

# COMPATABILITY OF CHEMICALS AND THE INTEGRATED SAFETY MANAGEMENT SYSTEM

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## **Abstract**

The safe and effective management of chemicals remains an issue within the Department of Energy (DOE) complex. This paper will describe programmatic enhancements to the ISM guide and other support documents designed to ensure that chemical hazards are adequately addressed from conception through completion or shutdown of a facility or operation.

In response to the increasing number of chemical related occurrences the Department has formed the Chemical Safety Interest Group (CSTS) that is comprised of both DOE and contractor managers that are accountable for the safe management of chemicals. The CSTS is currently working the issue of ensuring that chemical hazards are being effectively incorporated into the Integrated Safety Management (ISM) System. It is clear that the ISM System should effectively evaluate chemical hazards with the same level of rigor as any other hazards (radiological) or facility type (nuclear, non-nuclear and industrial) without adding additional orders, rules or requirements. The successful integration of chemicals into the analysis of hazards is imperative as the DOE complex strives to reduce the number of chemical related occurrences.

## **Introduction**

Chemicals are everywhere in DOE and they are associated with all manners of nuclear and non-nuclear facilities and operations. In spite of numerous efforts over the years to address the hazards associated with the use, handling, storage, and disposition of chemicals (e.g. the DOE 1994 Chemical Vulnerability Study), undesirable occurrences resulting from the presence of chemicals have continued to occur. DOE has traditionally focused significant attention on identifying and controlling the nuclear hazards associated with its operations. In particular this may be because the public has demonstrated more concern for nuclear hazards than for hazards such as those associated with chemicals. Similar attention, both from management and from the professionals whose responsibility it is to address safety and health hazards and environmental impacts, must be focused on chemical hazards in both nuclear and non-nuclear environments if the desirable level of protection is to be achieved. Increased attention on chemicals is especially important as the DOE sites move more into decommissioning and cleanup of facilities where varying quantities and mixtures of chemicals in containers and apparatus of varying degrees of deterioration are handled.

In light of the need to address the hazards associated with the presence of chemicals, the Chemical Safety Topical Committee (CSTC), established by DOE, partnered with the Energy Facility Contractors Group (EFCOG) to pursue safety and health issues related to chemicals. In December of 1999 in Washington, D.C. DOE and EFCOG presented the Chemical Safety '99 Workshop for DOE and contractor managers. The focus of the Workshop was to explore ideas and methodologies to more effectively incorporate chemical safety as a part of Integrated Safety Management (ISM). Much of the discussion at the Workshop dealt with whether or not additional and/or more enforceable drivers were needed to increase the attention that DOE pays to the hazards associated with chemicals. One conclusion of the Workshop attendees was that a very important driver is the Integrated Safety Management System (ISMS). Whether or not there exists a requirement in some law or DOE Order to address the hazards associated with chemicals, an effective ISMS should cause those hazards to be identified, evaluated, and appropriately controlled. Chemicals should be treated just like any other commodity, process, or piece of equipment through the ISMS. A decision was made to identify some actions that would enable the ISMS to more effectively focus on chemical hazards and a Team was established for that purpose. The rest of this paper describes the actions accomplished by the Team.

### Discussion of Actions Completed

A Team of individuals representing the DOE-HQ and the sites agreed to work together under the auspices of the EFCOG CSTC. Their purpose was to review the ISMS to identify improvements that could be made to enhance the effectiveness of the ISMS in addressing the hazards associated with the presence of chemicals. This task was accomplished in three separate work packages:

1. Review ISMS implementing guidelines to determine enhancements that would improve the evaluation of chemical hazards.
2. Develop Lines of Inquiry (LOI's) for use by people tasked with reviewing the adequacy of chemical management programs.
3. Identify Performance measures (PM's) which could be used to evaluate the quality of chemical management programs.

### ISMS guidelines

DOE G 450.4-1A, Integrated Safety Management System Guide, Volumes 1 and 2, dated May 27, 1999, were reviewed for opportunities to improve any discussion in the Guide relative to the hazards associated with chemical management. This review also included draft Chapter IV, dated 09/20/99. The Guide, as written, leaves no doubt that chemical work and the hazards associated with that work are included in ISM. However, a few opportunities were identified by the Team to add some statements that will appropriately enhance the association between chemical hazards and ISM. For example, explicit mention of chemical safety in an otherwise generic list provides greater visibility to chemical issues. In addition, the draft Chemical Management Handbook was suggested as a reference, as was the use of documents published by the Chemical Manufacturers Association.

Another ISMS document which provided opportunities to increase the visibility of chemical hazards was DOE-HDBK-3027-99, Integrated Safety Management System Verification, Team Leader's Handbook, dated June 1999. Changes were proposed to the discussion sections, and to the Criteria and Review Approach Documents (CRADs). In a number of places it was suggested that chemical hazards expertise be called out as well as other safety and health disciplines. Improvements were proposed to sections discussing authorization basis documents. Recognizing that chemical hazards may not be addressed in documents designed primarily to deal with nuclear hazards, it was suggested that "other documents that address the protection of workers, the public and the environment from facility hazards" also be called out for consideration.

The proposed changes to the ISMS guidelines have been provided to the Director of the Safety Management Implementation Team for incorporation into the appropriate documents. ISMS applies to all work processes, activities, and associated equipment and commodities. It is believed that the suggested changes will bring a greater focus on chemical management and the associated hazards during the implementation and validation of ISMS. The proposed changes have the double advantage of increasing the attention given to chemical hazards by the responsible organization, as well as causing oversight/validation activities to focus on chemical hazards.

### Lines of Inquiry

The Team recognized that bringing about a greater focus on chemical hazards through changes to ISMS was only a partial answer. Management and oversight organizations need tools to enable them to determine the quality of a chemical management program, the effectiveness of its implementation, and its ability to address associated chemical hazards. Hence a collection of lines of inquiry (LOI's) were assembled that could be used by subject matter experts and others responsible for evaluating a chemical management program. The LOI's are grouped according to the general criteria for an Subject Matter Expert evaluation recommended in the ISMS Team Leader's Handbook. The overall objective of the LOI's is stated below, as well as the criteria.

Objective: Within the Chemical Management area, the planning of work includes an integrated identification and analysis of hazards and development and specification of necessary controls. There is an adequate process for the authorization and control of work and a process for identifying opportunities for feedback and continuous improvement. Within the Chemical Management area, line managers are responsible for safety; clear roles and responsibilities have been established; and there is a satisfactory level of competence.

Criterion 1: Procedures and/or mechanisms for Chemical Management require adequate planning of individual work items to ensure that hazards are identified and analyzed and that appropriate controls are identified and selected for subsequent implementation.

Criterion 2: Procedures and/or mechanisms for Chemical Management contain clear roles and responsibilities. Chemical Management is effectively integrated with line support managers to ensure that line managers are responsible for Chemical Management.

Criterion 3: Procedures and/or mechanisms for Chemical Management require selected controls to be implemented, that these controls are effectively integrated, and that their readiness is confirmed prior to performing work.

Criterion 4: Procedures and/or mechanisms for Chemical Management require that personnel who are assigned to the subject area have a satisfactory level of competence.

Criterion 5: Procedures and/or mechanisms for Chemical Management require that within the subject area, feedback and continuous improvement occur.

The LOI's associated with the above criteria have been submitted for inclusion on the DOE-HQ Chemical Safety Homepage.

#### Performance Measures

Finally the Team recognized that both the organizations responsible for chemical management and the oversight organizations would benefit by having performance measures that could be utilized to evaluate or measure the adequacy of a chemical management program. Although the emphasis is on ensuring that safety, health, and environmental concerns are properly addressed, this will happen most effectively when chemical management is accomplished in a discipline, documented, and systematic fashion in accordance with established standards and measurable attributes. For example, the simple performance measure of identifying and tracking special chemical hazards (e.g. reactive, pyrophoric) will bring greater visibility to those chemicals that should be minimized and certainly appropriately controlled.

The performance measures have been submitted for inclusion on the DOE-HQ Chemical Safety Homepage.