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|  Process Safety Management Program |
| **Title:** Compliance Guidelines for Incident Investigation**Document #:** PSM-SY-UN-008 **Issued:** 08/08/2014 |
| **Responsible Dept.:** EHS **Version:** New**Approved By:** PSM Focus Group **Page:** 1 of 3 |

**1.0 Purpose:** This document summarizes the method The Pennsylvania State University uses to comply with the requirements relating to the Incident Investigation Element of the Process Safety Management (PSM) Program.

**2.0 Scope:** The intent of this element is to ensure that each Process Safety incident which resulted in, or could have resulted in, a catastrophic release of a highly hazardous chemical or significant impact to the covered process equipment is reported and thoroughly investigated. The requirements to complete PSM related incident documentation, appropriate notifications, investigation procedures & techniques, and corrective action management are covered within this element.

**3.0 Guidelines:** Through a well designed and implemented PSM Program, the University believes PSM Incidents are preventable. However, recognizing that unforeseen circumstances may arise that can lead to an event, incidents must be reported and appropriately investigated. Since any incident can be traced to a failure within the management system, the Incident Investigation element of the PSM program is an important component of the continuous improvement initiative. In addition, a thorough investigation can prevent a reoccurrence of similar incidents.

A basic five (5) step approach has been outlined for this element. These steps are highlighted below:

1. Report incident
2. Collect facts and details regarding the incident
3. Analysis the data collected and determine underlying causes of the event
4. Identifying appropriate risk control measures to prevent reoccurrence
5. Implement action plan for risk control measures

Reporting PSM incidents or near misses is the critical first step in the process, therefore, all employees are required to immediately notify their supervisor of a PSM incident. The report should be made using the PSM Incident Report Form with at least the first two Sections completed with the details associated with the event. The Report Form should be submitted to the Process Safety Program Manager (PSPM).

All PSM incidents will be investigated that resulted in or could reasonably have resulted in a catastrophic release of highly hazardous chemicals within the University. The investigation must be initiated as soon as it is safe and reasonably practicable to do so, but not later than 48 hours following the incident. Although all PSM incidents shall be investigated, not all incidents need to be investigated to the same level. Penn State will utilize an approach to concentrate on those incidents with the most serious or potentially serious effects. Therefore, the investigation team will be based on the type of event, however, at a minimum incidents will be investigated by the equipment operators/individual(s) involved with the event and a member of the EHS Dept. For more serious events or as determined by the EHS Dept., the investigation team will include additional representatives appropriate for the investigation (e.g. Area Supervisor, Building Operations Engineer, Facility Personnel, Safety Officer, etc.). It is important that the incident investigation must be suitable and sufficient in relation to the potential severity and frequency of the incident.

The intent of the incident investigation is to systematically review the causes of an event or near-miss to enable the University to take appropriate corrective actions to improve the process safety management system. With this in mind the following requirements are associated with a PSM investigation:

1. Initiated as promptly as possible but at least within 48 hours
2. Team approach and includes at least one person who is knowledgeable in the process involved in the incident (must include at least one contractor if a contractor was involved)
3. A report generated that contains at a minimum:
	1. Date & time of the incident
	2. Date & time of the investigation began
	3. Description of the incident
	4. Factors that contributed to the incident
	5. Recommendations resulting from the investigation
4. Management system to promptly address and resolve recommendations identified during the investigation
5. Mechanism to review investigation results with affected personnel whose job responsibilities are relevant to the incident findings including contractors where applicable

Various methodologies (e.g. 5 Why, Checklist, Fault Tree, etc.) for root cause determination are available and depending on the type of incident will be selected by the investigation team. Whichever method is selected, it must be sufficiently documented either as part of the incident report or as an attachment. As with any investigation, the team should focus on the facts relating to the event and not to assign blame. As part of this process the team should continue to drill down to the root cause(s) (rarely is there a single cause leading to an incident) contributing to incident. The investigation team must identify the immediate actions and decisions that preceded the event, as well as the latent organizational factors that failed to influence those actions and decisions, in order to recommend management system improvements to prevent similar occurrences. Once root causes are identified appropriate corrective actions must be identified for each contributing cause. In addition, if other recommendations are identified as part of the incident investigation, they should also be identified and included within the incident report.

The PSPM will track completion of all assigned actions and recommendations generated by the investigation team and individual’s assigned responsibility for the items will provide appropriate closure documentation to the PSPM. Once all actions have been completed, the incident report will be marked as Closed.

The PSPM is required to periodically evaluate select incident investigation reports to assess the root cause analysis. In addition, select actions will be evaluated to assess if they were effective in addressing the system failure.

**4.0 Definitions:** The following definitions provide guidance regarding common issues surrounding the Incident Investigation Element.

*Catastrophic Release* – a major release of a highly hazardous chemical resulting from uncontrolled developments which lead to, or could have led to, serious danger to persons both within and/or outside the covered process area.

*Immediate Cause* - the unsafe acts and conditions that directly resulted in or could have resulted in an incident (typically explains why the incident occurred).

*Incident Investigation –* a defined process for reporting, tracking and investigating incidents that occur within a covered process area.

*Incident Investigation Team* – A group of qualified people that examine an incident in a manner that is timely, objective, systematic, and technically sound to determine the factual information pertaining to the event, probable cause(s) are ascertained, and complete technical understanding of such an event is achieved and documented.

*Near Miss* – an extraordinary event that could have reasonably, but actually did not, result in a negative consequence (incident) under slightly different circumstances.

*Process Safety Incident –* an unplanned event or series of events and circumstances which did result or could reasonably have resulted in a catastrophic release of a highly hazardous chemical / biological agent from its primary containment structure, failure of a piece of equipment as originally designed, or deviation from an established procedure.

*Root Cause* – an initiating event or failing from which all other causes or failings originate; typically a management system failure such as facility design, inadequate training, etc., that contributed to the unsafe acts or conditions that resulted in an incident.

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|  Process Safety Management Program |
| **Title:** Incident Reporting and Investigation Procedure**Document #:** PSM-SOP-UN-008 **Issued:** 09/24/2014 |
| **Responsible Dept.:** EHS **Version:** New**Approved By:** PSM Focus Group **Page:** 1 of 6 |

**1.0 Purpose:** This document is intended to guide employees of The Pennsylvania State University (Penn State) in the requirements of Process Safety Incident Reporting and Investigation within the Process Safety Management (PSM) Program. This procedure provides guidance on the type of events that are considered Process Safety Incidents, timely reporting requirements and investigation criteria. Reporting and subsequent investigation of process safety incidents are an essential part of the PSM Program. The ability to formally evaluate the immediate and root cause(s) of an incident will improve the management system and minimize the likelihood of similar occurrences.

**2.0 Scope:** Process Safety incident reporting and investigation requirements apply to all University employees working on or around covered process areas. This also includes reporting “near misses” in an effort to identify management system deficiencies that need to be corrected to prevent a more serious outcome in the future.

**3.0 Responsibility:** The following list of employees has specific responsibilities assigned to them in accordance with the requirements of Process Safety Incident Reporting and Investigation procedure. Specific Budget Executives and Budget Administrators may assign these responsibilities to a Department or individual other than the one identified in this procedure as appropriate.

 Budget Executives and Budget Administrators:

1. Primary responsibility to maintain a safe work environment within their jurisdiction, by monitoring and exercising control over their assigned areas.
2. Assign a representative from each academic and administrative unit to ensure compliance with this procedure.
3. Ensure Incident Reporting and Investigation responsibilities are carried out in the academic departments or administrative units for which they are responsible.
4. Monitor implementation of the incident reporting and investigation program.

Director Design & Construction:

1. Ensure employees within their area(s) of responsibility understand and adhere to the Incident Reporting and Investigation requirements outlined in this procedure.

Building Operations / Utility Engineers:

1. Report Process Safety Incidents and Near Misses
2. Participate on Incident Investigation Teams as appropriate.
3. Address any assigned action items and/or recommendations generated from the incident investigation

Supervisor, Area Services:

1. Ensure employees within their area of responsibility understand and adhere to the Process Safety Incident Reporting and Investigation requirements outlined in this procedure.
2. Ensure incident reports are completed within defined time periods.
3. Participate on Incident Investigation Teams as appropriate.
4. Address any assigned action items and/or recommendations generated from the incident investigation.
5. Take prompt corrective action when unsafe process safety conditions or practices are observed or reported.

Operations/Facility Manager:

1. Ensure employees within their area of responsibility understand and adhere to the Process Safety Incident Reporting and Investigation requirements outlined in this procedure.
2. Ensure incident reports are completed within defined time periods.
3. Participate on Incident Investigation Teams as appropriate.
4. Address any assigned action items and/or recommendations generated from the incident investigation
5. Take prompt corrective action when unsafe process safety conditions or practices are observed or reported.

Safety Officer:

1. Coordinate implementation of the Process Safety Incident Reporting and Investigation program within the work unit.
2. Ensure required training is provided to employees within the work unit.
3. Ensure incident reports are completed within defined time periods.
4. Participate on Incident Investigation Teams as appropriate.
5. Address any assigned action items and/or recommendations generated from the incident investigation.

Process Safety Program Manager – EHS Department:

1. Oversee all aspects of the University’s Process Safety Incident Reporting and Investigation program.
2. Manage Incident Reports and track completion of Action Items
3. Periodically review the incident reporting and investigation program, consult with program stakeholders and update the element requirements as appropriate.
4. Track and report metrics established for this element to affected groups and senior leadership as appropriate.
5. Conduct periodic evaluations of select incident investigation reports to assess the root cause analysis and effectiveness of addressing the system failures.

Employees:

1. Adhere to the requirements of Process Safety Incident Reporting and Investigation program.
2. Report all Process Safety Incidents and Near Misses immediately to Supervisor
3. Participate on Incident Investigation Teams.

**4.0 Definitions:**

*Catastrophic Release* – a major release of a highly hazardous chemical / biological agent resulting from uncontrolled developments which lead to, or could have led to, serious danger to persons both within and/or outside the covered process area.

*Covered Process* - any process where a highly hazardous chemical / biological agent or extremely hazardous substance deemed by Penn State is used, handled or stored. This also includes critical process operations identified by the University that would benefit from PSM program implementation.

*Immediate Cause* - the unsafe acts and conditions that directly resulted in or could have resulted in an incident (typically explains why the incident occurred).

*Incident Investigation –* a defined process for reporting, tracking and investigating incidents that occur within a covered process area.

*Incident Investigation Team* – A group of qualified people that examine an incident in a manner that is timely, objective, systematic, and technically sound to determine the factual information pertaining to the event, ensure probable cause(s) are ascertained, and complete technical understanding of such an event is achieved and documented.

*Incidental Release* - a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employees cleaning it up, nor does it have the potential to become an emergency within a short time frame

*Near Miss* – an extraordinary event that could have reasonably, but actually did not, result in a negative consequence (incident) under slightly different circumstances.

*Process Safety Incident –* an unplanned event or series of events and circumstances which did result or could reasonably have resulted in a catastrophic release of a highly hazardous chemical / biological agent from its primary containment structure, failure of a piece of equipment as originally designed, or deviation from an established procedure.

*Root Cause* – an initiating event or failing from which all other causes or failings originate; typically a management system failure such as facility design, inadequate training, etc., that contributed to the unsafe acts or conditions that resulted in an incident.

**5.0 Procedure:** Penn State expects employees working in or around covered process areas to immediately report process safety incidents and near misses. The following steps outline the requirements relating to reporting incidents, incident investigation and associated action item management.

1. All process safety incidents shall be reported as soon as practical (e.g. appropriate medical treatment received, incident scene is safe/secure and does not pose a hazard to other personnel in the area, other University reporting requirements met, etc.) to the employees immediate supervisor.
2. The immediate supervisor is required to report the incident to the EHS Department within 24 hours. The Process Safety Incident Report form (Attachment A) will be used to report and document all incidents (available on EHS webpage). At a minimum Section I and II shall be completed prior to submission to the EHS Department. The information should contain the initial basic facts relating to the incident and should include sufficient details relating to any equipment involved.

Any incident involving significant releases (e.g. > reporting requirements, building evacuations, etc.), serious injury or substantial equipment damage, the Emergency Action Plan reporting requirements must also be followed. In addition, employee workplace injuries or illnesses must be reported according to University policy including completing the First Report of Employee Injury.

1. All incidents shall be investigated as soon as it is safe and reasonably practicable to conduct the investigation. For serious incidents involving a catastrophic release of a highly hazardous chemical / biological agent, the investigation must be initiated within 48 hours.

Although all PSM incidents shall be investigated, not all incidents need to be investigated to the same depth. The investigation shall be suitable and sufficient in relation to the potential severity and frequency of the incident.

1. All incident investigations will be conducted through a team approach. The investigation team will be based on the type of event and will include appropriate representatives from affected departments. The Operations/Facility personnel or the EHS Department will determine the membership of the team for more serious events. Although the investigation team can vary, guidelines for participation are summarized below:
	1. Near Miss – participation at the discretion of the line management but will include at least equipment operators/individual(s) involved with the event and a member of the EHS Dept.
	2. Incidental / Maintenance Release - participation at the discretion of the line management but could include equipment operators/individual(s) involved with the event, Area Supervisor, and a member of the EHS Dept.
	3. Equipment Failure - participation at the discretion of the line management but could include equipment operators/individual(s) involved with the event, Area Supervisor, Building Operations Engineer and a member of the EHS Dept.
	4. Significant Event / Release - equipment operators/individual(s) involved with the event, Area Supervisor, Building Operations Engineer, Operations / Facility personnel, Safety Officer and a member of the EHS Dept.

Other individuals can be involved in the investigation as appropriate. This could include contractors if they were involved or contributed to the event occurring.

1. The methodology to complete the incident investigation and root cause determination can vary and should be selected by the investigation team. Whichever method is selected, it must be sufficiently documented either as part of the incident report or as an attachment and should determine the following:
	1. The immediate cause(s) of the incident
	2. The relevant events leading up to the incident
	3. Unsafe conditions or actions that contributed to the incident
	4. Witnesses to the incident
	5. Recommendations to prevent a similar incident from recurring in the future

A guide to incident investigation is attached for reference (Attachment B).

1. The investigation must focus on the facts relating to the event. The team must identify the immediate actions and decisions that preceded the event, as well as the latent organizational factors that failed to influence those actions and decisions in order to recommend management system improvements. The team should inspect the incident site as soon as possible, and take any necessary photographs or video of the area as appropriate. In addition, the team should interview individuals involved with the event or witnesses. This should include individuals responding to the event.
2. Based on the root cause determination, the investigation team should establish at least one corrective action for each immediate and root cause identified to prevent similar occurrences. The action items identified through the investigation will be developed and managed in accordance to the Management System to Address Action Items Element (#04).
3. If the team identifies other deficiencies within the process safety program that did not contribute directly to the incident but could lead to an event or near miss if not corrected, a preventive action should be developed. The preventive action identified through the investigation will be developed and managed in accordance to the Management System to Address Action Items Element (#04).
4. The results of the investigation will be included within the Incident Report form or included as an attachment. The investigation report will include at a minimum the following information:
	1. Time & Date incident investigation started
	2. Investigation team members
	3. Date investigation completed
	4. Investigation Methodology selected
	5. Immediate Cause(s)
	6. Root Cause(s)
	7. Corrective and Preventive Action to prevent a similar incident from recurring in the future

The results of investigation will be made available to affected employees. In addition, lessons learned from the investigation will be reviewed and made available to appropriate personnel within other covered process areas within the University.

1. The Process Safety Program Manager (PSPM) will track completion of all assigned action items associated with an Incident Report and upon completion, close the incident. In addition, the PSPM will maintain the appropriate documentation associated with the Incident Report collected by the investigation team.
2. The PSPM is required to periodically evaluate select incident investigation reports to assess the root cause analysis. In addition, select actions will be evaluated to assess if they were effective in addressing the system failure.
3. The PSPM will periodically evaluate performance within the requirements of this element.

**6.0 Attachments**

* 1. Attachment A – Process Safety Incident Report Form
	2. Attachment B - Tools for Completing Process Safety Incident Investigations