag
- require approval signature from the Imperial front line supervisor

Red tags (or no tags) – DANGER – UNSAFE FOR USE

- red tags will be hung on all scaffolds, where, **no person** other than authorized scaffolding personnel shall be allowed on the structure
- access is restricted to scaffold builders and fall arrest equipment is required, unless a scaffold builder is working less than six feet and no additional fall hazards are present

Tagging scaffold lifting/rigging beam/anchor points:

- scaffold components/structures deemed safe to rig of off, that are not designed for personnel access, may be red tagged, with an information tag also posted describing the components safe limitations, name of approver and date

Orange tags – High risk special scaffolds

- an orange tag is to be used for "high risk special scaffolds" and must be accompanied with a green or yellow scaffold inspection tag

- No one but scaffold builders, are authorized to modify scaffolding.
- Scaffolds require swing gate access.
- All scaffold users shall perform a pre-use check on basic scaffold requirements.
- Scaffolds shall be kept clear of all unnecessary tools, materials, obstructions, snow, ice, litter, etc.
- Electrical tools used on a scaffold shall be equipped with ground fault circuit interrupter (GFCI).
- As the scaffold is being erected, access ladders are to be installed. Scaffold builders are to use the ladders for accessing deck levels and not climb the scaffold frame.

- Working surface for scaffold workers during erection/dismantling shall be a minimum of 18 inches (45.7 cm) in its narrowest dimension (2-board rule).
  - where working on a minimum 18 inch footing is not reasonably achievable (e.g,. lack of space) the qualified person can determine the amount of decking needed to safely perform the work by considering total risk
- Only journeymen carpenters or registered carpenter apprentices are allowed to build regular scaffolds.
- Only journeymen carpenter or registered carpenter apprentices along with journeymen are allowed to erect/dismantle special/ engineered scaffolds.
- Prior to building scaffolding onsite, all scaffold builders are required to take site specific asbestos awareness training (program managed/ updated by Imperial asbestos coordinator and industrial hygiene).
- Special precautions must be taken if a scaffold is to be located near high temperature equipment, to prevent combustion of wooden boards or exposing metal scaffolding planks to extreme temperatures.
- **High risk special scaffold:**

  a. Is a hanging scaffold

  b. Is a suspended scaffold

  c. Is 15 metres in height above its base support; or, ten metres in height above its base support if the scaffold is constructed of a tube and clamp system

  d. Positioned within eight feet (2.4 metres) of the centre railroad tracks

Heights

## Tiered work (preventing falling objects)

*(For more details, see: SMSM 20:10)*

- Tiered work, also known as stacked work, is defined as: work directly above an area where other persons are required to work or routinely pass and tools, equipment or job materials could be dropped on the persons below.
- Tiered work includes the risk of falling objects creating the risk of injury to people at lower elevations
- Tiered work is a Task level 2 job, which requires a pre-job safe job plan review with the Imperial point of contact, i.e.,
  - any work at heights that has the potential to knock objects over kickplates, guard rails or through openings in or off of work platforms (i.e., gaps in decks, tools, nuts and bolts falling through structural grating)
  - a person within the dropped object exclusion zone, i.e,.a person staying inside exclusion zone when materials are hoisted overhead, but not hand to hand passing where staggered to prevent dropped objects on a person below
  - any work that involves reaching beyond a guard rail with tools or materials that are not tethered
  - where dropped objects present a high risk of a process safety event(regardless of exclusion zone intentions)
- Examples that are not tiered work include when the risk of falling objects impacting people below are eliminated, with effective means, i.e.,
  - managed exclusion zones large enough to account for deflection of falling objects and without anyone working within, or,
  - bulk heads or physical barriers capable of stopping any work from above affecting work below, or,
  - 100% of tools or equipment that could fall are tethered stopping any work from above affecting work below

- Preventing dropped items before mitigating falling items is the objective where practicable.
- Controls must be in place to prevent objects/materials from one work zone affecting conditions on another adjacent work zone.
- To address the risk of falling objects, work groups are required to implement mitigations to prevent falling objects when a person is working at height.

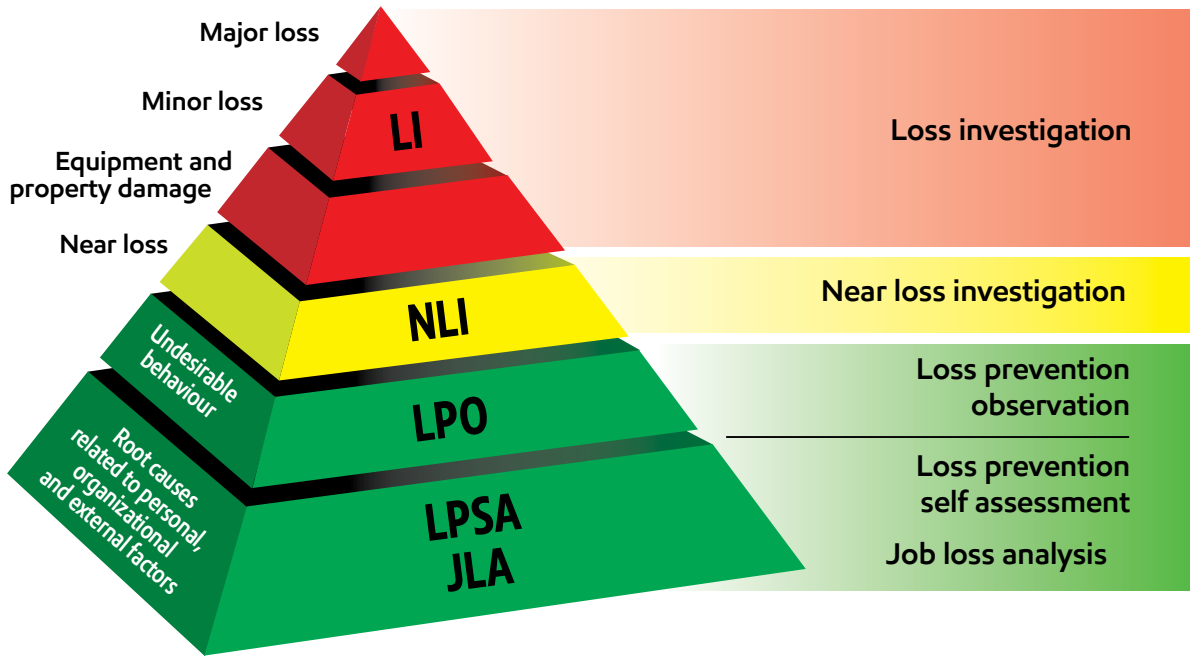
  Methods to prevent falling objects striking a person below:

  a. Job planning
  - Special emphasis shall be given to high worker density such as turnarounds and projects (e.g., milestones during appropriate planning stages to evaluate/develop plans).
  - Adjust work practices/plans to minimize the need for stacked work.
  - JLA or safe job plans to include when and what extra steps are required to prevent falling objects for specific work scenarios.

  b. Physical barriers
  - Methods for preventing falling objects include:
    - toe boards
    - screening or catch nets
    - tool lanyards/tethers
    - tool bags/storage containers for materials

  c. Worker protection
  - Shield workers from fallen/falling objects (catch nets, temporary roof)
    - provide overhead protection (bulkhead)
  - Exclusion zone/no entry zones:
    - restrict access to area through barricade or other means, e.g., safety watch
    - barricades to include signage to warn workers below

# Loss prevention system pyramid




## Introduction

LPS is a system created to identify and reduce losses such as:

- Business inefficiencies
- Product quality incidents
- Reliability issues
- Safety and health incidents
- Government fines
- Environmental incidents

## Glossary

| | |
|---|---|
| LPS | Loss prevention system |
| LPSA | Loss prevention self-assessment |
| LPO | Loss prevention observation |
| JLA | Job loss analysis |
| NLI | Near loss investigation |
| LI | Loss investigation |
| FRCS | Factors, root causes, solutions |
| V&V | Verification and validation - did the solution get done and is it addressing the root cause |

## Loss prevention self-assessment (LPSA)

The LPSA is a brief, general risk assessment made by employees of each work task.

This is an ongoing process which is the same for everyone who comes to work on site, to be conducted at the beginning of each task, when conditions change, after a near loss or loss is experienced, etc., with the intentions of making sure we can all perform our duties in a way which will not create a loss.

- Purpose of stewarding the LPSA is to ensure the process is being followed properly to positively reinforce its proper use.
- Talk to everyone of your direct reports in the field once per week.

### LPSA prompt questions to ask in the field

#### Supervisor

Ask what they are doing today. Let's walk through an LPSA. Pull out the card and use it as guidance.

- Ask about **Assess** the risk – ask the two questions.
- Ask what their plan is to reduce the risk. **Analyze** how to reduce the risk. Talk about what training they have, what standards (JLA, procedure, Rules & Regs book, JSAs) trade or job knowledge they are using, proper tools and PPE.
- Look for physical **Actions** they said they would do in the **Analyze** step to mitigate the risks identified in **Assess**.

Ask them if they think about all losses when considering using the LPSA? Give examples of other types of losses that you see. What do you do while performing a LPSA and do not have all the proper tools and knowledge?

## Roles and responsibilities – LPSA

| Tool | Employee | FLS | SLS and up |
|---|---|---|---|
| **LPSA** | ▪ Perform LPSA mental check before beginning work, as conditions change, etc.<br>▪ Participate in discussions when asked about your LPSA | ▪ Perform LPSA mental check before beginning work, as conditions change, etc.<br>▪ Ask each member of your work group about their LPSA at least once per week, in order to improve the process | ▪ Perform LPSA mental check before beginning work, as conditions change, etc.<br>▪ Periodically (spot check) ask employees about their LPSA to ensure the quality is high, and to provide feedback to FLSs about how their group is progressing |

## Loss investigation (LI) or near loss investigation (NLI)

**What is a loss?** (unplanned event with a negative outcome)

A loss = an unplanned cost

- Business inefficiencies
- Product quality incidents
- Reliability issues
- Safety and health incidents
- Government fines
- Environmental incidents

**What is a near loss?** (unplanned event with no negative outcome)

- Something **almost** happened that could have created a loss but only luck (or a fraction of an inch or split second) prevented it from actually happening.
- If you have a near loss in your group it's very important that you follow through with a blue NLI card and complete the investigation.

## Loss and near loss investigation

Systematic examination of losses and near losses (equipment/property damage, releases, leaks, reliability issues, regulatory violations, product quality incidents, motor vehicle crashes, fires, business interruptions, personal injuries, environmental incidents) for the purpose of eliminating risks and future losses.

1. Notify supervisor (self-reporting of near losses)
2. Risk assessment (use LPSA with worker)
3. Starting the investigation
4. Fact gathering (documents, standards, etc.)
5. Investigation team (those only involved in the incident)
6. Description (what and how it happened, where and when in the process did it happen?)
7. Root cause; "Factors, Root Causes, Solutions™ (FRCS)"
8. Quality review and approval
9. Communication
10. Implementation of solution(s)
11. Verification and validation of solution(s).

### Roles and responsibilities – LI/NLI

| Tool | Employee | FLS | SLS and up |
|---|---|---|---|
| **NLI/ LI** | ▪ Report all near losses as they occur<br>▪ Participated in near loss investigations by providing facts as appropriate and act as part of the investigation team as required | ▪ Follow NLI/LI protocol to determine the true root cause of a near loss and follow through on solutions<br>▪ Investigation owner for reports in workgroup | ▪ Spot check quality of NLI/LI process<br>▪ Participate in LI process as required by severity level |

## Factors, Root Causes, Solutions™ (FRCS)

To start with the FRCS you need a questionable item (QI) in an LPO or the equivalent to a QI in a near loss or loss.

**Organizational factors 1 to 4** – Looking at our company sandbox first.

Ask - Did I set my employees up for success by giving them everything they need to do the job "properly"?

**Personal factors 5 to 7** – Looking at myself personally

Asks - Why didn't we do (as an employee) what we know how to do?

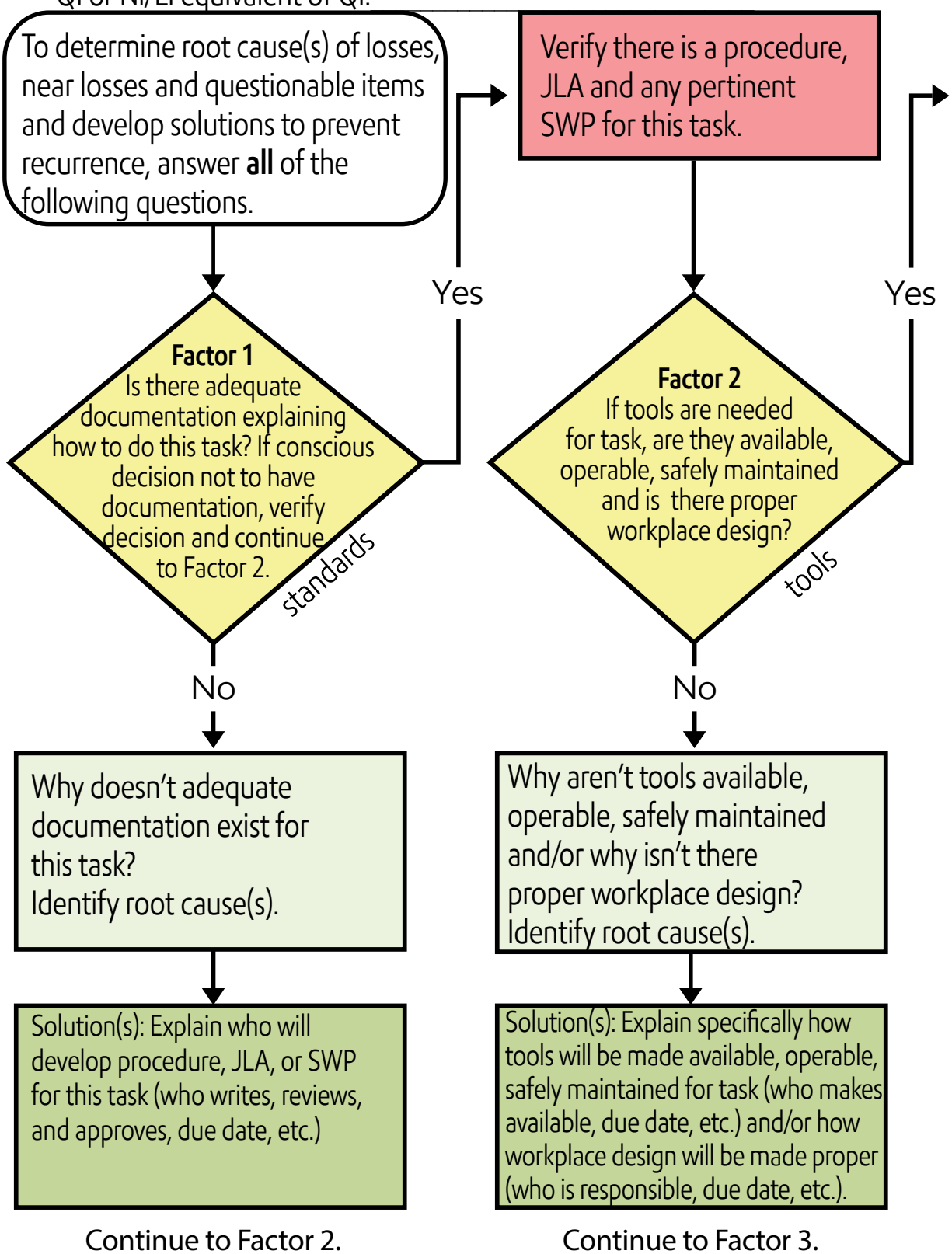
During LPO, loss or near loss investigation, you must go through every factor to see if it applies.

Note: Before using FRCS flow chart, first identify the QI

- QI = Deviation from standard.
- Then ask, does the QI apply to **each** factor on the FRCS flow chart?

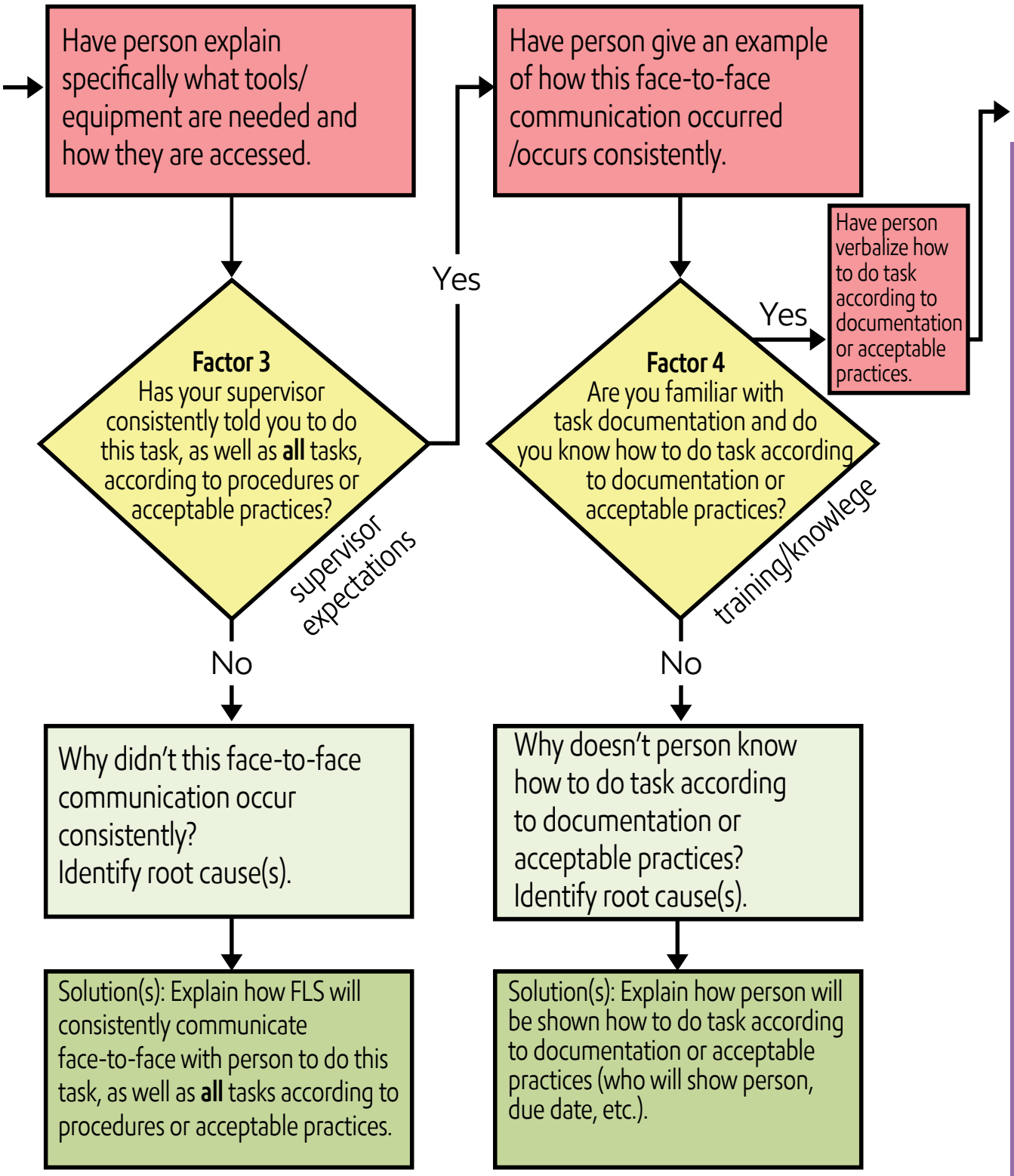
## Factors, Root Causes, Solutions™ (FRCS)

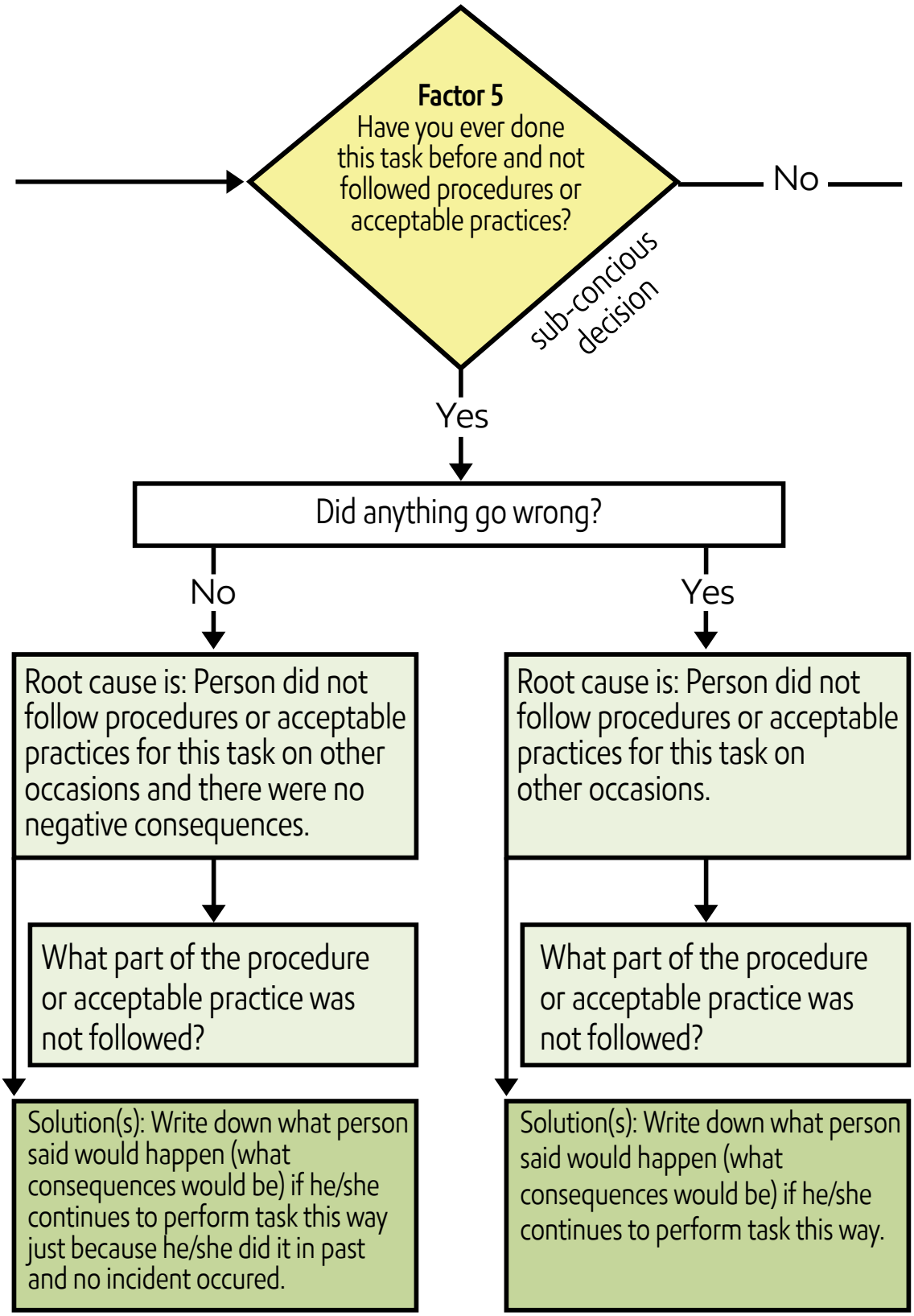
QI or NI/LI equivalent of QI:




Continue to Factor 2.

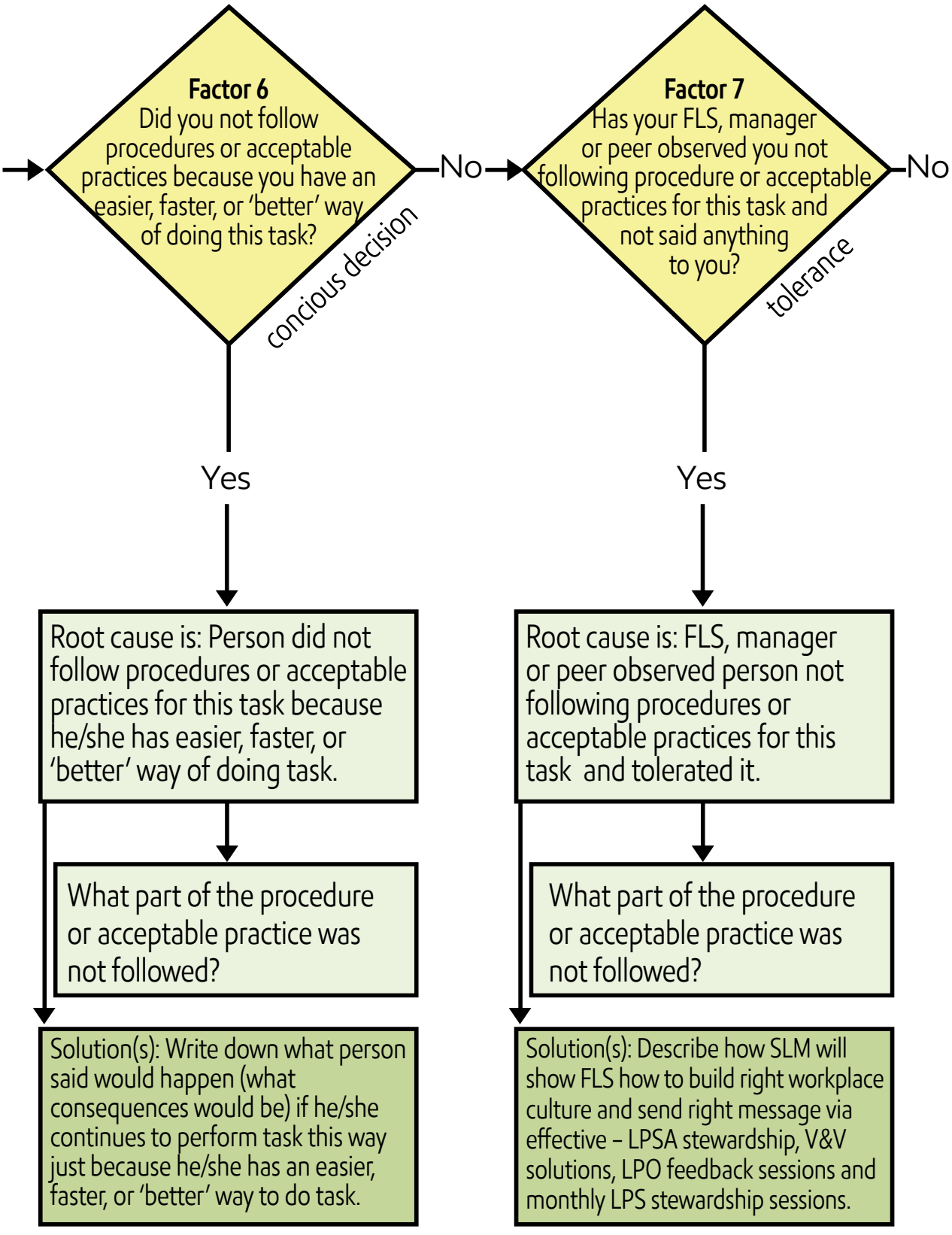
Continue to Factor 3.


Have person explain specifically what tools/ equipment are needed and how they are accessed.
Factor 3
Has your supervisor consistently told you to do this task, as well as **all** tasks, according to procedures or acceptable practices?
supervisor expectations
Yes
No
Why didn't this face-to-face communication occur consistently?
Identify root cause(s).
Solution(s): Explain how FLS will consistently communicate face-to-face with person to do this task, as well as **all** tasks according to procedures or acceptable practices.
Continue to Factor 4.
Have person give an example of how this face-to-face communication occurred /occurs consistently.
Factor 4
Are you familiar with task documentation and do you know how to do task according to documentation or acceptable practices?
training/knowlege
Yes
Have person verbalize how to do task according to documentation or acceptable practices.
No
Why doesn't person know how to do task according to documentation or acceptable practices?
Identify root cause(s).
Solution(s): Explain how person will be shown how to do task according to documentation or acceptable practices (who will show person, due date, etc.).
Continue to Factor 5 on next page.




Continue to Factor 6.

Continue to Factor 6.




Continue to Factor 7.

## Loss prevention observation (LPO)

To get a good quality LPO we need to follow these steps:

A standardized, systematic tool for observing a work process and determining if the process is being performed according to Imperial standards.

1. Target areas for observations based on history of losses, near losses, and areas of higher potential for losses of all types.
2. Selecting observer, with observer duties rotated every three months.
3. Scheduling of both observer and task, allowing flexibility in case of break-ins, upsets, etc.
4. Preparing for LPO by allowing time for observer to review JLA, procedures, and prior LI/NLIs associated with task to be observed.
5. Conducting by observer, lasting roughly 20 to 30 minutes.
6. Supervisor overview is a five minute face to face with observer to become familiar with key critical actions performed properly, as well as any questionable items from observation.
7. Feedback session with observer and observee, following the 6-step feedback process (next page).
8. Review and approval of LPO, ensuring solutions agreed upon are appropriate and people named in solutions know and agree to the solution and due date (viable solutions that can reasonably be completed). Forward form on to IMPACT inputter.
9. Communication of results to those to whom it is relevant.
10. Implementation of solution(s) by person responsible.
11. Verification and validation of solution(s) 100 percent of the time by the supervisor.

**Feedback process – supervisor leads conversation between observer and observee**

1. State purpose of LPO; why did we choose to do this observation?
2. Point out significant behaviours that were performed correctly.
3. Mention percentage of tasks/activities observed done properly.
4. Lead discussion into items that appeared "questionable".
   - involve observee in identification and resolution of questionable items
   - root cause narrative should be written explaining why each questionable item occurred
   - select factor(s) that matches each root cause from root cause narrative
   - development solution(s) that matches the factor and addresses the root cause narrative
5. Restate purpose of why this observation was performed
   - repeat positive comments for demonstration of important behaviours and mention percent of tasks observed as done properly
   - verbalize agreed upon solutions for any questionable items
   - thank both parties
6. Supervisor feedback to observer – recap done by supervisor, input for observer, positive comments and specific areas for improvement.

### Roles and responsibilities – LPO

| Employee | Supervisor | Manager |
|---|---|---|
| ▪ Participate in the selection of tasks to be observed through the monthly LPS meeting<br>▪ Act as an observer<br>▪ Act as an observee | ▪ Lead selection of tasks to be observed through the monthly meeting<br>▪ Lead overview discussion with observer<br>▪ Lead feedback session to ensure comments are positive and true root cause is determined and solutions are tracked to closure<br>▪ Act as observer once per quarter | ▪ Spot check quality of LPO process<br>▪ Act as observer once annually<br>▪ Lead feedback session for LPO he/she observed |

## Job loss analysis (JLA)

A tool used to carefully study and record the major steps of a job or task, identifying existing or potential risks (safety, health, environmental, product quality, reliability, financial or business) and determining the best actions to take in order to perform the job properly.

### Contact the core team before any new JLAs are created

1. Selection of job or task with workgroup input based on past loss or near losses or high risk jobs.
2. Choose development team members and rotate the development of JLA through the workgroup.
3. Development of JLA by workgroup and ensure proper writing protocol is followed.
4. Review and approval by asking questions like: are job step general activity categories, the hazards clearly specified (not slip or trip) and are actions to be taken clear and appropriate to address the hazards?

5. Communicate results and conduct training by sending new or modified JLA to the core team who will forward on to appropriate work groups, ensure your workgroup is informed of new or modified JLA relevant to their job. Before creating a JLA, look for an existing one on the LPS sharepoint site, if not found then contact the LPS core team.
6. Verification and validation by workgroup performing the task using the JLA and can be considered as an LPO.

**Roles and responsibilities – JLA**

| Employee | Supervisor | Manager |
|---|---|---|
| ▪ Participate in the selection of task for JLA development<br>▪ Participate in the creation of JLAs as part of team of experts<br>▪ Use JLA as a reference both when performing tasks, and when observing tasks | ▪ Lead the selection of tasks for development of JLAs<br>▪ Quality review of JLAs to ensure site requirements are met | ▪ Spot check quality of JLA process |

## Expectations for Imperial FLS (or Imperial contact) for Category 1, Category 2 and Category 3 contractors

| | LPS activity | Imperial FLS or contact | Cat 1 contractor foreman | Cat 2 and 3 contractor foreman |
|---|---|---|---|---|
| 1 | Perform LPSA | ■ | ■ | ■ |
| 2 | Minimum weekly one on one LPSA "field" discussion with all contract direct report | | ■ | ■ |
| 3 | Sample for LPSA use and test for JLA use and knowledge (review at job site) (one spot check per foreman/month, of all Cat 2 and 3 contract work group that perform work for you) | ■ | | |
| 4 | Sample one LPSA tool usage for all Cat 1 companies that perform work for you once per month and test for JLA use and knowledge (review at job site) | ■ | | |
| 5 | Review and approve applicable JLAs or JSAs as per task level matrix | ■ | | |
| 6 | Develop/use/reference JLAs (or JSA) and standards per task level matrix | | ■ | ■ |
| 7 | Perform one LPO per quarter on direct reports | | ■ | |
| 8 | Perform one monthly LPO (including leading feedback session and documenting on LPO form) on Cat 2 or Cat 3 contractors that perform work for you (Note 1,2,3) | ■ | | |
| 9 | Attend feedback session during LPO that Imperial FLSs perform (above) | | | ■ |

| | LPS activity | Imperial FLS or contact | Cat 1 contractor foreman | Cat 2 and 3 contractor foreman |
|---|---|---|---|---|
| 10 | Ensure one LPO is performed per 10 people/per week | | ■ | |
| 11 | Report near losses/Losses (Note 4) | ■ | ■ | ■ |
| 12 | Lead near loss/Loss investigation process for your work group in your area | ■ | ■ | ■ |
| 13 | Lead near loss/Loss investigation process for Cat 2 and 3 work groups who perform work for you | ■ | | |
| 14 | Hold/attend monthly LPS meeting | | ■ | |
| 15 | Verify and validate (V&V) all action items (LPO, NLI, LI) in your area for your work group | | ■ | |
| 16 | V&V all action item (LPO, NLI, Loss) in your area from a Cat 2 or 3 company that you are assigned to per month - foreman for Cat 2 and 3 involved in Factor 5&6 (personal factor) V&V | ■ | | |

Notes:

1. Frequency should increase to weekly on T/A
2. Any time an LPO is performed on any contractor, foreman shall be involved in feedback session
3. Activity may be completed by FLS equivalent - e.g., planner, CEC project manager, engineer, etc.
4. All personnel involved in NLI /LI shall participate in investigation, including both workers and foremen
5. Activities specified in this chart apply to those companies who perform work for you during the specified period

## Human performance

Human performance and our brains thinking fast and thinking slow

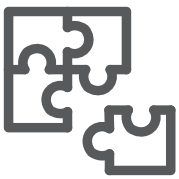
What is human performance? "A series of behaviours executed to accomplish specific results"

What are the key attributes of thinking "fast" and "slow"?

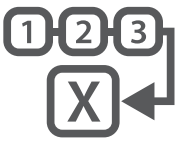
### System 1 - Fast


High capacity


Nonconscious


Automatic


Everyday decisions



Experience-based

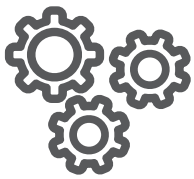
Potential for error

- Miss/dismiss cues
- Misinterpret situation based on past experience
- Bias

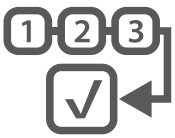
### System 2 - Slow

High limited


Conscious


Effortful and controlled


Complex decisions



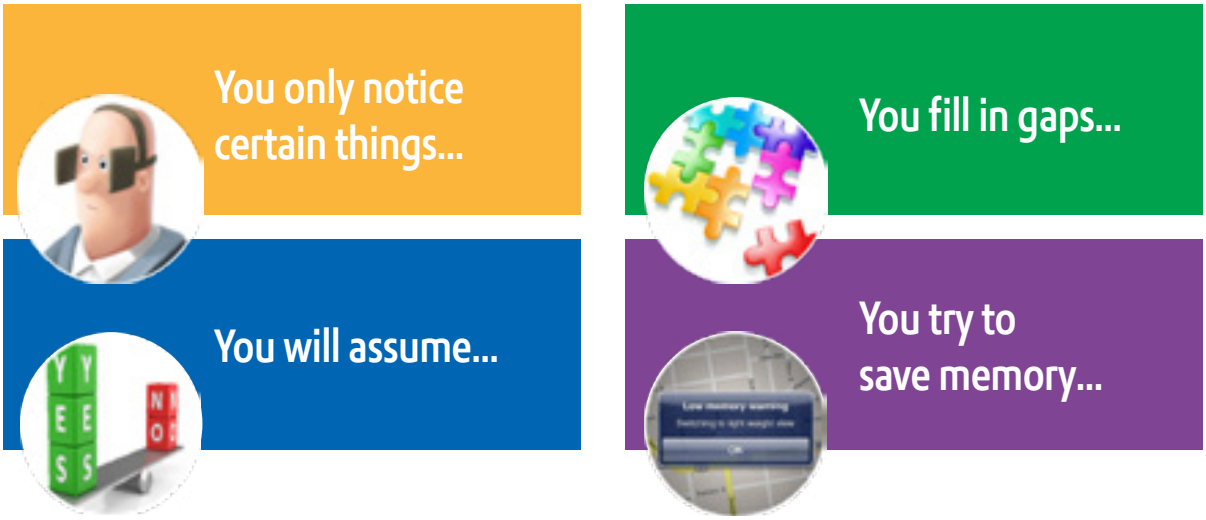
Reason-based

Potential for error

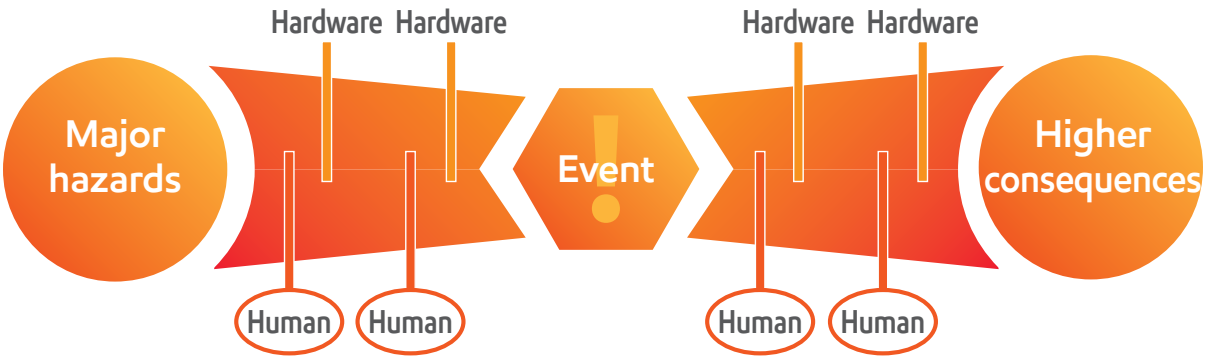
- Fatigue
- Perception blindness

Humans rely on both "fast" thinking and "slow" thinking depending upon the situation.

The truth about our brains, our brains make every effort to be efficient, so...




## People: the most important safeguard



## Human performance principles

It's important that we recognize and apply these human performance principles, and the example behaviours below, to reduce the likelihood and impact of human error when it matters most.

1

**People make mistakes.**

- Managers and supervisors ensure teams identify critical tasks where we cannot afford a mistake and add safeguards.
- Team members seek and welcome help, such as independent verification, to prevent mistakes when performing critical tasks.

2

**Mistakes often result from well-meaning behaviours intended to get the job done.**

- Managers and supervisors establish clear expectations about what to do when circumstances appear to require a deviation from a procedure, and hold the organization accountable to meet these expectations.
- Team members halt work and seek help when a deviation is required.

3

**Underlying conditions often contribute to error-prone situations.**

- Managers and supervisors promote the identification and mitigation of conditions potentially contributing to errors or deviations.
- Team members confirm error-preventing safeguards are in place before executing critical tasks.

4

**Understanding 'how' and 'why' mistakes occur can help us prevent them.**

- Managers and supervisors lead the analysis of events and near-misses, and apply the lessons learned to prevent their reoccurrence.
- Team members identify and take action to mitigate error-prone situations and apply lessons learned.

**5** **We can predict, and then prevent or manage most error-prone situations.**

- Managers and supervisors engage teams to conduct safety critical task analysis to identify and mitigate error-prone situations.
- Team members confirm the safeguards identified during the safety critical task analysis are in place when executing critical tasks.

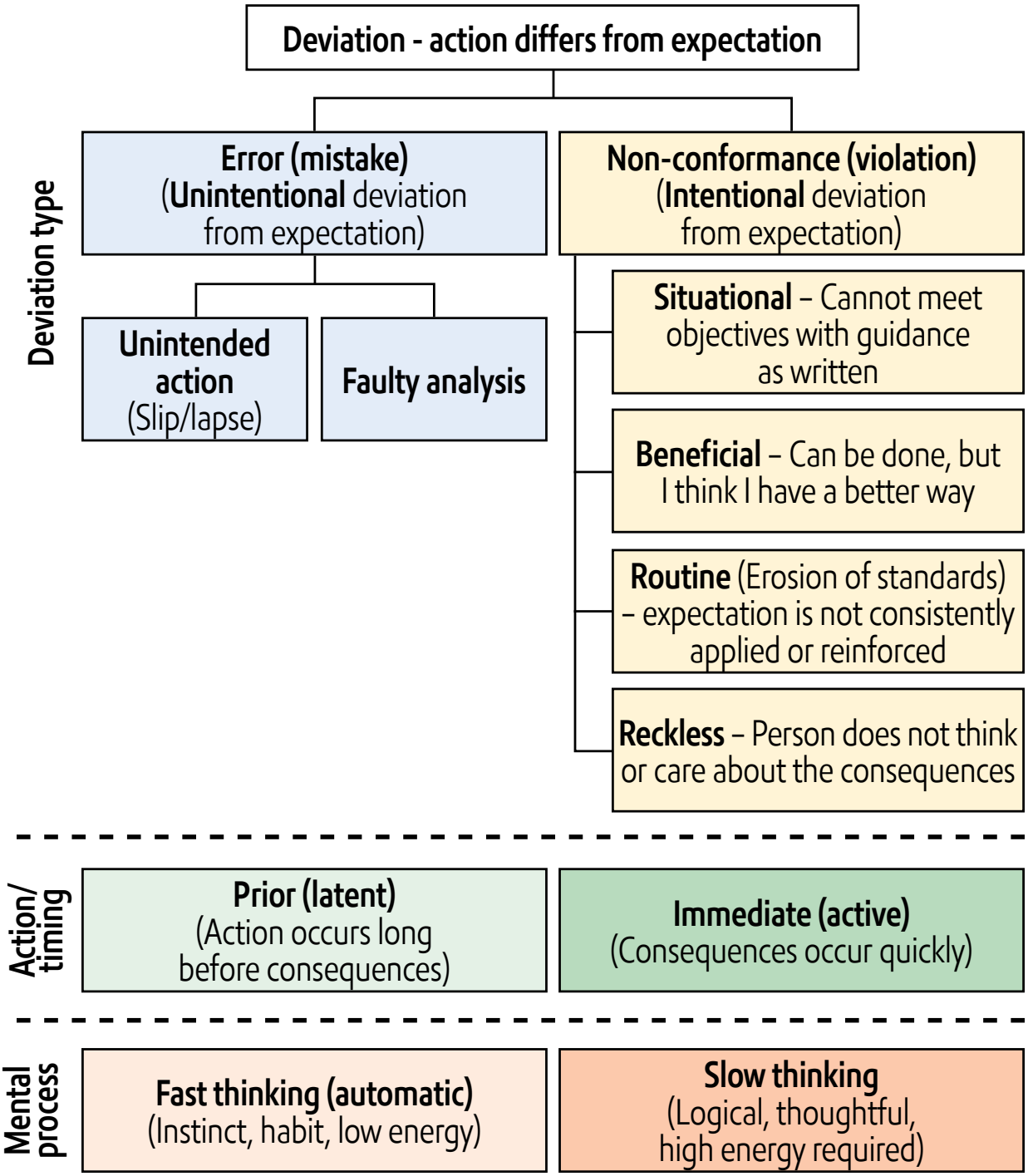
**6** **A leader's response to mistakes directly impacts the culture of both learning and accountability.**

- Managers and supervisors balance accountability and learning from mistakes to reduce the likelihood of reoccurrence.
- Team members identify error-prone situations, report errors and take steps to prevent their reoccurrence.

**7** **Managers, supervisors and team members work together to create an engaged, collaborative team.**

- Managers and supervisors recognize team members who identify error-prone situations, and proactively engage teams to prevent errors and deviations.
- Team members work collaboratively to identify and mitigate error-prone situations.

## Human performance terminology

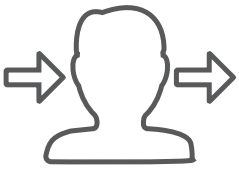


## Bias

What does bias sound like at work?

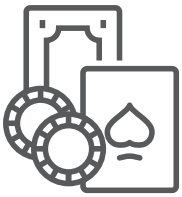
- "We have been tying off the spring loaded valve this way many times and haven't had any problems."
- "They didn't follow procedure. He should have held that valve open and monitored the water draw."
- "The work-pack says this job should take four hours; we've already been working for three hours and we're not even half way through."
- "The conditions and hazards look the same as yesterday."

**Anchoring bias**
Over reliance on one piece of information



**Confirmation bias**
Favouring information confirming our preconceptions

**Attribution error bias**
Overemphasizing personal characteristics and ignoring situational factors when judging others' behaviour



**Outcome bias**
Judging a decision based on the outcome, rather than how the decision was made

**Salience bias**
Focusing on items and information viewed as important; including authority pressure and production pressure

**Hindsight bias**
Believing the people involved in an event should have been able to predict their actions would result in an event

## Strategies to overcome bias

- **Acknowledge**
  - biases impact your decision making
  - be aware of errors and mistakes biases introduce
- **Do not rush important decisions**
  - before making a decision, stop and think: 'What are my biases toward the subject?'
  - if making decisions based on first impressions, slow down, reflect, and explore the situation
- **Test assumptions:** 'What makes us think what worked before will work now?'
  - create a diverse team, test assumptions and ask open ended questions
  - look for information that doesn't support your existing beliefs
- **Consider organizational weaknesses** and avoid focusing solely on fixing the person
- **Involve people** to gain a broader perspective
  - challenge introduced → identify options → sharing in open discussion
  - problem solve without directing the answers; ask open ended questions
- **Create clarity of what and why**; and empower employees to pause or stop
- **For investigations, ask** 'Why did the worker's actions make sense at the time?'
  - empathetically learn the full story – walk in their shoes – understand why their actions make sense at that time

## Use LPS tool to help overcome bias

- LPSA – use slow thinking to break bias
- JLA – anchor tasks to safe work methods
- LPOs – task observations – engage others to identify bias we may not identify within ourselves or our work

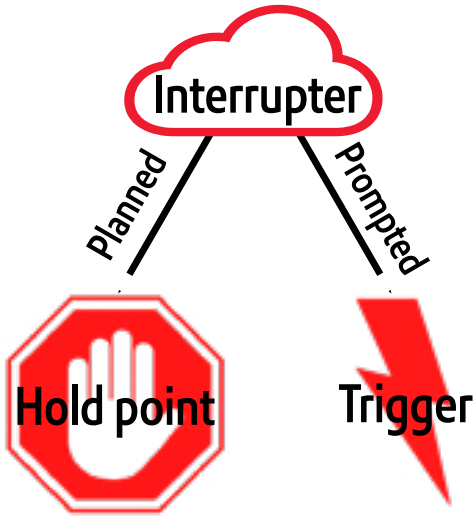
## Key HP concept - interrupters

Interrupters are designed to break the continuity of work and slow down thinking.

Interrupters combat traps associated with fast thinking, decision making bias and error-prone situations. In other words, interrupters address our individual factors and vulnerabilities associated with being human.

**Interrupters may be:**

1. **Planned** as part of our pre-job planning activities (i.e., hold points), or
2. **Prompted** during job execution (i.e., triggers).



**Hold points** are like stop signs – literally **planned interrupters** at pre-defined step(s) in a task or phase(s) in a job.

- Task level matrix – is designed as an interrupter, to pull people together, to discuss and plan before acting.
- A critical procedure with built in hold point verification point (maybe requiring second set of eyes or endorsement) required before proceeding.
- A hold point is used to determine if all necessary steps have been executed and necessary safeguards are in place before the point of no return. i.e., immediately before the first break of process piping, work is paused to verify energy sources are properly isolated, non-essential personnel have left the area, required PPE is worn, etc.

**Triggers** are like lightning bolts – **prompted interrupters** used to guide us to pause or stop work; they could occur at any time and require pre-planning.

- A trigger can be observable actions or reactions, a recognized thought or perceptions, or change. i.e., personnel standing in the line of fire, faulty equipment, manufacturer recommendations.
- Consider critical safe guard (CSG) a specific piece of equipment and controls that are vital to either prevent or mitigate a high consequence process safety incident that could result in multiple fatalities (i.e., BLEVE or tank boilover).
- If a CSG could be impacted from work which you are involved in, CSG should be a trigger, to engage slow thinking and have a discussion with Imperial operations to understand what mitigations are required before proceeding

Like lightning bolts, triggers could occur at any time, i.e.:

- If your 'gut' tells you something isn't right.
- Team member hears a loud hissing sound coming from a flange.
- When you observe a change of conditions from what was reviewed during your pre-job planning.
- If there's a sense of rushing, frustration, or distraction during a job.
- Trust your gut: one of the most powerful triggers is a gut-feeling that something isn't right.

## Examples - error prone situations

Unhealthy work conditions result in error prone situations and poor human performance (higher error rates, hard to get it right and worker's may have difficult choices).

**Visual example 1**

Design leading to awkward body positioning for maintenance activities

**Visual example 2**

High forces required, design that forces workers into difficult positions, and difficult to complete

**Visual example 3**

Tank bottom drain and roof drain similar and led to higher potential of human error

# 11 Life saving actions (LSA)

**Breaking containment/Opening process equipment (OPE)**
Manage ignition sources and exposure to energy and hazardous substances

**Bypassing safety controls**
Obtain authorization before overriding or disabling safety controls

**Confined space entry**
Obtain authorization before entering a confined space

**Energy isolation**
Verify isolation and zero energy before work begins

**Excavation**
Obtain authorization before digging or entering excavations

**Hot work**
Control flammables and ignition sources

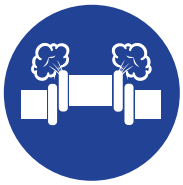
**Line of fire**
Keep yourself and others out of the line of fire

**Safe mechanical lifting**
Plan lifting operations and control the area

**Work authorization**
Work with a valid permit when required

**Working around mobile equipment (WAME)**
See and be seen; maintain a safe distance

**Working at height**
Protect yourself against a fall when working at height



# Breaking containment/ Opening process equipment (OPE)

Manage ignition sources and exposure to energy and hazardous substances

## Life saving action/safeguard

| | |
|---|---|
| 1 | I verify opening/break location(s) |
| 2 | I confirm energy isolation is complete |
| 3 | I manage ignition sources and confirm gas testing is completed when required |
| 4 | I use appropriate PPE and defensive behaviours when opening process equipment |

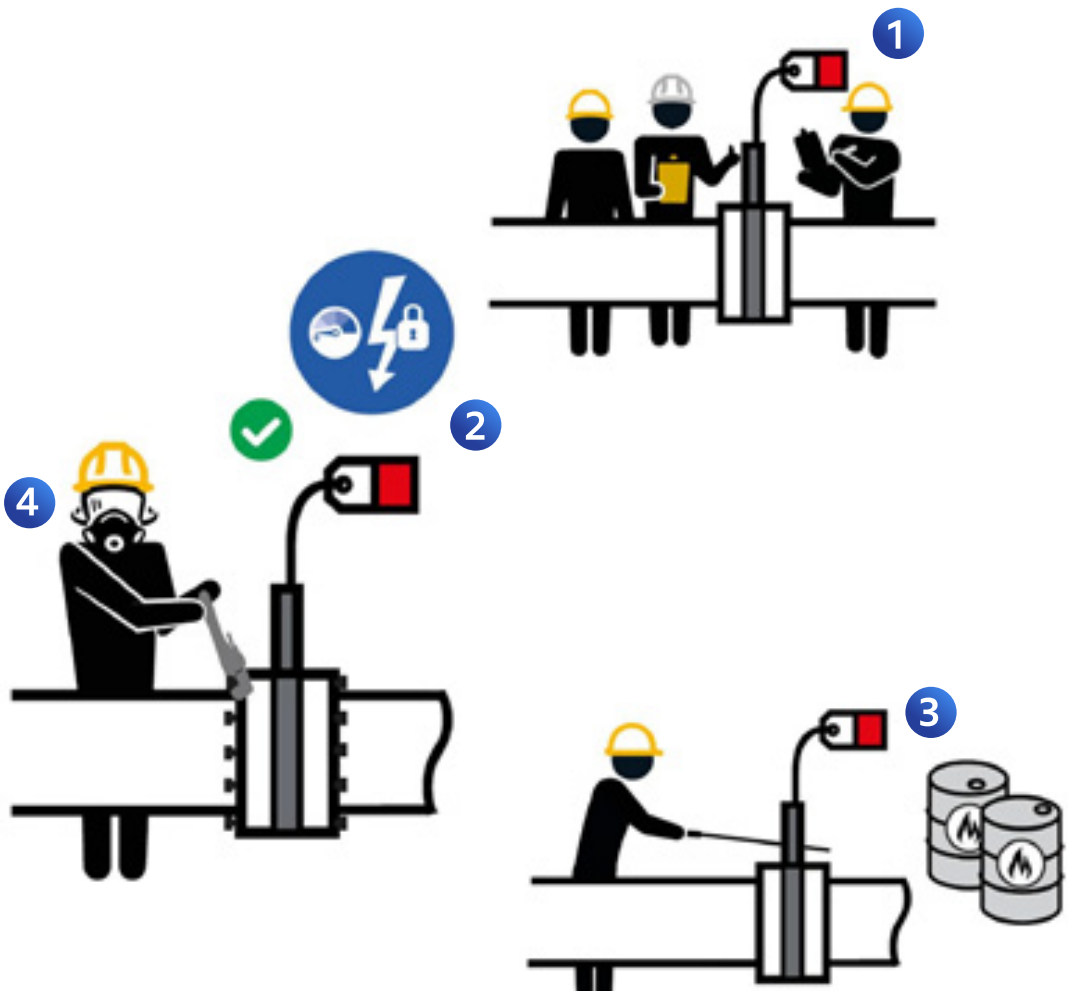
**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**



Back to LSA index

# Breaking containment/ Opening process equipment (OPE)

Manage ignition sources and exposure to energy and hazardous substances

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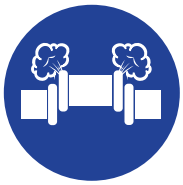

# Breaking containment/ Opening process equipment (OPE) V&V

Obtain authorization before entering a confined space

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I verify opening/break location(s) | ▪ Break/cut/opening points have been identified and confirmed per plan.<br>▪ Work has been authorized to begin (e.g., work permit). |
| 2 | I confirm energy isolation is complete | ▪ Potential energy sources have been identified and isolated per plan.<br>▪ System is clear of trapped hazardous liquids or gases.<br>▪ Safe energy state verified before starting work.<br>**Note:** Energy isolation start work check shall be reviewed prior to job. |
| 3 | I manage ignition sources and confirm gas testing is completed when required | ▪ Potential ignition sources have been identified and safeguards are in place<br>▪ Atmospheric testing has been performed as per work authorization process:<br>– during required timeframe prior to starting work<br>– at all openings (including above and below) in the work area<br>– follow-up testing is performed per atmospheric monitoring plan |
| 4 | I use appropriate PPE and defensive behaviours when opening process equipment | ▪ Required PPE is worn by all personnel within the affected radius.<br>▪ Exclusion zone (e.g., barricade) is in place, as applicable.<br>▪ Workers are positioned outside the line of fire of stored energy (e.g., open flanges opposite workers, restrain piping/valve movement, stay clear removing plugs). |

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# Bypassing safety controls

Obtain authorization before overriding or disabling safety controls

## Life saving action/safeguard

| | |
|---|---|
| 1 | I understand and use safety-critical equipment and procedures which apply to my task |
| 2 | I obtain authorization before:<br>▪ Disabling or overriding safety equipment<br>▪ Deviating from procedures<br>▪ Crossing a barrier |

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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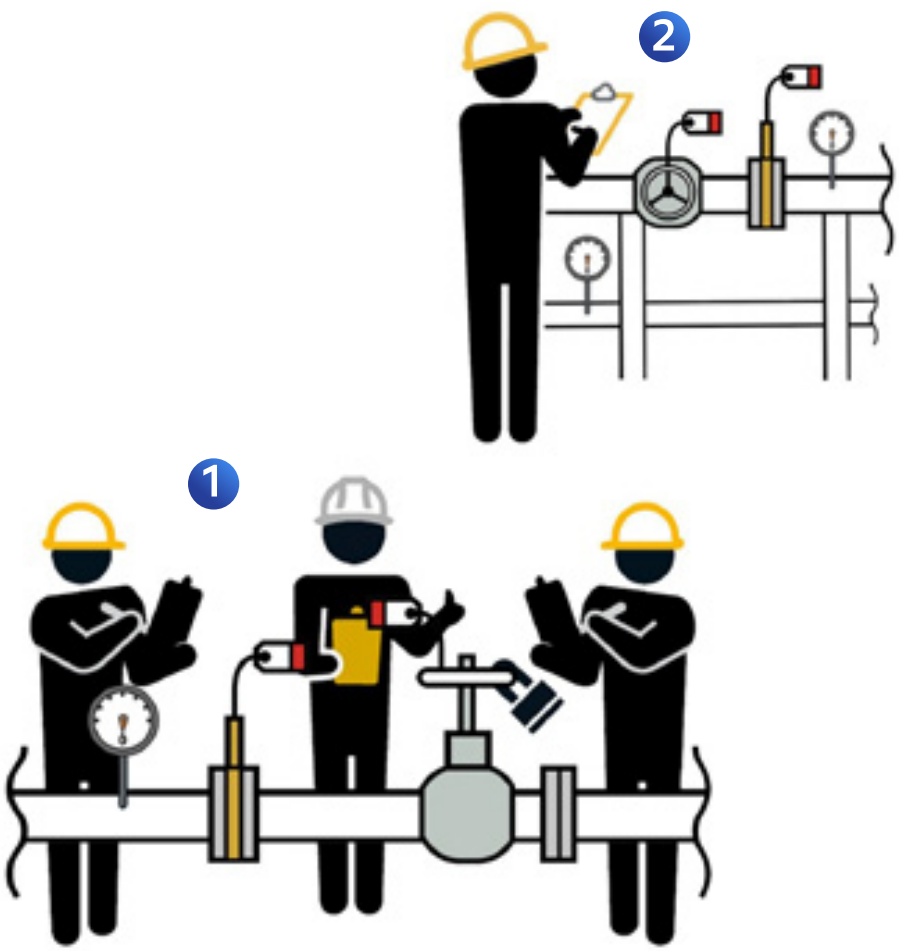
# Bypassing safety controls

Obtain authorization before overriding or disabling safety controls



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# Bypassing safety controls V&V

Obtain authorization before overriding or disabling safety controls

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 1 I understand and use safety-critical equipment and procedures which apply to my task | ▪ Follow applicable procedures/guidance related to task safety critical equipment.<br>▪ Team members understand what a safety critical device is (examples):<br>– fire suppression systems<br>– emergency shutdown systems<br>– process controls and alarms<br>– environmentally critical alarms<br>– relief valves<br>– crane safety devices (e.g., load moment indicator; anti-two block). |
| 2 I obtain authorization before:<br>▪ Disabling or overriding safety equipment<br>▪ Deviating from procedures<br>▪ Crossing a barrier | ▪ Safety control defeat/bypass is properly identified, documented, and communicated per local procedure including emergency preparedness and response plan, as applicable.<br>▪ Workers/crews understand how their task(s) being performed are impacted from bypassing safety controls, and:<br>– the mitigations to be implemented<br>– steps to be taken to ensure the device is safely defeated<br>▪ Personnel adhere to exclusion zone rules and obtain proper permission to enter. |

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# Confined space entry

Obtain authorization before entering a confined space

## Life saving action/safeguard

1. I confirm energy sources are isolated
2. I confirm the atmosphere has been tested and is monitored
3. I check and use my breathing apparatus when required
4. I confirm there is an attendant standing by
5. I confirm a rescue plan is in place
6. I obtain authorization to enter

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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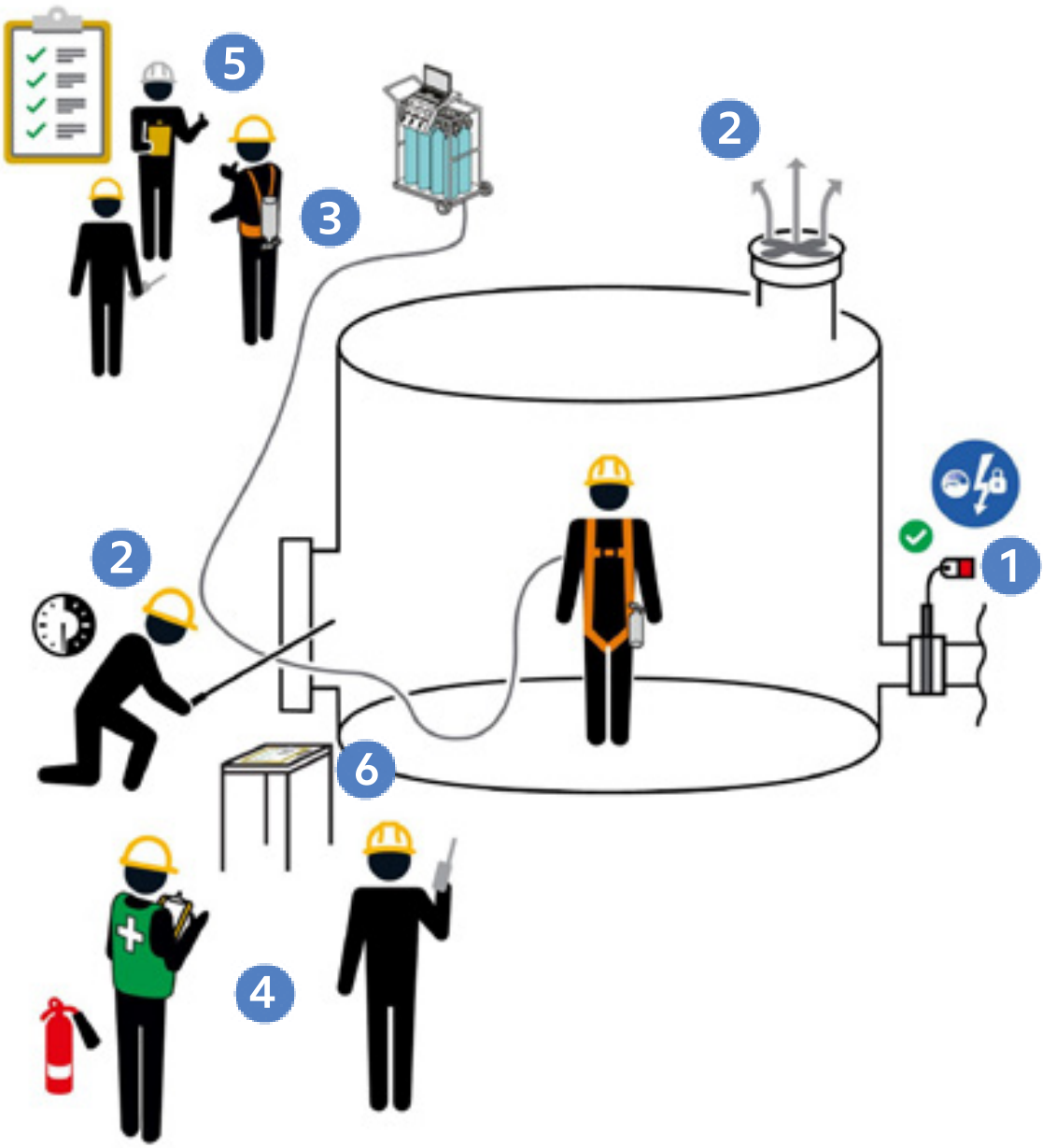
# Confined space entry

Obtain authorization before entering a confined space

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# Confined space entry V&V

Obtain authorization before entering a confined space

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I confirm energy sources are isolated | ▪ All potential energy sources have been identified, isolated, and locked/tagged out per isolation plan<br>▪ Lighting and electrical equipment is appropriately rated for atmosphere (e.g., 12v, explosion proof as applicable)<br>▪ The potential for simultaneous operations which could introduce additional hazards has been evaluated |
| 2 | I confirm the atmosphere has been tested and is monitored | ▪ Atmospheric testing has been performed as per work authorization process:<br>– during required timeframe prior to starting work<br>– at all required locations<br>– follow-up testing is performed per atmospheric monitoring plan<br>▪ Confined space is ventilated according to ventilation plan.<br>▪ Ventilation inlets:<br>– are not near an ignition source<br>– will not be affected by wind/weather conditions and will not have flow restrictions<br>– will not draw contaminated air (e.g., vehicle or generator exhaust) into the space |

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# Confined space entry V&V

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 3 I check and use my breathing apparatus when required | ▪ Respiratory protection is utilized if atmospheric testing determines it is required.<br>▪ The breathing apparatus is complete and in good working condition.<br>▪ The main air supply is certified breathing air and is properly connected.<br>▪ Escape pack is in place and functioning prior to entry. |
| 4 I confirm there is an attendant standing by | ▪ Dedicated attendant is present at the designated entry point(s) to the confined space or use of reliable remote CSE monitoring is in place where the attendants' responsibilities are redistributed between a centralized CSE Console Watch and CSE Rover.<br>– a qualified supplied air attendant is provided if supplied air required (e.g., SCBA, supplied airline)<br>▪ The attendant (or console watch and rover) understands their responsibilities, which include:<br>– using previously agreed upon communication methods (e.g., hand signals, radio)<br>– monitoring personnel in the confined space<br>– documenting entry and exits from the confined space<br>– monitoring the confined space and surrounding area for changing conditions |
| 5 I confirm a rescue plan is in place | ▪ Emergency rescue plan and resources are available to achieve prompt rescue.<br>▪ The entrant is wearing rescue equipment per plan (e.g., harnesses, retrieval device) and understands egress. |



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# Confined space entry V&V

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 6 I obtain authorization to enter | ▪ Permit issued for confined space entry.<br>▪ Permit conditions and risk mitigations have been communicated to all affected personnel prior to entry.<br>▪ Personnel accountability process is followed for entry into and out of confined space.<br>▪ All personnel (entrants, attendants, gas testers, entry supervisors) have been trained and understand their roles. |



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# Energy isolation

Verify isolation and zero energy before work begins

## Life saving action/safeguard

| | |
|---|---|
| 1 | I have identified all energy sources |
| 2 | I confirm that hazardous energy sources have been isolated, locked, and tagged |
| 3 | I have checked there is zero energy and tested for residual or stored energy |
| 4 | I never remove or tamper with energy control devices without authorization |
| 5 | I confirm equipment is back to safe operating condition prior to re-energizing |

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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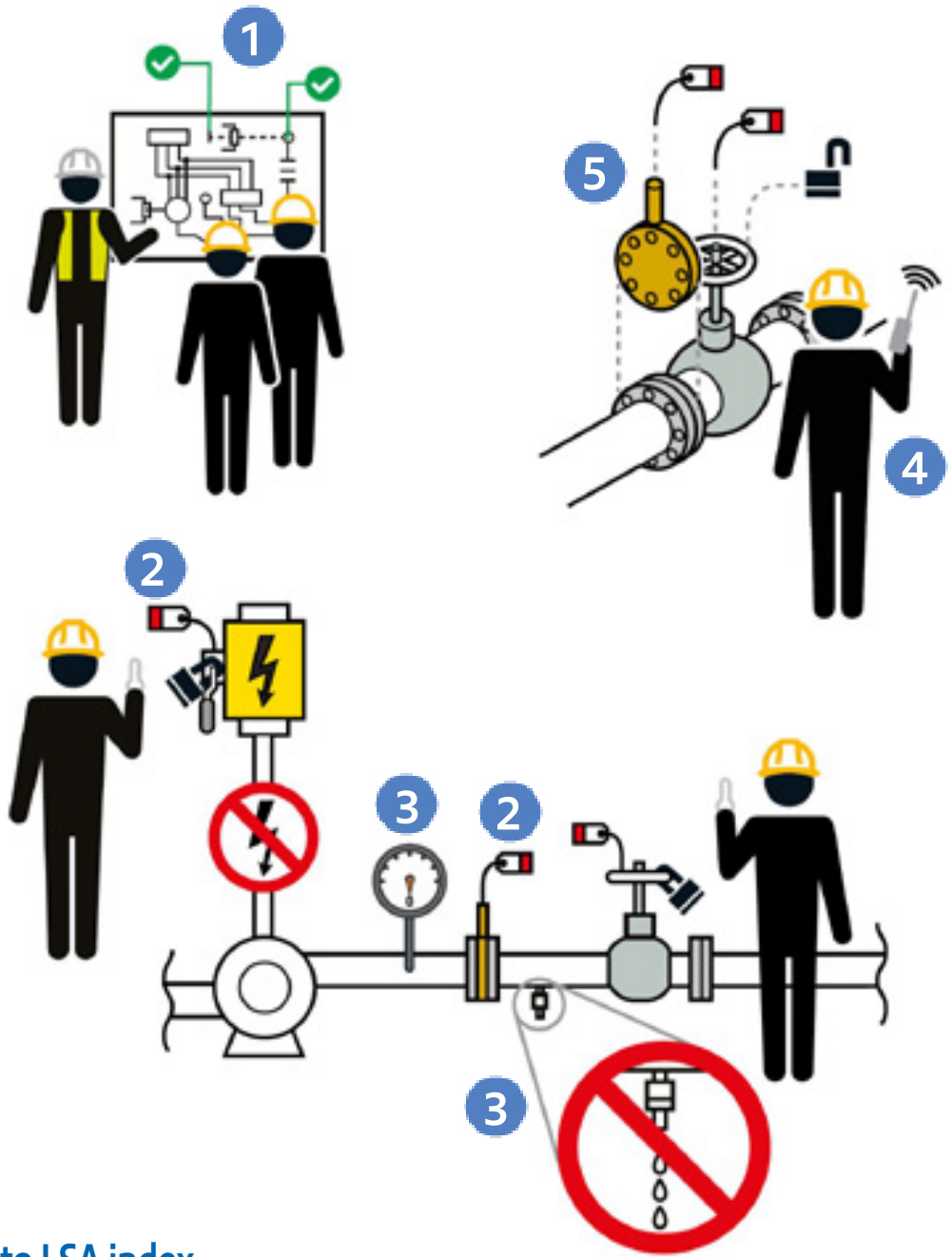
# Energy isolation

Verify isolation and zero energy before work begins

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# Energy isolation V&V

Verify isolation and zero energy before work begins

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | have identified all energy sources | ▪ Potential energy sources (e.g. electrical, pressure, hydraulic, mechanical, etc.) have been identified and verified.<br>▪ Tags or markings identify the circuit, system, and/or equipment to be isolated as indicated by the isolation list. |
| 2 | I confirm that hazardous energy sources have been isolated, locked, and tagged | ▪ All isolations points are in place and tagged or marked (use an isolation diagram, equipment isolation procedure, P&IDs, or process flow diagram).<br>▪ Valves are open or closed per the diagram and/or plan and secured in the correct position.<br>▪ Blinds, spades and skillets are:<br>– sized appropriately for the pressure rating of the equipment<br>– installed per the diagram and/or plan<br>▪ Electrical isolation points are open/switched off or disconnected from power source.<br>▪ Lockout-tagout devices are on isolation points. |

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# Energy isolation V&V

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 3 | I have checked there is zero energy and tested for residual or stored energy | ▪ Demonstrate equipment to be worked on is de-energized before starting work.<br>▪ Systems (lines, gauges, etc.) have been checked for residual or stored pressure by:<br>– checking bleed and vent points are open to release stored energy<br>– checking gauges, measurements and volt meters<br>**Note:** If zero energy is not possible, **stop** and:<br>Confirm controls/safeguards are in place, functioning and maintained to manage the risk from residual energy |
| 4 | I never remove or tamper with energy control devices without authorization | ▪ Appropriate approvals and communications are made to all affected parties if energy control devices must be removed or modified.<br>▪ Removal or modifying of control devices does not affect any other work activities |
| 5 | I confirm equipment is back to safe operating condition prior to re-energizing | ▪ Jobs related to the isolation have been completed.<br>▪ Lockout-tagout devices (e.g., blinds, locks, etc.) have been removed after work is completed.<br>▪ Personnel protected by energy isolation have been notified the equipment is ready to be re-energized.<br>▪ Line/system has been walked, validated and confirmed all equipment is in proper position and ready to return to service. |

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# Excavation

Obtain authorization before digging or entering excavations

## Life saving action/safeguard

| | |
|---|---|
| 1 | I obtain authorization prior to performing excavation/trenching/ ground disturbance activities |
| 2 | I confirm underground utilities and structures are located, de-energized or protected |
| 3 | I confirm hazard controls and confined space entry as required |
| 4 | I monitor for changing conditions and exit as appropriate |

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**



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# Excavation

## Obtain authorization before digging or entering excavations


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# Excavation V&V

Obtain authorization before digging or entering excavations

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I obtain authorization prior to performing excavation/ trenching/ ground disturbance activities | ▪ Work authorization established (including Confined space entry permit if required) for entry into excavation and entry accountability.<br>▪ Atmospheric testing requirements established, if applicable. |
| 2 | I confirm underground utilities and structures are located, de-energized or protected | ▪ Local utilities have been consulted about the dig so they can identify their lines (e.g., One Call, Dial Before You Dig).<br>▪ Underground utilities are visibly identified (e.g., flagging, paint, etc.).<br>▪ Depth and width of utilities or structures are known before digging.<br>▪ Before starting mechanical excavation, actions have been taken to locate and expose underground line/ utility and structures (e.g., probing, hand digging, soft digging, air knifing, hydro-vac).<br>▪ The location, height, and voltage of overhead power lines have been identified – Maintain identified minimum distance between equipment and energy source – To help with this, use flagging or barriers on overhead power lines. |



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# Excavation V&V

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 3 I confirm hazard controls and confined space entry as required | ▪ A competent person assessed the soil type to define the excavation safeguards.<br>▪ Excavations have a protective system (sloping, shoring, or shielding) in place, as applicable.<br>▪ Storage of excavated material is at least two feet (0.61 m) from the edge of excavation.<br>▪ Ensure stability of adjacent utilities/structures potentially affected by excavation through means of shoring, bracing, and underpinning.<br>▪ Excavation area is visibly identified with caution tape, silt fencing, or other visual identification.<br>▪ Excavation area is secure from unauthorized access.<br>▪ No personnel are in line-of-fire hazards (e.g., swing radius of excavator, discharge side of trencher).<br>▪ Only essential personnel/crew are in the area where the excavation work is occurring.<br>▪ Equipment maintains safe distance from the unprotected edges of excavation or trenches to prevent cave ins.<br>▪ Fall protection is required for access within six feet (1.8m) of an excavation leading edge that is deeper than six feet (1.8m). |
| 4 I monitor for changing conditions and exit as appropriate | ▪ Personnel are aware of their role to watch for changing conditions and exit when needed (e.g., water intrusion, protection system integrity, etc.) |

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# Hot work

Control flammables and ignition sources

## Life saving action/safeguard

| | |
|---|---|
| 1 | I identify and control ignition sources |
| 2 | Before starting any hot work:<br>▪ I confirm flammable material has been removed or isolated<br>▪ I obtain authorization |
| 3 | Before starting hot work in a hazardous area, I confirm:<br>▪ A gas test has been completed<br>▪ Gas will be monitored continually |

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**



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# Hot work

## Control flammables and ignition sources




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# Hot work V&V

Control flammables and ignition sources

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I identify and control ignition sources | ▪ Safeguards are in place to prevent ignition sources associated with the hot work.<br>– spark containment is in place as applicable<br>▪ Check for simultaneous operations that may introduce additional hazards. |
| 2 | Before starting any hot work:<br>▪ I confirm flammable material has been removed or isolated<br>▪ I obtain authorization | ▪ Potential flammable and combustible materials have been identified, isolated and removed as appropriate.<br>– no opening of process equipment occurring within the "hot work zone"<br>– drains, gaps, openings in tanks or piping have been covered/sealed<br>– vents are isolated/routed away from the area<br>– the system has been drained, flushed, or purged to remove flammable/explosive materials or gases<br>▪ A trained fire watch has been designated and is at the work location.<br>▪ Firefighting equipment is inspected, fully functional, and is available if needed.<br>▪ Work authorization for hot work has been completed per company requirements. |



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# Hot work V&V

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 3 Before starting hot work in a hazardous area, I confirm:<br>▪ A gas test has been completed<br>▪ Gas will be monitored continually | ▪ Atmospheric testing has been performed as per work authorization process:<br>– during required timeframe prior to starting hot work<br>– at all openings near the hot work area (including above and below)<br>▪ Follow-up gas testing is performed per atmospheric monitoring plan.<br>**Note:** "Continually" monitored means periodic monitoring of the atmosphere with a defined frequency or continuous monitoring throughout the duration of work activities as specified by local requirements. |



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# Line of fire

Keep yourself and others out of the line of fire

## Life saving action/safeguard

1. I position myself to avoid:
   - Moving objects
   - Vehicles
   - Pressure releases
   - Dropped objects

2. I establish and obey barriers and exclusion zones

3. I take action to secure loose objects and report potential dropped objects

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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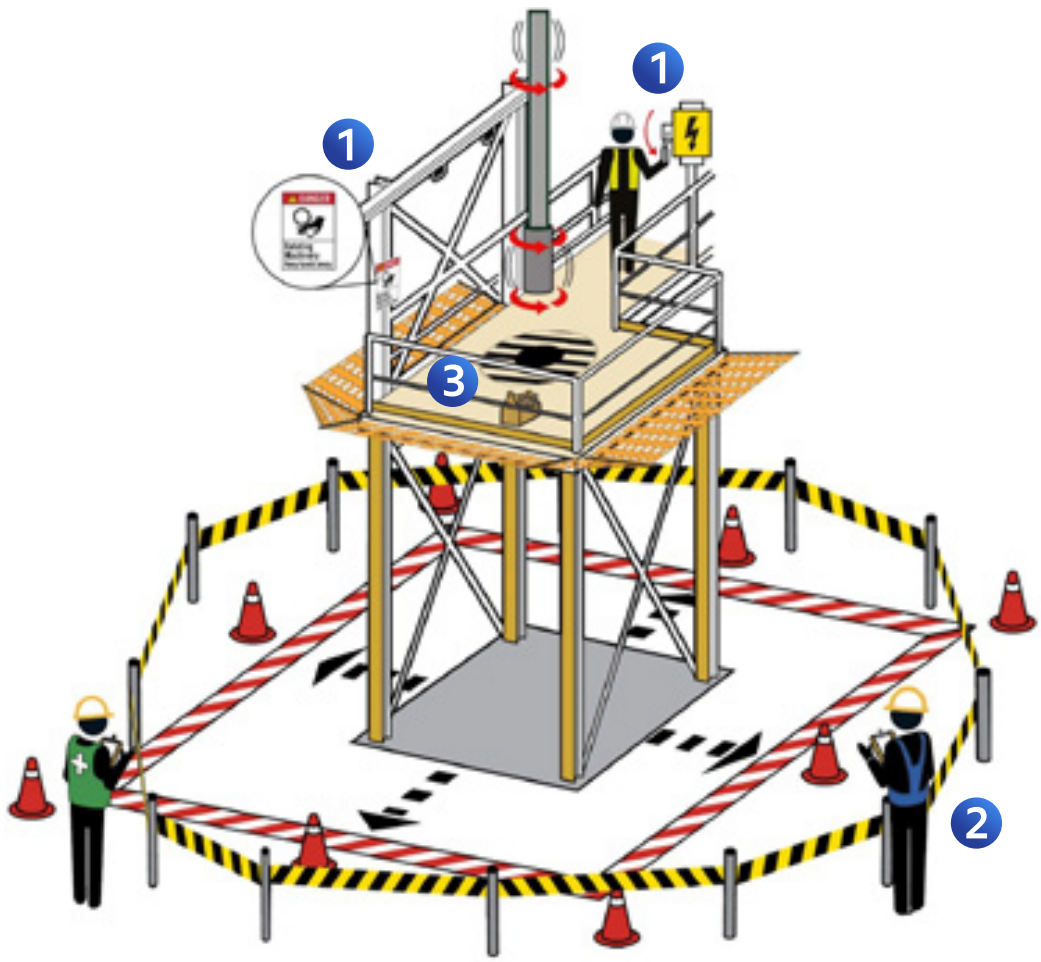
# Line of fire

Keep yourself and others out of the line of fire



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# Line of fire V&V

Keep yourself and others out of the line of fire

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I position myself to avoid:<br>▪ Moving objects<br>▪ Vehicles<br>▪ Pressure releases<br>▪ Dropped objects | ▪ Workers positioned outside line of fire of potential energy sources (e.g., electrical, pressure, hydraulic, mechanical, etc.). |
| 2 | I establish and obey barriers and exclusion zones | ▪ Exclusion zones have been identified and controls are in place to protect people from line of fire hazards.<br>▪ Access to exclusion/drop zones is controlled (e.g., attendant or physical barriers).<br>▪ See and be seen; maintain safe distance. Crew understands that permission must be obtained before entering exclusion zones.. |
| 3 | I take action to secure loose objects and report potential dropped objects | ▪ Tools used at heights have securing wire/ lanyards/tethers.<br>▪ Materials used at height are secured in storage boxes, pouches, bags, etc. and/or stored in areas away from the leading edge.<br>▪ Cover openings to lower levels (e.g., grating, gaps, etc.) or use debris nets. |



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# Safe mechanical lifting

Plan lifting operations and control the area

## Life saving action/safeguard

1. I confirm that the equipment and load have been inspected and are fit for purpose
2. I only operate equipment that I am qualified to use
3. I establish and obey barriers and exclusion zones
4. I never walk under a suspended load
5. I understand lift plan prior to starting work and keep hands off load unless authorized
6. I establish and maintain communication with lifting and rigging personnel

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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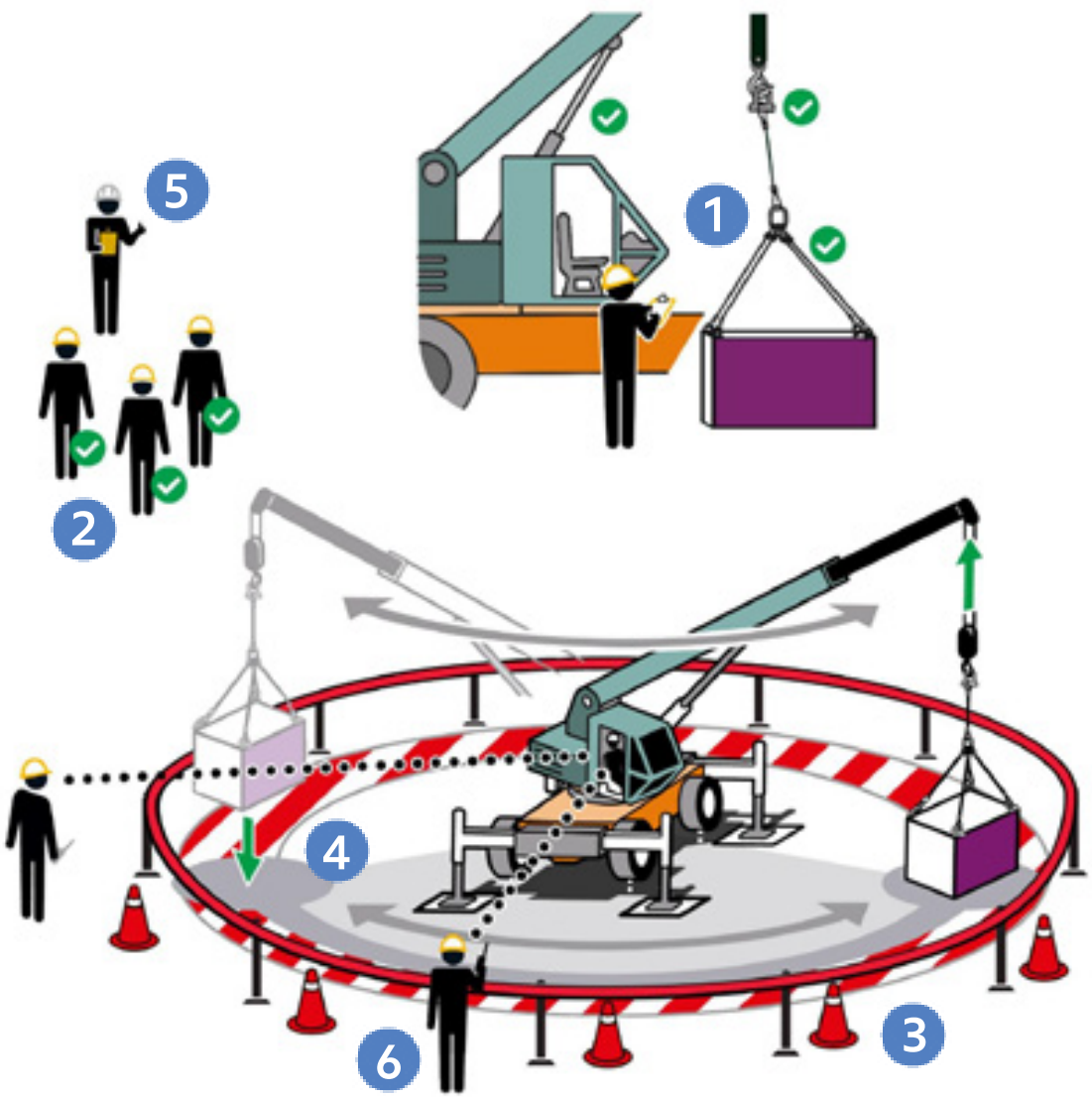
# Safe mechanical lifting

## Plan lifting operations and control the area

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# Safe mechanical lifting V&V

Plan lifting operations and control the area

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I confirm that the equipment and load have been inspected and are fit for purpose | ▪ Periodic and pre-use crane and/or rigging equipment inspection has been completed.<br>▪ Safety and monitoring devices are in place and functioning.<br>▪ The rigging equipment is rated for the lift.<br>▪ Matting/lifting surface has been assessed for stability and is level for the lifting equipment.<br>▪ Loads have been assessed for stability, taking into account: 1) securing of the load, including anchor point capacity; 2) workplace conditions; 3) travel path; 4) equipment capacity.<br>▪ Loose objects have been secured or removed prior to lift.<br>▪ Ensure softeners are used to protect nylon slings at sharp edges.<br>**Note:** If load chart does not exist, assume equipment is not rated for the lift; stop work and identify alternative lifting equipment that is rated for the load |
| 2 | I only operate equipment that I am qualified to use | ▪ Lifting equipment operator and lifting crew are qualified to perform the task, per local requirements.<br>▪ The members of the lift crew have agreed to and understand their individual roles and responsibilities for the lift. |

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# Safe mechanical lifting V&V

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 3 I establish and obey barriers and exclusion zones | ▪ Access to exclusion zones is controlled (e.g., attendant or physical barriers).<br>▪ Lift team members know the load crush and drop exclusion zones before load is lifted, lowered or tensioned and are out of the line of fire.<br>▪ Lift team members to enter exclusion zones only as agreed in lift plan and pre-lift meeting.<br>▪ Signal person(s) are easily identified (high-visibility vest, vest labeled rigger, etc.). |
| 4 I never walk under a suspended load | ▪ Exclusion zones have been identified and controls are in place to protect people from line of fire hazards, including walking/working under suspended loads and moving/dropped objects. |



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# Safe mechanical lifting V&V



| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 5 I understand lift plan prior to starting work and keep hands off load unless authorized | ▪ The lift method, equipment, and number of people required has been assessed and determined.<br>▪ When required, an approved lift plan or procedure is in place and has been evaluated by a competent person.<br>▪ The lift has been assessed for load weight, center of gravity, and load size.<br>▪ The lifting equipment's current capacity and condition has been assessed (including anchor points).<br>▪ Equipment operator and lifting crew have discussed the lift plan prior to lifting.<br>▪ Discuss stop work considerations if work situation changes including change of weather.<br>**Note:** Consider how to apply "hands-free lifting" (e.g., use of push poles and/or taglines). If hands on load must be used load shall be without stored lateral energy and movement, and only for guiding the load to its final position. |
| 6 I establish and maintain communication with lifting and rigging personnel | ▪ Communication method(s) (e.g., hand signals, radio) have been agreed to and tested.<br>▪ Continuous communication maintained between lifting equipment operator and signal person(s).<br>▪ Equipment operator and lifting crew have discussed the emergency response, including what emergency stop signals will be used. |

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# Work authorization

Work with a valid permit when required

## Life saving action/safeguard

| | |
|---|---|
| 1 | I have confirmed if a permit is required |
| 2 | I am authorized to perform work |
| 3 | I understand the permit |
| 4 | I have confirmed that hazards are controlled and it is safe to start |
| 5 | I stop and reassess if conditions change |

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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# Work authorization

Work with a valid permit when required


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# Work authorization V&V

Work with a valid permit when required

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I have confirmed if a permit is required | ▪ Workers aware of work authorization requirements of the task and if a written permit or verbal authorization is required. |
| 2 | I am authorized to perform work | ▪ Work authorization was established:<br>– work authorization documentation/permit complete including proper authorizations/signatures<br>– site preparations have been completed |
| 3 | I understand the permit | ▪ Scope of work matches what is documented on the authorization documents and/or permit.<br>▪ Understand if the work authorization is for the duration of the work.<br>▪ Work location is consistent with the location indicated on the permit. |
| 4 | I have confirmed that hazards are controlled and it is safe to start | ▪ Hazards have been identified, assessed, and mitigated; necessary controls have been put in place.<br>– required tools, equipment and materials identified<br>– responsibilities (ops, maintenance, construction, well work, etc.) identified and communicated<br>– energy isolated and safe energy demonstrated and verified<br>▪ Check for simultaneous operations that may introduce any additional hazards. |

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# Work authorization V&V

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 5 I stop and reassess if conditions change | ▪ Any change in scope of work is accounted for by stopping the work, reassessing the risk, and reviewing/ revising the permit, as appropriate. |



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# Working around mobile equipment (WAME)

See and be seen; maintain a safe distance

## Life saving action/safeguard

1. I plan work to separate workers and mobile equipment
2. I only operate mobile equipment if qualified and use spotters where required
3. I verify safety devices are functional on mobile equipment
4. I establish clear means of communication with equipment operator
5. I stay out of the equipment's exclusion zone while in operation
6. I confirm controls are in place to prevent unintentional movement of mobile equipment and/or loads

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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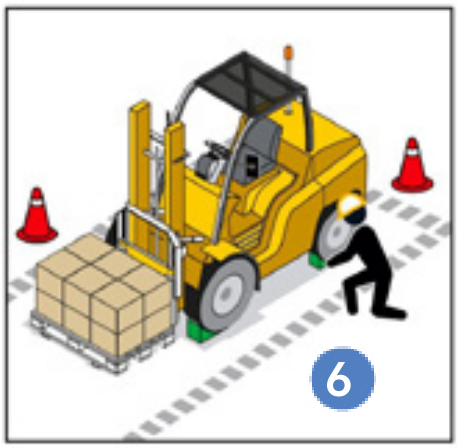
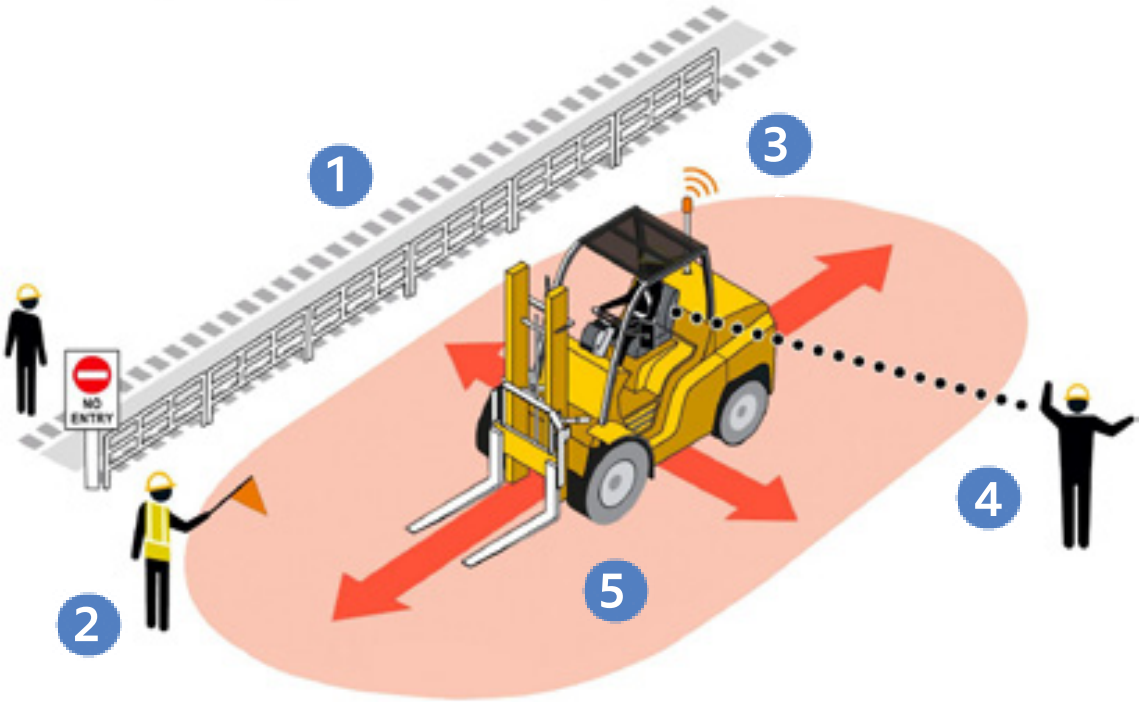
# Working around mobile equipment (WAME)

## See and be seen; maintain a safe distance

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# Working around mobile equipment (WAME) V&V

See and be seen; maintain a safe distance

| Life saving action/ safeguard | Discuss/verify/confirm (examples): |
|---|---|
| 1 I plan work to separate workers and mobile equipment | ▪ Interaction between workers and mobile equipment is eliminated or minimized by:<br>– dedicated walkways/paths<br>– signage and barriers to separate personnel from mobile equipment paths<br>– clearly defined pedestrian crossing points<br>– exclusion zones |
| 2 I only operate mobile equipment if qualified and use spotters where required | ▪ Assigned mobile equipment operators and spotters have required training and qualifications.<br>▪ If the operator cannot see what is in the direction of travel, there shall be an alternative method used to prevent personnel/mobile equipment interface such as (examples):<br>– audible alarm(s) and a qualified spotter positioned out of the line of fire and is able to monitor operations<br>– proximity detection devices and/or cameras<br>▪ Mobile equipment is free from hazards prior to movement (e.g., a 360° walk around).<br>– alternatives to reversing have been assessed prior to reverse operation of equipment |

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# Working around mobile equipment (WAME) V&V

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 3 | I verify safety devices are functional on mobile equipment | ▪ Safety devices such as alarms, lights, seat belts, brakes and audible alarm(s) are functioning.<br>**Note:** In the event a piece of equipment has a safety device that is not functioning properly, but must be used due to extenuating situations, an assessment must be done with appropriate up-line approval to ensure adequate controls are put in place to protect personnel. |
| 4 | I establish clear means of communication with equipment operator | ▪ Clear system of communication established/ understood between the equipment operator and work crew before starting:<br>– hand signals and/or radio communications<br>– emergency stop signals |
| 5 | I stay out of the equipment's exclusion zone while in operation | ▪ Mobile equipment exclusion zones have been defined by the work crew, and personnel understand the exclusion zone criteria (e.g., distance) for the type of equipment.<br>▪ Before entering an exclusion zone contact with equipment operator must be made, as well as permission granted by the equipment operator. |
| 6 | I confirm controls are in place to prevent unintentional movement of mobile equipment and/or loads | ▪ Load is secure/stable prior to transport based on workplace conditions and travel path.<br>▪ Equipment is located on flat ground where possible.<br>▪ Equipment wheels (including trailers) are chocked/ brakes engaged when there is potential for movement.<br>▪ Booms, attachments, and accessories are lowered or secured to prevent energy release/movement.<br>▪ Key is removed when the equipment is not in operation. |

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# Working at height

Protect yourself against a fall when working at height

## Life saving action/safeguard

1. I inspect my fall protection equipment before use
2. I secure tools and work materials to prevent dropped objects
3. I tie off 100% to approved anchor points while outside a protected area
4. I have validated prompt rescue capability when wearing fall protection
5. I will follow safe work practices when climbing, descending or working from ladders

**Verify these controls/safeguards are in place and effective prior to starting work. Stop and seek help if anything changes.**

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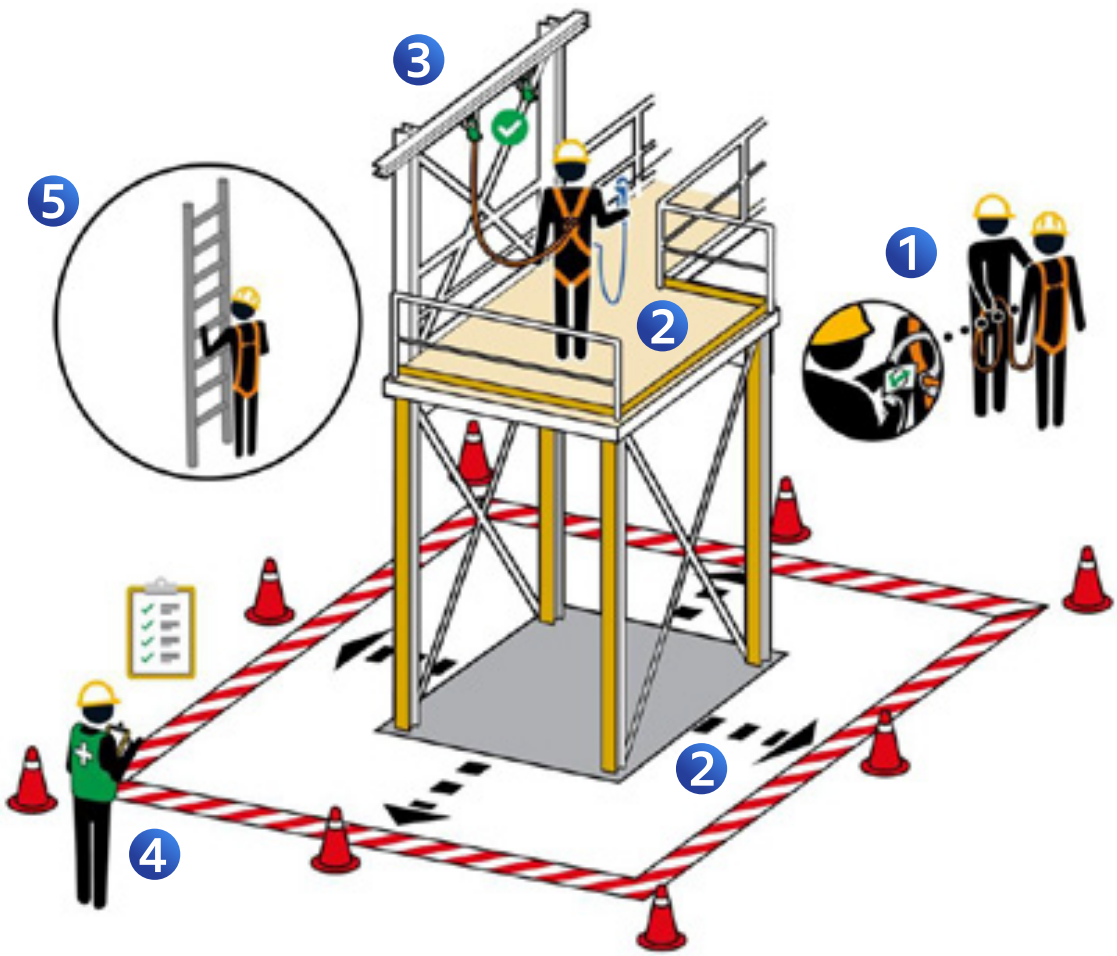
# Working at height

Protect yourself against a fall when working at height



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# Working at height V&V

Protect yourself against a fall when working at height

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 1 | I inspect my fall protection equipment before use | ▪ Full body harness is load rated to support the weight of the worker.<br>▪ Check fall protection system for signs of wear (includes fall arrest and/or fall restraint systems).<br>▪ Fall arrest system contains a self-retracting lifeline or shock absorbing lanyard.<br>▪ Fall restraint contains a fixed lifeline configured to prevent the worker from reaching the edge and falling.<br>▪ Fall arrest distance is shorter than the potential fall distance. |
| 2 | I secure tools and work materials to prevent dropped objects | ▪ Tools used at heights have securing wire/ lanyards/tethers.<br>▪ Materials used at height are secured in storage boxes, pouches, bags, etc. and/or stored in areas away from the leading edge.<br>▪ Cover openings to lower levels (e.g., grating, gaps, etc.), use debris nets or define exclusion/drop zones.<br>▪ Access to exclusion/drop zones is controlled (e.g., attendant or physical barriers). |

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# Working at height V&V

| Life saving action/ safeguard | | Discuss/verify/confirm (examples): |
|---|---|---|
| 3 | I tie off 100% to approved anchor points while outside a protected area | ▪ Workers understand that 100% tie-off means one hook must be anchored at all times.<br>▪ Company requires use of fall protection at heights six feet (1.8m) or greater unless local regulatory requirements are more restrictive.<br>▪ The anchor point meets regulatory/ company requirements.<br>▪ The position(s) of anchor points allow for 100% tie off.<br>▪ Work area has been assessed for sharp edge hazards and protected where applicable. |
| 4 | I have validated prompt rescue capability when wearing fall protection | ▪ Rescue capability and appropriate equipment is available to ensure prompt rescue (e.g., prevent suspension trauma).<br>▪ Workers do not work alone unless there is an alternative means of communication (e.g., cell phone or radio). |
| 5 | I will follow safe work practices when climbing, descending or working from ladders | ▪ Workers use 3-points of contact technique, keeping their body facing the ladder and near the middle of the ladder when ascending/descending.<br>▪ Fall arrest systems are being utilized when required per local requirements.<br>▪ Workers tied-off when working from ladders with >six foot (1.8m) fall potential. |

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## Opening process equipment (OPE) *(For more details, see: SMSM 18)*

- Operations is responsible for OPE.
- Energy isolation shall be in place for OPE.
- OPE applies when opening all process equipment to atmosphere including the installation and removal of blanks.
  - OPE applies, regardless of whether perimeter blanks are installed
  - OPE applies to all services including utilities
  - it should be assumed residual material could be present unless visually verified otherwise
- Equipment preparation (purging, steaming, chemical wash, etc.).
  - operations shall prepare equipment with the intent to minimize PPE
- OPE jobs require an approved *Process work plan.*
- The approved work plan includes required approvals for special conditions/tasks with elevated risk.
- Zero energy points (bleeders, drips, vents) shall be tagged and recorded on the EI list.
  - zero energy points shall be open while work is being performed
  - if there is visible leakage from an energy verification point or an LEL test above 10 percent, six inches from the drip, isolation valves are not holding and the job plan needs to include mitigations and required approvals for leaking valves
- Opening locations are tagged after independent verification of the isolation envelope.
- Breaking the seal (OPE) shall be performed using a cold work permit.
- A JJV with a member of the work crew performing the work is required for jobs involving opening process equipment.

- Wearing fall protection shall be avoided during equipment opening. If the work area cannot be modified to eliminate the need for fall protection, fall protection shall be attached to a horizontal 'line' type anchor that allows free movement away from the opening location.
- Steps need to be taken to ensure safe egress from the OPE location in the event of an unexpected release.
- Thirty-five foot perimeter and 10 foot perimeter expected
  - when performing OPE work involving hazard class 1, 2, or 3 flammable material, the ignition source control distance shall be a minimum of 35 feet (exclusion zone)
  - for equipment opening work involving hazard class 1, 2, 3 toxic or corrosive materials, an exclusion zone shall be established defining the area in which special RPE/PPE is required. Consider a 10 foot exclusion zone for toxic or corrosive materials. Adjust accordingly taking into consideration gas test results, wind, etc.
  - these exclusion zones are highlighted when the process planner creates a job pack. Mitigations and controls are documented in the job pack. The OPE standby (operations) is responsible for maintaining these exclusion zones

## Reaming and rodding equipment *(For more details, see SMSM 11:08, Clearing clogged beeder valves)*

- This standard provides requirements for cleaning plugged bleeder valves and orifice flange taps utilizing a specific brand of bleeder rod-out tools.
- **WARNING** – Every effort should be made to remove the line/vessel, etc., from service in order to minimize personnel exposure and loss of containment concerns.
- CRITICAL **CRITICAL - Rodding activities are a high risk activity with potential consequence of fatality or life altering injury. Failure to follow the steps and critical actions provided in the JLA could result in fatality or life altering injury.**
- Use of the Lawton bleeder cleaner requires strict adherence and reference to SMSM 11:08, do not proceed without reference to this standard and completion of required standard attachments.
- This standard is to be used when using Lawton Bleeder Cleaners. There may be instances where custom or modified tools are designed and used for unit specific applications. When this is required an owner's engineer (maintenance engineer) shall ensure the custom bleeder cleaner is properly designed and built for the intended service. In addition there should be an approved unit procedure that satisfies the requirements of this standard.
- If a new tool (non-Lawton bleeder cleaner) is being introduced the management of change process must be used.
- This is recommended high potential focus area for LPOs.

## Flange bolting techniques - quick reference

| Term | Definition/scope | Equipment status | OPE (yes/no) | JJV | EIL and process plan | Note |
|---|---|---|---|---|---|---|
| **Hot bolting** | Tightening, re-torquing or replacement of studs (one at a time) | In-service (live conditions) | No – process envelope not being opened | Optional | No | Adhere to MSWP 5.23 |
| **Flange tightening** | Tightening, re-torquing or re-tensioning of studs (no studs removed) | In-service (live conditions) | No – process envelope not being opened | Optional | No | Adhere to MSWP 5.23 |
| **Single stud change-out (stud replacement)** | Replacing one stud at a time in cross pattern sequence; each replaced stud is fully tightened before the next one is removed | In-service (live conditions) | No – process envelope not being opened | Optional | No | Adhere to MSWP 5.23<br>Limited to flanges with 8 or more studs |

| Term | Definition/scope | Equipment status | OPE (yes/no) | JJV | EIL and process plan | Note |
|---|---|---|---|---|---|---|
| **Half bolting** | Removing every other stud; practice is limited to flanges with 12 studs or more | Equipment is energy isolated from process<br>Prior to half bolting, equipment internal pressure must be below 25% of design pressure or 50 psig, whichever is lower | No | Yes | Yes | Can only be applied to flanges >= 12 bolts<br>Can be applied while purging/clearing equipment provided the internal pressure is below 25% of design pressure or 50 psig, whichever is lower |
| **Quarter bolting** | Removal of up to 75% (3 out of 4) of the bolts for flanges with 24 bolts of more | Equipment is energy isolated, depressured, drained and cleared/purged | No | Yes | Yes | System is at zero energy |
| **4-pointing** | Removing all but 4 studs on a flange (cross pattern) | Equipment is energy isolated, depressured, drained, and cleared/purged | Yes | Yes | Yes | System is at zero energy<br>OPE based on loss of gasket seal integrity |

## Cell phones/iPads/tablets/cameras/radios

- Any photos taken at site are intended for Imperial business. The sharing of any photos for use outside of company business requires approval from an Imperial second line supervisor.
- A safe work permit is required for any use of a camera.
  Note: camera's do not require an additional camera pass when a safe work permit is issued
- Only exception to requiring a safe work permit would be via an approved device permit.
- Do not use a cell phone (hand held or hands free) or walkie-talkies while operating a vehicle.
- Unless equipped with an alligator clip, clipped to FRC, radios/walkie-talkies need to be in a radio pouch or tool bag.

## Entry *(For more details, see: SMSM 04:19)*

- Operating units – except for the resident operators, and others defined in the safety manual, all persons entering process operating units must sign the unit entry log (including operations initials) or sign on a work permit.

Note: Due to changes in security systems for control room access, several sign in locations are now set up with a telephone connection to the log book authorizer located in another room. The above sign in procedure will still apply for both parties; however, the entrant will not physically see the authorizer. The log book authorizer will need to provide the permission to the entrant and then sign the log book as time allows to complete the authorization documentation in the log book.

## Fire protection/Road closure authorization

*(For more details, see: SMSM 10)*

- A fire water permit is required to use a hydrant for any purpose other than emergency response.

- A road closure authorization is required when a roadway or railway crossing is to be closed for a period of longer than one hour.
- Do not block access to fire hydrants and/or fire fighting equipment.
- Fire hydrants and monitors in use must be fully opened or fully closed to prevent undermining the equipment.
- Winterized hydrants used during freezing conditions require re-winterization immediately following use.
- Report leaking or damaged fire water systems immediately to the shift superintendent or SERL.
- Do not drive over fire hoses except with the use of protective ramps.
- Red fire hoses are for emergency use only. Replace on reels or in cabinets after use.
- All fire extinguishers must be inspected monthly and the inspection recorded on tag.
- After using any fire extinguisher, replace the fire extinguisher immediately with one that is fully charged.
- Report any incident requiring the discharge of a fire extinguisher to your supervisor and the SERL.
- Do not use permanent mounted building or operating area fire extinguishers for spark attendant duties.

## **Hoarding** *(For more details, see: SMSWP 14:11)*

- For welding and grinding activities in process areas, all efforts must be made to provide for 100 percent spark containment. Spark containment/protection is also required for personnel protection for some situations.
- The red fire blanket provides more protection for 'burn through' from slag and larger particles of metal. The red fire blanket must be used as flooring in hoarded areas to prevent slag burn through.

- Fabrene 'onion skin' material is ideal for walls and ceiling of the containment area.
- Care must be taken to ensure that a confined space is not created by the construction of the hoarded area.

## Safe job plan requirements and site point of contact

### Purpose

Designate an Imperial point of contact (POC) for all jobs, who is responsible for ensuring work performed adheres to applicable site standards. Where a site standard doesn't exist or lacks necessary detail to address the risks, a safe job plan must be established and followed in accordance with the Task level matrix.

POC responsibilities also apply in non-permitted work situations.

### Definitions

#### Safe job plan (SJP)

A documented assessment of a specific task, task steps, associated risks, and specific mitigations. This typically includes a well written specific job loss analysis (JLA) or job safety analysis (JSA) with three main columns identifying task steps, risks, and mitigation plans, divided with rows to show the correlation of each risk and mitigation associated with each step. See approved JLAs for examples.

In addition to a JLA or JSA, a safe job plan may also have supporting site documents/checklists (i.e., confined space entry documentation, excavation checklist, breathing air checklist, etc.)

For operations, an equivalent to a JLA/JSA may include a loading rack specific step by step procedure. The SJP may include field mark ups to ensure effectiveness.

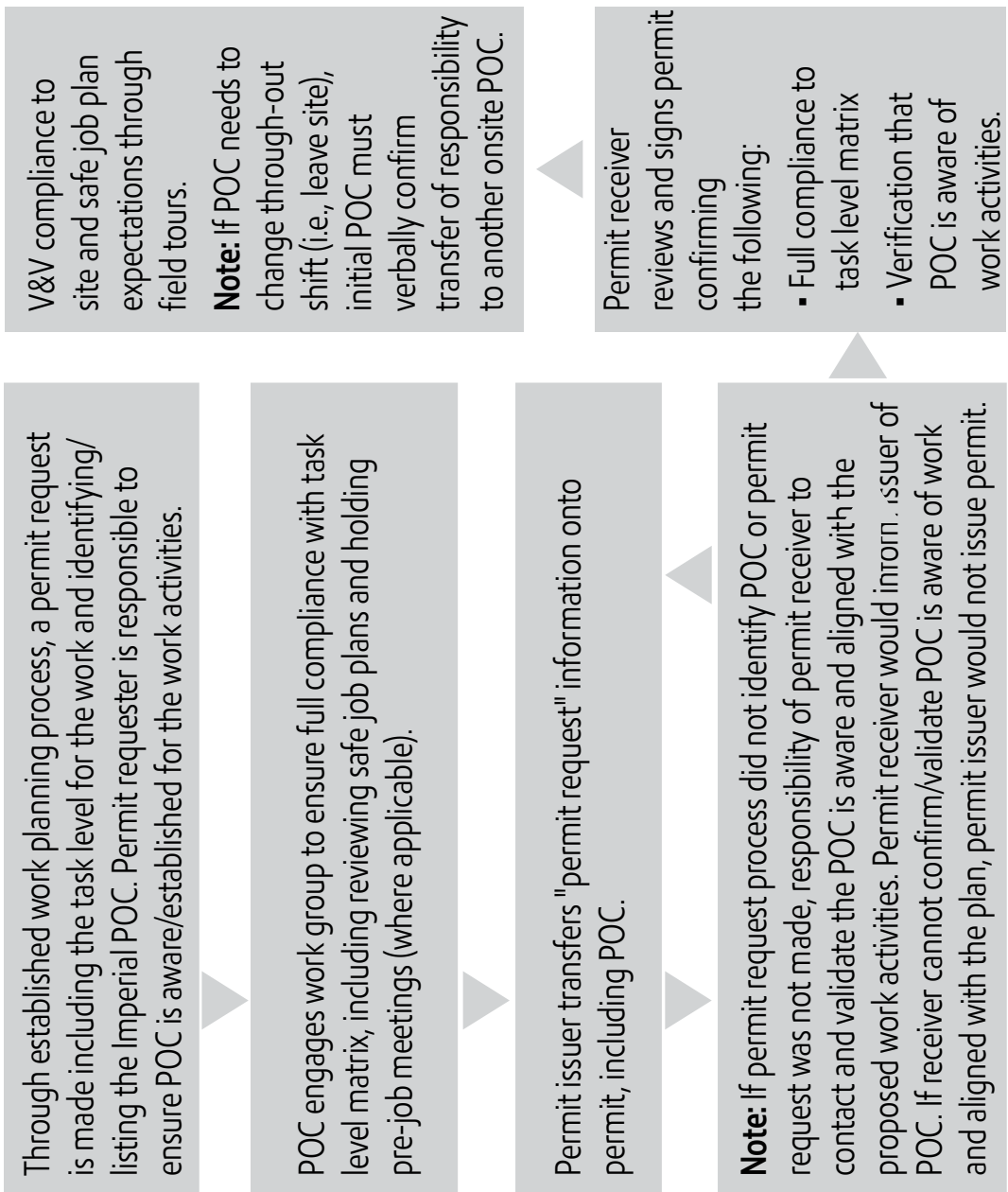
The SJP may include field mark ups to ensure effectiveness.

## Imperial point of contact (POC)

An Imperial representative, typically an FLS or operations designate who is responsible for the work being conducted.

POC does **not** default to ISRs, buddy and bud lite managers defined in SOIMS 8.1.

## Point of contact process flowchart



## Task level matrix guidelines

### Responsibilities

#### *Permit requester*

- Ensure point of contact and task level is included with the permit request.

#### *Point of contact*

Ensure all work performed adheres to applicable site standards which includes:

- Determining the task level for the job.
- Ensuring applicable site standards and documentation is developed and adhered to. The POC signs applicable documentation to ensure it is completed.
- Reviewing/assessing the risk of work being performed and ensuring a safe job plan (SJP) is developed and reviewed as per the task level matrix. (example, tiered work in a confined space entry). The POC signs the SJP to ensure it is adequate to manage identified risks.
- Ensures the workers are aware of applicable site standards and SJPs by communicating as per the task level matrix.
- Verify compliance to the established plans through-out execution of the work.
- Verbally transfer POC responsibility to another site rep if unable to be onsite (fill POC role) for entire period of time the work is being executed.
- Ensure proper reporting of near losses and loses.

#### *Permit issuer:*

- Records POC and task level on the permit.
- If permit request info does not have a POC and task level listed or no permit request was made, it is the permit receiver's responsibility to contact Imperial point of contact and verify a POC/task level is established. Once confirmed, receiver would indicate POC/task level rep

to issuer who would list on permit. If permit receive cannot confirm/validate that a POC is aware of the work and aligned with the plan, a permit shall not be issued.

***Permit receiver:***

- Ensures the permit identifies the POC and task level, if these are not present work should not proceed.
- Understands the task level for work being performed and ensuring applicable documentation and communication has taken place as per the task level matrix.
- Identify any changes to the safe job plan documentation that is required, near losses or losses to the POC and permit issuing area immediately.

## Task level

Determining the task level will dictate the documentation requirements; refer to the task level matrix guidelines:

**Task level 1:**

- Safe job plan signed by the Imperial point of contact.
  - requires a daily pre-job meeting led by the Imperial point of contact

**Task level 2:**

- Safe job plan signed by the Imperial point of contact, with a pre-job meeting led by the Imperial point of contact on the first day of the task.

**Task level 3:**

- Safe job plan review by work group.

**Task level 4:**

- No safe job plan documentation required (permit may still be required).
  - LPSA is always required, last line of defense

## Who develops the safe job plan?

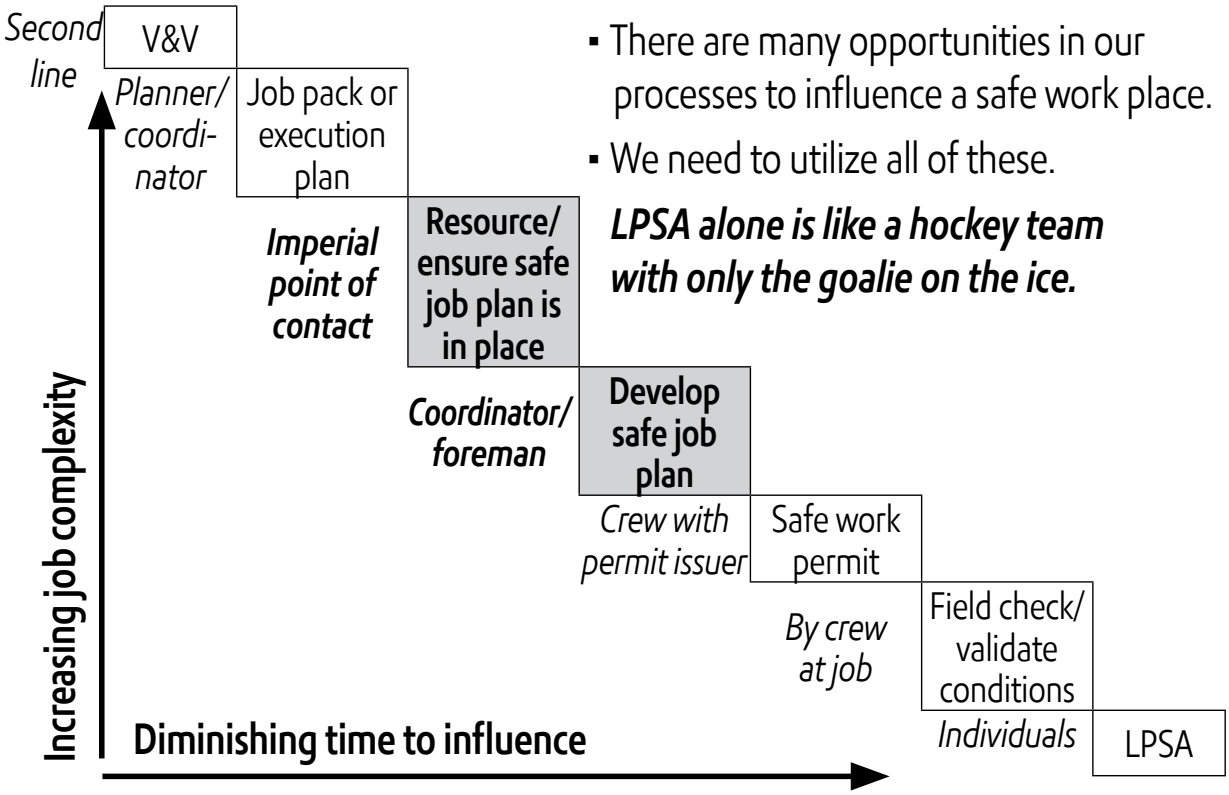
- The task matrix **does not** assign safe job plan execution roles and responsibilities amongst the different groups in the site organization, i.e., CEC, turnarounds, routine maintenance, operations, etc.
- The details of "who" is responsible must be decided within the business teams and organizations, i.e., project engineer role in SEC, T/A planner role in turnarounds, BTLs, etc. Ask your supervisor for these details.
- Although this standard doesn't specify who the owner/author of the safe job plan should be, it does specify that the Imperial point of contact is responsible to ensure the safe job plan is in place per the task matrix.

## Rational for determining who develops the safe job plan:

- Imperial point of contact will need to consider the work groups abilities. For example, embedded contractor companies onsite full time should be expected to be able to manage the development of most safe job plans. Some assistance or resourcing of expertise may be required.

Do not expect the same from infrequent contractors who are not as familiar with site expectations, up to and including the extreme example of a chemical truck delivery from driver and company who have never been to site prior. In some cases the Imperial point of contact may need to resource or take a more hands on approach a safe job plan creation.

## We need to leverage our entire tool set




- There are many opportunities in our processes to influence a safe work place.
- We need to utilize all of these.

***LPSA alone is like a hockey team with only the goalie on the ice.***

## Task level matrix

| Personal and process safety risk level - LPSA required for all tasks | | |
|---|---|---|
| | 1 | 2 |
| Definition | Any task that has a high probability of causing a fatality, **or,**<br>Potential to cause a significant process safety event and no mitigation in place | Any task that has a high probability of causing a serious injury with the potential for a fatality, **or**,<br>Potential to cause a significant process safety event and mitigation in place. |
| Clarifying examples (not limiting) | 1. Excavating/Trenching<br>2. High risk special scaffold build/modify<br>3. Complex lift, and/or hoisting of personnel<br>4. Over speed trip testing<br>5. Tank cleaning (once gas free n/a)<br>6. Electrical work<br>i. >100 cal incident energy<br>ii. Live electrical work >30V<br>iii. Electrical testing on live circuits >130V<br>7. Working on safety critical equipment that can't be bypassed<br>8. Welding on piping or a pressure vessel that is in service<br>9. A crew comprised of 100% short service workers (SSW)<br>10. Rope access risk level 1 (High) | 1. CSE<br>2. Working at heights (requiring tie-off) - not including manlift or scaffold builder<br>3. Electrical work<br>i. <100 but >40 cal incident energy<br>ii. Electrical work inside restricted approach boundary >30V<br>iii. Electrical testing on live circuits <130V >30<br>4. All *non-embedded contractors supporting maintenance and operations *Non-embedded means contractor companies who do not have an Imperial buddy manager/buddy lite, as per approved contractors list. (See Rules & Regs buddy manager co.'s for list)<br>5. Working on safety critical equipment that can be bypassed but not energy isolated<br>6. Work zone is closer than 20 feet to overhead power lines<br>7. Rope access risk level 2 (Medium)<br>8. Non-CSE excavations, hand digging, Excavations less <four foot depth<br>9. PCB, lead and norms work/remediation<br>10. Work around uninsulated equip. > 500F<br>11. Tiered work- (Rules & Regs defines) |

| Personal and process safety risk level - LPSA required for all tasks | | |
|---|---|---|
| | 3 | 4 |
| Definition | Any task that has a high probability of causing a serious injury | Standard work that has a low probability of causing a serious injury |
| Clarifying examples (not limiting) | 1. Manlift<br>2. Basic crane lift<br>3. Asbestos removal<br>4. Electrical work<br>i. >1.2 but < 40 cal incident energy<br>ii. Inside limited approach boundary >30V<br>iii. testing for absence of voltage<br>5. Climbing or working off a ladder or stairs requiring tie off<br>6. Crane operator tied off to crane.<br>7. Loading racks requiring tie off (with flash point >38°C/100°F)<br>8. Rope access risk level 3 (Low)<br>9. Ops dedicated loading contractors | 1. Tasks as outlined in Sarnia site safety manual, Section 4, Subject 4 - Low risk work permits<br>2. Camera use<br>3. Electrical work<br>i. Outside the fault protection boundary<br>ii. Outside the limited approach boundary<br>Process operations follow SHE Critical Procedures SMSM S.21 |

Prior to all work in non-permitted areas the Imperial FLS/POC must be notified.

| Task level | Documentation and approval requirements | Daily pre-job? | SJP's task level 2&3 frequency of review minimum requirements: |
|---|---|---|---|
| 1 | Safe job plan (SJP) (signed by Imperial point of contact) | Yes | ▪ When job plan changes<br>▪ New to crew workers<br>▪ Refresher reviews every three months at a minimum |
| 2 | | On first day of task | |
| 3 | Safe job plan<br>Crew review | No | |
| 4 | None | No | |

## Personal protective equipment (PPE)

*(For more details, see: SMSM 03)*

- All personnel shall wear the personal protective equipment as mandated by the OH&S Act, by Sarnia site policy, and as required by written work procedures.
- All PPE shall be worn and kept in a condition adequate to provide the protection intended.
- Users are responsible to inspect PPE before use and to replace damaged equipment. Do not wear PPE contaminated with a hazardous material.
- In general, CSA approved personal protective equipment shall be worn in all operating, laboratory, mechanical work and construction areas. Refer to the site *Safety manual* for PPE requirements and exemptions.
- The introduction of new PPE requires pre-approval from the Imperial safety advisors group before being used.
- All PPE must meet or exceed manufacturer's recommendation for inspection and maintenance.

Note: If work that normally requires the use of PPE is being performed in a PPE exempt area, appropriate PPE must be worn.

### Basic PPE

- Unless otherwise specified or required, based on hazards or work activities, basic PPE requirements are exempt within: offices, lunchrooms, locker and control rooms.
- Basic PPE requirements while traveling on site and in non-operating areas include, FRC, hardhat, gloves, eye protection and safety boots. Note: PPE is not required while walking on designated walkways to/from CMS to gate 2, to/from gate 318 to SPEP buildings.
- Exemptions include unless otherwise specified (i.e., signage): parking lots, trailer areas, traveling on designated walkways before/after shift (including leaving/returning to/from site for personal business including

lunch breaks) while traveling to/from the location where the traveling individual's personal protective equipment is usually stored.

- Within an operating unit or active construction/work area unless a vehicle/equipment is totally enclosed with all doors and windows closed; FRC, hardhat, eye protection and safety boots shall be worn within. If the area outside of the equipment is considered a hearing protection required zone, hearing protection shall also be worn.
- Basic PPE shall be worn in all operating, laboratory, mechanical work and construction areas, unless specific exemptions are noted within the SMSM.
- Refer to PPE - Eye and face protection matrix that outlines requirements for eye and face protection based on descriptions of task/hazard.
- Imperial employees: reference the Sarnia site web, for a PPE catalogue that details site approved/available PPE with reference to stores department inventory codes.
- Refer to PPE - Required hand protection matrix that outlines requirements for hand protection based on descriptions of task/hazard.

## Arm and wrist protection

- Gauntlet gloves and/or special arm protective sleeves (Nomex or Kevlar) must be worn when working around bare tracers, bare hot lines, or sharp objects.

## Clothing, FRC *(For more details, see: SMSM 03:15)*

- Flame retardant clothing (FRC) must be worn as the outermost garment in areas as defined by FRC policy. Long sleeves are mandatory in those areas that require FRC. Disposable flame resistant outer garments are worn with FRC underneath.
- Wearing non-synthetic underclothing and gloves (i.e., cotton and leather) is recommended to minimize burns and skin damage in a flash fire situation.
- Head, face and neck garments (e.g., hoodies, balaclavas) must be FRC.

- Hoodies:
  - not to be worn while operating mobile equipment or vehicles
  - not to be worn in a way that restricts peripheral vision
  - draw strings are discouraged, either remove or tuck away

## Eye protection

**Face shields** *(For more details, see: SMSM 03:06)*

- CSA approved face shields are mandatory in posted areas and while performing tasks where there is a need to protect the face from chemical splash or abrasion.

Note: Workers within the proximity (e.g., within three metres/10 feet) of eye and face hazards generated by other workers and with similar exposure to risk must use the same eye/face protection as the workers performing the work. For further clarification:

- Refer to PPE - Eye and face protection matrix that outlines requirements for eye and face protection based on descriptions of task/hazard.
- Impact face shields must be rated to meet Z94.3-07, Class 6A. An equivalent rating would include Z87+ rated shields.

**Safety glasses** *(For more details, see: SMSM 03:03)*

- CSA or ANSI approved safety glasses with side shields must be worn in all operating, mechanical, construction, offsite, warehouse, and rail-yard areas.
- Darkened (sunglasses) safety eyewear is not permitted at night, inside buildings, inside process vessels or in poorly lit conditions.
- Limited tint is permitted indoors, e.g., safety glasses designed and shaded for dual indoor/outdoor purpose and that are identified within the site PPE catalogue available on the Sarnia site intranet for use indoors and outdoors.

Note: Some dusty environments may require a higher level of eye protection than safety glasses or tight fitting foam sealed safety glasses can offer.

Work planning should include an assessment of the hazards and the protective factors of the PPE. A full face respirator or goggles as detailed within the *Sarnia manufacturing safety manual*, Section: 3, subject: 5 may be required to obtain a superior level of protection.

- Refer to PPE – Eye and face protection matrix that outlines requirements for eye and face protection based on descriptions of task/hazard.

**Prescription safety eyewear**

- If a pair of safety eyewear is required to be worn over non safety prescription eyewear (i.e., non safety approved), they shall be either:
  a. Safety glasses, or
  b. Splash goggles
- CSA Class 1, form fitting side shields are required to be worn with prescription safety glasses. Wafer type side shields are not permitted. The use of ANSI approved safety eyewear is an acceptable alternative where it is also equipped with suitable side shield protection or form fitting frames offering equivalent protection.
- Individuals who wear contact lenses are required to follow the same standard as individuals who do not wear corrective eyewear.
- Refer to PPE - Eye and face protection matrix that outlines requirements for eye and face protection based on descriptions of task/hazard.

**Goggles** *(For more details, see: SMSM 03:05)*

- CSA approved goggles must be worn in all posted areas and when required by the safe work practices or when there is a risk of exposure to hazardous chemicals.
- Splash goggles must be used in areas signed as 'safety goggles required'.
- Goggles designed for the protection from particles (including tight fitting foam sealed safety glasses) are never to be used for splash protection (i.e., Class 2A goggles, referenced within Z94.3-07). They are only to be used for dirty, dusty particulate protection.

## Eye and face protection requirements

| Description of task/hazard | Tight fitting foam sealed safety glasses | Safety glasses | Splash goggles | Face shield |
|---|---|---|---|---|
| Base requirement on site | | ■ | | |
| Tasks using power tools with potential to cause high impact flying particles (e.g., grinders, buffers, wire brushing, chipping guns, jackhammers, powered saws, impact and nail guns) | | ■ | | ■ |
| Mixing/applying/spraying of chemicals (paints, epoxy, lamination, chemical cleaning agents, industrial soaps and agents), per SDS | | | ■ | |
| Areas defined by signage to wear splash goggles (e.g., Equipment contains corrosive material) | | | ■ | |
| Sampling from a standard sample point station where a low splash potential exists with liquid <130°F | | ■ | | |
| Sampling from a standard sample point station where a low splash potential exists with liquid >130°F or corrosive chemicals | | | ■ | |
| Draining/clearing process equipment, verifying zero energy or sampling where a high splash potential exists with liquid <130°F | | | ■ | |
| Tasks that generate airborne dust: e.g., work with cement, insulation, fire-proofing or other dry materials. Handling contaminated surfaces (dirty fire blankets and scaffolds). Construction housekeeping and clean-up that generates airborne dust. | ■ | | | |

| Description of task/hazard | Tight fitting foam sealed safety glasses | Safety glasses | Splash goggles | Face shield |
|---|---|---|---|---|
| Draining/clearing process equipment, verifying zero energy or sampling where a high splash potential exists with liquid >130°F or corrosive chemicals | | | ■ | ■ |
| Any OPE job that has splash potential. Splash potential includes:<br>▪ All first breaks for OPE<br>▪ All OPE jobs that do not have zero energy verified<br>▪ Any breaks/openings as defined in safe job plan<br>▪ Hazardous service low points | | | ■ | ■ |
| Working with high pressure fluids that has potential to splash | | | ■ | ■ |
| Inspecting and lighting fire boxes manually | | ■ | | ■ shaded lens |
| Welding | | ■ | | ■ welding helmet (9-14 shade) |
| Oxy-acetylene (gas) cutting | | ■ | | ■ 5+ shade |
| Welders helper/spark attendant that is exposed to arc or gas cutting | | ■ | | ■ 5+ shade |
| As outlined in JLA/ JSA/ TASC/ LPSA | | ■ | | ■ |

Note 1: Eye/face protection that is materially equivalent or provides a higher level of protection is acceptable (e.g., full face respirator = goggles and face shield).
Note 2: Workers within the proximity of the above activities (e.g., within 10 feet) with similar exposure risk must use the same eye/face protection.
Note 3: Liquid can be any hydrocarbon, water, condensate, etc.
Note 4: Corrosive chemicals can be Amine, Flexsorb, Caustic, Acid or other as defined by SDS
Note 5: Low/no splash potential can be achieved through engineering/facility controls, i.e., closed loop sampling, tubing while draining, distance from source, etc.

## Foot protection *(For more details, see: SMSM 03:10)*

- CSA approved safety footwear – Grade 1 toe protection and sole puncture protection (green triangle patch) must be worn in all operating, mechanical, construction, offsite, warehouse, storehouse, and rail yard areas.
- All safety footwear must cover the ankle (150 millimetres or six inches height minimum).
- Safety footwear worn in operating units, offsites maintenance and construction areas and/or whenever climbing ladders must have a defined heel. Soles shall be non-slip, oil/chemical resistant and impervious to liquids.
- Running shoe style safety footwear is only permitted in laboratory areas.
- Employees while working exclusively in a laboratory area may wear CSA approved safety footwear with Grade 1 toe protection only.
- Safety footwear with rubber or TPR (thermal plastic rubber) outsole (most outer layer) sole compositions are recommended.
- All personnel entering or leaving the site must use proper footwear. No flip-flops, sandals, open-toed shoes or high heels are permitted when entering or leaving the site.
  - this includes all offices, the MOB and Sarnia manufacturing personnel at research. If you exclusively work in a controlled environment (office), it is acceptable to wear open-toed shoes once you have arrived/established yourself in the controlled area
  - high heel means: footwear that raises the heel of the wearer's foot significantly higher than the toes. (i.e., greater than 2.5 inches)
  - platform shoes are not considered high heal shoes and are acceptable to be worn onsite with ≥2.5 inch lift
  - visitors: in non-safety footwear required areas, will not be turned away for personal footwear worn that does not meet this guidance, however they should be encouraged if returning to site in the future to meet this requirement

## Hand protection *(For more details, see: SMSM 03:09)*

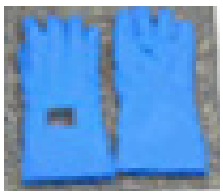
- Gloves are required to be worn at all times while in operating units, mechanical and construction work areas.
- Gloves will be worn at all times when performing any field activity, except in special circumstances where their use increases the hazard or provides a source of entanglement.
- Appropriate hand protection will be worn when performing higher risk work. The type of hand protection is defined by the procedures and/or as designated by the manufacturer.

  Examples include:

  - chemical resistant gloves to avoid skin contact with caustics or corrosives
  - insulated gloves for high heat sources
  - cut resistant gloves when handling stainless steel jacketing, metal banding and similar materials
  - the minimum requirement for "general work activities" is a glove that is 100 percent leather or 100 percent leather reinforced glove. Gloves should be 100 percent leather with no other material on the back of the hand. General work activities are described as: when no other increased hazards are present, with a few examples including: turning valves, climbing ladders, using hand tools. Gloves with cuffs are encouraged to protect wrists
- Site-approved cut-resistant gloves (e.g., Kevlar, etc.) are to be worn when working with sharp objects/materials, for example: blades/cutters, sheet metal, insulation cladding and similar materials.
- Gloves may be removed for the purpose of writing field notes, referencing papers, signing permits, task cards, etc., however must be worn once the task is complete.
- Refer to PPE - Required hand protection matrix that outlines requirements for hand protection based on descriptions of task/hazard.

## Hand protection matrix

| Task | Minimum hand PPE | Examples (only) |
|---|---|---|
| General work activities when no other increased hazards are present, e.g.,<br>▪ Turning valves<br>▪ Climbing ladders<br>▪ Using hand tools | Gloves shall cover the entire hand:<br>▪ Gloves can be constructed of new technology (meet at a minimum the EN 388-2.1.2.1 or ANSI 105 standard level of protection) or 100% leather or leather reinforced. |  |
| Working with sharp objects/materials, e.g.,<br>▪ Blades/cutters, sheet metal, insulation cladding | Site approved cut-resistant gloves (e.g., Kevlar, etc.)<br>Note: Cut-resistant gloves are not necessarily puncture resistant. |  |
| Handling corrosive or irritating chemicals: acids, caustics, amines, chemical cleaning detergents, coatings (e.g., epoxies, fiberglass). Includes opening process equipment tasks. | Chemical-resistant gloves (such as neoprene or nitrile rubber). See SDS sheet for exact details on type of glove. |  |
| Handling hydrocarbons (e.g., gasoline, diesel), oils (e.g., fuel and lubricating oils), solvents (e.g., VARSOL). Includes opening process equipment tasks. | Chemical-resistant gloves (such as neoprene, nitrile, butyl, or Viton rubber materials). See SDS sheet for exact details on type of glove. |  |
| Handling benzene concentrate/heartcut or pure benzene (Area-3). Includes opening process equipment tasks. | Silver Shield 10" disposable glove (grey) worn under leather or cut-resistant glove **or**<br>Viton rubber gloves. See Benzene control program. |  |
| Welding | Site-approved long cuff welders gloves |  |

| Task | Minimum hand PPE | Examples (only) |
|---|---|---|
| Handling hydrocarbon-contaminated equipment or debris, e.g.,<br>▪ Removing wet coke<br>▪ Hydroblasting<br>▪ Handling wet vacuum hoses<br>▪ Disassembling contaminated equipment | Chemical-resistant gloves (such as neoprene, nitrile, butyl, or Viton rubber materials). See SDS sheet for exact details on type of glove.<br>A thin chemical glove may need to be worn under a leather or cut-resistant glove depending upon the tasks. |  |
| Working with cold materials (e.g., handling dry ice, liquid nitrogen, or equipment in cryogenic service) | Site-approved cold-resistant gloves<br>(e.g., Cryo cold-resistant gloves, etc.) |  |
| Working with hot materials | Site-approved heat insulated gloves |  |
| Working on or near exposed electrical equipment | Class 0 rated rubber insulating gloves with leather protectors for voltages >30V and <1000V and Arc Flash exposure ≤ 8.0 cal/cm$^2$<br>Class 2 rated rubber insulating gloves with leather protectors for voltages > 1000V or arc flash incident energy > 8 cal/cm$^2$" |  |
| Work activities requiring high-level of manual dexterity (when no other increased hazards are present), for example:<br>▪ Precision instrumentation work<br>▪ Precision electrical work | Site-approved manual dexterity gloves (e.g., Hy-flex special purpose gloves, etc.) |  |

## Head protection *(For more details, see: SMSM 03:02)*

- Hard hats must comply with the ANSI Z89.1 and have a shell which can withstand a dielectric strength test at 20,000 volts phase to ground (Ont. Reg. 213/91 S. 22). Examples of hard hats that meet site requirements are CSA Z94.1 approved class E.
- Do not drill holes in or paint the hard hat.
- Hard hats shall be worn squarely on the head and not be physically altered in any way.
- Although the CSA standard (Z94.1-15) provides approvals of reversible hard hats, headwear should normally be worn facing forward. Reversible headwear shall be selected if the job, task, or work environment necessitates wearing headwear backward (e.g., for welding) and for any hard hat to be work in reverse position, it must have the CSA approvals, via: "reverse orientation performance mark" Shown here: 
- Hard hats and suspensions must be replaced if they are cracked, dented or no longer supple. Inspect the hard hat monthly and replace it after any severe blow to the hard hat.
- Hard hats are to be worn in pump-houses and compressor shelters. Hard hats are also worn in buildings and warehouses where overhead operations/work creates the risk of a head injury.
- Hard hats **shall** be equipped with either chinstraps or easily adjustable head-bands (e.g., band with an adjusting knob) to ensure a snug fit when working at height and/or in high wind conditions.
- Hardhats are not required in cabin areas of mechanized equipment (e.g., vehicles, forklifts, cranes, etc.) with overhead protection where a hard hat would not provide any additional protection.
- Hard hat exceptions: For work in non-operating areas (i.e., laydown area), a signed/ approved safe job plan by the Imperial second line supervisor

may be developed to document an exemption that is specific to: task, location, equipment, job and date. This exemption must be reviewed with a worker member of the JHSC and the workers performing the task. This may apply to areas such as tight locations where a hard hat physically restricts the wearer from performing the task. Example of when the exemption may be documented and approved within a safe job plan: welder's shield combination with hard hat in a prohibitively tight location or a similar situation. Adequate head protection must still be provided to address specific hazards. Considering mitigations as appropriate, i.e., bulk heads, bump caps, soft caps, applying softeners to bump hazards, etc. The safe job plan shall be limiting and not apply to more than one exemption. A general standing safe job plan is not permitted, must be tailored to the situation and valid for no longer than one week unless re-signed by the approver. To deviate from the use of a hard hat in an operating area, a specific management of change is required.

## Hearing protection *(For more details, see: SMSM 03:08 and SMS Hearing conservation program )*

Hearing protection equipment must have noise reduction rating (NRR) ≥ 20dBA at a minimum. (see Sarnia site hearing conservation program for details when Class A is not required).

- Ear plugs or muffs shall be worn in all areas inside an operating unit battery limit with high noise area(s). *Hearing protection required* signs are posted at the main entrance points to the unit/complex.

| Noise level | Requirements |
|---|---|
| ≥85 dBA to ≤95 dBA | Use of earplugs or muffs (single hearing protection, HP). A sign shall be posted with "Hearing protection required." |

| Noise level | Requirements |
|---|---|
| ≥95 dBA to ≤105 dBA | Use of earplugs and muffs (double hearing protection, DHP). A sign shall be posted with "Double hearing protection required." |
| ≥105 dBA | Use of earplugs and muffs and administrative controls such as time restriction.A sign shall be posted with "Double hearing protection required, time restriction of XX hour" NOVA 3 and NOVA 2000 helmets used with ear plugs provide a high level of hearing protection; allowing up to eight hours of worktime for levels up to 120dBA (additional details in the Hearing conservation program). |

- Examples of tools/activities that require double hearing protection: pneumatic tools, including wire wheels, impact guns, impact wrenches, jack hammers, grinders, electric tools, steam/air lance (when noise control tip is not used); large coppus blower; abrasive blasting; vacuum trucks.

## $H_2S$ personal detectors *(For more details, see: SMSM 07:02)*

- Personal $H_2S$ detectors must be worn by all personnel entering an $H_2S$ area. Monitors must be worn in the user's breathing zone (collar area, outside shirt pockets, front of hardhat using acceptable attachment device). $H_2S$ monitors **may not be worn** on the waistband, or the back of a shirt collar, or back of the hardhat.
- $H_2S$ detectors must be checked daily and calibrated each month or as per manufacturer's recommendations.
- Personal $H_2S$ alarms must have a low alarm setting of 5 ppm and high alarm setting of 10 ppm.

- If your personal $H_2S$ monitor goes into alarm, you must:
  - immediately leave the area, exiting crosswind and notifying other personnel in the immediate vicinity of the $H_2S$ concern as you exit
  - immediately report all occurrences to the unit's process technicians. Include the peak reading, (if available) the specific area and the task taking place at time of alarm
  - notify your immediate supervisor of the alarm. Include the time, the peak reading, (if available) the specific area and the task taking place at time of alarm
  - return to area only when determined to be safe by process technicians.

## Life jackets *(For more details, see: SMSM 03:11)*

- Approved life jackets must be worn when within 1.8 metres (six feet) of an unguarded dock, pit, basin, trap or separator or while working over open water or liquid.
- Life jackets are a personal flotation device that provides buoyancy sufficient to keep a person's head above water, face up, without effort by the person.
- Life jackets must be inspected colour coded consistent with the colour of the R&R booklet.

## Respiratory protection *(For more details, see: SMSM 03:13, 03:14 and SMS Respiratory protection program)*

- All employees and contractors are required to be clean shaven if performing a task that requires respiratory protection.
- Based on the potential need for respiratory protection during emergencies, all of operations and emergency direct responders are expected to be clean shaven 100 percent of the time while onsite.
- Similarly, based on the increased potential for respiratory protection on turnarounds, all personnel (employee and contractors) must be clean shaven while supporting a turnaround.

- Clean-shaven is defined as having no facial hair in the face-piece to face seal area. To assist in clarifying what is meant by clean-shaven, refer to Figure 02.01.01 from the Imperial respiratory protection guide.
- All respiratory protection equipment must meet the CSA and Ministry of Labour standard.
- Appropriate respiratory protection shall be worn when there is a potential inhalation exposure to hazardous materials (including vapours, fibres, dust, etc.) or where procedures specify their use.
- The *Sarnia manufacturing site respiratory protection program* defines the requirements for the individuals who must be clean-shaven in the face seal area and those who require fit testing and training.
- Local SCBA or unit packs are for emergency service only.
- Respirators must be cleaned and properly stored after use. Refer to the manufacturer's instructions for cleaning and sanitizing procedures and products.
- Respirators should be inspected before each use to ensure proper fit and function.

## Acceptable/Unacceptable facial hair

Clean-shaven is defined as having no facial hair in the face-piece to face seal area.

The shaded portions are your respirator seal areas. **Facial hair is not permitted on these portions of the face.**

### Unacceptable

Full beard

Goatee and narrow or wide mustache

Extended sideburns

Tendril mustache

Wide mustache

### Acceptable



Clean shaven
**<24 hours growth**

Narrow mustache

Soul patch

## Welding shields *(For more details, see: SMSM 03:06)*

- CSA approved welding shields must be worn to protect the eyes from welding arc, radiant heat and grindings. Welding shields also protect the face and neck from radiant heat.
- CSA approved safety glasses must be worn in conjunction with welding shields. Refer to PPE - Eye and face protection matrix that outlines requirements for eye and face protection based on descriptions of task/hazard.

## Welding/Burning/Torch cutting/Gouging - Respirator requirements - *refer to PPE matrix for further details*

| Welding/ Hotwork process | | | Confined spaces or enclosed spaces with poor ventilation (includes fully enclosed hoardings) – all metals/alloys | |
|---|---|---|---|---|
| | Open areas | Fabrication shops and partially enclosed hoardings | >2000 cfm/ welder dilution ventilation | <2000 cfm/ welder dilution ventilation |
| **All welding activities (SMAW/TIG/ MIG) and torch cutting** | Half-mask APR | Half-mask APR or LEV | Full face-mask APR or PAPR | Full face-mask APR or PAPR and LEV or Full face supplied air |
| **Arc gouging** | Full face-mask APR or PAPR | Full face-mask APR or PAPR and LEV or Full face supplied air | Full face-mask APR or PAPR and LEV or Full face supplied air | Requires IH assessment |

## Bicycles/Tricycles *(For more details, see: SMSM 07:06)*

- Bicycles/tricycles onsite must be inspected by the user before use. Repairs to Imperial owned bicycles can be done by coordinating a bike drop off to the facility services handymen who manage bicycle repairs within the area 2 CMS.
- To minimize the potential for injury during the winter season; the bicycle operator must not ride on snow or icy surfaces.
- Personal bicycles/tricycles are allowed onsite to go to and from the workplace, only.
- Cyclists must abide by all traffic rules; keep both hands on the handlebar at all times, except when used to perform a traffic signal such as turning or stopping.
- Maximum cargo weight to be carried in bicycle/tricycle baskets is limited to ≤ 20 pounds in the front basket and 40 pounds in the rear basket.
- Cyclists are not to ride on pedestrian walkways or between closely spaced equipment in congested areas.
- For greater clarification, basic PPE requirements apply to cyclists (see PPE - Basic PPE section of this R&R for more details).

## Compressed air

- Compressed air must not be used for blowing dust or other substances from clothing or used in any manner that might endanger anyone's health and safety.

## Compressed gases

- During storage and transportation, all cylinders, full or empty, must be secured in place, gauges removed and protective caps in place. The protective cap must be on when the cylinder is not in use.
- Acetylene cylinders must always be upright.

- Protect all cylinders from physical damage and from undue absorption of heat. Store cylinders in areas where they will not be a hazard in a fire situation.
- Storage of oxygen cylinders must be separated from flammable gas cylinders or combustibles by either six metres (20 feet) or a fire resistant barrier extending two metres (six feet) higher than and one metre (three feet) beyond the cylinders.

## Extension cords and temporary lighting

*(For more details, see: SMSWP 8.24 and SMSM 07:09)*

- Flexible electric cords connected to equipment may not be used for raising or lowering the equipment. They may not be fastened with staples or otherwise suspended in such a fashion as could damage the outer jacket or insulation.
- Electrical cords should not be routed under mats (unless designed to protect cords), under carpet, through wet areas, doorways, across walkways or other areas where they may become damaged.
- Do not route extension cords or flexible electric cords across roads or walkways unless adequate protection extending the width of the roadway is in place.
- Wherever practical, run extension cords overhead, consider use of "S" hooks.
- Take all reasonable efforts to minimize trip hazards and flag or barricade trip hazards that can't otherwise be reasonably mitigated.
- All "U" ground plugs and adapters must be adequately taped to ensure that the connections will not inadvertently come apart. This does not apply, however, to connections made to hand held power tools, where the connection is made in the immediate area covered by a hot work permit. This will allow the tool to be unplugged for the purpose of safe parking and working on the tool itself in an area where the hot work

permit controls adequately address the risk of potential spark generation when unplugging.

- For more related content, see: (Power tools) section
- Lighting branch circuits shall be kept entirely separate from power branch circuits. Each lighting circuit shall have its own dedicated circuit. This means, tools and other equipment must not be plugged into a lighting circuit. This is to remove the possibility of tools or equipment interrupting the work place lighting in the event of a breaker trip.
- Temporary lights must meet area classification requirements, i.e., Class 1, Div 1 or Class 1, Div 2 as appropriate.

## Forklifts *(For more details, see: SMSM 13:7)*

- Only use forklifts to lift and move items intended to be moved using a forklift (e.g., totes, materials on pallets, equipment with an integrated rack including slots for the forklift tines).
- If there is any question about whether the forklift is the right tool for the task, contact the site-lifting specialist for assistance.
- Forklift operator needs to conduct their LPSA addressing the immediate unloading/loading zone and the need for additional controls/barricades to restrict access to the lifting area.
- Before using a forklift, the operator must hold a valid training certificate.
- Documented pre-use inspections are required prior to the start of day or shift.
- **Seatbelts must be worn when operating a forklift.**
- Always drive the forklift with the forks lowered.
- If a forklift operator is required to work on a dedicated walk way, beyond simply crossing a walkway, a safe job plan should reflect the controls to avoid human machine interface.

- Whenever driving across designated walkways and or approaching blind corners the forklift operator must slow, sound the horn and proceed with caution.
- If pedestrians are required to enter high forklift traffic area outside of established designated walkways (i.e., warehouse or, cordoned off areas for catalyst bin shunting, etc.), pedestrians must seek authorization and wear retro reflective vest.

### Pedestrian/cyclist defensive behaviour

- Respect signs, barriers and specific markings that separate pedestrians/ cyclists from forklifts.
- Always look both ways before entering forklift areas.
- Never ride as a passenger or stand on any part of a forklift.
- Never stand or walk under the mast or load.
- Stand at a safe distance from loads that are being raised or lowered.
- Beware of tripping hazards posed by a forklift.
- Look out for reversing forklifts.

## Ground fault circuit interrupters (GFCI)

*(For more details, see: SMSWP 8)*

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- All portable electrical equipment, i.e., hand-held electric tools or lights shall be powered by one of the following approved methods:
  a. via a ground fault circuit interrupter (GFCI) device with a maximum tripping current of 30mA or less
  b. self-contained battery-powered equipment
- Many permanent GFCI protected receptacles are present throughout Sarnia site. If a permanent GFCI protected receptacle is not present then an external GFCI cord attachment shall be used; this must be located as close to the source (receptacle) as possible.

- If your power source is an ungrounded portable generator and its built in receptacle is not GFCI protected, an external GFCI cord attachment shall be used; this must be located in the cord feeding the tool, as close to the source as possible.
- GFCIs must never be used on DC generator outlets.
- GFCIs have a TEST and RESET button. The TEST button shall be pressed prior to use to confirm there is no power to the tool until the RESET button is pressed.

## Knives

- Jackknives/pocketknives are not intended for use as a universal tool. Consider the proper tool for the job, i.e., self-retracting razor knife, side cutters, scissors, tape cutter, wire strippers, lineman's stripping knife, task specific knife, etc.

## Ladders *(For more details, see: SMSM 20:05)*

### General

- Temporary ladders must be marked with maximum rated capacity.
- Do not stand on process equipment, handrails, etc. to reach the work. Use a ladder, scaffold or suitable work platform.
- When working off any ladder over 1.8 metres (six feet) above the work surface, you must wear appropriate fall protection. (Note: truck drivers/ operators may open/close loading hatches and valves off a fixed ladder if 3-point contact is maintained).
- Ladders must be used only for light activities (e.g., When parts or tool weight do not affect balance or ladder stability and no heavy force is needed for work).
- Another person must hold a ladder in place while being used if either:
  a. It is not securely fastened, **or**
  b. Is likely to be accidentally bumped.

- Non-conductive ladders are to be used when working on or near energized equipment.
- Ladders must be faced and 3-point contact maintained when ascending or descending.
- Hands must grasp ladder rungs or steps, do not slide hands on side rails.
- Do not climb or descend ladders with materials, tools or equipment in hand. Small tools that cannot be secured to your person shall be moved using a rope and an approved lifting container, rated for a minimum of 68 kilograms (150 pounds).
- Only one person on a ladder is permitted at a time.
- Stationary ladder safety bars/swing gates must be left in a closed position.
- Do not erect a ladder on or close to any thoroughfare, doorway or escape way unless adequate barricades, lights and other necessary devices are provided for the protection of both the user and passers by. A ladder shall not block escape-ways unless other adequate means of egress is provided.
- Wooden ladders shall not be used at the Sarnia site.
- All portable ladders shall be inspected annually and have an inspection tag coloured for that year. Tags shall be the same colour as the *Rules and regs* book (colour changes every January) and ladders shall be marked with the maximum weight limit.

## Straight and/or extension ladders

- A temporary, secured ladder must be inclined so that the horizontal distance from the top support to the foot of the ladder is not less than ¼ and not more than ⅓ of the extended length of the ladder.
- When the sections of an extension ladder are extended, the overlap must be one metre (three feet) or greater.
- The top of the ladder must extend one metre (three feet) beyond the landing or work surface.

- All temporary ladders greater than six metres (20 feet) long require a cage or SRL to be used where is cage is not practicable.
- Personal fall arrest system is required when climbing distance or fall potential exceeds:
  - six metres (20 feet) on: uncaged fixed, scaffold ladders or portable ladders
  - nine metres (30 feet) on caged fixed or scaffold ladders
  - if the ladder being used has SRL required signage or tag, with an SRL mounted, regardless of where on the ladder or how high on the ladder you are climbing, fall protection and self-retracting lifeline is required

## Step ladders

- Working from the top two steps or top platform of a step ladder is prohibited.
- Stepladders must have legs fully opened and spreaders locked before use.
- Stepladders must not exceed six metres (20 feet) in height.

## Portable stairs/Step ups

- All portable stairs and step ups shall be inspected annually and have an inspection tag coloured for that year (consistent with the colour of the years R&R book).
- Rolling stairs must be level and locked in position when in use.
- Tie off when three point contact cannot be maintained when over six feet.
- Wooden step ups are not to be used on site.

## Non-rigid ladders

- Approval process for use of non-rigid (e.g., rope, chain, webbing, etc.) ladders:
  a. **Develop a written safe job plan**, with review and approval by the company FLS (and contractor management where applicable) with consultation/input from the site WaH subject matter expert.

b. **Within the safe job plan** address applicable hazards and mitigations, consider the following:

**Scope of work** – define the scope of work intended/permitted on the ladder, i.e.:

i. Simple access and egress, or, if intending to perform work on the ladder define the scope of the work and corresponding mitigations, which may include protecting the ladder from heat, chemicals, or require a work positioning harness and anchorage, etc.

ii. Location, vessels to be used in, internal configuration

**Alternatives evaluated** - Scaffold, rigid extension ladder, rope access, etc.

**Physical abilities** – Climbing a non-rigid ladder is more physically demanding than climbing a rigid ladder

iii. Consider highlighting this before crew assignments and selecting personnel who are physically capable and are up to the task

**Inspection criteria** – detail or cite/reference in accordance with manufactures specifications

**Define ladder securement methods**

iv. Anchorage that will support the forces it may be subjected to

v. Top and bottom where practical – Consider: securing a non-rigid ladder from the bottom so the ladder is tight can make climbing it after initial setup easier/safer

vi. Set up ladder to extend the full distance to grade or platform below (no void between end of ladder and nearest location to dismount)

**Non-rigid ladders that lean against surfaces** and walls can become difficult to get a footing on, brackets/spacers/kick outs may be a necessary mitigation to make the ladder climbable.

**Sharp edge protection** considerations (softeners), how will this be done and where.

**Tagging the ladder as safe for use** (similar to scaffold tagging system). For fall protection that may be required while climbing or working on the ladder, indicate the methods for:

- **fall protection anchorage** – independent of the non-rigid ladder Fall protection methods. i.e.:
  1. Ratchet SRL mounted on a tripod overhead that can be engaged as a retrieval winch.
  2. Rope and rope grab with the rope grab maintained on a short three foot SRL maintained at or above chest height.

**Emergency rescue plan** - Engage emergency response on rescue plan with any unique situations or equipment needed.

## Scaffold ladders

- Scaffold inspection tags reflect the condition of the scaffold and access ladders, therefore scaffold ladders do not require an annual inspection tag.
- Often, many scaffolds onsite are built with portable extension ladders. The scaffold inspection tag is also considered sufficient in place of the annual inspection tag.
- All temporary ladders must have weight capacity documented (i.e., on the ladder or on an attached tag).

## Machinery

- Ensure energy isolation, lockout/tag and prepare the machine as per the equipment procedure before starting any repair work on the machine.
- All vehicles, machinery, tools and equipment shall be maintained in a condition that will not endanger a worker and shall not be used while it is defective, hazardous or under repair.

## Machine guards

- Guards must be fixed or inter-locked on machinery to prevent contact with moving parts.

- Lockout the machine before removing the guards to make repairs. The guards must be replaced before machinery is put in operation.
- Do not:
  - remove guards while the equipment is in operation
  - clean unguarded moving parts
  - remove or install belts on moving equipment

## Nails

- Exposed nails/spikes are to be pulled from scrap materials and safely disposed of.

## Power elevated work platforms (i.e., manlifts)

*(For more details, see: SMSM 20:11)*

- Before using an aerial manlift, the user must carry out an inspection using the approved checklist.
- Operators of this equipment must be trained in its use.
- Workers must enter and exit the manlift basket at grade. To exit at elevation, the worker must be wearing the appropriate lanyard with full body harness tied-off at all times to a suitable anchorage point.
- To prevent ejection from the basket, each worker must be restrained at all times by wearing full body harness and a self-retracting lanyard attached to the basket's anchorage points.
- If wind conditions exceed 61km/hour (38 mph) or more as described by the manufacturer, the equipment shall not be used.
- Hoarding in of the basket must only be used during calm air conditions as the sail effect greatly reduces the stability, or per manufacturers recommendations whichever is more stringent.
- See "Safety attendants" section within this book for Mobile equipment safety attendant considerations.

# Tools

## Hand tools *(For more details, see: SMSM 07:05)*

- Use all tools for their intended purpose.
- Small tools shall be carried in tool pouches or tool bags.
- Pails with metal or plastic handles are not to be lifted or lowered by rope, as the handle may fail. Use only approved lifting bags.
- Do not use defective tools. All defective tools must be tagged and repaired.
- Do not extend the handles of tools with sleeves or cheater bars for more leverage or power.
- Do not hammer on tools to gain more force unless the tool is designed for hammering.
- Mushroomed heads on striking tools must be ground down to prevent injury from flying metal particles.
- Wrenches shall not be used with cheater bars or metal tubing to increase leverage. Impact guns, hydraulic tools, hammer wrenches, etc., should be used if unable to free stuck nuts.
  - consider impact guns, hydraulic tools, etc., as an alternative to hammer wrenches when practical
  - do not hold a hammer wrench in hand while another person strikes it
  - tool holder and wrench retainers are an option when the individual striking the wrench is unable to hold it

## Power tools (portable) *(For more details, see: SMSM 07:05)*

- A safe work permit is required unless the work is being done in a permit free area.
- Electrical power tools must be approved by CSA or equivalent (per electrical code).

- Electrical tools must be grounded (approved three wire cord and plug) or double insulated. Inspect the tools and wiring regularly for cracked or broken insulation.
- Air-powered tools are connected to an industrial air source - **never** to nitrogen or instrument air.
- Never remove guards from power tools.
- Deadman switches must be checked for operation before use.
- Lock-on pins for grinders and other power tools must be disabled.
- Disconnect power tools from power source before making repairs or adjustments.
- When changing or moving pneumatic tools, shut off the air supply at the source.
- Some power tools may require an additional level of hearing protection.
- Powered (pneumatic, electrical) tools need to be safe parked (i.e., power removed) when leaving the work site for breaks.
- Follow manufacturer recommendation for inspection and usage including requirements to keep handles on drills/tools where applicable.

## Traffic

### Vehicles *(For more details, see: SMSM 02:12)*

- Vehicles must not be left running when unattended.
- Vehicle operators must have a valid driver's license.
- Seat belts must be worn when the vehicle is in motion.
- Speed limits inside the Sarnia site are posted as either 30 km/hour or 20 km/hour (high pedestrian traffic or restricted visibility).
- Pedestrians need to stay on the designated walkways and cross walks.
- Battery limits entry by a motorized vehicle requires a hot work permit from unit personnel.

- Park in designated areas and remove the keys from the vehicle.
- Authorization is required from area personnel if it is necessary to park in non-designated areas. The keys must be left in the ignition and vehicle turned off when any vehicle is parked in a non-designated area.
- The vehicle operator must be able to operate the vehicle with clear visibility – remove all snow/ice from windows before operating.
- Vehicles shall carry a current license, valid emission sticker, and be in a safe condition to operate.
- All tools and materials being moved via truck or forklift must be secured appropriately to prevent shifting.
- All vehicles entering the site must comply with the site vehicle pass process. *(SMSM 02:13)*

## Utility vehicles *(For more details, see: SMSM 02:12)*

Utility vehicles (UV) must be equipped with the following equipment if operating on Imperial property:

- Headlights, front and rear turn signal lights, tail lights, stop lights.
- Reflex reflectors; one red on each side as far to the rear as practicable and one red on the rear.
- An interior, rear view mirror.
- Parking brake.
- Seat belt assembly.
- A fire extinguisher.
- Company logo and a visible ID number.

Tractor and UTV hazards must be documented in JSA/JLA and capture the following:

- Process that ensures operator tightens seatbelt sufficiently to confine them to the protected area provided by the rollover protective structures (ROPS).

- Confirm no one but the operator rides on tractors.
- No equipment use near embankments, holes or on steep ditches/slopes.
  - when determining safe operating angle based on the equipment being used the owner must consult the equipment's manufacturers operating manual (not exceed manufacturer guidance) and consult the Imperial transportation group. Document decision of safe operating angles within the specific JLA/JSA
- Reduce speed turning, crossing slopes, and on rough, slick, or muddy surfaces.
- Hitch only to hitch points recommended by the manufacturer.
- Brakes to be set securely when equipment is stopped and, if available, park lock used.
- Equipment to be off before the operator dismounts.

## Utility stations/Hoses *(For more details, see: SMSWP S.9)*

- Never hook utility hoses to process equipment for permanent or temporary use (except for operations purging equipment) unless an approved engineered installation and the management of change process is followed.
- Do not string hoses or ropes within a ladder cage.
- Anti-whip devices (whip-checks) are to be used on all pressurized hose to hose, hose to utility station and hose to tool/equipment connections that do not have a screw-type, interlocking connection. Hoses on SCBA, oxy-acetylene torches, fire hoses and laboratory hoses are excluded from this requirement. Whip-checks must extend along the length of the hose, past the hose fittings.
- Visually inspect and discard hoses with blisters, cracks and other signs of deterioration.

- Types of hoses on-site are:
  - steam (red)
  - nitrogen (brown) - Nitrogen hoses are to be equipped with special fittings to prevent the use of air hoses for nitrogen and visa versa
  - air (green station, yellow hose)
  - chemical transfer hoses (black)

Cheater connections that would allow N2 to air connection are not allowed on site. Nitrogen valves on utility stations are to be tagged and secured closed by operations when not in use. Nitrogen stations are to be used by operations personnel only.

It is the hose users responsibility to inspect a hose before use and ensure it is only used in applications that it was designed for. *(Refer to manufacturers specifications and SMSWP S.9 for more details.)*

## Welding/Flame cutting

- Welding screens must be used to prevent exposure to welding arc in fabrication areas.
- Local exhaust must be used to minimize exposure to welding fumes during welding/cutting indoors.
- Fire extinguishers must be available both at point of work and on welding machine (two fire extinguishers). Unit extinguishers are for emergency use only.
- Cutting outfits are to be equipped with a back flow check valve at the torch and flame arrestors at the gauge.
- For cutting outfits on an operating unit, cylinder valves must be shut off when the cylinder is not in use. If the outfit is left unattended for a period longer than a break, the gauges must be removed and the cylinders capped.
- Welding leads must be maintained in good condition and be protected when exposed to vehicle movement.

- Welding machines grounding shall be as close to the weld point as practical.
- Refer to PPE – eye and face protection matrix that outlines requirements for eye and face protection based on descriptions of task/hazard.

## Working around mobile equipment (WAME)

### Purpose

Address the risk of personnel being hit, crushed or struck during work around heavy mobile equipment, including to but not limited to: forklifts, telehandlers, backhoes, excavators, and transport truck trailers reversing or coupling/uncoupling, dump trucks.

### Requirement

1. Assess hazards related to mobile equipment and pedestrian interfaces, establish controls/practices as needed, i.e.:
   - segregated pedestrian paths (e.g., hard/human barricade)
   - traffic control plans
   - follow exclusion zone guidance
2. Secure trailers without failsafe brakes with alternate means (i.e., wheel chalks). Trailer coupling is WAME.
   - never stand directly behind a trailer during coupling activities
3. Confirm mobile equipment operators are competent, and use qualified spotters where required.
4. Consider spotters in higher traffic areas, congested areas, and when working near structures or utilities.
5. Verify safety devices are functional on mobile equipment, e.g., back-up alarms, horns, brakes, critical devices, etc.
   - if the operator **cannot see what is in the direction of travel** the powered mobile equipment should be equipped with one or more of the three acceptable alternatives:

- if no proximity detection, the equipment should have:
  - a back-up alarm, and
  - a qualified spotter or physically segregated equipment operating area

– if equipped with a proximity alarm in the cab of the vehicle, the equipment should also have either a blind spot facing camera or a qualified spotter

– if equipped with a proximity alarm and emergency automatic shutdown – a blind spot facing camera or a qualified spotter may not be required
Exception: in the event the equipment does not have a back-up alarm, utilize with enhanced safeguards (e.g., larger exclusion zone, etc.)

6. Establish clear means of communications with the equipment operator and others on the work crew for the job.
   – i.e., hand signals, radio communications, etc. Agree on emergency stop signals
7. Adhere to minimum safe zone (halo); avoid blind spots/crush zones; only approach with permission
   – exclusion zones must be defined by the work crew and personnel understand the halo criteria for the type of equipment being operated. Larger equipment will likely require a larger halo (see diagram below)
   – maintain a safe distance (see and be seen). Crew understands that eye contact with the equipment operator must be obtained, as well as permission, before entering the halo zone. This should apply to spotters as well
   – consider high visibility clothing for spotter and others getting permission to enter the halo zone

8. Confirm load is secure prior to transport
   - qualified person must inspect the load to ensure it is properly secured prior to transport by the mobile equipment (e.g., proper strength tie down straps, come-along, etc.)
   - personnel understand the safe distance to be from the load while being transported

**Mobile equipment work zone**

**Red halo radius from equipment**

- Mobile equipment secured
- No lift or movement
- Remove hands from controls
- Worker should never enter area before vehicle is secured

**Before moving off - look forward, look back, and look again**

- Halo zone distances are to be used as a baseline until operation risk is assessed
- Once risk is assessed, distances can be modified

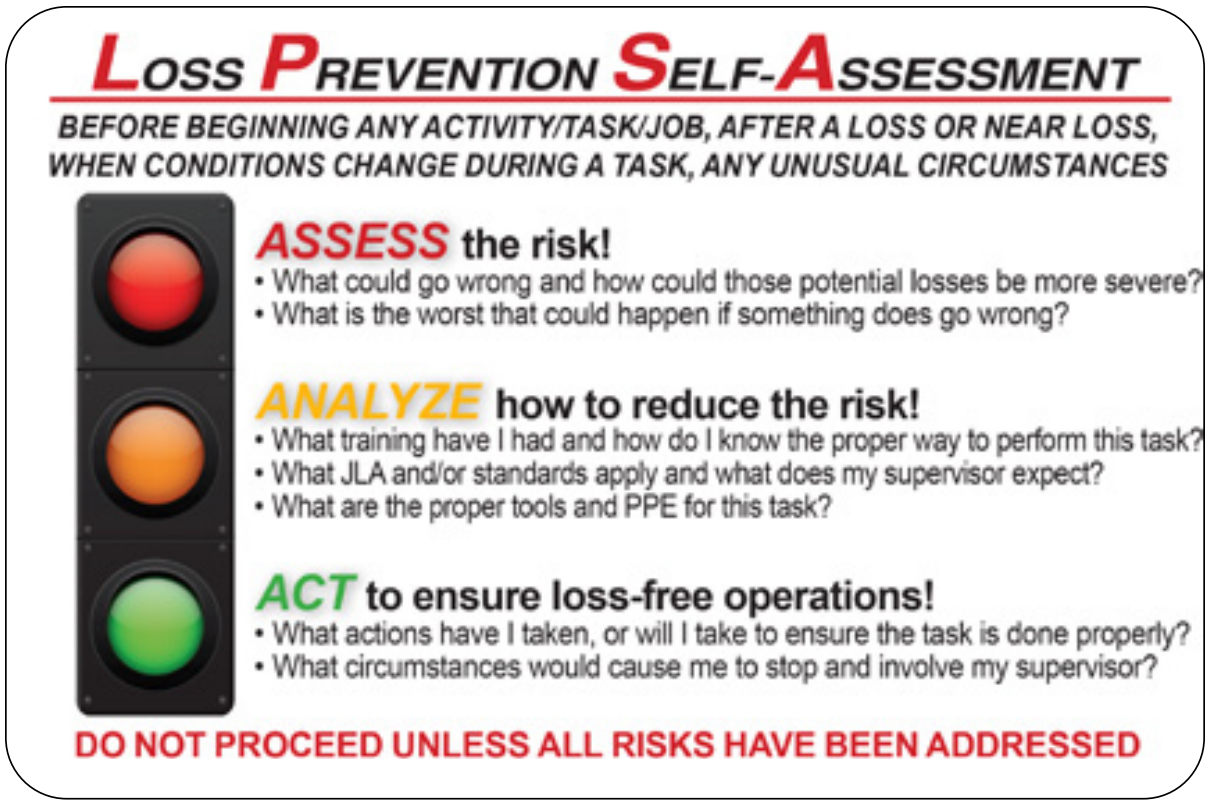
## Summary of all 2024 updates

For details, refer to referenced page number, look for blue text.

## Life saving rules

1. Follow 100 percent tie-off requirements
2. Follow work permit procedures
3. Follow hazardous energy control procedures
4. Authorization is required to defeat a SHE critical device
5. Follow all cranes and lifting requirements
   - get authorization before entering an established drop or lift zone during active lifts

Protect Tomorrow. Today.




**Permit receiver is responsible to notify Imperial point of contact before starting work**