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Process Safety Management and Risk Management

Purpose and Extent

The Process Safety Management Plan and Risk Management Plan (PSM/RMP) are designed to minimize the potential for a catastrophic release of highly hazardous chemicals (toxic, reactive, flammable, or explosive chemicals).

PSM/RMP covers an assortment of chemical processes based upon the total weight of the chemical stored on site. Escanaba Mill has four covered systems.

1. Kraft Mill Chlorine Dioxide System (including Methanol)
2. Water Treatment Anhydrous Ammonia System
3. Water Treatment Chlorine Systems (Bay Station, Sanitary Plant, & Water Plant)
4. Turpentine Recovery System

The Escanaba Mill has developed and implemented a written PSM/RMP Program that incorporates all the required elements of MIOSHA Part 91 Process Safety Management and EPA 40CFR68, Risk Management Plan.

A. Program Implementation Plan

Implementation of process safety management practices will result in minimizing the potential for release of highly hazardous chemicals, thereby protecting personnel, the community and the environment. While this policy outlines general expectations and requirements for PSM/RMP, it is not all-inclusive of requirements or practices at the Escanaba Mill.

B. Employee Participation

A written plan describing the methods of involving employees in the conduct and development of process hazard analyses (PHA's) as well as each of the other elements of the PSM Program has been developed and is located in DMS

C. Process Safety Information

Process safety information shall be compiled prior to conducting any process hazard analyses for processes covered by this policy. The information shall include at least the following: a) hazards of the chemicals used or produced by the process, b) information pertaining to the technology of the process, and c) information pertaining to the equipment in the process.

Information pertaining to the hazardous chemicals used or produced in the process shall consist of at least the following:

- a. Toxicity information
- b. Permissible exposure limits
- c. Physical data
- d. Reactivity and corrosivity data

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- e. Thermal and chemical stability data
- f. Safety data sheet (SDS) for each hazardous chemical used or produced in the process

Information pertaining to the technology of the process shall consist of at least:

- a. A block flow diagram or simplified process diagram
- b. Process chemistry
- c. Maximum intended inventory
- d. Safe upper and lower limits for temperature, pressures, flows, or compositions, and
- e. An evaluation of the consequences of deviations from the upper and lower safe limits

Information pertaining to the equipment in the process shall include:

- a. Materials of construction
- b. Piping and instrument diagrams (P&IDs)
- c. Electrical classification
- d. Pressure relief design and design basis
- e. Ventilation system design
- f. Design codes and standards employed
- g. Material and energy balances for processes built after May 26, 1992, and
- h. Safety systems (interlocks, detection, or suppression systems)

The Escanaba Mill documents that equipment in each covered process complies with recognized and generally accepted good engineering practices. For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the Escanaba Mill shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

D. Process Hazard Analysis

Process hazard analyses have been performed on all processes covered by this policy. A written risk analysis report has been prepared that describes the decision logic used to determine and document the priority order for conducting the PHA's. The following criteria was used in developing the decision logic:

- a. Extent of process hazards
- b. Number of potentially affected employees
- c. Age of the process
- d. Operating history of the process

The process hazard analysis shall address:

- a. The hazards of the process.
- b. The identification of any previous incident which had a potential for catastrophic consequences in the workplace.
- c. Engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of release
- d. Consequences of failure of engineering and administrative controls.
- e. Facility siting.

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- f. Human factors, and
- g. A qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the workplace.

PHA's shall be conducted by a team having the following expertise & knowledge:

- a. Expertise in engineering and process operations,
- b. At least one employee who has experience and knowledge specific to the process being evaluated,
- c. At least one member shall be knowledgeable in the specific PHA methodology being used, and
- d. At least one member knowledgeable of the maintenance procedures used in the process being analyzed.

Procedures shall be established for responding to findings and recommendations from the PHA, including:

- a. Documentation of what actions are to be taken.
- b. A written schedule of when these actions are to be completed.
- c. Identify who is responsible for ensuring the corrective action is taken.
- d. Communicate the actions to operating, maintenance, and other employees affected by the actions. This communication shall be documented.
- e. Document when the corrective action has been completed.
- f. Provisions for retaining all documented resolutions of all recommendations.

PHA's shall be updated and revalidated at least every five (5) years by a qualified team meeting the statutory requirements.

All PHA's and updated/revalidated PHA's for each covered process, as well as the documented resolution of all recommendations shall be retained for the life of the process.

E. Operating Procedures

Written standard operating procedures shall be developed for each covered process that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information. Operating procedures shall address at least the following elements:

- a. Steps For Each Operating Phase:
 - i. Initial startup
 - ii. Normal operations
 - iii. Temporary operations
 - iv. Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.
 - v. Emergency operations
 - vi. Normal shutdown, and
 - vii. Startup following a turnaround, or after an emergency shutdown.
- b. Operating Limits
 - i. Consequences of deviation, and

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- ii. Steps required to correct or avoid the deviation
- c. Safety and Health Considerations
 - i. Properties of, and hazards presented by the chemicals used in the process
 - ii. Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment
 - iii. Control measures to be taken if physical contact or airborne exposure occurs
 - iv. Quality control for raw materials and control of hazardous chemical inventory levels
 - v. Any special or unique hazards
- d. Safety Systems and Their Functions

Operating procedures shall be readily accessible to employees who work in or maintain a covered process. In addition, the operating procedures shall be reviewed & certified that the procedures are up-to-date on an annual basis, or more often if necessary, to ensure they reflect current operating practice, including changes that result from changes in process chemicals, technology, equipment, and changes to facilities.

When changes in operating procedures occur as a result of changes in process chemicals, technology, and/or equipment, a management of change form shall be retained on file for the life of the process.

Safe Work practices shall be established for the control of process hazards during operations, including, but not limited to: Lockout/Tagout, Confined Space Entry, Line Breaking, Hot Work, and Controlling access to covered process areas by unauthorized employees including contractor employees.

F. Employee Training

Initial Training

- a. Each employee presently involved in operating a covered process, and each employee before being involved in generating a newly assigned process shall be trained in those elements outlined below, as well as, the Operating Procedures as specified in Section E of this policy.

Refresher Training

- a. Refresher training shall be conducted at least every three- (3) years or more often as necessary to each employee involved in operating a covered process.
- b. The frequency of refresher training shall be determined with input from operators of covered processes. The method used to make this determination and its results shall be documented.

Training Content

- a. All operators of covered processes shall be trained in:
 - i. An overview of the covered process
 - ii. The established operating procedures for the covered process(es), as defined by Section E of this policy
 - iii. The safety and health hazards of the covered process

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- iv. The emergency operations, including shutdown of the covered process, and
- v. The safe work practices applicable to the employee's job tasks

Training Documentation

- a. Training records shall be maintained to document training.
Training records shall include:
 - i. Identity of employee
 - ii. Date of training
 - iii. Means used to verify that the employee understood the training

Responsibility

- a. Operating departments are responsible for ensuring that operators are properly qualified and certified to operate covered processes prior to assignment.
- b. Operating departments are responsible for periodic updating of their certification standards to ensure they reflect current operating conditions and department expectations. They are also responsible for maintaining documentation regarding the training of their personnel.
- c. Operating departments are responsible for development, scheduling and completion of required refresher training.
- d. The PSM Coordinator is responsible for periodic review of the certification standards to ensure that Process Safety requirements are properly incorporated.
- e. The Training Department, within Human resources, in conjunction with the operating departments, are responsible for overall management of the certification process.
- f. The Training Department, within Human Resources is responsible for overall direction of the mill certification and refresher training programs.

G. Contractors

Contractors covered by this policy include those performing work (e.g. maintenance, repair, turnaround, major renovation, or specialty work) on or adjacent to covered processes. When contractors perform work on or adjacent to covered processes, The Escanaba Mill shall:

- a. Evaluate contractor safety performance and programs during the selection process.
- b. Inform contractor representatives of known and work-related hazards related to contractors' work.
- c. Explain applicable elements of the Emergency Preparedness and Response Plan to contractor representatives.
- d. Implement procedures to control the entrance, presence, and exit of contractor employees in covered process areas.
- e. Periodically evaluate the performance of contractors in fulfilling their obligation to comply with this policy as well as all the safety policies of the Escanaba Mill.

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- f. Maintain contractor injury and illness logs related to the contractor's work in the covered process areas.

Contractors performing on or adjacent to covered processes shall:

- a. Assure that each employee is trained in the work practices necessary to perform the job.
- b. Assure that each contractor employee is instructed in the known potential fire, explosion, or toxic release hazards related to the work and the process and the applicable provisions of the Emergency Preparedness and Response Plan.
- c. Document that each contractor employee has received and understood the training. The contractor shall maintain a record which contains:
 - i. Name of the contract employee
 - ii. Date of training
 - iii. Means used to verify that the employee understood the training
- d. Assure that each contractor employee follows the safety rules and safe work practices established at the Escanaba Mill facility.
- e. Inform the Escanaba Mill of any unique hazards presented by the contractor's work, or any hazards identified by the contractor.

H. Pre-Startup Safety Review (PSSR)

A pre-startup safety review shall be completed for all new facilities and for modified facilities when the modification results in changes to the process safety information.

The PSSR shall confirm, that prior to introducing HHCs to the process:

- a. Construction and equipment meet design specifications
- b. Safety, operating, maintenance, and emergency procedures are in place and adequate
- c. Training of each employee involved in operating the process is complete
- d. A PHA has been performed (for new facilities) and the recommendations have been resolved or implemented before startup; and modified facilities meet the requirements in Section K Management of Change, of this policy.
- e. The PSM, Pre-Startup Safety Review Checklist shall be used to accomplish and pre-startup safety reviews.

Responsibility

- a. Mill operating departments are responsible for ensuring that no new process or significantly modified process is started prior to completion of a pre-startup safety review.
- b. Project Managers, the operating department and the PSM Coordinator are jointly responsible for ensuring pre-startup safety reviews are completed.
- c. Support departments are responsible for providing necessary information and support to the process startup team to ensure timely resolution of outstanding issues.
- d. The Operating Department is responsible for making the project team aware of the requirements of the pre-startup review at the earliest opportunity in the project.

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- e. The Operating Department is responsible for identifying the proper documentation that will be needed for file as proof of pre-startup safety review activities when a MOC is proposed, and for the proper filling of those documents.

I. Mechanical Integrity

The employer shall establish and implement written procedures to ensure the ongoing integrity of process equipment, including:

- a. Pressure vessels and storage tanks
- b. Piping systems (including piping components such as valves)
- c. Relief and vent systems and devices
- d. Emergency shutdown systems
- e. Controls (including monitoring devices and sensors, alarms, and interlocks)
- f. Pumps

Employees involved in maintaining the ongoing integrity of process equipment shall be trained to ensure they can perform their jobs in a safe manner. Training shall include:

- a. An overview of the process
- b. The hazards of the process
- c. The procedures applicable to the employee's job

The performance of inspections and tests on process equipment shall follow recognized and generally accepted good engineering practices, as outlined below:

- a. Frequency of inspections and tests of process equipment shall be consistent with:
 - i. Manufacturer's recommendations
 - ii. Good engineering practices
 - iii. Operating experience, which may dictate that frequencies be increased
- b. Document each inspection and test performed on process equipment and identify the following:
 - i. Date of the inspection or test
 - ii. Name of the person who performed the inspection or test
 - iii. Serial number or other identifier of the equipment tested or inspected
 - iv. Description of the inspection or test performed
 - v. Results of the inspection or test

Correct all equipment deficiencies that are outside acceptable limits (defined by the process safety information) before further use, or in a safe and timely manner when other means are taken to ensure safe operation.

Quality Assurance

To ensure the quality assurance in the fabrication, installation, and maintenance, the following procedures shall be established and implemented:

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- a. In the construction of new plants and equipment, ensure that fabricated equipment is suitable for the process application.
- b. Appropriate checks and inspections are performed to ensure that equipment is installed properly and is consistent with design specifications and manufacturer's instructions.
- c. Maintenance materials, spare parts, and equipment are suitable for the process application for which they will be used.

J. Hot Work Permit

All Hot Work conducted on or adjacent to covered processes shall be conducted in accordance with the Escanaba Mill Hot Work Policy.

K. Management of Change

The Escanaba Mill shall develop written procedures to manage changes (except for replacement in kind) to process chemicals, technology, equipment, procedures, and facilities.

The management of change procedures shall ensure that the following issues are addressed prior to any change:

- a. Technical basis for the change
- b. Safety and health impacts
- c. Changes to operating procedures
- d. Time period for change and
- e. Authorization requirements for the proposed change

Inform and train operations and maintenance employees and contractors whose job tasks will be affected by the change prior to the startup of the process or affected part of the process. If the change results in a change in the process safety information, PSI shall be updated accordingly.

If the change results in a change in the operating procedures or practices, such operating procedures or practices shall be updated accordingly.

L. Incident Investigation

For any incident investigations at the Escanaba Mill refer to the Immediate Reporting of Incidents and Injuries Policy for direction. The investigation shall be conducted by a team composed of at least one person knowledgeable in the covered process involved as well as a contract employee if the incident involved work of the contractor. Other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident may be included on the team. At least one member of the investigation team shall be trained and knowledgeable in the techniques of proper incident investigation.

Incident investigation reports shall be retained for five (5) years or until the PHA is revalidated for the affected covered process.

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RESPONSIBILITY

- a. Operations, maintenance, or any other department that is aware of a situation on a covered process which may require an incident investigation is to notify the PSM Coordinator as soon as possible.
- b. Area Supervision and operating department are jointly responsible for determining when an incident investigation should be conducted. If the incident involves personnel from other departments (such as maintenance), they will be involved in the decision-making process, as applicable.
- c. The PSM Coordinator is responsible for leading incident investigation teams unless another member has been designated.
- d. Members or contractors who are involved in the incident have an obligation to assist with the investigation process as part of employee participation requirements.
- e. Operations or maintenance should assign a member knowledgeable in the process to the investigation team.
- f. Maintenance is responsible for assigning member(s) to the investigation team if it is determined that the incident involved an equipment failure or may have been affected by maintenance activities.
- g. Support departments (i.e. Engineering, Process Control, Materials, health and safety, etc.) are responsible for providing timely assistance to the investigation process, when required.
- h. The PSM Coordinator is responsible for tracking the progress of recommendation resolution. Recommendations resulting from investigations are to be thoroughly reviewed and acted on to the extent practical, in a timely manner. Assigned personnel are expected to communicate the status of recommendations to the PSM Coordinator.
- i. Departments affected by the incident are responsible for communicating the investigation findings to affected personnel within their department. Communication to contractors will be handled by the Health and Safety and Purchasing or Maintenance departments.

M. Emergency Planning and Response

The Escanaba Mill has implemented an Emergency Preparedness and Response Plan in accordance with the Escanaba Mill Operation's Comprehensive Emergency Preparedness and Response Policy.

N. Compliance Audits

Covered process(es) shall certified, at least every three (3) years, that PSM compliance has been evaluated and that procedures and practices implementing the PSM standard are adequate and are being followed. The compliance audit shall be conducted by at least one person knowledgeable in the process and others from various engineering disciplines, as needed.

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A written report of the findings and recommendations of the compliance audit shall be developed.

A prompt response to the findings shall consist of:

- a. An appropriate documented response to each of the findings of the audit, and
- b. A document indicating that deficiencies have been corrected.

Copies of the two most recent compliance audit reports shall be retained on file.

O. Trade Secrets

Regardless of trade secret status, the necessary information shall be made available to those persons responsible for compiling PSI, developing PHAs, developing operating procedures, incident investigation, emergency planning and response, and compliance audits.

P. Off-Site Consequence Analysis

Off-Site Consequence Analyses will be performed as required by the RMP standard and updated as necessary or at least every five years. At a minimum a worst-case scenario and one alternative scenario will be developed for each PSM/RMP chemical on-site.

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