GLOBAL REACTIVE CHEMICALS STANDARD

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Until superseded. Audit all documents annually.

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Scope

This standard defines the requirements and responsibilities for reactive chemicals management processes at all facilities, operations and businesses of The Dow Chemical Company, and to those facilities, operations and businesses of its subsidiaries and joint ventures over which Dow has management or shareholder control. The purpose of this standard is to define the minimum requirements necessary to prevent injury, loss or environmental damage from uncontrolled chemical reactions. It is expected that these requirements will be applied in such a way as to create "competitive value" for Dow.

Definitions

Engineering Application – The engineering application of the reactive chemicals data that defines design parameters or operating conditions necessary to prevent reactive chemicals accidents.

Operation – The facility where the actual work is being done to manufacture, distribute, research or test chemicals.

Owner – A person who has defined responsibility for a proposal, a function, a work process, specific data or an idea. Use of the term "owner" needs to also clearly identify what is "owned" and what is the responsibility of that "ownership."

Reactive Chemicals Accident – An uncontrolled or unexpected chemical reaction that results in injury, property loss or environmental release.

> (The distinction between *Accident* and *Incident* is important. Goals should be focused on the prevention of *Accidents,* and every effort should be focused on maximizing the reporting of *Incidents* and *Accidents* for improving awareness and learning. The premise here is that by vigorously working on the near miss *Incidents* we will be preventing *Accidents.* All reactive chemicals incidents, learning experiences and accidents will be reported so that the learning and awareness may be leveraged across the entire company.)

Reactive Chemicals Audit – The determination of the basic compliance of the owner with the requirements outlined in this standard.

Reactive Chemicals Incident – An uncontrolled or unexpected chemical reaction that has the potential for injury, property loss or environmental release. (A reactive chemicals "Learning Experience" is a type of incident where the potential for an uncontrolled chemical reaction may be quite remote.)

Reactive Chemicals Review – The consulting process that is focused on providing a reactive chemicals hazard assessment and recommendations for improvement.

Reactive Chemicals Testing – The fundamental testing done by analytical laboratories to evaluate the compatibility and reactivity of chemicals in a variety of processing and handling conditions.

Responsibilities

The Owner has primary responsibility to ensure that the reactive chemicals risks are identified, and that controls and operating discipline are in place with formalized and documented periodic review. This is to be implemented in such a way as to assure the prevention of reactive chemicals accidents.

The Owner shall ensure that:

1. All personnel have a fundamental understanding of the reactivity of all the chemicals in the operation. This understanding shall be in place at a level necessary to prevent reactive chemicals accidents. Operating discipline and training are keys to achieving this desired result.
2. Every reactive chemicals incident or accident is appropriately investigated and reported. The root causes shall be determined for all accidents and the learning broadly communicated, documented and included in the operating discipline so as to prevent future accidents. This includes investigating and communicating the leveragable learning from all "near miss" or "learning experience" incidents.
3. All necessary reactive chemicals testing and engineering analysis have been completed and appropriately included in the operating discipline.
4. All reactive chemicals reviews, audits and recommendations are promptly completed, communicated, responded to and documented.
5. All changes as defined by the *Guidelines for Management of Change* are appropriately evaluated for reactive chemicals potential.

Audit/Review Requirements

Formalized and documented processes shall be established and used for every site and technology that evaluates:

1. Compliance of the operation with this standard as well as compliance with the *Management of Change Guideline* as it relates to reactive chemicals.
2. Retention of basic technology and learning necessary to prevent reactive chemicals accidents.
3. Level of understanding in place with key operations personnel necessary to prevent reactive chemicals accidents.

The minimum audit/review level necessary to accomplish this is:

1. **A review by a new Plant Manufacturing Leader or Process Owner within 90 days of assuming the job.** The review shall cover their basic understanding of the reactive chemicals/process hazard potential associated with the operation. Any management of change issues that potentially involve reactive chemicals occurring prior to completion of this review must also be approved by a designated process knowledgeable contact. In certain situations there may be a question over who in the facility should actually have the New Process Owner Reactive Chemicals Review. In general, it should be that person that has authority for approving the highest level of Management of Change for the facility.
2. **A reactive chemicals/process hazard analysis (PHA) to be completed every three years.** Special consideration may be given to facilities that have lower levels of process risk and which have demonstrated superior safety performance to extend this frequency up to five years. Facilities that pose higher process risk or who have lower safety performance may be recommended to have reactive chemicals/PHA reviews more frequent than every three years. In certain countries, government regulation will determine the frequency and other requirements for Process Hazard Analysis reviews. Dow will follow the government requirements where they are more stringent.
3. **A project review** process that is consistent with both the Dow Management of Change process and the Dow Global Project Methodology process.
4. **Laboratory operations** will have a written policy defining how three-year reviews and "New Supervisor Reviews" will be conducted.

Training Requirements

All operations personnel will be trained on the reactive chemicals potential for the chemicals they work with and to recognize the events that could lead to reactive chemicals incidents.

All operations management will be trained on the content and intent of this standard.

Resources/References

1. *Guidelines for a Reactive Chemicals Program,* The Dow Chemical Company, Midland, MI, June 1997 (Electronic).
2. REACHEM reactive chemicals database
3. CRI (Central Report Index) on CAMPS database
4. *Guidelines for Management of Change,* The Dow Chemical Company, Midland, MI, February 1992.
5. *Process Risk Management Guidelines for Facilities and Distribution,* The Dow Chemical Company, Midland, MI, January 1994.
6. *Guidelines for Root Cause Incident Investigation,* The Dow Chemical Company, Midland, MI, February 1993.
7. *Reactive Chemicals News* and *Summary Report of Reactive Chemicals Incidents*
8. *Environment, Health and Safety Requirements,* The Dow Chemical Company, Midland, MI, May 1995.
9. *Functional Input and Evaluation Process for New Projects,* The Dow Chemical Company, Freeport, TX, April 1997 (Electronic).
10. Site and Area Reactive Chemicals Implementation manuals. Example: *Hazard Evaluation Procedure Manual* developed by Texas Operations.