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CCP-CM-031

Revision 0

Verification of Designs Produced by External Agencies

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RECORD OF REVISION

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1.0 PURPOSE

1.1 Background

The Central Characterization Project (CCP) Characterization equipment is designed by subcontractors that are included on the Washington TRU Solutions (WTS) Qualified Suppliers List (QSL) as design agents. These subcontractor design agents perform design activities including design reviews under their approved quality assurance (QA) programs. Design Verification performed in accordance with this procedure will be performed by competent WTS personnel and/or subcontractors as the design authority.

1.2 Applicability

The applicability of this procedure is based on the quality level (as determined per CCP-QP-015, Section 4) of the CCP characterization equipment being designed.

- Quality Level One (QL-1) — Required
- Quality Level Two (QL-2) — As determined by Project Manager/Project Engineer
- Quality Level Zero (QL-0) — Not Applicable

1.3 Scope

This procedure establishes the process to ensure that new or refurbished CCP characterization equipment which is designed by external agencies satisfies design requirements. The scope of this procedure is limited to the following activities:

1.3.1 Identifying design requirements for new or refurbished CCP equipment including associated structures, systems, or components.

1.3.2 Incorporating design requirements into procurement documents for new or refurbished CCP equipment.

1.3.3 Verifying the adequacy of design requirements

NOTE

Change control of equipment in the field under CCP's configuration management (CM) program is controlled through a separate procedure, CCP-CM-001, *CCP Equipment Change Authorization and Documentation.*

2.0 REQUIREMENTS

2.1 References

Baseline Documents

- DOE Order 420.1B, *Facility Safety*
- DOE-STD-1073-2003, *Configuration Management*

Referenced Documents

- CCP-CM-001, *CCP Equipment Change Authorization and Documentation*
- CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-PO-002, *CCP Transuranic Waste Certification Plan*
- CCP-PO-003, *CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC)*
- CCP-PO-026, *CCP Configuration Management Plan*
- CCP-PO-505, *CCP Remote-Handled Transuranic Waste Authorized Methods for Payload Control (CCP RH-TRAMPAC)*
- CCP-QP-008, *CCP Records Management*.
- CCP-QP-015, *CCP Procurement*
- DOE/WIPP-02-3214, *Remote-Handled TRU Waste Characterization Program Implementation Plan*
- WP 15-GM.01, *WTS Project Execution Plans*

2.2 Quality Assurance Requirements

2.2.1 QA requirements are determined in accordance with CCP-QP-015, *CCP Procurement*.

3.0 RESPONSIBILITIES

3.1 Cognizant Manager

3.1.1 Assigns a Project Manager and/or Project Engineer(s).

3.1.2 Secures funding for the design effort.

3.1.3 Approves the Project Execution Plan (PXP), schedule, and budget.

3.2 Project Manager/Project Engineer (Or Designee)

3.2.1 The Project Manager/Project Engineer (or designee) ensures successful completion of the CCP equipment design by the following activities:

- Determines applicability of this procedure.
- Prepares a PXP, schedule, and budget if applicable in accordance with WP 15-GM.01, *WTS Project Execution Plans.*
- Identifies design requirements.
- Prepares procurement documents in accordance with CCP-QP-015.
- Acts as the subcontract technical representative (STR) for design subcontracts in accordance with CCP-QP-015, Attachment 1, CCP Subcontract Technical Representative (STR) Responsibilities.
- Prepares a design verification report with supporting data as applicable.
- Transfers design verification records to the CCP Records Custodian.

NOTE

The design verification report and supporting data are the record of the design verification.

3.3 Design Agent

3.3.1 Designs CCP equipment in accordance with the applicable Equipment Specifications, Scopes of Work, or Subcontract Tasks.

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3.4 PXP Team

3.4.1 Provides technical support to the Project Manager and Project Engineer as described in the PXP.

3.5 Design Input/Output Verification Team

The Design Input/output Verification Team is composed of individuals that are competent to evaluate the design requirements for the equipment being designed and were not engaged in the design of the equipment being validated.

3.5.1 Reviews CCP Equipment design input requirements to ensure the requirements are adequately identified and incorporated into procurement documents.

3.5.2 Verifies CCP Equipment design output requirements are met by one or more of the following methods:

- Design review
- Alternate calculations
- Qualification testing

3.6 CCP Records Custodian

3.6.1 Receives, processes, and maintains Design Verification records.

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4.0 PROCEDURE

4.1 Determining Applicability of this Procedure

The Project Manager/Project Engineer (or designee) determines the applicability of this procedure by the following steps:

4.1.1 Select the appropriate Quality Level (QL) for the equipment being designed in accordance with CCP-QP-015, *CCP Procurement*, Section 4.0.

4.1.2 Refer to Section 1.2 of this procedure to determine if this procedure is applicable.

4.2 Identifying Design Requirements

The Project Manager/Project Engineer (or designee) identifies the design requirements for new or refurbished CCP equipment by the following steps:

4.2.1 Determine the type of Equipment that is being designed for CCP Characterization Activities.

- Radiography equipment utilizes an x-ray technique to determine the physical contents of unopened containers. See Table 2, Radiography Equipment.

- Visual examination equipment is used to safely determine the physical contents of opened containers. See Table 3, Visual Examination Equipment.

- Headspace/flammable gas sampling equipment is used to determine the flammable and volatile organic compound (VOC) content of gases in the void volume of the containers. See Table 4, Headspace Gas Sampling Equipment.

- Non-Destructive assay equipment is used to determine the quantity of individual radionuclides in the containers. See Table 5, Non-Destructive Assay Equipment.

- Non-standard support equipment is equipment that is specifically designed to be used in conjunction with or to support CCP Characterization Equipment. See Table 6, Non-Standard Support Equipment.

NOTE

The design of material handling equipment and hoisting and rigging equipment is typically controlled by the manufacturer or the procuring site.

4.2.2 Review the following documents and determine the applicable requirements for the type of equipment that is being designed:

- CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-PO-002, *CCP Transuranic Waste Certification Plan*
- CCP-PO-003, *CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC)*
- CCP-PO-505, *CCP Remote-Handled Transuranic Authorized Methods for Payload Control (CCP RH-TRAMPAC)*
- DOE/WIPP-02-3214, *Remote-Handled TRU Waste Characterization Program Implementation Plan*

4.2.3 Utilizing the Design Requirements Templates located in Tables 1-6 as a guide, develop a comprehensive list of design requirements.

4.2.4 Obtain review and concurrence of design input requirements by the Design Input/Output Verification Team

4.3 Incorporating Design Requirements Into Procurement Documents

The Project Manager/Project Engineer (or designee) incorporates the design requirements into procurement documents for new or refurbished CCP equipment by the following steps:

4.3.1 Utilize the appropriate Tables (1 – 6) as a tool to incorporate the results of steps 4.2.1 through 4.2.4 into a Specification, Statement of Work, or Subcontract Task.

4.3.2 Prepare the appropriate procurement documents in accordance with CCP-QP-015, *CCP Procurement.*

4.3.3 Obtain review and concurrence of Specification, Statement of Work, or Subcontract Task by the Design Input/output Verification Team.

4.3.4 Procure the design from a design agent in accordance with CCP-QP-015.

4.4 Verifying Design Requirements

Upon receipt of the design from the design agent, the Project Manager/Project Engineer (or designee) verifies that design requirements by the following steps:

4.4.1 Utilize the requirements from the appropriate Tables (1 – 6) as a tool to prepare a Design Verification Plan. The Design Verification Plan shall incorporate sufficient detail to ensure the equipment is capable of achieving the desired results after the equipment is placed in service. The Design Verification Plan shall include one or more of the following methods to verify design requirements are met:

- Design Review

Design Review shall address the following items for the equipment being designed:

1. Were the design inputs correctly selected?

2. Are assumptions necessary to perform the design activity adequately described and reasonable?

3. Was an appropriate design method used?

4. Were the design inputs correctly incorporated into the design?

5. Is the design output reasonable compared to design inputs are the necessary design input and verifications requirements for interfacing organizations specified in the design documents or in supporting procedures of instructions?

- Alternate Calculations

Alternate Calculations are calculations or analysis that is made with alternate methods to verify the correctness of the original calculations or analysis. Alternate calculations shall address the following items for the equipment being designed:

1. Are the assumptions and input data appropriate?

2. Is the computer program of other calculation method used appropriate?

- Qualification Testing

  When Qualification Testing is used to verify design adequacy the Qualification Test Plan shall address the following items:

  1. Is the test configuration clearly defined and documented?

  2. Does the test demonstrate adequacy of performance under conditions that simulate the most adverse design conditions?

  3. Are operating modes and environmental conditions in which the equipment must perform satisfactorily considered?

  4. Where the test is configured to verify only specific design features, are other design considerations verified by alternate methods?

  5. Are the tests results documented and evaluated by the responsible design organization?

  6. If scale models are used for testing, will the results correlate to the full-scale design?

4.4.2 Establish a Design Verification Team consisting of competent individuals that were not engaged in the design of the equipment being validated.

4.4.3 Conduct the design verification in accordance with the Design Verification Plan.

4.4.4 Document the results of the design verification in a design verification report with supporting data as applicable.

4.4.5 Attach Attachment 1, Design Verification Report Cover Page, to the design verification report with supporting data as applicable.

4.5 Transferring Design Verification Records

4.5.1 The Project Manager/Project Engineer (or designee) submits design verification records to the CCP Records Custodian

4.5.2 The CCP Records Custodian receives, processes, and maintains the Design Verification records.

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5.0 RECORDS

5.1 The following records generated during the performance of this procedure are maintained as QA records in accordance with the requirements of CCP-QP-008, CCP Records Management:

5.1.1 <u>QA/Nonpermanent</u>

[A] Design Verification Reports with supporting data when applicable.

[B] Procurement Records (processed in accordance with CCP-QP-015).

5.2 The following records generated by a design agent as the result of this procedure are maintained as QA records in accordance with the design agent's QA program:

5.2.1 <u>QA/Nonpermanent</u>

[A] Specifications

[B] Drawings

[C] Calculations

[D] Other design documents as applicable

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Table 1. Design Requirements Template – All Equipment

Description/Name of Equipment: _____

Parameter	Requirement
Setup / Operation	
• Electrical	
• Mechanical	
• Heating, Ventilation, and Air Conditioning (HVAC)	
• Environment	
• Communication	
• Material Handling	
Safety	
• Fire Protection	
• Interlocks	
• Alarms	
Additional Parameters:	
•	
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Table 2. Design Requirements Template - Radiography Equipment

Description/Name of Equipment: _____

Parameter	**Requirement**
Characterization	
• Liquids	
• Sharp or Heavy Objects	
• Sealed Containers	
• Explosives, Corrosives, & Compressed Gasses	
• Material Parameter Weight	
Additional Parameters:	
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Table 3. Design Requirements Template - Visual Examination Equipment

Description/Name of Equipment: _____

Parameter	Requirement
Characterization	
• Authorized Payload Container	
• Dunnage	
• Container Marking	
• Filter Vents	
• Liquids	
• Sharp or Heavy Objects	
• Sealed Containers	
• Assembly Configuration	
• Layers of Confinement	
Additional Parameters:	
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Table 4. Design Requirements Template - Headspace/Flammable Gas Sampling Equipment

Description/Name of Equipment: _____

Parameter	Requirement
Characterization	
• Hydrogen Concentration	
• Methane Concentration	
• Flammable VOC Conc.	
• Total VOC Concentration	
• Target Analyte List	
Additional Parameters:	
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Table 5. Design Requirements Template - Non-Destructive Assay Equipment

Description/Name of Equipment: _____

Parameter	**Requirement**
Characterization	
• Radionuclide Composition	
• Pu-239 FGE	
• Transuranic (TRU) Alpha Activity Conc.	
• Pu-239 Equivalent Activity	
• Radiation Dose Equivalent	
• Decay Heat	
Additional Parameters:	
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Table 6. Design Requirements Template - Non-Standard Support Equipment

Description/Name of Equipment: _____

Parameter	**Requirement**
Description	
Equipment Supported	
Drawings	
Material	
Welding	
Machining	
Assembly	
Finish/Paint	
Additional Parameters:	
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Attachment 1. Design Verification Report Cover Sheet

Name of Equipment: _____

Design Agent: _____

Procurement Reference: _____

Date of Design Verification: _____ / _____ / _____

Project Manager/Engineer: _____
(Printed)

_____
(Signature)