



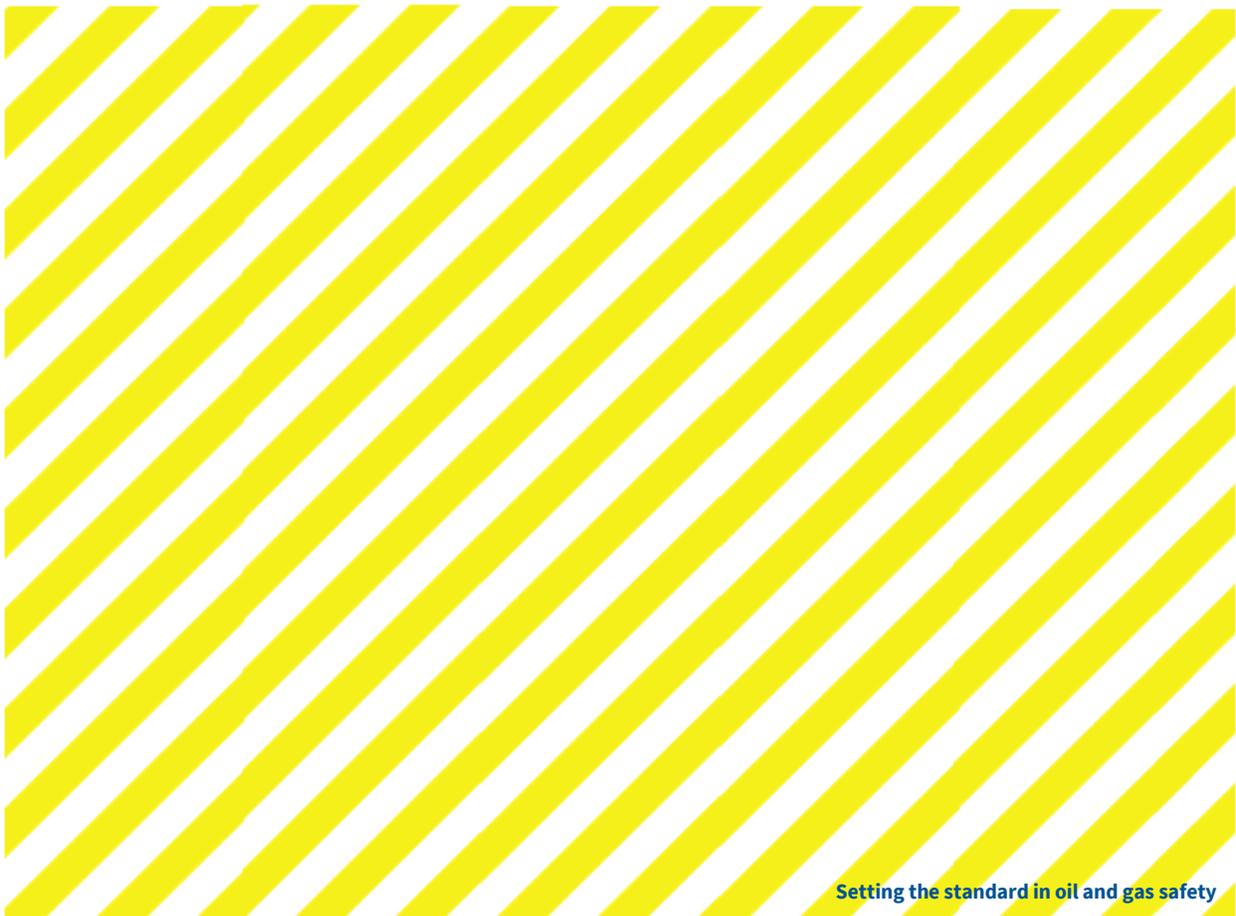
POTENTIALLY SERIOUS INCIDENTS (PSI)

A Guideline on Classifying and Reporting (draft)

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ABOUT ENERGY SAFETY CANADA

Energy Safety Canada is the upstream oil and gas industry's advocate and leading resource for the continuous improvement of safety performance. Our mission is to help companies achieve their safety goals by providing practices, assessment, training, support, metrics and communication.

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EXECUTIVE SUMMARY

This guideline is intended to assist the oil and gas industry in the classification and reporting of potentially serious incidents (PSI) that could seriously injure a worker. This is now a requirement in the new Occupational Health and Safety Act by Alberta Labour, herein referred to as Alberta OH&S, which comes into force June 1, 2018. If at such time more stringent regulatory requirements exist from Alberta OH&S, those requirements would supersede what is written here.

Potentially serious injuries and fatalities are defined as:

- Fatal injuries or illnesses
- Life-threatening injury that requires immediate emergency care
- Life-altering injury or illness that is permanent

For the purposes of this guideline and reporting to Alberta OH&S, near misses and injuries with the potential for serious injury or fatality will be considered. An unsafe condition or unsafe act, will not be considered for PSI within this guideline. For an incident to qualify as a near miss, the worker has to be exposed to hazardous energy and/or, there has to be a release of hazardous energy.

The classification of PSI will vary between organizations but, in general, industry can agree to common strategies to classify and report to Alberta OH&S consistent with this guideline. By adopting and using similar terminology and classification, industry can have more valuable conversations and data sharing around the prevention of serious injuries and fatalities.

A decision tree has been constructed to assist companies in the classification and subsequent reporting of PSI. This decision tree incorporates unprotected exposures that exceed or are reasonably likely to exceed the Immediately Dangerous to Life and Health (IDLH) concentrations, the definition and likelihood of incidents with the potential for serious injury.

The classification, management and reporting of PSI can be part of an effective strategy to prevent and learn from incidents that have the potential for serious injury. By classifying incidents consistent with this guideline, companies can comply with the new Alberta OH&S requirements, maintain due diligence, and help advance the industry's prevention efforts.



1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This guideline is intended to assist the oil and gas industry in the classification and reporting of potentially serious incidents (PSI) that could seriously injure a worker. This is now a requirement in the new Occupational Health and Safety Act by Alberta Labour, herein referred to as Alberta OH&S, which comes into force June 1, 2018. If at such time more stringent regulatory requirements exist from Alberta OH&S, those requirements would supersede what is written here.

It is understood that companies may have more stringent criteria for PSI than indicated in this guideline as part of their internal health and safety programs. The existence of this more stringent information does not make this information a reporting requirement to Alberta OH&S.

1.2 ALBERTA LEGISLATION

The requirement for reporting PSI is in Section 40(5) of the OH&S Act. It states:

“If any other injury or any other incident that has the potential of causing serious injury to a person occurs at a work site, the prime contractor or, if there is no prime contractor, the employer shall,

- (a) Report the time, place and nature of the incident to a Director of Inspection,
- (b) Carry out an investigation into the circumstances surrounding the injury or incident,
- (c) Prepare a report outlining the circumstances of the injury or incident and the corrective action, if any, undertaken to prevent a reoccurrence of the injury or incident,
- (d) Ensure that a copy of the report is readily available and provided to an officer on demand, and
- (e) Provide a copy of the report to a Director of Inspection, the joint work site health and safety committee or health and safety representative, if applicable, or, if there is no committee or representative, make it available to workers once the investigation is complete.”

The most notable change requires the prime contractor or employer to notify Alberta OH&S with respect to incidents that have the potential to cause serious injury as indicated in subsection (a).

It is important to note that Alberta reporting criteria in relation to injury has become admission to the hospital, regardless of duration.

Incidents where no injury has occurred that are already covered in the Alberta OH&S Act include the following:

- An unplanned or uncontrolled explosion, fire or flood that causes a serious injury or that has the potential of causing a serious injury
- The collapse or upset of a crane, derrick or hoist
- The collapse or failure of any component of a building or structure necessary for the structural integrity of the building or structure

- Any injury or incident or a class of injuries or incidents specified in the regulations

There are also additional reporting criteria for mine and mine sites that are covered in Section 40(4) of the Alberta OH&S Act.

1.3 DEFINING A POTENTIALLY SERIOUS INJURY

Potentially serious injuries and fatalities are defined as:

- Fatal injuries or illnesses
- Life-threatening injury that requires immediate emergency care
- Life-altering injury or illness that is permanent

Examples are provided below in Table 1. This definition and the examples are adapted from the definition provided by Dekra Insight.¹

Table 1. Potentially Serious Injury and Fatality Categories and Examples

Potentially Serious Injury Categories	Examples
Fatal injuries and illnesses	Loss of life
Life-threatening injury that requires emergency medical intervention	Airway obstruction and pulmonary damage, including edema Significant blood loss, internal bleeding and cardiac failure Skull or multiple bone fractures Chemical poisoning, such as H ₂ S or carbon monoxide Damage to brain or spinal cord Second or higher degree burns with body surface area >15%
Life-altering injury or illness that is permanent	Paralysis and central nervous system damage Significant damage to vital organs Serious chronic diseases, such as asbestosis Loss of large body part (amputation of hand, etc.) Significant burns including the face Post-traumatic stress disorder (PTSD)

¹ Dekra Insight, D. Martin, A. Black; *Preventing Serious Injuries and Fatalities (SIFS): A new study reveals precursors and paradigms*

It is important to note that a security incident may be a PSI when they involve violence, sexual harassment and assault, and incidents or situations that present serious physical or psychological hazards to the wellbeing of workers. These could result in mental illness such as PTSD.

1.4 MINOR INJURIES WITH THE POTENTIAL FOR SERIOUS INJURY

PSI include both injuries that were not serious but had the potential to be serious, as well as near misses where workers were not injured. For example, a worker is struck on the head with a swinging pipe and receives a minor cut to the side of his head. The potential is there for that worker to be killed by the strike to the head if the worker did not get out of the way in time or had been standing a few inches closer. This is classified as a PSI.

Similarly, if the worker described above had stepped out of the way in time and therefore was not injured at all, this would be a PSI, because a serious injury could have occurred if slight changes to the work site had occurred.

For the purposes of this guideline and reporting to Alberta OH&S, near misses and injuries with the potential for serious injury or fatality will be considered. An unsafe condition or unsafe act, will not be considered for PSI within this guideline. For an incident to qualify as a near miss, the worker has to be exposed to hazardous energy and/or, there has to be a release of hazardous energy. Hazardous energy can include the following:

- Pneumatic
- Hydraulic
- Chemical
- Mechanical
- Thermal
- Electrical
- Gravitational
- Nuclear

As such, workers have to be present or reasonably likely to be present during the release or exposure to hazardous energy for it to be considered a near miss.

If a release of energy has not occurred, then this may be an unsafe act or an unsafe condition rather than a near miss.

A graphic of the various components of serious injury and potential serious injury is presented below in Figure 1.



Figure 1. Components of actual serious injuries and incidents with the potential for serious injury

2.0 ROLES AND RESPONSIBILITIES

2.1 ALBERTA OH&S ACT NAMED PARTIES

The OH&S Act set out the obligations of various named parties. The list of parties is more comprehensive than those identified in the previous OH&S Act.

For more detailed information about the obligations, please refer to Energy Safety Canada’s resources on Alberta Bill 30 at energysafetycanada.com. The details of each named party as it relates to PSI is discussed below.

2.1.1 EMPLOYERS

In brief, employers are required to ensure the health, safety and welfare of workers engaged in the work; workers not engaged in the work of that employer but present on the work site; and other persons at or near the work site who may be affected by hazards originating from the work site.

Copies of the PSI report will need to be shared with the Health and Safety Committee, Health and Safety Representative and made available to Workers.



2.1.2 SUPERVISORS

Supervisors must be competent, and this includes their understanding of PSI. Supervisors must do everything in their power to prevent violence and harassment. They need to understand and reinforce the importance of reporting near misses, especially those with the potential for serious injury.

2.1.3 OWNER

Owners must maintain land, infrastructure and buildings under their control such that they do not endanger anyone. Possible PSI associated with their land, building or infrastructure must be reported to Alberta OH&S.

2.1.4 PRIME CONTRACTOR

Working in conjunction with any other named parties, it is the prime contractor's responsibility to notify, investigate and report PSI to Alberta OH&S.

2.1.5 WORKERS

Workers must know what a PSI is, and that it must be investigated and reported to Alberta OH&S. PSI investigation reports need to be made available to workers.

2.1.6 CONTRACTORS

The OH&S Act defines a contractor as a person, partnership or group of persons who, through a contract, an agreement or ownership, directs the activities of one or more employers or self-employed persons involved in work at a work site. As such, the expectation for reporting PSI to Alberta OH&S is the same as with other named parties.

2.1.7 SERVICE PROVIDERS

The OH&S Act defines a service provider as a person who provides training, consulting, testing, program development or other services in respect of any occupation, project or work site. This named party has the same obligations as employers and workers.

2.1.8 SELF-EMPLOYED PERSONS

Self-employed persons must comply with both the employer and worker components of the OH&S Act and associated regulations and codes. As such, the expectation for reporting PSI to Alberta OH&S is the same as with other named parties.



2.1.9 TEMPORARY STAFFING AGENCIES

Temporary staffing agencies have an obligation to ensure the worker is suitable for the work, has or will be given the necessary personal protective equipment, and that the host employer can protect the worker. As it pertains to possible PSI and reporting, the temporary staffing agency should ensure that the host company has a PSI program in place that defines and classifies PSI.

2.1.10 SUPPLIERS

Suppliers must provide products that are safe to use and comply with the law. In relation to PSI, suppliers must conduct investigations when they are notified of a possible PSI by users of their product and take corrective actions when required to inform other users of the risks.

2.2 HEALTH AND SAFETY

Health and Safety personnel play an integral role in preventing and reporting PSI. They build internal programs and practices around the classification of PSI, conduct investigations, prepare the investigation report, notify and report to Alberta OH&S, share learnings and manage the implementation of corrective actions to prevent reoccurrences.

2.3 HEALTH AND SAFETY COMMITTEE AND REPRESENTATIVES

The Health and Safety Committee or representative, if one is required, must to be involved in the sharing of learnings from PSI. Representatives from the Health and Safety Committee or the Health and Safety Representative must participate in the investigation of PSI. At a minimum, the report of the PSI that is shared with Alberta OH&S must be provided to the Health and Safety Committee and the Health and Safety Representative, if one exists. The report must be made available to Workers.

3.0 CLASSIFICATION

The classification of PSI will vary between organizations but, in general, industry can agree to common strategies to classify and report to Alberta OH&S consistent with this guideline. By adopting and using similar terminology and classification, industry can have more valuable conversations and data sharing around the prevention of serious injuries and fatalities.

3.1 DECISION TREE

A decision tree has been constructed to assist companies in the classification and subsequent reporting of PSI. This decision tree incorporates unprotected exposures that exceed the Immediately Dangerous to Life and Health (IDLH) concentrations defined by the National Institute of Occupational Safety and Health (NIOSH), the definition and likelihood of incidents with the potential for serious injury. The classification decision tree is presented in Figure 2.

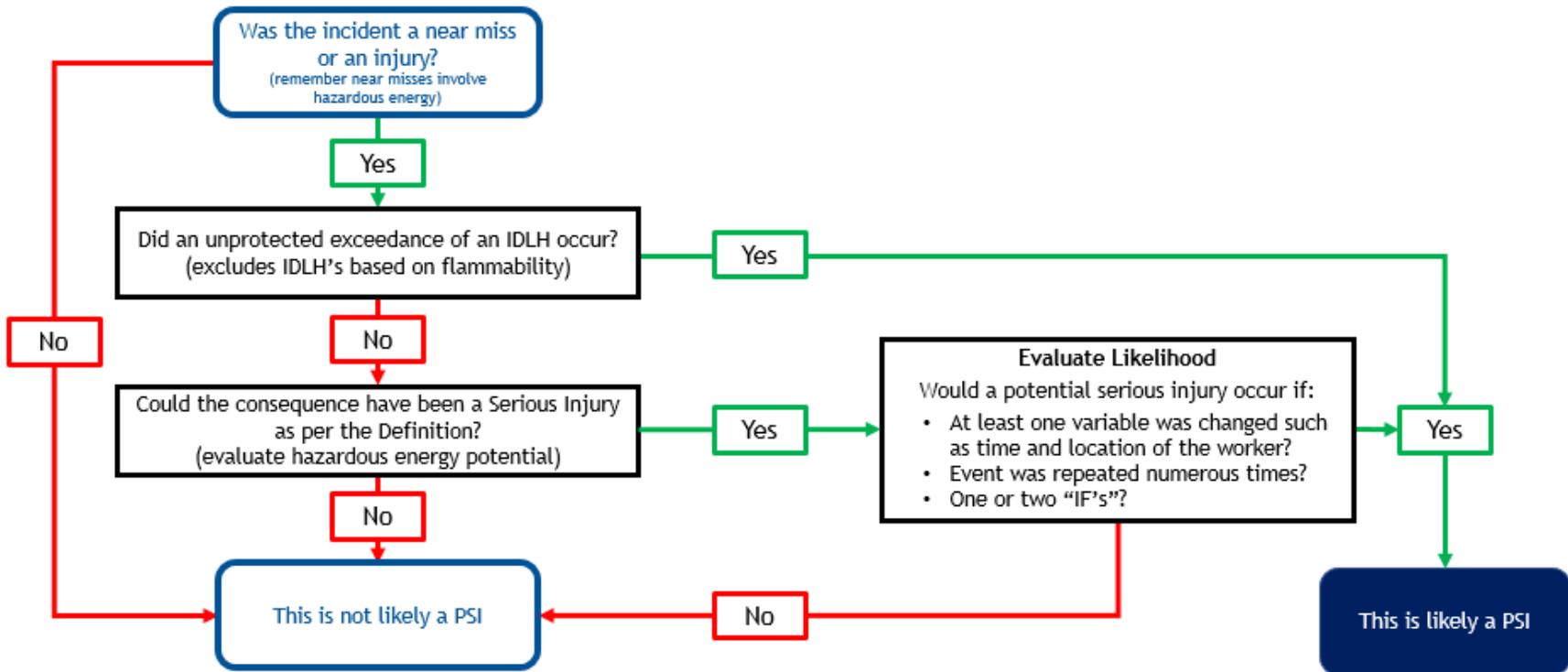


Figure 2. Classification Decision Tree



3.2 LIFE SAVING RULES

Non-compliance with Energy Safety Canada's Life Saving Rules (LSR) does not automatically become a PSI, because these rules relate to preventing unsafe acts. An unsafe act may not involve the release of hazardous energy and/or exposure to hazardous energy.

However, egregious violations of Life Saving Rules may be a near miss and therefore involve hazardous energy. In these instances, a Life Saving Rule non-compliance may be a PSI and should be assessed further as detailed below.

3.3 PROCESS SAFETY EVENTS

Process safety events involve the unintentional release or loss of containment of hazardous materials or energy that may lead to catastrophic consequences. Process safety events are classified into tiers based on classification criteria defined in the American Petroleum Institutes (API) Recommended Practice 754. Many process safety events are already reportable to regulators that may include Alberta OH&S. Some process safety events may be a PSI and should be assessed further as detailed below.

3.4 UNPROTECTED EXCEEDANCES OF THE IDLH

The Immediately Dangerous to Life and Health (IDLH) concentrations are atmospheres containing harmful substances such as chemicals and other hazardous materials.

Exceedance of IDLH concentrations represent an immediate threat to life, may affect health irreversibly, may have future adverse effects in health or may interfere with a worker's ability to escape from a dangerous atmosphere. As a result, IDLH aligns with the definition of a serious injury as identified in Section 1.3 of this guideline with one notable exception: it does not apply to IDLH concentrations based on flammability (10% LEL).

IDLH is notably different than occupational exposure limits (OEL), because OELs vary in what type of health and safety consequences they are trying to prevent such as irritation, organ system toxicity, carcinogenicity, etc.

PSI only applies to IDLH concentrations when a worker exceeds or is reasonably likely to exceed these concentrations in the absence of approved respiratory protective equipment such as supplied-air or self-contained breathing apparatus (SCBA).

An oil and gas example is the IDLH of H₂S, which is 100 parts per million (ppm). If a worker was exposed to over 100 ppm of H₂S without proper respiratory protection, this would constitute a PSI.



3.5 DEFINITION AND REASONABLE LIKELIHOOD

3.5.1 DEFINITION

Evaluate whether potential consequences meet the definition of an incident with the potential to cause serious injury as defined in Section 1.3 of this guideline. One question to ask is:

Was there enough hazardous energy present or the potential for enough hazardous energy to be present to cause a serious injury as per the definition?

If yes, then this may have the potential to cause serious injury and the likelihood needs to be evaluated.

3.5.2 LIKELIHOOD

Once the seriousness of the potential consequence has been determined, the likelihood or probability must be explored. The likelihood for the serious injury needs to be realistic, or possible, and therefore must be able to pass an additional test to be a PSI. This test of reasonable likelihood is the answer “yes” to any of the following:

- Would the potential serious injury occur if at least one variable was changed such as time and location of the worker?
- Alternatively, this can be thought of as one or two “IF’s”. Would a serious injury have occurred “if” the worker was standing there or “if” that control failed? If yes, then it is a PSI. In relation to controls, only weak or ineffective controls should be considered. For example, a restricted zone that is flagged off with banner tape that is often ignored on the site by workers would be appropriate verses the failure of a well-maintained engineering control that would never be expected to fail or that cannot be easily bypassed.
- Would the serious injury reasonably occur if the situation was repeated numerous times?
- Another approach is the quantitative approach on probability. In this approach, other methods are used to determine the probability. Is the probability of a serious injury less than one in 100?

If the answer is “yes” to any of the above, then the injury or near miss should be classified as a PSI.

3.6 RISK MATRICES

For the purposes of establishing more consistency in the classification of PSI a focused discussion on risk matrices has not been included, because of the variability in the design of various company matrices. However, individual companies can use the severity and likelihood aspects that are defined in this guideline and determine where these align on their company’s risk matrix. As a result, companies should be able to provide company-specific guidance to their personnel on what level of risk constitutes a PSI.



3.7 EXAMPLES

A series of PSI and non-PSI examples are provided below in Table 2.

Table 2. PSI and Non-PSI Examples

PSI	Non-PSI
A worker is working inside a confined space when his personal gas monitor alarms indicating 100 ppm H ₂ S, the IDLH for H ₂ S. The worker is not using SCBA.	A worker's gas monitor alarms indicating 5 ppm of H ₂ S when they walk past a vent connected to a process that has up to 10 ppm of H ₂ S.
A worker partially enters an inlet separator by placing his head and upper chest in the vessel so that he can see if all the remaining liquid has been sucked from the vessel boot. There is no safety watch present, the vessel has not been ventilated and no gas detection has been conducted.	A worker partially enters an inlet separator by placing his head and upper chest in the vessel so that he can see if all the remaining liquid has been sucked from the vessel boot. There is no safety watch present, the vessel has been ventilated and gas detection indicates a safe atmosphere.
A worker is struck on the side of the head with a swinging pipe and miraculously only receives a minor cut.	A worker drops a pneumatic tool he is using on his steel-toed boot that results in a hairline fracture in one of the bones within the upper part of his foot.
A worker driving to a wellsite is involved in a motor vehicle collision with a bridge pier when his floor mat becomes stuck on the accelerator pedal. The vehicle hits the pier at 50 kilometers per hour but glances off and the driver is not hurt.	A vehicles park break fails, and the vehicle rolls three feet into a parking lot guard rail damaging the front head light.
A suspended load of pipe is being lifted. The load shifts and the pipe falls to the ground narrowly missing a worker who briefly went under the barricade tape to observe the load.	During a lift the load shifts and is observed rocking back and forth. The lift is suspended and the load is stabilized and lowered to the ground to be reconfigured.
A worker slips on an icy road located next to a storage pond following a freezing rain event. The worker just narrowly grabs the guard rail before potentially sliding down the icy embankment into the storage pond's icy water.	A worker slips on an icy sidewalk and pulls muscles in her back resulting in a missed day of work.
A former disgruntled worker pushes through the security gate and fights with security personnel. The individual is taken into custody when a loaded gun is found in his coat pocket.	A heated discussion about health and safety occurs during a budget allocation meeting and the meeting is postponed to allow personnel to calm down.
A worker is located inside the guard fence of a beam pump (pump jack) that is not locked out when the counterweight strikes and knocks off his hard hat.	Slack in the chain used to lockout the beam pump counterweights results in the counterweights moving an inch when a worker is standing outside the guard fence.
A worker deathly allergic to bees opens an instrumentation cabinet that contains a bee's nest. The bees swarm and the worker takes refuge in the truck while killing a bee on his coveralls. The worker is not stung. The worker does not have their EpiPen.	A worker not allergic to bees, opens an instrumentation cabinet where a bee's nest is found inside and the worker is stung.



3.8 NOTIFICATION

Once a company has identified a PSI, they must notify Alberta OH&S as soon as reasonably practical. The OH&S Act requires that the prime contractor or, if no prime contractor, the employer, report to Alberta OH&S the time, place and nature of the PSI.

4.0 INVESTIGATION

Alberta and other jurisdictions require an investigation of PSI. How companies do this is at their discretion, but it is recommended that they have a risk-based approach where the type of investigation, the level of training of the investigators, and the formalized nature of the report are based on the severity of the incident.

A more formalized root cause investigation approach is recommended for PSI such as: TapRoot, 5 Whys, Failure Modes and Effects, Fault Tree Analysis, etc. These examples are provided for reference only and may not be appropriate for all PSI. Every company needs to build their program and select their investigation processes accordingly.

4.1 REPORTING

All PSI must be investigated, and a detailed report must be prepared that identifies corrective actions to prevent reoccurrence. This report must be provided to Alberta OH&S, the Health and Safety Committee or Health and Safety Representative and made available to the workers.

5.0 DATA METRICS AND TRENDING

Although not required by Alberta OH&S, metrics are an excellent way to understand and trend the potential for a serious injury or fatality. Metrics relating to actual serious injuries and potential serious injuries are provided below for reference.

- Serious injury and fatality metric is a reactive metric calculated by the number of actual serious incidents multiplied by 200,000 and divided by the number of worker hours.
- Incidents with the potential for serious injury (PSI) metric is a proactive metric calculated by the number of potential serious incidents reported to Alberta OH&S multiplied by 200,000 and divided by the number of work hours.

The collection and trending of these type of metrics offer insight into opportunities for improvement in the prevention of serious injuries and fatalities.



6.0 CORRECTIVE AND PREVENTATIVE ACTIONS

In general, the majority of the risks to workers within the industry are known. However, serious injuries and fatalities continue to occur. Often, a failure to implement changes from lessons learned can contribute to ongoing safety concerns. Therefore, a disciplined approach to communicating these learnings is vital to the prevention of similar injuries.

7.0 COMMUNICATIONS AND LEARNINGS

It is recognized that reportable incidents such as PSI may result in the selective sharing of information in an effort to manage other risks. This is particularly true for actual serious injuries and fatalities where a company's legal department is involved. While this need is recognized and necessary, it is equally important to recognize the need to share these incidents company and industry-wide to prevent reoccurrence. Companies and industry should do as much as possible to share learning and prevent re-occurrences.

8.0 EDUCATION AND TRAINING

For companies to successfully prevent serious injuries and fatalities, all named parties must understand the benefit and ultimate goal of keeping themselves and their co-workers safe from serious injuries and fatalities.

Management should be mindful about how PSI reporting is communicated within a company and how they respond to the identification of potential PSI; where reporting is encouraged and learnings are translated into preventative action.

9.0 SUMMARY

The classification, management and reporting of PSI can be part of an effective strategy to prevent and learn from incidents that have the potential for serious injury. By classifying incidents consistent with this guideline, companies can comply with the new Alberta OH&S requirements, maintain due diligence, and help advance the industry's prevention efforts.



APPENDIX I - GLOSSARY

Near Miss	An event that occurred that did not result in an injury, but where there was potential for it to do so. Sometimes referred to as a near hit. It must involve the release or exposure to hazardous energy.
Hazardous Energy	Energy in the form of pneumatic, nuclear, thermal, mechanical, hydraulic, gravitational, electrical, chemical. For additional information on hazardous energy please refer to the CSA Z460-13 Control of Hazardous Energy.
Process Safety Event	A process safety event involves the unintentional release or loss of containment of hazardous materials or energy that may lead to catastrophic consequences.
PSI	Potentially serious incidents that could seriously injure a worker
PTSD	Post-Traumatic Stress Disorder is a mental health condition that is triggered by experiencing or observing a terrifying event.
Security Incident	Security incidents involve threats of or criminal activity such as workplace violence, robbery, theft, alcohol and drug abuse or possession, terrorism, etc.
Unsafe Acts	A behavior that is unsafe and contravenes what is expected behaviors. Often involves not using personal protection equipment, not adhering to established practices and procedures, bypassing safety controls etc.
Unsafe Condition	Unsafe conditions relates to the work environment, equipment and processes. This could include poorly designed equipment, inoperable equipment, etc.



APPENDIX II - REFERENCES

Alberta Labour; *Occupational Health and Safety Act*, June 1, 2018, http://www.qp.alberta.ca/1266.cfm?page=002P1.cfm&leg_type=Acts&isbncln=9780779800490&display=html

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