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|  Process Safety Management Program |
| **Title:** Compliance Guidelines for Process Safety Information**Document #:** PSM-SY-UN-007 **Issued:** 08/20/2014 |
| **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 Process Safety Information Element of the Process Safety Management (PSM) Program.

**2.0 Scope:** The intent of this element is to develop and maintain complete and accurate written information concerning process chemicals/biological agents, process technology, and process equipment and to make that information available to affected individuals. This element defines the mechanisms to develop, maintain and update process safety related documentation and information.

**3.0 Guidelines:** It is essential for a well-managed PSM program to have a robust system for maintaining process safety related documentation and information that affected individuals can easily retrieve and understand. The data within the Process Safety Information (PSI) element is generated throughout the life cycle of a covered process. Employees responsible for this information must understand that it must be preserved and continuously maintained with up-to-date information in order to preserve the safety of the process. Fundamentally, PSI is what affected individuals need to know about the chemical/biological agent, the process and the equipment within the covered process to operate the process safely, reliably and efficiently.

The requirements of the PSI can be segregated into three (3) primary areas; hazards (health and physical) of the chemical/biological agent, technology of the process, and equipment used in the process. This information should be maintained within a Process Safety Master File for the specific covered process area. Although use of a Process Safety Master File is the requirement, it is recognized that documentation associated with a covered process may be maintained within the University at various locations and in different platforms. As such, a note identifying those locations should be included in the applicable Process Safety Master File.

The minimum PSI data required for each area is outlined below:

1. Chemical/Biological Agents
	1. Toxicity Information\Biosafety Level
	2. Permissible Exposure Limits
	3. Physical Data
	4. Reactivity Data
	5. Corrosivity Data
	6. Thermal and Chemical Stability Data
	7. Hazardous effects of inadvertently mixing different materials (used within the covered process) that could foreseeably occur
2. Technology
	1. Block Flow Diagram or simplified Process Diagram
	2. Process Chemistry
	3. Maximum Intended Inventory
	4. Safe Upper and Lower Operating Limits (e.g. temperature, pressure, flows, compositions, etc.) and includes an evaluation of the consequences of deviation
3. Equipment
	1. Materials of construction
	2. Piping and Instrumentation Diagrams (P&IDs)
	3. Electrical Classification
	4. Relief System Design and Design Basis
	5. Ventilation System Design
	6. Design Codes and Standards Employed
	7. Material and Energy Balances
	8. Safety Systems

The information compiled about the hazards of the chemicals/biological agents used in a process must be comprehensive enough for an accurate assessment of the fire and explosion characteristics, reactivity hazard potential, worker health and safety hazards, and the corrosion and erosion effects on the process equipment and monitoring tools.

A list of all process safety critical equipment necessary in a covered process needs to be developed and maintained as part of the PSI data. This list should include equipment name and number, equipment size (e.g. gallons, cubic meters, etc.), purpose/function in process, pressure rating (if applicable), electrical classification (if applicable) and material of construction. The specific requirements are outlined within the Mechanical Integrity Element (#11).

The Process Safety Master File for each covered process will outline who is responsible for maintaining and updating the PSI data referenced above. This will include a periodic review to ensure it reflects the latest information available. The Process Safety Program Manager (PSPM) is responsible for collecting the appropriate information from the responsible individuals and maintaining the Process Safety Master Files.

The PSPM is required to periodically evaluate adherence to the requirements of this element by the various covered process areas.

**4.0 Definitions:** The following definitions provide guidance regarding common issues surrounding the Process Safety Information Element.

*Block Flow Diagram –* diagram used to show the major process equipment and interconnecting process flow lines and show flow rates, stream composition, temperatures, and pressures when necessary for clarity.

*Piping & Instrumentation Diagram (P&ID) -* is to be generated for each stage of a covered process. It should reflect the as-built equipment setup, instrumentation & controls, safety systems and interlocks included in a covered process. A P&ID is the one document that when properly completed shows the most information pertaining to the technology of the covered process. It is generally considered to be the single most vital document that must be used when performing a Process Hazard Analysis (PHA).

*Process Safety Information –* data associated withthe chemical/biological agent, the process technology and the equipment within the covered process area that is necessary for affected individuals to operate the process safely, reliably and efficiently.

*Process Safety Master File* – The location where information on a covered process regarding chemical/biological, technology and equipment is located or describes where the specific information is located.

*RAGAGEP* – Recognized and Generally Accepted Good Engineering Practices (RAGEGEP), typically the specific design codes, standards or guidelines established for the covered process.

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|  Process Safety Management Program |
| **Title:** Process Safety Information Procedure**Document #:** PSM-SOP-UN-017 **Issued:** 02/11/2015 |
| **Responsible Dept.:** EHS **Version:** New**Approved By:** PSM Focus Group **Page:** 1 of 7 |

**1.0 Purpose:** This document outlines The Pennsylvania State University (Penn State) requirements relating to the Process Safety Information Element within the Process Safety Management (PSM) Program. This procedure defines the required written information concerning process chemical/biological agents, process technology, and process equipment associated with a covered process area and to ensure it is available to affected individuals.

**2.0 Scope:** This element covers the critical information associated with the covered process area within the PSM program. This data is known as the Process Safety Information (PSI) and includes three (3) primary areas; hazards (health and physical) of the chemical / biological agent, technology of the process, and equipment used in the process. This procedures outlines the mechanisms to develop, maintain and update process safety related documentation and information.

**3.0 Responsibility:** The following employees have specific responsibilities assigned to them in accordance with the requirements of the PSI element within the PSM Program. 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. Assume 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 their respective academic or administrative unit to ensure compliance with this procedure.
3. Ensure appropriate mechanisms and resources exist to collect and maintain PSI data.

Director Design & Construction:

1. Ensure employees within their area(s) of responsibility are aware and understand the requirements outlined in this procedure.
2. Ensure appropriate mechanisms and resources exist to collect and maintain PSI data.

Manager Engineering Services:

1. Ensure employees within their area(s) of responsibility are aware and understand the requirements outlined in this procedure.
2. Ensure appropriate mechanisms and resources exist to collect and maintain PSI data.

Building Operations / Utility Engineers:

1. Coordinate identification, collection and maintenance of documentation required within this procedure.
2. Collect and update PSI documentation as required.

Physical Plant Supervisors:

1. Ensure employees within their area(s) of responsibility are aware and understand the requirements outlined in this procedure.
2. Provide appropriate resources to collect and update PSI documentation.
3. Ensure PSI documentation is available to affected employees.
4. Take prompt corrective action when unsafe process safety conditions or practices are observed or reported.

Operations/Facility Manager:

1. Ensure employees within their area(s) of responsibility are aware and understand the requirements outlined in this procedure.
2. Provide appropriate resources to collect and update PSI documentation.
3. Ensure PSI documentation is available to affected employees.
4. Take prompt corrective action when unsafe process safety conditions or practices are observed or reported.

Safety Officer:

1. Coordinate implementation of the PSI element requirements within the work unit.
2. Ensure PSI documentation is available to affected employees
3. Take prompt corrective action when unsafe process safety conditions or practices are observed or reported.

Process Safety Program Manager – EHS Department:

1. Oversee all aspects of the University’s PSI element.
2. Maintain PSI documentation collected by various individual(s) and/or departments within the Process Safety Master File.
3. Coordinate auditing compliance to the PSI element requirements.

Employees:

1. Assist with the identification, collection and maintenance of documentation required within this procedure.
2. Adhere to the requirements outlined within this procedure.
3. Report Process Safety issues or concerns to appropriate line management and/or the Process Safety Program Manager.

**4.0 Definitions:**

*Block Flow Diagram –* diagram used to show the major process equipment and interconnecting process flow lines and show flow rates, stream composition, temperatures, and pressures when necessary for clarity.

*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.

*Operations/Facility Manager* – a person who has control / oversight of building use, stewardship, operation, repair, and general administration of campus facilities. Also includes the operational responsibility of a specific unit operation within a facility.

*Physical Plant Supervisors* – group of individuals in first-line management who monitors and regulates employees in their performance of assigned or delegated tasks (e.g. trains, evaluates, hires, and discipline employees; approves time & attendance; administers the University / Teamster contract, manages absences; plans & rotates overtime work, etc.).

*Piping & Instrumentation Diagram (P&ID) -* is to be generated for each stage of a covered process. It should reflect the as-built equipment setup, instrumentation & controls, safety systems and interlocks included in a covered process. A P&ID is the one document that when properly completed shows the most information pertaining to the technology of the covered process. It is generally considered to be the single most vital document that must be used when performing a Process Hazard Analysis (PHA).

*Process Safety Information –* data associated withthe chemical/biological agent, the process technology and the equipment within the covered process area that is necessary for affected individuals to operate the process safely, reliably and efficiently.

*Process Safety Master File* – The location where information on a covered process regarding chemical/biological, technology and equipment is located or describes where the specific information is located.

*RAGAGEP* – Recognized and Generally Accepted Good Engineering Practices (RAGEGEP), typically the specific design codes, standards or guidelines established for the covered process.

**5.0 Procedure:** It is essential for a well-managed PSM program to have a robust system for maintaining process safety related documentation and information that affected individuals can easily retrieve and understand. The data within the PSI element is generated throughout the life cycle of a covered process. Employees responsible for this information must understand that it must be continuously maintained with up-to-date information in order to preserve the safety of the process. Fundamentally, PSI is what affected individuals need to know about the chemical/biological agent, the process and the equipment within the covered process to operate the process safely, reliably and efficiently.

The following steps outline the requirements for managing PSI documentation and information:

1. PSI represents the data that employees need to know about the chemical/biological agent, the process and the equipment within the covered process area to operate the process safely, reliably and efficiently. This information is a required resource for various individuals to meet their obligations within other elements of the PSM program.
2. The PSI requirements can be segregated into three (3) primary areas; hazards (health and physical) of the chemical / biological agent, technology of the process, and equipment used in the process. This information should be maintained within a Process Safety Master File for the specific covered process area.

Although use of a Process Safety Master File is the requirement, it is recognized that documentation associated with a covered process may be maintained within the University at various locations and in different platforms. As such, a note identifying those locations shall be included in the applicable Process Safety Master File.

1. Depending on the type of covered process area designated within the University’s PSM program, the following data represents the minimum required within this element:
	1. Chemical/Biological Agents
		1. Toxicity Information\Biosafety Level
		2. Permissible Exposure Limits
		3. Physical Data
		4. Reactivity Data
		5. Corrosivity Data
		6. Thermal and Chemical Stability Data
		7. Hazardous effects of inadvertently mixing different materials (used within the covered process) that could foreseeably occur
	2. Technology
		1. Block Flow Diagram or simplified Process Diagram
		2. Process Chemistry
		3. Maximum Intended Inventory
		4. Safe Upper and Lower Operating Limits (e.g. temperature, pressure, flows, compositions, etc.) and includes an evaluation of the consequences of deviation
	3. Equipment
		1. Materials of construction
		2. Piping and Instrumentation Diagrams (P&IDs)
		3. Electrical Classification
		4. Relief System Design and Design Basis
		5. Ventilation System Design
		6. Design Codes and Standards Employed
		7. Material and Energy Balances
		8. Safety Systems

The information compiled about the hazards of the chemicals / biological agents used in a process must be comprehensive enough for an accurate assessment of the fire and explosion characteristics, reactivity hazard potential, worker health and safety hazards, and the corrosion and erosion effects on the process equipment and monitoring tools.

Information provided on a Safety Data Sheet (SDS) is typically sufficient to satisfy the data requirements outlined in 5.3.3.1 above. Where an SDS does not contain adequate information, other resources must be referenced.

1. The data included within this element will be managed and available to affected employees and individuals with certain process safety responsibilities. At a minimum this will include the following individuals and associated activities:
	1. Process Hazard Analysis team to conduct their assessment
	2. Development of standard operating procedures
	3. Development of PSM training programs
	4. Management of Change review team to conduct their assessment
	5. Pre-Startup Safety Review team to conduct their assessment
	6. Employees and contractors working on or around the covered process area
	7. Emergency Response planners and responders
2. Once a new facility / process has been approved to proceed and has been identified as covered within the PSM Program, the Director of the Design and Construction group will ensure the Process Safety Program Manager (PSPM) is notified of the associated design and construction schedule for the project. The PSPM will work with the Project Manager, Operations / Facility Manager, and Engineering Services personnel to identify and collect the required PSI data.
3. For existing operations the PSPM is part of the review and evaluation team to assess applicability of the PSM Program to the specific process in question. After the decision to include an existing operation in the PSM Program, the PSPM will work with the Engineering Services personnel, Operations / Facility Manager, Supervisor Area Services, Safety Officer and equipment operators to identify and collect the required PSI data.
4. To facilitate data collection and maintenance of the appropriate information required within this element, a Process Safety Master File Tracking Worksheet has been developed (see Attachment A). The PSPM is responsible to generate the Process Safety Master File Tracking Worksheet template for new processes covered within the PSM program. Individuals collecting the data or modifying PSI data shall ensure the Process Safety Master File Tracking Worksheet is maintained accordingly. A copy of this Worksheet will be maintained within the Process Safety Master File for the specific unit operation.
5. Process Chemistry data requirements outlined in the Technology section (5.3.3.2) for a covered process should where applicable include:

8.1 The chemical name of the raw materials and their required charge amounts and / or feed flow rates

8.2 The chemical equations that describe the reactions

8.3 The chemical name of any generated intermediates, the final product, any utilities (e.g. glycol, hot oil, scrubber solution, etc.) used in the process and any generated waste streams

8.4 Description of how the utilities (e.g. heating rate, cooling rate, consumption rate, addition rate, catalyst amount, etc.) support the chemistry of the process

 Note: Certain covered process areas identified by the University may not include chemical reactions as part of the process. A description of the process and a statement that chemical reactions are not part of the designed process should be placed in the Process Safety Master File.

1. Safe Upper and Lower Operating Limits noted in the Technology section (5.3.2) should be in the form of desired ranges (e.g. pressure, temperature, flow rates, etc.), if applicable, for most process parameters. This allows the operation to progress within established safe limits and the equipment operator to make acceptable field adjustments to compensate for the day-to-day variations that can occur to a specific covered process. Deviation from the upper and lower operating limits will require a Management of Change review, excluding circumstances covering short durations (e.g. startup of equipment requiring time to normalize, etc.).
2. An Equipment Master File is to be maintained on each piece of process equipment that is, or can impact the covered process. The equipment requirements are described in detail within the Mechanical Integrity Element. For additional information relating to the equipment data requirements please reference PSM-UN-SOP-016, “*Mechanical Integrity Procedure*”.

The Equipment Master File can be maintained or a defined portion contained within the Process Safety Master File. At a minimum, the Process Safety Master File will contain a copy of the Equipment Master File Worksheet as reference.

1. Piping & Instrumentation Diagrams (P&ID) noted in the Equipment section (5.3.3.3) are to be generated for each covered process. It should reflect the as-built equipment setup, instrumentation & controls, safety systems and interlocks included in a covered process. A P&ID is the one document that when properly completed shows the most information pertaining to the technology of the covered process. It is generally considered to be the single most vital document that must be used when performing a Process Hazard Analysis (PHA). Therefore, it is critical that a P&ID contains all of the processing information relevant to the operation of the process. Likewise, it is also critical that a P&ID is continuously updated to reflect relevant modifications.
2. If the covered process includes relief devices, proper documentation of the design basis for the relief devices along with calculated energy balances for reaction phases of a process are required to be maintained as part of the PSI data.
3. Additional information can be considered part of the covered process PSI data. Typical data would be included to provide useful information to those individuals who are working on the system, performing safety assessments or responding to incidents. The following represents examples of additional data that could be included within the Process Safety Master File:

13.1 Installation, Operation & Maintenance (IOM’s) Manuals for specific pieces of equipment

13.2 Equipment Cut Sheets providing details on the internal workings of specific devices (e.g. valves, pressure regulators, etc.)

13.3 Electric schematics and control logic diagrams

13.4 Vessel diagrams

The determination to include additional information within the PSI element can be identified by the equipment operators, Engineering Services, Operations / Facility personnel, EHS or other Physical Plant Supervisors as appropriate. Additional data identified will be included within the Process Safety Master File Tracking Worksheet and maintained according to the requirements outlined within this procedure.

1. The Process Safety Master File for each covered process will outline who is responsible for maintaining and updating the PSI data referenced above. This will include a periodic review to ensure it reflects the latest information available. The PSPM is responsible for collecting the appropriate information from the responsible individuals and maintaining the Process Safety Master Files.
2. The PSPM will periodically evaluate adherence to the requirements outlined within this element for the various covered process areas.

**6.0 Attachments**

* 1. Attachment A – Process Safety Master File Worksheet