A PRACTICAL APPROACH FOR INTEGRATING ISMS INTO EVERYDAY WASTE MANAGEMENT FIELD ACTIVITIES

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ABSTRACT

The U.S. Department of Energy (DOE) requires that activities be performed in a manner that protects DOE, contractor personnel and the general public against all environmental, health, and safety hazards. Therefore, it is DOE's expectation that all employees integrate the principles of the Integrated Safety Management System (ISMS) into their existing and future work activities. WESKEM, LLC's programmatic ISMS infrastructure uses a graded approach that takes into account the nature and hazards of the work to be performed. Programmatic elements consisting of: 1) a Field Work Request (FWR) (define the scope of work); 2) an Activity Hazard Review (AHR) form (analyze the hazards); 3) an Activity Hazard Analysis (AHA) database (develop and implement hazard controls); 4) pre-job briefings to confirm readiness (perform work); and 5) post-job briefings, end-of-day ISMS meetings, and corrective actions (feedback and continuous improvement) ensure that ISMS is followed in a consistent manner. This paper formalizes WESKEM, LLC's commitment to integrating ISMS into everyday waste management field activities. In addition, this information was used to complete a successful ISMS reverification effort during Fiscal Year 2003.

INTRODUCTION

The U.S. Department of Energy (DOE) requires that activities be carried out in a manner that protects DOE, contractor personnel and the general public against all environmental, health, and safety hazards. Therefore, it is DOE's expectation that all employees integrate the principles of the Integrated Safety Management System (ISMS) into their existing and future work activities. The details of ISMS are provided in the following references:

- 48 CFR (DEAR) 970.5204-2, *Integration of Environment, Safety and Health Into Work Planning & Execution* (1)
- 48 CFR 970.5204-78, *Laws, Regulations, and DOE Directives* (2)
- DOE Policy 450.4, *Safety Management System Policy* (3)
- DOE G 450.4-1B, *Integrated Safety Management Guide (Volumes 1 and 2)* (4)
- DOE Policy 450.5, *Line Management, Safety, and Health Oversight* (5)
- DOE Policy 450.6, *Secretarial Policy Statement, Environment, Safety and Health* (6)
- DOE M 411.1-1B, *Safety Management Functions, Responsibilities, and Authorities Manual (FRAM)* (7)
- DOE Handbook DOE-HDBK-3027-99, *Integrated Safety Management Systems (ISMS) Verification – Team Leaders' Handbook* (8)

These references yield five core safety management functions providing the necessary structure for work activities. The functions are applied as a continuous cycle with the degree of rigor appropriate for the type of work activity and the hazards involved. These functions are:

1) Define the Scope of Work
   - Translate mission into work
   - Set expectations
   - Prioritize tasks and allocate resources

2) Analyze the Hazards
   - Identify and analyze hazards
   - Categorize hazards

3) Develop and Implement Hazard Controls
   - Identify standards and requirements
   - Identify controls to prevent/mitigate hazards
   - Establish safety controls
   - Implement controls

4) Perform Work
   - Confirm readiness
   - Perform work safely

5) Feedback and Continuous Improvement
   - Collect feedback information
   - Identify improvement opportunities
   - Make changes to improve
   - Oversight and enforcement

Essentially, ISMS provides a formal organized process whereby employees can plan, perform, assess, and continually improve the safe conduct of translating "mission-to-work" for the DOE and its contractors. Although the regulatory and contractual information is explicit in requiring ISMS, the secondary objective requires a process for integrating ISMS into management and work practices at employee levels. This paper formalizes WESKEM, LLC's commitment to integrating ISMS into everyday waste management field activities. Additional project benefits include establishing expectations, prioritizing tasks and allocating resources effectively. In addition, the information contained in this paper was used to complete a successful ISMS reverification effort during Fiscal Year 2003.

FIVE PROGRAMMATIC ELEMENTS

WESKEM, LLC activities consist of storing, inspecting, inventorying, handling, characterizing, sampling, sorting, treating, and preparing low-level radioactive waste and mixed waste for transportation and disposal. Since these activities can involve direct handling and contact with various types of waste forms, project objectives consist of maintaining the health and safety of the employees, general public and the environment, as well as communicating with subcontractors and third-party organizations. To accomplish these objectives, WESKEM, LLC's programmatic ISMS infrastructure is comprised of five elements that use a graded approach when taking into account the nature and hazards of the work to be performed.

Define the Scope of Work - Field Work Request

The first element is comprised of a Field Work Request (FWR) that is initiated based on individual proposals, work releases or project baseline schedules. Therefore, the FWR defines the scope of work to be performed by the field teams and lists support activities. The FWR ensures the proper planning, generation, approval and completion of work activities, and is generated for each new project. The FWR is initiated through project management consisting of the project manager, project planner and waste stream manager. The FWR is assigned to a specific front line manager and field team. In addition to performing a field walkdown to generate a step-by-step approach of how the work is to be completed, the FWR includes the following information; a list of personnel by position who will work under the FWR; documents and attachments; an Environmental, Safety and Health (ES&H) evaluation; special tools, equipment and personal protective equipment; training; and required permits. Supplemental information includes pre-mobilization and start-up mobilization directions; nuclear criticality safety (NCS) assessments, characterization and inventories; waste characterization, packaging and storage instructions; followed by demobilization directions.

Analyze the Hazards - Activity Hazard Review (AHR)

The information obtained from the FWR and field walkdown is used to address the second element comprised of an Activity Hazard Review (AHR). Depending on the scope of a project, information from field walkdowns and tabletop meetings is collected on an AHR form. Examples of hazards listed on the AHR form include physical hazards, safety/construction hazards, chemical hazards, ionizing/non-ionizing hazards, biological/vector hazards, and environmental hazards. A copy of the AHR form is available in its entirety elsewhere (9). The AHR form is used to identify and categorize the types of known, potential or non-existent hazards associated with the work activities. An AHR form is generated for every new project and developed through tabletop sessions comprised of individual work teams and support personnel planning to perform the actual work. Tabletop activities consist of reviewing the FWR and supplemental project documentation (e.g., field walkdowns, records search, process knowledge, labels, etc.) in order to plan work. Field teams participating in these planning meetings may consist of a front line manager, security/NCS inspectors, environmental compliance specialists, operators, field coordinators, and representatives from the ES&H Department and the radiological control organization.

Develop and Implement Hazard Controls – Activity Hazard Analysis (AHA)

The FWR, AHR, and information gathered from performing field walkdowns by representatives from the ES&H Department, front line managers and the field work crews are used to develop the third element - a draft AHA. The draft AHA documents the potential failure along with consequence scenarios for a particular hazard and recommends whether the type of mitigation appears appropriate or whether additional controls should be implemented. The draft AHA is organized in sequential steps according to the progression of work and the types, magnitudes and expected interactions of the identified hazards. The ES&H Department representative (e.g., Site Safety and Health Officer) then evaluates and recommends controls to mitigate the identified hazards. Information such as procedures, tools, personal protective equipment and special instructions are included in the draft AHA which is subsequently reviewed and approved by support organizations (e.g., health physics, maintenance) involved with the work. This subsequent review provides the opportunity for feedback from all direct, subcontractor and third-party support personnel. Once the reviews are compete, the draft AHA is finalized and included in the field work package documentation.

To enhance web-based capabilities and interaction across four separate work sites located in Kentucky and Tennessee, an AHA database has been developed to capture this information into a single system. Over 200 work activities have already been recorded in the database. Using this streamlined AHA

method has also improved AHA preparation time from over four hours to an average of one hour, allowing more time to analyze unique hazards and develop appropriate controls. Also, the enhanced configuration control creates a readily available AHA library to research and utilize along with standardizing hazard analysis and control selection. The AHR/AHA system provides an applied example of how the ISMS concept has evolved into a standardized field-deployed tool yielding considerable efficiency gains in project planning and resource utilization. Employee safety is preserved through detailed planning that now requires only a portion of the time previously necessary. The available resources can then be applied to implementing appropriate engineering, administrative and personal protective equipment controls in the field (9).

Perform Work – Tools and Communication

Direct and active employee participation is the key to the fourth element which is to perform work safely and successfully. Therefore, clear and unambiguous lines of authority and responsibility are defined for all WESKEM management, administrative and technical staff. These lines of authority are defined in the organizational chart and responsibilities are outlined in position job descriptions. Job tasks and responsibilities are communicated, understood and agreed upon by those employees involved prior to commencement of work. When alternate employees fill in temporarily, they are briefed on the work planning process and informed of any identified hazards associated with the work being performed.

Although radioactive and mixed waste management activities are generally routine in nature, they primarily rely heavily on the training and qualifications of the personnel performing the work and employee feedback. Trained and qualified workers possess the knowledge and job skills to perform their assigned tasks safely. Training is verified by the training coordinator, an ES&H Department representative and the front line manager (e.g., access cards and passports [10]), while on-site reference materials (e.g., procedures, AHA, Health and Safety Plan, etc.) are made available for easy access in the field. To enhance clear and concise communication to all project personnel, all employees attend daily pre-job briefings that cover the work for the day, hazards and hazard controls, evacuation and assembly points. Plant and building-specific notifications are made, as necessary, when activities affect contiguous operations not governed by WESKEM, LLC. In addition to having ES&H (e.g., perform industrial hygiene monitoring) and health physics support assigned to each team, every employee is issued a "Stop/Suspend Work" authorization card granting employees the right and responsibility to: 1) report unsafe conditions; 2) interrupt work; or 3) stop work without fear of reprisal. The card states that:

> Front: *"I (employee name), have the right, obligation, and authority to stop work immediately if work jeopardizes the safety and health of my coworkers, the environment, or me, or creates a significant condition adverse to quality. Safety is the bottom line."*
>
> Back: *"My 'Stop Work' authority can be exercised if ever I observe 'imminent danger' at the work site. Imminent danger means a condition or hazard that would reasonably be expected to cause death or serious harm to workers or members of the public immediately before such condition or hazard can be eliminated through normal practices. I may exercise this right at a WESKEM work site without fear of reprisal."*

Examples of STOP work include the following:

- Samplers verifying an area was bermed before beginning invasive drum sampling operations.
- Operators wearing respirators, and thus having a limited field of vision, recommended removing a row of empty pallets from an area using a forklift, thus making it easier to access a second row of drums and eliminate potential slip/trip/fall injuries.

- An A-frame lifting device began squeaking while in use, was promptly removed from service by the ES&H Department representative and front line manager and replaced with another A-frame lifting device.

- An unknown drum was discovered in a work area making a "popping" sound. The ES&H Department representative restricted access to the area, obtained information using binoculars, and provided all initial response notifications. The site Hazardous Materials Response (HAZMAT) Team identified drum contents that was later identified as hydraulic oil.

- While performing radiological surveys of rails, a previous lessons learned indicated the need to minimize bending and stooping by employees. A process was implemented to elevate rails on forklift tines, but was shown to be inefficient prompting a "STOP" work. The new process included using longer handles on instruments and setting rails on cribbing, thus eliminating potential back injuries.

When employees are empowered, they work to achieve success instead of working to avoid failure. Distress and apathy are created when individuals are held accountable for issues outside of their control. In addition, a "STOP" work does not always suggest that the encountered activities are either unsafe or outside the defined scope of work. It provides the opportunity to verify the assigned controls are in place before work begins.

Feedback – Feedback and Continuous Improvement

The fifth and last element consists of providing feedback for continuous improvement. This element is accomplished using post-job briefings, end-of-day ISMS meetings for feedback and communication, and third-party employee suggestion programs. The Quality Assurance (QA) department organizes internal (e.g., management) and independent (e.g., DOE) site assessments and inspections. Recommended corrective actions identified by field personnel during routine inspections are initiated prompting updates or revisions to existing documentation. The process consists of recording issues/opportunities and submitting them to QA using an Issue Tracking Report mechanism. The QA department then prepares an Issue Response Request which is forwarded to responsible personnel to develop interim and permanent corrective actions with owners and closure dates. The goal of the corrective action process is designed to prevent recurrence. QA then tracks issues and corrective actions to final resolution. In addition to internal/external audits, feedback is obtained from other third-party organizations; regular contractor and subcontractor monthly meetings (e.g., monthly "STOP" committee meeting); reviewing the Occurrence Reporting System periodically; and distributing lessons learned obtained from other DOE sites.

Case Studies

The following field projects all used the ISMS process: 1) a room containing both hazardous (e.g., hydrofluoric acid) and radioactive constituents (11); 2) a former reaction vessel containing approximately 568 liters (150 gallons) of lime sludge and technetium-99 (12); 3) drum crushing/soil repackaging operations; 4) handling overpressurized drums; and 5) developing in-house forklift, respiratory protection and industrial hygiene training modules. This process allowed responsible personnel to evaluate and implement work-related decisions based on their knowledge, experience, expertise, and feedback from field observations. Also, these efforts have been performed in conjunction with WESKEM, LLC's safety philosophy for continuous safety improvement. Furthermore, working together has yielded increased productivity and is used as a catalyst to open communications, confirming that strong internal and external communication fosters problem resolution resulting in successful project completion.

CONCLUSIONS

This paper documents how the DOE's ISMS principles are integrated into everyday waste management field activities. These principles consist of worker involvement in all stages of planning, hazard analysis and control, work execution, feedback and using lessons learned. WESKEM employees are directly involved with identifying and categorizing operational hazards associated with the scope of work. Before work starts, every project, operation, or facility that has the potential to impact employee safety and health, equipment, property, environment, and/or the public are processed using the five ISMS elements, thus ensuring consistency. Defined organizational roles and responsibilities are identified on every project, and requirements are communicated and understood by those employees involved prior to commencement of work. Resources can then be allocated to address ES&H, programmatic, and operational considerations effectively in order to protect the workers, public and environment when waste management field activities are planned and performed within a defined scope of work. Based on the successful results of this program, other organizations working within the DOE complex can use this information to support their own ISMS reverification objectives.

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FOOTNOTES

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