

DUF₆

Depleted Uranium
Hexafluoride
Conversion Project

DUF6-PLN-040

REV. 2

ISSUING ORGANIZATION: ENVIRONMENT, SAFETY, AND HEALTH

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INTEGRATED SAFETY MANAGEMENT SYSTEM PLAN

Mid-America Conversion Services, LLC

U.S. Department of Energy
Portsmouth/Paducah Project Office
Portsmouth Site
Paducah Site

APPROVAL PAGE

REFER TO 4320 FOR APPROVERS AND APPROVAL DATES

DISCLAIMER

This document was prepared by Mid-America Conversion Services, LLC (MCS) under United States Department of Energy (DOE) Contract DE-EMC0004559, and is intended for use solely in conjunction with the Depleted Uranium Hexafluoride (DUF₆) Conversion Project. The information contained herein shall not be disclosed, duplicated, or released in whole or in part for any purpose other than the DUF₆ Conversion Project without the express written consent of the DOE and MCS.

REVISION LOG			
Revision	Effective Date	Description of Change	Pages Affected
0	02/01/2017	Initial release by MCS to replace DUF6-BWCS-PLN-040. Updated to reflect MCS contract with DOE and MCS ES&H Policy.	All
1	12/13/2017	Updated procedures, policies, and program titles and identifying numbers. Minor editorial and grammatical corrections. Note: DUF6 identifying prefixes on the title numbers were used as authorized by the blue sheet process.	All
2	11/16/18	Updated procedures, policies, DOE Orders, and program titles and identifying numbers. Minor editorial and grammatical corrections. Note: DUF6 identifying prefixes on the title numbers were used as authorized by the blue sheet process.	All

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ACRONYMS

CFR	Code of Federal Regulations
DEAR	Department of Energy Acquisition Regulation
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
DUF ₆	Depleted Uranium Hexafluoride
EMS	Environmental Management System
ERPP	Environmental Radiation Protection Program
ES&H	Environment, Safety, and Health
ESH&QA	Environment, Safety, Health and Quality Assurance
FP	Fire Protection
HA	Hazard Analysis
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
MCS	Mid-America Conversion Services, LLC
NCS	Nuclear Criticality Safety
O	Order
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
P	Policy
POMC	Performance, Objectives, Measures and Criteria
PPE	Personal Protective Equipment
PQAP	Project Quality Assurance Plan
QA	Quality Assurance
RPP	Radiation Protection Program
SMP	Safety Management Plan
SOW	Scope of Work
SRDs	System Requirements Documents
TRC	Total Recordable Cases
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question

EXECUTIVE SUMMARY

This *Integrated Safety Management System Plan*, hereafter entitled ISMS program description, reflects MCS approach for integrating safety into all aspects of work planning and execution for operations and maintenance (O&M) activities of the DUF₆ Conversion Project, hereafter referred to as the Project. In accordance with DOE guidance pertaining to integrated safety management (ISM), the term safety encompasses protecting the environment (including environmental compliance, pollution prevention, resource conservation and waste minimization), as well as occupational/industrial safety, health, and radiation protection.

This ISMS program description has been developed in compliance with the Contract¹; 10 Code of Federal Regulations (CFR) 830, *Nuclear Safety Management*, Subpart A-*Quality Assurance Requirements*; DOE Acquisition Regulation (DEAR) 952.223-71, *Integration of environment, safety, and health into work planning and execution*; DOE Order (O) 436.1, *Departmental Sustainability*; DOE O 450.2, Change 1, *Integrated Safety Management*; 10 CFR 835, *Occupational Radiation Protection*; 10 CFR 851, *Worker Safety and Health Program*; DOE O 440.1B, Change 2, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*; and DUF6-PLN-001, *Project Management Plan*.

Key to implementation of this ISMS program description is the understanding that this is an integration document that includes both cylinder storage yards and conversion facility's O&M activities at the DOE Paducah Gaseous Diffusion Plant in Paducah, Kentucky and the DOE Portsmouth Gaseous Diffusion Plant in Portsmouth, Ohio. The Project's ISMS Program for O&M is implemented primarily through the management systems defined in the DUF6-PLN-003, *Project Quality Assurance Plan (PQAP)*. Consistent with 10 CFR 830, Subpart A, the PQAP integrates the ten quality assurance (QA) criteria with the five core functions and eight guiding principles of ISMS as defined in this ISMS program description, thereby ensuring a single integrated management system for the Project. To ensure ISMS implementation and continuous improvement, assessments will be performed in accordance with the PQAP and its implementing assessment procedures as defined in DOE O 414.1D Change 1, *Quality Assurance*.

The Project's ISMS Program is also supported by other key Project-specific documents (e.g., DUF6-PLN-001, *Project Management Plan*; DUF6-PLN-002, *Regulatory and Permitting Management Plan*; DUF6-PLN-011, *Cylinder Surveillance and Maintenance Plan*; DUF6-PLN-014, *Conversion Facilities Operations and Maintenance Plan*; DUF6-PLN-015, *Records Management Plan*; DUF6-U-SMP-005, *Safety Management Program Descriptions for the DUF₆ Conversion Project*; DUF6-PLN-074, *Worker Safety and Health Program*; and the implementing procedures/documents for these and other various supporting plans). As a supplement to this ISMS program description, a matrix that demonstrates the Project's integration approach is included for the cylinder yards and conversion facilities O&M.

¹ DOE Contract No. DE-EMC0004559

1 INTRODUCTION

The ISMS program description reflects the MCS approach to the integration of environmental protection and worker health and safety into all aspects of work planning, performance, and continuous improvement. This ISMS program description ensures a streamlined approach and facilitates implementation of the DUF₆ Conversion Project.

For the purposes of this ISMS program description, safety encompasses protecting the environment (including environmental compliance, pollution prevention, resource conservation, and waste minimization), as well as occupational/industrial safety, health, and radiation protection. Other programs including engineering, procurement, fire protection, emergency preparedness, maintenance, training, and chemical safety have utilized the elements of ISMS in their development and thereby support the complete MCS ISMS program. This ISMS program description has also been developed to: (1) demonstrate compliance with the Contract; applicable requirements of 10 CFR 830, *Nuclear Safety Management, Subpart A-Quality Assurance Requirements*; DEAR 952.223-71, *Integration of environment, safety, and health into work planning and execution*; DOE O 436.1, *Departmental Sustainability*; DOE O 450.2, Change 1, *Integrated Safety Management*; 10 CFR 835, *Occupational Radiation Protection*; 10 CFR 851, *Worker Safety and Health Program*; DOE O 440.1B, Change 2, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*; and DUF6-PLN-001, *Project Management Plan*; and (2) describes how the ISMS process is integrated into the O&M activities of the Project.

This ISMS program description references the Project's QA program approach to implementing a strong environment, safety, and health (ES&H) posture within the requirements of the Project and without compromise to ES&H objectives. Consistent with 10 CFR 830, Subpart A and DOE O 414.1D Change 1, *Quality Assurance*, the DUF6-PLN-003, *Project Quality Assurance Plan*, integrates the ten QA criteria with the five core functions and eight guiding principles of ISMS as defined in this ISMS program description. The Project's ISMS Program also relies on other key Project-specific documents (e.g., DUF6-PLN-001, *Project Management Plan*, and implementing procedures for various supporting plans). A matrix that specifically demonstrates the Project's integrated approach is provided in Attachment A.

Implementation of the PQAP is fully consistent with and supportive of the principles and functions of the ISMS. The expectation in the PQAP is that all work meets established standards and requirements allowing work to be completed safely within established procedures. The PQAP also describes processes that are utilized to seek continuous improvements by identifying and correcting deficiencies and preventing their recurrence. Subcontractors performing work at the sites to support cylinder yard and conversion facility operations will also utilize this ISMS program description and its implementing documents to the extent that such requirements are incorporated into subcontractor documents. Subcontractors may utilize equivalent implementing documents as approved by MCS; however, the documents must implement the requirements of this ISMS program description. The PQAP will provide the overall assessment authority to assure that MCS, its member organizations, and subcontractors comply with the requirements of this ISMS program description.

One of the purposes of this document is to assure that an adequate ISMS process has been identified. This purpose is accomplished by describing the relationship to the PQAP and by providing a mapping of the requirements of the ISMS five core functions to specific MCS control mechanisms (i.e., plans, procedures) that implement the requirements of this document. To facilitate an understanding of the context within these control mechanisms, descriptions of processes and their interrelationships are also described.

This ISMS program description facilitates an understanding by Project personnel of the ISMS process and provides a model from which focus on excellence in performance and improvements to the overall ISMS process can be discussed and considered.

Attachment A identifies the administrative controls (primarily plans and procedures) for implementing the systems and processes for O&M of the conversion facilities and the surveillance and maintenance of the cylinder storage yards. Additionally, the attachment serves as a cross-reference between the applicable administrative controls used by the Project and the five DOE ISMS core functions as discussed in this ISMS program description.

The ISMS program description is organized as follows:

Section 2, "SAFETY MANAGEMENT SYSTEM COMMITMENT AND CONTROLS OVERVIEW" introduces the Project's related commitments and policies and describes the identification of applicable requirements.

Section 3, "ROLES AND RESPONSIBILITIES" introduces specifics related to the organization and roles and responsibilities of management, workers, and subcontractors.

Section 4, "INTEGRATED SAFETY MANAGEMENT SYSTEM OVERVIEW" describes how the five core functions and eight guiding principles of DOE ISMS are addressed for the Project through programs and processes.

Section 5, "FUNCTIONS" describes how MCS implements the ISMS Core Functions and Guiding Principles.

Section 6, "MAINTAINING AND IMPROVING INTEGRATED SAFETY MANAGEMENT" describes the Project's approach to ensuring that work continues to be conducted efficiently and continuously improves in a manner that protects the health and safety of the worker.

Section 7, "SUPPORTING INFORMATION" lists the major documents and/or requirements implemented by the ISMS program description.

Attachment A includes an implementation matrix that correlates the applicable implementation mechanisms for O&M of the conversion facilities and cylinder storage yards (e.g., practices, procedures, and subcontract clauses) with the five DOE ISMS core functions. This information is also referenced in Section 4.2.5 and 4.2.6.

Implementation of this ISMS program description requires that the organization integrate safety including environmental protection into all aspects of work planning and execution, using the guiding principles and core functions. Integration means that all systems and programs are designed to fit together to ensure safe and efficient performance of work.

2 SAFETY MANAGEMENT SYSTEM COMMITMENT AND CONTROLS OVERVIEW

The following subsections and referenced attachments provide an overview of the MCS commitment and policy related to the Project's ISMS that promotes the company's core values and commitment to ensuring the safety and health of every worker, the public, and the environment.

2.1 ENVIRONMENT, SAFETY, AND HEALTH POLICY

MCS has established an ISMS Program that promotes the company's core values including a commitment to providing a safe and healthy workplace for employees and to protecting the public and the environment. The objective of MCS' ISMS is to systematically integrate safety, health, QA, the Environmental Management System (EMS) including environmental management, environmental protection, environmental compliance, pollution prevention, resource conservation, and waste minimization into management and work practices at all levels so that work is performed safely and in a compliant manner that is protective of the worker, public, and environment. MCS' management commitment to ISM excellence is established in DUF6-POL-060, *Environment, Safety and Health Policy*.

MCS' ISMS Program integrates and implements an EMS graded to the activities being performed. Through implementation of the integrated ISMS/EMS, effective protection of workers, the surrounding communities, and the environment can be achieved while meeting operating objectives to comply with legal and other requirements.

2.2 ENVIRONMENT, SAFETY AND HEALTH COMMITMENT

Safety leadership starts at the top level of management. MCS' President & Project Manager and Senior Managers are responsible for protecting the environment; the safety, and health of every worker in the organization, including those employed by our subcontractors; as well as that of visitors and the public. Management's commitment to these responsibilities establishes and flows down these standards to all employees, subcontractors, and subcontractor employees. Objectives related to the Project commitment are provided in the following paragraphs.

2.2.1 Safety and Health

MCS protects the safety and health of workers and the public by identifying, analyzing, and mitigating hazards and utilizing sound work practices. Safety is not compromised for the sake of Project objectives (cost and schedule). All of MCS's employees and subcontractors are held responsible for complying with requirements during all work activities.

2.2.2 Environmental Management System

Pursuant to DOE O 436.1, *Departmental Sustainability*, the DUF6 Project has developed and implemented an EMS. The EMS integrates environmental protection, environmental compliance, pollution prevention, and continual improvement into work planning and execution throughout all work areas as a function of the ISMS Program. The EMS is based upon the elements of the International Organization of Standardization 14001:2004 as incorporated in the *Environmental Management System Plan*, DUF6-PLN-118. Through implementation of the integrated ISMS/EMS, effective protection of workers, the surrounding communities, and the environment can be achieved while continuing to meet operating objectives and while complying with legal, contractual, environmental, regulatory, and other requirements.

2.2.3 Facility Safety Programs

Controls are developed to ensure that no undue risk of accidents occurs that could adversely affect the public, worker, or environment. Controls are established in accordance with a hazards-based graded approach, and supplemented with a defense-in-depth concept to prevent accidents, as well as to limit consequences should accidents occur.

2.2.4 Safety Management System Integration with Quality Assurance

Effective implementation of QA requirements supports the principles and functions of ISMS. In this regard, the QA program ensures compliance with approved standards and requirements, so that the expectation for safe work within controls is met, and workers, the environment, and the public are protected from harm. The MCS management systems assure that quality and safety requirements are properly integrated to achieve their objectives.

2.2.5 Contractor Assurance System

DUF6-PLN-145, *Site Contractor Assurance System (CAS) Description*, provides the assurance of mission success demonstrated by environment, safety, QA, project management and operational business excellence achieved through implementation of:

- Well defined requirement identification, adoption, and implementation processes
- Graded and integrated risk management processes applied to MCS activities
- Functional area improvements driven by appropriate performance metrics, management and self-assessments, and effective actions
- A robust and pervasive culture that stresses safety and quality

2.2.6 Worker Involvement

MCS manages the Project in a manner that encourages the involvement of employees in the identification and control of hazards in the workplace. Workers have the right and responsibility to express concerns about safety and to seek resolution of those concerns. Mechanisms for ensuring worker involvement include participation in job planning, walk-downs, pre-job briefings, Safety First suggestions, safety suspensions/stop work actions, and post-job feedback.

2.2.7 Stop Work

Work will be brought to a safe condition and/or stopped rather than continued in an unsafe manner. Individuals within the Project have the right and obligation to stop work when they believe it cannot be conducted in a safe manner, is detrimental to worker and/or public safety, quality, or it has an unacceptable impact on the environment. The process of pausing, suspending, and/or stopping work is described in procedure DUF6-U-QAP-0022, *Time Out/Stop Work*.

2.2.8 Environment, Safety and Health Culture

MCS is committed to a culture that focuses on zero-accident performance. MCS's commitment adheres to the premise that all accidents are preventable. This commitment starts at the top of the organization with the President & Project Manager and flows down through all managers and employees of the organization, including subcontractors. MCS' commitment creates a safe working environment that empowers employees to "take charge" of their own safety and to work with supervision to remove unsafe conditions/actions prior to their development. This commitment shall be institutionalized into all phases of the Project and is documented in the MCS ES&H Policy, *DUF6-POL-060*.

2.3 SAFETY MANAGEMENT SYSTEMS/CONTROLS

A set of underlying management systems and practices are integral to implement successfully any process or program. These systems provide the procedures and other management tools required to establish MCS's integrated approach to safety management.

2.3.1 Budget and Financial Management

MCS's budget and financial management system includes the following business management functions: Project work breakdown structure, scope definition, performance milestones, cost estimate, budget, risk-based analysis, critical path schedule logic, project schedule, charge code structure, cost accounting, funds management, and baseline change control. These functions assist the line organizations in defining the scope of work (SOW) and monitoring progress. They are integrated in the Project Baseline and are maintained under configuration management via a joint DOE/MCS baseline change control process. The Baseline provides the basis for establishing annual work scope and goals which are measured through performance-based incentives and performance objectives.

2.3.2 Conduct of Operations

Conversion facility and cylinder yard conduct of operations is based on well-developed industrial operations practices and DOE O 422.1, Change 1, *Conduct of Operations*. Implementation of these practices results in a high level of performance and, therefore, contributes to safe and reliable operation. The primary consideration in conduct of operations is the health and safety of workers, the public, and protection of the environment. Conduct of operations is defined in DUF6-U-CON-0001, *Conduct of Operations Manual*; the DUF6-PLN-014, *Conversion Facilities Operations and Maintenance Plan*; and DUF6-PLN-118, *Environmental Management System Plan*. This ISMS program description describes the management methods with which the conversion facilities are operated and maintained, and is implemented through the use of detailed plans and procedures. The process of developing procedures includes an identification of the hazards and development of appropriate controls which are then incorporated into procedural steps.

2.3.3 Configuration Management

Configuration management for MCS is integrated in company procedures. The DUF6-PLN-121, *Configuration Management Plan for Operations*, establishes expectations for configuration management for structures, systems, and components identified in associated safety basis documents as safety significant or defense in depth, thereby ensuring work is performed within controls. Control of changes and as-found conditions is implemented through the change control process outlined in DUF6-PLN-121, *Configuration Management Plan for Operations*, and procedure DUF6-U-NSP-0002, *Unreviewed Safety Question Process*.

2.3.4 Criticality Safety

Criticality safety is an integral part of the safety aspects of operations of the cylinder storage yards. Nuclear criticality is precluded in the conversion facility by minimizing the likelihood of a fissile cylinder entering the facility. The nuclear criticality safety (NCS) program is outlined in DUF6-U-NSP-0003, *Nuclear Criticality Safety Process*. The procedure establishes the policy, guidelines, rules, and regulations for the NCS Program to ensure that nuclear criticality hazards are evaluated and NCS limits and controls are established and implemented to provide worker protection, environmental protection, and public safety.

2.3.5 Emergency Management

The DUF6-PLN-044, *Paducah Emergency Management Plan*, and DUF6-PLN-045, *Portsmouth Emergency Management Plan*, describe the established site-wide emergency management system and plan. The site-wide emergency management plan provides a comprehensive description of emergency preparedness and response to operational emergencies, which may occur at the site. The administration of the site emergency management plan, as it pertains to MCS, is identified in DUF6-X-SHP-0303, *Portsmouth Emergency Protective Actions*, and DUF6-C-SHP-0304, *Paducah Emergency Protective Actions*. Procedure DUF6-U-OPS-0107, *DUF₆ Conversion Facility Safety Control Measures*, provides requirements to control entry of personnel into the DUF₆ Conversion Facility property protection area.

2.3.6 Environmental Compliance and Protection

Environmental management is an integral element of MCS' safety management program. MCS' environmental management goals, roles, and responsibilities are described in DUF6-PLN-002, *Regulatory and Permitting Management Plan*.

The environmental management program is integrated into the ISMS through the following Project plans and documents:

- DUF6--PLN-002, *Regulatory and Permitting Management Plan*
- DUF6-PLN-005, *Waste Management Plan*
- DUF6-PLN-118, *Environmental Management System Plan*
- DUF6-PLN-031, *Pollution Prevention and Waste Minimization (P2WM) Plan*
- DUF6-PLN-216, *Environmental Radiation Protection Program*
- DUF6-U-ENV-0600, *Environmental Compliance Assessments*
- Regulatory Permits

- State Historical and Preservation Offices notifications and concurrences
- Ohio's Director's Final Findings and Orders
- Kentucky Agreed Order

2.3.7 Hazardous Material Protection

The DUF6-U-SHP-0211, *Hazard Analysis*, identifies and documents work-related hazards associated with a specific SOW, mitigating controls/actions, personal protective equipment (PPE), and other measures necessary to provide adequate worker protection. This procedure, in concert with the safety basis documents, ensures rigorous identification and analysis of hazards and hazard control development and implementation. An important aspect of the hazard control program is hazardous material protection that is implemented through DUF6-U-SHP-0601, *Hazard Communications*, which is established to protect human health and the environment by informing workers of chemical hazards present and the appropriate protective measures. The hazard control program applies to hazardous chemicals and materials used at the MCS-managed DOE facilities, including hazardous chemicals used and generated in the workplace, and consumer products that are used by MCS in a manner or quantity that significantly differ from an average consumer's manner or quantity of use. Procedures have been established for identifying and procuring hazardous chemicals and materials, maintaining a chemical inventory, assessing work area hazards, communicating information to workers, implementing appropriate engineering and administrative controls, as well as methods of disposing of used/waste/excess chemicals and their containers.

2.3.8 Fire Protection

Fire Protection (FP) is an integral part of the safety aspects of operations of the MCS facilities. The FP program is outlined in DUF6-PLN-024, *Fire Protection Program Description for the DUF₆ Conversion Project*, which defines the scope, roles and responsibilities, organizational structure, and requirements for implementing FP program activities. The ISMS program description also defines the administrative program responsibilities for ensuring that MCS maintains compliance with FP requirements when managing or overseeing subcontractors, and implements the MCS FP policy, DUF6-POL-003, *Fire Protection Statement*, and is the framework to guide MCS in systematically managing this important part of its work.

The FP program is designed to guide MCS efforts to minimize the potential for:

- The occurrence of a fire or fire-related event
- A fire that causes an unacceptable release of hazardous or radiological material that threatens the health and safety of employees, the public, or the environment
- Vital DOE programs suffering unacceptable interruptions as a result of fire and fire-related hazards
- Excessive property losses from a fire and fire-related events
- Critical process controls and safety systems being damaged as a result of a fire and fire related events

Fire hazards analyses for the MCS facilities define the fire hazards associated with the facility, the adequacy of designed FP systems, and controls in reducing maximum credible and possible fire losses.

2.3.9 Industrial Hygiene

The DUF6-PLN-074, *Worker Safety and Health Program*, summarizes the MCS approach to meeting the requirements of 10 CFR 851, *Worker Safety and Health Program*. This Worker Safety and Health Program is implemented through policies and procedures which have been established to ensure hazardous operations are conducted in a manner that safeguards the health and safety of workers, the public, and the environment. The various exposure hazards or workplace stresses that cause sickness, impaired health, or significant discomfort in workers can be classified as chemical, physical, biological, or ergonomic. Hazards are assessed in accordance with DUF6-U-SHP-0211, *Hazard Analysis*, and appropriate controls are specified in order to eliminate or reduce the risk(s). Hazard analyses (HAs) are performed to anticipate, recognize, evaluate, and control exposure to hazards or stresses arising in or from the workplace. Workers are protected from workplace hazards through the implementation of hazard elimination, engineering controls, administrative controls, and/or personal protection equipment.

2.3.10 Operating Experience (Lessons Learned)

MCS Lessons Learned program is implemented in accordance with DUF6-U-CPL-0017, *Operating Experience Program*. The operating experience program is integral to work planning and ISMS feedback and improvement process.

2.3.11 Nuclear and Facility Safety

Nuclear Hazard Category 2 and 3 facilities have a safety basis document prepared in accordance with 10 CFR 830, Subpart B, *Nuclear Safety Management*, and DOE-STD-3009-94, Change 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*. As indicated in this standard, the HA will meet the requirements for non-radiological HA required by 10 CFR 851, *Worker Safety and Health*. DUF6-U-SMP-005, *Safety Management Program Descriptions for the DUF₆ Conversion Project*, provides descriptions of the MCS Safety Management Programs (SMPs). The purpose of the SMP description document is to present information that is common to the MCS managed facilities and support organizations. It is intended to complement the facility-specific Documented Safety Analysis (DSA).

For cylinder yard and conversion operations the documented safety basis is governed by the DSA, Technical Safety Requirements (TSRs), and referenced supporting documents. The documents for each respective site are:

Paducah

- DUF6-C-DSA-001, *Paducah DUF₆ Conversion Facility Documented Safety Analysis, Paducah, Kentucky*
- DUF6-C-DSA-003, *Documented Safety Analysis for the DUF₆ Conversion Project Cylinder Storage Yards, Paducah, Kentucky*
- DUF6-C-TSR-002, *Technical Safety Requirements for the DUF₆ Conversion Facility, Paducah, Kentucky*
- DUF6-C-TSR-004, *Technical Safety Requirements for the DUF₆ Conversion Project Cylinder Storage Yards, Paducah, Kentucky*

Portsmouth

- DUF6-X-DSA-001, *Portsmouth DUF₆ Conversion Facility Documented Safety Analysis, Piketon, Ohio*
- DUF6-X-DSA-003, *Documented Safety Analysis for the DUF₆ Conversion Project Cylinder Storage Yards, Piketon, Ohio*
- DUF6-X-TSR-002, *Technical Safety Requirements for the DUF₆ Conversion Facility Piketon, Ohio*
- DUF6-X-TSR-004, *Technical Safety Requirements for the DUF₆ Conversion Project Cylinder Storage Yards, Piketon, Ohio*

Documents and activities which could affect the safety basis are reviewed in accordance with DUF6-U-NSP-0002, *Unreviewed Safety Question Process*.

2.3.12 Occupational Safety and Health

The MCS occupational safety program establishes standards for worker safety through the implementation of industrial safety requirements contained in 10 CFR 851, *Worker Safety and Health Program*. Programs and procedures are in place to implement the requirements in these standards and to prevent or minimize injuries, illnesses, and accidental losses. DUF6-PLN-074, *Worker Safety and Health Program*, is the primary document that implements the DOE requirements.

2.3.13 Occurrence Reporting

The MCS occurrence-reporting program is governed by DUF6-U-CPL-0016, *Occurrence Notification and Reporting*. The occurrence-reporting system requires reporting, tracking, and trending of occurrences involving industrial and/or facility safety, health, property, operations, and/or the environment.

2.3.14 Procedures

Technical procedures are developed under DUF6-U-GFP-0015, *Technical Procedure Development*, which defines the process necessary to convey and institute management policies for operations involving the safety of workers, the public, and the environment. The procedure establishes the requirements for the preparation, review, approval, issuance, revision, and cancellation of implementing procedures, policies, instructions, and guidelines.

Administrative procedures are developed under procedure DUF6-U-ADM-0001, *Administrative Procedure Preparation, Revision, Review, and Approval*. While similar to DUF6-U-GFP-0015, DUF6-U-ADM-0001 emphasizes those requirements that are applicable to administrative procedures.

2.3.15 Quality Assurance

The DUF6-PLN-003, *Project Quality Assurance Plan*, describes the MCS QA Program and its organization. It provides the primary requirements for the integration of quality functions into all aspects of MCS activities. The DUF6-U-QIP-001, *Quality Implementation Plan*, demonstrates how quality requirements are implemented through MCS procedures.

2.3.16 Radiation Protection

The Radiation Protection Program (RPP) is defined in DUF6-PLN-007, *Radiation Protection Program*. The purpose of the RPP is to minimize exposure to ionizing radiation for workers, the public, and the environment to levels that are as low as reasonably achievable and to manage the Project in a manner that ensures that radiation exposure of the workforce, the environment, and the public is controlled well below regulatory limits. Implementation of this objective facilitates the Project's efforts to implement all five core functions but, most specifically, the fourth core function to "Perform Work within Controls."

MCS developed an Environmental Radiation Protection Program (ERPP), DUF6-PLN-216, to ensure compliance with the requirements of DOE O 458.1, Change 3, *Radiation Protection of the Public and the Environment*. MCS has implemented an appropriate structure of management and administrative measures, as necessary, to ensure the authorized activities are conducted in accordance with the ERPP.

2.3.17 Radioactive and Hazardous Waste Management

The radioactive and hazardous waste management program are described in DUF6-PLN-005, *Waste Management Plan*. The radioactive and hazardous waste management program establishes processes to characterize, package, control radiological and hazardous waste, and protect all receptors. Waste management policies, plans, and/or procedures will be established to address: (1) waste stream identification/profiling; (2) waste information reporting; (3) waste acceptance criteria; (4) waste characterization, segregation, and recycling; and (5) onsite and offsite treatment, storage, and disposal.

2.3.18 Records Management

MCS' records management system identifies the current revision of controlled documents and provides controlled copies of approved documents to those performing work. Documents are prepared, reviewed, and revised in accordance with DUF6-PLN-015, *Records Management Plan*; DUF6-U-DMP-0001, *Controlled Document Procedure*; and DUF6-U-DMP-0002, *Records Management*.

2.3.19 Standards Selection and Maintenance

A key element of ISM is the selection of standards and maintenance of the standard set. This set is the end result of a process for reviewing laws, regulations, and standards to determine applicability to the scope of project work. During the operation and maintenance phase of the Project, the DOE directives identified in Section J of the Contract, as well as applicable federal, state, and local rules and regulations, provide the requirements function for the Project.

Periodically, the compliance group monitors the DOE online database system, "Directives – Home Page Alerts" for changes (additions/deletions) in DOE Orders/Directives and federal regulations.

2.3.20 Training and Qualification

The training and qualification process assures that needed skills for the workforce are identified and developed, and documents knowledge, experience, abilities, and competencies of the workforce for key positions requiring qualification. This process is described in DUF6-PLN-027, *Personnel Selection, Training, and Qualification Management Plan*. This plan describes how

MCS will implement the requirements of DOE O 426.2, *Personnel Selection, Training, Qualification and Certification Requirements for DOE Nuclear Facilities*. Given a specific work assignment, the training and qualification requirements in this training program are developed specifically for the work to be performed, maintained, and implemented using a graded approach in a standardized, comprehensive manner utilizing the systematic approach to training.

2.3.21 Work Control

The work control system, as described in DUF6-U-GFP-0108, *Control of Work*, encourages the involvement of employees in the identification and control of hazards in the workplace as part of the planning, pre-job discussions, and post-job feedback and lessons learned. Hazards are to be eliminated where possible or controlled through engineering/administrative controls with PPE as a last resort.

Workers have the right and responsibility as described in DUF6-U-SHP-0101, *Safety First Program*, to express concerns about safety and to seek resolution of those concerns, and they have the right and obligation to stop work when they believe it cannot be conducted in a safe manner, is detrimental to worker and/or public safety, quality, or has an unacceptable impact to the environment.

3 ROLES AND RESPONSIBILITIES

Two of the eight principles for an effective ISMS Program address roles and responsibilities that are specifically institutionalized as follows through the implementation of DOE Policy 450.4A, *Integrated Safety Management Policy*; 48 CFR 970.5223-1, *Integration of environment, safety, and health into work planning and execution*; DEAR Clause 952.223-71, *Integration of environment, safety, and health into work planning and execution*; and DOE O 450.2, Change 1, *Integrated Safety Management*.

- Principle 1, Line Management Responsible for Safety. Line management is directly responsible for the protection of the public, the workers, and the environment.
- Principle 2, Clear Roles and Responsibilities. Clear and unambiguous lines of authority and responsibility for ensuring safety shall be established at all organizational levels within DOE and its contractor organizations.

Clear definitions of authorities, roles, and responsibilities related to implementation of the ISMS Program are defined in the following subsections. First, the MCS organizational structure is defined, and then roles and responsibilities are addressed for DOE and MCS management, employees, and subcontractors. Additional information on the Project's approach for implementing the established ISMS principles can be found in Section 4, "Integrated Safety Management System Overview."

3.1 DEPARTMENT OF ENERGY

DOE roles and responsibilities related to implementation of an ISMS Program are clearly defined in 48 CFR 970.5223-1, *Integration of environment, safety, and health into work planning and execution*; DEAR Clause 952.223-71, *Integration of environment, safety, and health into work planning and execution*; and DOE O 450.2, Change 1, *Integrated Safety Management*. Of particular importance, the implementation of the Project's ISMS program description is the responsibility of the Contracting Officer's Representative and the Project Manager. Among these are defining a budget (scope) for the Project, providing continuous effective oversight (feedback), and annually reviewing and, as necessary, approving the ISMS program description and related performance goals and matrices.

3.2 MCS ORGANIZATIONAL STRUCTURE

MCS' organizational structure has been established to ensure that roles, responsibilities, and reporting relationships are clearly recognized and understood. Roles and responsibilities have been defined for all levels of the Project organization to ensure effective communication during all phases of work planning and execution. The organizational structure of the Project can be found on the MCS intranet website.

MCS' President and Project Manager is responsible for all project activities within the contract SOW and for successful execution of the project activities. The President and Project Manager has the organizational freedom and authority to address problem areas in all activities and to initiate and effect corrective actions. Other managers, lead staff, and professional personnel assigned to the Project support the President and Project Manager in the execution of the Project activities.

For the purpose of this ISMS program description, line management includes the MCS President and Project Manager's direct reports (i.e., senior managers/directors), middle managers, and front-line supervisors.

One of the eight guiding principles in implementation of an ISMS program description is line management's responsibility for safety. The President and Project Manager, working with direct reports and with the support of the ESH&QA Manager, is responsible for implementing an effective safety program. The ESH&QA Manager reports directly to the President and Project Manager and exercises independent oversight authority of all MCS matters affecting safety and quality.

The ESH&QA Manager supervises a group of managers, safety professionals, and technicians that are responsible for identifying applicable environmental, safety, health, radiation protection and quality standards and requirements for each work activity and for the development, with worker input, of appropriate hazard controls to ensure that work is performed so as to protect the worker, the public, and the environment. ESH&QA Manager key interfaces include:

- Operations Managers and line management to ensure that ISMS is effectively implemented
- ES&H Manager to fully integrate ES&H into a comprehensive ISMS program
- QA Manager to fully integrate QA into a comprehensive ISMS program

Roles and responsibilities for personnel key to the implementation of ISMS are further defined in Project plans and implementing procedures as appropriate. Responsibilities of key positions are summarized in DUF6-PLN-001, Project Management Plan. Additionally, position descriptions define authority and responsibility for management and supervisory personnel.

3.3 WORKERS

All workers associated with the Project team are integral to the successful implementation of the defined ISMS program. It is at the worker level that core function Number 4, "Perform Work within Controls" is accomplished. Workers are personally involved in the ISMS process through the following:

- Documented training and qualifications as identified in the training program description
- Identifying workplace hazards
- Participating in work control document and procedure development and maintenance
- Following administrative controls (procedures)
- Providing feedback, including lessons learned
- Participating in incident investigations and self-assessments
- Exercising time out or stop work authority when concerns arise or conditions adverse to worker protection, public safety or environmental stewardship are discovered

Worker involvement, feedback, and suggestions will be sought through the following:

- Proactive safety suggestion mechanisms such as employee teams
- Involving workers in safety and job planning walk-downs
- Pre-job and post-job briefings
- Development and review of HA, work packages, and procedures
- Interactive safety/toolbox meetings
- Near-miss reporting and interactive discussions of personal near-miss situations

Line Managers and Supervisors clearly communicate expectations during briefings that address job-specific hazards and the means to mitigate them, and reviews of affected procedures, work permits, and associated task-specific HAs. Line Managers and Supervisors encourage participation of experienced and knowledgeable worker representatives. Prior to starting work, the supervisor will review and confirm job-site conditions, and will suspend work if changed conditions are discovered.

3.4 SUBCONTRACTORS

Throughout the life of the Project, MCS will manage subcontractors. These subcontractors function within the MCS ISMS structure. Subcontractor roles and responsibilities related to the implementation of ISMS are defined in subcontract documentation as well as subcontract submittals that are reviewed and approved by MCS prior to conducting work. MCS-prepared subcontract documentation, including requests for proposals, clearly state the Project's expectations related to ES&H performance and ISMS Program implementation.

Subcontractors are evaluated based upon their previous safety and quality performances prior to contract award for work to be performed at the Project sites. This ensures that the subcontractors performing the work have a history of satisfactory safety performance, and that they are capable of performing the SOW in a quality manner. Subcontractors performing work at the sites will utilize this ISMS program description and its implementing documents to the extent that such requirements are incorporated into subcontract documents.

Subcontractors may utilize equivalent implementing documents; however, the documents must implement the requirements of this ISMS program description. The flow down of requirements is performed through subcontractor procurement activities. Subcontractors are required to: (1) ensure that their employees are competent to perform the task assigned, and (2) have received General Employee Training and adequate task/hazard specific training. The performance of the subcontractor will be evaluated through MCS's performance assessments in accordance with the PQAP to ensure ISMS implementation.

Required subcontractor submittals are reviewed to ensure that the subcontractor clearly understands the safety performance objectives and has in place the administrative processes necessary to implement an effective program. Many of the roles and responsibilities identified for MCS personnel, along with other MCS-required administrative controls (e.g., lockout/tagout, confined space entry, hot work, and excavation/penetrations) will also be applicable and utilized by subcontracted personnel.

4 INTEGRATED SAFETY MANAGEMENT SYSTEM OVERVIEW

The DOE P 450.4A, *Integrated Safety Management Policy*, identifies the following six primary components of ISMS:

- Objective
- Principles
- Functions
- Mechanisms
- Responsibilities
- Implementation

The first three components are described in detail in the DOE policy. The last three are unique to each DOE prime contractor and are tailored by each according to the contractor's mission and organizational structure. This ISMS program description is the high-level description of the MCS ISMS that discusses the mechanisms, responsibilities, and implementation specific to the DUF6 Conversion Facilities operations at the Paducah and Portsmouth sites.

4.1 OBJECTIVE

The objective of ISMS is to provide a safe workplace and to perform work safely while protecting the worker, the public, and the environment. This plan, DUF6-PLN-040, *Integrated Safety Management System Plan*, defines implementation of ISMS by MCS and its subcontractors.

4.2 GUIDING PRINCIPLES

The following discussion outlines the seven guiding principles of ISMS as established by DOE P 450.4A, *Integrated Safety Management Policy*. MCS has also established guiding principle number eight (worker involvement), which is imperative to MCS ISMS implementation strategy success. The MCS core mechanism for implementation is identified for each principle.

4.2.1 Line Management Responsibility for Safety

Line management is directly responsible for the safe and efficient conduct of work to ensure the protection of the public, the workers, and the environment. To ensure that line management understands its responsibility for safety, worker's position descriptions identify the requirements defined in this document and their responsibility that work is to be performed safely. Each line manager is held accountable for the Project's safety performance through his or her performance review. The concept is further enforced in lower-tier program procedures.

4.2.2 Clear Roles and Responsibilities

Clear and unambiguous lines of authority and responsibility for ensuring safety are established and maintained at all organizational levels. MCS qualification and training procedures define the process used to identify key roles and responsibilities and associated training requirements for MCS personnel. Policies, plans, and procedures identify specific roles and responsibilities for the safe execution of work.

4.2.3 Competence Commensurate With Responsibilities

Personnel shall possess the experience, knowledge, skills, and abilities necessary to discharge their responsibilities. MCS qualification and training procedures define the process for training and qualifying MCS personnel. Procedure DUF6-U-GFP-0108, *Control of Work*, requires the assignment of qualified personnel to perform activities.

4.2.4 Balanced Priorities

Resources shall be effectively allocated to address safety, programmatic, and operational considerations. Protecting workers, workers, the public, and the environment shall be a priority whenever activities are planned and performed. DUF6-PLN-001, *Project Management Plan*, defines the budgetary process and controls for assuring that protecting the public, the workers, and the environment is a priority when planning and addressing changes to the scope, schedule, or budget.

4.2.5 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, when properly implemented, will provide adequate assurance that workers, the public, and the environment are protected from adverse consequences. MCS and DOE have established and agreed to a set of standards and requirements, which are identified in Section J of the Contract.

4.2.6 Hazard Controls Tailored to Work Being Performed

Administrative and engineering controls that are designed to prevent and mitigate hazards shall be tailored to the function of work being performed and the associated hazards. Facility hazard categorization was performed in accordance with DOE-STD-1027-92, Change Notice 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE O 5480.23, Nuclear Safety Analysis Reports*. The DSA defines the requirements that must be implemented to maintain the safety envelope of the conversion facilities. The DSA, TSRs, Unreviewed Safety Questions (USQs) procedure, and work control requirements, including activity HAs, assure that hazards controls are tailored to the work being performed at the activity level.

4.2.7 Operations Authorization

The conditions and requirements to be satisfied for operations to be initiated and conducted are clearly established and agreed upon. This principle is implemented through DUF6-U-CON-0001, *Conduct of Operations Manual*.

4.2.8 Worker Involvement

Woven into the seven principles of ISMS is the need for worker involvement in all of the five (5) core functions described in section 5 below. MCS procedures require MCS and subcontractor worker involvement, when appropriate, in job planning, hazard identification, pre- and post-job briefings, assessments, safety and employee team meetings, incident investigations, and procedure development.

5 FUNCTIONS

The focus of the MCS ISMS is to systematically integrate ES&H controls into management and work practices in order to mitigate the risk to which workers performing work are exposed. In managing the contract, MCS implements five safety management functions:

- Define the SOW
- Analyze the Hazards
- Develop and Implement Hazard Controls
- Perform Work within Controls
- Provide Feedback and Continuous Improvement

The following sections address each of the five safety management functions and describe MCS's method for applying them in our work. The guiding principles are evident throughout the sections. Figures 1 and 2 graphically illustrate MCS' approach to incorporating the five core functions of ISMS into how we do work.

5.1 DEFINE THE SCOPE OF WORK

The first step in the ISMS process is defining the work scope. Definition of the SOW begins with DOE's Project mission objectives as defined in the contract. The Project then develops the baseline documents, which include tasks to satisfy mission objectives. This information is then developed into an approved work breakdown structure that supports work execution.

5.1.1 Set Expectations

Performance and contractual metrics are established and agreed to with DOE as the mechanism for measuring the accomplishment of specific contract objectives. These metrics are based upon the approved baseline. The expectation that work be performed safely and in compliance with contract requirements is also clearly established and implemented through the work control procedure, DUF6-U-GFP-0108, *Control of Work*, and the procedure system described in procedures DUF6-U-GFP-0015, *Technical Procedure Development*, and DUF6-U-ADM-0001, *Administrative Procedure Preparation, Revision, Review, and Approval*. Completing each task in a safe and environmentally sound manner helps ensure that both objectives and schedules are met. Performance, schedule, ES&H, and quality expectations are communicated through the Project organizations to all employees, and pollution prevention and waste minimization expectations and opportunities are discussed in the planning phase of the Project work development process.

External requirements, such as laws, rules, codes, standards, regulations, and Section J of the Contract, are examined for their applicability. Relevant criteria and requirements (functional and performance) are extracted and entered into the system requirements documents (SRDs) that identify the project baseline mission milestones, requirements, and expectations. These SRDs documents are shown under Figure 2 and are noted in Attachment A.

5.1.2 Prioritize Tasks and Allocate Resources

MCS and DOE have established mission scope, cost, and schedule baselines that have been used to determine the Project budget and operational targets. As program or Project conditions emerge, changes from the original baseline plan may be required due to a variety of reasons. MCS uses a baseline change control process to assure that changes in priorities, scope, cost, and schedule are appropriately reviewed and approved. This process is described in the MCS baseline change control procedure, DUF6-POL-047, *Baseline Change Control Policy*.

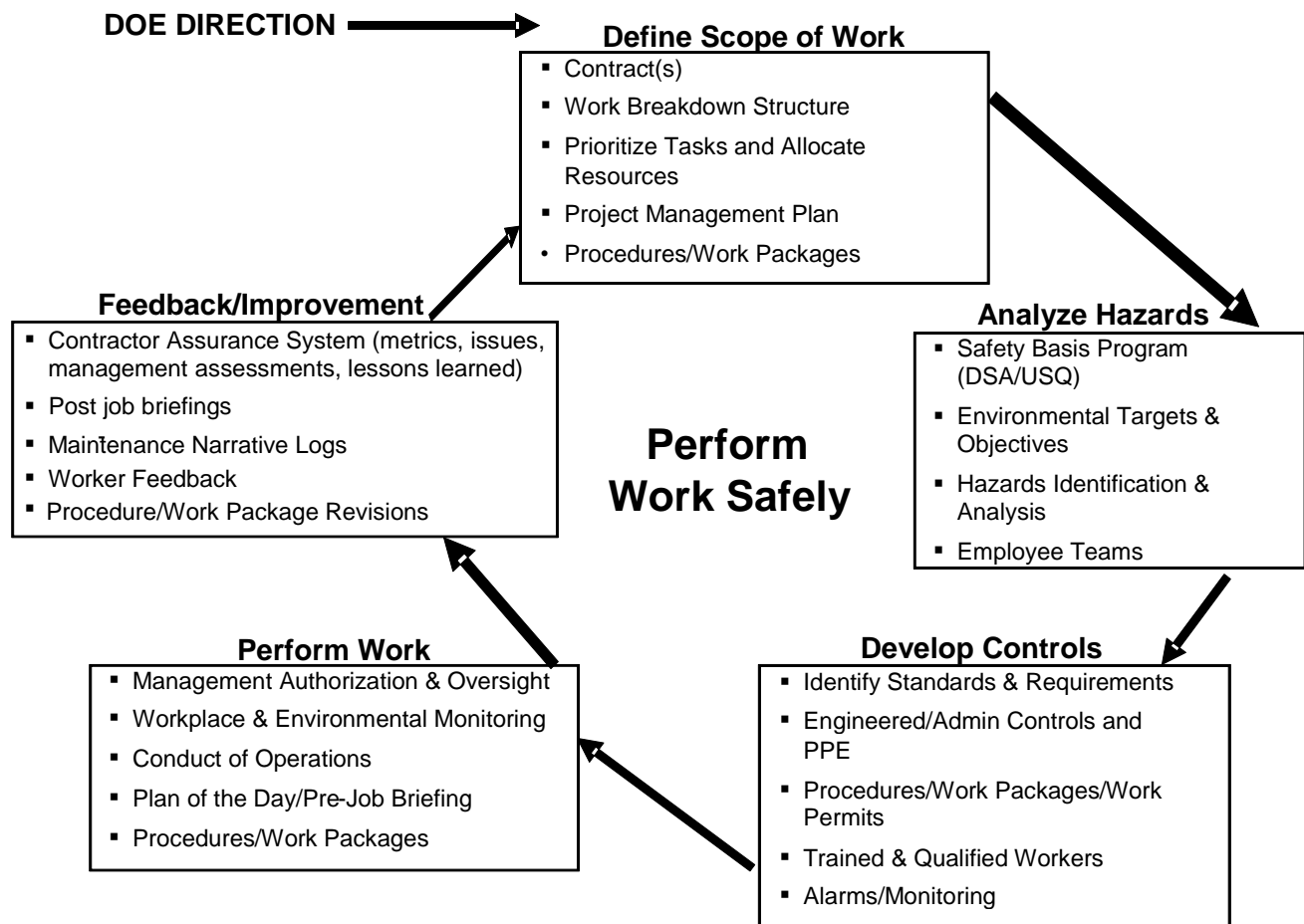


Figure1. Elements of the Five Core Functions

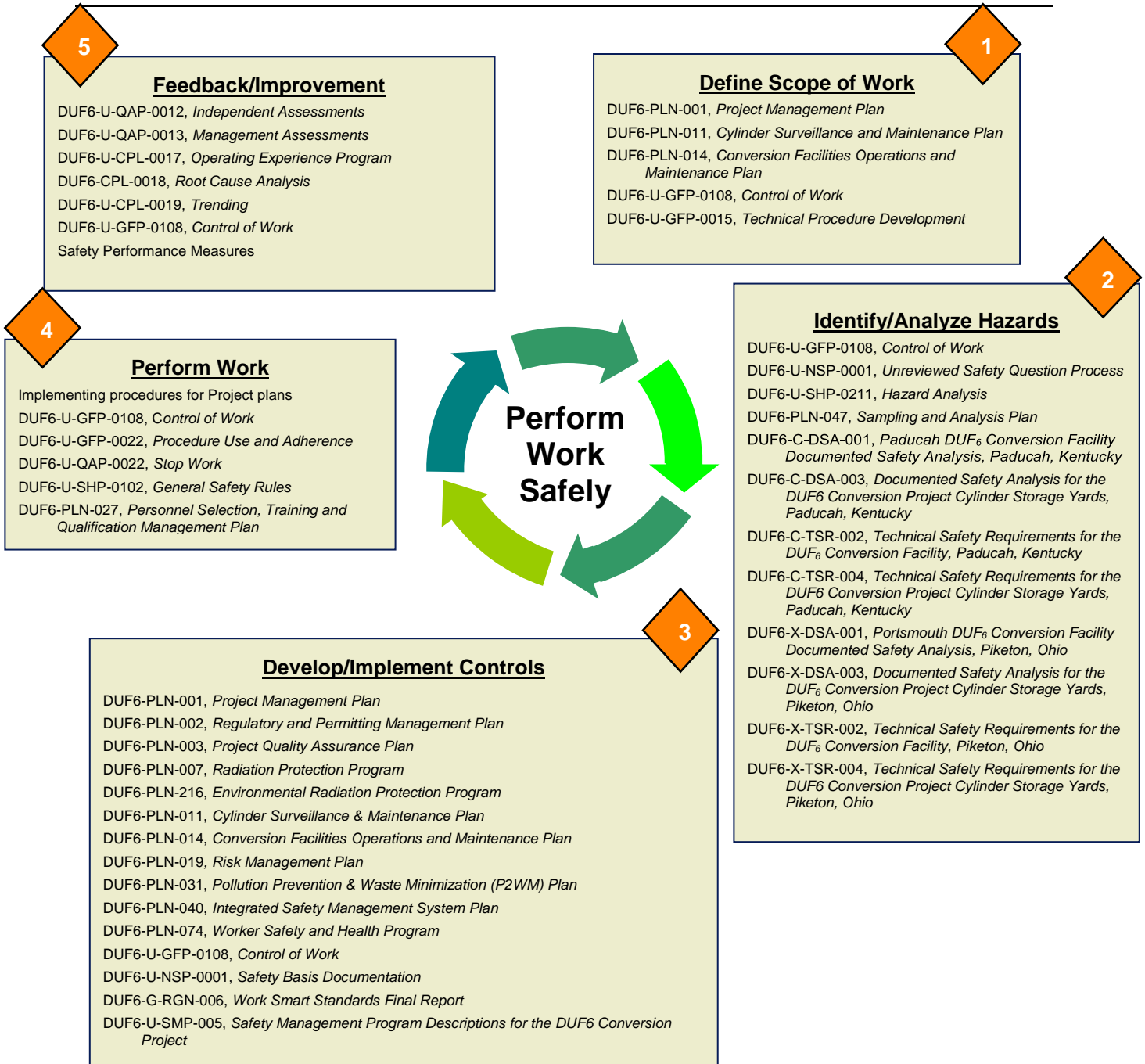


Figure 2. ISMS Implementation Elements of the Five Core Functions

5.2 ANALYZE THE HAZARDS

The analysis of hazards addresses potential risks and vulnerabilities from credible accident scenarios at the facility level in the facility safety basis documents.

For specific scopes and when the tasks for performing work have been clearly defined, potential hazards are identified and analyzed for the defined work scope in accordance with DUF6-U-SHP-0211, *Hazard Analysis*, to assure that appropriate measures are identified to prevent or mitigate potential exposure to the hazards. Based on the complexity and risks associated with the activity, work processes and environment are reviewed by an integrated multidiscipline team. This team analyzes all hazards to identify the controls necessary to perform the activity safely. This process includes examining the facility safety basis, risk assessments, and other available site data, interviewing people involved in the work processes, and performing site walk-downs. If existing information does not provide adequate data to identify hazards, sampling and characterization may be performed. After the hazards are identified, the HA development team documents the hazard assessment.

For subcontracted work, discrete subcontract packages are developed to facilitate the definition of work steps. Each subcontractor will then be required to further define hazards and to develop appropriate hazard controls. Work hazards will be defined and analyzed through the development of HAs and hazard specific permits.

For routine and non-routine O&M activities, hazard identification, and work control will be performed utilizing procedure, DUF6-U-GFP-0108, *Control of Work*.

5.2.1 Categorize Hazards

Categorization of nuclear facilities was performed in accordance with the requirements of DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE O 5480.23, Nuclear Safety Analysis Reports*.

5.3 DEVELOP AND IMPLEMENT HAZARD CONTROLS

Once the hazards have been identified and analyzed, appropriate preventive or mitigative systems, structures, components, engineered and administrative controls are identified and implemented. ISMS subdivides this process into four distinct steps. The first step in controlling hazards is to identify the standards and requirements associated with the work to be performed. These standards and requirements provide the necessary guidance to complete the second step that is to determine options for hazard elimination/mitigation. The hazard control options are evaluated, and the third step is to choose the best option for eliminating or mitigating the hazard. The fourth step is to establish and implement selected controls.

5.3.1 Identify Standards and Requirements

MCS complies with the standards and requirements identified in Section J of the Contract with DOE.

5.3.2 Identify Controls to Mitigate or Prevent Hazards

Controls to mitigate hazards are identified through TSRs, safety bases, permits, regulatory requirements, agreements, procedures, HA, and training. Work planning includes a step-by-step review of how the activity will be performed, which hazards are involved, and which controls are needed to eliminate or mitigate identified hazards. The types of engineered controls, administrative controls, and PPE used to mitigate or preclude all identified hazards are documented. These work planning activities are described in DUF6-U-GFP-0108, *Control of Work*. The preferred order of controlling hazards is engineering (elimination, removal, substitution, etc.), administrative (procedures, plans, directives, etc.), and personal protection equipment (safety harness, respirator, etc.).

5.4 ESTABLISH CONTROLS

Controls are also established in the facility safety basis documents to ensure that site personnel, the public, and the environment are protected from unacceptable environmental, safety, and health consequences due to accidents. Administrative ES&H controls for workers are tailored to the specific task. Details are included in procedures, work process documentation, safety basis documents, and TSRs. Engineering controls are put in place where necessary to protect workers, the site, and the environment.

At the task level, additional controls may be required based on the identification of controls required through the HA development process, DUF6-U-SHP-0211, *Hazard Analysis*. Activity sequences, prerequisites, and hold points related to ES&H are documented in the activity work plan. Based on the HA, administrative points related to ES&H are documented in the activity work plan or procedure, and administrative, engineering, or process controls necessary to mitigate each ES&H hazard are implemented. If site conditions change, work is suspended or stopped, hazards are reviewed, and, when needed, the existing ES&H controls are discontinued or modified with management concurrence to adapt to changed site conditions.

At the activity level, work is categorized in accordance with procedure, DUF6-U-GFP-0108, *Control of Work*. Personnel qualifications and competencies are derived from the identified SOW and associated hazards. The training and qualification process ensures that needed skills for the workforce are identified and developed, and document knowledge, experience, abilities, and competencies of the workforce for key positions requiring qualifications, and implements the requirements of DOE O 426.2, *Personnel Selection, Training, Qualification and Certification Requirements for DOE Nuclear Facilities*.

5.5 IMPLEMENT CONTROLS

Based on the work to be performed, the identified hazards, and methods of accomplishment, the appropriate tools are utilized to define and implement necessary controls. MCS uses the following hazard control method hierarchy:

- Engineered controls
- Work practices and administrative controls that limit work exposures
- PPE

Engineered barriers are used when possible to control hazards and mitigate potential accidents. Administrative controls are used to maintain the integrity of the engineered systems (configuration management), add additional margin through the implementation of a QA Program, and provide the administrative structure for operations, maintenance, and ES&H programs. PPE is used when engineered barriers and administrative controls are either unavailable or insufficient to mitigate the hazard.

The implementation of approved safety basis documents and associated administrative controls ensures engineered barriers and operating parameters are maintained within the facility's safety basis when required.

Safety basis requirements are implemented via implementing procedures. Procedures provide directions to ensure that MCS facilities are operated within their design basis and are used to support safe operations of those facilities. It is MCS's policy that any time work cannot be performed consistent with applicable procedures, the work shall be stopped or suspended, supervision notified, and the work shall remain stopped or suspended until the discrepancy is resolved.

Worker involvement in procedure development and verification is essential to ensure procedures are usable, technically correct, and contain the appropriate requirements. As part of the HA process, workers participate to identify hazards for the defined work.

Using experienced personnel who have an understanding of the engineered and administrative controls and the PPE requirements is essential to handling abnormal situations should these controls fail. Therefore, a training and qualification program supporting work execution is an essential element of ISMS. Prior to performing work, an employee must complete the applicable training, qualification, or certification program.

5.6 PERFORM WORK WITHIN CONTROLS

To perform work safely, MCS confirms a trained and qualified team is ready, that the work control documents are in place, monitors and oversees work during execution, and ensures that effective systems for managing change are in place. Each of these important steps in the safe performance of work is discussed in the following paragraphs.

5.6.1 Operational Authorization

The operations authorization for MCS nuclear facilities is established through authorization agreements. Facility managers authorize work to be performed in their facility in accordance with the approved safety basis and DUF6-U-CON-0001, *Conduct of Operations Manual*, and DUF6-U-GFP-0108, *Control of Work*.

5.6.2 Management of Change

MCS follows a structured process to ensure that changes to the facility are reviewed against the governing safety basis documents and properly authorized. This process evaluates changes in design, proposed activities, work plans and procedures, and is also used to evaluate the discovery of changing conditions that may affect the safety basis. The change evaluation process encompasses the following:

- Screening of appropriate proposed changes to determine if a change evaluation is required.
- Evaluating proposed changes in design, activities, procedures, and work documentation to verify that a proposed change is within the existing safety basis and MCS is authorized to make the changes, or if DOE authorization is needed.
- Performing annual updates of nuclear facility safety basis documents.

The process for managing change in nuclear facilities is described in DUF6-U-NSP-0002, *Unreviewed Safety Question Process* (DOE approved), and DUF6-U-NSP-0001, *Safety Basis Documentation*. For non-nuclear facilities, controls used for managing change are controlled through DUF6-PLN-121, *Configuration Management Plan for Operations*.

5.6.3 Suspend/Stop Work Authority

The authority and expectation to suspend work is extended to all MCS and subcontractor employees. Procedure DUF6-U-QAP-0022, *Time Out/Stop Work*, provides guidance on suspension of work. Without fear of reprisal, employees are encouraged to approach all work with a questioning attitude and to satisfy themselves that it is safe to proceed. All employees are empowered to refuse to perform work that is unsafe, even if directed to do so by supervisors. Work that is suspected or proven to place workers, the public, or the environment at risk shall be suspended until it can be demonstrated that changes are made and it is safe to proceed with the work.

5.7 PROVIDE FEEDBACK AND CONTINUOUS IMPROVEMENT

MCS utilizes a variety of feedback and continuous improvement methods on an ongoing basis to evaluate the adequacy and effectiveness of the ISMS process and to assure continuous improvement. Data is collected at the program (company) and task levels.

MCS management systems for feedback and continuous improvement include assessments, subcontract submittals, and reporting protocols. These management systems provide ongoing evaluation of both MCS and subcontractor performance to ensure conformance to specified requirements and effective implementation. Examples of these systems include self-assessments and independent assessments to provide ongoing, formal feedback. Issues identified from internal and external assessments are documented, causal analyses are performed, and corrective actions developed and tracked to closure. Analyses are conducted on a regular basis to identify trends for management action. Data from these processes are evaluated by senior management to identify opportunities for continuous improvement relative to the adequacy of the ISMS and its implementation, including the effectiveness of feedback and improvement activities. This information is used to identify and correct systemic issues. The following procedures define the MCS feedback and continuous improvement processes: DUF6-U-QAP-0005, *Condition Reporting*; DUF6-U-QAP-0012, *Independent Assessments*; DUF6-U-QAP-0013, *Management Assessments*; DUF6-U-CPL-0016, *Occurrence Notification and Reporting*; DUF6-U-CPL-0017, *Operating Experience Program*; DUF6-U-CPL-0018, *Root Cause Analysis*; DUF6-U-CPL-0019, *Trending*; DUF6-U-SHP-0301, *Accident/Incident Reporting*; DUF6-U-CPL-0029, *Initial Event Notification*; DUF6-U-CPL-0015, *Nuclear Safety and WSHP Noncompliance Reporting*; and DUF6-PLN-145, *Site Contractor Assurance System (CAS) Description*.

All aspects of ISMS are subject to continuous improvement through assessment and feedback that will occur during each phase of the Project. Each level of Figure 1, "Elements of the Five Core Functions," depicts the safety management system core functions. Although the arrows indicate a general direction, these functions are not independent, sequential functions. They are a linked, interdependent collection of activities that may occur simultaneously. Outcomes during the accomplishment of one function may affect the other functions and, potentially, the entire system. The Project's safety management system is accomplished by performing the core functions in an iterative fashion.

One of the most important elements of the MCS assessment program is management presence in the workplace. Management observation of daily activities is considered one of the primary and most effective techniques for performance of assessments. Post-job debriefs, safety meetings, assessments, and continuing training all take place where work is performed and provide face-to-face communication and feedback between the line supervisor and the worker. As appropriate, ISMS performance matrices (safety indicators) are developed and the resulting data reported monthly to DOE. Safety performance measures will be tracked and trended for the entire project.

To support continuous improvement, a periodic review of internal and external sources including assessments, nonconformance reports, lessons learned (both complex wide and internally), and occurrence reports will be performed and any applicable information will be provided to appropriate company personnel.

5.8 ISMS PERFORMANCE MEASURES

ISMS Performance, Objectives, Measures, and Criteria (POMCs) will be established at the beginning of each fiscal year. MCS will submit proposed POMCs to the DOE for approval. Once the POMCs are approved by DOE, they will be updated in the monthly project report and discussed, as necessary, at the monthly status meeting. Metrics will include, at a minimum:

- Occupational Safety and Health Administration (OSHA) Total Recordable Cases (TRC) and TRC rate
- OSHA Days Away and Restricted/Transferred case rate
- OSHA first aid cases
- Safety First suggestion tracking
- Radiation safety (skin contamination and personnel exposures)
- National Pollutant Discharge Elimination System Notices of Violation

MCS will track, trend, and report additional lagging and leading performance measures to ensure that safety performance is properly measured. These additional measures shall be approved annually by DOE and may vary from year to year based on the scope of anticipated project activities. MCS will also submit an ISMS declaration and subsequent effectiveness review of the program, as necessary.

6 MAINTAINING AND IMPROVING INTEGRATED SAFETY MANAGEMENT

The Project continually strives to maintain and improve implementation of its established ISMS program. Maintenance and the ongoing improvement of the ISMS Program will ensure that work performed by MCS, including its subcontractors, continues to be conducted in a manner that protects the health and safety of the worker, the public, and the environment.

Self-assessment is the process by which MCS will measure performance in relationship to the ISMS standards and will identify areas needing improvement. Management assessment and independent assessment programs integrate QA requirements with the ISMS to provide feedback and identify areas requiring improvement. Independent assessments may include the option of having independent third party surveillances from outside organizations. The QA Manager has the primary responsibility for the implementation of independent assessments as identified in DUF6-U-QAP-0012, *Independent Assessments*.

DUF6-PLN-003, *Project Quality Assurance Plan*, and its applicable implementing procedures (DUF6-U-QAP-0012, *Independent Assessments* and DUF6-U-QAP-0013, *Management Assessments*), are the documents that describe the assessment process. Consistent with the PQAP and implementing procedures, the ESH&QA Manager coordinates the independent assessment schedule and the Compliance Manager coordinates the management assessment schedule. Both the ISMS functions and principles are integrated, as appropriate, into each assessment.

DUF6-PLN-003, *Project Quality Assurance Plan*, and its applicable implementing procedures address condition and nonconformance reporting, lessons learned, and trend analysis establishes the methodology for reporting, tracking, trending, and analyzing performance. The procedure for condition and nonconformance reporting is utilized to document external (including DOE or other regulators) oversight and enforcement and any resulting corrective actions. Trending data will be obtained from the corrective actions tracking system and other sources. The Compliance Manager will analyze and trend data and provide recommendations for improvement of ISMS practices to applicable MCS senior managers.

The MCS ESH&QA Manager and the MCS Compliance Manager have the primary responsibility for the development, maintenance, and implementation for MCS procedures that track the implementation of the feedback and continuous improvement process. These procedures include DUF6-U-QAP-0005, *Condition Reporting*; DUF6-U-QAP-0013, *Management Assessments*; DUF6-U-CPL-0017, *Operating Experience Program*; DUF6-U-CPL-0015, *Nuclear Safety and WSHP Non-Compliance Reporting*; and DUF6-U-CPL-0019, *Trending*.

Project management encourages the review of positive and negative information, issues, and problems available through internal and external sources with the goal of project problem prevention and continuous improvement. Employees are empowered to use the MCS condition reporting system to not only report safety problems but also lessons learned, employee suggestions, and conditions or situations, including worker suggestions that need management review for program improvements.

6.1 TAILORING

Operations and Maintenance (O&M) of the DUF₆ conversion facilities can range in complexity and hazard potential from high hazard tasks, such as in hydrogen fluoride recovery and loading to much simpler tasks, such as performing cylinder surveillance. Therefore, implementation of the ISMS Program requires tailoring of the safety controls to fit the hazards and the work. Through tailoring, existing guidance and safety management processes are selectively applied to plan work activities to meet applicable, enforceable requirements while adequately protecting health, safety, and the environment. Subcontractors are provided clear direction on the tailoring process through contractually binding documentation.

DOE P 450.4A, *Integrated Safety Management System Policy*, and 10 CFR 851, *Worker Safety and Health Program*, state explicitly that administrative and engineering controls to prevent and mitigate hazards shall be tailored to the work and associated hazards. To meet these requirements, MCS personnel, and subcontractors at all levels tailor implementation of their ISMS processes (see Section 3.4 for further discussion of subcontractor ISMS responsibilities). Established safety management programs must deal effectively with the full spectrum of work types and work activities. These safety management systems allow flexibility in planning, analysis, and work preparation, which, in turn, includes tailoring the work and hazard controls to the work at hand. As a result, implementation of the Project's ISMS program description ensures high-quality work and compliance with predetermined performance expectations.

7 SUPPORTING INFORMATION

7.1 REFERENCED PROCEDURES AND INSTRUCTIONS

7.1.1 Requirement References

- 10 CFR 830, *Nuclear Safety Management*
- 10 CFR 835, *Occupational Radiation Protection*
- 10 CFR 851, *Worker Safety and Health Program*
- 48 CFR 970.5223-1, *Integration of Environment, Safety and Health into Work Planning and Execution*
- DEAR 952.223-71, *Integration of Environment, Safety and Health into Work Planning and Execution*
- DOE O 414.1D, Change 1, *Quality Assurance*
- DOE O 436.1, *Departmental Sustainability*
- DOE O 440.1B, Change 2, *Worker Protection Program for DOE (including the National Nuclear Security Administration) Federal Employees*

7.1.2 Source References

- DUF6-POL-003, *Fire Protection Statement*
- DUF6-POL-047, *Baseline Change Control Policy*
- DUF6-C-SHP-0304, *Paducah Emergency Protective Actions*
- DUF6-U-CON-0001, *Conduct of Operations Manual*
- DUF6-U-CPL-0015, *Nuclear Safety and WSHP Noncompliance Reporting*
- DUF6-U-CPL-0016, *Occurrence Notification and Reporting*
- DUF6-U-CPL-0017, *Operating Experience Program*
- DUF6-U-CPL-0018, *Root Cause Analysis*
- DUF6-U-CPL-0019, *Trending*
- DUF6-U-CPL-0029, *Initial Event Notification*
- DUF6-U-DMP-0001, *Controlled Document Procedure*
- DUF6-U-DMP-0002, *Records Management*

- DUF6-U-ENV-0600, *Environmental Compliance Assessments*
- DUF6-U-GFP-0015, *Technical Procedure Development*
- DUF6-U-GFP-0022, *Procedure Use and Adherence*
- DUF6-U-GFP-0108, *Control of Work*
- DUF6-U-NSP-0001, *Safety Basis Documentation*
- DUF6-U-NSP-0002, *Unreviewed Safety Question Process*
- DUF6-U-NSP-0003, *Nuclear Criticality Safety Process*
- DUF6-U-OPS-0107, *DUF₆ Conversion Facility Safety Control Measures*
- DUF6-U-QAP-0005, *Condition Reporting*
- DUF6-U-QAP-0012, *Independent Assessments*
- DUF6-U-QAP-0013, *Management Assessments*
- DUF6-U-QAP-0022, *Time Out/Stop Work*
- DUF6-U-SHP-0101, *Safety First Program*
- DUF6-U-SHP-0102, *General Safety Rules*
- DUF6-U-SHP-0211, *Hazard Analysis*
- DUF6-U-SHP-0301, *Accident/Incident Reporting*
- DUF6-X-SHP-0303, *Portsmouth Emergency Protective Actions*
- DOE O 420.1C, Change 1, *Facility Safety*
- DOE O 422.1, Change 2, *Conduct of Operations*
- DOE O 425.1D, Change 1, *Verification of Readiness to Start Up or Restart of Nuclear Facilities*
- DOE O 426.2, Change 1, *Personnel Selection, Training, Qualification and Certification Requirements for DOE Nuclear Facilities*
- DOE O 435.1, Change 1, *Radioactive Waste Management*
- DOE O 450.2, Change 1, *Integrated Safety Management*
- DOE P 450.4A, Change 1, *Integrated Safety Management Policy*

- DOE P 451.1, *National Environmental Policy Act Compliance Program*
- DOE O 458.1, Change 3, *Radiation Protection of the Public and the Environment*
- DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE O 5480.23, Nuclear Safety Analysis Reports*
- DOE-STD-3009-94, Change 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*
- DUF6-PLN-001, *Project Management Plan*
- DUF6-PLN-002, *Regulatory and Permitting Management Plan*
- DUF6-PLN-003, *Project Quality Assurance Plan*
- DUF6-PLN-007, *Radiation Protection Program*
- DUF6-PLN-011, *Cylinder Surveillance and Maintenance Plan*
- DUF6-PLN-014, *Conversion Facilities Operations and Maintenance Plan*
- DUF6-PLN-015, *Records Management Plan*
- DUF6-PLN-019, *Risk Management Plan*
- DUF6-PLN-024, *Fire Protection Program Description for the DUF₆ Conversion Project*
- DUF6-PLN-027, *Personnel Selection, Training, and Qualification Management Plan*
- DUF6-PLN-031, *Pollution Prevention and Waste Minimization (P2WM) Plan*
- DUF6-PLN-044, *Paducah Emergency Management Plan*
- DUF6-PLN-045, *Portsmouth Emergency Management Plan*
- DUF6-PLN-074, *Worker Safety and Health Program*
- DUF6-PLN-118, *Environmental Management System Plan*
- DUF6-PLN-121, *Configuration Management Plan for Operations*
- DUF6-PLN-145, *Site Contractor Assurance System (CAS) Description*
- *DUF6-PLN-216, Environmental Radiation Protection Program*
- DUF6-C-DSA-001, *Paducah DUF₆ Conversion Facility Documented Safety Analysis, Paducah, Kentucky*

- DUF6-C-DSA-003, *Documented Safety Analysis for the DUF₆ Conversion Project Cylinder Storage Yards, Paducah, Kentucky*
- DUF6-C-TSR-002, *Technical Safety Requirements for the DUF₆ Conversion Facility, Paducah, Kentucky*
- DUF6-C-TSR-004, *Technical Safety Requirements for the DUF₆ Conversion Project Cylinder Storage Yards, Paducah, Kentucky*
- DUF6-U-ADM-0001, *Administrative Procedure Preparation, Revision, Review and Approval*
- DUF6-U-SMP-005, *Safety Management Program Descriptions for the DUF₆ Conversion Project*
- DUF6-X-DSA-001, *Portsmouth DUF₆ Conversion Facility Documented Safety Analysis, Piketon, Ohio*
- DUF6-X-DSA-003, *Documented Safety Analysis for the DUF₆ Conversion Project Cylinder Storage Yards, Piketon, Ohio*
- DUF6-X-TSR-002, *Technical Safety Requirements for the DUF₆ Conversion Facility, Piketon, Ohio*
- DUF6-X-TSR-004, *Technical Safety Requirements for the DUF₆ Conversion Project Cylinder Storage Yards, Piketon, Ohio*

8 ATTACHMENTS

Attachment A. Implementing Document Matrix - Operations and Maintenance

ATTACHMENT A. IMPLEMENTING DOCUMENT MATRIX - OPERATIONS AND MAINTENANCE

ISMS Functions	Implementing Mechanism
Define scope of work	DUF6-PLN-001, <i>Project Management Plan</i>
	DUF6-PLN-011, <i>Cylinder Surveillance and Maintenance Plan</i>
	DUF6-PLN-014, <i>Conversion Facilities Operations and Maintenance Plan</i>
	DUF6-POL-047, <i>Baseline Change Control Policy</i>
Identify and analyze hazards associated with the work	DUF6-U-NSP-0001, <i>Safety Basis Documentation</i>
	DUF6-U-NSP-0002, <i>Unreviewed Safety Question Process</i>
	DUF6-U-NSP-0003, <i>Nuclear Criticality Safety Process</i>
	DUF6-U-WMP-1001, <i>Waste Characterization</i>
	DUF6-U-SHP-0211, <i>Hazard Analysis</i>
Develop and implement controls	DUF6-U-ENV-0600, <i>Environmental Compliance Assessments</i>
	DUF6-U-NSP-0001, <i>Safety Basis Documentation</i>
	DUF6-U-NSP-0002, <i>Unreviewed Safety Question Process</i>
	DUF6-U-NSP-0003, <i>Nuclear Criticality Safety Process</i>
	DUF6-PLN-001, <i>Project Management Plan</i>
	DUF6-PLN-002, <i>Regulatory and Permitting Management Plan</i>
	DUF6-PLN-003, <i>Project Quality Assurance Plan</i>
	DUF6-PLN-007, <i>Radiation Protection Program</i>
	DUF6-PLN-011, <i>Cylinder Surveillance and Maintenance Plan</i>
	DUF6-PLN-015, <i>Records Management Plan</i>
	DUF6-PLN-019, <i>Risk Management Plan</i>
	DUF6-PLN-024, <i>Fire Protection Program Description for the DUF₆ Conversion Project</i>
	DUF6-PLN-027, <i>Personnel Selection, Training, and Qualification Management Plan</i>
	DUF6-PLN-074, <i>Worker Safety and Health Program</i>
	DUF6-PLN-216, <i>Environmental Radiation Protection Program</i>
	DUF6-U-SMP-005, <i>Safety Management Program Descriptions for the DUF₆ Conversion Project</i>
DUF6-U-RPP-0001, <i>Maintenance of the Radiation Protection Program</i>	
DUF6-U-RPP-0002, <i>Radiological Control Management and Administrative Requirements</i>	

ISMS Functions	Implementing Mechanism
	<i>DUF6-U-RPP-0003, Occupational Dose Limits</i>
	<i>DUF6-U-RPP-0007, Radiological Monitoring of the Workplace</i>
	<i>DUF6-U-RPP-0008, External Dosimetry Program</i>
	<i>DUF6-U-RPP-0009, Internal Dosimetry Program</i>
	<i>DUF6-U-RPP-0010, Airborne Radioactivity Monitoring</i>
	<i>DUF6-U-GFP-0015, Technical Procedure Development</i>
	<i>DUF6-U-GFP-0108, Control of Work</i>
	<i>DUF6-U-PRP-0002, Purchase Requisitioning Procedure</i>
	<i>DUF6-U-ADM-0001, Administrative Procedure Preparation, Revision, Review, and Approval</i>
Perform work within controls	<i>DUF6-U-GFP-0015, Technical Procedure Development</i>
	<i>DUF6-U-GFP-0022, Procedure Use and Adherence</i>
	<i>DUF6-U-GFP-0108, Control of Work</i>
	<i>DUF6-PLN-007, Radiation Protection Program</i>
	<i>DUF6-PLN-027, Personnel Selection, Training, and Qualification Management Plan</i>
	<i>DUF6-PLN-216, Environmental Radiation Protection Program</i>
	<i>DUF6-U-RPP-0018, Contamination Control and Monitoring</i>
	<i>DUF6-U-SHP-0102, General Safety Rules</i>
	<i>DUF6-U-SHP-0211, Hazard Analysis</i>
	<i>DUF6-U-SHP-0601, Hazard Communications</i>
	<i>DUF6-U-TRN-0001, Training and Qualification</i>
	<i>DUF6-U-QAP-0005, Condition Reporting</i>

Provide feedback on adequacy of controls and continue to improve safety management	DUF6-U-QAP-0012, <i>Independent Assessments</i>
	DUF6-U-QAP-0013, <i>Management Assessments</i>
	DUF6-U-QAP-0022, <i>Time Out/Stop Work</i>
	DUF6-U-CPL-0015, <i>Nuclear Safety and WSHP Noncompliance Reporting</i>
	DUF6-U-CPL-0016, <i>Occurrence Notification and Reporting</i>
	DUF6-U-CPL-0017, <i>Operating Experience Program</i>
	DUF6-U-CPL-0018, <i>Root Cause Analysis</i>
	DUF6-U-CPL-0019, <i>Trending</i>
	DUF6-U-RPP-0014, <i>Radiological Records Management</i>
	DUF6-RPP-0015, <i>Reports to Individuals</i>
	DUF6-U-RPP-0020, <i>Radiological Accidents and Emergencies</i>
	DUF6-U-SHP-0101, <i>Safety First Program</i>
	DUF6-U-SHP-0103, <i>Safety Walkthroughs</i>
	DUF6-U-GFP-0108, <i>Control of Work</i>

NOTE: The most current list of document titles and numbers are maintained/available in Documentum (electronic document management system). This list of document titles and numbers identified in Attachment A is a representation of ISMS implementing documents, but is not intended to be an all-inclusive list.

END OF DOCUMENT