

**ENHANCED INTEGRATED SAFETY MANAGEMENT
SYSTEM VERIFICATION (ISMSV)**

A Report

by

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ACRONYMS

AEC	Atomic Energy Commission
CEO	Chief Executive Officer
CMA	Chemical Manufacturers Association
CMS	Chemical Management System
CRAD	Criteria Review and Approach Document
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOT	Department of Transportation
DSC	Department Standards Committee
EFCOG	Energy Facilities Contractors Group
EPA	Environmental Protection Agency
ES&H	Environment, Safety & Health
FDH	Fluor Daniel Hanford
HAZOPS	Hazard and Operability Study
HEPA	High Efficiency Particulate Absolute
ISMS	Integrated Safety Management System
ISMSV	Integrated Safety Management System Verification
ISO 14000 System	International Standards Organization, Environmental Management System
JRA	Job Results Analysis
JSHA	Job Safety and Health Analysis
LBNL	Lawrence Berkeley National Laboratory
LEPC	Local Emergency Planning Committee
MBO	Management by Objectives
MOU	Memorandum of Understanding
MSV	Management System Verification
OAK	Oakland Operations Office
OSHA	Occupational Safety and Health Administration
PHMC	Project Hanford Management Contract
RL	Richland Operations Office
SMIT	Safety Management Integration Team
TWRS	Tank Waste Reclamation System

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I. Executive Summary

The Department of Energy (DOE) can learn from the chemical industry's experience and apply principles of the Management System Verification (MSV) process to enhance the Department's verification of the Integrated Safety Management System (ISMS) program. One particular lesson that the Department can learn is the value of involving the community in the verification process. Industry's MSV process, developed by members of the Chemical Manufacturers Association (CMA), is also an excellent tool for examining the soft side of ES&H management - the attitude, culture, and commitment of the management system.

After the Bhopal chemical accident in 1984, the chemical industry developed an aggressive ES&H initiative (Responsible Care[®]) designed to enhance performance and thereby improve the industry's image. Similarly, the Department of Energy recognized the need for a new, aggressive ES&H initiative in 1995. That initiative is the Integrated Safety Management System (ISMS). By 1993 industry realized that the new initiative had all of the right components, but concern still existed as to whether the initial effort with this initiative would be successful in the long run. The answer was a management systems verification (MSV) process. Also in like manner, the Department realized that they needed a verification system, or ISMSV. The DOE's ISMSV is an effective process, but it could be even better with some enhancements found in the industry's process. For example, industry puts more stress on accountability at all levels from the CEO down to first line worker with everyone having personnel ES&H responsibilities and goals which are related to annual compensation. Industry also stresses top management commitment and on-going involvement.

Industry uses a protocol-driven process in the MSV to evaluate five basic management system elements, or core functions, which are common to the management of all work, not just safety. The core functions are:

- Leadership (policy, goals, structure, etc.);
- Planning (includes defining scope of work, hazards identification and analyses, and control development);
- Implementation;
- Measurement;
- Management Review (includes feedback and process changes).

Within the five core functions, industry delineates 35 attributes. The attributes are collection of qualities of each key management area addressed by the core management functions. Attributes are often the "how" management is accomplished.

In the industry MSV process, industry peers, accompanied by community representatives, engage in a series of open-ended interviews with company personnel, coupled with documentation reviews and on-site observations, to determine whether a company has appropriate, functioning and sustainable management systems in place. The group interviews involve representatives from all levels within the company - top to bottom. This report identifies the differences between the DOE and the industry verification systems, and recommends that DOE consider enhancing its ISMSV with value-added components from industry, for example:

- using open panel discussions with management and workers at all levels;
- including public representatives;
- focusing on basic management attributes which have been found to be effective in limited DOE tests.

The appendices display the industry attributes and related questions modified to be used for panel discussions in the ISMS verification process.

II. Introduction

The Hanford and Lawrence Berkeley Laboratory sites have successfully demonstrated and tested the Management System Verification (MSV) process developed by the chemical industry for ES&H programs. Participants in these studies agreed that there are a number of aspects or principles of the MSV process that could be of significant value to the Department's Integrated Safety Management System Verification (ISMSV) process. DOE can learn from the chemical industry's experience and apply principles of MSV to enhance the ISMSV program. One particular lesson that the Department can learn is the value of involving the community in the verification process.

Background

Over the years, the increase in regulations, the enhancement of detection capabilities, and the cleanup, deactivation, and decommissioning of older sites, have led to a significant increase in ES&H concerns for the Department of Energy. These safety (ES&H) concerns involve not only radioactive materials but also non-radioactive chemical hazards.

In response to these changes as well as to missions that were shifting with the world situation, the Defense Nuclear Facilities Safety Board (DNFSB) forwarded its Recommendation 92-5 on August 17, 1992. This Recommendation included the stipulation that facilities to be used in the longer term for nuclear defense missions or in cleanup from previous nuclear defense activities should be operated according to a superior level of conduct of operations.

On October 11, 1995, the Board, recognizing that the circumstances affecting DOE's

defense programs had continued to evolve, forwarded Recommendation 95-2 to the Department as an update to 92-5 and other related recommendations. Recommendation 95-2 included that DOE “institutionalize the process of incorporating into the planning and execution of every major defense nuclear activity involving hazardous materials those controls necessary to ensure that environment, safety, and health objectives are achieved.”

On April 18, 1996, Secretary O’Leary sent to the DNFSB Chairman the Department’s implementation plan for Recommendation 95-2 which recognized that effective work planning must be integrated into management at all levels. This plan included the concept of an Integrated Safety Management System (ISMS). The stated objective of ISM is that the Department and Contractors must systematically integrate safety into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment. Stated simply, the objective is to: DO WORK SAFELY.

An Integrated Safety Management System is the Department’s answer to assuring safe plant operations. If all safety issues, i.e., environment, safety, and health issues, are reviewed by all workers at all levels for all jobs (no matter how small or routine), then the safety records at all DOE facilities, so managed, should improve.

However, to date there seems to be no significant improvement in safety at DOE facilities. In May, 1997, a chemical explosion occurred at the Hanford Plutonium Reclamation Facility. In March, 1999, an explosion took place in a salvage vat used to recover lithium from HEPA filters at Oak Ridge. And in July of this year (1999) the DNFSB found the chemical hazards assessments at the Y-12 Plant in Oak Ridge to be inadequate and warranting “the attention of senior managers.” These and other problems continue to occur in spite of both ISMS and the DOE *Chemical Safety Vulnerability Study* of 1994.

To find some answers, consider Chemical Safety. While the Department has made some progress in the last few years, e.g., streamlining the chemical procurement process and improved inventory controls, other problems still exist. In September, 1998, the Department’s Oversight Analysis of Chemical Safety Programs found that chemical safety roles and responsibilities are often informal and not communicated to all organizational levels. There are insufficient numbers of qualified and knowledgeable chemical safety personnel who can evaluate the potential risks (reactions) from long-term storage of hazardous chemicals. DOE and prime contractor oversight of chemical safety programs does not always include regular surveillance of stored hazardous materials and does not always communicate lessons learned to facility managers, workers, or training personnel. Chemical safety occurrences are not limited to a small number of sites, but are widely distributed across the complex.

Weaknesses in work planning limit the understanding of chemical hazards in work activities. For example, sites do not always consider accident scenarios impacting worker safety,

particularly from procedure deviations or equipment failure. Sites often do not subject “low-hazard” facilities to a formal hazard analysis of chemical safety events that might compromise worker safety. Collectively, the above weaknesses contribute to an environment where Personnel Error and Management Problem are increasing as a proportion of all chemical safety occurrences and represent the dominant direct and root causes, respectively.

In his speech to DOE’s Project Management Workshop in Denver on April 27, 1999, DNFSB member Joseph DiNunno said: “... failure to define and ensure implementation of requirements (expectations) has been the root cause of much of the problem of poor contract management. On the other hand, it should not require a DOE directive for experienced contractors to set up and execute effective safety management programs. . . . Yet, the Board and its staff have observed from recent reviews of various design and construction projects at Hanford, Los Alamos, and Savannah River, for example, shortcomings in the early identification and incorporation of health and safety requirements into facility design.”

The question is: Why do significant shortcomings still exist in the chemical safety programs at DOE sites? One explanation at this time is that management at some sites has not fully integrated safety into the planning of all work at all levels by all workers.

The applied ISM concepts will greatly improve safety, including chemical safety, but it requires the proper management system - an overall work management system that includes safety at all levels by all workers, and this system must have certain attributes. The chemical industry has developed a list of attributes of a successful management system. By verifying the presence of these attributes in the management system of a company and its facilities, industry believes that the company has a high probability of success with their ES&H program. The Department now has an opportunity to learn from the chemical industry and apply MSV principles to enhance the ISM System Verification process.

DOE/CMA Relationship

The relationship between the Department of Energy and the chemical industry goes back to the Department’s beginning when the major chemical companies operated many of the Atomic Energy Commission (AEC) sites, for example: Dupont at Savannah River, Union Carbide at Oak Ridge, Dow at Rocky Flats, and Monsanto at Mound. However, by the late eighties the Department had turned over these operations to new contractors without as strong a chemical manufacturing experience as in the origins of the DOE complex.

In February 1994, Secretary O’Leary initiated a vulnerability review of chemical safety at Department of Energy sites. The review, which was completed in July 1994 and involved the evaluation of 146 facilities at 29 sites across the DOE complex, identified eight generic vulnerabilities and generic management weaknesses in five programmatic areas. To address

these findings, the Assistant Secretary for Environment, Safety and Health developed a management response plan which was endorsed by all of the Department's Cognizant Officers.

The response plan highlighted industry partnerships as key to improving safety at DOE sites and specifically referenced Responsible Care[®] as an exemplary industry initiative in chemical safety. The Assistant Secretary, EH-1, and the Deputy Assistant Secretary, EH-5, took the lead in strengthening the ties with the Chemical Manufacturers Association (CMA), and on August 1, 1996, the Assistant Secretary signed a Memorandum of Understanding (MOU). The MOU encourages the sharing of exemplary policies, procedures and practices for continuous improvement in E&SH. In addition, the Department is a sponsor of the Center for Chemical Process Safety to help assure that the sites stay on the cutting edge of chemical industry best management practices.

The MOU with CMA has resulted in a number of successful DOE/CMA interactions, e.g.:

- Extensive phone conferences among Ashland Chemical Company ES&H experts and Richland Operations Office (RL) and Hanford Contractor personnel during November, 1996
- DOE attendance at the 1997 CMA Responsible Care[®] Annual Conference
- Three-day visit with presentations/discussions by Rohm and Haas personnel at Hanford, May, 1997
- First DOE/CMA Joint Chemical Safety Conference in June, 1997
- DOE Headquarters (HQ), RL, Oakland Operations Office (OAK), Lawrence Berkeley Laboratory (LBL), and DNFSB staff participate in CMA Management System Verification (MSV) training, 1998
- Management System Verification (MSV) Pilot on Hanford's Chemical Management System, May, 1998 (Details in Appendix A)
- MSV Introduction and Demonstration at Lawrence Berkeley Laboratory in April, 1999

III. Industry's Method of Verifying Good Management

The Chemical Manufacturers Association developed the Management System Verification (MSV) process specifically as a tool to assist in the continuous improvement of the management and implementation of ES&H programs. To understand the context of the MSV process, it is necessary to understand the overall framework into which it fits, Responsible Care[®]. Responsible Care[®] is an initiative of the chemical manufacturing industry in the United States which was launched in 1988 by the Chemical Manufacturers Association and

has now spread to dozens of other countries. CMA is a non-profit trade association whose approximately 195 member companies account for more than 90 percent of basic industrial chemical production in the United States. The development of Responsible Care[®] was an industry-wide response to escalating public concerns about the environment, safety, and health (ES&H) practices of the chemical industry following the Bhopal accident in December, 1984. The focus of the initiative is to continually improve the performance of the chemical industry in the areas of ES&H stewardship and to be responsive to public concerns about the industry's overall management of chemicals.

In 1993, CMA's Board of Directors recognized that a management systems verification process would assist CMA companies with their ES&H continuous improvement efforts as well as contribute to the building of trust between chemical facilities and their neighboring communities. A group of management experts thought about other successful industry programs, e.g., increased sales, new product development, etc., and they identified common management attributes. They intentionally decided to focus more on the "soft side" of management (style, culture, philosophy, commitment, etc.) versus the "hard side" of management (details of technical programs such as ES&H).

Conventional reviews, which focus on the hard side issues, are extremely important and vital for helping to ensure success. However, people, programs, and equipment will only produce consistent quality if they are applied through an effective management system - one that exhibits the required attributes in all phases of work beginning with the overall management direction. This continues through work planning, hazards analyses, control development and implementation, work performance, and feedback and improvement.

Consequently, "sustained quality performance" can only be ensured by reviewing both the hard and soft sides of business. The CMA Management System Verification process identifies the management attributes required for the core functions of ISMS, and it is one proven way to review the soft side of business - the ES&H management culture.

In the context of CMA's MSV process, management systems are the collection of programs, operations, people, documents, policies, guidelines, and procedures, required to effectively manage and sustain ES&H activities, and how they are utilized in daily business. The verification of management systems is intended to provide an accurate understanding of how the leadership of a chemical company plans to meet its ES&H responsibilities, and how committed management is to doing so. The process essentially evaluates the ES&H culture from top to bottom.

This report emphasizes that the MSV evaluates the management of work, not the technical work systems or products. It does not look in detail at the various ES&H system technical components, e.g., the pollution control program and the reduction in effluents, or the industrial hygiene program and the number of workplace evaluations or the improvement in workers' health. In other words, MSV will verify that a facility has a pollution control

program, for example; but will focus more on how it is managed. This process will not evaluate the quality of the program results.

The MSV process is not an audit to identify non-compliance with federal, state or local government regulations. It does, however, verify that appropriate management systems are in place and are functioning to assure continued compliance with applicable regulations. Further, it verifies that appropriate ES&H performance-improvement goals have been established by the company. The MSV looks for the existence of internal company audit and self-assessment procedures to verify ongoing compliance with both self-initiated performance-improvement goals and external regulations. The MSV does not replace but rather complements the more traditional audit/self-assessment practices that continue in place at most chemical facilities.

The MSV process evaluates five basic management system elements, or core functions, which are common to the management of all work, not just safety. The core functions are:

- Leadership (policy, goals, structure, etc.);
- Planning (includes defining scope of work, hazards identification and analyses, and control development);
- Implementation;
- Measurement;
- Management Review (includes feedback and process changes).

Figure 1 shows the core functions of the industry work cycle. These core functions are identical to the five identified for ISO 14000 and very similar to the five core functions of the Department's Integrated Safety Management System which are shown in Figure 2.

Sub-divided within the five core functions, CMA delineates 35 "attributes". The attributes are collection of qualities of each key management area addressed by the core management functions. These attributes are usually the necessary systems, organization, policies, programs, activities, or other indicators, etc. that support each core area of the management system and are the basis for the evaluation of the overall management system. Attributes are often the "how" management is accomplished. The attributes are somewhat analogous to the Criteria Review and Approach Documents (CRADs) of ISMSV.

Evidence of the existence of these attributes and their integration into the company's operations and culture is the focus of the MSV process. For examples of the attributes consider:

Leadership - Senior management demonstrates leadership and commitment by active participation in the creation and implementation of a policy that reflects the

organization's commitment to the principles of ISM. (Attribute 0.5 in Appendix B)

Planning - The organization demonstrates appropriate planning in part by maintaining documented ISM and ES&H objectives and targets which have clear means, time frames, and assigned responsibilities for accomplishment. (Attribute 1.2 in Appendix B)

Figure 1
Core Functions of Chemical Industry Work Cycle

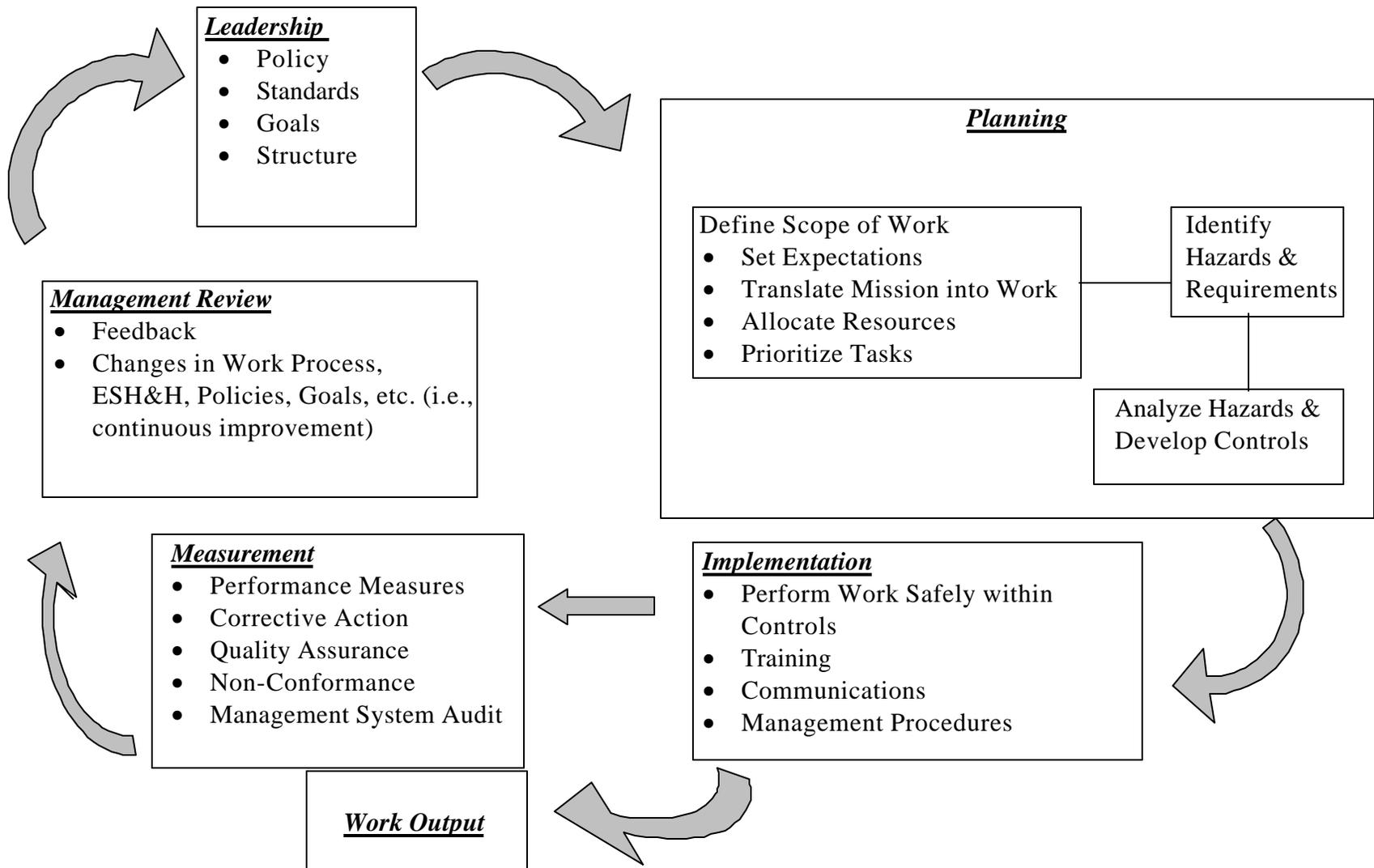
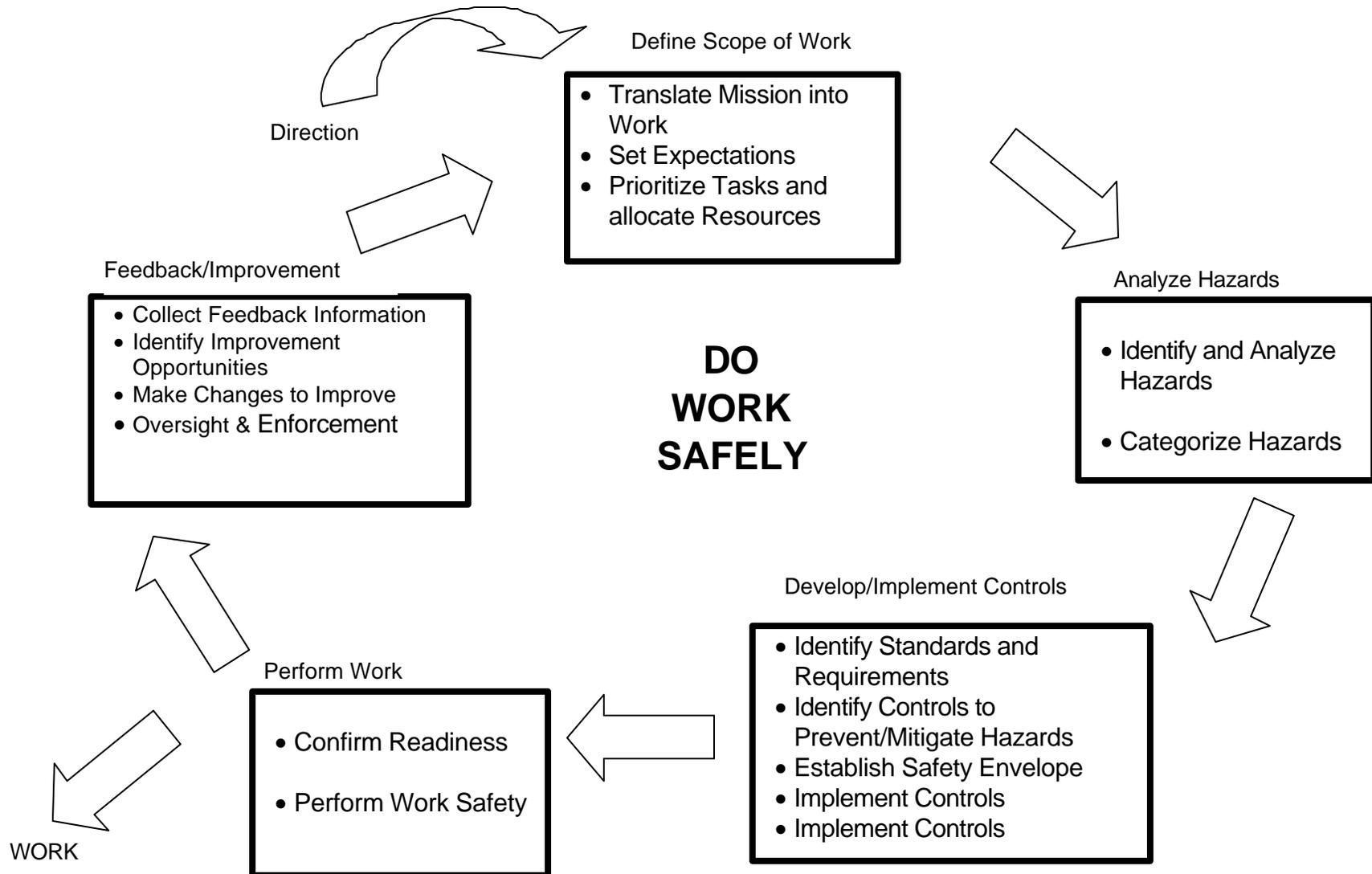


Figure 2
Core Functions of DOE Work Cycle



In the MSV process, industry peers, accompanied by community representatives, engage in a series of open-ended interviews with company personnel, coupled with documentation reviews and on-site observations, to determine whether a company has appropriate, functioning and sustainable management systems in place. The group interviews involve representatives from all levels within the company - top to bottom.

The team assesses the general level of documentation and also looks for a commitment to necessary resources. Through this combined interview/review/observation process, the industry peers and community representatives are able to identify strengths and areas for improvement in the company's management systems. The verification team submits these findings to the company being verified (and ONLY to the company being verified) in a final written report.

It is interesting to realize that, with minor alterations, the MSV process could be used for any work program, not just ES&H, e.g., a new personnel system, research program, new product development, or sales campaign. Since all of these examples involve work, then a successful program will have all of the management attributes for each of the work steps.

IV. Summary of Differences between DOE and Industry Verification Methods

Table 1 compares the basic core functions of the safety management systems of DOE and the chemical industry. Both sets of functions are very similar and essentially cover the work cycle but with some of the detailed functions grouped differently. The industry system ostensibly places more emphasis on top-down leadership by including "leadership" as one of the core functions.

Table 2 compares the DOE and the chemical industry processes for verifying the safety management systems. The Department looks more closely at the details and results of specific ES&H programs, or the "hard side" as discussed previously. The chemical industry, on the other hand, focuses more on the "how" the management of ES&H programs is accomplished, i.e., the management culture, or "soft side."

The major differences between the DOE and industry verification processes can be considered under five qualities, namely, accountability, commitment, consistency, worker participation, and review team composition.

Accountability

Industry stresses accountability. Verification looks for inclusion of ES&H performance in employee performance management process, questioning whether ES&H is in the job descriptions of all employees and whether pay increases are tied, in part, to ES&H performance. Are bonuses and other special recognition tied to individual ES&H performance? The DOE ISMS Verification protocol does not verify individual

accountability.

Commitment

In industry, the verification team questions top management about:

- involvement of the Corporate Board of Directors in ES&H goals and results;
- benchmarking;
- employees committees;
- integrating quality and business management with ES&H management;
- company policy on compliance; frequency and quality of ES&H communications from top management to employees; and
- process for identifying resources needed for ES&H.

There is even a separate Top Managers Checklist (see Appendix D) to encourage commitment and on-going involvement. The DOE ISMS Verification protocol looks at line management responsibility and balanced priorities, but not at “commitment” per se.

Consistency

Industry believes that all successful work management systems have essentially the same attributes, and for this reason the verification format and questions are essentially the same for all companies and facilities. The DOE ISMS verification protocol develops site-specific Criteria and Review Approach Documents (CRADs).

Worker Participation

As part of the verification process, industry interviews executives, including the CEO, down to “shop floor” workers. The DOE ISMS Verification protocol interviews managers at various levels; worker input appears to be missing.

Review Team Composition

Industry utilizes a hybrid review team which includes representatives from other companies as well as the public sector. The Chemical Manufacturers Association selects the representatives of other companies. The public representatives are chosen from locally active groups as identified by the facility. The team is coordinated by a private contractor to CMA. This hybrid team facilitates cross-fertilization of ES&H best practices and also results in consideration of the public’s interests. The DOE ISMS protocol does not include public participation.

Table 1. COMPARISON OF CORE FUNCTIONS OF DOE AND INDUSTRY INTEGRATED SAFETY MANAGEMENT SYSTEMS

DOE Integrated Safety Management System	CMA ES&H Management System	Comments
	Leadership (Commitment): Company Standards, Goals, Structure	Industry begins all work based on company policies, leadership, commitment, etc.
Define Scope of Work: Translate mission into work; prioritize tasks, develop policies, set expectations, allocate resources/funds.	Planning ¹ : 1) Define scope of work; translate mission into prioritized work tasks, set expectations, allocate resources. 2) Identify hazards and requirements. 3) Analyze hazards. 4) Plan/develop controls in hierarchical order: a) source reduction or elimination; b) engineering controls c) administrative controls	Industry defines all pre-implementation as “planning.” DOE highlights steps within “planning.”
Analyze Hazards: all hazards identified, analyzed (in a tailored manner), and categorized.		Industry does not specifically address “tailoring” which it considers part of good management.
Develop and Implement Controls: Set of safety standards, requirements, and conditions established; controls tailored to hazards; safety policies, procedures, and other documents adequate to perform work.		Again, industry does not address “tailoring.”
Perform Work: Perform work within controls; process to confirm readiness to perform work safely; independent DOE review and approval of readiness.	Implementation: Perform work within controls, includes training, communications, and other management procedures including approvals.	This step is essentially the same for both DOE and industry.
Feedback/Improvement: Feedback on adequacy of controls; personnel assigned for oversight and direction of work; self-assessments; continuous improvement; contractually-based review.	Measurement: performance measures; immediate corrective actions; quality assurance; other non-conformance; management system audit.	Industry separates measurement and feedback as two steps.
	Management Review: Feedback of measurements up to top management; may result in changes to work processes, ES&H program, policies, goals, etc.,	Industry highlights management review since top-down commitment and on-going involvement is key to successful ES&H program and ISMS.

¹ Industry typically includes under Planning: defining scope of work, analyzing hazards, and developing and implementing appropriate controls.

Table 2. COMPARISON OF DOE and INDUSTRY VERIFICATION PROCESSES

Process Component	DOEISMSV	CMA MSV	Comments
Review Team	All DOE/Federal safety management professionals (line & staff).	Includes representatives from other companies and the public sector.	DOE should consider involvement of other sites, the public, workers, and managers from all of the facilities at the site under review.
Team Training	Facility documentation review and possible familiarization visit to site prior to review.	1.5 days covering: <ul style="list-style-type: none"> • roles of company, review team, and review contractor • mgt. system vs. self-evaluation vs. compliance • preparation • document review • mock interviews • reporting • legal issues 	Since this is a verification of a management system and not a technical safety audit, the DOE team, which now consists of only safety experts, should probably have some training for a management review.
Method	<ul style="list-style-type: none"> • Review documents • Interview various managers 	<ul style="list-style-type: none"> • Review documents • Interviews from top management levels down to front-line workers 	DOE should consider interviewing workers with public participation.
Method	<u>Phase I</u> (written descriptions): 1) Consistent & responsive ISMS description; 2) Define scope of work; 3) Analyze hazards; 4) Develop controls; 5) Implement controls; 6) Operations authorization; 7) Perform work w/in controls; 8) provide feedback for continuous improvement; 9) Line management responsible for safety with roles and responsibilities clearly established and maintained; 10) competence commensurate with responsibility; 11) Balanced priorities;	Review written ES&H policies, programs, results, communications, etc.	Industry reviews most documents before site visits, then concentrates on interviews from CEO to shop floor employees. Industry specifically specifies leadership commitment and accountability at all levels, looks at individual employee's ES&H annual goals and performance evaluations used to determine annual pay adjustments to ensure that ES&H is an important aspect of each employee's job, i.e., safety is truly integrated into all work at all levels by all workers.

Continuation of Table 2

Process Component	DOEISMSV	CMA MSV	Comments
Major Areas for Review	12) Adequate implementation & integration mechanisms; 13) DOE organization & processes support ISM.		
Major Areas for Review – continued	<u>Phase II</u> (implementation): 1) Define scope of work 2) Analyze hazards 3) Develop & implement controls 4) Authorize & perform work within controls 5) Feedback & continuous improvement 6) DOE oversight	1) Policy & Leadership 2) Planning 3) Implementation, Operation, and Accountability 4) Performance Measurement and Corrective Action 5) Management review & reporting	Both systems are similar but industry puts more emphasis on policy and upper management leadership as part of the first step for all work.
Site/Facility-Specific Attributes & Questions	Criteria and Review Approach Documents (CRAD's) specifically developed for each site/facility.	Same CMA MSV booklet and training used for all facilities; same attributes and questions.	Industry believes that all successful work systems have essentially the same attributes. The attributes of the system are not tailored, but how the attributes are achieved may be.

V. Summary of MSV Experience in DOE

On August 1, 1996, the Assistant Secretary (EH-1) signed a MOU with CMA which encourages the sharing of exemplary policies, procedures and practices for continuous improvement in E&SH. In 1998 the Department and the Defense Nuclear Facilities Safety Board became interested in the process used by the chemical industry to verify strong management of its ES&H programs. DOE HQ, RL, OAK, LBL, and DNFSB staff participated in CMA Management System Verification training. Roger Briggs, RL, and Dan Burnfield, DNFSB staff, were two of the early participants in MSV training. Both agreed that the MSV process is a high level verification process that can establish with good certainty the presence and function of ES&H systems and processes in an organization. Briggs went on to say that there are clearly some opportunities for Hanford to fit some value-added aspects of MSV into its verification process during the implementation of Hanford's ISMS Plan."

That same year the Hanford site pilot tested the MSV on its Chemical Management System (CMS). The pilot, with its emphasis on management commitment and involvement, primarily examined the MSV process in the context of a possible adjunct to the ISMSV. This was particularly important since the recommendations from the recently conducted K Basins Phase I Verification at Hanford indicated a need for increased management attention, resources and involvement with respect to ISMS implementation. The purpose of the pilot was to test the potential applicability of the MSV process as a tool for evaluating management systems at Hanford and not to evaluate the CMS effort per se. The evaluation results from the Hanford panel participants indicated that the MSV Pilot was particularly beneficial for:

- Focusing on senior management direction, leadership, and accountability;
- Focusing on clear roles and responsibilities;
- Focusing on communication and public accountability; and,
- Gauging overall management commitment.

In 1999 the Lawrence Berkeley Laboratory asked for and received a demonstration of the MSV process. The demonstration focused on illustrating the benefits of a "panel-to-panel" dialogue approach for examining necessary attributes of a well functioning ES&H management system. The attendees completed an effectiveness survey. They rated the MSV approach as effective for assessing safety management systems and for complementing current assessment tools. Jack Bartley of LBL, who also took the MSV training at CMA, believes that the MSV process can be a significant enhancement of the ISMSV process by focusing on the ES&H management system per se and not on the ES&H technical aspects.

The process has been presented and discussed at a couple of conferences for DOE and contractors from across the complex. Joe DiNunno, DNFSB, spoke at one such conference in the fall of 1998, and he praised the chemical industry safety program and the MSV

process.

Appendix A contains a more complete description of MSV experience within DOE.

In general, DOE staff, contractors, and the DNFSB staff involved in the MSV activities within the Department have been impressed, and they support additional work in this area. Much of the support focuses on MSV's ability to stress:

- Long-term Senior Management Involvement
- Public Involvement
- Individual Accountability
- Panel Dialogue Method
- Systems Approach Towards Evaluation

VI. Conclusion

Just as the chemical industry realized that they needed a process to focus on the management of their new ES&H initiative (Responsible Care®), DOE needs a similar process to focus on the management of its new ES&H initiative - Integrated Safety Management System. Industry's MSV process has many aspects which could enhance the Department's ISMS Verification process.

After the Bhopal chemical accident in 1984, the chemical industry developed an aggressive ES&H initiative designed to enhance performance and thereby improve the industry's image. By 1993 industry realized that the new initiative had all of the right components and that companies were implementing them, but concern still existed as to whether the initial effort with this initiative would be sustained and be successful in the long run. The answer was a management systems verification (MSV) process that would assist CMA companies with their ES&H continuous improvement efforts over time as well as contribute to the building of trust between chemical facilities and their neighboring communities.

Similarly, the Department of Energy recognized the need for a new, aggressive ES&H initiative in 1995. That initiative is the Integrated Safety Management System. Also in like manner, The Department realized that they needed a verification system, or ISMSV. The DOE's ISMSV is an effective process, but it could be even better with some enhancements found in the chemical industry's MSV process. For example, industry puts more stress on accountability at all levels from the CEO down to the first line worker. Each level has personal ES&H responsibilities and goals which are related to annual compensation. Industry also stresses top management commitment and on-going involvement. Industry believes that all successful work management systems have essentially the same attributes, and for this reason the verification format and questions are essentially the same for all companies and facilities. Industry utilizes a hybrid review team, which includes

representatives from other companies as well as the public sector.

Another industry enhancement for the Department's ISMSV would be the "panel dialogue" format which is the heart of the chemical industry's verification process. It is a series of open-ended interviews that employ a panel-to-panel dialogue approach and directly involve a member from the community. Industry executives repeatedly have commented on the value of involving a community member as part of the "verifier" panel to offer a different, valuable perspective and to help build trust and credibility with the community through the verification process.

The Hanford Site recently conducted a "pilot" whereby it used a panel dialogue approach to examine its Chemical Management System, an important component of the site's overall ISM efforts. A member of the verifier panel played the role of a member of the public. Participants in the pilot, who included ISM principals at the site, endorsed the panel-to-panel open dialogue interview approach because it catalyzed mutual support and validation among participants while also revealing opportunities for improvement.

The Department should consider enhancing its ISMSV with components of the industry's MSV methodology, especially by:

- using open panel discussions with management and workers at all levels;
- including public representatives;
- focusing on basic management attributes, which have been found to be effective in industry and in limited DOE tests.

These management attributes are found in any successful program - not just ES&H. Such an approach to management verification can help improve all of DOE major issues including ISM, security, and cost control. Appendix B is the industry MSV (management attributes and the related panel discussion questions) converted to a possible ISM format.

APPENDIX A

MSV Experience in DOE

As part of Doe's 1996 Memorandum of Understanding with the Chemical Manufacturers Association, the trade association representing more than 190 U.S. chemical manufacturing companies, the industry and the Department agreed to share experiences in the application of best practices in ES&H. The MSV is one such best practice that the industry has shared. Conversely, the Department is sharing its Integrated Safety Management experience with the industry.

Hanford MSV Pilot

Pilot testing of the value added aspects of the CMA's Management Systems Verification process at Hanford used the Chemical Management System (CMS), which was currently under development, as the test program. The MSV process, which was developed by CMA's member chemical companies specifically as a tool to assist in the continuous improvement of environment, safety and health (ES&H) performance, represents a commercial sector best practice for evaluating ES&H management systems.

The primary purpose of Hanford's MSV Pilot was to evaluate the applicability and utility of the MSV process in the Department of Energy (DOE) environment. However, because the Integrated Safety Management System is the framework for ES&H management at Hanford and at all DOE sites, the pilot specifically considered the MSV process in the context of a possible future adjunct to Integrated Safety Management System Verification efforts at Hanford and elsewhere within the DOE complex.

The pilot involved the conduct of two-hour interviews with four separate panels of individuals with functional responsibilities related to the CMS including the Department of Energy Richland Operations (DOE-RL), Fluor Daniel Hanford (FDH) and FDH's major subcontractors. The team of three verifiers employed a semi-structured interview process by directing open-ended questions to the panels regarding the development, integration and effectiveness of management systems necessary to ensure the sustainability of the CMS effort. Each panel participant also completed a "MSV Pilot Effectiveness Survey" immediately following the interview.

The results of the Effectiveness Survey indicated that the MSV Pilot was particularly beneficial in focusing on: 1) senior management direction, leadership, and accountability; 2) clear roles and responsibilities; 3) communication and public accountability; and, 4) gauging overall management commitment. All of these areas were ranked high in terms of important indicators of management performance. Furthermore, at the request of panel participants, the contractor generated an internal report which identified strengths and opportunities for improvement with respect to the management of the CMS.

The verifier team concluded that the MSV Pilot was successful for engaging participants in open-ended and relevant discussion on the management aspects of the CMS as evidenced by:

- 1) the high level of participation (86%);
- 2) the active engagement of all panelists during the interview process; and;
- 3) the energetic and frank nature of discussion that was achieved with each panel that formed the basis of the strengths and opportunities for improvement identified in the CMS MSV Report.

The conclusion drawn by the verifier team, and suggested by panel participants, was that MSV may have significant value added as a “front end” process in conjunction with, or associated with internal preparation for, an ISMSV. This conclusion is particularly germane given the strong MSV emphasis on management commitment and involvement and the recommendation of strengthening management commitment that emerged from Hanford’s recent K Basins ISMS Phase I Verification effort.

In its November 19, 1998, report at the Energy Federal Contractors Group/Department of Energy Chemical Safety Issues Workshop, the DNFSB staff directed DOE-RL and Hanford contractor safety management to provide the best elements of Management Systems Verification into revisions to the Integrated Safety Management System Team Leaders Guide. The following are the suggestions of DOE-RL and Hanford contractor senior management in response to the DNFSB staff directive.

The key “value added” aspects of the chemical industry’s MSV process, from the perspective of potential enhancement of the ISMS verification process, are:

- 1) The inclusion of representatives from the community as part of the verifier team.

The experience of 50 chemical companies is that directly involving the community as part of the verifier panel helps to bring a different and valuable perspective to the verification process while also strengthening the building of trust and credibility with the public.

- 2) A panel-to-panel dialogue approach for gathering information and engaging participants.

Again, the experience of the chemical industry is that this approach for information gathering has the advantage of catalyzing mutual support and

validation among participants while also simultaneously revealing opportunities for improvement at a systems level.

To incorporate these aspects, the ISMS Guide, DOE G450.4-1, could be modified as follows:

- 1) In Volume 2, Appendix E, page E-2, second full paragraph:
Add a second sentence to read as follows: "A member of the community, one who can serve as a constructive critic, should also be seriously considered for inclusion as part of the verifier team."

- 2) In Volume 2, Appendix E, page E-2, third full paragraph:
Add a third bullet to read as follows: "The review, at least in part, should employ a panel-to-panel dialogue approach between verifiers and verifiees for gathering and verifying information especially for, but not limited to, senior management level discussions."

The Hanford Site has had a long-standing involvement with benchmarking and adapting chemical industry "best practices," where appropriate, in the area of integrated ES&H management and ES&H continuous improvement. As an example, the Project Hanford Management Contract's (PHMC) Integrated Environment, Safety, and Health Management System Plan, which was approved in the Fall of 1997, incorporated two new guiding principles on 1) management commitment; and, 2) community involvement/outreach. These principles came directly from the chemical industry.

The following proposed "next steps," therefore, represent a continuation of Hanford's efforts to adapt chemical industry best practices, where relevant and applicable, to "add value" to the site's ISMS-related efforts.

Hanford is considering a "field test" of the attributes it is suggesting for incorporation into the ISMS Team Leaders Guide into the PHMC's Tank Waste Reclamation System (TWRS) Phase II ISMS verification which is scheduled for late 1999.

Specifically Hanford would seek a commitment from DOE-RL and contractor senior management to:

- 1) Include an informed member of the public to directly participate as part of the verifier team; and,

- 2) Employ the use of a panel-to-panel dialogue approach, in part, for gathering and

verifying information during the interview process.

If Hanford decides to employ a panel-to-panel dialogue approach during the TWRS Phase II verification, the verified team, and relevant others, would receive a brief training session beforehand. The training session on the panel-to-panel dialogue approach would be similar to that developed and conducted for Lawrence Berkeley Laboratory and the DOE Oakland field office in April, 1999.

Lawrence Berkeley National Laboratory MSV Demonstration

Roger Briggs (DOE Richland Operations Office, Concerns Resolution and Quality Resources), and consultants Lori Ramonas and Bill Westendorf conducted two half-day session demonstrations of the MSV process. They held the sessions on April 6 and 7 at Lawrence Berkeley National Laboratory for both LBNL and OAK ES&H staff.

The purpose of the LBL/OAK introduction to MSV was to demonstrate a new tool that could be used to complement existing assessment practices and provide a unique insight into assessing safety management systems. The demonstration focused on illustrating the benefits of a "panel-to-panel" dialogue approach for examining necessary attributes of a well functioning ES&H management system. Both LBL and DOE OAK Environment, Safety and Health (ES&H) management and staff participated in the demonstration of the MSV "panel-to-panel" dialogue process with others from line and program offices observing. Following each session, the attendees completed an effectiveness survey. They rated the MSV approach as effective for assessing safety management systems and for complementing current assessment tools.

Both LBL and DOE OAK participants expressed interest in taking the "next steps" necessary to evaluate MSV for use:

- as a tool for assessing Integrated Safety Management (ISM) implementation;
- as a consistent framework for Division Management ES&H (MESH) reviews; and
- as a complement to programmatic audits

Based on the demonstrations of the MSV process and the knowledge that more than 50 major chemical manufacturing companies have successfully applied this process to evaluate the vitality of the management system underlying their ES&H continuous improvement efforts, LBL is interested in receiving proposals for the next step. The scope of work would explore some of these applications of MSV and provide follow-up training on the MSV process for DOE Oakland and LBL ES&H staff. A report on the results of the LBL/OAK "panel-to-panel" MSV demonstration is scheduled for the next meeting of the Department Standards Committee (DSC).

MSV Training by DOE and DNFSB Personnel

Ken Murphy (DOE EH-52), Roger Briggs (RL), Dean Decker (OAK), Jack Bartley (LBL), and Dan Burnfield (DNFSB) participated in CMA Management System Verification (MSV) training, 1998. All were impressed and thought that many aspects of the MSV could enhance ISMSV, e.g., panel dialogue approach, public involvement, long-term senior management involvement, and individual accountability.

Other DOE Exposures to MSV

In October 1998, the Department held the fourth ISMS Lessons Learned Workshop in New Orleans. More than 300 participants from across the DOE complex attended. Plenary speakers

included Dick Crowe (SMIT), John Wagoner (RL), and Joe DiNunno (DNFSB). Mr. DiNunno in particular emphasized the importance of including the experiences and best practices of other industries, as resource enhancements, under the ISMS umbrella. As examples, he specifically mentioned the Chemical Manufacturers Association's Management System Verification process. He complimented Hanford for its efforts to integrate best practices from the chemical industry into its ISMS plan and subsequent verifications. Maggie Sturdivant (DSC), as part of her session on "Processes, Benefits, and Barriers for Successful integration of Initiatives" specifically mentioned CMA's programs and processes. There was also a presentation on the Hanford MSV pilot study at this workshop.

In November, 1998, more than 140 DOE and contractor ES&H personnel from across the complex attended the DOE Energy Facilities Contractors Group (EFCOG) Joint Chemical Safety Issues Workshop in Albuquerque. Plenary speakers included Joe DiNunno (DNFSB), Bob Perry (Center for Chemical Process Safety), and Bob Coffield (Chemical Manufacturers Association). Mr. DiNunno specifically referred to the DOE/CMA Memorandum of Understanding and advised the audience to take advantage of the MOU to benefit from CMA's efforts to codify good chemical safety practices, e.g., the process to verify management of ES&H. Mr. Coffield indicated that the "soft side" of safety (leadership, accountability, ethics/core values, communications, etc.) was as important as the "hard side" (procedures, measurements, controls, etc.). He thought that DOE tended to emphasize the hard side. There was also a presentation on the Hanford MSV Pilot study.

APPENDIX B

Recommended DOE ISM Core Functions and Associated Attributes Applying MSV Principles

0. Direction (additional core function)

This management element addresses the leadership exhibited by senior management in setting clear policy and guidelines for performance, and for enhancing the value of the Integrated Safety Management (ISM) ethic within the DOE site.

Senior management demonstrates leadership and commitment for their organization by active participation in the creation and implementation of a clear and visible policy that:

- 0.1 Involves a demonstration of a personal commitment and dedication to ISM
- 0.2 Is tailored to the nature and scale of the organization's work and products
- 0.3 Fosters openness in dealing with stakeholders and takes into account public and employee inputs
- 0.4 Sets a framework for reviewing and establishing ISM and environmental, health, and, safety goals, objectives, and targets
- 0.5 Includes a commitment to continual improvement of the ISM system and the ES&H programs
- 0.6 Includes a commitment to comply with relevant legislation and regulations
- 0.7 Reflects the site's commitment to the Guiding Principles of ISM
- 0.8 Requires that the ISM system is documented, maintained and communicated to employees
- 0.9 Has a system in place for the identification and prioritization of needs and the allocation of resources to implement performance improvements

1. Define Scope of Work

This management element addresses the definition and planning of work and covers: 1) the establishment of the site's goals and objectives, with full integration of ISM, 2) the development of a management system infrastructure for the realization of the goals and objectives and policy expectations, and 3) the preparation and competence of employees to carry out the site's work, and documentation that is critical to the execution of that work.

The organization demonstrates appropriate planning by:

- 1.1 A clear definition of responsibility and accountability for the execution of work , including ISM and specific ES&H tasks
- 1.2 Documenting work and ISM goals, objectives, and targets which have clear means, time frames, and responsibilities for accomplishment

- 1.3 Training programs that include work specific skills and competencies, and awareness of regulatory and site requirements appropriate to the work
- 1.4 Employee involvement in the development, communication and execution of ISM activities
- 1.5 The development and approval of an ISM plan that has been fully implemented
- 1.6 Processes for the qualification and selection of suppliers and contractors that place priority on safety performance (ISMS has safety as focus of all workers including procurement and contracts personnel.)

2.0 Analyze Hazards

This management element addresses those attributes necessary to understand the complexities of the work, to identify the hazards associated with the work, to analyze potential off normal and accident scenarios, to understand the degree of protection offered by current controls, and the identification of additional control needs.

The organization demonstrates appropriate hazards analyses by:

- 2.1 Having systems in place for the assessment of hazards, risks, and the adequacy of controls for the following:
 - proposed and new research and development activities and products
 - current program activities and facility operations
 - hazards arising from any changes, such as those occurring in program, a facility, or staff
 - for work done by others, i.e. suppliers, contractors, or customers
- 2.2 Having a work planning process in place that incorporates ES&H reviews for all work activities at the task level
- 2.3 Having ongoing programs in place that identify workplace hazards as they arise
- 2.4 Having a lessons-learned program that identifies ES&H weaknesses and implements improvements and feedback loop
- 2.5 Creating and maintaining a database for information related to environmental, health and safety risks
- 2.6 Having processes in place for the systematic review of all environmental, health and safety related regulations, and their interpretations, that are relevant to the site's activities
- 2.7 Having processes in place to assess community and employee concerns about the organization's activities
- 2.8 Has a process by which all the hazards analysis elements and improvements are fully integrated into the site's ISM system.

3.0 Develop and Implement Controls

This management element addresses the following activities: 1) steps required to address the findings and recommendations of hazards analyses; 2) the identification and assessment of employee and community concerns about environmental, health and safety issues and performance; 3) the identification and assessment of relevant regulations, industry

standards, and DOE requirements; and 4) maintenance of an infrastructure that ensures the implantation of controls appropriately tailored to the work.

The organization maintains an infrastructure capable of ensuring the implementation of ES&H controls through:

- 3.1 Training programs that include task specific skills and competencies, and awareness of regulatory requirements appropriate to the task, and ISMS concepts
- 3.2 Appropriate evaluation and implementation of the findings and recommendations of hazards analyses, as well as ES&H concerns raised by employees and the public.
- 3.3 A thorough review of the ES&H controls implemented to assure they are adequate and appropriately tailored to the work.
- 3.4 Documented procedures to ensure safe operations for all activities, activity changes, maintenance, and product use
- 3.5 Written site emergency response plans with appropriate considerations of communications and community recovery needs
- 3.6 Participation in the development of community emergency preparedness planning
- 3.7 Programs to provide guidance, information and training requirements to customers and contractors on the risks and hazards of the organization's products
- 3.8 Clearly defined and visible emissions reduction, waste minimization, pollution prevention, and ground water protection programs

4. Perform Work

This management element addresses the following: 1) assurance of the readiness to perform the work correctly and safely, and 2) the supervision of work to ensure it progresses according to the approved work plans.

The organization prepares for and conducts work correctly and safely by:

- 4.1 Implementing a written process to confirm readiness to perform all work at all levels by all workers
- 4.2 Supervision of work to ensure it progresses according to approved work plans

5. Feedback and Improvement

This management element deals with the use of performance indicators, performance reviews, accident and incident investigation, compliance audits, data records, and taking or recommending corrective actions.

The organization demonstrates the use of performance measurement and corrective action by having processes in place for:

- 5.1 The tracking of emissions and releases, accidents and injuries, near misses.
- 5.2 Reviewing the performance of site staff, suppliers, customers and contractors.

- 5.3 The investigation of accidents and incidents that get at the root causes of occurrence and develop recommendations for prevention or corrective action.
- 5.4 The maintenance of sufficient data files to enable analysis of trends and performance against goals.
- 5.5 The audit or review of compliance with regulations and company procedures.
- 5.6 The measurement of the effectiveness of its communications programs with its stakeholders.

Senior Management Review and Reporting

This management element addresses the manner in which the organization reports its performance to its stakeholders and senior management, and how the organization and senior management reviews that performance relative to goals and makes appropriate changes in goals, policies or priorities.

Management Review and Reporting is characterized by evidence of:

- 5.7 A process for communication and dialogue with stakeholders of relevant risks and impacts of the organization's activities to human health and the environment, and plans for improving the organization's ISM systems
- 5.8 Periodic reviews of the organization's objectives and policies for relevance against the organization's products and processes, the expectations of stakeholders, the adequacy of resources assigned to ES&H management programs, and the organization's performance against their goals and policies
- 5.9 Reporting mechanisms to stakeholders, employees and communities on the organization's ES&H results
- 5.10 Bench marking of ES&H management systems against other organizations
- 5.11 A performance management system for employees that recognizes ISM excellence

APPENDIX C

Questions for Verifying DOE ISM Management Attributes

Looking at the five core areas of work, or core functions of ISMS, it is possible to identify a number of management qualities that should ensure success in each of the five areas. Questions are then developed that promote discussions on those management qualities, or attributes. From these discussions with employees at all levels within an organization, it becomes clear whether the management system exhibits the attributes necessary for the successful implementation of any program.

Sufficient dialogue must take place between the verifiers and the appropriate managers of the organization to determine whether the elements of the management process have been developed, integrated into the organization's activities and are effective in improving performance. Questions should be asked to directly probe the significant management process element attributes. Verifiers ask the questions and are the primary participants in the discussions with the site representatives. The facilitator's function is to make sure all questions, and therefore all attributes, are adequately covered.

Sample questions, listed below are designed to open dialogue. Bullet items under the questions are thoughtful probes to lead to further questions if the necessary information is not forthcoming in the dialogue resulting from the questions. In some cases the thoughtful probes define questions to be asked of different functional managers within an organization.

O. Direction

The verifiers should obtain copies of appropriate policies and publications that contain policies prior to the interviews. They should look for such things within the policies such as references to industry ES&H initiatives such as ISO 14001, legal compliance or continual improvement. The verifiers should be very familiar with the policies prior to the interviews.

Q0.1: Could you describe your personal role in the communication of your commitment and dedication to ISM; could also ask questions from "Top Managers" Checklist (see Appendix D).

- Speeches?
- Periodic messages to employees?
- Industry participation?

Q0.2 How do you ensure that ES&H concerns are identified and controlled for all work, or projects, at all levels by all employees, and how do you ensure that the ES&H concerns are addressed in the scope and to the depth that the work warrants?

Q0.3: What process have you gone through to determine if your ES&H policy is relevant

to the nature of your organization's business and takes into account public and employee inputs?

- Reviewed against industry peers?
- Have board level review?
- Make results based judgments?
- Have employee committees?

Q0.4 How do you integrate the philosophy of continual improvement into your
& 5: ISM and ES&H policies and set a framework for establishing objectives?

- Set long term goals?
- Integrate quality and business management with ES&H management?
- Make explicit references?

Q0.6: How do you encompass the range of regulatory requirements and their compliance in your ES&H policy? (If done through explicit wording in policy, this does not have to be asked.)

Q0.7: How have you worked the principles of integrated safety management into your ES&H policy? (If done through explicit wording in policy, this does not have to be asked.)

Q0.8: Could you describe your process for communicating your ES&H and ISM policies to employees?

- Periodic reports?
- Newsletters, bulletin boards?

Q0.9: Could you describe your process for identifying the resources needed and staffing required for ES&H implementation and how you test the adequacy the resources allocated?

- Bottom up?
- Review with peers?

1. Define Scope of Work

Interviewees should be encouraged to use examples and provide samples of manuals, etc. during the interviews for reference and illustration. Of course, many pertinent manuals and other references are reviewed prior to these interviews to assess the management of integrated ES&H programs.

Q1.1: Could you describe the way your organization is structured to implement the ES&H/ISM program?

- Responsibility matrix?

- Accountability?

Q1.2: How are your ES&H and ISM goals, targets, and plans developed, documented, and maintained?

- Who develops? Are workers involved?
- Specified performance targets?
- Time frame expectations?

Q1.3: Could you describe your organization's training programs?

- Job Skills?
- Environmental, health and safety training including ISM?
- Competency requirements?
- Training records?
- Regulatory familiarization?

Q1.4: *See Q1.1 and Q1.2.* Also: How do you get employees to contribute to the outreach and communications programs?

- Volunteers?
- Delegation?
- Training?

Q1.5 *See Q1.2. Attributes 1.2 and 1.5 still seem to be the same thing.*

Q1.6: Could you describe your process for qualifying and selecting suppliers of services and materials to your organization?

- Pre-screening audits?
- Qualification criteria?
- Carriers?
- Toll processors?
- Subcontractors?
- Distributors and terminals?
- Disposal sites?

2. Analyze Hazards

Q2.1: Could you describe your process for assessing the risk of products, processes (including changes), R&D, and other activities?

- Methodology?
- Management of Change?
- Distribution?
- Inbound materials?

Q2.2 Can you describe your work planning process? (Tailor to individual level, i.e., activity, facility, site)

- Who is involved in planning?
- Who approves?

Q2.3 How do you identify hazards as they arise in on-going work?

- Workers themselves?
- Routine industrial hygiene and safety inspection programs?

Q2.4: What kind of system do you maintain for product and process risk data including
&2.5 historical problems and their solutions, and what type of data is in the system?

- Computer based?
- On-line?
- Toxicology?
- Regulatory classifications?
- Lessons learned?

Q2.6: How does your organization identify the regulations, legislation and interpretations that are relevant to your operations

- EPA?
- OSHA?
- DOT?
- Other government agencies?
- Trade association activity?

Q2.7: How do you identify and assess employee and community needs?

- Community Advisory Panels?
- Surveys?
- Focus Groups?
- Safety meetings?

Q2.8 How are your ES&H and ISM requirements built into your process operating procedures?

- Regular HAZOPS?
- Regular Job Safety & Health Analysis (JSHA)?
- Review committees?
- Employee involved?

3. Develop and Implement Controls

Q3.1: *Same as Q1.3*

Q3.2 How do you ensure that the hazards have been completely identified and that
&.3: designed controls are adequate?

- Tailoring?
- Outside consultants?
- Multiple sign-offs?

Q3.4 *Same as Q2.8.*

Q3.5 Could you describe your emergency response plans and your involvement with
&.6: community preparedness planning?

- For plant sites?
- For distribution?
- LEPC involvement?
- Testing of plans?
- Integration with the community and neighbors?

Q3.7: What is your process for providing and receiving risk-related guidance and
information to/from your commercial partners?

- Distributors?
- Customers?
- Contractors?
- Suppliers?

Q3.8: Can you describe your emissions reduction, pollution protection and ground water
protection program? (The use of results and performance data in the form of graphs
and tables may be used as an appropriate tool for describing the programs)

- Goals and targets?
- Stage of implementation?

4. Perform Work

Q4.1: Can you describe your written process to confirm readiness to perform work at all
levels?

Q4.2 How do you ensure that supervisors are directing work according to approved plans?

5. Feedback and Improvement

In this portion of the interviews, performance data may be used to assist in the illustration
of programs.

Q5.1: Could you describe your process for tracking ES&H performance?

- Injury and illness?
- Process incidents?
- Distribution incidents?
- Toxic releases?
- Regulatory violations?

Q5.2: How do you track the performance of your commercial partners and review it with them?

- Subcontractors?
- Customers?

- Distributors?

Q5.3: Could you describe your accident/incident investigation processes?

- Injury and illness?
- Distribution?
- Process incidents?
- Near-hits?
- Root causes?
- Corrective action?

Q5.4: Do you maintain a data base of all accidents, incidents and near-hits to facilitate analysis of trends?

- Injury and illness?
- Distribution?
- Process incidents?
- Customer reports?

Q5.5: Could you describe your internal audit processes for measuring compliance with regulations and your organization's policies?

- OSHA?
- EPA?
- TSCA?
- DOT?
- Other government agencies?

Q5.6: How do you measure the effectiveness of your communications and outreach programs?

- Surveys?
- Focus groups?

Management Review and Reporting are characterized by evidence of:

Q5.7: Could you describe your processes for reporting your ES&H results to your stakeholders, including employees and communities? (*Stakeholders are interested in ES&H not how you do it, i.e., ISM*)

- Employees?
- Stockholders?
- Plant communities?
- Public?

Q5.8: What process does your organization use to periodically review your ES&H policy for relevance and appropriateness? (This question may be redundant if adequate answers were provided in the interviews involving policy and planning)

- Board review?
- Senior management review?
- Bench marking?

And: How does your organization review and discuss your ES&H performance?

- Management Council?
- Department meetings?

Q5.9: *Part of Q5.7.*

Q5.10: Could you describe some of your bench marking activities within the Industry?

- Managed systems?
- Performance?

Q5.11: Have you included ES&H performance in your employee performance management process?

- MBO/JRAs?
- Bonuses?
- Merit increases?
- Special forms of recognition?
- Job description and annual reviews?

APPENDIX D

Top Managers Checklist

1. Is safety an agenda item at every staff meeting and general communications meeting you hold? Is it the first thing on the agenda?
2. Does your organization have key measurements for safety that are linked to the documented strategic plan for your organization? Are goals established and tracked for each key measurement?
3. How many hours a week do you personally spend in the field, with the people in your organization, where the sole purpose of your time spent is safety? If you expect improvement, anything less than 4 hours/week is not enough.
4. When was the last time you personally stopped an employee or contractor from continuing what they are doing because of your concern for their safety or the safety of others?
5. How many safety incident investigations have you personally led or have been an active participant of the investigation team?
6. Has an employee ever been hospitalized due to injury while working in an organization under your leadership? If so, did you go to the hospital to visit that employee?
7. Is safety a topic on all scheduled employee performance reviews for all employees at all levels?
8. How many safety staff professionals do you have working in your organization? If there are more than 1 per 500 employees, you have too many. Safety is the responsibility of every employee. Line management has accountability.
9. When is the last time a manager or supervisor, under your leadership, underwent a significant emotional event that you personally created because of poor safety performance by one of more of his or her employees? -- Letter of concern; Letter of reprimand; Delayed salary increase; Delayed promotion; Disciplinary time off work; Discharge.
10. When is the last time you personally gave praise and recognition to individuals or work groups who have met or exceeded your expectations for safety performance.
11. Is the safety performance of the contractor, who works in your area of responsibility,

better than, equal to or worse than the safety performance of employees who are directly under your leadership? Why?

12. If I were to interview employees who work under your leadership, what percent would tell me that you personally are committed and involved in safety and that you truly “walk the talk