Process risk assessment and risk reduction involve the identification and analysis of process-related hazards, documentation of hazard analyses, and implementation of risk reduction measures.

A risk assessment is a series of steps to identify hazards, determine the level of harm they can cause, determine control measures to eliminate or reduce the risk and record the findings. Risk reduction focuses on mitigating potential losses by reducing the likelihood and severity of a possible loss or injury due to a hazard.

Self-Assessment & Action Plan

Visit Process Risk Assessment and Risk Reduction on pellet.org for:

* Self-Assessment & Action Plan Worksheets
* Example Risk Management Standard
* Example Risk Register and Action Plan Worksheet

When completing the Self-Assessment & Action Plan below:

* If you identify a gap in any of the questions, develop an action plan.
* When choosing due dates for the action plans, consider the following to determine priority:
	+ The anticipated effort required to close the gap and make improvements,
	+ The benefits expected from taking action and implementing change, and
	+ The urgency (e.g., perceived risk) of the improvements needing to be made.

Key Resources

* [PSM Implementation: How to Use the Self-Assessment Worksheets](https://pellet.org/resources/how-to-use-the-psm-self-assessment-worksheets/)
* [Process Safety Management](https://pellet.org/safety/safety-initiatives/process-safety-management-psm/) on [pellet.org](http://pellet.org/)
* [CSA Z767 Process safety management standard (2nd edition)](https://www.csagroup.org/store/product/CSA_Z767%3A24/)

Materials are being updated all the time—come back to pellet.org often.

Suggested Activities

* Define responsibility and the process for safety approval of new projects and changes.
* Assess abnormal operations, emergency settings and protection requirements during process hazard evaluations.
* Implement safeguards aligned with good engineering practice (e.g., spark detection and deluge systems, explosion protection)

Suggested Deliverables

* Documented hazard identification and risk analyses.
* Documentation and clear communication of hazards, safeguards and risks to affected personnel.
* Documented an effective emergency response plan, along with trained emergency response team and fit-for-duty emergency equipment.

References

* Rayner Brown, K., Murray, G., Laturnus, B., Yazdanpanah, F., Cloney, C., Amyotte, P.R. (2024). [*Integrating Process Safety Management into Canadian Wood Pellet Facilities that Generate Combustible Wood Dust.*](https://onlinelibrary.wiley.com/doi/10.1002/cjce.25462) The Canadian Journal of Chemical Engineering. 102, 4085-4103.
* WorkSafeBC. (2022). [*Managing Risks in Manufacturing Workplaces: How to Use the Self-Evaluation Tool*.](https://www.worksafebc.com/en/resources/health-safety/information-sheets/managing-risks-manufacturing-how-to-use-self-evaluation) Last accessed April 2024.
* WorkSafeBC. (2023). [*Enhancing Health & Safety Culture & Performance: Self-Evaluation Tool for Managing Risks in Manufacturing Workplaces*](https://www.worksafebc.com/resources/health-safety/checklist/managing-risks-manufacturing-assessing-mobile-equipment?lang=en&direct). Last accessed April 2024.

A portion of these resources were developed through a project funded by WorkSafeBC under an Innovation at Work grant. The views, findings, opinions, and conclusions expressed herein do not represent the views of WorkSafeBC.

|  |
| --- |
| 1. **Has a Process Hazard Analysis (PHA) or Dust Hazard Analysis (DHA) been completed at your facility?**

 *A PHA is a systematic method for identifying and assessing hazards associate with  operations to facilitate the control and management of them. A DHA is a hazard  analysis focussed on combustible dust.* [ ]  Yes (formalized) [ ]  Yes (informal) [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **How are hazards identified and documented? Check all that apply:**

[ ]  The scenario pathway from the initiating event to consequences is described, as well as event relationships/connections (links, interdependence). [ ]  The incidents that have occurred at the facility previously and pertinent incidents that have occurred at other facilities. [ ]  Any hazards that be new to the facility that may have arose due to changes.[ ]  Existing barriers and controls that decrease the probability and/or severity of consequences of hazardous scenarios.[ ]  Not applicable. |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Does the PHA or DHA include an estimation of risk (as a function of consequence and likelihood) for the identified hazard scenarios?**

 [ ]  Yes [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Has a consequence analysis been completed that involves the identification, analysis and documentation of consequences for hazardous scenarios?**

 [ ]  Yes [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Which of the following does the consequence analysis consider (check all that apply):**

[ ]  Effects on people.[ ]  Effects on the environment.[ ]  Effects on business operations.[ ]  Effects on property.[ ]  Any interaction of materials released in a given loss of containment situation.[ ]  Potential knock-on effects.[ ]  Not applicable. |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Has a likelihood analysis been completed?**

 [ ]  Yes [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Which of the following does the likelihood analysis include (check all that apply):**

[ ]  Events within the facility/operations.[ ]  Events outside of the facility/operations.[ ]  Human error.[ ]  Equipment failure.[ ]  Process control failure.[ ]  Not applicable. |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Which of the following are practiced with respect to risk management? Check all that apply.**

[ ]  Risks that were deemed intolerable have been reduced to broadly tolerable or conditionally tolerable range.[ ]  Risks that are deemed tolerable are managed.[ ]  Measures implemented for risks in the conditionally tolerable or ALARP (as low as reasonably practicable) range are assessed and documented.[ ]  Not applicable. |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Has an implementation plan been put in place for implementing control measures related to the risk assessment, PHA or DHA?**

 [ ]  Yes (formalized process) [ ]  Yes (informal process) [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Is there a plan for implementing risk reduction measures/controls that includes prioritizing controls and creating a schedule?**

 [ ]  Yes (formalized process) [ ]  Yes (informal process) [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Is there a formal process (e.g., corrective action plans) to track the implementation of risk reduction measures/controls to completion?**

 [ ]  Yes (formalized process) [ ]  Yes (informal process) [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Indicate if the following items are completed during the implementation and completion of risk reduction measures/controls (check all that apply):**

[ ]  Confirming that changes involving equipment, procedures, or organization have been adequately executed.[ ]  Determining that the risk reduction measures have successfully reduced risk to the target level.[ ]  Unsure.[ ]  Not applicable. |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Is the hierarchy of controls and Inherently Safer Design (ISD) considered when identifying and selecting control measures from the risk assessment, PHA or DHA?**

*The hierarchy of controls is the preferred order of consideration of risk reduction measures. The hierarchy of controls is ISD, passive engineered, active engineered, and administrative (procedural). ISD treats hazards at the source through the fundamental design rather than add-on equipment or procedures. ISD is based on the principles of minimization, substitution, moderation, and simplification.* [ ]  Yes (formalized process) [ ]  Yes (informal process) [ ]  No [ ]  Unsure  |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |
| 1. **Are risk assessments revalidated (re-examined) after changes to any of the following? Check all that apply:**

 [ ]  Facility [ ]  Operation/Process [ ]  Operating environment [ ]  After 5 years regardless of any changes [ ]  Not applicable |
| **Action owner** | **Due date (yyyy-mm-dd):** |
| **Plans and actions needed to address gap or improve existing approach**      |

Review of Action Plan for Process Risk Assessment and Risk Reduction

Complete the following table after corrective actions have been implemented.

|  |
| --- |
| Improvement actions taken      |
| How did you ensure the controls were implemented in a timely fashion? How did you prioritize your actions?      |
| How will you ensure the implemented controls will continue to be effective over time?      |
| How are workers involved in developing and implementing controls?      |
| How do you know that workplace decisions related to safety are effective and sustainable?      |
| How do you measure change to establish a new performance expectation?      |
| When changes are made, how are interrelated procedures, programs, and policies updated effectively?      |
| Is a strategy for continuous improvement in place? How does this process work?      |
| If you have multiple locations, are lessons learned and continuous improvements shared with other locations? How does this process work?       |
| Is the safety management system self-sufficient, or does it rely on specific individuals to make it function? How do you ensure the system remains self-sufficient?      |
| Overall effectiveness of improvement actions.      |