MID-AMERICA
CONVERSION SERVICES
ATKINS, WESTINGHOUSE & FLUOR

DUF6
Depleted Uranium
Hexafluoride
Conversion Project

DUF6-PLN-121
REV. 2
ISSUING
ORGANIZATION:
ENGINEERING
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Configuration Management Plan for Operations

Prepared by: Engineering

Approved by: See associated 4320

Adam Goldberg, Chief Engineer

APPROVAL PAGE

Listed below are personnel responsible for the preparation, review, and approval of this plan. Signatures for each have been provided on DUF_6 Form 4320, *Document Review & Approval Form*.

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REVISION LOG			
Revision	**Effective Date**	**Description of Change**	**Pages Affected**
0	8/15/18	Initial issue – replaces DUF6-BWCS-PLN-121 Rev.0. Incorporate changes from IA-16-001 and CR 16-142-6	CR 16-142-6: 11-14, 17 - 18
1	03/04/20	Incorporated changes from CR-19-033	
2	01/13/21	Incorporated changes from CR-19-665 (Changing DOE-STD-1073 from 2003 to 2016); updated reference to DOE Order 420.1C to Chg. 3.	8, 9, 23, 24, Attachment C

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ACRONYMS

ANSI	American National Standards Institute
BCP	Baseline Change Proposal
BPCS	Basic Process Control System
CCCB	Configuration Change Control Board
CD	Configured Document
CI	Configured Item
CIL	Configured Item List
CM	Configuration Management
CMP	Configuration Management Plan
CR	Condition Report
DA	Design Authority
DCR	Design Change Request
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
DUF_6	Depleted Uranium Hexafluoride
EIA	Electronic Industries Alliance
ERMS	Electronic Records Management System
FCR	Field Change Request
FCN	Field Change Notice
FDD	Facility Design Description
FM	Facility Manager
GS	General Support
ICCB	Internal Change Control Board
iRen	Irenaissance
ISMS	Integrated Safety Management System
ISS	Independent Safety System
MCS	Mid-America Conversion Services, LLC
MEL	Master Equipment List
MIP	Maintenance Implementation Plan
NCR	Noncompliance Report
NTS	Noncompliance Tracking System
PAAA	Price Anderson Amendment Act
PDSA	Preliminary Documented Safety Analysis
PQAP	Project Quality Assurance Plan
PS	Production Support
QA	Quality Assurance
SDD	System Design Description
SEM	Site Engineering Manager
SRD	System Requirements Document
SS	Safety Significant
SSC	Structure, System, and Component
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question

EXECUTIVE SUMMARY

In accordance with the Mid-America Conversion Services, LLC (MCS) contract with U.S. Department of Energy (DOE), this plan is compliant to the requirements of DOE-STD-1073-2016, Configuration Management, and American National Standards Institute/Electronic Industries Alliance ANSI/EIA-649, National Consensus Standard for Configuration Management.

This document describes the Configuration Management Plan for Operations (CMP) for the Depleted Uranium Hexafluoride (DUF6) Conversion Project at Portsmouth, Ohio, and Paducah, Kentucky and defines Configuration Management (CM) processes for operations as required by DOE Order 413.3B, Attachment 2 (Contractor Requirements Document), Item 9, and, DOE O 420.1C Chg 3, Facility Safety.

The document comprehensively defines the necessary subordinate details in its body and its attachments which complete these contract requirements.

1 INTRODUCTION AND OVERVIEW

This document describes the Configuration Management Plan for Operations (CMP) for the depleted uranium hexafluoride (DUF6) Conversion Project at Portsmouth, Ohio, and Paducah, Kentucky. This plan is applicable to Configuration Management (CM) processes for operations as required by U.S. Department of Energy (DOE) Order 413.3A, Attachment 2 (Contractor Requirements Document), Item 9, and, DOE O 420.1C Chg 3, *Facility Safety*.

Per Mid-America Conversion Services, LLC's, (MCS) contract with DOE, this plan is compliant to the requirements of DOE STD-1073-2016, Configuration Management, and American National Standards Institute/Electronic Industries Alliance ANSI/EIA-649, *National Consensus Standard for Configuration Management*. A compliance crosswalk to the requirements from the DOE and ANSI/EIA standards has been attached to this plan (Attachment C). The crosswalk identifies each of the DOE CM standards, applicable requirements, the corresponding ANSI standard requirements, and where the requirements are addressed in the CMP and the implementing documents.

The Operations CMP is intended to meet the objectives and expectations of both standards and has been structured to respond to the guidelines presented in the standards on a point-by-point basis to the extent practicable. This plan will serve to apply CM to both facilities while conversion operations are performed. The plan does not address CM during decontamination and deactivation activities.

The CMP utilizes a graded approach to assure that appropriate resources are applied to maintain program objectives in a cost effective manner as detailed within the plan. In addition, the CMP is structured to interface with and support other related management systems/programs including:

- DUF6-PLN-040, *Integrated Safety Management System Plan for Operations*
- DUF6-U-NSP-0001, *Safety Basis Documentation*
- DUF6-PLN-003, *Project Quality Assurance Plan*
- DUF6-PLN-122, *System Engineer Program*
- DUF6-U-DMP-0001, *Controlled Document Procedure*
- DUF6-U-DMP-0002, *Records Management Procedure*
- DUF6-U-GFP-0015, *Technical Procedure Development*
- DUF6-PLN-027, *Personnel Selection, Training, and Qualification Management Plan*
- DUF6-PLN-056, *Maintenance Implementation Plan*
- DOE Order 440.1B, *Worker Protection Management for DOE (Including the National Nuclear Security Administration) Federal Employees* (This supports the requirements documentation, traceability, and accountability for pressure vessels.)

The CMP describes how CM is incorporated into the MCS Integrated Safety Management System, including flow down into implementing procedures for the project and the lines of authorities, responsibilities, and accountability.

2 PURPOSE

The CM program is established to ensure that selected managed facilities and activities meet the following objectives:

- Maintain the consistency among design documents, facility safety documents, regulatory requirements, physical configuration, and documentation (including analyses, drawings, calculations, procedures and training materials).
- Maintenance of this consistency throughout the life of the facilities and activities, particularly as changes are made.
- Help assure ongoing protection of the safety and health of workers, the public, and the environment.
- Attachment E is MCS's policy statement signed by the MCS President and Project Manager.

3 SCOPE

This CMP is applicable to the Hazard Category 3 conversion facility and associated operations and Hazard Category 2 cylinder storage yards at both the Portsmouth and Paducah sites.

This plan, and the requirements identified within, applies to all MCS personnel, subcontractors, and suppliers while performing work at the DUF_6 conversion facilities and the cylinder storage yards, under contract to the DOE contract number DE-EM004559. MCS CM program requirements are flowed down to subcontractors and suppliers as appropriate to the work (through contractor requirement documents), and ensures subcontractors and suppliers are implementing the CM program appropriately as part of the CM program assessments.

3.1 CONFIGURATION MANAGEMENT PROGRAM TRAINING

Training requirements are documented in applicable Qualification Profiles.

3.2 ROLES AND RESPONSIBILITIES

The following CM functional support personnel are considered critical to the success of MCS's CM program. Responsibilities for the personnel assigned to these positions are detailed below and expanded upon in the CMP and implementing procedures.

Chief Engineer:

The Chief Engineer_has overall responsibility and authority for maintaining and implementing MCS's CM programs while maintaining independence. The Chief Engineer is responsible for approving design modifications and overseeing the implications of changes proposed at both sites. The Chief Engineer serves as the Design Authority or delegates the responsibility.

Site Engineering Manager (SEM):

The SEM is responsible for ensuring that all proposed changes for his respective site are reviewed through the processes described in this plan and detailed in the implementing procedures and that the required program and configuration assessments are performed and changes tracked through the MCS Quality Assurance (QA) processes.

Nuclear Safety Manager:

The Nuclear Safety Manager's responsibility is to ensure that DOE approves proposed changes outside the safety basis prior to implementation and compensatory actions including safety basis changes from discovery conditions are determined to be outside the safety basis.

Design Authority (DA):

This individual(s) is responsible for maintaining the established design requirements and ensuring that design output documents appropriately and accurately reflect the design basis. The Design Authority (DA) is responsible for design control, including technical adequacy of the engineering design change process, change implementation, verification processes, and documentation. The DA's responsibilities are applicable whether the process is conducted fully in-house, partially contracted to outside organizations, or fully contracted to outside organizations.

System Engineer:

The system engineer(s) shall provide technical assistance in support of line management responsibility to ensure continued operational readiness of their assigned system(s). The system engineers ensure that the configuration of assigned system(s) is being effectively managed according to the elements of the CM program as detailed within this plan.

Configuration Specialist:

The Configuration Specialist is responsible for keeping the design requirements and Configured Items (CIs) database current. The Configuration Specialist is responsible for interfacing with the SEM to ensure identified design changes are tracked to specific components and/or configured documents, and results of regularly scheduled physical configuration assessments are incorporated into the database. The Configuration Specialist is also responsible to identify database discrepancies and bring them to the attention of the SEM for resolution.

Work Planners:

Work planners are responsible for ensuring all work and maintenance activities are reviewed that may impact the systems or components on the CI list.

4 PROGRAM REQUIREMENTS

Fulfilling the CM objective is accomplished through the five key CM elements: design requirements, work control, change control, document control, and assessments. Applicable items have been under configuration management, maintained and verified physical configuration, and documented since construction and system testing.

4.1 IDENTIFICATION OF CONTROLLED ITEMS

The Structures, Systems, and Components (SSCs) subject to the CM program were selected during design based on their relative importance to safety, safeguards, and security; the magnitude of any hazard involved; operational reliability of the facilities; the particular characteristics of the items; and other relevant factors. SSCs are functionally classified as Safety Class, Safety Significant (SS), Production Support (PS), or General Support (GS). The DUF6 Conversion Project has no Safety Class SSCs. The remaining functional classifications are assigned by using DUF6-U-PEP-1102, *Grading of Structures, Systems and Components and Identification of Configured Items*.

SSCs are further identified based on their configuration status - either "configured" or "non-configured". SSCs identified as functional classification SS were automatically determined to be configured. Items determined to be PS were further analyzed to determine their applicability to the CM program. Those PS SSCs whose failure would adversely impact the availability, reliability, and operability of the process were also placed in the CM program as configured items. SSCs, whose failure does not impact the process, were designated as GS. These SSCs were not identified as configured items; however they are still managed under the CM Program. Design control practices were utilized to provide sufficient change control during design and construction. The Conversion Facility Documented Safety Analyses (DSAs) identified "Additional Protective Features" in DSA Table 4-3. These "Additional Protective Features" were placed in the CMP as configured items.

Following evaluation, components were identified using DUF6-U-PEP-1101, Component Numbering and Labeling System. The component identification number contains several fields, which vary by discipline and component. The last field of the component number identifies the functional classification of the component, as well as whether or not it is a configured item.

Table 2.1-1. Component Identification

Functional Class	Functional Class Designation	Configuration Status	Configuration Designation
Safety Significant	SS	Always configured	C
Process Support	PS	Can be either configured or non-configured	C or N
General Support	GS	Always non-configured	N

All components for conversion operations and information related to these components have been captured on a Master Equipment List (MEL) and are managed through the CMP. For cylinder storage yards, all components and information have been captured on DUF6-G-G-LST-002.

4.2 DESIGN REQUIREMENTS (IDENTIFICATION AND DOCUMENTATION)

Design requirements define the constraints and objectives placed on the physical and functional configuration of a configured item (CI) and the design requirements to be controlled under CM encompass the safety basis functional requirements of a CI needed to accomplish its safety functions. The design requirements for CIs for the existing DUF_6 conversion facilities were identified during the facility design and are referenced in the configured items list (CIL) as described in DUF6-U-PEP-1103, *Maintenance and Control of MEL/CIL*. The CIs for the cylinder storage yards were adopted from the previous contractor and then reviewed and updated to reflect the current mission and are also referenced in the CIL.

The CMP assures that any new or revised design requirements resulting from maintenance or modifications are documented. In these cases, the CMP:

- Ensures that the physical and functional requirements for the CIs identified in the DSA are maintained.
- Validates that the CIs will perform their intended safety functions as described in the DSA.

4.3 ESTABLISHMENT OF A DESIGN AUTHORITY

The Chief Engineer has responsibility for the design authority. The Chief Engineer may delegate the DA role. The DA is responsible for:

- Maintaining the design requirements
- Ensuring design output documents accurately reflect the design basis

- Maintaining design control
- Assuring technical adequacy of any design revision

4.4 REVIEW OF DESIGN REQUIREMENTS

The System Engineer performs periodic assessments and maintains working files of system information, including information related to design requirements as discussed in DUF6-U-PEP-1306. DUF6-PLN-122, *System Engineer Program,* provides requirements and guidance for establishing and maintaining system design information.

4.5 USE OF SYSTEM DESIGN DESCRIPTIONS

System Design Descriptions (SDDs) document design requirements and provide a link between engineering design documents, the safety basis, and implementing procedures. The SDD provides explanation as to why those requirements exist (e.g., provides the basis for the requirements), and describes the system design features provided to meet those requirements. SDDs will be used to assist operational personnel in understanding system functions and requirements. SDDs were developed utilizing Content of System Design Descriptions, DOE-STD-3024-98 and DUF6-U-PEP-1104, Preparation of Facility Design Descriptions, System Requirements Documents, and System Design Descriptions. SDDs are not required for the cylinder storage yards.

4.6 ESTABLISHMENT OF EQUIPMENT DATABASES

CIs and supporting design requirement references are maintained in a database (iRen) at the facility level. Configured documents under the CM program are also maintained in the Electronic Records Management System (ERMS) database at the facility level. The System Engineer, Configuration Specialist, and SEM are responsible for the accuracy and currency of database information, and changes are accomplished through the facility's CM change control process. The SEM is responsible to ensure resolution of conflicting or inaccurate equipment and component CM information.

4.7 GRADING

The MCS CMP utilizes a graded approach to apply a level of resources and control that is appropriate to the degree of risk to safety goals and objectives. Grading is used in the CM program for two purposes:

- To help define which facilities, systems, and activities will be subject to the CMP.
- To define the extent to which the CMP will be applied, e.g., the degree, rigor, and extent to which applicable CM activities and requirements applied to facilities, SSCs, and associated work activities.

Based on the guidance provided in DOE-STD-1073-2016, and evaluation of DUF_6 facilities and planned work activities in conjunction with these criteria and consistent with the CM standard guidance, MCS has determined that facilities, SSCs, activities, and programs can be graded based on a combination of two criteria:

- Facility hazard category (Facility Grading)
- SSC Functional Classification (System Grading)

Attachment D, *Operations CM Program Graded Approach Summary,* discusses the development of the grading approach and resultant facility and system grading levels.

4.8 USE OF SYSTEM ENGINEERS

MCS has established and implemented a System Engineer Program (DUF6-PLN-122) for conversion operations to ensure initial and continued operational readiness of conversion operations. System Engineers provide technical assistance in support of line management to ensure system readiness, and support the CM program by remaining apprised of operational status and ongoing modification activities, assisting in the evaluation of system performance, initiating actions to correct problems (including obsolescence), remaining cognizant of system-specific maintenance/operations history and industry operating experience, reviewing and concurring with design changes, and providing input to the development of special operating/test procedures utilized to evaluate and verify approved configuration changes. The System Engineer ensures that the configuration of assigned system(s) is being effectively managed according to the elements of the CMP and as detailed in DUF6 -PLN-122.

5 CHANGE CONTROL

MCS has established a formal change control process with the objective to maintain consistency among design requirements, the physical configuration, and the related facility documentation during conversion operations. The change control process ensures that all changes are properly reviewed and coordinated as follows:

- Changes are identified and assessed
- Changes receive appropriate technical and management review to evaluate the consequences of the change.
- Changes are approved or disapproved.
- Waivers and deviations are properly evaluated and approved or denied, and the technical basis for the approval is documented.
- Approved changes are adequately and fully implemented, or the effects of the partial implementation are evaluated and accepted.
- Implemented changes are properly assessed to ensure the results of the changes agree with the expectations.
- Documents are revised to be consistent with the changes and the revised documents are distributed to users.

5.1 CHANGE IDENTIFICATION

Any DUF_6 Conversion Project participant, including members of outside vendors and subcontractors, may request proposed changes to the configuration of the facility SSCs. Once identified, proposed changes within the MCS CM program are reviewed

and routed for approval through the change control process per DUF6-U-PEP-1110, *Operations Design Change Control* or DUF6-U-PEP-1111, *Facility Change Process.*

5.2 CONFIGURED DOCUMENT IDENTIFICATION

Configured Documents are identified and controlled per Controlled Document Procedure DUF6-U-DMP-0001. Document owners have been identified for all Configured Documents. Document owners are responsible for developing and revising the technical content of the documents and ensuring they are kept current and distributed as detailed under DUF6-U-DMP-0001. DUF6 Configuration Management is governed through the implementing plans and procedures listed in Attachment A.

5.3 INTERFACE IDENTIFICATION AND CONTROL

To ensure changes are controlled as appropriate, an analysis was performed (UDS-U-CFG-0003, *Configuration Management – Change Mechanism Analysis Report*) of the project's Management Systems and Safety Management programs to identify potential mechanisms that could lead to a temporary or permanent change in design requirements, physical configuration, or controlled documentation. The analysis identified potential initiating mechanism for changes and put in place necessary change control processes that link these management systems to the CM change control process. The analysis was also used to flow down processes into the implementing procedures to ensure necessary configuration related information is completely and accurately communicated to all affected organizations, and that the appropriate review, actions, and document updates are accomplished in a timely manner. The analysis included the review of potential physical, document, procedural, operations, software, or design changes.

5.4 EQUIVALENT SUBSTITUTION PROCESS

Like for Like changes do not require evaluation under the configuration change control process. Engineering is responsible for evaluating replacement parts and components to assure design requirements continue to be met as detailed in DUF6-U-PEP-1204, *Equivalency/Substitution*. Hardware changes that continue to meet the design requirements for the equipment, meet all interface requirements, and do not impact the safety shall be considered equivalent changes as determined per DUF6-U-PEP-1204.

5.5 SAFETY SOFTWARE CONFIGURATION CONTROL

MCS has identified the Independent Safety System (ISS) control as a safety-significant SSC because it provides an independent control capability for those processes that have safety-significant functions. The system software, along with non-safety-significant process controls (e.g., Basic Process Control System [BPCS]), is considered part of the configuration control program and has been established and is controlled as detailed in DUF6-U-PEP-1310, *Software Management.*

5.6 DOCUMENTATION OF PROPOSED CHANGES

The change control process is initiated utilizing DUF6-U-PEP-1110, *Operations Design Change Request,* or DUF6-U-PEP-1111*, Facility Change Process,* and both require the initiator of the proposed change to provide change details to support initial preparation of a design change package. The type of design change package is consistent with the design process and controls for the proposed change. The change request is verified to be accurate and appended to the design change package. In addition to the change request, the design change package includes drawings, analysis, procedures, instructions, and other related documents needed to properly assess, implement, verify, and validate the proposed change. Additionally, the design change package defines the methods and acceptance criteria for the post-modification testing. Prior to issuance of the design change package, a technical review is performed by an individual or group other than the one that developed the package.

Design changes are subject to the same design control measures commensurate with those applied during the original design.

Design change packages are revised, updated, and supplemented as the review progresses and contain a copy of all approvals. Once the proposed change is approved for implementation, the design change package is used to facilitate implementation.

5.7 SAFETY BASIS AND DESIGN BASIS CHANGE REVIEW

Design change packages are reviewed through the Unreviewed Safety Question (USQ) process per DUF6-U-NSP-0002 to determine if the proposed change is within the facility safety basis. If the proposed change is not within the currently approved safety basis as determined by the USQ process, then a safety basis change package is developed, internally approved and transmitted to DOE for approval. The proposed change may not be implemented until DOE approval is obtained. Changes to safety basis documents are controlled by DUF6-U-NSP-0001, *Safety Basis Documentation*.

5.8 REVIEW OF CHANGES

The MCS change control review process involves a formal review process for each proposed change to a configured item or document, which includes a technical review, a management review, and a USQ review. The technical review ensures that the proposed change is within applicable codes, standards, and technical constraints of the operating facility. The management review ensures that management considerations, such as funding, have been adequately considered prior to approving the change for implementation. The USQ review is required for all changes to assure the proposed change does not adversely affect the facility DOE-approved safety basis. Results of all reviews are formally documented. Other reviews may be performed as needed for such items as meeting regulatory or contractual requirements. Technical, management, and USQ reviews are included in the change package or referenced as appropriate.

5.8.1 Technical Review

Technical reviews of the design change package evaluations of proposed changes are to verify that:

- Conversion facility and cylinder storage yard operations will continue to operate safely and provide adequate protection to workers, the public, and the environment.
- Proposed changes do not impact or change established federal and state safety and environmental requirements, performance criteria, or permit requirements.
- Conversion facility and cylinder storage yard operations performance metrics will continue to be achieved.
- The proposed change will not create unacceptable maintenance problems
- The security of the facility or activity will not be compromised.
- The safety basis is preserved or the changes to the safety basis are assessed and determined to be acceptable

Technical reviews are performed on proposed changes in accordance with DUF6-U-PEP-1303, *Technical Reviews*.

5.8.2 Management Review

Following the technical review, MCS management reviews the proposed change to verify:

- The technical review was adequately performed
- The design change package is complete and ready for implementation
- Any necessary external reviews and approvals have been obtained
- Funding is expected to be available to complete the implementation and update the documentation

DUF6 accomplishes its management review through the SEM and Configuration Change Control Board (CCCB) as appropriate. When required, the Internal Change Control Board (ICCB) is also convened for a review.

If modifications are made to the proposed change during the management review, then those modifications are subject to the same level of management and technical review as applicable to the original design.

5.8.2.1 *Configuration Change Control Board*

The CCCB has the responsibility to review, evaluate, and formally approve or reject proposed changes to SSCs that may change the reason an item is identified as being a configured item within the DUF_6 Conversion Project CM program. Each requested design change is evaluated against configured design requirements and the facility safety basis. In the case of the cylinder storage yards, the change can only be reviewed against the safety bases. The CCCB member configuration and

management review and approval processes are detailed in DUF6-U-PEP-1113, *Configuration Change Control Board*.

The CCCB also determines whether the proposed change would impact a scope, cost, or schedule baseline. If it is determined that one or more of the baselines is affected, then, following CCCB approval of the change, a Baseline Change Proposal (BCP) is submitted to the DUF_6 Conversion Project ICCB. If the change does impact a baseline, then the change may not be implemented until the baseline changes have been approved by the project ICCB. The CCCB has the authority to challenge a decision of the ICCB. Changes approved by the CCCB that do not impact scope, cost, or schedule baseline are implemented, and the associated documentation is updated to reflect the approved change.

5.8.2.2 *Internal Change Control Board*

Configured items may be impacted by approved baseline changes to cost, schedule, and scope initiated by MCS or the DOE. Approval of these changes is designated to occur at specified threshold levels determined by DOE and indicated in the DOE *Project Execution Plan* for the DUF_6 conversion project facilities. These changes are processed through the ICCB. When initiated and within the control threshold of MCS, this type of change is processed using DUF6-U-PCP-0009, *Change Control*.

When the ICCB has approved a baseline change that impacts one or more configured items, the change is submitted to the CCCB for review and approval. The CCCB has the authority to challenge a decision of the ICCB. The CCCB must approve changes referred to it by the ICCB before they are implemented.

5.8.3 Unreviewed Safety Question Review

All proposed changes are screened as part of the DOE-approved USQ process as detailed in procedure DUF6-U-NSP-0002, *Unreviewed Safety Question Process*. MCS may perform USQ reviews concurrent with the technical and management reviews. However, the final configuration of the change (if modifications are made during concurrent reviews) is verified prior to proposed change approval.

5.9 APPROVING CHANGES

The approval authorities for proposed changes managed under the CM program are noted below:

Table 3.9.1. Approval Authorities for Changes

Type of Change	SEM	CCCB	ICCB	DOE
Change below DOE approval threshold	√	√		
Change impacting cost and schedule baselines		√	√	

Type of Change	SEM	CCCB	ICCB	DOE
Change impacting Safety Basis approval level and/or cost and schedule baseline DOE approval thresholds		√	√	√

5.10 POST APPROVAL DOCUMENTATION IDENTIFICATION

Following the management approval of a design change and any required ICCB or DOE approval, DUF6-U-PEP-1110, *Operations Design Change Control*, requires the performance of a complete and thorough review to identify documents affected by the change. If other SSCs are impacted by the change, then the documents associated with impacted SSC(s) are included in this review.

Critical facility documents identified and maintained under the CM program are updated and uploaded to the ERMS upon completion and closeout of a modification. Prior to completion and closeout, the in-progress version of the modification will contain the Certified for Construction (CFC) drawings which are the approved versions for implementation as well as operation of the modification until the modification is closed and the drawings as-built. Once the drawing are as-built, the drawings are separated from the modification and uploaded separately into the ERMS. At that time, the as-built drawings become the only approved versions residing in the ERMS.

5.11 IMPLEMENTING CHANGES

Approved changes under the CM program and their associated Configured Documents are implemented in a manner consistent with the approved change packages. Work is accomplished using approved procedures, instructions and practices, and in accordance with DUF6-U-GFP-0108, *Control of Work*. The approved design change package and associated document changes form the basis for development of the design work package to implement the change. The work control process ensures the design change package is complete and usable, that there are no unidentified physical interferences, and that the change is likely to meet defined post-implementation acceptance criteria.

5.12 FIELD CHANGES

Changes are implemented consistent with the design change package. If the design change package cannot be implemented as approved, the package is revised through the use of the Field Change (FC) process. FCs are an alternative to complete revision and reissue of a design change package, but receive technical, management, and if required, USQ reviews commensurate with those of the original change package. The approval authority level is the same as the original change package as detailed in DUF6-U-PEP-1112, *Field Change Request - Operations.*

Additionally, if any nonconforming items are discovered while implementing a FC, the nonconformance is documented in a Condition Report (CR) and processed in accordance with DUF6-U-QAP-0037, *Nonconformance Reporting.*

5.13 TRACKING CHANGES

The SEM is responsible for tracking physical change status and ensuring that the change is completed in accordance with the approved design change package, including associated changes to configured documents. This tracking/oversight function may be assigned to the System Engineer.

5.14 PARTIAL IMPLEMENTATION

The need for a partial implementation typically results when a change package is being worked for a system (or line) and cannot be completed as approved and the system (or line) must be returned to service, declared operable, or capable of meeting its intended safety function. Partially implemented change packages are reviewed and approved prior to operations. The SEM approves partially implemented changes and obtains necessary design engineering review and USQ review to confirm the original technical review is still valid or indicates that a new technical review is required and approved prior to operations. Documents are updated and distributed for partial implementation consistent with the configured document distribution processes. Some circumstances are best suited for partial implementation under the work control process, and accepted by Operations. Additionally, the DUF6-U-CON-0001, *MCS Conduct of Operations Manual,* includes temporary modification control requirements as controlled and performed per DUF6-U-PEP-1114, *Control and Tracking of Temporary Modifications.*

5.15 PARALLEL CHANGE IMPLEMENTATION

The concurrent implementation of two or more changes that affect or involve the same SSC is typically not planned during normal operations. Multiple changes may be accomplished during system maintenance outages. In cases where parallel changes are to be implemented, the SEM ensures that the design analysis considers any parallel changes and the level of completion of the change prior to return to operation of the SSC.

5.16 POST-MODIFICATION TESTING

MCS validates work before implementation and performs acceptance testing as identified in the design change package. Post-modification testing validates that the system or component performs as intended and operates within the design requirements after the change is installed and before turnover to operations. All post-modification testing is completed and all acceptance criteria satisfied prior to turnover to operations, unless specific tests are to be done post-turnover. These tests serve as the final and independent check of the adequacy of the design review for the proposed change.

5.17 POST-MODIFICATION TRAINING

Before returning a SSC to service following changes, MCS modifies affected procedures and completes any identified staff training on the modification and the effect on normal, abnormal, and emergency operations.

5.18 DOCUMENTATION OF CHANGES

"As-built" documentation is prepared at the completion of implementation of the physical changes. Revised documentation is distributed to users of configured documents. Maintenance of documents and records is required by DUF6-U-DMP-0002, *Document Control and Records Management*.

6 WORK CONTROL

DUF6-PLN-056, *Maintenance Implementation Plan* and associated implementing procedures meet the requirements of DOE Order 433.1B and apply the work control process described in DOE G 433.1-1A, *Nuclear Facility Maintenance Management Program Guide for Use with DOE O 433.1B*. The plans, along with DUF6-U-GFP-0108, *Control of Work,* and DUF6-U-CON-0001, *Conduct of Operations Manual* explain in detail how work is evaluated and coordinated before it is performed. Work activities are identified, initiated, planned, scheduled, coordinated, performed, approved, validated, and reviewed for adequacy and completeness, and documented. The work control process also ensures that when work activities are performed, consistency is maintained between the documents, the procedures, and the physical configuration of the facility. This is accomplished through review and concurrence by the System Engineer of planned work packages as per approval requirements of DUF6-U-GFP-0108, *Control of Work.* All work is approved by the Facility Manager (FM).

Responsibilities, authorities, and expectations of work control are clearly communicated to all individuals who do work including facility personnel, subcontractors, and non-facility personnel. As necessary, engineering documents (e.g., technical specifications) are prepared to flow down specific work control responsibilities, authorities, and interfaces for subcontractors who perform work activities.

Procurement of SSCs, including those that are identified as within the CM program, follow the procurement processes and procedures. Specifically, DUF6-U-PRP-0037, *Technical Bid Evaluations*, involves responsible engineers in the review of procurement packages to ensure the correct system and component requirements including receipt inspections, storage requirements, and shelf life criteria for CM are contained in procurement documents.

The MCS ISMS is described in DUF6-PLN-040, *Integrated Safety Management System Plan for Operations*. This document describes how the ISMS process integrates safety into all aspects of work planning and execution, and the involvement of the workers and hands-on involvement of line managers. The ISMS process ensures that environment, safety, and health management are an integral part of performing

work. Authorized personnel approving the work ensure that the CM change control process, including the USQ process, is used for changes that could impact facility safety analysis or hazard controls. If additional changes affecting the safety analysis or the hazard controls are identified during the performance of work, these identified changes are processed using DUF6-U-PEP-1110 and DUF6-U-NSP-0002. DUF6-U-GFP-0015, *Technical Procedure Development,* establishes the requirements for the preparation, review, approval, issuance, cancellation, and revision of the DUF_6 Conversion Project implementing procedures and forms.

7 CONFIGURATION VERIFICATION AND ASSESSMENT

7.1 ASSESSMENTS

Assessments of the CM program and implementation of the CMP are performed to meet the requirements of 10 CFR Part 830, Subpart A, to assess management processes and measure the adequacy of work performance. The assessments also address the criteria of DOE O 433.1B to verify the condition of systems and equipment. Program assessments are periodically scheduled and conducted in accordance with DUF6-U-QAP-0013, *Management and Technical Assessments*, as an oversight role by the QA organization utilizing DUF6-U-QAP-0012, *Independent Assessments,* or in other assessments such as ISMS. Assessment results are documented, reported to, and reviewed by responsible MCS management. As indicated in the assessment reports, appropriate, documented corrective action shall be taken to resolve any discrepancy or noncompliance found during these assessments. Corrective actions shall be tracked until verified as complete and closed as required by DUF6-U-QAP-0005, *Condition Reporting*.

The effectiveness of different aspects of the CMP is assessed through physical configuration assessments, post-implementation inspections and tests, and periodic performance assessments. Where practicable, CM related reviews and assessments are combined with other periodic assessments of facilities and activities for efficiency and cost-effectiveness. All or part of the assessment of the adequacy of CM for an activity may be integrated into broader management and performance assessments, such as QA, maintenance, or ISMS assessments. CM assessments should identify if they are combined with other assessments such as QA, maintenance, or ISMS assessments. Specific CM assessments, as summarized below, are to be performed at least on an annual basis or as identified otherwise.

7.1.1 Physical Configuration Assessments

Assessment requirements specified in DOE O 420.1C Chg 3 are met as part of the review of Safety System operability, reliability, and material condition inspections through the System Engineer Program. DUF6-U-PEP-1002, *Safety Basis Surveillances*, provides guidance on material condition inspections of CIs credited in the DSAs. Additionally, SSCs are inspected to assure their configuration agrees with their associated Configuration Documents (CDs) including drawings.

DUF6-U-PEP-1304, *Engineering Evaluations,* provides for performing technical evaluations to identify discrepancies and to recommend appropriate corrective actions, which may include changes to the physical configuration or the documentation. Special reviews are performed on an as needed basis for discovery conditions or occurrences potentially affecting the safety function of SSCs.

7.1.2 Post-Modification Assessment

System testing following system modifications is evaluated to ensure the system continues to be capable of fulfilling system requirements as required by Chapter V of DOE O 420.1C Chg 3. The design change package and resulting work change package will identify post-modification testing requirements, which are to be completed prior to return to service.

7.1.3 Periodic Performance Assessments

Testing of SSCs is performed as required by DOE O 433.1B to determine if they are capable of meeting their intended safety design and performance requirements.

Deficiencies identified during the periodic performance testing, that cause the SSCs to deviate from design requirements are evaluated to determine causes of performance degradation as warranted. Corrective actions including repair, replacement, or changes of components are taken as needed to assure that systems continue to be capable of meeting their DSA credited functions.

7.1.4 Resolution of Open Items

Assessment findings are documented as open items if they are validated to involve contradictory information among different CDs, unanswered technical questions, and/or missing, undocumented or inaccurate information and are documented through the DUF6-U-QAP-0005, *Condition Reporting.* Findings are tracked until satisfactory completion and closeout is achieved. Any identification or a potential inadequacy of the DSA is addressed through the USQ process. The Noncompliance Tracking System (NTS) and Price Anderson Amendments Act (PAAA) Noncompliance and Reporting are used when applicable as described in DUF6-U-CPL-0015, *Nuclear Safety and WSHP Noncompliance Reporting*.

8 PROGRAM IMPLEMENTATION

Procedures that implement the CM program are listed in Attachment A. Attachment C, Configuration Management Compliance Crosswalk, provides a listing of the requirements of *Configuration Management,* DOE-STD-1073-2016, and *National Consensus Standard for Configuration Management,* ANSI/EIA-649, and the corresponding procedures that implement these requirements. Procedures of particular importance to implementation of the CM program for the operational phase are:

- DUF6-U-CPL-0015, *Nuclear Safety and WSHP Noncompliance Reporting*

- DUF6-U-CPL-0019, *Trending*
- DUF6-U-DMP-0001, *Controlled Document Procedure*
- DUF6-U-DMP-0002, *Document Control and Records Management*
- DUF6-U-GFP-0108, *Control of Work*
- DUF6-U-NSP-0001, *Safety Basis Documentation*
- DUF6-U-NSP-0002, *Unreviewed Safety Question Process*
- DUF6-U-PCP-0009, *Change Control*
- DUF6-U-PEP-1114, *Control and Tracking of Temporary Modifications*
- DUF6-U-PEP-1111, *Facility Change Process*
- DUF6-U-PEP-1110, *Operations Design Change Control*
- DUF6-U-PEP-1113, *Configuration Change Control Board*
- DUF6-U-PEP-1112, *Field Change Request – Operations*
- DUF6-U-PEP-1204, *Equivalency/Substitution*
- DUF6-U-PEP-1304, *Engineering Evaluations*
- DUF6-U-QAP-0012, *Independent Assessments*
- DUF6-U-QAP-0013, *Management and Technical Assessments*
- DUF6-PLN-027, *Personnel Selection, Training, and Qualification Management Plan*
- DUF6-U-GFP-0015, *Technical Procedure Development*
- DUF6-U-TRN-0001, *Training and Qualification*
- DUF6-PLN-015, *Document Control and Records Management Plan*
- DUF6-PLN-040, *Integrated Safety Management System Plan for Operations*
- DUF6-PLN-056, *Maintenance Implementation Plan*
- DUF6-PLN-122, *System Engineer Program*

Steps or sections of these procedures are a part of the CM process.

- Attachment A. Implementing Plan/Procedures
- Attachment B. Definitions
- Attachment C. Configuration Management Compliance Crosswalk
- Attachment D. Operations CM Program Graded Approach Summary
- Attachment E. Mid-America Conversion Services, LLC Configuration Management Policy

ATTACHMENT A. IMPLEMENTING PLANS/PROCEDURES

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DUF_6 CONVERSION PROJECT PROCEDURES IMPLEMENTING THE CONFIGURATION MANAGEMENT PROGRAM

Title	Document No.	Description
Conduct Of Operations	DUF6-U-CON-0001	Establishes the responsibilities and requirements associated with the operation of the DUF_6 Conversion Project facilities
Controlled Document Procedure	DUF6-U-DMP-0001	Describes responsibilities and requirements for the receiving, processing, distributing, and maintaining controlled documents generated for or in support of the DUF_6 Conversion Project
Document Control and Records Management	DUF6-U-DMP-0002	Describes responsibilities and requirements for the creation, collection, storage, maintenance and disposition of records generated for or in support of the DUF_6 Conversion Project
Safety Basis Documentation	DUF6-U-NSP-0001	Establishes the processes and requirements associated with the development and approval of revisions to a facility's approved safety basis documentation
Unreviewed Safety Question Process	DUF6-U-NSP-0002	Establishes the process for determining whether proposed changes are adequately evaluated relative to the approved safety basis
Engineering Evaluations	DUF6-U-PEP-1304	Establishes requirements for engineering evaluations
Component Numbering and Labeling System	DUF6-U-PEP-1101	Provides the methodology to be used in numbering components of the DUF_6 Conversion Project facilities, structures, and systems
Grading of Structures, Systems, and Components, and Identification of Configured Items	DUF6-U-PEP-1102	Establishes the requirements to place SSCs on the configured items list
Maintenance and Control of MEL/CIL	DUF6-U-PEP-1103	Established the requirements for establishing and maintaining the MEL and CIL
Preparation of Facility Design Descriptions and System Design Descriptions	DUF6-U-PEP-1104	Describes the responsibilities and format for the revision of facility design descriptions (FDDs) and system design descriptions (SDDs)
System Requirements Document	DUF6-U-PEP-1105	Describe the development and control of the project System Requirements Documents (SRD).

Title	Document No.	Description
Preparation of Technical Specifications	DUF6-U-PEP-1108	Establishes the requirements for the preparation of technical specifications
Preparation of Calculations	DUF6-U-PEP-1109	Establishes the requirements for the preparation and revision of engineering calculations
Operations Design Change Control	DUF6-U-PEP-1110	Prescribes the requirements for requesting and authorizing design changes to the technical baselines
Facility Change Process	DUF6-U-PEP-1111	Prescribes the requirements for requesting and authorizing design changes that do not change the technical baseline
Field Change Request - Operations	DUF6-U-PEP-1112	Defines the method used to make field changes for approved Operations Design Change Requests (DCRs) including USQ and technical evaluations, reviews, and approvals
Configuration Change Control Board	DUF6-U-PEP-1113	Establishes the CCCB review, evaluation, and approval process for proposed changes to configuration of DUF6 Conversion Project
Control and Tracking of Temporary Modifications	DUF6-U-PEP-1114	Establishes the methodology and requirements for maintenance of temporary modifications
Requirements For Revising or Creating Engineering Drawings	DUF6-U-PEP-1115	Establishes the requirements for creation or revision of engineering drawings
Equivalency/Substitution	DUF6-U-PEP-1204	Establishes the requirements for specifying equivalent equipment or instrumentation
Purchase Requisitioning Procedure	DUF6-U-PRP-0002	Establishes requirements for requesters, reviewers, and buyers in completing, routing, and processing purchase requisitions
Technical Reviews	DUF6-U-PEP-1303	Establishes the requirements for the engineering review and approval of design documents
Software Management	DUF6-U-PEP-1310	Establishes the requirements for managing software configuration
Change Control	DUF6-U-PCP-0009	Describes the process for preparation, review, and approval of DUF6 Conversion Project BCPs
Technical Bid Evaluations	DUF6-U-PRP-0037	Establishes a uniform method for obtaining engineering and construction review and evaluation of technical proposals on the DUF6 Conversion Project
Control of System and Integrated System Testing	DUF6-U-GFP-0014	Establishes the process for preparing, implementing, and documenting system and integrated process testing of DUF6 conversion facilities' SSCs

Title	Document No.	Description
Technical Procedure Development	DUF6-U-GFP-0015	Establishes the requirements for the preparation, review, approval, issuance, cancellation, and revision of the DUF6 Conversion Project implementing procedures and forms
Control of Work	DUF6-U-GFP-0108	Defines process requirements for planning and executing work in MCS facilities
Graded Approach	DUF6-U-QAP-0004	Defines the graded approach, which involves the selection and application of appropriate technical and administrative controls commensurate with the associated risk
Condition Reporting	DUF6-U-QAP-0005	Describes the method for identification, documentation, tracking, closure, and verification of adverse and non-conforming conditions of the DUF_6 Conversion Project
Independent Assessments	DUF6-U-QAP-0012	Provides direction for the implementation of independent assessments of the DUF_6 Conversion Project
Management and Technical Assessments	DUF6-U-QAP-0013	Identifies deficiencies or proficiencies and facilitates continuous quality improvement in management processes, systems, and procedural controls.
Trending	DUF6-U-QAP-0019	Describes the processes for the collection, analysis, and evaluation of data and information for determining and reporting the existence of trends to facilitate continuous quality improvement activities
Receipt Inspection	DUF6-U-QAP-0032	Provides requirements for receipt inspection of quality-related items
Non-Conformance Reporting	DUF6-U-QAP-0037	Describes the method for identification, documentation, tracking, closure, and verification of non-conforming conditions on the DUF_6 Conversion Project
Training and Qualification	DUF6-U-TRN-0001	Describes the methods of implementing training and, as appropriate, qualification of MCS personnel on the DUF_6 Conversion Project
Operational Experience Program	DUF6-U-CPL-0017	Describes the Lessons Learned Program and associated processes for implementing the applicable requirements of the DUF_6 Conversion Project Quality Assurance Plan (PQAP)

Title	Document No.	Description
Personnel Selection, Training, and Qualification Management Plan	DUF6 -PLN-027	Describes the method for qualification of personnel
System Engineer Program	DUF6 -PLN-122	Describes the responsibilities and requirements of managing systems, structures, and components (SSCs) to ensure that they maintain their design function after the construction phase is completed

ATTACHMENT B. DEFINITIONS

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Configured Document: A Configured Document is a document, procedure, or other documentation that is controlled under the CM program.

Configuration Change Control Board (CCCB): The CCCB consists of selected members of MCS management whose primary responsibility is to maintain configuration control of the project. Its function is to review, evaluate, and formally approve or reject any proposed change to a Structure, System, and Component (SSC) that is identified as being within the MCS Configuration Management Program.

Configuration Management (CM): The process that manages the configuration of the project's SSCs so that they satisfy the functional performance requirements defined in scoping documents and the safety requirements defined in the facility safety basis approved by the Department of Energy.

Configured Item (CI): Any SSC that will be included in the MCS Configuration Management Program.

Design Authority (DA): The Design Authority is the individual designated to review and approve the process and facility designs to ensure the technical adequacy of the designs. The Design Authority also ensures the process design meets all requirements necessary to meet the conversion goals of the DUF_6 Conversion Project.

Design Basis: The set of requirements that bound the design of structures, systems and components within the facility. These design requirements include consideration of safety, plant availability, efficiency, reliability, and maintainability. Some aspects of the design basis are nuclear safety requirements important to safety, others are not (DOE-STD-3009-94).

Design Change Request (DCR): A DCR is a formal document for requesting and authorizing changes to the DUF_6 Conversion Project Technical Design Basis.

Design Requirements: Those engineering requirements reflected in design output documents (drawings, specifications, etc.) that define the functions, capabilities, capacities, physical sizes and dimensions, limits and set points, etc., specified by design engineering for a SSC.

General Support (GS): Designation for those SSCs not classified as Safety Class, Safety Significant, or Production Support.

Master Equipment List (MEL): A detailed master list of equipment, components, and structures to be included in the maintenance program. This list includes both safety-related and non-safety-related systems and equipment (DOE G 433.1-1).

Production Support (PS): Designation for those SSCs not classified as Safety Class or Safety Significant, but determined to be necessary to support expected operation of the facility.

ATTACHMENT B. DEFINITIONS
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System Engineer: The DUF_6 engineer responsible for a specific SSC as designated by the SEM.

Safety Class: Designation for those SSCs whose preventative or mitigative function is necessary to limit radioactive hazardous material exposure to the public, as determined by safety analysis. The Facility safety analyses have determined that the DUF_6 Conversion Project does not have any Safety Class SSCs.

Safety Significant (SS): Designation for those SSCs, which are not designated as Safety Class, but whose preventative or mitigative function, is a major contribution to defense-in-depth and/or worker safety as determined by the safety analyses.

ATTACHMENT C. CONFIGURATION MANAGEMENT COMPLIANCE CROSSWALK

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Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
1	1.1 Policy Ownership	Unless it is determined that CM is no longer needed for the facility or activity, the contract shall clearly define which contractor is responsible for CM at each point in tie with no gap in time.			DUF6-PLN-121, Configuration Management Plan for Operations (Section 3)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
2	1.1 Policy Transition/ Transfer	If there is a contractor change, the outgoing contractor should work with the incoming contractor to determine how the CM effort is to be relayed to the new customer. Such transitional activities should be documented in contracts to ensure that they are completed. Once the CM effort is transferred to the new contractor, the new contractor shall be responsible for CM at the facility or activity unless or until CM is no longer required. If a new CM process is needed it should be developed and approved so that it can be implemented at the point of transition with no gap in time from the previous CM process. In particular, for capital asset projects transitioning to operation, the CM process to be used during and following the transition should be documented in the Transition to Operations Plan discussed in DOE G 413.3-16A, Chg. 1, Project Completion/Closeout Guide.			DUF6-PLN-121, Configuration Management Plan for Operations

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
3	1.1 CM during Decon & Deactivation	Prior to the end of life of the facility or activity, the contractor, in coordination with DOE, shall determine if CM should be applied to post-operation activities, such as decontamination and deactivation.	CI-11 5.2.6	A configuration baseline is established by agreeing to the definition of the attributes of a product at a point in time and identifies known configuration to which changes are addressed.	DUF6-PLN-121, Configuration Management Plan for Operations (Section 1)
4	1.2 Policy	In implementing the CM, DOE contractors shall meet the following general provisions for CM: • Establish a formal policy that endorses the use of CM • Document the CM process in a CM plan which o Defines the key roles and responsibilities for CM			DUF6-PLN-121, Configuration Management Plan for Operations
5	1.2 Resources	In implementing the CM, the DOE contractors shall meet the following general provisions for CM: • Commit sufficient resources to adequately implement the CM process.	1-3 CMP-3 5.1.3	To implement planned CM functions, resources are identified and applied, and responsibilities to perform CM activities are assigned.	DUF6-PLN-121, Configuration Management Plan for Operations (Section 1)

6	1.2
	
	Plan must address
		Document the CM process in a CM plan which:
		
		•Addresses how each of the key elements of CM will be met
		• Identifies the structures, systems, and components (SSCs) and credited controls to be included in the CM process, as well as the basis and justification for the selection
		• Define the CM training for personnel
		
		• Who is assigned key responsibilities and authorities for configuration management
		• Defines how interfaces are controlled
		
		• (Restated later, replaced with 2 new requirements cover by section 3)
		  • Ensure participation of individuals who are involved in the day-to-day work of a facility or activity in the CM process, such as operations and maintenance supervisors
		  • Engage the applicable Cognizant System Engineers in the CM process when changes are being proposed or implemented
		• Describes how the graded approach is applied to the CM process
			CMP-1
			
			5.1.1
				The foundation for CM planning, which delineates the specific CM application methods and their levels of emphasis, is an understanding of the context and environment of the product to which the CM process is to be applied.	DUF6-PLN-121, *Configuration Management Plan for Operations*
					
					• Section 4
					• Section 4.1
					• Section 3.1
					• Section 3.2
					• Section 4.1
					• Section 3

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
7	1.2 Independent authority	Provide sufficient independence and authority to the individuals assessing the implementation of the CM process			DUF6-PLN-121, Configuration Management Plan for Operations (Section 3.2)
8	1.2 Personnel knowledge	Ensure the individuals who implement CM are knowledgeable about the various activities being implemented for the facility or activity and the impact proposed changes might have on the facility or activity and on related safety documentation.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Sections 2 and 3.1)
9	1.2 Life time Control	Ensure configuration is-controlled for the life of the facility or the duration of the activity.	CMP-2 5.1.2	CM Planning documents how the organization will implement CM throughout the applicable phases of the product life cycle to provide consistency between the product configuration information, and the product.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 1.1)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section

10	1.2
	
	CM into Procedures and Training
		• Ensure CM requirements are incorporated into procedures and other work processes and work is performed in accordance with those procedures and work processes.
		
		• Ensure the training organization is involved in the CM process so it is aware of changes needed to training programs and the content of training programs are maintained current with changes to the facility or activity.
		
		• Define the CM training for personnel which include:
		
		  • Training on the facility or activity CM process
		  • Instruction on the objectives of CM
		  • Instruction on the implementation of CM, including applicable procedures
		  • Update and refresher training (e.g., annually)
			CMP-5
			5.1.5
			
			CMP-6
			
			5.1.6
				CM Procedures document how each CM function is implemented to accomplish the intent of the CM planning. Formerly CMP-4.
				
				Provide CM training to assure that individuals understand their responsibility, authority, accountability, and the procedures for performing CM. Formerly CMP-5.
					DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 3.1)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
11	1.2 Should CM Integration	CM should be established as an integrated process to be used by all personnel when performing activities that affect configuration of items within the process, not as a separate program. If the contractor established a separate group with the responsibility for CM, the role of that group should be to develop and maintain the CM procedures, maintain the required documentation, and coordinate and facilitate the reviews of the various line organizations. However it should not be the sole group responsible for reviewing proposed changes and assessing impacts on operation.			DUF6-PLN-121, Configuration Management Plan for Operations

12	1.3 Set of CM SSCs	The CM SSCs and credited controls that will be controlled under the CM process shall be identified for each facility or activity and will, in part, define the scope of the CM process. The CM SSCs and credited controls are compiled from several categories of SSCs and credited controls. For HC 1, 2, and 3 nuclear facilities, the Safety SSCs identified in the Documented Safety Analysis (DSA), as required by 10 CFR 830.(b)(1), shall be included in the list of CM SSCs. The safety SSCs are the combination of Safety-Class SSCs and Safety-Significant SSCs, and they include those SSCs whose preventive or mitigative functions are considered to be major contributors to defense-in-depth and worker safety. "Defense-in-depth" refers to the various layers of protection provided to ensure public safety, worker safety, and protection of the environment. In addition to the safety SSCs (which are considered to constitute the baseline or minimum set of CM SSCs for HC 1, 2, and 3 nuclear facilities as discussed later in this Section) and the credited controls for accelerators (which are considered to be the baseline for minimum set of CM SSCs and credited controls for accelerators as discussed later in this Section), the contractor should consider SSCs and credited controls in the following categories when establishing	CI-3 5.2.3.1	Enterprise identifiers designating the responsible designer, manufacturer, or preparer provide uniqueness to the identifiers of products and product configuration information.	DUF6 -PLN-121, *Configuration Management Plan for Operations* (Section 4.1)

	Cont. 1.3	the SSCs and credited controls to be included in the CM process (CM SSCs): • Defense-in-depth SSCs (for HC 1, 2, and 3 nuclear facilities only); • Mission critical SSCs: SSCs whose failure could cause substantial interruption to the mission of the facility or activity; • Environmental Protection SSCs: SSCs that could have a significant impact on the environment if they failed to perform their function; • Costly SSCs: SSCs that would be expensive to fix or replace or whose failure could result in problems that could be expensive to fix • Critical Software and Firmware: Software and firmware whose proper performance is critical to the expected performance of a safety SSC, a defense-in-depth SSC, the safety of a nuclear facility, or a critical function of a radiological or non-nuclear facility; • Master Equipment List (MEL) SSCs: SSCs that are included in a maintenance program; • Collocated SSCs: SSCs that are located near important SSCs, such that changes to the SSCs could negatively impact the safety or mission of the facility or activity of the function of the important SSCs			

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	Cont. 1.3	• Authorization Bases (including Environmental Permits, as well as Safety Bases) where applicable; • Life/Safety SSCs and Controls: SSCs and controls that protect life and safety in the event of a fire; • Safety management System (SMS) Work Processes: Processes and procedures e.g., for fire protection, maintenance, criticality safety, radiation protection, worker safety, hazardous materials handling, pressure safety, quality management, integrated safety management, nuclear explosive, non-nuclear explosive, accelerator beam safety, emergency preparedness procedures, and evacuation of accelerators before startup. • Worker Safety SSCs: Those needed to ensure safety of workers; and • SSCs needed to preserve the integrity of the facility or activity.			

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	Cont. 1.3 Set of CM SSCs	The CM process shall identify the sum of all of the CM SSCs and credited controls to be controlled by the CM process. The design authority (or other technical authority as documented in the CM process) should define the SSCs that fall under each type. For HC 1, 2, and 3 nuclear facilities, the safety SSCs identified in the DSA constitute the baseline set (i.e., minimum) of CM SSCs.	CI-3 5.2.3.1	Enterprise identifiers designating the responsible designer, manufacturer, or preparer provide uniqueness to the identifiers of products and product configuration information.	DUF6 -PLN-121, *Configuration Management Plan for Operations* (Section 4.1)
13	1.3 Defined systems	Systems in the CM process shall have defined system boundaries and component lists. Systems shall contain those components necessary to accomplish the system functions and to meet the system design requirements.	CI-13 5.2.7	Interfaces between products are managed by mutually agreeing to defined common product attributes, making them part of the product configuration baselines for each product, and applying a process to maintain interface integrity.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.1)
14	1.4 Graded Approach	When a graded approach is used for CM, the bases for that graded approach shall be documented in the CM process.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.7)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
15	2.1 Formal Plan	Where different levels of CM are to be implemented, the CM plan shall document the provisions for CM at each level. The contractor shall formally document, and DOE shall approve, the conditions for transitioning from one level to the next, and the process for handing off responsibility for CM from one DOE contractor to another.	CMP-2 5.1.2	CM Planning documents how the organization will implement CM throughout the applicable phases of the product life cycle to provide consistency between the product configuration information, and the product.	DUF6-PLN-121, *Configuration Management Plan for Operations*
16	2.1 Formal Agreement	For new construction, the contract or other formal document between DOE and the contractor shall define the process for establishing the design baseline for CM.			N/A. Configuration is currently managed.

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
17	2.1 New Facilities and Activities	For new construction, the contract or other formal document between DOE and the contractor shall define the process for establishing the design baseline for CM. There should be a thorough review of the design, the documentation, and the physical configuration to establish the baseline for the CM process at the initiation of the CM process. Subsequent changes to project design and supporting documents should be made by means of a formal change control program. For design/build projects, the design/build contractor shall ensure that the facility can be built consistent with the design. Following submittal of the preliminary documented safety analysis (PDSA) to DOE, the contractor shall review all changes for their potential impact on the PDSA and maintain the PDSA up-to-date as the design evolves so that both the contractor and DOE can rely on the information until it is replaced by the final DSA.			DUF6-PLN-121, Configuration Management Plan for Operations DUF6-U-PEP-1110, Operations Design Change Control

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
18	2.1 Design requirement document	For new construction and major modifications for HC 1, 2, and 3 nuclear facilities, the design requirements shall be identified and documented as part of the design process and incorporated into a formal CM process before start of construction.	CSA-2 5.4.1	Information about the product and the product configuration information are captured as CM tasks are performed; reporting is accessible to support program/project activities as needed.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.2)
19	2.2 Existing Facilities Changes	When changes are performed, the contractor shall document the design requirements associated with the change.		Principal CSA-2 applies.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5)
20	2.2 Modification of Facilities and Activities	For existing HC 1, 2, and 3 nuclear and other facilities that incorporate this Standard by contract, the contractor shall determine the essential design requirements applicable to the CM SSCs and credited controls based on environment, safety, and health considerations, mission requirements, and other potential costs of failure to meet design requirements. CM shall be applied to these essential design requirements.			DUF6-PLN-121, *Configuration Management Plan for Operations* DUF6-U-PEP-1110, *Operations Design Change Control*

21	2.2 Existing Facilities Cylinder Yards Cont. 2.2	The contractor shall continue to document the new or revised design requirements for CM SSCs and credited controls as maintenance and modifications are performed at the facility or activity. In these cases, the contractor shall: • Ensure the safety analysis [i.e., DSA, safety analysis document (SAD), hazard analysis report (HAR), or other safety or project documentation as appropriate] demonstrates that the design and functional requirements for the CM SSCs are sufficient, and • Validate that the credited controls, and other hazard controls will perform their essential safety functions and/or operational functions as assumed in the analysis If the information is not sufficient to adequately document the CM baseline and validate proper operation of the CM SSCs, credited controls, and other hazard controls,, as well as the performance of the work activities, then the contractor shall consider if additional action is necessary so changes can be adequately assessed. If the data recovery techniques are still not sufficient to adequately complete the design requirements, the contractor should consider whether the information		Principal CSA-2 applies.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.2)

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		should be regenerated (e.g., performing analysis and/or calculations, or interviewing technical experts who are knowledgeable about the particular equipment or situation). If the contractor decides to pursue regeneration of the information, it should take maximum advantage of pertinent existing safety analysis and design information (i.e., requirements and their bases) that are immediately available or can be retrieved through reasonable efforts.			

22	2.3 Identify Design requirements	Once the design baseline is established and the set of CM SSCs and credited controls is identified, the contractor shall identify and document the design requirements for the CM SSCs and credited controls. The design requirements to be documented should include at a minimum those that affect: • Operation, • Installation, • Function, • Performance, and • Maintenance. Design requirement documentation should include design inputs, design analysis and calculations, and design output. In establishing design inputs, the contractor should consider the effects of the operating environment (e.g., radiation, temperature, pressure, humidity, and chemical spray), material condition, and aging (e.g., erosion, corrosion, fatigue, chloride stress or intergranular stress corrosion cracking, and embrittlement). For example, in establishing the design inputs and subsequent requirements, the contractor should consider the effects of radiation exposure and aging on elastomeric materials, such as rubber O-rings and Teflon tape. Design inputs should be gathered from all affected	CI-1 CI-2 CI-8 5.2.3.5	Configuration identification is the basis from which the configuration of products is defined and verified; products and their product configuration information are labeled; changes are managed; and traceability is maintained throughout the product's life cycle. Product configuration information serves as the basis for development, production, operation, and maintenance/support of the product. Product configuration information is uniquely identified so that it can be referred to precisely and made accessible.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.2)

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	Cont. 2.3	parties. Design inputs for CM SSCs and credited controls should be controlled by the change control process. Design analysis and calculations should not be relied upon until independently verified in accordance with the requirements of QA Criterion 6 (DOE O 414.1D, Chg. 1, *Quality Assurance*, or 10 C.F.R. Part 830, Subpart A), the facility or activity Quality Assurance Program (QAP), and applicable work processes related to design verification. Design outputs include documentation such as drawings, design change packages, specifications, load lists, valve lists, design reports, and setpoint lists.			

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23	2.3 Design Requirement	Once the design baseline is established and the set of CM SSCs and credited controls is identified, the contractor shall identify and document the design requirements for the CM SSCs and credited controls. The contractor shall thereafter assess the effects of changes to the design requirements of CM SSCs and credited controls through the CM change control process (see Section 4). Furthermore, unless (1) the SSC or credited control is deleted from the set of CM SSCs and credited controls or (2) the facility or activity no longer needs a CM process, the contractor shall maintain the design requirements for CM SSCs and credited controls throughout the life of the facility or activity.			DUF6 -PLN-121, *Configuration Management Plan for Operations* (Section 4.2)
24	2.3 Should Design Outputs	Design output should be sufficient to support the CM process objectives in a form that allows easy and proper use by the various user organizations, including procurement, construction, operations, maintenance, testing, and design engineering.			DUF6-PLN-121, Configuration Management Plan for Operations

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25	2.3 Design Changes	The contractor shall thereafter assess the effects of changes to the design requirements of CM SSCs and credited controls through the CM change control process. Design reviews should be conducted for all projects and major modifications. Design reviews should involve a formalized, structured approach to ensure the reviews are comprehensive, objective, professional, and documented. Design reviews should meet the applicable requirements in the facility of activity QAP.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5)
26	2.3 Design requirements retention	Furthermore, unless (1) the SSC or credited control is deleted from the set of CM SSCs and credited controls or (2) the facility or activity no longer needs a CM process, the contractor shall maintain the design requirements for CM SSCs and credited controls throughout the life of the facility or activity.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.4)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
27	2.3, 2.10 Changes to design requirements	The contractor shall thereafter assess the effects of changes to the design requirements of CM SSCs and credited controls through the CM change control process (see Section 4). Furthermore, following review and approval of the proposed change, the CM database shall be updated as appropriate to reflect the change.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5)
28	2.5 Should Design Authority	Unless the design authority is designated by the acquisition executive or in the contract, contractors should establish the design authority for the CM SSCs. The design authority is responsible for establishing and maintaining the design requirements, ensuring design output documents accurately reflect the design basis, and maintaining design control and ultimate technical adequacy of the design process. There may be a single design authority or multiple design authorities for a facility or activity but each CM SSC should have an identified design authority. When facilities or systems are turned over from one organization to another, the design authority may also change. Procedures should be developed to govern this turnover	CCM-4 5.3	Classification of a request change determines the appropriate level of review and the applicable change approval authority.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.3)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
29	2.6 Design Requiremen – Technical Review	When the design requirements are initially established for the CM SSCs and credited controls in the CM process, the contractor shall perform a review to determine the adequacy of these requirements and the associated documentation. The technical review team shall include technical managers who have broad design backgrounds and experience and represent the various design disciplines.	CI-11 5.2.6	A configuration baseline is established by agreeing to the definition of the attributes of a product at a point in time and identifies a known configuration to which changes are addressed.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.4)

30	2.6 Design Requirement Technical Review Doc.	The contractor shall document, retain, and maintain the team's conclusions and the basis for the conclusions regarding the adequacy of the facility or activity design requirements in a retrievable form. The documentation should indicate the relevant design information by system and an index of design documents should be provided. At the conclusion of this review, the team shall decide if any of the still missing information is truly critical to safe and effective CM. If the information is not critical, then the contractor should not invest additional resources in recovering the information. If major construction or modification is performed on the system at a later date, the design information should be developed. If the conclusion of the team is the design requirements and their design basis are not adequately documented and additional information is critical to ensure safe and effective CM, then the team shall develop a plan to recover that information. If the missing information is necessary to support the safety or design basis, then the missing information shall be retrieved or regenerated. If the team concludes a design reconstitution is recommended, the team should develop and document specific recommendations for that effort.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.4)
31	2.7	Contractors should consider using system design descriptions (SDDs) to			DUF6-PLN-121, Configuration

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	Should Design Descriptions	document design requirements and to provide a link between engineering design documents, safety basis documents (DSAs and Technical Safety Requirements or TSRs), and implementing procedures for HC 1, 2, or 3 nuclear facilities.			Management Plan for Operations
32	2.8 Should CIL & CD Database	Contractors should develop CM databases that cross-reference SSCs and credited controls with their design requirements, design basis, and associated documents.	CSA-1 5.4	Configuration Status Accounting (CSA) provides an accurate, timely information base concerning a product and its product configuration information throughout the product life cycle. Principle CMP-9 applies.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.6)
33	2.8 Should CIL & CD Database Owner	The contractor should assign a database owner for the equipment database, with established roles and responsibilities.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 3.2)

34	2.9 Turnover	The design, construction, and operating contractors shall accept responsibility for the CM at respective turnovers. To ensure a successful turnover of new facilities or activities or to new modifications prior to operations, the design contractor and the construction contractors should interface with the operating contractor early in the design and construction phases. The design and construction contractors, together with the operating contractor, should establish and agree upon the formal criteria for construction turnover. The criteria should include the following provisions: • Specify at design inception the format and content of design basis and design output documents such that they will be compatible with the operating contractor's work processes, • Periodically monitor the preparation of design basis and design output documents to ensure they will meet the operating contractor's needs, • Specify the review and approval process for the format and content of final design basis and final design output documents, and • The design, construction, and operating contractors shall accept responsibility for the CM at respective turnovers.			DUF6-PLN-121, Configuration Management Plan for Operations

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35	2.11 System Engineer	The Cognizant System Engineer is required to be knowledgeable of the system and the related safety basis. The Cognizant System Engineer is also required to retain a working knowledge of the facility's operation and the existing condition of the system. The Cognizant System Engineer is responsible for overseeing the configuration of the assigned system to ensure that it continues to be able to perform its expected functions.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.8) DUF6-PLN-122, *System Engineer Program* (Section 4.1.2)
36	2.11 Should System Engineer	The Cognizant System Engineers should have a major role in identifying the CM SSCs. Each Cognizant System Engineer should also participate in the identification of the design requirements for his/her system and the SSCs within the system. Finally, the Cognizant System Engineer should participate in the CM review of any changes that are made to the system for which the Cognizant System Engineer has responsibility.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.8) DUF6-PLN-122, *System Engineer Program* (Section 4.1.2)

37	2.11 Should System Engineer	The Cognizant System Engineer should: • Be knowledgeable of the system safety functions, requirements, and performance criteria and their bases; • Understand how the system SSCs are designed and how the function to meet the requirements and performance criteria; • Understand system operation; • Be knowledgeable of the testing and maintenance necessary to ensure the system continues to be able to perform its safety functions; • Be responsible for ensuring documents related to the system are complete, accurate, and up-to-date, including SDDs, technical drawings, diagrams, and procedures for surveillance, testing, and maintenance; • Be appropriately involved in the design, review, and approval of changes affecting/impacting system design, operation, and maintenance; and • Maintain awareness of the availability of replacement parts for SSCs and initiate any necessary design and change control reviews in anticipation of the need to replace obsolete (i.e., no longer available in the supply chain) SSCs as part of the preventative maintenance program (See DOE G 433.1-1A, *Nuclear Facility*			DUF6-PLN-121, Configuration Management Plan for Operations

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		Maintenance Management Program Guide for Use with DOE O 433.1B).			

38	3.0 Should Work control process	In order to ensure that work is appropriately evaluated and coordinated before it is performed, contractors shall incorporate work control into the CM process and into their work procedures. In addition, work processes should: • Use the approved design output documents in work planning. • Assign an individual the responsibility for tracking physical change status and ensuring the change is completed in accordance with the change control package. • Pay special attention to partially implemented changes including defining how temporary and partially implemented modifications are controlled and communicated to affected organizations. • Pay special attention to parallel implementation of two or more changes which affect the same CM structure, system or component or credited control. • Contain provisions related to control of equipment status, lockouts and tagouts, and other areas associated with conduct of operations applicable to partially implemented changes as discussed in DOE O 422.1. • Use Cognizant System Engineers or dedicated CM specialists to review work and track changes to completion.	CCM-8 5.3.3	An approved change is implemented in accordance with documented direction approved by the appropriate level of authority.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 6) DUF6-U-GFP-0108, *Control of Work* DUF6-U-CON-0001, MCS *Conduct of Operations*, Chapter 1 DUF6-U-GFP-0015, *Technical Procedure Development*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	Cont. 3.0	• Include provisions for issuing periodic progress reports on the implementation of major changes.			
39	3.0 Work Control Procedures	Specific provisions for work control for CM include the following: • Work processes shall identify the work to be performed and clearly communicate the responsibilities, authorities, and expectations of work control to all individuals who do work, This expectation is consistent with the requirements of QA Criteria 1 and 5 (DOE O 414.1D, Chg. 1 and 10 C.F.R. Part 830, Subpart A).			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 6) DUF6-U-GFP-0108, *Control of Work* DUF6-U-GFP-0015, *Technical Procedure Development*

	Cont. 3.0 Work Control Provisions	• The work shall be reviewed and approved under the applicable change control process in accordance with the approved CM process, including where applicable the unreviewed safety question (USQ) process (for HC 1, 2, or 3 nuclear facilities), the USI process (for accelerators), and the nuclear explosives safety (NES) change evaluation process (for NEOs). • If during the performance of work, additional changes affecting the CM SSCs are identified, the changes shall be processed using the approved change control process. Changes shall receive reviews commensurate with those of the original work and the approval authority level shall be at the same level as the original work. Work should not resume until these changes have been analyzed and approved. • If the contractor identifies any nonconforming items while implementing a change, the nonconformance shall be documented in a nonconformance report (NCR) or other appropriate means. The review and disposition of NCRs or other means would be documented and retained.			

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	Cont. 3.0	Additional information on NCRs can be found in DOE G 413.3-1. • For NEOs, a detailed description of maintenance activity control and approval for maintenance implementation plans shall be included as required by DOE O 452.2E, *Nuclear Explosives Safety* (for successor documents).			
40	4.0 Formal Change Control	Contractors shall establish and use a formal change control process for CM SSCs and credited controls as part of the CM process.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
41	4.0 Change Control includes	Through the change control process, contractors shall ensure: • Changes are identified and assessed through the change control process • Changes receive appropriate technical review to evaluate the consequences of the change • Changes are approved or disapproved • Waivers and deviations are properly evaluated and approved or denied and the technical basis for the approval or the denial is documented • Approved changes are adequately and fully implemented or the effects of the partial implementation are evaluated and accepted • Implemented changes are properly assessed to assure the results of the changes agree with the expectations • Documents are revised consistent with the changes and the revised documents are provided to the users	CCM-4	Classification of a requested change determines the appropriate level of review and the applicable change approval authority.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5) DUF6-U-PEP-1110, *Operations Design Change Control*
42	4.1 Changes processed through change control	The contractor shall ensure each proposed change to the facility or activity is considered for processing through the change control process.	CCM-2	Justifying the need for a change provides the rationale to commit resources required to document, process, and if approved, implement the change.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.1) DUF6-U-PEP-1110, *Operations Design Change Control*

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43	4.1 Change mechanism identification	To ensure that all changes are controlled as appropriate, the contractor shall identify all mechanisms that can lead to temporary or permanent changes in: • The design requirements • The physical configuration • The documentation	CSA-3	Metrics derived from configuration status accounting information are used to evaluate and improve CM process effectiveness.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.3)
44	4.1 Identification of changes	Contractors should consider eliminating or combining change mechanisms to make changes easier to control. Change control for capital assets governed by DOE O 413.3B, Chg. 2 focuses particularly on changes that impact the approved performance baseline for a project. For these capital asset project, the change control provisions of the CM process should integrate the change control processes of DOE G 413.3-20, Chg. 1 with the change control provisions of this Standard. A change control process for capital asset projects subject to the requirements of DOE O 413.3B, Chg. 2 should be established before the CD-2 phase of construction.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.3) DUF6-U-PEP-1110, *Operations Design Change Control* DUF6-U-NSP-0002, *Unreviewed Safety Question Process* (USQ)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	Cont. 4.1	A well-designed change control process should include a screening process to determine if seemingly insignificant changes should have at least a cursory review by an interdisciplinary group to confirm that there are no significant impacts from the proposed change. Once change mechanisms are defined, contractors shall ensure the change control process is properly integrated into the procedures and other work processes for that change mechanisms.			

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45	4.2 Should Equivalent Changes	However, as vendors sometimes change materials or design of components, or modify the firmware without changing the model number, the contractor should ensure the design requirements continue to be met with the replacement part. Changes that are shown to be equivalent changes do not need to be evaluated under the change control process. Equivalent changes are hardware changes that: • Continue to meet the design requirements for the equipment • Meet all interface requirements • Do not impact the safety basis For HC 1, 2, and 3 nuclear facilities, the CM process should include a provision to allow the maintenance program to authorize the use of equivalent repair parts and a method for workers to verify this approval for the maintenance program in accordance with the guidance in DOE G 433.1-1A.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.4) DUF6-U-PEP-1204, *Equivalency/ Substitution*

46	4.3 Should Safety Software	If multiple change control processes are being used, they should be consolidated into a single, consistent change control process that is both useful and effective. Unique change control processes for specific types of changes, such as software changes, should be integrated into the overall change control process for the facility of activity. Facility and activity managers should ensure vendors and subcontractors use the established process. All personnel in design, operations, and support organizations that do work for the facility or activity and could do, initiate, or perform changes should: • Be trained on the change control process; • Follow the associated procedures closely; and • Be alert to activities that may not be planned or may occur without following appropriate procedures. The change control process should be efficient to ensure it is used effectively. Forms and procedures should be easy to use and understand, particularly as the change control process will be used by individuals from a number of organizations with carried background and experience. To be effective, forms and procedures should: • Facilitate complete and timely change identification and control;			DUF6- PLN-121, *Configuration Management Plan for Operations* (Section 5.5) DUF6-U-PEP-1310, *Software Management*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	Cont. 4.3	• Be easy to use and encourage participants to use them; and • Provide for management tracking and reporting.			
47	4.4 Change Request form	The change control process shall include provisions for the initiator of the proposed change to document the proposed change. The following information should be considered for inclusion in the documentation. • A unique identifier for the proposed change • A description of the proposed change sufficient to support technical and management reviews prior to approval • The name and organization of the requester • A description of the potentially affected SSCs and credited controls • The reason for the proposed change • A list of the alternative solutions considered and the results • The date by which the decision about the change needs to be completed to facilitate timely implementation or to allow implementation to occur concurrent with other activities, such as a planned maintenance shutdown • Constraints • Any other information needed to review, track, approve, or process the proposed change	CCM-3	A unique change identifier enables tracking of the request for change and the status of implementation and verification of the approved change.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.6) DUF6-U-PEP-1110, *Operations Design Change Control*

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48	4.4 Should Design change package	The contractor should prepare a change control package consistent with the design process and controls for the proposed change. The change request should be verified to be accurate and appended to the change control package. The change control package should also include (either directly or by reference) drawings, analysis, procedures, instructions and other documents needed to properly assess, implement, verify, and validate the proposed change. If a work control document is being used to initiate the change, it should be included in the design change package.			DUF6- PLN-121, *Configuration Management Plan for Operations* (Section 5.6) DUF6-U-PEP-1110, *Operations Design Change Control*
49	4.5 System Engineers	DOE O 420.1C requires contractors to designate a Cognizant System Engineer for each active system for DOE HC 1, 2, or 3 nuclear facilities. The duties, responsibilities, and interfaces of each Cognizant System Engineer to support CM shall be clearly defined, documented, and communicated to supporting facility or activity organizations.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 4.8) DUF6-PLN-122, *System Engineer Program* (Section 4.1.2)

50	4.5 Change control review – Technical and Management	The review of the change control package shall include a technical review and a management review. The technical review should be interdisciplinary, except where the change is so isolated as to not impact the efforts of more than one discipline. The management review should ensure management considerations, such as funding and procurement, have been adequately considered prior to approving the change for implementation. The technical review should include: • Design basis and safety analysis reviews, • Independent design verifications, • Interdisciplinary technical reviews, • Identification of affected hardware and documents, • Identification of post-implementation acceptance criteria, • Conduct of operations requirements, and • Other reviews, as appropriate. The technical review should verify: • The change can be implemented; • The facility or activity will continue to operate safely and provide adequate protection to workers, the public, and the environment; • The contractor's ability to continue to meet safety and environmental requirements, performance criteria, permit requirements, environmental impact statements (EIS), or any other applicable state or Federal requirement is not negatively affected;	CCM-6 CCM-7	Prior to approval, a requested change is evaluated for all impacts and risk considerations including technical, operational, support, schedule, and cost, as well as the consequences of not approving the request. After considering all impacts and risk factors, change approval decisions are made by an appropriate authority who can commit resources to implement the change.	DUF6- PLN-121, *Configuration Management Plan for Operations* (Section 5.8) DUF6-U-PEP-1110, *Operations Design Change Control*

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	Cont. 4.5	• The mission can continue to be achieved; • The change will not create unacceptable maintenance problems; • The security of the facility or activity is not compromised; and • The safety or design basis is preserved or the changes are assessed and determined to be acceptable.			
51	4.5 Should Document reviews	The results of both reviews should be documented. Design changes should be subject to the same level of reviews as applicable to the original design.			DUF6- PLN-121, *Configuration Management Plan for Operations* (Section 5.8) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
52	4.5 USQ Review	Where review under the USQ, USI, or the NES change control process is required, these reviews may be performed concurrent with the technical and management reviews, but all reviews shall reflect the final configuration of the change.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.3) DUF6-U-PEP-1110, *Operations Design Change Control* DUF6-U-NSP-0002, *Unreviewed Safety Question Process*
53	4.5 Review of Changes - Concurrent Reviews	Where review under the USQ, USI, or the NES change control process is required, these reviews may be performed concurrent with the technical and management reviews, but all reviews shall reflect the final configuration of the change.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.3) DUF6-U-PEP-1110, *Operations Design Change Control* DUF6-U-NSP-0002, *Unreviewed Safety Question Process*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
54	4.5 Review of Changes – additional technical review	If during the management review or other reviews modifications are made to the proposed change, those modifications may need to undergo new technical reviews.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.2) DUF6-U-PEP-1110, *Operations Design Change Control*
55	5.1 Should Documents to be Controlled - Software	additional documents that should be controlled include: Software data and manuals for operation and maintenance of critical software			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.5) DUF6-U-PEP-1310, *Software Management*

56	4.5 Review of Changes- Formal Multi-disciplinary Technical Review Cont. 4.5	The change control process shall contain provisions for a formal, multidisciplinary technical review to be performed for proposed changes to assess the impacts of the proposed changes to the facility, activity, or operation. The technical review should verify that: • The change can be implemented; • The facility, activity, or operation will continue to operate safely and provide adequate protection to workers, the public, and the environment • The contractor's ability to continue to meet safety and environmental requirements, performance criteria, permit requirements, environmental impact statements (EIS), or any other applicable state or federal requirement is not negatively affected • The mission can continue to be achieved • The change will not create unacceptable maintenance problems • The security of the facility or activity is not compromised • The safety basis is preserved or the changes to the safety basis are assessed and determined to be acceptable The technical review should include: • Design basis and safety analysis review • Independent design verification • Interdisciplinary technical reviews •Identification of affected hardware and documents	CCM-6	Prior to approval, a requested change is evaluated for all impacts and risk considerations including technical, operational, support, schedule, and cost, as well as the consequences of not approving the request.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.1) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
		• Identification of post-implementation acceptance criteria• Conduct of operations requirements, and • Other reviews, as appropriate.			
57	4.5 Design Analysis for changes not in design basis	If the proposed change is not within the current design basis, the contractor shall perform an analysis for the change. The analysis should be sufficiently detailed that the independent verifiers can assess the adequacy of the analysis. The change control package should be made available to the individuals responsible for the technical review of the analysis. The analysis should include: • Current and proposed design inputs and constraints • An analysis of the proposed changes and their impacts • Design outputs • Consideration of system interactions • Any assumptions that are to be verified in the post-operational testing • Identification of any computer program that was used in the analysis			DUF6- PLN-121, *Configuration Management Plan for Operations* (Section 5.7) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
58	4.5 Should Design basis changes	Revisions to design bases involve significant effort by the design authority or other technical authority and include external evaluations and approvals. Consequently, the contractor should weigh the resources needed to process the design change against the benefits of the proposed change.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.7) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
59	4.6 Independent design verification for change packages	The provisions of QA Criterion 6 (DOE O 414.1D, Chg. 1 or 10 C.F.R. Part 830, Subpart A) require the contractor to use individuals or groups other than those who performed the work to verify or validate the adequacy of design products. Documentation of the independent design verification should be included in the change control package. The independent design verification shall verify: • Design inputs and constraints are correctly identified • Design analyses and calculations are complete and correct • Design outputs are complete and consistent • The reasonable methods are used in the analysis and, where applicable, computer programs are verified • System interactions are considered appropriately • The assumptions are reasonable • Appropriate post-modification testing and acceptance criteria are established			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.7) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
60	4.5 Should Multi-discipline technical review	The technical review should be interdisciplinary, except where the change is so isolated as to not impact the efforts of more than one discipline.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.1) DUF6-U-PEP-1110, *Operations Design Change Control*
61	4.5 Change impact on Safety and Reliability	The technical review team shall include technical experts who can assess the potential impact of the change on safety and reliability, as well as the design requirements.			DUF6-PLN-121, *Configuration Management Plan for Operations (*Section 5.8.1*)* DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
62	4.5 Should Tech review competence review	The Cognizant System Engineers, or assigned technical engineers, for nearby or interfacing systems should be consulted as appropriate when making changes.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.1) DUF6-U-PEP-1110, *Operations Design Change Control* DUF6-U-PEP-1303, *Technical Reviews*

63	4.9 Identification of change documents	Once it is determined that a proposed change can be made, either within the defined design requirements or within new or revised design requirements, each affected document shall be identified as part of the change control process and identified in the change control package. This includes the documents that are directly affected by the change, such as drawings, as well as indirectly affected documents such as the DSA, TSR, ASE, SAD, HAR, hazard controls, training information, procedures, procurement documents, and systems drawings. A complete and thorough review shall be done to identify each document affected by the change. If other CM SSCs or credited controls are affected by the change, the contractor shall determine if documentation for those also needs to be changed. Examples of documents that are sometimes overlooked are configuration management equipment databases, operating and maintenance procedures, and training lesson plans. The configuration management equipment database and the document database should be used as primary tools to identify affected documents. Cross-disciplinary and cross-organizational reviews may be necessary to identify all affected documents.	*CI-12*	*A baseline for any product, or any document, plus the approved changes, is the current approved configuration.*	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.1) DUF6-U-PEP-1110, *Operations Design Change Control*
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Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	4.8 Post modification testing	The change control package shall specify any post-modification testing to be performed and the acceptance criteria. All post modification testing should be completed and all acceptance criteria satisfied prior to turnover to operations, unless specific tests are to be done post-turnover.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.16) DUF6-U-PEP-1110, *Operations Design Change Control*
65	4.5 Change Technical Management Verification	The review of the change control package shall include a technical review and a management review. The management review should ensure management considerations, such as funding and procurement, have been adequately considered prior to approving the change for implementation.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.2) DUF6-U-PEP-1110, *Operations Design Change Control*
66	4.5 Concurrent Technical and Management reviews	These reviews may be performed concurrent with the technical and management reviews, but all reviews shall reflect the final configuration of the change.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.2) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
67	4.4 Should Documentation of Proposed Changes	The contractor should prepare a change control package consistent with the design process and controls for the proposed change. The change request should be verified to be accurate and appended to the change control package.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.2) DUF6-U-PEP-1110, *Operations Design Change Control*
68	4.5 Consult USQ for changes	To maintain the integrity of the safety basis, contractors for HC 1, 2, or 3 nuclear facilities shall ensure the USQ process is invoked and applied consistent with the requirements of 10 C.F.R. Part 830 and the DOE-approved USQ process prior to implementing changes to these facilities.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.8.3) DUF6-U-PEP-1110, *Operations Design Change Control* DUF6-U-NSP-0002, *Unreviewed Safety Question Process*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
69	4.4 Implementing a change	Once the proposed change is approved for implementation, the change control packages are used to facilitate implementation.	CCM-8	An approved change is implemented in accordance with documented direction approved by the appropriate level of authority.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.11) DUF6-U-PEP-1110, *Operations Design Change Control* DUF6-U-GFP-0108, *Control of Work*
70	4.4 Should Documentation of Proposed Change	The change control package should also include (either directly or by reference) drawings, analysis, procedures, instructions and other documents needed to properly assess, implement, verify, and validate the proposed change.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.6) DUF6-U-PEP-1110, *Operations Design Change Control*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
71	4.6 Independent Verification	The provisions of QA Criterion 6 (DOE O 414.1D, Chg. 1 or 10 C.F.R. Part 830, Subpart A) require the contractor to use individuals or groups other than those who performed the work to verify or validate the adequacy of design products.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.6) DUF6-U-PEP-1110, *Operations Design Change Control*
72	4.0 Change Control - Waivers and Deviations	Through the change control process, contractors shall ensure: Waivers and deviations are properly evaluated and approved or denied and the technical basis for the approval or the denial is documented;	CCM-9	*If it is necessary to temporarily depart from approved product configuration information, a request for variance is identified, classified, documented, coordinated, evaluated and dispositioned.* Any request for variance must be documented, coordinated, evaluated, and dispositioned by the appropriate approval authority.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
73	3.0 Nonconforming Items	If the contractor identifies any nonconforming items while implementing a change, the nonconformance shall be documented in a nonconformance report (NCR) or other appropriate means. The review and disposition of NCRs or other means would be documented and retained. Additional information on NCRs can be found in DOE G 413.3-1.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.12) DUF6-U-QAP-0005, *Condition Reporting*
74	3.0 Should Partial Implementation	In addition, work processes should: Pay special attention to partially implemented changes including defining how temporary and partially implemented modifications are controlled and communicated to affected organizations. Contain provisions related to control of equipment status, lockouts and tagouts, and other areas associated with conduct of operations applicable to partially implemented changes as discussed in DOE O 422.1.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.14)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
75	3.0 Should Parallel or multiple system changes	work processes should: Pay special attention to parallel implementation of two or more changes which affect the same CM structure, system or component or credited control.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.15) DUF6-U-PEP-1110, *Operations Design Change Control* (Design analysis) DUF6-U-GFP-0108, *Control of Work*
76	4.8 Validation of work before testing	The QA Criteria 6, 7, and 8 (DOE O 414.1D, Chg. 1 or 10 C.F.R. Part 830, Subpart A) require contractors to validate work before implementation and perform acceptance testing.	CCM-8	An approved change is implemented in accordance with documented direction approved by the appropriate level of authority.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.16)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
77	4.8 Change training and qualification	QA Criterion 2 (DOE O 414.1D, Chg. 1 or 10 C.F.R. Part 830, Subpart A) requires contractors to train and qualify personnel to be capable of performing their assigned work and to provide continuing training to personnel to maintain their job proficiency. Before returning a system, structure or component to service following changes, the contractor shall train staff on the modifications that have been made and their effect on normal, abnormal, and emergency operations.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.17)
78	4.9 Affected document identification	Because every change directly or indirectly affects associated documentation, a major interface exists between the change control and document control processes. The contractor shall identify any drawings and procedures to be updated as part of the work processes to implement the change. Other documents should be updated and issued as needed following implementation. As-built documentation shall be prepared at the completion of implementation of the physical changes. Revised documentation shall be distributed (or made available in the case of electronic document files) to users of controlled documents.	CSA-3	PRINCIPLE CSA-3 applies.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.10)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
79	4.9 Should Critical facility documents	Critical facility or activity documents, such as drawings and procedures needed for operation, should be updated prior to placing systems and components in operation.	CSA-3	PRINCIPLE CSA-3 applies.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 5.10) DUF6-U-PEP-1110, *Operations Design Change Control* (Design Change)
80	1.4 Grading	Grading as used in this Standard does not permit the user to omit requirements, but allows different levels in depth or rigor of implementation of those requirements as appropriate. For example, levels of approval may be adjusted for higher or lower potential impacts on safety or cost. Where a graded approach is used for CM, the bases for that graded approach shall be documented in the CM process.			DUF6--PLN-121, *Configuration Management Plan for Operations* (Section 4.7) Non CM program changes routed through DUF6-U-PEP-1111, *Facility Change Process*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
81	5.0 Controlled documents updates	Document control shall ensure only the most recently approved versions of documents are used in the process of operating, maintaining, and modifying the facility or activity. As controlled documents are updated to reflect changes to the requirements and physical installation, the contractor shall ensure: 1) Each updated document is uniquely identified and includes a revision number and date 2) Each outdated document is replaced by the latest revision			DUF6-PLN-015, *Records Management Plan* DUF6-U-DMP-0001, *Controlled Document Procedure*

82	5.1 Identification of documents to be controlled. Cont. 5.1	The CM process shall identify what documents need to be controlled. It should define "document owners" who are responsible for developing and revising the technical content of the documents and ensuring they are maintained current. Document owners should establish the schedules for document revisions, distribution, and retrieval. Documents to be controlled should include those documents that reflect the facility or activity requirements, performance criteria, and associated design bases; however, the number of documents that are controlled should be limited because of the resources required to properly control documents. DSAs, TSRs, ASEs, SADs, HARs, and the documents that identify or define design requirements shall be controlled documents. Other documents, such as the safety management programs and documents supporting the DSA, SAD, or HAR, should be evaluated for potential inclusion in the CM program. The application of document control on vendor documents should be graded consistent with the importance of that information to operation of the CM SSC or credited control. In addition to DSAs, SADs, and HARs, additional documents that should be controlled include: • Safety Management Plans			DUF6 -PLN-121, *Configuration Management Plan for Operations* (Section 5.2)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
		• Design specification and calculations; • Hazard and accident analyses supporting documents; • Software data and manuals for operation and maintenance of critical software • Key procedures • Key drawings • Key vendor supplied documents			
83	5.2 Document Storage	Storage and retention of documents and records shall meet government recordkeeping requirements, including applicable DOE Orders, specific commitments to DOE and other Federal organizations, and applicable consensus standards.	CMP-9	Information processes, including collection and processing, controlling status, providing interoperability and exchange, and long-term preservation, are essential elements of effective CM planning and management.	DUF6-PLN-015, *Records Management Plan* DUF6-U-DMP-0001, *Controlled Document Procedure*
84	5.3 Timeliness	Contractors shall incorporate approved changes into controlled documents in a timely manner as defined in the CM process. The document control process should include provisions to ensure that document users are provided information on outstanding approved changes whenever they request a controlled document.	CSA-1	Configuration Status Accounting (CSA) provides an accurate, timely information base concerning a product and its product configuration information throughout the product life cycle.	DUF6-PLN-015, *Records Management Plan.* DUF6-U-DMP-0001, *Controlled Document Procedure*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
85	4.9 Controlled Document Distribution	Revised documentation shall be distributed (or made available in the case of electronic document files) to users of controlled documents.	CSA-2	Principal CSA-2 applies	DUF6-PLN-015, *Records Management Plan* DUF6-U-DMP-0001, *Controlled Document Procedure*
86	4.1 Should Major vs. Minor Document Changes	It is important to identify and consider even subtle changes under the CM process. Changes that are perceived to be minor or insignificant can significantly impact the functions of SSCs and credited controls required to maintain safe operation or to achieve mission objectives. They can also result in operation outside the approved safety or design basis. In addition, multiple minor changes could have a cumulative effect that should be considered. A well-designed change control process should include a screening process to determine if seemingly insignificant changes should have at least a cursory review by an interdisciplinary group to confirm that there are no significant impacts from the proposed change.			DUF6-PLN-015, *Records Management Plan* DUF6-U-DMP-0001, *Controlled Document Procedure* DUF6-U-GFP-0015, *Technical Procedure Development*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
87	5.3 Timely incorporation of changes	Contractors shall incorporate approved changes into controlled documents in a timely manner as defined in the CM process.			DUF6-PLN-015, *Records Management Plan* DUF6-U-DMP-0001, *Controlled Document Procedure*
88	2.8 Should Status Document Database	Contractors should develop CM databases that cross-reference CM SSCs and credited controls with their design requirements, design basis, and associated documents. The contractor should assign a database owner for the equipment database, with assigned roles and responsibilities.	CMP-4	The establishment and maintenance of CM performance and status measurements are necessary for all products where compliance with the Configuration Management planning and continuous improvement is critical.	DUF6-PLN-015, *Records Management Plan* DUF6-U-DMP-0001, *Controlled Document Procedure*
89	2.1 PDSA change tracking	Following submittal of the preliminary documented safety analysis (PDSA) to DOE, the contractor shall review all changes for their potential impact on the PDSA and maintain the PDSA up-to-date as the design evolves so that both the contractor and DOE can rely on the information until it is replaced by the final DSA.			n/a: DSA approved.

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
90	2.1 Should CM Assessment	If the contractor decides to fold the assessment of configuration management into a broader assessment, it should consider the provisions in this Section when developing the assessment criteria for the broader assessment.			DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 7)
91	6.1 Assessments	The objective of assessing CM is to detect, document, determine the cause of, and initiate correction of inconsistencies among design requirements, documentation, and physical configuration. Properly performed assessments should help identify inconsistencies between these areas, evaluate the root causes for these problems, and prescribe improvements to avoid similar inconsistencies in the future. The five specific types of assessments discussed in this Section are: • Construction assessments, which are performed to ensure configuration is managed throughout the construction process for new construction or major modification • Physical configuration assessments, which are conducted to evaluate the consistency between the physical configuration and the facility or activity documentation	5-3	Maintain surveillance over the configuration management process to ensure that the process is adequately documented, that the process documentation is being followed, and that the process execution is in compliance with requirements. PRINCIPLE 3-3C applies.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 7.1) • Part of DUF6-PLN-121 • Section 7 • Part of DUF6-PLN-023 • Section 7 • Section 7.1.1 DUF6-U-QAP-0012, *Independent Assessment* DUF6-U-QAP-0013, *Management Assessments*

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
	Cont. 6.1	• Design assessments which are done to ensure that design documents have been updated to reflect changes and accurately reflect the physical configuration of the facility or activity • • Periodic performance assessments, which are conducted to verify that systems and components continue to meet design and performance requirements in their current configurations			
92	2.1	the contract or other formal document between DOE and the contractor shall define the process for establishing the design baseline for CM.			Noted in UDS CMP transmittal Letter (DUF6-UDS-LEX-09-00010)
93	6.3 Physical Configuration Assessment	Physical configuration assessments are performed to determine if the actual physical configuration agrees with the design requirements and the documentation. They also determine the effectiveness of CM in the field. The CM process shall identify who may approve discrepancy resolutions (i.e., through a design verification) to ensure the final configurations are consistent with the design requirements. Changes to either the physical configuration or the documentation should be tracked through a design change document.	CVA-2	Verifying a product's compliance with the physical, functional, and interface requirements in approved product configuration information confirms the basis for managing product configuration.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 7.1.1)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
94	6.5 Periodic Performance Assessments	The CM SSCs and credited controls shall be monitored and tested periodically to determine if they are still capable of meeting their design and performance requirements. The process for performing this monitoring and testing should be described in the facility or activity maintenance plans or other procedures. By performing periodic performance monitoring, contractors shall verify selected systems and components continue to be able to perform their intended functions (i.e., meet their design requirements). For HC 1, 2, 3 nuclear facilities and activities, the Cognizant System Engineers, as discussed in DOE O 420.1C, shall maintain cognizance over performance monitoring activities on assigned systems. Their responsibilities should include the identification of performance goals and acceptance criteria consistent with the associated SSC design requirements. Reviewing trend graphs of collected equipment data at specified intervals is a proven, effective approach to assess performance.	CVA-1	Verify CM processes to ensure appropriate consistency is established and maintained in their execution.	DUF6-PLN-121, *Configuration Management Plan for Operations* (Section 7.1.3)

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
95			CMP-4	The establishment and maintenance of CM performance and status measurements are necessary for all products where compliance with the Configuration Management planning and continuous improvement is critical.	DUF6-U-CPL-0019, *Trending*
96			CI-3	Enterprise identifiers designating the responsible designer, manufacturer, or perparer provide uniqueness to the identifiers of products and product configuration information.	n/a
97			CI-6	When a product is modified, it retains its original product unit identifier, even though its part identifying number is altered to reflect a new configuration.	n/a

Item	Standard Section	DOE-STD-1073-2016 Requirement "Shall / Should"	ANSI/EIA-649C Principal	ANSI/EIA-649C Standard	MCS Implementing Document/Section
98			CI-5	Individual units of a product are assigned a unique product unit identifier when there is a need to distinguish one unit of the product from another.	n/a
99			CI-7	A series of like units of a product is assigned a unique product group identifier when it is unnecessary or impractical to identify individual units but necessary to correlate units to a process, date, event, or test.	n/a
100			CCM-6	Prior to approval, a requested change is evaluated for all impacts and risk considerations including technical, operational, support, schedule, and cost, as well as the consequences of not approving the request.	n/a

ATTACHMENT D. OPERATIONS CM PROGRAM GRADED APPROACH SUMMARY

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1.0 CM Grading Overview

DOE-STD-1073-2016, *Configuration Management,* provides a methodology for grading the application of CM to facilities (including operations and activities) and SSCs. The main purpose of using a graded approach is to determine and apply a level of resources that is appropriate when implementing a program. The goal is to apply the highest level of resources to the most important equipment in the most important facilities and to avoid such expenditures where they are not warranted.

The DOE CM Standard notes that the grading system should take into account both facility grades and SSC grades in determining the appropriate level of resources to be applied. The Standard also notes that the "*contractors may grade their configuration management activities consistent with the quality assurance levels.*"

2.0 Grading Approach

Based on evaluation of DUF_6 conversion facilities and planned work activities in conjunction with these criteria and consistent with the CM standard guidance, facilities, SSCs, activities, and programs can be graded based on a combination of two criteria:

- Facility hazard category based on DOE-STD-1027 (Facility Grading)
- SSC Functional Classification (System Grading)

SSCs are functionally classified as Safety Significant (SS), Production Support (PS), or General Support (GS) by using DUF6-U-PEP-1102, *Grading of Structures, Systems and Components and Identification of Configured Items*. SSCs are further identified based on their configuration status - either "configured" or "nonconfigured". This functional classification and configuration status may be assigned either by whole system or individual SSC. The configuration status of systems (or the majority of items, therein) and support facilities are given in Chart 1, *Results of Graded Approach Analysis*. Refer to Master Equipment List (MEL) for specific component configuration determinations.

Attachment D. OPERATIONS CM PROGRAM GRADED APPROACH SUMMARY

Chart 1: Results of Graded Approach Analysis

Systems with majority of Configured Items (SS or PS):

CON – Conversion System
CSS – Cylinder Stabilization System
CTS - Cylinder Transfer System
ETS – Effluent Treatment System
FWS – Fire Water System
HFR – HF Recovery System
HFS – HF Storage System
ICS (ISS) – Integrated Safety Software
ICS (BPCS) – Basic Process Control System
KRS – KOH Regeneration System
OPH – Oxide Powder Handling
POS – Process Off-gas System
VAP – Vaporization System
NIT – Nitrogen Supply System (one component only)

EMS – Effluent Monitoring System (PORTS only)

Structural Design Features:

X/C-1300– Conversion Building Structure (BSS)
X/C-1300– HF overflow/receiver tanks (curbs around tanks only)
X/C-1305 – HF Storage Tank Area
X/C-1305A – HF Tanker Car Containment Pit
X/C-1745A – Full Cylinder Staging Area
X/C-1745B – Empty & Heel Cylinder Staging Area
SPS – Plant Standby Power System (curb around generator only)

Systems with majority of Nonconfigured Items:

CCW – Closed Cooling Water System
CHS – Cylinder Handling System (Full Cylinder Staging [FCS] Area overhead crane, the FCS, CER and VAP transition carts and the VAP monorail)
CHW – Chilled Water System
CMS – Cylinder Modification System
CWS – Chiller Condenser Cooling Water System
DWS – Deionized Water System
GLP – Plant Grounding and Lighting Protection
HDS – Hydrogen Supply System (outside the Conversion Bldg.)
HVA – Heating, Ventilation, and AC System
IAS – Instrument Air System
MPS – Plant Main AC Power Supply
NIT – Nitrogen Supply System (except one component)
PCP – Plant Cathodic Protection
PCS – Plant Communication System
PCW – Process Chilled Water System
PLS – Plant Illumination and Lighting System
PWS – Potable Water System
RMS – Radiation Monitoring System
SPS – Plant Standby Power System
SSS – Steam Supply Service
SSW – Sanitary Sewer System
SWS – Service Water System
UPS- Uninterruptible Power Supply
WWC – Waste Water Collection
CFS – Chemical Feed System
GEN – General Misc. Items
RRS – Rail Systems
SDS – Storm Drain System
SES – Plant Access and Security
VAC – Vacuum System

ATTACHMENT E. MID-AMERICA CONVERSION SERVICES, LLC CONFIGURATION MANAGEMENT POLICY

Page 1 of 1

Mid-America Conversion Services, LLC (MCS) establishes, documents, and provides the necessary resources for the configuration management (CM) requirements of the depleted uranium hexafluoride (DUF_6) Conversion Facilities at Paducah, KY and Portsmouth, OH. The conversion project *Configuration Management Plan* (CMP) *for Operations*, DUF6-PLN-121, is compliant to the requirements of *Configuration Management,* DOE STD-1073-2016, and *National Consensus Standard for Configuration Management*, American National Standards Institute/Electronic Industries Alliance (ANSI/EIA-649). Fulfilling the configuration management objective is accomplished through the five key CM elements: design requirements; work control; change control; document control, and assessments.

Configuration management is a disciplined process that involves both management and technical direction to establish and document the design requirements and the physical configuration of a nuclear facility and to ensure that they remain consistent with each other and the documentation. The MCS Chief Engineer has management responsibility for the CMP. The CMP is supported principally by the Site Engineering Managers, System Engineers, Facility Management, and Work Control programs. The CMP requirements are integrated into procedures for these programs and other Safety Management Programs to facilitate implementation.

The objectives of configuration management are to:

(1) Establish consistency among design requirements, physical configuration, and documentation (including analysis, drawings, and procedures) for the activity, and

(2) Maintain this consistency throughout the life of the facility, particularly as changes are being made.

MCS is dedicated to configuration management and the principles stated above.

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T. Zack Smith
President/Project Manager Mid-America Conversion Services, LLC

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