Department of Energy
Washington, DC 20585

August 5, 2005

MEMORANDUM TO DISTRIBUTION

FROM: BRUCE M. CARNES
ASSOCIATE DEPUTY SECRETARY

SUBJECT: Reinvigorating Integrated Safety Management (ISM)

The Secretary approved the Department's 2004-1 implementation plan on June 10, 2005. One of the central objectives of this plan is to reinvigorate ISM. This will require significant effort and attention, and your personal involvement. Three specific areas of ISM implementation are targeted for attention by the implementation plan: (1) ISM system descriptions for Federal organizations, (2) work planning, and (3) feedback and improvement. The implementation plan also provides an updated vision for fully implementing the ISM guiding principles, and a clear articulation of DOE federal responsibilities for ISM implementation. The vision and expectations are excerpted from the implementation plan [draft Appendices F and G] and attached for your information and familiarization; these will be promulgated in a DOE ISM manual by December 2005. Another action described in the Department's 2004-1 implementation plan calls for each DOE site and program office with nuclear facilities to think through and document its ISM system in an ISM system description document by March 2006.

To ensure the necessary leadership and commitment for reinvigorating ISM at all levels throughout the DOE organization, and as described in the 2004-1 implementation plan, I am requesting that each program and site office identify an ISM Champion who will be responsible for leading ISM implementation activities at his or her office. In selecting your ISM champions, please bear in mind the ISM principle that line management is responsible for safety. ISM champions for program offices should be at least at the level of Deputy Assistant Secretary or equivalent. ISM champions for site offices (including operations offices, field offices, and service centers) should be at least at the level of Assistant Manager or equivalent. I am asking you to designate these ISM champions and inform me by August 31, 2005, so that I can coordinate overall Departmental efforts. We will also name a Department ISM champion by that time.

Please provide any further feedback to me at (202) 586-2550, or have your staff provide feedback to the 2004-1 project leader, Ms. Kim Davis, at (202) 586-3771.

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Requisite Environment for Effective Implementation of Integrated Safety Management (ISM) Systems

June 2005

DRAFT

* Safety encompasses environment, safety and health, including pollution prevention and waste minimization.

Background

In 1996, the Department defined the Integrated Safety Management (ISM) system as its programmatic framework for accomplishing work safely. Nine years of implementation experience have proven that ISM is a fundamentally sound safety management approach with broad applicability. The ISM concept is also well supported by Department personnel and contractors. The Department remains committed to ISM as its enduring framework for performing work safely.

Over the past year, the Department has recognized and acknowledged the need to revitalize ISM implementation. This need to revitalize or reinvigorate ISM is due to two factors: (1) incompleteness and inconsistencies in implementing ISM principles and functions in programs, sites, offices, and facilities throughout the complex, and (2) a general waning of attention to and use of ISM as it was intended to create and sustain real continuous improvement.

To address inconsistencies in implementation, the Department has targeted three long-recognized weaknesses for renewed attention: (1) work planning and control, (2) feedback and improvement processes, and (3) ISM system description and implementation by DOE federal organizations. To help reinvigorate the use of ISM as the guiding framework for organizational performance improvement, this paper seeks to clearly describe the context or environment within which ISM must operate to be effective. With this vision, leaders throughout the organization can direct efforts to create the necessary environment for effective ISM implementation and, ultimately, positive culture change that supports safe, and highly productive operations.

Introduction

This paper seeks to clearly describe and articulate the attributes – expected, observable behaviors – typical of the total environment within which ISM must be implemented to be fully effective. Leaders need to implement appropriate change strategies to make these behaviors recognizable and typical in their work environments. Achieving these desired work behaviors will result greater productivity as well as improved safety.

Within the ISM hierarchy, it is the ISM principles that describe the environment or context for work activities, in that, most ISM principles apply to each and every ISM function. Experience and research with safety cultures and high-reliability organizations (HRO) over the past ten or more years have raised new insights and deeper understanding relevant to the desired work environment for effective safety management. An analysis of this experience and research over the past decade has identified 4 supplemental high-reliability principles that are necessary to focus attention and action in the right direction to create the desired ISM environments. These principles also promote a mature shift from a compliance orientation toward an excellence orientation. They emphasize continuous improvement and long-term performance, and are entirely consistent with the original intents of ISM. As the Department moves forward, the desired environment for effective ISM implementation is described by the 7 ISM guiding principles plus 4 supplemental high-reliability principles.

Guiding Principles for Integrated Safety Management

The Department has established the following principles to guide implementation of Integrated Safety Management (ISM) systems.

1. **Line Management Responsibility for Safety.** *Line management is directly responsible for the protection of the public, the workers, and the environment.*

2. **Clear Roles and Responsibilities.** *Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.*

3. **Competence Commensurate with Responsibilities.** *Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.*

4. **Balanced Priorities.** *Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.*

5. **Identification of Safety Standards and Requirements.** *Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.*

6. **Hazard Controls Tailored to Work Being Performed.** *Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.*

7. **Operations Authorization.** *The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.*

Note: The ISM functions describe the specific work activities that must be accomplished, and these are not explicitly addressed by this paper: (1) define the work, (2) identify and analyze the hazards, (3) identify and implement the controls, (4) perform work safely within controls, and (5) feedback and improvement. It is vitally important that each organizational element effectively implement these five core functions, beginning with accurately and completely defining its own work, even though the nature of the work may vary significantly across the total organization.

1. **Line Management Responsibility for Safety.** *Line management is directly responsible for the protection of the public, the workers, and the environment.*

Attributes:

- Line management (from the Secretary of Energy to the DOE cognizant Secretarial Officer to the DOE Site Office Manager to the Contractor Senior Manager to the front-line worker) understands and accepts their safety responsibilities inherent in mission accomplishment. Line management does not depend on supporting organizations to build safety into line management work activities.

- Line management has a clear understanding of its work activities and its performance objectives, and how it will conduct its work activities safely and accomplish its performance objectives.

- Leaders demonstrate commitment to safety. Executive and senior managers are the leading advocates of safety and demonstrate their commitment both in word and action.

- Organization leaders periodically take steps to reinforce safety, including personal visits and walkthroughs to verify that their expectations are being met.

- Organization leaders practice visible leadership in the field by placing "eyes on the problem," coaching, mentoring, and reinforcing standards and positive behaviors. Deviations from expectations are corrected promptly.

- Line management maintains a strong focus on the safe conduct of work activities.

- Line management maintains awareness of key performance indicators related to safe work accomplishment, watches carefully for adverse trends or indications, and takes prompt action to understand adverse trends and anomalies.

- Leaders throughout the organization set an example for safety through their direct involvement in continuous learning by themselves and their followers on topics related to technical understanding and safety improvement.

- Managers and supervisors are skilled in responding to employee questions in an open, honest manner. They encourage reporting of safety issues and errors. They do not discipline employees for the reporting of errors. They encourage a vigorous questioning attitude toward safety, and constructive dialogues and discussions on safety matters.

- Credibility and trust are present and continuously nurtured. Leaders reinforce perishable values of trust, credibility, and attentiveness.

- The organization is just. The system of rewards and sanctions is aligned with strong safety policies and reinforces the desired behaviors and outcomes.

2. **Clear Roles and Responsibilities.** *Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established and maintained at all organizational levels within the Department and its contractors.*

Attributes:

- Responsibility and authority for safety are well defined and clearly understood as an integral part of performing work.
- Organizational safety responsibilities are sufficiently comprehensive to address the work activities and hazards involved.
- The line of authority and responsibility for safety is defined from the Secretary of Energy to the individual contributor. Each of these positions has clearly defined roles, responsibilities, and authorities, designated in writing and understood by the incumbent.
- Organizational Functions, Responsibilities, and Authorities documents are maintained current and accurate.
- Reporting relationships, positional authority, staffing levels and experience, processes and infrastructure, and financial resources are commensurate with and support safety responsibilities.
- All personnel understand the importance of adherence to safety standards.
- Line management oversight is provided to reinforce expectations and ensure that key safety responsibilities and expectations are being met.
- Personnel are held accountable at all levels of the organization for shortfalls in meeting standards and expectations related to fulfilling safety responsibilities. Accountability is demonstrated both by recognition of excellent safety performers as well as identification of less-than-adequate performers. In holding people accountable, managers consider individual intentions and the organizational factors that may have contributed.

3. **Competence Commensurate with Responsibilities.** *Personnel shall possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities.*

Attributes:

- People and their professional capabilities, experiences, and values are regarded as the organization's most valuable assets. The organization places a high priority on recruiting, selection, and retention of an excellent technical staff.

- The organization maintains a highly knowledgeable workforce to support a broad spectrum of operational and technical decisions. Technical and safety expertise is embedded in the organization. Outside expertise is employed when necessary.

- Individuals have in-depth understanding of safety and technical aspects of their jobs. Technical support personnel have expert-level technical understanding. Senior managers have strong technical backgrounds in their area of expertise.

- Assignments and delegations of safety responsibilities are made to individuals with the necessary technical experience and expertise. In rare cases, if this is not possible, corrective and compensatory actions are taken.

- The organization values and practices continuous learning, and requires employees to participate in recurrent and relevant training and educational experiences to improve knowledge, skills, and abilities. Professional and technical growth is formally supported and tracked to build organizational capability.

- Old models and practices are updated and refreshed based on new information and new understanding.

- Training effectively upholds management's standards and expectations. Beyond teaching knowledge and skills, trainers are adept at instilling requisite safety values and beliefs.

- Training to broaden individual capabilities and to support organizational learning is available and encouraged – to appreciate the potential for unexpected conditions; to recognize and respond to a variety of problems and anomalies; to understand complex technologies and capabilities to respond to complex events; to develop flexibility at applying existing knowledge and skills in new situations; to improve communications; to learn from significant industry and DOE events.

- Leaders set an example for safety through their personal commitment to continuous learning and by their direct involvement in high-quality training that consistently reinforces expected worker behaviors.

- Informal opinion leaders in the organization are encouraged to model safe behavior and influence peers to meet high standards.

4. **Balanced Priorities.** *Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting the public, the workers, and the environment shall be a priority whenever activities are planned and performed.*

Attributes:

- Organization leaders frequently and consistently communicate the safety message, both as an integral part of the mission and as a stand-alone theme.
- Leaders recognize that aggressive mission and production goals can appear to send mixed signals on the importance of safety. Managers are sensitive to detect and avoid these misunderstandings, or to deal with them effectively if they arise.
- The organization demonstrates a strong sense of mission and operational goals, including a commitment to highly reliable operations, both in production and safety. Safety and productivity are both highly valued.
- Safety and productivity concerns both receive balanced consideration in funding allocations and schedule decisions.
- Staffing levels and capabilities are consistent with expectation of maintaining safety and reliable operations.
- The organizational staffing provides sufficient depth and redundancy to ensure that all important safety functions are adequately performed.
- The organization is able to build and sustain a flexible, robust technical staff and staffing capacity. Pockets of resilience are established through redundant resources. The organization develops sufficient resources to rapidly cope and respond to unexpected changes.
- Key technical officials are assigned for long terms of service to provide institutional continuity and constancy regarding safety requirements and expectations. Organizational knowledge is valued and efforts are made to preserve it when key players move on.
- Systems of checks and balances are in place and effective at all levels of the organization to make sure that safety considerations are adequately weighed and prioritized.
- Safety and quality assurance positions have adequate organizational influence.
- Adequate resources are made available for safety upgrades and repairs to aging infrastructure. Modern infrastructure and new facility construction are pursued to improve safety and performance over the long-term.

5. **Identification of Safety Standards and Requirements.** *Before work is performed, the associated hazards shall be evaluated and an agreed-upon set of safety standards and requirements shall be established which, if properly implemented, will provide adequate assurance that the public, the workers, and the environment are protected from adverse consequences.*

Attributes:

- Facilities are designed, constructed, operated, maintained, and decommissioned using applicable consensus industry codes and standards, where available and applicable, to protect workers, the public, and the environment.

- Clear, concise technical safety directives that are centrally developed, where necessary, and are based on sound engineering judgment and data. DOE directives and technical standards are actively maintained up to date and accurate.

- A clearly-defined set of safety requirements and standards are invoked in management contracts, or similar agreements. An accepted process is used for identification of the appropriate set of requirements and standards. This set of requirements is comprehensive and includes stringent quality assurance, safety, and radiological and environmental protection requirements.

- Implementing plans, procedures and protocols are in place to effectively translate requirements into action by the implementing organization.

- Technical specifications clearly control the safe operating envelope. The safety envelope is clearly specified and communicated to individuals performing operational tasks.

- Exemptions from applicable technical requirements are rare, specific, short-term, provide equivalent safety, have a compelling technical basis, and are approved by a central technical authority.

- Compliance with applicable safety and technical requirements is expected and verified.

- Willful violations of requirements are rare, and personnel and organizations are held strictly accountable. Unintended violations of requirements are promptly reported, and personnel and organizations are given credit for self-identification and reporting of errors.

- The organization actively seeks to continuously improve safety standards and requirements through identification and sharing of effective practices, lessons learned, and applicable safety research. The organization is committed to continuously rising standards of excellence.

6. **Hazard Controls Tailored to Work Being Performed.** *Administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work being performed and associated hazards.*

Attributes:

- Work hazards are controlled to prevent or mitigate accidents, with particular attention to low probability, high consequence events with unacceptable consequences.
- Safety analyses identifying work hazards are comprehensive and based on sound engineering judgment and data.
- Defense in depth is designed into highly-hazardous operations and activities, and include independent, redundant, and diverse safety systems, which are not overly complex. Defense in depth controls include engineering controls, administrative processes, and personnel staffing and capabilities.
- Emphasis is placed on designing the work and/or controls to reduce or eliminate the hazards and to prevent accidents and unplanned releases and exposures.
- A hierarchy of defense in depth is recognized and applied. Inherently safe designs are preferred over ones requiring engineering controls. Engineering safeguards are preferred over administrative controls. Administrative controls are preferred over personnel protective equipment.
- Equipment is meticulously maintained well within design requirements.
- Safety margins are rigorously maintained. Design and operating margins are carefully guarded and changed only with great thought and care. Special attention is placed on maintaining defense-in-depth.
- Organizations implement hazard controls in a consistent and reliable manner.
- Safety is embedded in processes and procedures through a functioning formal safety management system.
- Facility activities are governed by comprehensive, efficient, high-quality processes and procedures.
- Hazards are designed with an understanding of the potential for human error. Error-likely situations are identified, eliminated, or mitigated. Existence of known error-likely situations is communicated to workers prior to commencing work. Work is planned with consideration of error-likely situations.

7. **Operations Authorization.** *The conditions and requirements to be satisfied for operations to be initiated and conducted shall be clearly established and agreed upon.*

Attributes:

- Formal facility authorization agreements are in place and maintained between owner and operator.
- Readiness is verified before hazardous operations commence.
- Facility operations personnel maintain awareness of all facility activities to ensure compliance with the established safety envelope.
- Operations authorization is defined at the job and task level. The work authorization process verifies that adequate preparations have been completed so that work can be performed safely. These preparations include verifying that work methods and requirements are understood; verifying that work conditions will be as expected and not introduce unexpected hazards; and verifying that necessary controls are implemented.
- The extent of documentation and level of authority for agreement is based on the complexity and hazards associated with the work, and are clearly documented in the controlling ISM system description.

Supplemental High-Reliability Principles
for Effective Safety Management System Implementation

Based on experience and learning over the past 10 years since the inception of Integrated Safety Management, the Department has established the following four supplemental high-reliability principles to be used, along with the existing ISM guiding principles, to help develop the appropriate context or environment for effective implementation of Integrated Safety Management (ISM) systems within the Department of Energy and at its sites and facilities for 2005 and beyond:

A. **Highly-Reliable Operational Performance.** *Organizations achieve sustained, high levels of operational performance, encompassing all DOE and contractor activities to meet mission, safety, productivity, quality, environmental, and other objectives. High-reliability is achieved through a focus on operations, quality decision-making, open communications, deference to expertise, and systematic approaches to eliminate or mitigate error-likely situations.*

B. **Individual Attitude and Responsibility.** *Every individual accepts responsibility for safe mission performance. Individuals demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. All employees are mindful of work conditions that may impact safety, and assist each other in preventing unsafe acts or behaviors.*

C. **Performance Assurance.** *Competent, robust, periodic and independent oversight is an essential source of feedback that verifies expectations are being met and identifies opportunities for improvement. Performance assurance activities verify whether standards and requirements are being met. Performance assurance through conscious, directed, independent reviews at all levels brings fresh insights and observations to be considered for safety and performance improvement.*

D. **Organizational Performance Improvement.** *The organization demonstrates excellence in performance monitoring, problem analysis, solution planning, and solution implementation. The organization encourages openness and trust, and cultivates a continuous learning environment.*

A. **Highly-Reliable Operational Performance.** *Organizations achieve sustained, high levels of operational performance, encompassing all DOE and contractor activities to meet mission, safety, productivity, quality, environmental, and other objectives. High-reliability is achieved through a focus on operations, quality decision-making, open communications, deference to expertise, and systematic approaches to eliminate or mitigate error-likely situations.*

Attributes:

- Leaders are in close contact with the front-line; leaders pay attention to real-time operational information. Maintaining operational awareness is a priority. Leaders identify critical performance elements and monitor these closely.

- Operational anomalies, even small ones, get prompt attention and evaluation – this allows early detection of problems so necessary action is taken before problems grow.

- People are systematic and rigorous in making decisions that support safe, reliable operations. Workers are expected and authorized to take conservative actions when faced with unexpected or uncertain conditions. Leaders support and reinforce conservative decisions.

- Candid dialogue and debate and a healthy skepticism are encouraged when safety issues are being evaluated. Differing professional opinions are welcomed and respected. Robust discussion and constructive conflict are recognized as a natural result of diversity of expertise and experience.

- Leaders regularly and promptly communicate important operational decisions, their basis, expected outcomes, potential problems, and planned contingencies.

- Organizations know the expertise of their personnel. Leadership and decision-making are delegated to qualified individuals with relevant expertise during operational upset conditions. People closest to the operational upset are empowered to make important decisions, and are held accountable justly.

- Operations personnel are held to high standards of both technical understanding and detailed task-oriented performance. Operations personnel provide reliable and consistent responses to expected occurrences. Flexible responses to unexpected occurrences are based on continuous preparation and training. Formality and discipline in operations is valued.

- Organizational systems and processes are designed to provide layers of defenses, recognizing that people are fallible. Error prevention and mitigation defenses are used to preclude errors from propagating. Error-likely situation are sought out and corrected, and recurrent errors are carefully examined as indicators of latent organizational weaknesses. Leaders aggressively and promptly correct latent organizational weaknesses and measure the effectiveness of actions taken to close the gaps.

B. Individual Attitude and Responsibility. *Every individual accepts responsibility for safe mission performance. Individuals demonstrate a questioning attitude by challenging assumptions, investigating anomalies, and considering potential adverse consequences of planned actions. All employees are mindful of work conditions that may impact safety, and assist each other in preventing unsafe acts or behaviors.*

Attributes:

- Individuals understand and demonstrate responsibility for safety. Safety and its ownership are apparent in everyone's actions and deeds. Workers are involved in job planning. Workers follow approved procedures. Workers at any level can stop unsafe work or work during unexpected conditions.

- Workers are actively involved in identification, planning and improvement of work and work practices.

- People promptly report errors and incidents. People feel safe from reprisal in reporting errors and incidents; people offer suggestions for improvement and innovative solutions.

- People are mindful of the possibility and potential impact of process and equipment failures; people are sensitive to the potential of faulty assumptions and errors, and demonstrate constructive skepticism. People appreciate that mindfulness requires effort.

- People recognize that errors and imperfections are likely to happen. They recognize the limits of foresight and anticipation, and watch for things that have not been seen before. People appreciate that error-likely situations are predictable, manageable, and preventable, and seek to identify and eliminate latent conditions that give rise to human performance errors.

- Individuals cultivate a constructive, questioning attitude and healthy skepticism when it comes to safety. Team members support one another through both awareness of each other's actions and constructive feedback when necessary.

- Individuals are aware of and counteract human tendencies to simplify assumptions, expectations, and analysis. Diversity of thought and opposing views are welcomed and considered. Intellectual curiosity is encouraged.

- Individuals are intolerant of conditions or behaviors that have the potential to reduce operating or design margins. Anomalies are thoroughly investigated, promptly mitigated, and periodically analyzed in the aggregate. The bias is set on proving work activities are safe before proceeding, rather than proving them unsafe before halting. Personnel do not proceed when safety is uncertain.

- Individuals question deviances, and avoid institutional complacency or arrogance based on past successes. Individuals are attentive to indications of organizational arrogance, overconfidence, narrowed perception, or false optimism.

C. **Performance Assurance.** *Competent, robust, periodic and independent oversight is an essential source of feedback that verifies expectations are being met and identifies opportunities for improvement. Performance assurance activities verify whether standards and requirements are being met. Performance assurance through conscious, directed, independent reviews at all levels brings fresh insights and observations to be considered for safety and performance improvement.*

Attributes:

- Performance assurance consists of robust, frequent, and independent oversight, conducted at all levels of the organization. Performance assurance includes independent evaluation of performance indicators and trend analysis.

- Performance assurance programs are guided by plans that ensure a base level of relevant areas are reviewed. Assessments are performed to established requirements (or Criteria and Review Approach Documents).

- Efficient redundancy in monitoring is valued; higher levels of redundancy are recognized as necessary for higher risk activities.

- Performance Assurance includes a diversity of independent "fresh looks" to ensure completeness and to avoid complacency. A mix of internal and external oversight reviews reflects an integrated and balanced approach. This balance is periodically reviewed and adjusted as needed.

- The insights and fresh perspectives provided by performance assurance personnel are valued. Organizational feedback is actively sought to make performance assurance activities more value-added.

- Complete, accurate, and forthright information is provided to performance assurance organizations.

- Findings from performance assurance activities are effectively integrated into the performance improvement processes, such that they receive adequate and timely attention. Linkages with other performance monitoring inputs are examined, high-quality causal analyses are conducted, as needed, and corrective actions are tracked to closure with effectiveness verified to prevent future occurrences.

- Leaders throughout the organization set an example for safety through their direct involvement in oversight activities and associated performance improvement.

- Senior executives are periodically briefed on results of oversight group activities to gain insight into organizational performance and to direct needed corrective actions.

- Periodic ISM assessments are conducted and used as a basis for ISM program adjustments and implementation improvements.

D. Organizational Performance Improvement. *The organization demonstrates excellence in performance monitoring, problem analysis, solution planning, and solution implementation. The organization encourages openness and trust, and cultivates a continuous learning environment.*

Attributes:

- The organization actively and systematically monitors performance through multiple means, including leader walk-arounds, issue reporting, performance indicators, trend analysis, benchmarking, industry experience reviews, self-assessments, and performance assessments. Feedback from various means is integrated to create a full understanding.

- Processes are established to identify and resolve latent organizational weaknesses that can aggravate relatively minor events if not corrected. Linkages among problems and organizational issues are examined and communicated.

- Open communications and teamwork are the norm. People are comfortable raising and discussing questions or concerns. No news is bad news. All information is valued, because it shows that the organization is effectively self-monitoring.

- A high level of trust is established in the organization. Reporting of individual errors is encouraged and valued. A variety of methods are available for personnel to raise safety issues, without fear of retribution.

- Organization members convene to swiftly uncover lessons and learn from mistakes. Frequent incident reviews are conducted promptly after an incident to ensure data quality to identify improvement opportunities.

- Operating experience is highly valued, and the capacity to learn from experience is well developed. The organization regularly examines and learns from operating experiences, both internal and in related industries.

- Expertise in causal analysis is applied effectively to examine events and improve safety focus. High-quality causal analysis is the norm. Causal analysis is performed on a graded approach for both major and minor incidents. Any failure, no matter how small, is viewed as a window into the system that can spur learning.

- Performance improvement processes encourage workers to offer innovative ideas to improve performance and to solve problems.

- Leaders are actively involved in all phases of performance monitoring, problem analysis, solution planning, and solution implementation to resolve safety issues.

- Vigorous corrective and improvement action programs are in place and effective. Rapid response to problems and closeout of issues ensures that small issues do not become large ones. Managers are actively involved to balance priorities to achieve timely resolutions.

Implementation

Implementation of this vision is described in the Department's 2004-1 implementation plan to improve oversight of nuclear operations. Initially, DOE offices will be expected to prepare ISM system descriptions that address how these principles will be implemented to create the desired behaviors for effective ISM implementation. It is expected that some DOE contractors seeking excellence will find it beneficial to adopt all or part of this approach, and begin gaining experience and improved performance. Ultimately, DOE directives will be revised to capture the experience, lessons learned, successful implementation methods, and good practices related to implementation.

Conclusion

Thorough and consistent implementation of the principles in this document will provide the necessary environment for DOE organizations to succeed and thrive. These principles provide the vision for DOE to become a high-performing organization, with an excellent safety record and an excellent productivity record. These principles capture the elements needed for DOE to move beyond a compliance-based approach to a performance-based approach, consistent with more mature high-reliability organizations.

For example, the International Atomic Energy Agency (IAEA) developed a capability maturity model that illustrates the stages that an organization goes though in achieving a mature safety culture. These stages are:

> *Stage I.* The organization sees safety as an external requirement and not as an aspect of conduct that will help the organization to succeed. The external requirements are those of national governments, regional authorities, or regulatory bodies. There is little awareness of behavioral and attitudinal aspects of safety performance, and no willingness to consider such issues. Safety is seen very much as a technical issue. Mere compliance with rules and regulations is considered adequate.
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> *Stage II.* An organization at Stage II has a management which perceives safety performance as important even in the absence of regulatory pressure. Although there is growing awareness of behavioral issues, this aspect is largely missing from safety management methods which comprise technical and procedural solutions. Safety performance is dealt with, along with other aspects of the business, in terms of targets or goals. The organization begins to look at the reasons why safety performance reaches a plateau and is willing to seek the advice of other organizations.
>
> *Stage III.* An organization at Stage III has adopted the idea of continuous improvement and applied the concept to safety performance. There is a strong emphasis on communications, training, management style, and improving efficiency and effectiveness. Everyone in the organization can contribute. Some behaviors are seen within the organization which enables improvements to take place and, on the other hand, there are behaviors which act as a barrier to further improvement. Consequently, people also understand the impact of behavioral issues on safety. The level of awareness of behavioral and attitudinal issues is high, and measures are being taken to improve behavior. Progress is made one step at a time and never stops. The organization asks how it might help other companies.

The principles described herein can take the Department to IAEA Stage III performance, a fully developed safety culture.

Appendix G: DOE Expectations for Implementation of ISM at DOE Offices

DOE Expectations for Implementation of ISM at DOE Offices

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ISM Expectations for DOE HQ Program Offices (NA, EM, NE, SC, EH, OA)

1. ISM System Descriptions – As part of the ISM core function to "Define Work Scope," DOE HQ program offices will create and maintain ISM system descriptions that are accurate and up-to-date. ISM system descriptions for DOE program offices will be approved by the responsible DOE headquarters program office. These systems descriptions will describe how the program offices define their work activities related to achieving the ISM objective, as defined in DOE Policy 450.4, *Safety Management System Policy*. These system descriptions will describe the ISM mechanisms, processes and methods by which the program office implements the five ISM core functions. These system descriptions will describe the processes and methods used to create an effective environment for ISM implementation, as defined by the seven ISM guiding principles and four supplemental high-reliability principles (articulated in the 2004-1 Implementation Plan). These system descriptions will describe how the program office will measure ISM effectiveness, perform annual reviews of ISM effectiveness, and prepare annual ISM declarations. These system descriptions will also establish, document, and implement relevant safety performance objectives, performance measures, and commitments in response to program and budget execution guidance while maintaining the integrity of the system. ISM system descriptions will be updated at least annually, as needed.

These ISM system descriptions will follow applicable DOE guidance, including that found in DOE Guide 450.4, *Integrated Safety Management System Guide*. These ISM system descriptions are the controlling management system descriptions for the program office and must be integrated with the Quality Assurance Program (see existing requirement in DOE Order 414.1C, *Quality Assurance*). These systems will be integrated with the office business processes for work definition and planning, budgeting, authorization, execution, change control, performance measurement, and performance evaluation. These ISM system descriptions may be integrated into a single document with the program Functions, Responsibilities and Authorities document, which must be consistent with the ISM system descriptions.

2. Annual Effectiveness Reviews of ISM Implementation – As part of the ISM core function of "Feedback and Improvement," DOE HQ program offices will perform annual

self-assessment reviews of ISM implementation at the program office level. DOE HQ program offices will also perform line-oversight reviews of their site offices' implementation of ISM, including an integrated review of the site level annual ISM reviews and declarations by both federal and contractor organizations.

3. Annual ISM Declarations – As part of the ISM core function of "Feedback and Improvement," DOE HQ program offices will annually declare in writing whether ISM is effectively implemented within that program office. If not, corrective or compensatory actions will be defined, tracked, and verified. Annual ISM declarations should provide a detailed basis which includes the annual ISM review, lower-level ISM reviews, and pertinent feedback data from a variety of mechanisms. Areas for improving ISM implementation performance will be clearly identified to promote continuous improvement. Annual ISM declarations should be provided to the DOE senior official above the program office (EH will declare to the DS; NA will declare to NA-1; EM, NE, and SC will declare to US-ESE; OA will declare to the Secretary concerning the status of implementation of ISM in the total DOE complex).

4. Annual Performance Expectations and Performance Objectives – As part of the ISM core function of "Feedback and Improvement," DOE HQ program offices will annually prepare safety performance objectives, performance measures, and commitments, for approval by the DOE senior official above the program office (DS will approve EH's, NA-1 will approve NA's, US-ESE will approve those for EM, NE and SC, etc.).

ISM Expectations for DOE Field Offices

1. ISM System Descriptions – As part of the ISM core function to "Define Work Scope," DOE field offices (including NNSA site offices and EM project offices) will create and maintain approved ISM system descriptions that are accurate and up-to-date. ISM system descriptions for DOE field offices will be submitted for review and approval by the responsible program office. These systems descriptions will describe how the field offices define their work activities related to achieving the ISM objective, as defined in DOE Policy 450.4, *Safety Management System Policy*. These system descriptions will describe the processes and methods by which the field office implements the five ISM core functions. These system descriptions will describe the ISM mechanisms, processes and methods used to create an effective environment for ISM implementation, as defined by the seven ISM guiding principles and four supplemental high-reliability principles (articulated in the 2004-1 Implementation Plan). These system descriptions will describe how the field office will measure ISM effectiveness, perform annual reviews of ISM effectiveness, and prepare annual ISM declarations. These system descriptions will also establish, document, and implement relevant safety performance objectives, performance measures, and commitments in response to program and budget execution guidance while maintaining the integrity of the system. ISM system descriptions will be updated at least annually, as needed.

These ISM system descriptions will follow applicable DOE guidance, including that found in DOE Guide 450.4, *Integrated Safety Management System Guide*. These ISM system descriptions are the controlling management system descriptions for the field office and must be integrated with the Quality Assurance Program (see existing requirement in DOE Order 414.1C, *Quality Assurance*). These systems need to be integrated with the office's business processes for work definition and planning, budgeting, authorization, execution, change control, performance measurement, and performance evaluation. These ISM system descriptions may be integrated into a single document with the program Functions, Responsibilities and Authorities document, which must be consistent with the ISM system descriptions.

2. Annual Effectiveness Reviews of ISM Implementation – As part of the ISM core function of "Feedback and Improvement," DOE field offices will perform annual self-assessment reviews of ISM implementation at the field office level. DOE field program offices will also perform line-oversight reviews of their contractor implementation of ISM, including an integrated review of contractor annual ISM reviews and declarations, if the office has more than one contractor.

3. Annual ISM Declarations – As part of the ISM core function of "Feedback and Improvement," DOE field offices will annually declare in writing whether ISM is effectively implemented within that field office. If not, corrective or compensatory actions will be defined, tracked, and verified. Areas for improving ISM implementation performance will be clearly identified to promote continuous improvement. Annual ISM declarations should provide a detailed basis which includes the annual ISM review, lower-level ISM reviews, and pertinent feedback data from a variety of mechanisms. Annual ISM declarations should be provided to the responsible HQ program office for review.

4. Annual Performance Expectations and Performance Objectives – As part of the ISM core function of "Feedback and Improvement," DOE field offices will annually prepare safety performance objectives, performance measures, and commitments, for approval by the HQ program office.

ISM Expectations for Review of DOE HQ Program Offices

1. Line Oversight – DOE Central Technical Authorities (CTAs) will review Annual ISM reviews, declarations, and performance objectives for their line organizations, for both headquarters line organizations and for field offices.

2. Independent Oversight – DOE OA will perform periodic independent oversight of ISM implementation at all levels (i.e., DOE headquarters program offices, DOE field offices, and DOE contractors).

Schedule

1. ISM Workshop on ISM System Descriptions (by the end of August 2005)

2. Issue template for ISM system descriptions for Headquarters programs (by October 2005).

3. Issue draft ISM system descriptions for Headquarters programs (by January 2006).

4. Issue approved ISM system descriptions for Headquarters programs (by March 2006).

5. Issue draft ISM system descriptions for field offices (by May 2006).

6. Issue approved ISM system descriptions for field offices (by August 2006).

7. Complete first annual ISM reviews within 1 year of approval of ISM system descriptions (by August 2007)

8. Complete first annual ISM Declarations within 1 year of approval of ISM system descriptions (by August 2007)

9. Complete preparation and approval of first set of annual ISM performance objectives within 1 year of approval of ISM system description (by August 2007)