

Allen, Pam, NMENV



From: Maestas, Ricardo, NMENV
Sent: Tuesday, March 20, 2012 7:43 AM
To: Allen, Pam, NMENV
Subject: FW: NMED C7 Confirmation Review
Attachments: 02-RC.11, R6.pdf; 02-RC.12, R3.pdf; 02-RC.13, R4.pdf; 02-RC1101, R7.pdf; 02-RC1102, R10.pdf; EA02RC1102-1-0, R7.pdf; EA02RC1102-2-0, R1.pdf; EA02RC1102-3-0, R1.pdf; 02-RC1103, R7.pdf; 02-RC1105, R10.pdf; 02-RC1107, R6.pdf; 02-RC1108, R10.pdf; 09-CN3031, R3.pdf; 16-2, R11.pdf

Hi Pam,
Email and attachments for February WIPP file. You can copy the attachments to a single disk or whatever is easiest for you.
Thanks.

From: Mullins, Mary Ann - WTS [<mailto:MaryAnn.Mullins@wipp.ws>]
Sent: Wednesday, February 08, 2012 12:03 PM
To: Maestas, Ricardo, NMENV
Cc: Hoff, Jon - WTS; Haschets, John - RES; Martinez, Prissy - CTAC; Fesmire, Courtland - DOE
Subject: RE: NMED C7 Confirmation Review

Ricardo,

Attached are the current procedures and forms associated with CBFO Surveillance S-12-12, Permittee Waste Confirmation. These are all of the procedures listed on the Surveillance Plan. Additionally, I have included the associated Electronic Attachments for WP 02-RC1102. See the listing below.

Please note the following:

- 1) I have included the current revision (10) to WP 02-RC1105; however, Revision 11 may be approved prior to the beginning of the surveillance. If this happens, I will forward the new revision.
- 2) Revision 10 to WP 16-2 was listed on the Surveillance Plan; however, the current revision is 11, which I have included.

WP 02-RC.11, R6, Qualification and Certification of NDE Personnel Performing Radiography for TRU Waste Confirmation

WP 02-RC.12, R3, Qualification of Personnel performing Visual Examination for TRU Waste Confirmation

WP 02-RC.13, R4, Conduct of Operations for TRU Waste Confirmation

WP 02-RC1101, R7, Visual Examination for TRU Waste Confirmation

WP 02-RC1102, R10, Review of Radiography Media for TRU Waste Confirmation

EA02RC1102-1-0, R7, TRU Waste Confirmation (RTR/VE) Approval Form

EA02RC1102-2-0, R1, TRU Waste Confirmation ITR Review Checklist

EA02RC1102-3-0, R1, TRU Waste Confirmation PCR Review Checklist

WP 02-RC1103, R7, Radiography Inspection Operating Procedure for TRU Waste Confirmation



WP 02-RC1105, R10, Electronic Notification, Container Selection, and Data Entry for TRU Waste Confirmation

WP 02-RC1107, R6, Management of Nonconforming Waste Identified During TRU Waste Confirmation

WP 02-RC1108, R10, Review of Visual Examination Records for TRU Waste Confirmation

WP 09-CN3031, R3, Engineering Calculations

WP 16-2, R11, Software Screening and Control

Thank-you,

Mary Ann Mullins
575-234-8114
575-234-6037 (fax)
Quality Assurance
Washington TRU Solutions LLC
Contractor for the U.S. Department of Energy
Waste Isolation Pilot Plant (WIPP)
maryann.mullins@wipp.ws

From: Maestas, Ricardo, NMENV [<mailto:Ricardo.Maestas@state.nm.us>]

Sent: Tuesday, February 07, 2012 2:37 PM

To: Hoff, Jon - WTS; Mullins, Mary Ann - WTS; Chavez, Rick - RES; McCauslin, Susan - DOE

Cc: Fesmire, Courtland - DOE; Martinez, Prissy - CTAC; Kliphuis, Trais; Holmes, Steve; Hall, Timothy

Subject: NMED C7 Confirmation Review

Mr. Hoff,

I will be representing NMED next week in Carlsbad (February 14-16, 2012) to observe the CBFO Surveillance S-12-12 that will be verifying the adequacy and implementation of the Permittees Waste Confirmation activities.

NMED has conducted Waste Confirmation reviews/inspections in the past and we would like to conduct a review during this time. Because of the short notice, NMED asks that any and all training records and data packages (including videos) that are requested by the Surveillance Team also be provided to NMED for our review of Confirmation activities.

During the surveillance, NMED may also request other documents as needed but will remain mindful of the CBFO Surveillance in progress. If you could also provide us with current revisions of all confirmation-related procedures that would be appreciated.

If you have any questions about this request, please contact me at 505-476-6050.

Thank you.

TRU WASTE CONFIRMATION PCR REVIEW CHECKLIST

| Shipment Number: | | | | |
|--|---------------|----|-----|---------------------|
| Description of Criteria Reviewed | Criteria Met? | | | Comments/Qualifiers |
| | Yes | No | N/A | |
| 1. The data are technically reasonable based on the technique used. Reference Source: (C7-1e(2)) | | | | |
| 2. The data have received independent technical review. Reference Source: (C7-1e(2)) | | | | |
| 3. The data indicate that the waste examined contained no ignitable, corrosive, or reactive waste. Reference Source (C7-1e(2)) | | | | |
| 4. The data indicate that the physical form of the waste was consistent with the waste stream description in the waste stream profile form. Reference Source: (C7-1e(2)) | | | | |
| 5. The data met the established QAOs for RTR? Mark N/A if there are no RTRs for this shipment. Reference Source: (C7-1e(2)) | | | | |
| 5a. Precision Were discrepancies between two operators with regard to the waste stream waste confirmation, identification of liquid in excess of TSDf-WC limits, and identification of compressed gases through independent replicate scans and independent observations reconciled? Mark N/A if there were no discrepancies. Reference Source: (C7-1d(1)) | | | | |
| 5b. Accuracy Was the lines-Pair Resolution Test Check included in the BDR? Reference Source: (C7-1d(1)) | | | | |
| 5c. Accuracy Are the training qualifications for all radiography personnel acceptable? Reference Source: (C7-1d(1)) | | | | |
| 5d. Representativeness Was a Confirmation module completed accurately and signed for each waste stream in the shipment? Reference Source: (C7-1d(1)) | | | | |

| Shipment Number: | | | | |
|--|---------------|----|-----|---------------------|
| Description of Criteria Reviewed | Criteria Met? | | | Comments/Qualifiers |
| | Yes | No | N/A | |
| <p>5e. Completeness</p> <p>Was a video and audio media recording of the radiography examination and a validated radiography data form obtained for 100 percent of the waste containers selected for confirmation?</p> <p>Reference Source: (C7-1d(1))</p> | | | | |
| <p>5f. Comparability</p> <p>Was the most current version of the confirmation procedure used?</p> <p>Reference Source: (C7-1d(1))</p> | | | | |
| <p>5g. Comparability</p> <p>Are the confirmation personnel working the shipment currently qualified?</p> <p>Reference Source: (C7-1d(1))</p> | | | | |
| <p>6. The data meet the established QAOs for VE? Mark N/A if there are no VEs for this shipment.</p> <p>Reference Source: (C7-1e(2))</p> | | | | |
| <p>6a. Precision</p> <p>Discrepancies between the operator and the independent technical reviewer with regard to the waste stream waste confirmation, identification of liquid in excess of TSDF-WAC limits, and identification of compressed gases have been reconciled? Mark N/A if there were no discrepancies.</p> <p>Reference Source: (C7-1d(2))</p> | | | | |
| <p>6b. Accuracy</p> <p>Are the training qualifications for all Visual Examination personnel acceptable?</p> <p>Reference Source: (C7-1d(2))</p> | | | | |
| <p>6c. Representativeness</p> <p>Was a Confirmation Module completed accurately and signed for each waste stream in the shipment?</p> <p>Reference Source: (C7-1d(2))</p> | | | | |

| Shipment Number: | | | | |
|--|----------------------|-----------|------------|----------------------------|
| Description of Criteria Reviewed | Criteria Met? | | | Comments/Qualifiers |
| | Yes | No | N/A | |
| 6d. Completeness A validated VE data form was obtained for 100 percent of the waste containers subject to VE? Reference Source: (C7-1d(2)) | | | | |
| 6e. Comparability Was the most current version of the confirmation procedure used? Reference Source: (C7-1d(2)) | | | | |
| 6f. Comparability Are confirmation personnel working the shipment currently qualified? Reference Source: (C7-1d(2)) | | | | |
| Comments: | | | | |
| | | | | |
| PCR Printed Name | | Signature | | Date |
| Shipment payloads have been verified and have not changed: | | | | |
| | | | | |
| PCR Printed Name | | Signature | | Date |

TRU WASTE CONFIRMATION ITR REVIEW CHECKLIST

| Shipment Number: | | | | |
|--|---------------|-----------|-----|---------------------|
| Description of Criteria Reviewed | Criteria Met? | | | Comments/Qualifiers |
| | Yes | No | N/A | |
| 1. Data generation and reduction were conducted in a technically correct manner in accordance with the methods used (procedure with revision). Data were reported in the proper units and correct number of significant figures. Reference Source: (C7-1e(1)) | | | | |
| 2. Is the media complete, if applicable? Reference Source: (C7-1e(1)) | | | | |
| 3. The data have been reviewed for transcription errors? Reference Source (C7-1e(1)) | | | | |
| 4. Ensure the generator/storage site radiography video and audio media recordings were reviewed (independent observation) on a waste container basis at a minimum of once per shipment or once per day of operation, whichever is less frequent. The radiography video/audio recording was reviewed against the data reported on the radiography form to ensure that the data are correct and complete. *Mark N/A if the containers being confirmed in this shipment are VE only. Reference Source: (C7-1e(2)) | | | | |
| 5. If review of radiography scans recorded by the generator/storage site was used to perform confirmation, were two observations performed for each shipment or two observations per day, whichever is less frequent. *Mark N/A if the containers being confirmed in this shipment are VE only. Reference Source: (C7-1e(2)) | | | | |
| Comments: | | | | |
| | | | | |
| ITR Printed Name | | Signature | | Date |

WP 16-2

Revision 11

Software Screening and Control

Management Control Procedure

EFFECTIVE DATE: 01/05/12

Jon Hoff

APPROVED FOR USE

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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|--|
| 10 | 03/01/11 | Added screening criteria for ML-1 and 2 items (Introduction), to support requirements of WP 09-CN3005, Graded Approach to Application of QA Controls. Added reference to 09-CN3005 |
| 11 | 01/05/12 | <ul style="list-style-type: none">• Added step to address controlled software which is rescreened as safety software. (1.3.3)• Added inventory requirements specific to safety software, per DOE O 414.1D. (3.2.1)• Added step to notify QA if software is found defective during testing. (5.4) |

INTRODUCTION ¹

This procedure provides instructions for the development, acquisition, maintenance, and use of software by Washington TRU Solutions LLC (WTS). It implements the requirements of WP 13-1, Washington TRU Solutions LLC Quality Assurance Program Description (WTS QAPD), for software quality assurance (SQA).

The SQA requirements of this procedure apply to:

- Computer software used in the manipulation or production of data that are, in turn, used in the processing, gathering, or generation of information whose output is relied upon to make design, analytical, operational, or compliance-related decisions with respect to any of the following:
 - Performance of the waste confinement, waste characterization, waste transportation, or waste acceptance processes
 - Long-term monitoring for compliance with the compliance certification, or modeling the performance of the repository for purposes of compliance certification application and/or reapplication
 - Activities that affect or are directly related to compliance with the Hazardous Waste Facility Permit
 - Management Level 1 or 2 items or related activities (e.g., design, calculations), in accordance with WP 09-CN3005, Graded Approach to Application of QA Controls
- Safety Software, including the following:
 1. Safety System Software - software that performs a safety function as part of a structure, system, or component and is cited in either (a) a Documented Safety Analysis, or (b) an approved hazard analysis.
 2. Safety and Hazard Analysis Software and Design Software - software that is used to classify, design, or analyze nuclear facilities. This software is not part of a structure, system, or component (SSC), but helps to ensure the proper accident or hazards analysis of nuclear facilities or an SSC that performs a safety function.

3. Safety Management and Administrative Controls Software - software that performs a hazard control function in support of nuclear facility or radiological safety management programs or technical safety requirements or other software that performs a control function necessary to provide adequate protection from nuclear facility or radiological hazards. This software supports eliminating, limiting, or mitigating nuclear hazards to workers, the public, or the environment.

Software that is acquired, received, or developed by or for WTS, except for the exemptions noted below, shall be screened in accordance with Section 1.0 of this procedure, to determine if it falls within this scope. If applicable, the software shall be processed in accordance with the requirements of this procedure.

The following are exempt from these requirements (they do not have to be screened):

- Software covered by the Central Characterization Project (CCP) Quality Assurance (QA) program (see CCP-QP-022)
- Systems software and site standard software

Systems software includes operating systems, administrative and management systems, system utilities, compilers (including vendor-supplied library files), assemblers, translators, interpreters, query languages, word processing programs, spreadsheet programs, database managers, graphing programs, and other software that does not generate data that are used in the formulation of conclusions.

Site standard software is considered systems software. A list of site standard software is maintained at <http://bellview/wcontr/IRM/pdfs/faqs/SWStandards.pdf> by the Information Resource Management (IRM) group; it includes general office programs, such as Microsoft (MS)-Word, MS-Excel, etc.

However, specific applications developed using site standard or other systems software are not exempt and must be screened for applicability of this procedure. This includes Excel spreadsheets, Access databases, detailed formulas, macros, and similar applications built within a standard software program to perform a specific function. These applications must be screened per Section 1.0 of this procedure and, if applicable, processed per Section 4.0. This requirement applies only to Waste Isolation Pilot Plant (WIPP) mission-related applications (i.e., it does not include personal spreadsheets or administrative support applications such as time, budget, economic, or manpower trackers, etc.). Macros and other applications that are developed for one time use and whose output is independently verified and documented using an alternate method, such as testing, alternate calculations, design review, or other appropriate means, are excluded from this requirement.

- Firmware that is normally inaccessible to users

Quality measures applied to firmware will be those applied to the hardware in which the firmware is installed. This category includes such things as EPROMs (erasable programmable read only memory) used in multimeters, analytical instruments, basic input/output system (BIOS), etc. It is not intended to exclude EPROMs, etc., developed by or for WTS.

Organizations may develop dedicated programs/procedures to control a specific software, if necessary due to the complexity or unique nature of the software, in lieu of working to this procedure. (An example is the Waste Data System, addressed in WP 08-NT.01 Waste Data System Program and Management Plan, and related documents.) Such software, program documents, and procedures shall:

- Be documented on a Software Screening Checklist (EA16-2-1-0)
- Be included on the Controlled Software Log (see Subsection 3.2 and Step 7.2.5)
- Meet the applicable requirements of the WTS QAPD
- Be approved by QA and IRM if applicable per Subsection 3.8

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Controlled Software Log
- EA16-2-1-0, Software Screening Checklist
- EA16-2-2-0, Software Quality Assurance Elements Checklist
- EA16-2-3-0, Software Installation and Checkout Form
- EA16-2-4-0, Software Problem Report
- EA16-2-5-0, Software QA Plan Review Checklist
- EA16-2-6-0, Software Requirements Document Review Checklist
- EA16-2-7-0, Software Verification and Validation Plan Review Checklist
- EA16-2-8-0, Software Design Document Review Checklist
- EA16-2-9-0, Software Implementation Document Review Checklist
- EA16-2-10-0, Software Test Documentation Review Checklist
- EA16-2-11-0, Software User Documentation Review Checklist
- Software Quality Assurance Plan (SQAP)
- Project Plan
- Configuration Management Plan
- Requirements Document
- Verification and Validation Plan
- Design Document
- Implementation Document (code)
- Verification and validation (V&V) documentation
- Test documentation
- User documentation

| REFERENCES | | | |
|--|--------------------------|----------------------------|-----------------|
| DOCUMENT NUMBER AND TITLE | BASELINE DOCUMENT | REFERENCED DOCUMENT | KEY STEP |
| ASME NQA-2a-1990 addenda, Part 2.7, <i>Quality Assurance Requirements of Computer Software for Nuclear Facility Applications</i> | | ✓ | |
| IEEE Std 610.12-1990, <i>IEEE Standard Glossary of Software Engineering Terminology</i> | | ✓ | |
| DOE/CBFO-94-1012, <i>U.S. Department of Energy Carlsbad Field Office Quality Assurance Program Document (CBFO QAPD)</i> | | ✓ | |
| CCP-QP-022, <i>CCP TRU Software Quality Assurance</i> | | ✓ | |
| WP 04-IM1000, <i>Issues Management Processing of WIPP Forms</i> | | ✓ | |
| WP 08-NT.01, <i>Waste Data System Program and Management Plan</i> | | ✓ | |
| WP 09, <i>Engineering Conduct of Operations</i> | | ✓ | |
| WP 09-CN3005, <i>Graded Approach to Application of QA Controls</i> | | ✓ | |
| WP 09-CN3007, <i>Engineering and Design Document Preparation and Change Control</i> | | ✓ | |
| WP 13-1, <i>Washington TRU Solutions LLC Quality Assurance Program Description (WTS QAPD)</i> | ✓ | ✓ | 1 |
| WP 13-QA3004, <i>Nonconformance Report</i> | | ✓ | |
| WP 15-PC3609, <i>Preparation of Purchase Requisitions</i> | | ✓ | |
| WP 15-RM, <i>WIPP Records Management Program</i> | | ✓ | |
| EA04IM1000-1-0, <i>WIPP Form</i> | | ✓ | |

PERFORMANCE

NOTE

Each software program that is controlled by this procedure (“controlled software”) shall have a software custodian, designated by the cognizant manager, who will be primarily responsible for determining applicability of the SQA requirements and for processing the software in accordance with those requirements. The software custodian shall be the cognizant engineer for the affected system, when applicable, or another individual with technical knowledge of the affected system, as determined by the cognizant manager. Procedure steps are performed by the software custodian, unless otherwise noted.

NOTE

Software may be obtained (through means other than formal procurement, e.g., evaluation copy, download, provided by government agency) for evaluation before initiating this procedure. The Software Screening Checklist shall be completed as soon as it is determined that the software will be used and before submitting procurement documentation.

1.0 SCREENING SOFTWARE FOR APPLICABILITY OF SQA REQUIREMENTS

1.1 Complete the Software Screening Checklist (EA16-2-1-0):

- For any software to be developed or acquired that is not excluded per the Introduction of this procedure
- As soon as practical after determining the need for a software program
- Before submitting procurement documentation or otherwise developing or acquiring software
- When the applicability (i.e., whether the software meets any of the criteria for applicability on the checklist) may have changed

It is not required to complete the Software Screening Checklist for other changes (e.g., revisions, updates, changes to information maintained on the Controlled Software Log) after the initial determination of applicability has been made.

- 1.2 If all questions on the Software Screening Checklist are answered "No," then:
- 1.2.1 Obtain required approvals:
- Cognizant Manager
 - QA
 - IRM if applicable per Subsection 3.8
- 1.2.2 QA, retain the Software Screening Checklist as a record.
- 1.2.3 Exit this procedure.
- 1.3 If any question on the Software Screening Checklist is answered "Yes," then:
- 1.3.1 Classify the software and record the classification on the Software Screening Checklist. (Refer to Subsection 3.1 for classification guidance.)
- 1.3.2 Obtain required approvals:
- Cognizant Manager
 - QA
 - IRM if applicable per Subsection 3.8
- 1.3.3 If a previously controlled, developed software is rescreened as safety software, then GO TO 6.1.4, develop a SQAP addressing the safety software requirements of Section 6.0, evaluate the software for continued use, and complete any remaining steps in Section 6.0, as necessary in accordance with the SQAP.
- 1.3.4 Process the software in accordance with the applicable section(s) of this procedure:
- 4.0, Specific Applications Developed Using Generally Available Software (spreadsheets, macros, databases, formulas, etc.)
 - 5.0, Acquired Software
 - 6.0, Developed Software
- Sections 2.0 and 3.0 provide an overview and general requirements. Section 7.0 and 8.0 apply to all software/applications.

2.0 OVERVIEW

2.1 Life Cycle Phases

Software shall be developed/acquired and maintained using a life cycle methodology that includes the following phases, to the extent applicable, based on the nature and complexity of the software:

- Requirements The technical requirements that the software must implement are developed.
- Design The requirements are translated into design.
- Implementation The design is translated into computer language (code).
- Testing The program (code) is tested to validate that it meets its requirements.
- Installation and Checkout The program is installed and tested in its operating environment.
- Operations and Maintenance The program is used and maintained under configuration control.
- Retirement The program is removed from use when no longer needed.

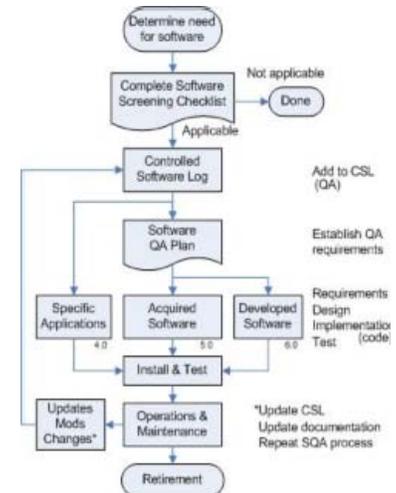
The phases should generally follow the order shown, but may be performed iteratively, sequentially, or concurrently, to suit the development process needed for a particular software, providing that the requirements of each applicable phase are addressed. Applicable phases for each type of software (acquired, developed, etc.), and activities, documentation, and verification required for each phase, are noted in individual sections of this procedure.

2.2 How to use this procedure

2.3 The following summarizes the SQA process for controlled software, i.e., software for which the Software Screening Checklist (EA16-2-1-0) results are positive. Details are provided in the applicable section.

- Complete the Software Screening Checklist (EA16-2-1-0).
- Review Section 3.0 (general requirements - these are applicable to planning for and processing different types of software throughout the life cycle).
- Classify the software.

- Add the software to the Controlled Software Log.
- Evaluate the software to determine the applicable life cycle phases and requirements (minimum requirements are described in the applicable section).
- Develop an SQAP. The SQAP documents the specific SQA requirements for the software. (Not required for specific applications developed using generally available software, e.g., spreadsheets, macros, databases, formulas, etc.)
- Develop/acquire the software per the applicable section (one of the following):



- 4.0, Specific Applications Developed Using Generally Available Software (e.g., spreadsheets, macros, databases, formulas, etc.)
- 5.0, Acquired Software
- 6.0, Developed Software

The Requirements, Design, Implementation, and Testing phases are addressed in these sections. The phases and SQA activities required will be different depending on the type of software. Each phase typically requires one or more life cycle documents and verification that the requirements for that phase have been met.

- Install and test the software in its operating environment.
- Place the software under configuration control.
- Use and maintain the software.
- Retire the software when no longer needed.

Screening and establishment of the SQA requirements should be accomplished before the acquisition/development of the software begins.

Section 3.0 provides planning and general requirements; review this section as needed. The software is then acquired or developed according to the applicable section of this procedure, tested to ensure it will perform as required, used and maintained under configuration control, and retired when no longer needed. Upgrades, revisions, or modifications are controlled in accordance with this procedure.

3.0 GENERAL REQUIREMENTS

3.1 Classification

Each software program shall be classified and the classification maintained on the Controlled Software Log. The classification consists of the type, impact, and purpose of the software. Code letters may be used to record the classification in *type-impact-purpose* format, e.g., *D-z-dc*, for developed software, used to monitor safety, and data collection. Classification is determined and documented when the Software Screening Checklist is completed; the classification may be updated when software revisions are processed or as necessary, but existing software classifications are not required to be updated to reflect categories added by later revisions of this procedure.

3.1.1 Identify the type of software as one of the following (software type code in brackets):

- Specific application developed using site standard or other generally available systems software - Excel spreadsheets, macros, Access databases, detailed formulas, etc. [M]
- Acquired - software acquired for use by WTS without any modification, and which can be treated as a "black box." Acquired software includes any software that is received by WTS, such as commercial off-the-shelf software (COTS), purchased software, freeware, shareware, software provided by other U.S. Department of Energy (DOE) sites or government agencies, downloaded software, etc. [A]
- Developed - software which is developed by WTS or by a vendor for WTS [D]

3.1.2 Identify the impact of the software, using the following categories (impact code in brackets):

- Safety (software with critical functionality that is used to maintain, monitor, and document safety) [z]

- Significance in managing information (software that is used to collect, store, present, document, and assess information that is mission-critical) [y]
- Augmenting mission-essential decisions (software that is used to present, assess, and document decision processes that are mission-essential) [w]
- Process safety (software that is used to control processes or machines whose malfunction could potentially endanger health or safety, or that could cause violations of regulatory or process limits, regulations, or safety parameters) [v]

3.1.3 Identify the purpose of the software, using the following categories (purpose code in brackets):

- Engineering [e]
- Scientific [s]
- Testing [t]
- Data collection [dc]
- Design [d]
- Analysis [a]
- Operations [o]

3.2 Controlled Software Log

A Controlled Software Log, which includes an inventory of software that is controlled by this procedure, i.e., software for which the Software Screening Checklist (EA16-2-1-0) results are positive, shall be maintained. Exemptions listed in the Introduction of this procedure and software for which the Software Screening Checklist results are negative are considered exempt and are not listed on the Controlled Software Log. (The Controlled Software Log is maintained at <http://bellview/wqnr/sqa/csl.pdf>.)

3.2.1 QA, perform the following:

[A] Maintain the Controlled Software Log, with the following information for each software program:

- Name
- Version
- Description
- Classification
- Operating environment
- Software custodian

- Organization responsible for the software
- Software grading level (safety software or controlled software)

[B] Maintain the following additional information for safety software:

- Safety software designation (safety system software, safety and hazard analysis software and design software, safety management and administrative controls software)
- Specific nuclear facility application where the program is used

[C] Update the Controlled Software Log using the Software Screening Checklist or other information provided by software custodians.

3.2.2 If any information reflected in the Controlled Software Log is changed, notify QA in writing (may be email or documents that are submitted to QA, e.g., Software Screening Checklist, Software Installation and Checkout Form, or SQAP revision).

3.3 Life Cycle Documentation

Documentation required for each life cycle phase (i.e., Requirements Document, Design Document, etc.) is noted in the applicable section of this procedure.

No specific format is required for life cycle documents. Documentation may be combined or broken out and formatted as necessary to suit the software complexity, as long as the required elements are addressed. For complex programs, the separate documents for each phase should be developed. For less complex programs, elements may be combined as appropriate; all elements may be included in one document, e.g., the SQAP or "Life Cycle Documentation;" and some elements may be addressed in other documents, e.g., requirements may be included in the Statement of Work.

Documentation may apply to more than one software program, e.g., a generic SQAP for all software controlled by an organization.

Completed documents shall be controlled by the software custodian until the software is placed under configuration control. However, documents may be updated/revised during subsequent phases.

3.4 User Documentation

User documentation should be sufficient to allow a user with adequate technical background to install and run the software and properly respond to errors.

User documentation may be provided with the software, included in site procedures, or developed as necessary.

3.4.1 Ensure that user documentation adequately and accurately reflects the software and includes the following:

- The software name and version identifier
- Description of functional requirements and system limitations, including hardware
- Explanation of the mathematical models and derivation of the numerical methods used in the software design (physical and mathematical assumptions on which the software is based shall be included, along with an explanation of the capabilities and limitations of the software)
- Instructions that describe user interaction with the software, user messages initiated as a result of improper input and how the user can respond, the identification and description of input and output specifications and formats, and input parameters
- Description of any required training necessary to use the software
- Information for obtaining user and maintenance support

3.5 Procurement

3.5.1 Purchase software per WP 15-PC3609, Preparation of Purchase Requisitions.

3.5.2 Ensure that the applicable quality requirements are included in the procurement documentation.

3.5.3 The following elements are required for vendors developing software for WTS:

- The vendor must have a QA program and procedures that meet the applicable requirements for software (NQA-2, Part 2.7; CBFO QAPD; and/or WTS QAPD), or work under this procedure.
- The vendor shall have an SQAP that describes the program, controls, activities, and documentation that will be used to control software quality. The SQAP will be approved by WTS QA, cognizant organization, and IRM if applicable per Subsection 3.8.
- The procurement documentation shall specify the life cycle and user documentation to be developed and provided by the vendor. Some documentation (e.g., source code) may be proprietary. User documentation shall meet the requirements of Subsection 3.4.
- The vendor shall provide the required life cycle development and user documentation to WTS.
- If the software will be firmware or installed on equipment when the equipment is received, the owner shall either:
 - Develop and execute testing for the equipment that demonstrates that the software will satisfactorily perform its intended functions; or
 - Include provisions in the procurement documentation requiring the vendor to provide documentation of testing.

3.5.4 Include provisions for the vendor to report software errors or failures to WTS.

3.6 Configuration Control

A software configuration baseline which defines the most recent approved software configuration shall be maintained and controlled during the development or acquisition process and while the software is used. Software components (files) and documents become part of the configuration baseline as they are completed and approved. Components/documents may be updated/revised during subsequent phases, but shall be controlled per the applicable section of this procedure. The software documents and components shall be traceable to each other.

3.6.1 Maintain and control software components and documents, including completed and in-process items and proposed changes.

3.6.2 Develop a labeling system that:

- Uniquely identifies each configuration item
- Identifies changes to configuration items by revision
- Provides the ability to uniquely identify each configuration of the revised software available for use

3.6.3 Maintain configuration baseline status information, including identity and version of approved baseline configuration items, and status of changes.

3.6.4 Provide configuration baseline status information to designated users upon request.

3.6.5 If necessary (e.g., for large/complex programs), develop a Configuration Management Plan.

[A] Address the following, as applicable:

- Identification of organizational positions that are authorized to make changes
- Methods, procedures, and instructions to be used to control the identification of, access to, changes to, and the status of computer software
- How changes will be validated, including regression testing, and how the tests will be documented

[B] Submit the Configuration Management Plan to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

In the absence of a Configuration Management Plan, changes shall be authorized, approved, and processed per the applicable section of this procedure.

3.6.6 Control the software documentation per WP 15-RM, WIPP Records Management Program.

3.6.7 If applicable to engineering processes per WP 09, Engineering Conduct of Operations, submit the software package to the Engineering File Room (EFR).

3.7 Verification and Validation

Verification is required for individual development phases. Verification includes measures such as reviews or testing performed during the development cycle to verify that each phase meets requirements for that phase. The minimum required verification activities for each development phase are specified in the applicable steps in Section 6.0, Developed Software. Validation involves evaluating and testing completed software to verify that it meets the software requirements. Testing is the primary means of validating software; however, if testing is not feasible, a peer review may be performed and documented to validate the software.

Planning for V&V, such as development of test cases, should be integrated into each development phase. Validation methods, test data, software-generated results, and conclusions shall be documented in a form that can be understood by an independent individual technically competent to use the software. V&V documentation shall be organized in a manner that allows traceability to both the software requirements and the software design. This documentation shall also contain the results of the execution of the software V&V activities, and shall include the results of reviews and tests, and a summary of the status of the software, e.g., incomplete design performance and application requirements.

V&V shall be performed by any competent individual(s) or group(s) other than those who performed the software design, but who may be from the same organization and may include the designer's supervisor, provided the supervisor:

- Did not specify a singular design approach
- Did not rule out certain design considerations
- Did not establish the design inputs used
- Is the only individual in the organization competent to perform the verification or validation

3.8 IRM Approval

IRM approval, where it is called for in this procedure, is required for the following:

- Software that will be placed on a network server
- Software that interacts with other sites (EDI [electronic data interface/interchange])
- Software that affects computer or computer-related security
- Downloaded freeware or shareware

3.9 Review Checklists

Optional review checklists are provided for the life cycle phases/documents. They may be used informally as a tool to assist in completing the documents, or formally to document the verification for a life cycle phase, in which case they shall be included in the software documentation package.

4.0 SPECIFIC APPLICATIONS DEVELOPED USING GENERALLY AVAILABLE SOFTWARE (SPREADSHEETS, MACROS, DATABASES, FORMULAS, ETC.)

NOTE

This section applies to specific applications developed using site standard or other generally available systems software (i.e., Excel spreadsheets, macros Access databases, detailed formulas, etc.) which can be verified by hand calculations or other means and which are WIPP mission-related (i.e., does not include personal spreadsheets or administrative support applications such as time, budget, economic, or manpower trackers, etc.) Macros and other applications that are developed for one time use and whose output is independently verified and documented using an alternate method, such as testing, alternate calculations, design review, or other appropriate means, are excluded from this requirement.

The following documentation is required for applications developed under this section:

- Software Screening Checklist (EA16-2-1-0)
- A listing of the software code (i.e., a printout of the macro, spreadsheet, formulas, file/table/cell references, etc.)
- Documentation indicating that the application provides the correct results for the specified range of input parameters, including appropriate testing
- Software Installation and Checkout Form (EA16-2-3-0)

The software custodian/manager should determine whether any other life cycle documents (e.g., SQAP, Requirements Document, Design Document, User Documentation), activities (e.g., training), or controls (e.g., process per Section 6.0, Developed Software) are needed, based on the complexity and impact of the application.

- 4.1 Ensure that a Software Screening Checklist (EA16-2-1-0) has been completed for the application.
- 4.2 Develop the application, documenting as determined necessary.
- 4.3 Perform installation and checkout testing.
 - 4.3.1 Validate, by testing or other appropriate means, and document that the application provides the correct results for the specified range of input parameters.

- 4.3.2 Perform the validation for each system that the software is installed on.
- 4.4 Create a printout of the application, or record the formulas, macro, etc., in the application documentation.
- 4.5 Determine controls necessary to permit authorized and prevent unauthorized access to software that has been accepted in accordance with this section, and document on the Software Installation and Checkout Form (EA16-2-3-0).
- 4.6 Compile the software documentation package and complete the Software Installation and Checkout Form (EA16-2-3-0). Each system that the software is installed on shall be documented; more than one system/installation may be documented on an individual form.

The software package shall include:

- Software Screening Checklist (EA16-2-1-0)
- Testing/validation documentation
- Program printout (may be included in other documentation)
- Software Installation and Checkout Form (EA16-2-3-0)
- Other life cycle documentation, if used
- Supporting documentation, if applicable

NOTE

Verification is not required for this section. The "Reviewer" signature line on EA16-2-3-0 should be marked "N/A" if the review is not performed.

- 4.7 Submit the Software Installation and Checkout Form (EA16-2-3-0) with the software package to the following for approval:
- Cognizant Manager
 - QA
 - IRM if applicable per Subsection 3.8

Completion of this step constitutes approval of the software for operational use.

- 4.8 Maintain the software package under configuration control per Subsection 3.6. This constitutes the approved software configuration baseline, which includes the required documentation, and the documented hardware, system software, and application software components.

5.0 ACQUIRED SOFTWARE

NOTE

This section applies to software acquired or received by WTS for use without any modification, such as COTS, purchased software, freeware, shareware, software provided by other DOE sites or government agencies, downloaded software, etc. It also applies to legacy software, i.e., existing software which was not developed/acquired per current requirements, and other software not developed under this QA program.

The following documentation is required for software acquired under this section:

- Software Screening Checklist (EA16-2-1-0)
- SQAP
- Test documentation
- User documentation
- Software Installation and Checkout Form (EA16-2-3-0)

Subsections 3.3, Life Cycle Documentation, and 3.4, User Documentation, provide additional information on documentation.

Acquired software (including existing V&V and development documentation) shall be evaluated before being used to ensure its adequacy to perform as required. In addition to the required documentation, the software custodian/manager shall determine whether any other life cycle documents (e.g., Requirements Document, Design Document, V&V documentation) or activities (e.g., supplier evaluation) are needed, based on the complexity and impact of the application.

5.1 If this is the first use of the software, perform the following:

- 5.1.1 Ensure that a Software Screening Checklist (EA16-2-1-0) has been completed for the software.
-

NOTE

For small or low-impact programs, the Software Quality Assurance Elements Checklist (EA16-2-2-0) may be used as the SQAP. The applicable requirements of this section must be addressed.

- 5.1.2 Develop an SQAP (preferably before submitting procurement documentation, if applicable, but required before the software is received).

5.1.3 Include the following in the SQAP:

- Software name
- Responsible person or organization
- User application requirements, including capabilities and limitations
- Activities and documentation required to ensure the software's adequacy to perform as required
- Post-installation configuration control
- Maintenance and retirement requirements, if applicable
- Provisions for problem reporting, evaluation, and corrective action

5.1.4 Submit the SQAP to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

5.2 If the software is an update to existing controlled software, perform the following:

5.2.1 Verify that documentation required in Subsection 5.1 is on file and adequate.

5.2.2 Repeat Subsection 5.1 as necessary to update the software's documentation.

5.3 If the software will be purchased, procure the software per Subsection 3.5.

5.4 Perform installation and checkout testing.

5.4.1 Develop a test plan and test cases that demonstrate that the software will satisfactorily perform its intended functions in its operating environment. Refer to subsection 6.5, as necessary, for guidance in developing testing.

5.4.2 Perform the testing for each system that the software is installed on.

5.4.3 If any software is found to be defective, notify QA.

- 5.5 Verify that user documentation meets the requirements of Subsection 3.4, User Documentation. The Software User Documentation Review Checklist (EA16-2-11-0) may be used.
- 5.6 Determine controls necessary to permit authorized and prevent unauthorized access to software that has been accepted in accordance with this section, and document on the Software Installation and Checkout Form (EA16-2-3-0).
- 5.7 Compile the software documentation package and complete the Software Installation and Checkout Form (EA16-2-3-0). Each system that the software is installed on shall be documented; more than one system/installation may be documented on an individual form.

The software package shall include or reference (documents maintained elsewhere, e.g., site procedures) the following:

- Software Screening Checklist (EA16-2-1-0)
- SQAP / Software Quality Assurance Elements Checklist (EA16-2-2-0)
- Test documentation
- User documentation
- Software Installation and Checkout Form (EA16-2-3-0)
- Other life cycle documentation, if used
- Supporting documentation, if applicable

NOTE

Verification reviews shall be performed by individuals who did not design the software. (See Subsection 3.7, Verification and Validation, for additional detail.)

- 5.8 Reviewer, perform the verification review of the Installation and Checkout activities.
- 5.8.1 Verify that the software baseline has been established. The software baseline includes the required documentation, and the documented hardware, system software, and application software components.

5.8.2 Document the review on the Software Installation and Checkout Form (EA16-2-3-0). Include the following:

- Results of the review
- Comments, if applicable
- The reviewer's name, signature, and date

5.9 Resolve review comments, document resolution, and update the software documentation as necessary.

5.10 Submit the Software Installation and Checkout Form (EA16-2-3-0) with the software package to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

Completion of this step constitutes approval of the software for operational use.

5.11 Maintain the software package under configuration control per Subsection 3.6. This constitutes the approved software configuration baseline, which includes the required documentation, and the documented hardware, system software, and application software components.

6.0 DEVELOPED SOFTWARE

NOTE

This section applies to software which is developed by WTS or by a vendor for WTS.

The following documentation is required for software developed under this section:

- Software Screening Checklist (EA16-2-1-0)
- SQAP
- Requirements Document
- V&V Plan
- Design Document
- Implementation Document (code)
- Test documentation
- V&V documentation (verification reviews for each phase)
- User documentation
- Software Installation and Checkout Form (EA16-2-3-0)

Subsections 3.3, Life Cycle Documentation, and 3.4, User Documentation, provide additional information on documentation.

Software may be developed by a vendor for WTS per the applicable steps in this section, or per the vendor's accepted QA program in lieu of corresponding steps in this section. The vendor shall supply (or make available) the required development phase documentation to WTS. For software developed by a vendor, WTS actions typically begin with Subsection 6.6, Installation and Checkout, but may also include some of the development phase activities, e.g., the Requirements Document.

6.1 Software Quality Assurance Plan

NOTE

For small or low-impact programs, the Software Quality Assurance Elements Checklist (EA16-2-2-0) may be used as the SQAP, as long as the applicable requirements of this section are addressed. The Software QA Plan Review Checklist (EA16-2-5-0) may be used to verify requirements are addressed.

- 6.1.1 Ensure that a Software Screening Checklist (EA16-2-1-0) has been completed for the software.

6.1.2 If the software will be developed by a vendor, then:

[A] Develop an SQAP (preferably before submitting procurement documentation, but required before the software is received).

[B] Procure the software per Subsection 3.5.

6.1.3 If the software will be developed by WTS, develop an SQAP before beginning the development activities.

6.1.4 Include the following in the SQAP:

- Software name
- Responsible person and organization
- Development standards and techniques to be used and methods of verifying compliance with them
- Required activities, responsibilities, and documentation
- Required reviews and methods of verifying implementation of requirements
- Items that need to be baselined and methods for controlling the baseline configuration
- Provisions for error reporting, evaluation, and corrective action
- The procedure(s) used for establishing and maintaining the integrity of data, embodied mathematical models, and output files

For safety software, the following shall be identified, as applicable:

- Risk management - potential software risks, likelihood, consequences, and methods of controlling the risk
- Design authority involvement in identifying requirements specifications, acquisition, design, development, V&V (including inspection and testing), configuration management, maintenance, and retirement

- Required training in design, development, and evaluation of safety software

Sufficient information shall be provided to clearly indicate the necessary tasks, the deliverables and baselines for each phase, the required reviews, appropriate milestones, and the responsibilities associated with each task. This information may be included in a separate Project Plan, if appropriate.

6.1.5 Submit the SQAP to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

6.2 Requirements

6.2.1 Develop the Requirements Document.

[A] Include the following, as applicable:

- Requirements the software must satisfy
- Required response of the software to anticipated input classes
- Functionality - the functions the software is to perform
- Performance - the time-related issues of software operation such as speed, recovery time, response time, etc.
- Design constraints imposed on implementation phase activities - any elements that will restrict design options
- Attributes - non-time-related issues of software operation such as portability, acceptance criteria, access control, maintainability, etc.
- External interfaces - interactions with people, hardware, and other software

[B] For safety software, identify and evaluate potential failures. Include measures to mitigate the safety consequences of identified potential failures.

6.2.2 Ensure that:

- All requirements can be verified and validated.
- The Requirements Document provides enough detail and information to design and validate the software.

NOTE

Verification reviews shall be performed by individuals who did not design the software. (See Subsection 3.7, Verification and Validation, for additional detail.)

6.2.3 Reviewer, perform the verification review of the software requirements.

- [A] Verify that the requirements are complete, verifiable through testing, consistent, and technically feasible.
- [B] Verify that the requirements will result in feasible and usable code.
- [C] Document the review. Include the following:
 - Results of the review
 - Comments, if applicable
 - The reviewer's name, signature, and date

No format is specified. The Software Requirements Document Review Checklist (EA16-2-6-0) may be used.

- [D] Submit the review documentation to the Cognizant Manager for approval.

6.2.4 Resolve review comments, document resolution, and update the software documentation as necessary.

6.2.5 Submit the Requirements Document to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

NOTE

Requirements phase activities include development of a V&V Plan for the software. (See Subsection 3.7, Verification and Validation, for additional detail.) For less complex programs, the V&V Plan may be combined with the test document (See Subsection 6.5). The Software Verification and Validation Plan Review Checklist (EA16-2-7-0) may be used to verify the requirements for the V&V Plan are met.

6.2.6 Develop a software V&V Plan.

V&V shall include the following:

- Verification that each development phase meets the requirements for that phase, including those imposed by the previous phase, and that the software requirements are traceable through each phase
- Verification that the software adequately and correctly performs all intended functions and does not perform any unintended undesirable functions
- V&V activities specific to each system configuration which may affect the software
- V&V documentation required for each development phase
- Identification of the participants in V&V activities and their responsibilities (must be individuals who did not design the software and meet the requirements of Subsection 3.7)
- Validation (testing) of the completed code to ensure that it satisfies the software requirements

6.2.7 Submit the V&V Plan to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

6.3 Design**6.3.1** Develop the Design Document based on the requirements.

- [A] Describe the design in a manner that can be translated into code.

[B] Include the following, as applicable:

- Description of the major components of the software design as they relate to the software requirements
- Technical description of the software - theoretical basis, embodied mathematical model, overall structure (control and data flow) and the reduction of the overall structure into physical solutions (algorithms, equations, control logic, and data structures)
- Allowable or prescribed ranges for inputs and outputs

[C] For safety software, include measures to mitigate the safety consequences of software failures as an integral part of the design.

6.3.2 Repeat Subsection 6.2 as necessary to update the requirements documentation.

6.3.3 Start to develop test cases based on the design and requirements. (Refer to Subsection 6.5, Testing.)

NOTE

The software design review shall be performed by competent individual(s) who did not design the software. (See Subsection 3.7, Verification and Validation, for additional detail.) This review shall meet the applicable design review requirements of WP 13-1, Section 2.2.5, Design Verification. The Software Design Document Review Checklist (EA16-2-8-0) may be used to verify that these requirements are met.

6.3.4 Reviewer, perform the software design review.

[A] Evaluate the technical adequacy of the design approach.

[B] Verify that all requirements have been addressed and that the design is:

- Complete
- Correct
- Clear

- Consistent
- Technically Feasible
- Traceable to the Software Requirements
- Verifiable (through testing, using approved test plans and test cases)

[C] Document the review. Include the following:

- Results of the review
- Comments, if applicable
- The reviewer's name, signature, and date

No format is specified. The Software Design Document Review Checklist (EA16-2-8-0) may be used.

[D] Submit the review documentation to the Cognizant Manager for approval.

6.3.5 Resolve review comments, document resolution, and update the software documentation as necessary.

6.3.6 Submit the Design Document to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

6.4 Implementation

6.4.1 Translate the design into a computer program (code).

6.4.2 Analyze the computer program to identify and correct errors.

NOTE

Verification reviews shall be performed by individuals who did not design the software. (See Subsection 3.7, Verification and Validation, for additional detail.)

6.4.3 Reviewer, perform the verification review of the Implementation phase activities.

[A] Verify that the design has been implemented in code.

[B] Examine the code for adherence to coding standards and conventions

[C] Document the review. Include the following:

- Results of the review
- Comments, if applicable
- The reviewer's name, signature, and date

No format is specified. The Software Implementation Document Review Checklist (EA16-2-9-0) may be used.

[D] Submit the review documentation to the Cognizant Manager for approval.

6.4.4 Resolve review comments, document resolution, and update the software documentation as necessary.

6.5 Testing

NOTE

During the Testing phase, the design as implemented in code is exercised by executing test cases. Testing validates that the code meets requirements and produces correct results.

The Testing phase and Installation and Checkout phase (Subsection 6.6) may be combined.

6.5.1 Develop (finalize) test plans and test cases, based on the design or other pertinent technical bases.

Acceptable test methods consist of:

- Hand calculations
- Calculations using comparable proven problems
- Empirical data and information from confirmed published data and correlations or technical literature
- Comparison with other validated software of similar purpose
- Manual inspections or qualitative checks not involving numerical manipulation (examples include visual inspection of database reformatting or data plotting)

- 6.5.2 If it is not feasible to validate the software through testing per this section, perform and document a peer review to validate the software.
- 6.5.3 Ensure that the testing will demonstrate that:
- The software requirements are met, including capabilities and limitations specified in the software documentation.
 - The software produces correct results for the test cases, over the range of anticipated use and the range of operation of controlled processes.
 - The software will satisfactorily perform its intended functions and not perform any unintended undesirable functions.
- 6.5.4 Specify the following in the test plan, as applicable:
- Required tests and test sequence
 - Required ranges of input parameters
 - Identification of the stages at which testing is required
 - Criteria for establishing test cases
 - Requirements for testing logic branches
 - Requirements for hardware integration and system software
 - Anticipated output values
 - Acceptance criteria
- 6.5.5 Include regression testing as necessary to detect errors or unintended adverse effects caused by modifications, and to verify that modified systems or components meet requirements.
- 6.5.6 Submit the Test Plan to the following for approval:
- Cognizant Manager
 - QA
 - IRM if applicable per Subsection 3.8

NOTE

Validation testing shall be performed by individuals who did not design or code the software. (See Subsection 3.7, Verification and Validation, for additional detail.)

- 6.5.7 Tester, perform the approved test plan and test cases.
- 6.5.8 If the test is not successful, then:
- [A] Determine the cause of problems, working with the developer if necessary.
 - [B] Review the requirements, design, implementation, test plans, test cases, and test results to determine what modifications are needed.
 - [C] Repeat the applicable steps of Section 6.0 to correct any problems.
 - [D] Retest. Include regression testing as necessary to detect errors or unintended adverse effects caused by modifications, and to verify that modified systems or components meet requirements.
- 6.5.9 Ensure that the following is included in the test documentation:
- Name of the software program
 - Hardware and operating system used for the test
 - Test equipment and calibration due dates, if applicable
 - Simulation models used, if applicable
 - Test cases/problems used
 - Results and acceptability
 - Actions taken in connection with any deviations
 - Name and signature of the tester
 - Name and signature of the person evaluating the results
 - Date

NOTE

Verification reviews shall be performed by individuals who did not design the software. (See Subsection 3.7, Verification and Validation, for additional detail.)

- 6.5.10 Reviewer, perform the verification review of the Testing phase activities.

[A] Verify that the test criteria and expected results have been met, and the prescribed software development documentation has been completed and meets the applicable requirements of this procedure.

[B] Document the review. Include the following:

- Results of the review
- Comments, if applicable
- The reviewer's name, signature, and date

No format is specified. The Software Test Documentation Review Checklist (EA16-2-10-0) may be used.

[C] Submit the review documentation to the Cognizant Manager for approval.

6.5.11 Resolve review comments, document resolution, and update the software documentation as necessary.

6.5.12 Submit the test documentation to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

6.6 Installation and Checkout

NOTE

During installation and checkout, software becomes part of a system consisting of applicable software components, hardware, and data. The process of integrating the software with applicable components may consist of installing both hardware and software, converting or creating databases, and verifying that all components of the system have been included in the installation.

The Testing phase (Subsection 6.5) and Installation and Checkout phase may be combined.

6.6.1 Develop and execute a test plan and test problems that demonstrate that the software will satisfactorily perform its intended functions in its operating environment.

6.6.2 Perform installation and checkout testing for each system that the software is installed on.

- 6.6.3 Verify that user documentation meets the requirements of Subsection 3.4, User Documentation. The Software User Documentation Review Checklist (EA16-2-11-0) may be used.
- 6.6.4 Determine controls necessary to permit authorized and prevent unauthorized access to software that has been accepted in accordance with this section, and document on the Software Installation and Checkout Form (EA16-2-3-0).
- 6.6.5 Compile the software documentation package and complete the Software Installation and Checkout Form (EA16-2-3-0). Each system that the software is installed on shall be documented; more than one system/installation may be documented on an individual form.

The software package shall include or reference (documents maintained elsewhere, e.g., site procedures) the following (or equivalent; see Subsection 3.3, Life Cycle Documentation):

- Software Screening Checklist (EA16-2-1-0)
- SQAP (or)
- Software Quality Assurance Elements Checklist (EA16-2-2-0)
- Requirements Document
- V&V Plan
- Design Document
- Implementation Document (code)
- Test documentation
- V&V documentation (including verification reviews/comments)
- User documentation
- Software Installation and Checkout Form (EA16-2-3-0)
- Supporting documentation, if applicable

NOTE

Verification reviews shall be performed by individuals who did not design the software. (See Subsection 3.7, Verification and Validation, for additional detail.)

6.6.6 Reviewer, perform the verification review of the Installation and Checkout phase activities.

[A] Verify that the software baseline has been established. The software baseline includes the required documentation, and the documented hardware, system software, and application software components.

[B] Document the review on the Software Installation and Checkout Form (EA16-2-3-0). Include the following:

- Results of the review
- Comments, if applicable
- The reviewer's name, signature, and date

The reviewer's signature without comments indicates acceptance.

6.6.7 Resolve review comments, document resolution, and update the software documentation as necessary.

6.6.8 Submit the Software Installation and Checkout Form (EA16-2-3-0) with the software package to the following for approval:

- Cognizant Manager
- QA
- IRM if applicable per Subsection 3.8

Completion of this step constitutes approval of the software for operational use.

6.7 Maintain the software package under configuration control per Subsection 3.6. This constitutes the approved software configuration baseline, which includes the required documentation, and the documented hardware, system software, and application software components.

7.0 OPERATIONS AND MAINTENANCE

7.1 Operation

7.1.1 Ensure that software is approved and configuration controls are in place before using the software.

- 7.1.2 Provide user documentation and other documentation as needed to designated users.
- 7.1.3 Implement training as required.
- 7.1.4 Operate software per the user documentation.
- 7.1.5 Maintain software to:
- Remove latent errors (corrective maintenance)
 - Respond to new or revised requirements (perfective maintenance)
 - Adapt the software to changes in the operating environment (adaptive maintenance)
- 7.1.6 Prescribe and perform periodic in-use manual or automatic self-check routines for software for which computer failure or electronic drift can affect required outcomes. This may be handled through the M&TE (measuring and test equipment) program, if applicable.

7.2 Changes to Controlled Software

NOTE

Revisions, new versions, updates, modifications, and other changes to approved software shall be processed per the applicable sections of this procedure. Such changes shall follow the same process as the original software; however, some documentation may not need to be generated if the original documentation (e.g., the original SQAP) is still valid. Such documentation shall be updated as necessary to reflect the changed software.

- 7.2.1 If an update to software is received, repeat the applicable section as necessary.
- 7.2.2 If a specific application using generally available software (macro, spreadsheet, etc.) is changed, repeat Section 4.0.
- 7.2.3 If software is modified (except macro-type software per Section 4.0), perform the following:
- [A] If applicable to engineering processes per WP 09, Engineering Conduct of Operations, control modifications using the Engineering Change Order per WP 09-CN3007.

- [B] Verify that required life cycle documentation is on file and adequate per Section 6.0.
 - [C] Repeat applicable steps as necessary to update the software's documentation.
 - [D] Document the following:
 - Change details
 - Rationale for the change
 - Affected configuration baseline items
 - [E] Perform and control the modification per Section 6.0, as applicable.
 - [F] Perform Installation and Checkout per Section 6.0. Documentation applicable to the modification shall be included with the Software Installation and Checkout Form.
 - [G] Notify users and affected organizations/individuals of the changes.
- 7.2.4 If the software is installed on a different computer, or significant hardware or system software configuration changes are made, perform the following:
- [A] Perform and document in-use testing to verify that the software still meets its required functions. Testing shall be performed by someone technically competent in the use of the software.
 - [B] Update the affected documentation as necessary.
 - [C] Complete the Software Installation and Checkout Form (EA16-2-3-0).
 - [D] Submit the Software Installation and Checkout Form (EA16-2-3-0) with supporting documentation to the following for approval:
 - Cognizant Manager
 - QA
 - IRM if applicable per Subsection 3.8
- 7.2.5 If any information reflected in the Controlled Software Log is changed, notify QA in writing. (The Controlled Software Log is maintained at <http://bellview/wqnra/sqa/csl.pdf>.)

7.3 Problem Reporting and Corrective Action

NOTE

Software problems (e.g., errors, faults, failures) discovered in approved software shall be reported and corrected per the following steps. Problems may be reported by anyone; the software custodian or sponsoring organization is responsible for ensuring that the evaluation and corrective actions are completed. In lieu of following these steps, the software custodian or sponsoring organization may establish and maintain a system which meets the software problem reporting and corrective action requirements of the WTS QAPD, Section 6.8.

- 7.3.1 Document software problems on a Software Problem Report (EA16-2-4-0) (SPR). (The SPR # is optional and should be marked "N/A" if not used.)
- 7.3.2 Document the following on a WIPP Form (EA04IM1000-1-0) per WP 04-IM1000, Issues Management Processing of WIPP Forms, or a Nonconformance Report (EA13QA3004-1-0) per WP 13-QA3004, Nonconformance Report:
- Conditions adverse to quality
 - Other problems as appropriate (e.g., recurring or severe problems, problems which cannot be resolved per this section, or other problems needing disposition through the site corrective action program)
- 7.3.3 Classify problems as follows and record on the SPR:
- Major – could result in incorrect results or failure of the software to perform its function as required
 - Minor – deviations from expected results that do not significantly affect the performance or output of the software
- 7.3.4 Notify potentially affected organizations and users.
- 7.3.5 Report software errors to the supplier.
- 7.3.6 Enter items requiring tracking into the site Commitment Tracking System.
- 7.3.7 Evaluate the problem and correct the software as needed per the applicable section of this procedure.

- 7.3.8 Evaluate the effect of the problem on work performed using the software which contains the problem and perform necessary corrective actions.
- 7.3.9 Document the evaluation and corrective actions on the SPR.
- 7.3.10 Submit the SPR with supporting documentation to the following for approval:
- Cognizant Manager
 - QA
 - IRM if applicable per Subsection 3.8
- 7.3.11 Notify affected organizations and users of the evaluation results and corrective actions taken or required.
- 7.3.12 Maintain SPRs and related documentation with the software package as part of the configuration baseline.
- 7.3.13 Distribute SPRs and related documentation as appropriate for use in process improvement and to prevent recurrence of errors.

8.0 RETIREMENT

NOTE

This section shall be performed to retire software which meets the following criteria:

- The software is no longer used, or has been superseded.
- The software is not required for archival purposes, by any other procedure or document (e.g., to continue to access data in a certain format, unique to the particular software in question).

Upon retirement, user support for a software product is terminated.

- 8.1 Physically remove the software from computers on which it was used.
- 8.1.1 If not practical to remove the software, develop alternate methods to prevent use of the software.
- 8.2 Update affected procedures or other documents which address use of the software.
- 8.3 Notify QA in writing of the disposition of the software.
- 8.4 QA, remove the software from the Controlled Software Log.

Attachment 1 – Acronyms and Definitions

Attachment 1 – Acronyms and Definitions

ACRONYMS

| | |
|-------|--|
| ASME | American Society of Mechanical Engineers |
| BIOS | basic input/output system |
| CBFO | Carlsbad Field Office |
| CCP | Central Characterization Project |
| COTS | commercial off-the-shelf |
| DOE | U.S. Department of Energy |
| EDI | electronic data interface/interchange |
| EFR | Engineering File Room |
| EPROM | erasable programmable read only memory |
| IEEE | Institute of Electrical and Electronics Engineers, Inc |
| IRM | Information Resource Management |
| M&TE | measuring and test equipment |
| MS | Microsoft |
| NQA | Nuclear Quality Assurance |
| PROM | programmable read only memory |
| QA | Quality Assurance |
| QAPD | Quality Assurance Program Description (WTS); Quality Assurance Program Document (CBFO) |
| SPR | Software Problem Report |
| SQA | software quality assurance |
| SQAP | Software Quality Assurance Plan |
| SSC | structure, system, or component |
| V&V | verification and validation |
| WIPP | Waste Isolation Pilot Plant |
| WTS | Washington TRU Solutions LLC |

Attachment 1 – Acronyms and Definitions

DEFINITIONS

Black box: A system or component whose inputs, outputs, and general function are known but whose contents or implementation are unknown or irrelevant.
(IEEE Std 610.12-1990)

Configuration baseline: Software that has been formally reviewed and agreed upon, and that can only be changed through formal change control procedures. The baseline includes all approved components of the software development cycle.

Firmware: Software which is loaded onto a PROM (programmable read only memory), or similar device, by a manufacturer (not WTS) and which is not normally accessible by the user, nor intended to be modified by the user, and is embedded in equipment or a device that is tested or calibrated by other well-defined methods. Examples include software embedded in measuring devices (e.g., multimeter), BIOS software in a personal computer, or similar items. Such software is not covered by this procedure. However, software that is developed for or by WTS that is intended to be "burned" onto an EPROM (erasable programmable read only memory) or similar device must follow the requirements of this procedure.

Installation and checkout: During installation and checkout, software becomes part of a system consisting of applicable software components, hardware, and data. The process of integrating the software with applicable components may consist of installing both hardware and software, converting or creating databases, and verifying that all components of the system have been included in the installation.

Regression testing: Selective testing to detect errors introduced during the modification of systems or system components, to verify that the modifications have not caused unintended adverse effects, or to verify that modified systems or system components still meet specified requirements.

Safety Software includes the following:

1. Safety System Software - software that performs a safety function as part of a structure, system, or component and is cited in either (a) a Documented Safety Analysis, or (b) an approved hazard analysis.
2. Safety and Hazard Analysis Software and Design Software - software that is used to classify, design, or analyze nuclear facilities. This software is not part of a structure, system, or component (SSC), but helps to ensure the proper accident or hazards analysis of nuclear facilities or an SSC that performs a safety function.

Attachment 1 – Acronyms and Definitions

3. Safety Management and Administrative Controls Software - software that performs a hazard control function in support of nuclear facility or radiological safety management programs or technical safety requirements or other software that performs a control function necessary to provide adequate protection from nuclear facility or radiological hazards. This software supports eliminating, limiting, or mitigating nuclear hazards to workers, the public, or the environment.

Software: Computer programs, procedures, rules, and associated documentation and data pertaining to the operation of a computer system. In this procedure, "software" may also refer to a specific application developed using site standard or other systems software. This includes Excel spreadsheets, macros, Access databases, detailed formulas, and similar applications.

Validation: Testing and evaluation of completed software to verify that the software meets its requirements. Software validation is primarily a formal testing activity that is performed prior to installation and checkout. It is used to demonstrate that the computational model embodied in the software is an acceptable representation of the process or system for which it is intended and that the software produces correct solutions within defined limits for each parameter employed.

Verification: The process of determining whether or not the product of a given phase of the software development cycle fulfills the requirements imposed by the previous phase.

WP 09-CN3031

Revision 3

Engineering Calculations

Management Control Procedure

EFFECTIVE DATE: 05/26/05

John Garcia
APPROVED FOR USE

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INTRODUCTION ¹

This procedure establishes requirements for preparing and documenting engineering calculations that support new engineering designs or modifications to existing Waste Isolation Pilot Plant (WIPP) Structures, Systems, and Components (SSCs). This procedure also applies to temporary modifications that impact or interface with permanent SSCs or where calculations are needed to support data analysis. Calculations may be used to support design requirements and as a method of design verification. Computer programs used for design calculations are to be validated prior to initial use. Computer programs may be utilized for design analysis without individual verification of the program for each application, provided that the program has been shown to produce valid solutions for the particular analysis.

Records generated by the performance of this procedure are as follows:

- EA09CN3031-1-0 - Calculation Sheet
- EA09CN3031-2-0 - Calculation Cover Sheet

REFERENCES

BASELINE DOCUMENTS

- WP 13-1, Washington TRU Solutions LLC Quality Assurance Program Description

REFERENCED DOCUMENTS

- WP 16-2, Software Screening and Action Plan
- WP 09-CN3007, Engineering and Design Document Preparation and Change Control

PERFORMANCE

1.0 CALCULATIONS FOR NEW DESIGNS OR MODIFICATIONS TO WIPP SSCS

1.1 Cognizant Engineer (CE), or author, perform the following:

- 1.1.1 Perform calculations for new designs or modifications where calculations support the design, using EA09CN3031-1-0 (see Attachment 1 for an example) or equivalent. Examples: structural loading, instrument and alarm setpoints, relay setpoints.

1.1.2 Document the following, as applicable, using EA09CN3031-2-0 (see Attachment 2 for an example) or equivalent:

- Assumptions and bases of assumptions
- Source of data
- References for formula(s) used
- Drawing references

1.1.3 Ensure computer programs that are developed and/or used for design calculations or analysis are validated in accordance with WP 16-2 prior to use for design verification or validation.

NOTE

When the CE is the author, the calculations are independently checked by an individual or individuals competent in the design method.

1.2 CE, design reviewer, or checker, perform the following:

- 1.2.1 Confirm applicable analytical models and methods.
- 1.2.2 Confirm reasonableness and adequacy of inputs and assumptions.
- 1.2.3 Check calculations for accuracy.
- 1.2.4 Resolve calculation issues with the author.
- 1.2.5 Forward checked EA09CN3031-1-0 and EA09CN3031-2-0 to the Cognizant Manager (CM) for approval signature.

1.3 CM, perform the following:

- 1.3.1 **IF** NOT approving the calculations,
THEN resolve calculation issues with the CE.
- 1.3.2 **WHEN** approving the calculations,
THEN sign the completed EA09CN3031-1-0 and EA09CN3031-2-0.
- 1.3.3 Return the completed EA09CN3031-1-0 and EA09CN3031-2-0 to the CE.

1.4 CE, forward completed, checked, and approved EA09CN3031-1-0 and EA09CN3031-2-0 to Engineering File Room (EFR) with the originating Engineering Change Order (ECO) in accordance with WP 09-CN3007.

2.0 REVISIONS TO APPROVED CALCULATIONS

2.1 Author of a revision to an approved calculation, perform the following:

2.1.1 Obtain a copy of the calculation to be revised from the EFR.

2.1.2 Make the necessary changes to a calculation and add the next sequential revision number to the calculation cover sheet (EA09CN3031-2-0 or equivalent).

2.1.3 Obtain the necessary review and approval per Section 1.0.

2.1.4 Submit the revised calculation to the EFR with the originating ECO in accordance with WP 09-CN3007.

Attachment 1 - Example Calculation Sheet

Working Copy

Calculation Sheet

| | | | | | | |
|---------------------------|-----------------|------------|---------------|------|----------------|------|
| 1. Title | | 2. Page of | | | | |
| 3. Input and Assumptions: | | | | | | |
| 4. Calculations: | | | | | | |
| 5. Rev. No. | 6. CE or Author | Date | 7. Checked By | Date | 8. CM Approval | Date |

Attachment 2 - Example Calculation Cover Sheet

Working Copy

Calculation Cover Sheet

| | | | | | |
|------------------------------|---------------|------------|-------------|-------------|-------------------------------|
| 1. Calculation Title: | | | | 2. Page: of | |
| 3. System: | | 4. AR No.: | | 5. ECO No.: | 6. Functional Classification: |
| 7. SOURCE OF DATA | | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 8. SOURCE OF FORMULAS | | | | | |
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 9. REFERENCES | | | | | |
| No. | Drawing No. | Rev. No. | No. | Drawing No. | Rev. No. |
| 1. | | | 6. | | |
| 2. | | | 7. | | |
| 3. | | | 8. | | |
| 4. | | | 9. | | |
| 5. | | | 10. | | |
| 10. RECORD OF ISSUES | | | | | |
| Rev. No. | CE or Author: | Date: | Checked By: | Date: | CM Approval: |
| | | | | | |
| | | | | | |
| | | | | | |
| 11. COMMENTS | | | | | |
| | | | | | |

WP 02-RC1108

Revision 10

Review of Visual Examination Records for TRU Waste Confirmation

Technical Procedure

EFFECTIVE DATE: 08/12/11

R. R. Chavez
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|--|
| 7 | 06/30/10 | Document updated for Class 2 modification changes. |
| 8 | 12/29/10 | Incorporate permit-related changes. Added references for the two new EAs. Step 1.1.3 changed packaging type. Added information in document for appropriate use of the two new EAs. Changed PMR to PCR throughout document. |
| 9 | 06/15/11 | Baseline References: Added DOE/LLW-217 Deleted WP 02RC.12 and WP 02-RC1107 moved to Referenced Documents Changed Project Manager to Program Manager throughout procedure. Added last bullet under Precautions and Limitations: Any qualified PCR that did not Operate or ITR the shipment may confirm the shipment. Deleted Note above Step 1.1 Deleted "or designee" after PCR in procedure. Step 1.1.3 moved to second bullet under Step 1.2. Deleted Note above new Step 1.1.3. Step 1.1.3 deleted the EAs and added "as applicable." Step 1.2 first bullet added "generator", deleted "completeness and" added "containers elected for confirmation, and deleted rest of sentence. Last bullet added "container" and "associated WSPF(s)". Step 1.2.1 Added last part of sentence from "...if applicable.." Step 1.2.4 added "absence of the" Second bullet added "Observable" at beginning and "at the time of VE" and deleted it from after the parenthesis. Step 1.2.5 changed determine if to confirm Step 1.2.12 deleted last two EA references Step 1.3 changed package to packet and deleted rest of sentence after "following" |

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|-----------------|-------------|---|
| | | <p>(d) Added "initial the ITR section of EA02RC1102-1-0 and EA02RC1102-2-0.</p> <p>Added Step 1.3.1 for ITR concurrence.</p> <p>Added bullet under Step 1.3.2 for the PCR review concerns.</p> <p>Deleted Step 1.4 for PCR review of WWIS. Deleted Step 1.4.1.</p> <p>New numbered Step 1.4 added "review the data packet and" after PCR.</p> <p>Deleted Note and old Step 1.6 for Created By information.</p> <p>Step 1.5 added "and obtain and complete EA02RC1102-3-0."</p> <p>Step 1.6 added to end of sentence "Designee for DOE management representative review."</p> <p>Added Note (previously old Step 1.9) for PCR not approve any waste shipment until DOE approval and any qualified PCR that did not Operate or ITR may confirm shipment.</p> <p>Step 1.7 added verification of no change to shipments.</p> <p>Added Step 1.7.1 for if payloads have changed.</p> <p>Added Step 1.8 for notify generator/storage site that confirmation process is complete.</p> |
| 10 | 08/12/11 | <p>Added reference to DOE/WIPP-09-3427</p> <p>Clarified step 1.1.1 that the daily listing will be selected via the TRU Waste Confirmation Module Report in the WDS</p> |

INTRODUCTION^{1,2}

This procedure provides instructions for the review of generator/storage site visual examination (VE) audio/video tapes or recording media and/or VE data forms. This procedure has been prepared to meet the Hazardous Waste Facility Permit (HWFP) requirement for confirmation of certified waste prior to shipment to the Waste Isolation Pilot Plant (WIPP) from the generator/storage sites.

Performance of this procedure generates the following record(s). Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- EA02RC1102-1-0, TRU Waste Confirmation (RTR/VE) Approval Form
- EA02RC1102-2-0, TRU Waste Confirmation ITR Review Checklist
- EA02RC1102-3-0, TRU Waste Confirmation PCR Review Checklist

REFERENCES

BASELINE DOCUMENTS

- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- DOE/LLW-217, *DOE Waste Treatability Group Guidance*
- DOE/WIPP-09-3427, *Waste Data System User's Manual*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*
- AMWTP-INST-FOI-17, *Facility Visual Examination Operations*
- AMWTP-INST-FOI-34, *Non-Facility Visual Examination Operations*
- CCP-TP-006, *CCP Visual Examination Technique for Idaho National Laboratory (INL) Newly Generated TRU Waste Retrieved from Pits*
- CCP-TP-113, *CCP Standard Contact Handled Waste Visual Examination*
- CCP-TP-500, *CCP Remote-Handled Waste Visual Examination*

REFERENCED DOCUMENTS

- WP 02-RC.12, *Qualification of Personnel Performing Visual Examination for TRU Waste Confirmation*
- WP 02-RC1105, *Electronic Notification, Container Selection, and Data Entry for TRU Waste Confirmation*
- WP 02-RC1107, *Management of Nonconforming Waste Identified During TRU Waste Confirmation*
- EA02RC1102-1-0, *TRU Waste Confirmation (RTR/VE) Approval Form*
- EA02RC1102-2-0, *TRU Waste Confirmation ITR Review Checklist*
- EA02RC1102-3-0, *TRU Waste Confirmation PCR Review Checklist*

PRECAUTIONS AND LIMITATIONS

- Personnel performing the review under this procedure shall be qualified as a Level 1 and/or Level 2 VE Operator in accordance with WP 02-RC.12.
- The Permittees Confirmation Representative (PCR) must be trained to the requirements of a Level 1 or 2.
- The PCR, the Operator (OP), and the Independent Technical Review (ITR) functions will not be performed by the same person during waste confirmation of any container.
- Any qualified PCR that did not Operate or ITR the shipment may confirm the shipment.

PERFORMANCE

1.0 REVIEW OF VE MEDIA AND/OR DATA

1.1 PCR, perform the following:

- 1.1.1 Obtain a daily listing of 7% of certified waste containers in each waste stream shipment which have been randomly selected via the TRU Waste Confirmation Module Report in the Waste Data System (WDS) for waste confirmation as described in WP 02-RC1105.
- 1.1.2 Contact each generator/storage site whose certified containers have been selected and obtain the VE media and/or data forms (Batch Data Reports) and Nonconformance Reports, if applicable, for those containers.

NOTE

EA02RC1102-1-0 will be completed for each waste stream and EA02RC1102-2-0 and EA02RC1102-3-0 will be completed on each shipment.

- 1.1.3 Forward the VE media (if applicable) and data sheets to the Operator (OP) for confirmation, as applicable.
- 1.2 Operator, perform the confirmation as follows:
- Access and verify generator VE container media and/or data sheets (including Nonconformance Reports, if applicable) to assure the container media and/or data correspond with those containers selected for confirmation.
 - Obtain form EA02RC1102-1-0 and document the following:
 - Shipment as Contact-Handled (CH) or Remote-Handled (RH).
 - Packaging Type (RH TRU 72-B Cask, TRUPACT II, or HalfPACT) for shipment, if applicable.
 - Procedure Number to be used (e.g., WP 02-RC1108 and/or WP 02-RC1102).
 - Generator/Storage Site.
 - Shipment Number.
 - Waste Stream Profile Number.
 - Shipping Container Type (e.g., SWB, TDOP, 100-gallon, 85-gallon, RH canister).
 - Shipping Container Number, if applicable.
 - Payload Identification (ID) Number(s).
 - Individual Waste Container Number(s).
 - Batch ID Number(s).
 - Media ID Number(s), if applicable.
 - Complete "Date Reviewed" column for each container on EA02RC1102-1-0.

- Verify Hazardous Waste Numbers listed on the container data report(s) and associated WSPF(s) are acceptable at the WIPP per Table C-9 in the HWFP, and record on EA02RC1102-1-0.

NOTE

Lighting should be comfortable for viewing of the monitor, minimizing glare and eye strain.

- 1.2.1 Position the monitor to allow direct viewing of the media at a comfortable distance from the monitor, if applicable, if NO media is associated for review, proceed to Step 1.2.3.
- 1.2.2 When VE video/audio media are reviewed, ensure that the following minimum requirements are met:
 - The video/audio media shall record the waste packaging event for the container such that all waste items placed into the container are recorded in sufficient detail that a trained Permittee VE Operator can determine what the waste items are and their associated waste material parameter.
 - The video/audio media shall capture the waste container identification number.
 - The personnel loading the waste container shall be identified on the video/audio media or on packaging records traceable to the loading of the waste container.
 - The date of loading of the waste container will be recorded on the video/audio media or on packaging records traceable to the loading of the waste container.
- 1.2.3 When VE forms or packaging records are reviewed, ensure the following are met:
 - When audio/video media is not used, at least two generator site personnel who witnessed the packaging shall approve the data forms or packaging logs attesting to the contents of the waste container.
 - The data forms or packaging records shall contain an inventory of waste items in sufficient detail that a trained Permittee VE Operator can identify the associated waste material parameters.
 - The waste container identification number shall be recorded on the data forms or packaging records.

NOTE

The prohibition for observable liquid is:

- Observable liquid shall be less than 1 percent by volume of the outermost container at time of VE.
 - Internal containers with more than 60 milliliters or 3 percent by volume observable liquid, whichever is greater, are prohibited.
 - Containers with Hazardous Waste Number U134 assigned shall have no observable liquid.
 - Overpacking the outermost container that was examined during VE or redistributing untreated liquid within the container shall not be used to meet the liquid volume limits.
-

1.2.4 Examine the VE media and/or data records for the absence of the following unacceptable conditions in those selected containers and record on EA02RC1102-1-0:

- Unvented compressed gas containers (e.g., unpunctured aerosol cans)
- Observable liquid content equal to or greater than 1 percent of volume of the outermost container at the time of VE (e.g., 55-gallon drum or SWB) (Payload containers with Hazardous Waste Number U134 assigned shall have **NO** observable liquid.)
- Internal containers with greater than 60 milliliters or 3 percent volume of observable liquid, whichever is greater.

1.2.5 Examine the VE media and/or data records to confirm the physical form (Summary Category Group) of the waste is consistent with the waste stream description and the Waste Matrix Code (debris, homogenous solids, and soil/gravel) documented on the Waste Stream Profile Form (WSPF), and record on EA02RC1102-1-0.

1.2.6 Examine Nonconformance Report(s) to determine if they have been dispositioned in accordance with WP 13-1 (QAPD) and record on EA02RC1102-1-0.

1.2.7 Verify VE data sheets and, if applicable, media are complete and accurate, then record on EA02RC1102-1-0.

- 1.2.8 Document notification of rejected containers, if applicable, in the "Notes" section of EA02RC1102-1-0, STOP WORK, and notify PCR and proceed as directed.
- 1.2.9 Initial the OP section on EA02RC1102-1-0 after each container is reviewed.
- 1.2.10 Verify the following is complete and accurate on EA02RC1102-1-0:
- All required information is entered.
 - All unused blocks are marked "N/A," or lined through, if applicable.
- 1.2.11 Print name, sign, and date the "OP Reviewed by" section of EA02RC1102-1-0.
- 1.2.12 Forward the following to the Independent Technical Reviewer (ITR) to begin the review process:
- All associated reports/media
 - EA02RC1102-1-0

NOTE

Each container selected for confirmation will undergo an ITR. The VE media, if applicable, data packages, and all forms related to the selected containers will be forwarded to the ITR. The ITR will be performed by a qualified operator other than the original operator.

- 1.3 ITR, review the data packet for completeness, and ensure the following 0:
- [A] Ensure that data generation and reduction were conducted in a technically correct manner in accordance with the methods used.
- [B] Ensure that data were reported in the proper units and numbers of significant figures.
- [C] Ensure that the media is complete, if applicable.
- [D] Ensure that the data have been reviewed for transcription errors.
- 1.3.1 ITR, if concurring, initial the ITR section of EA02RC1102-1-0, print name, sign, and date EA02RC1102-1-0 and obtain and complete EA02RC1102-2-0.

- 1.3.2 ITR, **IF** you do not concur,
THEN notify the PCR, and proceed as directed.
- The PCR will review ITR concerns and determine the appropriate path forward.
- 1.3.3 Forward EA02RC1102-1-0, EA02RC1102-2-0, and all associated reports/media to the PCR for review.

NOTE

The PCR review will be conducted by an individual who is **NOT** directly responsible for performing the original work or the ITR.

- 1.4 PCR, review the data packet and ensure the following:
- The data are technically reasonable based on the technique used.
 - The data have received independent technical review.
 - The data indicate that the waste examined contained no ignitable, corrosive, or reactive waste and that the physical form of the waste was consistent with the waste stream description in the WSPF.
 - The data meets the established Quality Assurance Objectives.
- 1.5 PCR, initial the PCR section of EA02RC1102-1-0, (verifying the data package is complete),
THEN print name, sign, and date EA02RC1102-1-0, and obtain and complete EA02RC1102-3-0 when data review is complete.
- 1.6 PCR, provide confirmation data package via email to a trained U.S. Department of Energy (DOE) National TRU Program Designee for DOE management representative review.

NOTE

PCR shall not approve any waste shipment until DOE approval is obtained.

Any qualified PCR that did not Operate or ITR the shipment may confirm the shipment.

- 1.7 PCR, once the DOE Management Representative review is complete, verify the shipment payloads have not changed and print name, sign and date EA02RC1102-3-0.
- 1.7.1 **IF** the payloads have changed,
THEN notify Idaho Site Manager and/or Confirmation Program Manager, and proceed as directed.

- 1.8 PCR, confirm the shipment and notify the generator/storage site that the confirmation process is complete and the waste can be shipped to the WIPP site.

NOTE

VE media containing Classified Waste Containers will be reviewed at, and retained by, the generator site or predetermined secure location. VE data forms or packaging records shall not contain classified information.

NOTE

The waste confirmation data includes VE data forms, video/audio media, review checklist, random selection of containers, and applicable Nonconformance Report(s).

- 1.9 PCR, transfer all VE media and associated data sheets supplied by the generator/storage site as well as all data forms to the records coordinator or designee, to be placed in the WIPP Operating Record as non-permanent records after the shipment has been received at the WIPP.

WP 02-RC1107

Revision 6

Management of Nonconforming Waste Identified During TRU Waste Confirmation

Technical Procedure

EFFECTIVE DATE: 06/15/11

R. R. Chavez
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|---|
| 4 | 06/30/10 | Document updated for Class 2 modification changes. Added section on Verification of Disposition of Nonconformance Reports. |
| 5 | 12/29/10 | Incorporated permit-related changes. Added reference for CBFO MP 3.4. Step 1.3 added notify Regulatory Compliance Dept. Mgr. first then General Manager and CBFO Mgr. Step 2.3 added reference and changed for CBFO MP 3.4. Deleted Note and Steps 2.4 and 2.5. Changed PMR to PCR throughout document. |
| 6 | 06/15/11 | Changed Confirmation Program Manager to Idaho Site Manager in procedure and Project Manager to Program Manager throughout procedure. |

INTRODUCTION^{1, 2}

This document details the steps that must be taken if the results of transuranic (TRU) waste confirmation indicate that a container does not conform to the waste confirmation requirements specified in the Hazardous Waste Facility Permit (HWFP) for the Waste Isolation Pilot Plant (WIPP).

The nonconformances applicable to this procedure include containers found to contain ignitable, corrosive, or reactive waste, or wastes with observable liquid in excess of TSDF-WAC (Treatment, Storage, and Disposal Facility/Waste Acceptance Criteria) limits; or compressed gases; or when the physical form, or Waste Matrix Code of the waste does not meet the physical form and Waste Matrix Code as described by the generator/storage site, or assigned Nonconformance Report(s) have not been dispositioned. The physical form can be S3000, homogeneous solids, or S4000, soil/gravel, or S5000, debris. The Waste Matrix Code is assigned by the generator/storage site based on the physical form of the waste.

Nonconformances are identified when performing confirmation activities per WP 02-RC1101, WP 02-RC1102, WP 02-RC1103, and WP 02-RC1108.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Notification of Nonconformance

REFERENCES

BASELINE DOCUMENTS

- Hazardous Waste Facility Permit, EPA Identification No. NM489039088
- DOE/CBFO-94-1012, *U.S. Department of Energy, Carlsbad Field Office, Quality Assurance Program Document (QAPD)*
- DOE/WIPP 02-3122, *Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*
- WP 02-RC.13, *Conduct of Operations for TRU Waste Confirmation*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*

REFERENCED DOCUMENTS

- WP 02-RC.11, *Qualification and Certification of Personnel Performing Radiography for TRU Waste Confirmation*

- WP 02-RC.12, *Qualification of Personnel Performing Visual Examination for TRU Waste Confirmation*
- WP 02-RC1101, *Visual Examination for TRU Waste Confirmation*
- WP 02-RC1102, *Review of Radiography Media for TRU Waste Confirmation*
- WP 02-RC1103, *Radiography Inspection Operating Procedure for TRU Waste Confirmation*
- WP 02-RC1108, *Review of Visual Examination Records for TRU Waste Confirmation*
- EA02RC1102-1-0, *TRU Waste Confirmation (RTR/VE) Approval Form*
- CBFO MP 3.4, *CBFO Manager Actions Upon Notification of Potential Noncompliant Waste Identified During the Waste Confirmation Process*

PRECAUTIONS AND LIMITATIONS

- Personnel performing the Real-Time Radiography (RTR) review under this procedure shall be qualified as a RTR/Nondestructive Examination (NDE) Level 1 and/or Level 2 in accordance with WP 02-RC.11.
- Personnel performing the Visual Examination (VE) review under this procedure shall be qualified as Level 1 and/or Level 2 VE Operator in accordance with WP 02-RC.12.
- The Permittees Confirmation Representative (PCR) must be trained to the requirements of NDE/VE Level 1 or 2.

PREREQUISITE ACTIONS

NONE

PERFORMANCE

1.0 VERIFICATION OF PHYSICAL FORM

- 1.1. Operator, **IF** during radiography, review of radiography records, VE, or review of VE records it is determined that the physical form or Waste Matrix Code of the waste is **NOT** the same as described by the generator/storage site on the Waste Stream Profile Form (WSPF), **THEN** document in the "Notes" Section on EA02RC1102-1-0 or "Comments" Section on Waste Visual Examination Data Sheet or Radiography Data Sheet, and notify the PCR immediately.

- 1.2. PCR, review the radiography or VE data.
 - 1.2.1. **IF** concurring with the operator,
THEN notify the Idaho Site Manager and/or the Confirmation Program Manager, and the generator/storage site point-of-contact immediately to inform them of the nonconformance.
- 1.3. Confirmation Program Manager, **IF** the nonconformance can NOT be resolved with the generator/storage site,
THEN notify Regulatory Compliance Department Manager,
THEN notify Washington TRU Solutions LLC (WTS) General Manager and the U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) Manager will be notified.
- 1.4. **IF** the Characterization Information Summary and/or WSPF require revision,
THEN suspend shipments of the affected waste stream, and shipments may not resume until the Permittees have reviewed and approved the revisions to the WSPF.
- 1.5. **IF** nonconformances occur more than once in a running 90-day period,
THEN suspend shipments from the offending generator/storage site.

2.0 VERIFICATION OF PROHIBITED ITEMS

- 2.1. Operator, **IF** during radiography, review of radiography records, VE, or review of VE records, it is determined that there are prohibited items in the waste container, STOP WORK,
THEN document in the "Notes" Section on EA02RC1102-1-0, or "Comments" Section on Waste Visual Examination Data Sheet or Radiography Data Sheet, and notify PCR immediately.
- 2.2. PCR will review the radiography or VE data.
 - 2.2.1. **IF** concurring with the operator,
THEN notify the Idaho Site Manager and/or the Confirmation Program Manager.
- 2.3. Confirmation Program Manager, contact the WTS General Manager and the DOE CBFO Manager to notify them of the potential noncompliant waste so they can take appropriate action per DOE Management Procedure MP 3.4.

3.0 VERIFICATION OF DISPOSITION OF NONCONFORMANCE REPORTS

- 3.1. Operator, **IF** during radiography, review of radiography records, VE, or review of VE records, it is determined that Nonconformance Report(s) have **NOT** been dispositioned,
THEN document in the "Notes" Section on EA02RC1102-1-0 or "Comments" Section on Waste Visual Examination Data Sheet or Radiography Data Sheet, and notify the PCR immediately.
- 3.2. PCR, review the radiography or VE data.
 - 3.2.1. **IF** concurring with the operator,
THEN notify the Idaho Site Manager and/or the Confirmation Program Manager and the generator/storage site point-of-contact immediately to inform them of the Nonconformance Report(s) **NOT** being dispositioned.

WP 02-RC1105

Revision 10

Electronic Notification, Container Selection, and Data Entry for TRU Waste Confirmation

Technical Procedure

EFFECTIVE DATE: 08/12/11

R. R. Chavez
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|---|
| 7 | 06/30/10 | Document updated for Class 2 modification changes. Updated references. |
| 8 | 12/29/10 | Document updated for permit-related changes. Change PMR to PCR throughout document. Added Step 1.16 for confirmation data package to DOE National TRU Program Designee. |
| 9 | 06/15/11 | <p>Added last bullet in Precautions and Limitations: Any qualified PCR that did not Operate, IO, or ITR the shipment may confirm the shipment.</p> <p>Prerequisite Actions 1.0 and 2.0 corrected titles.</p> <p>Deleted old Step 1.12.</p> <p>New Step 1.12 beginning changed to "If concurring, approve..."</p> <p>Deleted Note and Step 1.14 for after final date is entered into WWIS check payload.</p> <p>Added new Note and Step 1.16 for PCR shall not confirm any waste shipment until DOE approval and confirm payload and containers' numbers match in WWIS and SPM notified. Step 1.16 Once DOE approval is received check payload and containers' numbers verification for shipment.</p> <p>Added Note above Step 1.17 for PCR did not Operate, IO, or ITR may confirm shipment.</p> <p>Step 1.17 changed to "If there are no changes, confirm shipment in WWIS."</p> <p>Step 1.18 added Idaho Site Manager and changed "waste containers" to "the shipment."</p> |
| 10 | 08/12/11 | <p>Added Notes above step 1.3.</p> <p>Added new steps 1.3 to 1.7.</p> <p>Deleted steps 1.3 to 1.5.</p> |

INTRODUCTION ^{1, 2, 3, 4, 5}

This procedure describes the steps the waste confirmation team will use to determine which payload containers are included in a shipment, which waste containers are within those payload containers, and which waste containers have been randomly selected for transuranic (TRU) waste confirmation prior to shipment to the Waste Isolation Pilot Plant (WIPP). This procedure describes the process for performing those functions using the Waste Tracking System at the Idaho National Laboratory (INL) and the WIPP Waste Information System (WWIS) for all other generator/storage sites. The WWIS database is a subsystem of the Waste Data System (WDS).

Records generated by performance of this procedure are maintained as part of the WIPP Operating Record, and can include:

- Radiography and VE data forms
- Video/audio media
- Review checklist
- Random Selection of Containers (data)

REFERENCES

BASELINE DOCUMENTS

- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- DOE/WIPP-09-3427, *Waste Data System User's Manual*
- DOE/WIPP-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (TRU-WAC)*
- DOE/WIPP-01-3194, *TRU Waste Content Codes (TRUCON)*
- DOE/WIPP Eight Week Rolling Schedule
- AMWTP-INST-FOI-17, *Facility Visual Examination Operations*
- AMWTP-INST-FOI-34, *Non-Facility Visual Examination Operations*
- AMWTP-INST-OI-12, *Real Time Radiography Operations (Drum)*
- CCP-TP-113, *CCP standard Contact Handled Waste Visual Examination*
- CCP-TP-053, *Standard Real-Time Radiography (RTR) Inspection Procedure*
- WP 02-RC1101, *Visual Examination for TRU Waste Confirmation*

- WP 02-RC1102, *Review of Radiography Media for TRU Waste Confirmation*
- WP 02-RC1103, *Radiography Inspection Operating Procedure for TRU Waste Confirmation*
- WP 02-RC1108, *Review of Visual Examination Records for TRU Waste Confirmation*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*

PRECAUTIONS AND LIMITATIONS

- This procedure shall be performed by personnel qualified in appropriate procedures in the Waste Tracking System, and WWIS.
- The Permittees Confirmation Representative (PCR) must be trained to the requirements of Level 1 or 2 Nondestructive Examination (NDE) and Visual Examination (VE).
- The PCR, the Operator, the Independent Operator (IO) (if applicable), and the Independent Technical Review (ITR) functions will not be performed by the same person during TRU waste confirmation of any container.
- Any qualified PCR that did not Operate, IO, or ITR the shipment may confirm the shipment.

PREREQUISITE ACTIONS

NOTE

The WIPP WDS User's Manual (current revision) should be referred to for complete instructions to obtain access to the WWIS and instructions to obtain remote access to WIPPNet via the Internet. Instructions for completion of the WIPP Remote Access Request Form can be found in the WDS User's Manual.

- 1.0 Confirmation Program Manager and/or Idaho Confirmation Site Manager, perform the following:
 - 1.1 Determine which confirmation personnel will need access to the Waste Tracking System, and/or WWIS.
 - 1.2 Request access for each person and provide the following to the Waste Tracking System, and WWIS Data Administrator:
 - Full name
 - Mailing address
 - E-mail address

- Telephone and fax numbers
 - Organization
 - Title
 - Reason for access request
- 1.3 Notify the Waste Tracking System and/or WWIS Data Administrator of changes based on personnel:
- Leaving the project,
 - No longer needing access, or
 - Needing to change their type of access.
- 2.0 Confirmation Program Manager and/or Idaho Confirmation Site Manager, review the WIPP Eight Week Rolling Schedule and any updates and coordinate the container confirmation effort on an as-needed basis with the Idaho Shift Supervisors, Carlsbad Supervisor, and the PCR to ensure adherence to the shipping schedule and to facilitate on-time departure of each scheduled shipment from the generator/storage sites.

PERFORMANCE

1.0 PERMITTEE'S CONFIRMATION REPRESENTATIVE

PCR, perform the following:

- 1.1. Confirm that personnel performing TRU waste confirmation are trained and qualified.

NOTE

If using the AMWTP Waste Tracking System, the containers requiring confirmation will be identified in that system and the appropriate radiography or VE data will be reviewed.

- 1.2. Review the list of certified containers that have been assembled into a shipment submitted in the WWIS when the "Ready for Confirmation" e-mail is received for that shipment.

NOTE

Ten Drum Overpacks (TDOPs) may contain up to ten individual containers; 100-gallon drums may contain up to seven supercompacted pucks; 85-gallon drums may contain a 55-gallon drum; and standard waste boxes may contain up to four 55-gallon drums.

NOTE

Random Selection of at least 7% of each waste stream shipment shall be selected, a minimum of 1 container from each 14 containers in each waste stream in each designated shipment. If there are less than 14 containers from a waste stream a minimum of 1 container from the waste stream shipped will be selected.

NOTE

Selection for containers from each waste stream are as follows:
For 1-14 Containers 1 container shall be randomly selected
For 15-28 Containers 2 containers shall be randomly selected
For 29-42 Containers 3 containers shall be randomly selected

- 1.3. Access the Waste Data System Confirmation Dashboard.
- 1.4. Access Shipment information by selecting correct Shipment Number (e.g. IN1xxxx, LA1xxxx, SR1xxxx).
- 1.5. Ensure the TRU Waste Confirmation Module Report was not previously executed and is not valid.
- 1.6. Ensure correct Shipment Number is selected.
- 1.7. Execute Waste Confirmation Module.
- 1.8. Use the TRU Waste Confirmation Module Report in the Waste Data System (WDS) to determine which containers will undergo waste stream shipment confirmation.
- 1.9. Determine through the Waste Tracking System or WWIS whether the selected containers have radiography or VE data associated with their characterization.
- 1.10. Submit a daily list of these containers to the radiographers/VE personnel.
- 1.11. Provide the appropriate Site Program Manager (SPM) or Designee the waste stream and daily list of candidate containers for each shipment, if necessary.

NOTE

Generator/storage site records will be available in the Central Confirmation Team Records Center.

- 1.12. Direct radiographers/VE personnel on the confirmation team to perform confirmation on the appropriate container through real-time radiography (RTR), VE, review of RTR media, or review of VE media, and records.
-

NOTE

The PCR, the Operator, the IO (if applicable) and the ITR functions will not be performed by the same person during waste confirmation of any container.

- 1.13. If applicable, direct the IO to perform their reviews on two waste containers per shipment or two waste containers per day, whichever is less frequent.
- 1.14. Direct the Independent Technical Reviewer to perform their review on each container selected for TRU waste confirmation.
- 1.15. If concurring, approve confirmation data reports.
-

NOTE

Shipment status in the WWIS may be "reset" at the request of the generator site, for reasons such as road conditions, weather conditions, etc. These conditions may affect shipment departure dates from the generator sites.

- 1.16. **IF** a shipment has been rejected using the "reset" option in the WWIS, **THEN** ensure the Payload Identification Number (ID), Container ID, **AND** the appropriate waste stream(s) has not changed and confirm the shipment.
- 1.17. Serve as a focal point for resolution of data issues.
- 1.18. Once the confirmation process for a shipment is complete, PCR provide confirmation data package via email to the U.S. Department of Energy (DOE) National TRU Program Designee for DOE Management Representative for review.
-

NOTE

PCR shall not confirm any waste shipment until DOE approval is obtained.

Payload AND containers' numbers must match the shipment data entered into the WWIS or the shipment will be rejected and the SPM notified.

- 1.19. Once the DOE approval is received, check all payload AND containers' numbers to ensure that the same payloads and containers are those from which the random selection was used for the shipment.

NOTE

Any qualified PCR that did not Operate, IO, or ITR a shipment may confirm the shipment.

- 1.20. If there are no changes, confirm the shipment in WWIS.
- 1.21. Notify the Idaho Site Manager and Confirmation Program Manager of approval or rejection of the shipment.
- 1.22. Confirmation Program Manager, notify the Washington TRU Solutions LLC (WTS) General Manager and Carlsbad Field Office Manager of any rejected containers.

WP 02-RC1103

Revision 7

Radiography Inspection Operating Procedure for TRU Waste Confirmation

Technical Procedure

EFFECTIVE DATE: 06/15/11

R. R. Chavez
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|--|
| 5 | 06/30/10 | Updated document for Class 2 modification change. Added "for Waste Confirmation" to title of document. Added steps for completion of system checks and recording on Attachment 1. Added steps to record additional information to Attachment 2. |
| 6 | 12/29/10 | Updated document for permit-related changes. Deleted Hanford Referenced Documents. Changed PMR to PCR throughout document. Added Step 10.9 to email completed data package to DOE for review. Added Step 10.10 once DOE approves data package then waste can be shipped to the WIPP site. |
| 7 | 06/15/11 | Added late bullet to Precautions and Limitations for Any qualified PCR that did not Operate, IO, Replicate Scan, or ITR may confirm the shipment. Deleted "or designee" after PCR in procedure. Step 6.13 added "assigned to the waste stream" and "per Table C-9 in the HWFP" to the sentence. Added Note above Step 10.10 for PCR and shipment approvals and if PCR did not Operate, IO, Replicate Scan or ITR they may confirm shipment. Step 10.10 added to end of sentence "...verify the shipment payloads have not changed and print name, sign, and date Attachment 4. Added Step 10.10.1 for shipment payloads that have changed. Step 10.11 added to beginning of sentence "PCR, confirm the shipment and..." Attachment 4 added verification that shipments have not changed statement and signature line for PCR. |

INTRODUCTION ¹

This procedure describes the safe operation of a typical real-time radiography (RTR) system for drums. The RTR system is used to confirm that the physical form and Waste Matrix Code matches the waste stream description, and that there is an absence of prohibited items in the waste container.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules. All records will be maintained in the Waste Isolation Pilot Plant (WIPP) Operating Record.

- Attachment 1, Radiography Measurement Control Report
- Attachment 2, Radiography Data Sheet
- Attachment 3, Radiography Independent Technical Reviewer Checklist
- Attachment 4, Permittee's Confirmation Representative Checklist

REFERENCES

BASELINE DOCUMENTS

- DOE/CBFO-94-1012, *U.S. Department of Energy Carlsbad Field Office Quality Assurance Program Document (QAPD)*
- AMWTP-INST-OI-12, *Real Time Radiography Operations (Drum)*
- CCP-TP-053, *CCP Standard Real-Time Radiography (RTR) Inspection Procedure*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*

REFERENCED DOCUMENTS

- Title 40 Code of Federal Regulations (CFR) Part 261, Appendix VIII, "*Hazardous Constituents*"
- Hazardous Waste Facility Final Permit, EPA Identification No. NM4890139088
- WP 02-RC.11, *Qualification and Certification of Personnel performing Radiography for TRU Waste Confirmation*

PRECAUTIONS AND LIMITATIONS

- Personnel conducting RTR activities shall be trained as a Level 2 Operator and qualified in accordance with WP 02-RC.11, prior to performing this procedure.

- The Permittees Confirmation Representative (PCR) must be trained to the requirements of RTR Level 1 or 2 Operator.
- If this procedure cannot be implemented as written, RTR personnel shall notify the PCR.
- If it is determined that work cannot be performed as described in this procedure, or would result in an undesirable situation, work **SHALL** be stopped and not resume until this procedure is modified or replaced by a new procedure that reflects the current work practices.
- Personal protective equipment (PPE) for normal operations is leather gloves (for handling drums). Additional PPE may be specified by a Radiological Control Technician (RCT) or in a site-specific radiation work permit (RWP). Personnel will don the PPE, as required, prior to starting RTR operations.
- Potential hazards associated with the RTR system include high energy x-rays, high voltages, and pinch points.
- X-ray exposure can **NOT** be initiated until the vault doors are in the **CLOSED** position.
- After the x-ray **ON** button is depressed, and if this procedure can not be implemented as written, RTR personal shall operate to the generator site procedure(s) and equipment process(es), as applicable.
- If the generator site procedures cannot be followed as written, **STOP WORK**.
- The PCR, the Operator, the Independent Operator (IO), the Replicate Scan, and the Independent Technical Review (ITR) functions will not be performed by the same person during waste confirmation of any container.
- Any qualified PCR that did not Operate, IO, Replicate Scan, or ITR may confirm the shipment.

NOTE

After the x-ray **ON** button is depressed, an amber beacon located inside the chamber will illuminate and an alarm will sound as a warning that x-ray generation will begin.

X-ray exposure begins after the delay, a red beacon located inside the chamber, a red light on the X-Ray Controller, and the "Very High Radiation" sign over the rear vault door are illuminated.

NOTE

Anyone trapped inside the enclosure can prevent x-ray exposure by depressing the red E-STOP button located on the junction box in the vault.

- X-ray exposure can **NOT** be re-activated after the E-STOP button is depressed until the E-STOP button is reset and the fault message is cleared at the X-Ray Controller.
- The x-ray vault must not be entered, except to perform maintenance of equipment or visual inspection of equipment.
- Safety interlocks must not be overridden.
- The vault door must not be opened when the x-ray system is in operation.
- The system must not be left operating unattended at anytime.
- Workers who will be working in a radiation area must have read and signed the applicable RWP.

EQUIPMENT

- RTR System
- Test drum, training drum, and other test objects (e.g., lines-pair resolution test gauge)
- Conveyor cart, drum-handling equipment

PREREQUISITE ACTIONS

1.0 RTR Operator, verify the following at the beginning of each day, or any time after the Power Key Switch is turned **ON** at the Operator's Bench Board; and before the RTR system is powered up and used to x-ray waste containers:

- Warning lights illuminate
- Alarms are audible
- RTR system interlocks operate properly
- Radiation leak check certification is current

- 2.0 RCT, conduct a survey with a currently calibrated meter prior to entering the vault, and continue monitoring with the meter as long as personnel are in the vault.

PERFORMANCE

1.0 POWERING THE X-RAY SYSTEM

NOTE

Powering of the x-ray system may be applicable to the generator site current procedure and the equipment process.

- 1.1 RTR Operator, open the shutters on the Image Intensifier.
- 1.2 At the Operator's Bench Board, set the Image Intensifier Magnification Switch to the **NORMAL** position.
- 1.3 At the Control Console, verify the voltage and current controls are at the minimum settings with both controllers fully counterclockwise.
- 1.4 Power on the RTR system at the Control Console by completing the following:
- 1.4.1 Insert the Safety Key, **AND** turn to the full right position.
 - 1.4.2 Insert the Voltage Key, **AND** turn to the 220V position.
 - 1.4.3 Verify the green standby light is **ON**.
- 1.5 Perform the check on the system interlocks as follows:
- 1.5.1 At the Operator's Bench Board, depress the Emergency Stop Pushbutton.
 - 1.5.2 On the Control Console, verify the green standby light is **OFF**.
 - 1.5.3 At the Operator's Bench Board, reset the Emergency Stop Pushbutton.
 - 1.5.4 At the Operator's Bench Board, turn the Power Switch Key to the **ON** position.
 - 1.5.5 On the Control Console, verify that the green standby light is **ON**.

2.0 RECORDING DEVICE SYSTEM SETUP

NOTE

The recording device subsystem is comprised of an Image Intensifier with integrated charge-coupled device (CCD) camera, raw video monitor, precision recording devices, processed video monitor, and video printer. There is a CCD video camera and a dedicated monitor for surveillance of the x-ray vault and loading area.

NOTE

Only new unrecorded audio/video media **MUST** be used.

- 2.1 RTR Operator, prepare the audio/video media by labeling with the analysis date and container number.
-

NOTE

The pilot lights on each piece of equipment will illuminate when the equipment is powered up.

- 2.2 Power up the recording device and verify each individual power switch is **ON**.
- 2.2.1 **IF** the individual piece of equipment light does not illuminate, **THEN** check the associated fuse, circuit breaker, or electrical cord.
- 2.2.2 Do **NOT** proceed with radiography until all equipment powers up satisfactorily.
- 2.3 Insert the audio/video media, label side up, into the recording device and verify the counter is at zero.
- 2.4 Verify the power switches are **ON** and the lights are illuminated on all video monitors.
- 2.5 Verify the power switch is **ON** and the green light is illuminated on the video graphic monitor.
- 2.6 Verify the video graphic printer has adequate paper supply by pressing the Open/Close button on the front panel.
- 2.7 Power on the Character Generator Keyboard and perform the following:
- 2.7.1 Press the New Page Key **AND** verify the cursor appears on the monitor.
- 2.7.2 Type the drum number **AND** press new line.

- 2.7.3 Type the date **AND** press new line.
- 2.7.4 Type the operator name.
- 2.7.5 Press the Play Key.

NOTE

The drum number and date will become the overlay for the container as it is recorded onto the audio/video media. This information will be entered for each container at the beginning of RTR for each drum.

- 2.8 Verify the information entered appears on the monitor.
 - 2.9 While viewing the video surveillance monitor, open the rear doors to the x-ray vault using the Back Door Switch at the Operator's Bench Board.
- 3.0 DRUM LOADING

NOTE

The powering, drum loading, and unloading of the X-Ray System may be applicable to the generator site procedure(s) and the equipment process(es).

NOTE

Prior to loading the first drum of the day, the RTR Operator will ensure that the lines-pair resolution test gauge may be affixed to the upper one-third of the drum. The RTR Operator will also request that the lines-pair resolution test gauge is removed after the first drum scan is complete.

- 3.1 RTR Operator, verify by observing the vault monitor, that a drum is loaded by Waste Handling personnel onto the conveyor at its rearmost position.
- 3.2 Transport the drum into the x-ray vault by using the joystick at the Operator's Bench Board.
- 3.3 While maintaining visual surveillance on the video monitor, close the rear doors by using the Back door Switch at the Operator's Bench Board.

CAUTION

To prevent injury to personnel, a survey **MUST** be conducted by RCT with a current calibrated meter prior to entering the vault, **AND MUST** continue monitoring with the meter as long as personnel are in the vault.

NOTE

The remaining steps are **ONLY** performed when loading the first drum of the day.

- 3.4 Remove the three box head bolts from the personnel x-ray vault door and open the door, if applicable.
- 3.5 On the Control Console, verify that the green light is **OFF**.
- 3.6 Enter the x-ray vault accompanied by the RCT **AND** depress the system Emergency Stop Button.
- 3.7 Visually inspect the coolant level by looking at the inspection sight glass window **AND** record on Attachment 1.
 - 3.7.1 **IF** the coolant level is low,
THEN add coolant as specified in the x-ray operating manual.
- 3.8 Visually inspect the x-ray vault interior for any foreign objects or other possible obstructions.
- 3.9 Turn **ON** the coolant pump by pressing the toggle switch, **AND** turn **ON** surveillance camera.
- 3.10 Exit the x-ray vault, **AND** close the personnel x-ray vault door.
- 3.11 On the Control Console, verify the green light is **OFF**.
- 3.12 Request the RCT to re-survey the x-ray vault as the personnel vault door is opened.
- 3.13 Enter the x-ray vault, accompanied by the RCT, **AND** reset the system Emergency Stop button.
- 3.14 RTR Operator and RCT exit the x-ray vault and close the personnel x-ray vault door.
- 3.15 On the Control Console, verify that the green standby light is **ON**.
- 3.16 Install the three box head bolts, if applicable, in the personnel x-ray vault door.

- 3.17 Verify x-ray certification-compliance certification is current and record on Attachment 1.
- 3.18 Verify both internal and external warning lights illuminate and alarms are audible. Record on Attachment 1.

WARNING

To prevent injury to personnel or damage to equipment, if any RTR system interlock is **NOT** functional, work may **NOT** continue until all corrective actions have been completed, **AND** all interlocks are functional.

- 3.19 **IF** any of the RTR system interlocks are **NOT** functional, **THEN STOP AND** notify the PCR.
- 3.20 Record interlock checks on Attachment 1.
- 3.21 At the Operator's Bench Board, position the drum using the joystick to prevent direct illumination from the x-ray source to the Image Intensifier.

NOTE

The time required to perform a warm-up sequence will vary depending on the recent operating history of the installed system.

- 3.22 Perform a warm-up sequence for the RTR system following the manufacturer's recommended practices.
- 3.23 At the Control Console, depress the **IN** button to move the container in place.

4.0 LINES-PAIR RESOLUTION TEST

NOTE

The Lines-Pair Resolution Test must be conducted at the beginning of each day, or at the beginning of each shift when operations are continuous.

The Lines-Pair Resolution Test must include observation of a lines-pair resolution test gauge affixed to the upper one-third of the first drum to ensure that the RTR system has adequate video quality.

To pass, at least five lines-pair per centimeter (5 LP/cm) must be visible. The image of the lines-pair resolution test gauge shall be recorded on the RTR audio/video media.

The lines-pair resolution test gauge shall consist of a lead-foil raster screen with a maximum thickness of 0.1 cm. The lead-foil may be bonded between two plastic plates for mechanical strength. The lines-pair resolution test gauge shall be capable of demonstrating a range of resolution of 5 - 50 LP/cm.

The RTR Operator may vary the following switch settings to obtain the desired image results: kV and mA controllers at the Control Console and the Turntable Switch, Rotation Speed Switch, and the normal/mag1/mag2 Switch at the Operator's Bench Board.

- 4.1 RTR Operator, at the Operator's Bench Board, rotate the drum using the Turntable Switch until the lines-pair resolution test gauge appears on the raw image monitor.
- 4.2 Start the recording device, **AND** record the lines-pair resolution test gauge and the audio commentary.
- 4.3 At the Control Console, depress the **OUT** button.
- 4.4 **STOP** the recording device, **AND** play back to verify the quality of the image and audio.

NOTE

If the Lines-Pair Resolution Test fails, the PCR must be notified.

- 4.5 Record the results of the Lines-Pair Resolution Test, **AND** the audio/video check on Attachment 1.
 - 4.5.1 **IF** the Lines-Pair Resolution Test fails, **THEN STOP AND** notify PCR.
- 4.6 RTR Operator, verify completion of system checks on Attachment 1 and print name, sign, and date Attachment 1.

- 4.6.1 If any of the system checks fail, do **NOT** perform RTR operations, and notify the PCR and proceed as directed.

5.0 PERFORMING RTR OPERATIONS

NOTE

The RTR Operator may vary the following switch settings to obtain the desired image results: kV and mA controllers at the Control Console and the Turntable Switch, Rotation Speed Switch, and the normal/mag1/mag2 Switch at the Operator's Bench Board.

The RTR Operator is allowed to start and stop the system, by depressing the **IN** and **OUT** buttons at the Control Console, as required to conduct scanning of the drum.

The RTR Operator is allowed to depart the "At the Controls" area only when the Voltage Key is removed from the Control Console. Upon return, the key shall be reinserted in the Control Console and turned to the 220V position.

- 5.1 RTR Operator, obtain the correct container number by checking the video monitor or looking through the lead glass window of the vault personnel door, **AND** record on Attachment 2.
- 5.1.1 Check box on Attachment 2 for original scan.
- 5.1.2 Record Site ID, Procedure and Revision Number, Waste Stream Profile Number, Radiographer, and Examination Date on Attachment 2.
- 5.2 At the Control Console, verify that the initial values for kV and mA are set in their minimum settings position, fully counter clockwise.
- 5.3 At the Control Console, depress the **IN** button.
- 5.4 At the Control Console, enhance the image by increasing **OR** decreasing the kV and mA values.
- 5.5 Rotate the drum to the desired rotation start position using the Turntable Switch at the Operator's Bench Board.
- 5.6 Start the recording devices, **AND** verify the microphone is in the **ON** position for audio recording.

NOTE

100% of a container (e.g., drum) is examined. At anytime while performing the examination, snap shots may be taken for information, or identification of an item.

- 5.7 On the Operator's Bench Board, use the joystick, Turntable Switch, and the Rotation Speed Switch to position the turntable in the desired position to make a detailed inspection of an item or items in the drum.
- 5.8 Record a verbal running commentary of the waste contents.
- 5.9 Record a description clearly identifying all waste items, packaging material and waste material parameter of the waste on Attachment 2.
- 5.10 Stop the recording devices when 100% examination of the drum is completed.

WARNING

To avoid injury to personnel or damage to equipment, work may **NOT** continue if the x-ray warning lights do **NOT** extinguish when the **OUT** button on the Control Console is depressed. The PCR must be notified immediately.

- 5.11 At the Control Console, depress the **OUT** button.

NOTE

The prohibition for observable liquid is:

- Observable liquid shall be less than 1 percent by volume of the outermost container at time of RTR.
- Internal containers with more than 60 milliliters or 3 percent by volume observable liquid, whichever is greater, are prohibited.
- Containers with Hazardous Waste Number U134 assigned shall have no observable liquid.
- Overpacking the outermost container that was examined during RTR or redistributing untreated liquid within the container shall not be used to meet the liquid volume limits.

If the contents of the containers prevent full examination via radiography, visual examination will be required unless the operator can certify, through existing acceptable knowledge, that visual examination would provide no additional relevant information. This must be documented on Attachment 2.

5.12 Use the checklist on Attachment 2 to confirm there are no prohibited items in the container.

5.12.1 **IF** any nonconforming/prohibited items are noted during the RTR inspection,
THEN perform the following:

- [A] Detail these items in the comments section of Attachment 2 contact the PCR immediately and proceed as directed.
- [B] Take a snap shot (still photo) of the nonconforming/prohibited item.

NOTE

The physical waste form requirements, waste stream description, and Hazardous Waste Number(s) for the waste stream being evaluated are found in the approved Waste Stream Profile Form for that waste stream.

5.13 Verify that the physical form matches the waste stream description and Waste Matrix Code and record on Attachment 2.

- **IF** the waste does NOT match,
THEN contact the PCR immediately and proceed as directed.

- 5.14 Verify the assigned Hazardous Waste Number(s) are acceptable at WIPP.
- 5.14.1 **IF** the Hazardous Waste Number(s) are **NOT** acceptable, **THEN** contact the PCR immediately and proceed as directed.
- 5.15 Verify that assigned Nonconformance Report(s) have been dispositioned in accordance with WP 13-1 (QAPD) and record on Attachment 2.
- 5.15.1 **IF** an assigned Nonconformance Report has **NOT** been dispositioned, **THEN** contact the PCR immediately and proceed as directed.
- 5.16 Record the audio/video media identification (ID) numbers, frame start and stop counts of the primary audio/video media, or the backup audio/video media on Attachment 2.
- 5.17 Print name, sign, and date Attachment 2.
- 5.18 RTR Operator, **IF** the drum constitutes the last drum of the day, **THEN** verify that all x-ray warning lights are **OFF**, stop the recording devices, and proceed to Step 7.1.
- 5.19 **IF** scanning operations are to continue, **THEN** request that a drum be loaded on the turntable, and repeat Step 5.1 through Step 5.17.

6.0 REPLICATE SCAN

NOTE

Replicate scan is performed by an RTR operator who did not perform original scan. The replicate scan will be performed on one container per day or one container per shipment, whichever is less frequent.

- 6.1 RTR Operator, obtain the correct container number by checking the video monitor or looking through the lead glass window of the vault personnel door, **AND** record container number on Attachment 2.
- 6.1.1 Check box on Attachment 2 for replicate scan.
- 6.1.2 Record Site ID, Procedure and Revision Number, Waste Stream Profile Number, radiographer, and Examination Date on Attachment 2.
- 6.2 At the Control Console, verify that the initial values for kV and mA are set in their minimum settings position, fully counter clockwise.
- 6.3 At the Control Console, depress the **IN** button.

- 6.4 At the Control Console, enhance the image by increasing **OR** decreasing the kV and mA values.
- 6.5 Rotate the drum to the desired rotation start position, using the Turntable Switch at the Operator's Bench Board.
- 6.6 Start the recording devices, **AND** verify the microphone is in the **ON** position for audio recording.

NOTE

100% of a container (e.g., drum) is examined. At anytime while performing the examination, snap shots may be taken for information, or identification of an item.

- 6.7 On the Operator's Bench Board, use the joystick, Turntable Switch, and the Rotation Speed Switch to position the turntable in the desired position to make a detailed inspection of an item or items in the drum.
- 6.8 Record a verbal running commentary of the waste contents.
- 6.9 Stop the recording devices when 100% examination of the drum is completed.

WARNING

To avoid injury to personnel or damage to equipment, work may **NOT** continue if the x-ray warning lights do **NOT** extinguish when the **OUT** button on the Control Console is depressed. The PCR must be notified immediately.

- 6.10 At the Control Console, depress the **OUT** button.

NOTE

The prohibition for observable liquid is:

- Observable liquid shall be less than 1 percent by volume of the outermost container at time of RTR.
- Internal containers with more than 60 milliliters or 3 percent by volume observable liquid, whichever is greater, are prohibited.
- Containers with Hazardous Waste Number U134 assigned shall have no observable liquid.
- Overpacking the outermost container that was examined during RTR or redistributing untreated liquid within the container shall not be used to meet the liquid volume limits.

If the contents of the containers prevent full examination via radiography, visual examination will be required unless the operator can certify, through existing acceptable knowledge, that visual examination would provide no additional relevant information. This must be documented on Attachment 2.

6.11 Use the checklist on Attachment 2 to confirm there are no prohibited items in the container.

6.11.1 **IF** any nonconforming/prohibited items are noted during the RTR inspection,
THEN perform the following:

- [A] Detail these items in the comments section of Attachment 2 and contact the PCR immediately and proceed as directed.
- [B] Take a snap shot (still photo) of the nonconforming/prohibited item.

NOTE

The physical waste form requirements, waste stream description, and Hazardous Waste Number(s) for the waste stream being evaluated are found in the approved Waste Stream Profile Form for that waste stream.

6.12 Verify that the physical form matches the waste stream description and Waste Matrix Code and record on Attachment 2.

- **IF** the waste does **NOT** match,
THEN contact the PCR immediately and proceed as directed.

- 6.13 Verify the assigned Hazardous Waste Number(s) assigned to the waste stream are acceptable at WIPP per Table C-9 in the HWFP and record on Attachment 2.
- 6.13.1 **IF** the Hazardous Waste Number(s) are **NOT** acceptable, **THEN** contact the PCR immediately and proceed as directed.
- 6.14 Verify that assigned Nonconformance Report(s) have been dispositioned in accordance with WP 13-1 (QAPD) and record on Attachment 2.
- 6.14.1 **IF** an assigned Nonconformance Report has **NOT** been dispositioned, **THEN** contact the PCR immediately and proceed as directed.
- 6.15 Record the audio/video media identification (ID) numbers, frame start and stop counts of the primary audio/video media, or the backup audio/video media on Attachment 2.
- 6.16 Print name, sign, and date Attachment 2.
- 6.17 RTR Operator, **IF** the drum constitutes the last drum of the day, **THEN** verify that all x-ray warning lights are **OFF**, stop the recording devices, and proceed to Section 7.0

7.0 DRUM UNLOADING

NOTE

The powering, drum loading, and drum unloading of the x-ray system may be applicable to the generator site procedure(s) and the equipment process(es).

- 7.1 RTR Operator, while maintaining visual surveillance on the video monitor, at the Operator's Bench Board use the Back Door Switch to open the rear doors.
- 7.2 At the Operator's Bench Board, use the joystick and move the drum conveyor to the rearmost position (loading position) and transport the drum into the vault.
- 7.3 Waste Handling will remove drums from the vault.
- 7.4 At the Operator's Bench Board, use the Back Door Switch while maintaining visual surveillance on the video monitor and close the rear doors.

8.0 INDEPENDENT OBSERVATION

NOTE

An Independent Observation of one scan shall be performed by a qualified operator other than the individual who performed the first examination or the replicate scan once per day or once per shipment, whichever is less frequent.

8.1 IO, view a drum of choice from the audio/video media, check applicable box, and complete Attachment 2.

8.1.1 **IF** nonconforming/prohibited item(s) are noted during the RTR inspection,
THEN perform the following:

[A] Detail these items in the Comments section of Attachment 2, contact the PCR immediately, and proceed as directed.

[B] Take a snap shot (still photo) of the nonconforming/prohibited item.

8.2 IO, print name, sign, and date Attachment 2.

9.0 SYSTEM SHUTDOWN

NOTE

The powering of the x-ray system may be applicable to the generator site procedures and equipment processes.

9.1 RTR Operator, when all scanning activities have been completed, at the Operator's Bench Board, use the joystick to transport the drum conveyor into the x-ray vault.

9.2 At the Operator's Bench Board, use the Back Door Switch to close the rear doors while maintaining visual surveillance on the video monitor.

9.3 At the Control Console, turn the Voltage Key to the OFF position, and remove the key from the Voltage Select Key Switch.

9.4 At the Control Console, turn the Safety Key to the left position, and remove the key from the Safety Key Switch.

9.5 Close the shutters on the Image Intensifier.

9.6 At the Operator's Bench Board, turn the Power Key to the **OFF** position, and remove the key from the Power Key Switch.

9.7 Request that RCT survey the vault.

- 9.8 RTR Operator, remove three box head bolts from the vault personnel door, and open the door, if applicable.
- 9.9 RCT, survey the vault.
- 9.10 RCT and RTR Operator, enter the vault area.
- 9.11 RTR Operator, depress the ON/OFF toggle switch on the coolant pump to the **OFF** position.
- 9.12 RCT and RTR Operator, exit the vault area.
- 9.13 RTR Operator, close the vault doors and replace the three box head bolts in the vault personnel door, if applicable.
- 10.0 DATA VALIDATION
- 10.1 RTR Operator, verify that data sheets are signed and dated in reproducible ink or using an unalterable electronic signature by the individual generating the data sheets.

NOTE

Changes to original data will be single lined out, initialed, and dated by the individual making the change(s). A justification for changing the original data may be included.

- 10.2 Verify that the original data are not obliterated or otherwise disfigured so as to be unreadable.

NOTE

Radiography data forms will not contain classified information. RTR media containing classified waste containers will be retained by the generator site or predetermined secure location.

- 10.3 Verify that electronic and video data are stored appropriately to ensure that waste container, sample, and associated quality control data are readily retrievable.

NOTE

The ITR will be performed by a qualified RTR Operator, other than the RTR Operator who performed the first examination, the replicate scan, or the independent observation.

- 10.4 Independent Technical Reviewer, review all data sheets and complete Attachment 3.

10.4.1 Provide explanation of all **NO** answers, if necessary.

10.5 Print name, sign, and date Attachment 3 and forward the confirmation data package to the PCR.

NOTE

The PCR review will be conducted by an individual who is **NOT** directly responsible for performing the first examination, the replicate scan, the independent observation, or the independent technical review.

10.6 PCR, ensure the following:

- The data are technically reasonable based on the technique used.
- The data have received ITR.
- The data indicate that the waste examined contained no ignitable, corrosive, or reactive waste and that the physical form of the waste was consistent with the waste stream description in the Waste Stream Profile Form.
- Quality Control checks have been performed (e.g., replicate scans, image quality checks).
- The data meets the established Quality Assurance Objectives.

10.7 PCR, review all data sheets and complete Attachment 4.

10.7.1 Provide explanation of all **NO** answers, if necessary.

10.8 PCR, print name, sign, and date Attachment 4.

NOTE

The waste confirmation data includes radiography data forms, video/audio media, review checklist, random selection of containers, and applicable Nonconformance Reports.

- 10.9 PCR, provide confirmation data package via email to a trained U. S. Department of Energy (DOE) National TRU Program Designee for DOE management representative review.

NOTE

PCR shall not approve any waste shipment until DOE approval is obtained.

Any qualified PCR that did not Operate, IO, Replicate Scan, or ITR may confirm the shipment.

- 10.10 PCR, once the DOE management representative review is complete, verify the shipment payloads have not changed and print name, sign, and date Attachment 4.

- 10.10.1 **IF** the shipment payloads have changed,
THEN notify the Idaho Site Manager and/or Confirmation Program Manager, and proceed as directed.

- 10.11 PCR, confirm the shipment and notify the generator/storage site that the confirmation process is complete and the waste can be shipped to the WIPP site.

- 10.12 PCR, transfer all media and associated data sheets supplied by the generator/storage site, as well as all data forms, to the records coordinator, or designee, to be placed in the WIPP Operating Record as nonpermanent records, after the shipment is received at the WIPP.

Attachment 1 – Radiography Measurement Control Report

| RADIOGRAPHY MEASUREMENT CONTROL REPORT | | |
|---|-------------------------------|-------------------------------|
| Site Location: _____ | | |
| Examination Date: _____ | | |
| SYSTEM MAINTENANCE AND SAFETY CHECKS: | | |
| X-Ray Compliance Certification Current | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Warning Lights and Alarms Operating | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Interlocks Operating | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Coolant Level Acceptable | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| CONTROL CHECKS: | | |
| Lines-Pair Resolution Test (line-pair/cm) | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| (Minimum Acceptable 5 lines-pair/cm) LP/cm | _____ | |
| Audio/Video Check Satisfactory | <input type="checkbox"/> Pass | <input type="checkbox"/> Fail |
| Comments: | | |
| | | |
| | | |
| | | |
| RTR Operator's Approval: | | |
| Printed Name | Signature | Date |

Attachment 2 – Radiography Data Sheets

| RADIOGRAPHY DATA SHEET | | |
|---|---|-----------------|
| <input type="checkbox"/> Original Scan <input type="checkbox"/> Replicate Scan <input type="checkbox"/> Independent Observation | | |
| Site ID Location (RTR): _____ Procedure and Revision Number: _____ Waste Stream Profile Number: _____ | | |
| Container Number: _____ Radiographer: _____ Examination Date: _____ | | |
| Audio/Video Media ID No: _____ Frame Start Count: _____ Frame Stop Count: _____ | | |
| Description of waste items and waste material parameters: | | |
| | | |
| | | |
| NDE TASK | Yes or No (Y/N) | Comments |
| Is there observable liquid in the waste container? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Is there observable liquid in internal containers, greater than 60 milliliters or 3 percent by volume, whichever is greater? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Is the total volume of observable liquid equal to or GREATER than 1 percent of volume of the outermost container? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Is there observable liquid and EPA Hazardous Waste Number U134 assigned? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Is there an indication of the waste exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002, or D003)? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Are any pressurized containers or compressed gasses present? | <input type="checkbox"/> Y <input type="checkbox"/> N | |

Attachment 2 – Radiography Data Sheets

| RADIOGRAPHY DATA SHEET | | |
|--|---|------|
| <input type="checkbox"/> Original Scan <input type="checkbox"/> Replicate Scan <input type="checkbox"/> Independent Observation | | |
| Does physical form match the waste stream description? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Does the waste match the Waste Matrix Code? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Are the assigned Hazardous Waste Number(s) acceptable at WIPP? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Have assigned Nonconformance Report(s) been dispositioned? | <input type="checkbox"/> Y <input type="checkbox"/> N | |
| Comments: | | |
| | | |
| | | |
| | | |
| RTR Operator's Approval: | | |
| Printed Name | Signature | Date |

Attachment 3 – Radiography Independent Technical Reviewer Checklist

| INDEPENDENT TECHNICAL REVIEWER CHECKLIST | | |
|--|--|------|
| SITE ID LOCATION: _____ | | |
| Container ID Number: _____ | | |
| Radiographer: _____ | | |
| Procedure and Rev. No.: _____ | | |
| DATA GENERATION AND REDUCTION | YES or NO | |
| Was the correct version of the operating procedure(s) used? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Was the lines-pair resolution check satisfactory? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Was the audio/video check satisfactory? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Does the physical form match the Waste Matrix Code and the waste stream description? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Were prohibited items absent? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Was the data reviewed for transcription errors? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Are calibration records available? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Was Independent Observation on a waste container performed at a minimum of once per shipment or once per day of operation, whichever is less frequent? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Do container numbers selected from the confirmation module correspond with those on the NDE data sheets? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Is the media complete? | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Comments: | | |
| | | |
| | | |
| | | |
| Independent Technical Reviewer's Approval: | | |
| Printed Name | Signature | Date |

Attachment 4 – Permittee's Confirmation Representative Checklist

| Permittee's Confirmation Representative Checklist | | |
|--|---|--|
| Container ID Number: | | |
| Permittee's Confirmation Representative Printed Name: | | |
| No. | Criteria | Criteria Met? Yes /No |
| 1. | Were the correct revisions of the operating procedure(s) used? Enter procedure(s) number and revision number. | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 2. | Is the data reasonable based on the technique used? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 3. | Is the confirmation data report complete? A. Radiography Data Sheet for each drum B. Radiography Container Narrative C. Radiography Measurement Control Report D. Independent Observation E. Radiography Independent Technical Reviewer Checklist(s) | <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 4. | Has the ITR been performed and data sheet signed? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Quality Assurance Documentation | | |
| 1. | Independent observation performed on one container per day or once per shipment, whichever is less frequent. | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 2. | Did the operator verify the waste stream and Waste Matrix Code for each drum? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Comments: | | |
| | | |
| | | |
| | | |
| | | |
| PCR Printed Name | Signature | Date |
| Shipment payloads have been verified and have not changed: | | |
| | | |
| PCR Printed Name | Signature | Date |

WP 02-RC1102

Revision 10

Review of Radiography Media for TRU Waste Confirmation

Technical Procedure

EFFECTIVE DATE: 08/12/11

R. R. Chavez
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|---|
| 7 | 06/30/10 | Document updated for Class 2 modification changes. |
| 8 | 12/29/10 | <p>Updated references for changes to the HWFP. Changed PMR to PCR throughout the document.</p> <p>Added 1.4 E and F for proper reviewing and observation at generator/storage sites.</p> <p>Added Step 1.9 for confirmation data package confirmation via email to DOE management representative.</p> |
| 9 | 06/15/11 | <p>Deleted "or designee" after PCR in procedure.</p> <p>Added reference WP 02-RC1107.</p> <p>Added last bullet under Precautions and Limitations for any qualified PCR that did not Operate, IO, or ITR may confirm shipment.</p> <p>Added "AND DATA" to end of title of Section 1.0.</p> <p>Deleted Note above Step 1.1.</p> <p>Deleted Steps 1.1.3 and 1.1.4 and moved information Step 1.2 under new bullet to "Obtain EA02RC1102-1-0 and document the following." Added "the container" and "associated WSPF(s)" to last bullet.</p> <p>Step 1.2.2 added "absence of the" after Examine the RTR data/media for the...</p> <p>Added Step 1.2.5 to verify RTR data sheets and media and record on EA02RC1102-1-0.</p> <p>Deleted EA02RC1102-2-0 and EA02RC1102-3-0 from Step 1.2.10 and 1.3.3.</p> <p>Step 1.3 deleted last part of sentence to remove initial the IO section and record in IO log. Added to Step 1.3.1.</p> <p>Step 1.4 deleted last part of sentence for initialing ITR section of EA02RC1102-1-0 and completing EA02RC1102-2-0.</p> <p>Step 1.4 D Deleted last part of sentence of concurring and initial, sign, and date EA02RC1102-1-0.</p> <p>Added Step 1.4.1 ITR if concurring, initial the ITR section</p> |

| | | |
|----|----------|--|
| | | <p>of EA02RC1102-1-0 and complete EA02RC1102-2-0.</p> <p>Step 1.4.3 deleted EA02RC1102-3-0.</p> <p>Deleted Steps 1.5 and 1.5.1 for PCR to review WWIS and WDS and notification to Confirmation Program Manager is containers are not current.</p> <p>Deleted Note above original 1.7 referring to completion of the Created By section of EA02RC1102-1-0.</p> <p>Deleted Step 1.7 for PCR to sign Created By on EA02RC1102-1-0.</p> <p>Added new Note above Step 1.8 for PCR not to approve waste shipment until DOE approval and if PCR did not act as Operate, IO, or ITR then he/she can confirm shipment.</p> <p>Step 1.8 Added once DOE management representative review is complete, then PCR reviews to be sure no changes have been made to shipment and fills out EA02RC1102-3-0.</p> <p>Deleted Step 1.10 and broke into Steps 1.8.1 and 1.9.</p> <p>Step 1.8.1 Added If shipment payloads have changed then notify Idaho Site Manager.</p> <p>Step 1.9 added for "PCR to confirm shipment and" to beginning of sentence to notify generator/storage site.</p> |
| 10 | 08/12/11 | <p>Added reference to DOE/WIPP-09-3427.</p> <p>Clarified step 1.1.1 that the daily listing will be selected via the TRU Waste Confirmation Module Report in the WDS.</p> |

INTRODUCTION^{1, 2, 3}

This procedure provides instructions for the review of generator/storage site radiography (RTR) audio/video tapes or recording media and radiographic data forms. This procedure has been prepared to meet the Hazardous Waste Facility Permit (HWFP) requirement for confirmation of certified waste prior to shipment to the Waste Isolation Pilot Plant (WIPP) from the generator/storage sites.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules and included in the WIPP Operating Record.

- EA02RC1102-1-0, *TRU Waste Confirmation (RTR/VE) Approval Form*
- EA02RC1102-2-0, *TRU Waste Confirmation ITR Review Checklist*
- EA02RC1102-3-0, *TRU Waste Confirmation PCR Review Checklist*

REFERENCES

BASELINE DOCUMENTS

- DOE/LLW-217, *DOE Waste Treatability Group Guidance*
- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- DOE/WIPP-09-3427, *Waste Data System User's Manual*
- AMWTP-INST-OI-12, *Real Time Radiography Operations (Drum)*
- CCP-TP-053, *CCP Standard Real-Time Radiography (RTR) Inspection Procedure*
- CCP-TP-508, *CCP RH Standard Real-Time Radiography Inspection Procedure*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*

REFERENCED DOCUMENTS

- WP 02-RC.11, *Qualification and Certification of Personnel Performing Radiography for TRU Waste Confirmation*
- WP 02-RC1105, *Electronic Notification, Container Selection, and Data Entry for TRU Waste Confirmation*

- WP 02-RC1107, *Management of Nonconforming Waste identified During TRU Waste Confirmation*
- EA02RC11021-1-0, *TRU Waste Confirmation (RTR/VE) Approval Form*
- EA02RC1102-2-0, *TRU Waste Confirmation ITR Review Checklist*
- EA02RC1102-3-0, *TRU Waste Confirmation PCR Review Checklist*

PRECAUTIONS AND LIMITATIONS

- Personnel performing the review under this procedure shall be qualified as an Nondestructive Examination (NDE) Level 1 and/or NDE Level 2 in accordance with WP 02-RC.11.
- The Permittees Confirmation Representative (PCR) must be trained to the requirements of Level 1 or 2.
- The PCR, Operator, Independent Observation (IO), and Independent Technical Review (ITR) functions will not be performed by the same person during waste confirmation of any container.
- Any qualified PCR that did not Operate, IO, or ITR the shipment may confirm the shipment.

PERFORMANCE

1.0 REVIEW OF RADIOGRAPHY MEDIA AND DATA

1.1 PCR, perform the following:

- 1.1.1 Obtain a daily listing of 7% of certified waste containers in each waste stream shipment which have been randomly selected via the TRU Waste Confirmation Module Report in the Waste Data System (WDS) for waste confirmation as described in WP 02-RC1105.
- 1.1.2 Contact each generator/storage site whose certified containers have been selected and obtain the radiography media, data forms (Batch Data Reports), and Nonconformance Reports (if applicable) for those containers.

NOTE

EA02RC1102-1-0 will be completed for each waste stream. EA02RC1102-2-0 and EA02RC1102-3-0 will be completed on each shipment.

- 1.1.3 Forward the RTR media and data sheets to the Operator (OP) for confirmation, as applicable.

1.2 OP, perform the confirmation as follows:

- Access and verify generator RTR container media and data sheets (including Nonconformance Reports, if applicable) to assure the container media and/or data correspond with those containers selected for confirmation.
- Obtain form EA02RC1102-1-0 and document the following:
 - Shipment Contact-Handled (CH) or Remote-Handled (RH).
 - Packaging Type (e.g., RH TRU 72-B Cask, TRUPACT-II, or HalfPACT).
 - Procedure Number to be used (e.g., WP 02-RC1102 and/or WP 02-RC1108).
 - Generator/Storage Site.
 - Shipment Number.
 - Waste Stream Profile Number.
 - Shipping Container Type (e.g., SWB, TDOP, 100-gallon, 85-gallon, or RH canister).
 - Shipping Container Number, if applicable.
 - Payload Identification (ID) Number(s).
 - Individual and/or Inner Waste Container Number(s).
 - Batch ID Number(s).
 - Media ID Number(s).
- Complete "Date Reviewed" column for each container on EA02RC1102-1-0.
- Verify Hazardous Waste Numbers listed on the container data report(s) and associated WSPF(s) are acceptable at the WIPP per Table C-9 in the HWFP, and record on EA02RC1102-1-0.

NOTE

Lighting should be comfortable for viewing of the monitor and minimizing glare and eye strain.

- 1.2.1 Position the monitor to allow direct viewing of the media at a comfortable distance from the monitor.
-

NOTE

The prohibition for observable liquid is:

- Observable liquid shall be less than 1 percent by volume of the outermost container at time of RTR.
 - Internal containers with more than 60 milliliters or 3 percent by volume observable liquid, whichever is greater, are prohibited.
 - Containers with Hazardous Waste Number U134 assigned shall have no observable liquid.
 - Overpacking the outermost container that was examined during radiography or redistributing untreated liquid within the container shall not be used to meet the liquid volume limits.
-

- 1.2.2 Examine the RTR data/media for the absence of the following unacceptable conditions in those selected containers and record on EA02RC1102-1-0:

- Unvented compressed gas containers (e.g., unpunctured aerosol cans)
- Observable liquid content equal to or greater than 1 percent of volume of the outermost container at time of RTR (e.g., 55-gallon drum or SWB) (Payload containers with Hazardous Waste Number U134 assigned shall have **NO** observable liquid.)
- Internal containers with greater than 60 milliliters or 3 percent by volume of observable liquid, whichever is greater.

- 1.2.3 Examine the RTR data/media to confirm the physical form (Summary Category Group) of the waste is consistent with the waste stream description and the Waste Matrix Code (debris, homogenous solids, and soil/gravel) documented on the Waste Stream Profile Form (WSPF), and record on EA02RC1102-1-0.

- 1.2.4 Examine Nonconformance Report(s) to determine if they have been dispositioned in accordance with WP 13-1 (QAPD) and record on EA02RC1102-1-0.

- 1.2.5 Verify RTR data sheets and media are complete and record on EA02RC1102-1-0.
- 1.2.6 Document notification of rejected containers, if applicable, in the "Notes" section of EA02RC1102-1-0, and notify PCR and proceed as directed.
- 1.2.7 Initial the OP section on EA02RC1102-1-0 after each container is reviewed.
- 1.2.8 Verify the following is complete and accurate on EA02RC1102-1-0:
- All required information is entered.
 - All unused blocks are marked "N/A," or lined through, if applicable.
- 1.2.9 Print name, sign, and date the "OP Reviewed by" section of EA02RC1102-1-0.
- 1.2.10 Forward the following to the IO, if applicable, or the ITR for the review process:
- All associated reports/media
 - EA02RC1102-1-0

NOTE

Two containers per day or two containers per shipment (whichever is less frequent) will be selected for an independent observation. The RTR media, data packages, and all forms related to the selected containers will be forwarded to the IO. The IO will be performed by a qualified operator other than the original operator. Once this requirement is met, all other IO reviews will be indicated as N/A on EA02RC1102-1-0.

- 1.3 IO, review the RTR media and all data for two containers.
- 1.3.1 IO, if concurring, initial the IO section on EA02RC1102-1-0, print name, sign, and date EA02RC1102-1-0 and record in the IO log.
- 1.3.2 IO, **IF** you do NOT concur, **THEN** notify the PCR and proceed as directed.
- The PCR will review IO concerns and determine the appropriate path forward.

1.3.3 Forward the following to the ITR for the review process:

- All associated reports/media
- EA02RC1102-1-0

NOTE

Each container selected for confirmation will undergo review by an ITR. The RTR media, data packages, and all forms related to the selected containers will be forwarded to the ITR. The ITR will be performed by a qualified operator other than the original operator and the IO.

1.4 ITR, review the data packet for completeness, ensure the following:

- [A] Ensure that data generation and reduction were conducted in a technically correct manner in accordance with the methods used.
- [B] Ensure that data were reported in the proper units and numbers of significant figures.
- [C] Ensure that the media is complete.
- [D] Ensure that the data have been reviewed for transcription errors.
- [E] Ensure the generator/storage site radiography video and audio media recording were reviewed (independent observation) on a waste container basis at a minimum of once per Batch Data Report or once per day of operation, whichever is less frequent. The radiography video/audio recording was reviewed against the data reported on the radiography form to ensure that the data are correct and complete.
- [F] If review of radiography scans recorded by the generator/storage site was used to perform confirmation, ensure two independent observations were performed for each shipment or two independent observations per day, whichever is less frequent.

1.4.1 ITR, if concurring, initial the ITR section of EA02RC1102-1-0, print name, sign, and date EA02RC1102-1-0 and obtain and complete EA02RC1102-2-0.

1.4.2 ITR, **IF** you do NOT concur, **THEN** notify the PCR, and proceed as directed.

- The PCR will review ITR concerns and determine the appropriate path forward.

- 1.4.3 ITR, forward EA02RC1102-1-0, EA02RC1102-2-0, and all associated reports/media to the PCR for review.

NOTE

The PCR review will be conducted by an individual who is **NOT** directly responsible for performing the original work, the ITR, or the IO.

- 1.5 PCR, review the data packet and ensure the following:
- The data are technically reasonable based on the technique used.
 - The data have received independent technical review.
 - The data indicates that the waste examined contained no ignitable, corrosive, or reactive waste and that the physical form of the waste was consistent with the waste stream description in the WSPF.
 - The data meets the established Quality Assurance Objectives.
- 1.6 PCR, initial the PCR Section of EA02RC1102-1-0, verifying the data package is complete, **THEN** print name, sign, and date EA02RC1102-1-0, and obtain and complete EA02RC1102-3-0 when data review is completed.
- 1.7 PCR, provide confirmation data package via email to a trained U. S. Department of Energy (DOE) National TRU Program Designee for DOE management representative review.

NOTE

The PCR shall not approve any waste shipment until DOE approval is obtained.

Any qualified PCR that did not Operate, IO, or ITR the shipment may confirm the shipment.

- 1.8 PCR, once DOE management representative review is complete, verify the shipment payloads have not changed and print name, sign, and date EA02RC1102-3-0.
- 1.8.1 **IF** the shipment payloads have changed, **THEN** notify Idaho Site Manager and/or Confirmation Program Manager, and proceed as directed.
- 1.9 PCR, confirm the shipment and notify the generator/storage site that the confirmation process is complete and the waste can be shipped to the WIPP site.

NOTE

RTR media containing Classified Waste Containers will be reviewed at, and retained by, the generator site or predetermined secure location. Radiography data forms will not contain classified information.

NOTE

The waste confirmation data includes radiography data forms, video/audio media, PCR and ITR review checklists, random selection of containers, and applicable Nonconformance Reports.

- 1.10 PCR, transfer all RTR media and associated data sheets supplied by the generator/storage site as well as all data forms to the records coordinator or designee, to be placed in the WIPP Operating Record as non-permanent records after the shipment has been received at the WIPP.

WP 02-RC1101

Revision 7

Visual Examination for TRU Waste Confirmation

Technical Procedure

EFFECTIVE DATE: 06/15/11

R. R. Chavez
APPROVED FOR USE

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CHANGE HISTORY PAGE

| REVISION NUMBER | DATE ISSUE | DESCRIPTION OF CHANGES |
|------------------------|-------------------|--|
| 5 | 06/30/10 | Document updated for Class 2 modification changes. Clarified use and duties of two operators. Global change from "tape" to "media." |
| 6 | 12/29/10 | For permit update, changed PMR to PCR throughout procedure. Deleted Step 5.5. Added new Step 5.5 for transfer of data package to DOE for review. Added new Step 5.6 once DOE approves data package then waste can be shipped to the WIPP site. |
| 7 | 06/15/11 | Added bullet under Precautions and Limitations for the PCR that performed as Operator or ITR on the shipment cannot confirm the shipment. Deleted Note above Step 1.0 in Prerequisite Actions for a designee to be appointed if PCR is not available. Deleting "or designee" after PCR in procedure. Step 2.4.11 Added "Table C-9 in HWFP" for Hazardous Waste Numbers assigned to the waste stream. Step 5.4 Added Note under step and bullet after for PCR that did not Operate or ITR shipment may confirm shipment. Added Step 5.5.5, If the payloads have changes notify Idaho Site Mgmt. and/or Confirmation Program Manager. Step 5.6 Added to beginning of sentence "PCR, confirm the shipment and" Attachment 3 – Added Shipment payloads have been verified and have not changed. Added signature line under this for PCR verification signature. |

INTRODUCTION^{1, 2}

This procedure provides instructions for Visual Examination (VE) to confirm the absence of prohibited items, the accuracy of the Waste Matrix Code, and the physical form of waste to be shipped to the Waste Isolation Pilot Plant (WIPP) matches the waste stream description. This procedure shall be performed in conjunction with generator/storage site facilities operating procedures.

The VE process may be documented on audio/video media or by using two operators when both operators observe the waste for themselves.

Performance of this procedure generates the following records. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Attachment 1, Waste Visual Examination
- Attachment 2, Waste VE Independent Technical Reviewer Checklist
- Attachment 3, Permittee's Confirmation Representative Review Checklist

REFERENCES

BASELINE DOCUMENTS

- DOE/CBFO-94-1012, *U.S. Department of Energy, Carlsbad Field Office, Quality Assurance Program Document (QAPD)*
- AMWTP-INST-FOI-17, *Facility Visual Examination Operation*
- CCP-TP-006, *CCP Visual Examination Technique for Idaho National Laboratory (INL) Newly Generated TRU Waste Retrieved from Pits*
- CCP-TP-113, *CCP Standard Contact Handled Waste Visual Examination*
- CCP-TP-500, *CCP Remote-Handled Waste Visual Examination*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*

REFERENCED DOCUMENTS

- Hazardous Waste Facility Permit, EPA Identification No. 4890139088
- DOE/WIPP 02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*

- WP 02-RC.12, *Qualification of Personnel Performing Visual Examination for TRU Waste Confirmation*

EQUIPMENT

- Torque Wrenches

PRECAUTIONS AND LIMITATIONS

- Personnel conducting VE activities shall be trained as a Level 2 Operator and qualified in accordance with WP 02-RC.12, prior to performing this procedure.
- The Permittees Confirmation Representative (PCR) must be trained to the requirements of VE Level 1 or 2 Operator.
- Radiography results shall **NOT** be made available to VE personnel until after the completion of VE, with the exception of items or conditions that could pose a potential hazard to VE personnel.
- The PCR, Operator, and independent technical review (ITR) functions will not be performed by the same person during waste confirmation of any container.
- Any qualified PCR that did not Operate or ITR the shipment may confirm the shipment.

PREREQUISITE ACTIONS

- 1.0 Prepare drums to be examined for VE in accordance with generator/storage site procedures.
- 2.0 PCR, coordinate containers undergoing VE.

PERFORMANCE

NOTE

VE may be documented on audio/video media or by using two operators when both operators observe the waste for themselves and approve the data forms/packaging records attesting to the contents of the container.

1.0 VIDEO CAMERA

- 1.1 **IF** two operators are used,
THEN mark Attachment 1 as "N/A" **AND GO TO** Section 2.0.

1.2 VE Operator (VEO), record the following on audio/video media label:

- Date
- Container ID number
- Audio/video media number

NOTE

If the VE continues for more than one day, a camera check will be conducted prior to continuing the VE for the new day. The results of the second camera check will be recorded on media and noted in the Comments block of Attachment 1.

1.3 VEO, verify the video camera operation is satisfactory and record on Attachment 1.

1.3.1 VEO, ensure the audio/video media is at the beginning, or at the point where recording was stopped the previous day.

1.3.2 Once a test image has been recorded, do not erase it or record over it.

1.3.3 VEO, review the test segment by playing the audio/video media **AND** verify the image is in focus and the narration is clear.

1.4 **IF** the results are unsatisfactory,
THEN notify the PCR and proceed as directed.

2.0 VISUAL EXAMINATION

2.1 VEO, ensure a Container Traveler label is affixed to the selected waste container(s), if applicable, or obtain the necessary information for waste container(s) requiring VE.

2.2 Record the following on Attachment 1:

- Container number
- Container type (e.g., 55-gallon drum)
- Site identification (ID) number and location
- Examination date
- Procedure and revision number
- Audio/video media number or "N/A"
- Waste Stream Profile Number

NOTE

Video recording is intended to document activities that manipulate waste during the VE. Recording will be halted whenever VE is suspended. Reason for suspension must be verbally documented on the media.

- 2.3 VEO, if applicable, position the video cameras(s) to record the VE of the waste container and its contents **AND** start the cameras(s).
-

NOTE

Radiological Control Technician (RCT) **SHALL** be present to conduct radiological surveys in accordance with the generator/storage site interface document and site-specific procedures.

- 2.4 VEO, perform the following:

- 2.4.1 Remove the container lid from the input waste container in accordance with generator/storage site procedures.
-

NOTE

VE of large or heavy packages/items shall be performed as they are removed from the container.

For contents too large or heavy to move (e.g., solidified mass or sludge), the VE may be performed with the material in place.

- 2.4.2 Remove the packages/items from the Input Waste Container as directed by the PCR and provide a description clearly identifying all waste items, packaging material and waste material parameter of the waste and record on Attachment 1.
-

NOTE

The prohibition for observable liquid is:

- Observable liquid shall be less than 1 percent by volume of the outermost container at time of VE.
 - Internal containers with more than 60 milliliters or 3 percent by volume observable liquid, whichever is greater, are prohibited.
 - Containers with Hazardous Waste Number U134 assigned shall have no observable liquid.
 - Overpacking the outermost container that was examined during VE or redistributing untreated liquid within the container shall not be used to meet the liquid volume limits.
-

- 2.4.3 Examine each package/item for prohibited items.

- 2.4.4 **IF** a prohibited item is found during VE,
THEN record the prohibited item **AND** description on Attachment 1, **AND** notify PCR, and return container to generator site for remediation.
- 2.4.5 Place the package/item into the Output Waste Container OR stage for return to the Input Waste Container.
- 2.4.6 Repeat Steps 2.4.2 through 2.4.5 until all the necessary packages/items from the Input Waste Container have been visually examined.
- 2.4.7 Reinstall the lid onto the Input Waste Container in accordance with the generator/storage site procedure(s).
- 2.4.8 Determine the waste type (Summary Category Group) and Waste Matrix Code and record on Attachment 1.
- 2.4.9 Determine if the waste is consistent with the assigned Waste Stream Description and Waste Matrix Code and record on Attachment 1.
- 2.4.10 **IF** "No,"
THEN enter remarks in the Comments section of Attachment 1 **AND** inform PCR and proceed as directed.
- 2.4.11 Determine if the Hazardous Waste Number(s) assigned to the waste stream are acceptable at WIPP per Table C-9 in the HWFP, and record on Attachment 1.
- 2.4.12 Complete the Prohibited Items Summary List on Attachment 1.
- 2.4.13 Verify the absence of prohibited items on Attachment 1, or if a prohibited item is found, notify the PCR and proceed as directed.
- 2.4.14 Verify assigned Nonconformance Report(s) (NCRs) have been dispositioned in accordance with WP 13-1 (QAPD) and record on Attachment 1.
- [A] **IF** no NCR(s) are assigned,
THEN mark "N/A" on Attachment 1.
- 2.4.15 Prepare a backup audio/video media, if applicable.

3.0 CONTAINER LID INSTALLATION AND CLOSURE VERIFICATION

- 3.1 VEO, perform the following **AND** record the applicable data for the Output Waste Container on Attachment 1:
- 3.1.1 Verify the filter torque wrench is in calibration **THEN** record serial/ID number and calibration due date on Attachment 1.
 - 3.1.2 Verify the lid ring bolt torque wrench is in calibration, **THEN** record the serial/ID number and calibration due date on Attachment 1.
 - 3.1.3 Record the container lid filter model and serial number.
 - 3.1.4 Install the filter in accordance with the manufacturer's instructions.
 - 3.1.5 Torque the filter to the manufacturer's specifications **AND** record the torque value.
 - 3.1.6 Install the container lid in accordance with generator/storage site procedures, site-specific training, **OR** the manufacturer's instructions.
 - 3.1.7 Torque the container lid ring bolt(s) to the manufacturer's specifications **AND** record the torque value.
 - 3.1.8 VEO, print name, sign, and date Attachment 1 upon completion of the VE process.
 - 3.1.9 **IF** VE performed using audio/video media, **THEN** mark "N/A" on VEO 2 signature area on Attachment 1.
 - 3.1.10 **IF** VE performed using two operators, **THEN** VEO 2 print name, sign, and date Attachment 1 upon completion of the VE process.
 - 3.1.11 PCR, print name, sign, and date Attachment 1 upon completion of VE process.

4.0 VE INDEPENDENT TECHNICAL REVIEW

NOTE

The independent technical review is conducted by an individual who is qualified to perform the initial work, but who is **NOT** directly responsible for performing the initial work. The ITR can **NOT** review their own work.

- 4.1 ITR, review Attachment 1 data sheet(s) generated by the VEO, **THEN** complete Attachment 2.
- 4.2 ITR, ensure that the media is complete, if applicable.
- 4.3 ITR, print name, sign and date Attachment 2 and forward with Attachment 1 to the PCR.

5.0 PCR REVIEW

NOTE

The PCR review will be conducted by an individual who is **NOT** directly responsible for performing the initial work or the independent technical review.

- 5.1 PCR, review the Attachment 1 and 2 data sheets generated by the VEO and ITR.
- 5.2 PCR, ensure the following:
 - The data are technically reasonable based on the technique used.
 - The data have received independent technical review.
 - The data indicate that the waste examined contained no ignitable, corrosive, or reactive waste and that the physical form of the waste was consistent with the waste stream description in the Waste Stream Profile Form.
 - Quality Control checks have been performed (e.g., video camera check).
 - The data meets the established Quality Assurance Objectives.
- 5.3 PCR, complete Attachment 3.

NOTE

The waste confirmation data includes VE data forms, video/audio media, review checklist, and random selection of containers. VE media containing Classified Waste Container shall be retained by the generator site or predetermined secure location. VE data forms shall not contain classified information.

- 5.4 PCR, provide confirmation data package via email to a trained U.S. Department of Energy (DOE) National TRU Program Designee for DOE management representative review.
-

NOTE

PCR shall not confirm any waste shipment until DOE approval is obtained.

NOTE

Any qualified PCR that did not Operate or ITR the shipment may confirm the shipment.

- 5.5 PCR, once the DOE management representative review is complete, verify the shipment payloads have not changed and print name, sign, and date Attachment 3.

5.5.1 IF the shipment payloads have changed,
THEN notify the Idaho Site Manager and/or Confirmation Program Manager, and proceed as directed.

- 5.6 PCR, confirm the shipment and notify the generator/storage site that the confirmation process is complete and the waste can be shipped to the WIPP site.
- 5.7 PCR, transfer all VE media and/or associated data sheets supplied by the generator/storage site, as well as all data forms, to the records coordinator, or designee, to be placed in the WIPP Operating Record as a non-permanent record(s).

Attachment 1 – Waste Visual Examination

| VISUAL EXAMINATION | | | | |
|------------------------------|---|------------------------------------|----|-----|
| Container No: _____ | | Examination Date: _____ | | |
| Container Type: _____ | | Audio/Video media #: _____ | | |
| Generator Site Number: _____ | | Procedure and Rev. No.: _____ | | |
| Location: _____ | | Waste Stream Profile Number: _____ | | |
| Step | Performance | YES | NO | N/A |
| 1.1 and 1.3 | Video camera operation is satisfactory. | | | |
| 2.4.2 | Description of waste items and waste material parameters: _____ _____ _____ | | | |
| 2.4.8 | Waste type : _____ Waste Matrix Code: _____ | | | |
| 2.4.9 | Waste is consistent with assigned Waste Stream Description and Waste Matrix Code. | | | |
| 2.4.11 | Verified Hazardous Waste Number(s) assigned to the waste stream are acceptable at WIPP. | | | |
| 2.4.13 | Verified the absence of prohibited items. (If a prohibited item is found, notify PCR.) | | | |
| 2.4.14 | Verified assigned NCR(s) have been dispositioned. | | | |
| 3.1.1 | Filter torque wrench in calibration? Serial No.: _____ Calibration Due Date: _____ | | | |
| 3.1.2 | Lid ring bolt torque wrench in calibration? Serial No.: _____ Calibration Due Date: _____ | | | |
| 3.1.3 | Container lid Filter model: _____ Serial No.: _____ | | | |
| 3.1.5 | Torque filter to manufacturer's specifications. Torque value: _____ | | | |
| 3.1.7 | Torque lid ring bolt(s) to manufacturer's specifications. Torque value: _____ | | | |
| Prohibited Items | | | | |
| 2.4.4 | Item and Description: _____ _____ _____ | | | |

Attachment 1 – Waste Visual Examination

| Prohibited Items Summary List | | |
|--|------------|-----------|
| Item | Yes | NO |
| 1. Is there observable liquid in the waste container? | | |
| 2. Is there observable liquid in internal container(s), that is GREATER than 60 milliliters or 3 percent by volume (whichever is greater)? | | |
| 3. Is the total volume of observable liquid GREATER than or equal to 1 percent of the outermost container? | | |
| 4. Is there observable liquid in waste containers with EPA Hazardous Waste Number U134 assigned? | | |
| 5. Is there an indication of waste containing compressed gases? | | |
| 6. Is there an indication of the waste exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002, or D003)? | | |
| Comments: | | |
| | | |
| | | |
| | | |
| | | |
| Approvals: | | |
| VEO #1: | | |
| | / | / |
| Print Name | Signature | Date |
| VEO #2: | | |
| | / | / |
| Print Name | Signature | Date |
| PCR Approval: | | |
| | / | / |
| Print Name | Signature | Date |

Attachment 3 – Permittee's Confirmation Representative Review Checklist

| VE Review | | |
|---|-----------|------|
| Container No.: | | |
| ITEM | YES | NO |
| 1. Has all the data received an independent technical review as evidenced by the appropriate ITR signature? | | |
| 2. Was data technically reasonable based upon the techniques used? | | |
| 3. Were Attachments 1 and 2 complete and the waste stream correct? | | |
| Comments: | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| I have reviewed 100 percent of the container-specific data in this report and found it acceptable. | | |
| | | |
| PCR Print Name | Signature | Date |
| | | |
| Shipment payloads have been verified and have not changed. | | |
| | | |
| PCR Print Name | Signature | Date |

WP 02-RC.13

Revision 4

Conduct of Operations for TRU Waste Confirmation

Cognizant Section: Regulatory Compliance

Approved by: R. C. Chavez



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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|---|
| 2 | 06/15/10 | Added bullets in Introduction for required reading and reference/information in text and in Attachment 1. Added in Reference Section and in text information for WP 02-RC.12. Added PMR to LO in various duties and clarified duties/performance. |
| 3 | 12/29/10 | Incorporate permit-related changes. Updated references. Changed PMR to PCR throughout document. |
| 4 | 06/15/11 | Editorial revision to change WRES to RES and Project Manager to Program Manager. |

1.0 INTRODUCTION ^{1, 2, 3}

The purpose of this document is to provide specific guidance for implementation of the Conduct of Operations Plan in a concise format. This document allows the user to reference implementing documents and procedures applicable to transuranic (TRU) waste confirmation.

The scope of this document includes the operating practices to which personnel, including subcontractors, are expected to perform. The practices in this document supplement other instructions provided in TRU waste confirmation documents.

Employees will place personnel safety, facility safety, and environmental safety above facility production.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules (RIDS).

- Completed Equipment Logbooks
- Pre-job checklists
- Required Reading Signed Cover Sheet(s)
- Electronic notification of Required Reading
- Electronic notification of Acknowledgment and Understanding of Required Reading

2.0 REFERENCES

- DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*
- WP 02-RC.11, *Qualification and Certification of Personnel Performing Radiography for TRU Waste Confirmation*
- WP 02-RC.12, *Qualification of Personnel Performing Visual Examination for TRU Waste Confirmation*
- WP 02-RC1101, *Visual Examination for TRU Waste Confirmation*
- WP 02-RC1102, *Review of Radiography Media for TRU Waste Confirmation*

- WP 02-RC1103, *Radiography Inspection Operating Procedure for TRU Waste Confirmation*
- WP 02-RC1105, *Electronic Notification, Container Selection, and Data Entry for TRU Waste Confirmation*
- WP 02-RC1107, *Management of Nonconforming Waste identified During TRU Waste Confirmation*
- WP 02-RC1108, *Review of Visual Examination Records for TRU Waste Confirmation*

3.0 SHIFT ROUTINES AND OPERATING PRACTICES

3.1 Status Practices

- 3.1.1 Confirmation operations will be performed in accordance with approved operating procedures, and will be performed by qualified/certified personnel.
- 3.1.2 The Permittee's Confirmation Representative (PCR) will verify daily that personnel are qualified to perform their assigned duties and that relevant certifications and eye examinations are current by reviewing the current List of Qualified Individuals (LOQI).
- 3.1.3 The term "Lead Operator" (LO) is used to identify the person responsible to assist the PCR in completion of his/her duties associated with a specific piece or set of equipment during operations of Radiography and/or Visual Examination.

NOTE

An Equipment Logbook will be maintained and updated by the LO or PCR. Completed Equipment Logbooks shall be retained in accordance with applicable documentation (e.g., Records Inventory Disposition Schedules).

- 3.1.4 The LO will possess technical expertise and applicable certifications for the specific equipment involved, and will assist the PCR with duties such as ensuring assigned personnel are fit for duty, maintenance, and review of Equipment Logbooks, preparation and review of standing orders, and preparation of operator aids.
- 3.1.5 The LO position is assigned at the discretion of the PCR.
- 3.1.6 The PCR shall notify affected personnel of any such assignment. This notification may be provided verbally during the daily planning meeting.

- 3.1.7 If an unexpected event, or series of events occurs, **AND** if the cause and consequences cannot be readily determined, the situation will be investigated and appropriate action taken before resuming operation.
- 3.1.8 LO or PCR will make an initial entry in applicable logs, stating the initiating event. Log entries will be clear, complete, and concise.
- 3.1.9 LO or PCR will ensure that evidence regarding the cause of a problem will be safeguarded as sensitive information.
- 3.1.10 The LO and operators are responsible and accountable for the operations conducted during their shift. They will be cognizant of the status of all equipment, systems, and records of respective watch stations.

3.2 Safety Practices

- 3.2.1 Employees assigned to TRU waste confirmation operations shall present and maintain themselves in a condition fit for duty.
- 3.2.2 The PCR or LO shall ensure that no unfit employee is permitted to assume their duties and responsibilities.
- 3.2.3 If an employee is unfit for duty, for any reason, that employee shall be relieved. The PCR or LO will arrange relief for the affected person.
- 3.2.4 Prior to operational evolutions, PCR or Designee will conduct pre-job briefings, which include any job hazard analysis, jobs new or complex in nature, or where proficiency at the task is questioned.
 - [A] Planning for safety is the responsibility of all employees.
 - [B] Strict compliance with applicable safety standards and/or precautions will be maintained at all times.
 - [C] Safety precautions may be posted or be described or referenced in job-specific procedures, work instructions or job hazard analysis.
 - [D] Pre-job checklists may be used and initialed to indicate understanding by employees.
- 3.2.5 In all situations, employees will place personnel safety, facility safety, and environmental safety above facility production.
- 3.2.6 Employees will wear personal protective equipment (PPE) (e.g., proper hearing, eye, head, foot, and respiratory protection) as required. Clothing will not restrict movement nor be so loose that it might get caught in machinery.

- 3.2.7 Employees will not climb or walk on facility components.
- 3.2.8 Employees will exercise appropriate precautions when working in or around energized panels or equipment.
- 3.2.9 Doors or passageways that serve as fire protection, security, and ventilation barriers will not be reconfigured without the PCR's notification and proper facility approval.
- 3.2.10 Employees will place emphasis on determining the adverse factors that contribute to personnel exposures and minimizing those factors to keep exposures within as low as reasonably achievable (ALARA) specifications.

3.3 Shift Operating Bases

- 3.3.1 Each operating location will be equipped with appropriate office equipment for the operator to maintain necessary procedures and references to conduct administrative duties.
- 3.3.2 Necessary communication equipment will be available at each operating base.

3.4 Potentially Distractive Written Material and Devices

- 3.4.1 Some devices, such as radios, are allowed in administrative work areas. Non-job-related written materials may be present in the administrative work areas, but personnel are not allowed to read these during work hours.
- 3.4.2 Written material or entertainment devices that do not relate to operations are prohibited for use by on-duty operating personnel. This includes such items as radios, televisions, tape players, computer games, etc.
- 3.4.3 Operator workstations shall contain only work-related materials or devices.
- 3.4.4 Operators may read training bulletins, technical manuals, and operating experience information, or review other written, audible, and visual materials that relate to operator duties.

4.0 COMMUNICATIONS

4.1 Emergency Communications Systems

- 4.1.1 If Employees are working in areas where emergency notifications may not be heard, the PCR will provide alternate notification methods for their responsible areas. Employees should ask for clarification of any communication that is not understood.

4.2 Lessons Learned

- 4.2.1 The RES Confirmation Program Manager may issue lessons learned or required reading to their staff.
- 4.2.2 PCRs may consider implementing the following actions based on lessons learned reading assignments:
- Assign as formal required reading.
 - Revise an existing document.
 - Initiate changes to a training/qualification program.
 - STOP WORK as required, and verify that lessons learned conditions or equipment do not affect the task at hand or the safety of the employee.

4.3 Communication of Employee Concerns

- 4.3.1 When personnel wish to report an employee concern, they should follow existing processes (e.g., Open Door Policy, discussion with Management).

NOTE

The employee concern process does **NOT** take the place of STOP WORK for immediate safety issues.

- 4.3.2 Documented employee concerns will be tracked in accordance with existing processes.

4.4 Reporting Abnormal Conditions

- 4.4.1 When personnel identify an abnormal condition, formal notification should be made to the PCR.
- Notification can be made via telephone and will be followed with formal notification.
 - Formal notification may be an e-mail, fax, or memorandum.
 - Notification shall include the name of person identifying the concern or abnormal condition, and whether the issue is safety related.

- Written notification will include, but is not limited to, the following:
 - Date and time of the abnormal condition
 - Employee(s) involved
 - Safety issue/injury
- A copy of the notification shall be sent to the Confirmation Program Manager by the PCR, to allow tracking of issues via nonconformance reports (NCRs).

5.0 CONTROL OF ON-SHIFT TRAINING

5.1 Adherence to Training Programs

- 5.1.1 Qualification training for Radiography is based on training identified in WP 02-RC.11 and qualification training for Visual Examination is based on training identified in WP 02-RC.12.

5.2 Supervision and Control of Trainees

- 5.2.1 Employees will receive adequate training to assure appropriate quality and proficiency for operations assigned prior to performing those operations.
- 5.2.2 On-the-Job (OJT) Training Instructors will be specifically designated in writing.
- 5.2.3 Designated OJT Instructors must have appropriate communication skills, technical knowledge, appropriate certifications, and ability to instruct trainees properly using hands-on experience.
- 5.2.4 Trainees will NOT perform tasks within qualification areas that require certification unless directly supervised by the designated OJT Instructor.

5.3 Training Documentation

- WP 02-RC.11 provides guidance for Radiography qualification programs and WP 02-RC.12 provides guidance for Visual Examination qualification programs.

6.0 CONTROL OF EQUIPMENT AND SYSTEM STATUS

6.1 Status Change Authorization and Reporting

- 6.1.1 The PCR is responsible for maintaining proper configuration and authorizing changes of TRU waste confirmation equipment and systems, as modified by specific site interface documents.

- 6.1.2 TRU waste confirmation personnel will monitor the equipment and systems of their assigned area frequently, especially after starting components, to assure proper operation.
- 6.1.3 When changing the operational status of equipment/systems and anticipated results are not received, the operator will:
- STOP and inform the LO or the PCR.
 - Take necessary action to restore the equipment/system to a proper operating status or place it in a safe condition.
 - Place the equipment or system in a safe condition and obtain direction from the LO or the PCR before proceeding if an unexpected result occurs while performing an operating procedure.
 - Appropriate equipment/systems information will be entered into the Equipment Logbook.

7.0 OPERATIONS ASPECTS OF FACILITY UNIQUE PROCESSES

7.1 Operator Responsibilities

- TRU waste confirmation has no systems dedicated to facility chemistry or unique processes as described in Chapter XIII, *Operations Aspects of Facility Chemistry and Unique Processes of DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities*.

8.0 REQUIRED READING

8.1 Required Reading for Indoctrination

- 8.1.1 Required reading for indoctrination will be conducted as identified in Attachment 1.

NOTE

Personnel assigned required reading for continuous work performance are only required to read the changes made to the document in the revision and by signing the cover sheet indicate they understand the changes and their impact prior to performing any activities impacted by the revision. It is the responsibility of each individual to perform work to the latest document revision.

8.2 Required Reading for Continuous Work Performance

- 8.2.1 PCR(s)/Confirmation Program Manager or Designee shall monitor all document changes that impact their respective operations.

- 8.2.2 PCR(s)/Confirmation Program Manager or Designee shall oversee required reading through the use of signed required reading cover sheets or electronic notifications of Acknowledgment and Understanding, to assure it is completed before the document is used.
- 8.2.3 Notification of a document revision shall be made through the e-mail system or through the Required Reading Cover Sheet to appropriate personnel.
- 8.2.4 Confirmation of completion of required reading shall be made via that same e-mail or Required Reading Cover Sheet to the Confirmation Program Manager or Designee.
- 8.2.5 Required reading documents are identified in Attachment 1, Required Reading for Project Level Positions.
- 8.2.6 Employees shall review each document revision prior to assigned due date.
- 8.2.7 Employees will complete acknowledgment, documenting understanding of changes and impacts, via required reading notification e-mail or signing the Required Reading Cover Sheet. If questions arise, they will direct questions to PCR or Confirmation Program Manager.
- 8.2.8 Understanding of required reading changes to procedures may include a performance, demonstration, or verbal feedback to the PCR or Designee.
- 8.2.9 Periodic reminders shall be sent by the PCR to the Confirmation Program Manager identifying outstanding required reading for their respective organizations.
- 8.3 Required Reading for Supplemental Information**
- 8.3.1 Supplemental required reading includes need-to-know corporate information, safety bulletins, lessons learned, or information that will add value to the TRU waste confirmation activities, but are not a prerequisite for indoctrination or performing work.
- 8.3.2 Supplemental required reading for personnel will be assigned by the PCR or Confirmation Program Manager.

Conduct of Operations for TRU Waste Confirmation
WP 02-RC.13, Rev. 4

Attachment 1 – Required Reading for project Level Positions

| Procedure | Document Name | Program Manager | PCR | Lead Operator | VE Operator | Radiography Operator |
|--------------|--|-----------------|----------|---------------|-------------|----------------------|
| WP 13-1 | <i>Washington TRU Solutions LLC Quality Assurance Program Description</i> | X | X | X | X | X |
| N/A | <i>Waste Isolation Pilot Plant Hazardous Waste Facility Permit, Attachment C7</i> | X | X | X | X | X |
| WP 02-RC.11 | <i>Qualification and Certification of Personnel Performing Radiography for TRU Waste Confirmation</i> | X | X | X | | X |
| WP 02-RC.12 | <i>Qualification and Certification of Personnel Performing Visual Examination for TRU Waste Confirmation</i> | X | X | X | X | |
| WP 02-RC.13 | <i>Conduct of Operations for TRU Waste Confirmation</i> | X | X | X | X | X |
| WP 02-RC1101 | <i>Visual Examination for TRU Waste Confirmation</i> | X | X | X | X | |
| WP 02-RC1102 | <i>Review of Radiography Media for TRU Waste Confirmation</i> | X | X | X | | X |
| WP 02-RC1103 | <i>Radiography Inspection Operating Procedure for TRU Waste Confirmation</i> | X | X | X | | X |
| WP 02-RC1105 | <i>Electronic Notification, Container Selection, and Data Entry for TRU Waste Confirmation</i> | X | X | X | X | X |
| WP 02-RC1107 | <i>Management of Nonconforming Waste Identified During TRU Waste Confirmation</i> | X | X | X | X | X |
| WP 02-RC1108 | <i>Review of Visual Examination Records for TRU Waste Confirmation</i> | X | X | X | X | |

WP 02-RC.12
Revision 3

Qualification of Personnel
Performing Visual Examination for
TRU Waste Confirmation

Cognizant Department: Regulatory Compliance

Approved by: R. R. Chavez



Qualification of Personnel Performing
Visual Examination for TRU Waste Confirmation
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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|--|
| 1 | 06/30/10 | Corrected title of VE SME. Changed residual to observable liquid in Step 5.1. |
| 2 | 12/29/10 | Incorporate permit-related changes. |
| 3 | 06/15/11 | Editorial changes include: Removed PCR from Section 4.0 Responsibilities. |

1.0 INTRODUCTION^{1,2}

This document establishes the program as specified in the Hazardous Waste Facility Permit (HWFP) Attachment C7 for the control and administration of qualifications of Permittee's personnel performing visual examination (VE) for waste confirmation in accordance with the documents referenced below:

- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*, Sections on Special Processes and Qualification of Inspection and Test Personnel

The scope of this program covers all personnel performing VE for waste confirmation activities. The training and qualification process outlined in this document is for VE Level 1 Operators, VE Level 2 Operators, and VE Experts.

RECORDS

All records associated with Washington TRU Solutions LLC (WTS) VE training, examinations, appointments, qualifications, and certifications shall be contained in the individual's WTS Technical Training files.

2.0 REFERENCES

- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*
- WP 14-TR3005, *Preparation, Administration, and Grading of Examinations*

3.0 DEFINITIONS

Closed-book Examination: An examination administered without access to reference material except for materials supplied with or in the examination.

Documented: The condition of being in written form.

Employer: The corporate, private or public entity which employs personnel for wages, salary, fees or other considerations.

Experience: Work activities accomplished in VE and related activities under the direction of qualified supervision, but not including time spent in organized training programs.

Qualification: Demonstrated skill, demonstrated knowledge, documented training, and documented experience required for personnel to properly perform the duties of a specific job.

Training: The organized process developed to impart the knowledge and skills necessary for qualification.

4.0 RESPONSIBILITIES

Confirmation Program Manager and/or Confirmation Project Manager shall:

- Ensure that designated VE personnel are qualified in accordance with this program and maintain current certifications.
- Ensure that VE Level 1 personnel are requalified biennially.
- Ensure that VE Level 2 personnel are requalified biennially.
- Ensure that VE Level 1 and VE Level 2 personnel training records are complete, accurate, and current.

5.0 REQUIREMENTS

5.1 Qualification Process

The qualification process for Level 1 and Level 2 VE Operators involves instruction in the specific waste generating processes, typical packaging configurations, waste material parameters, and waste matrix codes for each waste stream at each generator/storage site from which waste is being shipped. Upon completion of the qualification process, the student will be able to perform VE or perform a review of VE media/records in a safe manner and will be able to confirm that the waste contains no ignitable, corrosive, or reactive waste. This is achieved by confirming that the waste contain no observable liquid in excess of Treatment, Storage, and Disposal Facility (TSDF) Waste Acceptance Criteria (WAC) limits or compressed gases and that the physical form of the waste matches the waste stream description documented on the Waste Stream Profile form. Competency will be demonstrated by successfully passing a comprehensive exam based upon training of enabling objectives. The comprehensive exam will address the VE operation, documentation, and procedural elements stipulated in the Waste Analysis Plan (WAP) and a practical capability demonstration in the presence of an appointed Permittees' VE Subject Matter Expert (SME) shall be performed. Initial qualifications shall be performed in the presence of an appointed Permittee's VE Expert (VEE).

NOTE

The comparability of Confirmation VE data from different operators shall be enhanced by using standardized VE procedures and operator qualifications.

5.2 Levels of Qualification

An individual in the process of qualifying to a VE Level 1 or a VE Level 2 is considered a trainee. A trainee will work with a certified individual and will not work independently.

5.2.1 VE Level 1 Qualification

VE Level 1 personnel will be qualified to review VE media and records. The VE Level 1 will be thoroughly familiar with the general principles of VE, the scope and limitations therein.

Personnel considered qualified for VE Level 1 Operator must have sufficient education, training, and experience to ensure understanding of the principles and procedures of those areas of waste confirmation.

5.2.2 VE Level 2 Qualification

VE Level 2 personnel will be qualified to perform confirmation by VE and/or a review of VE media and records. VE Level 2 personnel will be thoroughly familiar with the general principles and practices of VE and the scope and limitations therein.

VE Level 2 personnel will exercise assigned responsibility for on-the-job training and guidance of trainees.

Personnel considered qualified for VE Level 2 Operator must have sufficient education, training and experience to ensure understanding of the principles and procedures of those areas of waste confirmation.

5.2.3 Visual Examination Expert

The selection, qualification, and training requirements of waste confirmation visual examination expert (VEE) consists of the following:

- The VEE must be VE Level 2 trained.
- The VEE is selected by waste confirmation management.
- The VEE must complete and maintain SME/OJT.
- The VEE must complete SME oral board for VE.

Qualification of Personnel Performing
Visual Examination for TRU Waste Confirmation
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- The VEE is designated by management and letter is placed in training file.
- The VEE shall be familiar with the waste generating processes.
- The VEE shall be responsible for the overall direction and implementation of VE for TRU Waste Confirmation.

5.3 Education

To be considered qualified, VE Level 1 or VE Level 2 personnel must possess an academic or vocational high school diploma or equivalent.

5.4 Training Programs

The Permittees' VE operators performing waste confirmation shall be trained in accordance with the requirements of the HWFP.

NOTE

Accuracy is maintained by requiring confirmation operators to pass a comprehensive examination and demonstrate satisfactory performance in the presence of the VE Subject Matter Expert during their initial qualification and subsequent requalification.

5.4.1 VE Level 1 Qualification

Personnel being considered for qualification will complete training as required by the HWFP to become a qualified VE Level 1 Operator. Competency will be demonstrated by successfully passing a comprehensive exam which must be completed with a passing grade.

5.4.2 VE Level 2 Qualification

Personnel being considered for qualification will complete sufficient training as required by the HWFP to become a qualified VE Level 2 Operator. Competency will be demonstrated by successfully passing a comprehensive exam which must be completed with a passing grade. A capability demonstration shall be performed in the presence of an appointed site Permittees' VE SME.

5.5 Examinations

Examination results shall be maintained in the WTS Technical Training records for VE Level 1 and VE Level 2 personnel.

5.5.1 General Written Examinations for VE Level 1 Operator

The general examination for VE Level 1 Operator will cover the basic principles and requirements to review VE records. The general examination will also consist of all items required in the HWFP. The general examination will be closed-book and consists of ten (10) questions and is in accordance with WIPP procedure WP 14-TR3005.

5.5.2 General Written Examinations for VE Level 2 Operator

The general examination for VE Level 2 Operator will cover the basic principles, techniques, scope, and limitations of the VE method. The general examination will also consist of all items required in the HWFP. The general examination will be closed-book and consists of ten (10) questions and is in accordance with WIPP procedure WP 14-TR3005.

5.6 Practical Demonstrations

Practical demonstration results shall be maintained in the WTS Technical Training records for VE Level 1 and VE Level 2 personnel.

5.6.1 Practical Demonstration for VE Level 1 Operator

VE Level 1 personnel will perform a practical capability demonstration in the presence of an experienced qualified VE SME. VE Level 1 personnel will demonstrate familiarity with (through a simulated VE process), and the ability to identify the necessary prohibited items through review of VE media and records.

5.6.2 Practical Demonstration for VE Level 2 Operator

VE Level 2 personnel will perform practical capability demonstrations in the presence of an appointed site Permittee VE SME. VE Level 2 personnel will demonstrate familiarity with (through a simulated VE process), and the ability to identify the necessary prohibited items through performing VE and/or reviewing VE media and records.

5.7 Grading

Qualification for VE Level 1 and VE Level 2 personnel will require a score on the General and Practical examinations of 80% or greater.

5.8 Re-examination

Personnel failing to obtain minimum scores during initial qualification shall wait 30 days, as deemed necessary by training requirements, or having received suitable additional training as determined by the employer before re-examination.

5.9 Requalification for VE Level 1 and VE Level 2 Operators

VE Level 1 and VE Level 2 Operators will be subject to requalification, by means of re-examination, at least once every two years by the end of the month in which qualified.

5.10 VE File Contents Requirements

The WTS Technical Training files are the official files for all VE Level 1 and Level 2 personnel, training, qualification, and data.

WP 02-RC.11
Revision 6

Qualification and Certification of NDE Personnel Performing Radiography for TRU Waste Confirmation

Cognizant Department: Regulatory Compliance

Approved by: R. R. Chavez



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NDE Personnel Performing TRU Waste Confirmation
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CHANGE HISTORY SUMMARY

| REVISION NUMBER | DATE ISSUED | DESCRIPTION OF CHANGES |
|------------------------|--------------------|--|
| 4 | 06/30/10 | Updated document for Class 2 modification changes. Added Attachment 9 for Sample NDE Test/Training Drum Inventory. |
| 5 | 12/29/10 | Incorporate permit-related changes including: Name change on doc to add TRU to title PMR to Permittee's Confirmation Representative (PCR) Added GET-21X to Training |
| 6 | 06/15/11 | Editorial changes include: Changed WRES to RES. Deleted PCR from Section 4.0 Responsibilities |

1.0 INTRODUCTION^{1,2}

This document establishes the program, Hazardous Waste Facility Permit (HWFP) C7 requirements and Attachment 7, Written Practice, for the control and administration of qualification and certification of Permittee's personnel performing radiography for confirmation in accordance with the documents referenced below:

- American Society for Nondestructive Testing (ASNT) Recommended Practice SNT-TC-1A (1980)
- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*, Section 2.1.5, Special Processes, and Section 2.4.1.2, Qualification of Nondestructive Examination Personnel

The scope of this program covers all personnel performing radiography for waste confirmation activities. The training, qualification, and certification process outlined in this document is for Nondestructive Examination (NDE) Level 1 and NDE Level 2 operator for Real-Time Radiography (RTR).

RECORDS

All records associated with Washington TRU Solutions LLC (WTS) RTR training, examinations, appointments, qualifications, and certifications shall be contained in the individual's WTS Technical Training files and part of the Waste Isolation Pilot Plant (WIPP) Operating Record.

2.0 REFERENCES

- ASNT Recommended Practice SNT-TC-1A (1980 Edition)
- Hazardous Waste Facility Permit, EPA Identification No. NM4890139088
- WP 13-1, *Washington TRU Solutions LLC Quality Assurance Program Description*
- WP 14-TR3005, *Preparation, Administration, and Grading of Examinations*
- EA02RC11-1-0, *RES Physical (Vision Examination)*

3.0 DEFINITIONS

Certification: Written testimony of qualification.

Certifying authority: The person, persons or office designated to sign certifications on behalf of the employer.

Closed-book examination: An examination administered without access to reference material except for materials supplied with or in the examination.

Documented: The condition of being in written form.

Employer: The corporate, private or public entity which employs personnel for wages, salary, fees or other considerations.

Experience: Work activities accomplished in a specific Nondestructive Testing (NDT) method under the direction of qualified supervision including the performance of the NDT method and related activities, but not including time spent in organized training programs.

Nondestructive Examination (NDE), Nondestructive Inspection (NDI), Nondestructive Testing (NDT): Related terms with identical meaning having to do with various methods of material inspection which do not damage the materials during the inspection process. RTR is a subset of these methods.

Outside Agency: A company or individual who provides NDE Level 3 services and whose qualifications to provide these services have been reviewed by the organization engaging the company or individual.

Qualification: Demonstrated skill, demonstrated knowledge, documented training, and documented experience required for personnel to properly perform the duties of a specific job.

Real-Time Radiography (RTR): A NDE method whereby an image is produced electronically rather than on film, so that very little lag time occurs between the item being exposed to radiation and the resulting image. (Also called "real-time radioscopy.")

Training: The organized process developed to impart the knowledge and skills necessary for qualification.

RES: Regulatory and Environmental Services

4.0 RESPONSIBILITIES

Confirmation Program Manager and/or Confirmation Project Manager shall:

- Ensure that designated RTR personnel are qualified in accordance with this program and maintain current certifications.
- Ensure that NDE Level 1 Personnel are qualified on a training drum biennially.
- Ensure that NDE Level 2 Personnel are qualified on a test drum biennially.
- Ensure that NDE Level 1 and NDE Level 2 Personnel training records are complete, accurate, and current.

5.0 REQUIREMENTS

5.1 Qualification Process

The qualification process for Level 1 and Level 2 NDE operator involves documented hours of formal training, documented hours of supervised practical experience, and compliance with the requirements listed in Attachment 2 and 5. Upon completion of the qualification process and passing the eye exam, appropriate personnel will review the documentation, and if it is satisfactory, testify to such by certifying the technician to the appropriate level. Management concurrence is indicated by endorsement of the certifying document.

5.2 Levels of Qualification

An individual in the process of qualifying to a NDE Level 1 operator or a NDE Level 2 operator is considered a trainee. A trainee will work with a certified individual and will not work independently.

5.2.1 NDE Level 1 Qualification

NDE Level 1 operators will be qualified to perform confirmation by a review of radiography media and records. The NDE Level 1 will be thoroughly familiar with the general principles of RTR, the scope and limitations of the methods for which the individual is qualified. NDE Level 1 operator will perform waste confirmation through media and record review for the Permittees.

5.2.2 NDE Level 2 Qualification

NDE Level 2 operator will be qualified to set up and calibrate equipment and to interpret and evaluate results and to complete all applicable forms and reports. The NDE Level 2 will be thoroughly familiar with the general principles and practices of RTR, the scope

and limitations of the methods for which the individual is qualified, and will exercise assigned responsibility for on-the-job training and guidance of trainees. The NDE Level 2 will be able to prepare written instructions and to organize and report examination results. NDE Level 2 operator will perform waste confirmation for the Permittees by either review of records or performing radiography on waste containers.

5.3 Education, Training, and Experience Requirements for Initial Qualification

Personnel considered qualified for NDE Level 1 and NDE Level 2 operator must have sufficient education, training and experience to ensure understanding of the principles and procedures of those areas of waste confirmation.

To be considered qualified, a candidate must satisfy the following criteria:

5.3.1 Education

NDE Level 1 and NDE Level 2 operator must possess an academic or vocational high school diploma or equivalent.

5.3.2 Training Programs

NDE Level 1 - Personnel being considered for qualification will complete sufficient organized training to become a qualified NDE Level 1 operator per Section 5.2.1. Organized training shall consist of formal training by an approved individual capable of meeting this criteria. The training program will include an examination for the purpose of demonstrating proficiency and comprehension and meeting the applicable requirements which must be completed with a passing grade. NDE Level 1 must satisfy the eligibility requirement specified in Attachment 2.

NDE Level 2 - Personnel being considered for qualification will complete sufficient organized training to become a qualified NDE Level 2 operator per Section 5.2.2. Organized training shall consist of formal training by an approved individual capable of meeting this criteria. Documented experience hours by method may be accepted based on previous work scope or job positions, or qualification of individuals for the RTR methods currently used at the generator/storage sites as listed in Table 1, as well as completion with passing grade of a required examination. Documented experience hours by method may be accepted based on previous work scope or job positions. NDE Level 2 must satisfy the eligibility requirement specified in Attachment 4.

5.4 Examinations

Examination results shall be maintained in the WTS Technical Training records and in the WIPP Operating Record for NDE Level 1 and NDE Level 2 operators.

5.4.1 Physical Examination

All NDE Level 1 and NDE Level 2 applicants will pass a vision acuity examination to assure natural or corrected near-distance acuity in at least one eye per the Jaeger Number 1 Vision Examination, or equivalent type and size letters at a distance of not less than twelve (12) inches on a standard Jaeger test chart.

The eye examination will demonstrate the capability of distinguishing and differentiating contrast between the colors used in the method being applied for. The radiography media is only in black and white. Therefore, only the capability to distinguish shades of gray (not color) is required.

The eye examination will be administered on an annual basis by appropriate medical personnel or another designated qualified person. These results are maintained in the individual's WTS Health Services and Technical Training records.

Results of the eye examination will be documented on EA02RC11-1-0, or an equivalent form, by the personnel administering the exam. (See sample Physical, Vision Examination, Attachment 8.)

The forms will be reviewed by the waste confirmation supervisors.

Any portion of the form that is marked as "Fail" will require the individual be retested and the Confirmation Program Manager and/or Confirmation Project Manager will be notified within 24 hours.

Personnel who fail any portion of the eye examination will not be permitted to perform radiography reviews until the successful completion of the eye examination.

All successfully completed eye examination forms will be submitted to the RES NDE Level 3 representative for signature within 30 calendar days of successful completion of the exam. After the eye examination form is signed by the RES NDE Level 3 representative, a confirmation supervisor will ensure that the form is transferred to WTS Health Services and Technical Training.

5.4.2 General Written Examinations for NDE Level 1

The general examination for NDE Level 1 operator will cover the basic principles, requirements, and regulations of Radiography. The general examination will also consist of all items required as shown in Attachment 2. The general examination will be closed-book and be in accordance with Attachment 7.

5.4.3 General Written Examinations for NDE Level 2

The general examination for NDE Level 2 operator will cover the basic principles, techniques, scope, and limitations of the RTR method. The general examination will

also consist of all items required as shown in Attachment 4. The general examination will be closed-book and be in accordance with Attachment 7.

5.4.4 Specific Written Examination for NDE Level 1

The specific examination should address the equipment, operating procedures, and test techniques that the applicant may encounter during specific assignments to the degree required by the employer's written practice.

The specific examination should also cover the specifications or codes and acceptance criteria used by the employer in his nondestructive testing procedures.

5.4.5 Specific Written Examination for NDE Level 2

The specific examination should address the equipment, operating procedures, and test techniques that the applicant may encounter during specific assignments to the degree required by the employer's written practice.

The specific examination should also cover the specifications or codes and acceptance criteria used by the employer in his nondestructive testing procedures.

5.4.6 Practical Examinations for NDE Level 1

The NDE Level 1 operator will demonstrate familiarity with, and the ability to identify, the necessary prohibited items through review of a RTR training drum video, and to record and analyze the resultant information to the degree required. The practical examination is to be in accordance with Attachment 7.

5.4.7 Practical Examinations for NDE Level 2

The NDE Level 2 operator will demonstrate familiarity with, and the ability to operate, the necessary examination equipment, and to record and analyze the resultant information to the degree required. The practical examination is to be in accordance with Attachment 7.

At least one test drum, as defined in the WIPP HWFP, will be examined and the candidate must successfully identify all required items listed on Attachment 9.

5.4.8 Grading

Qualification for NDE Level 1 and NDE Level 2 operators will require a score on the examination of 80% or greater. Grading will be in accordance with Attachment 7.

5.5 Re-examination

Personnel failing to obtain minimum scores during initial qualification shall wait at least 30 days before re-examination, or having received suitable additional training as determined by the employer before re-examination.

5.6 Certification

After all qualifications for NDE Level 1 and NDE Level 2 operators have been met, the Confirmation Program Manager shall prepare a formal letter to file attesting that all qualification requirements have been met. Management's endorsement of the letter constitutes certification. The original will be placed in the appropriate training file and a copy presented to the individual.

5.7 Recertification for NDE Level 1 and NDE Level 2 Operators

NDE Level 1 and NDE Level 2 operators will be subject to recertification, by means of re-examination, at least once every two years by the end of the month in which certified.

5.8 NDE File Contents Requirements

The WTS Technical Training files are the official files for all Level 1 and Level 2 RTR training, qualification, and certification data. Copies of the training records will also be maintained in the WIPP Operating Record.

The PCR shall verify that the data on Attachment 3 for NDE Level 1 operator, and Attachment 6 for a NDE Level 2 operator, are retained in the WTS Technical Training files by updating and signing the summary sheet. The original signed summary sheet shall be retained in the WTS Technical Training files.

Attachment 1 – Radiography Training Requirements

RCRA Hazardous Waste Management Job Description

Position Title: Radiographer NDE Level 1 (Radiography Independent Technical Reviewer)

Duties: Reviews radiography record performed by another radiographer

Requisite Skills, Experience, and Education: Academic or vocational high school diploma or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET- 21X)
- General Employee Training Refresher (GET-20XA/GET-21XA)
- Conduct of Shift Operations (OPS 115) (Once)
- Radiography Training (NDE Level I)

Attachment 2 – NDE Level 1 (HWFP- F2) Requirements

COURSE: Radiography (NDE Level 1)

TYPE: Classroom/On-the-Job Training (OJT)

OBJECTIVES:

Upon completion of this course and obtaining a grade of at least 80% on a comprehensive examination, the student will be able to review radiography records performed by another radiographer. NDE Level 1 radiographers will perform a practical capability demonstration in the presence of an experienced, qualified radiography operator or trainer.

REFRESHER: Biennially

COURSE DESCRIPTION:

NDE Level 1 radiography operators shall be instructed in the specific waste generating practices and typical packaging configurations expected to be found in each Waste Matrix Code at each site shipping waste to WIPP. The OJT and apprenticeship shall be conducted by an experienced, qualified radiography operator or trainer prior to qualification of the training candidate.

The Permittees' NDE Level 1 radiography training program includes:

Formal Training:

- Project Requirements
- State and Federal Regulations
- Basic Principles of Radiography
- Radiography of Waste Forms (including the ability to identify liquid and compressed gases which will be verified by a radiography subject matter expert)
- Waste Stream-Specific Instruction (e.g., specific waste generating processes, typical packaging configurations, waste material parameters)

Attachment 2 – NDE Level 1 (HWFP- F2) Requirements

OJT:

- System Operation (equipment and procedures used by NDE Level 1 radiographers)
- Identification of Packaging Configurations
- Identification of Waste Material Parameters/Waste Matrix Codes
- Identification of liquid in excess of the limits defined in the TSDF-WAC and compressed gases
- Verification of waste stream description

Attachment 3 – NDE Level 1 Summary Sheet

The NDE Level 1 Summary Sheet shall contain the following information:

- Name of qualified individual
- Level of qualification(s) and test method(s)
- Educational background
- RTR experience
- Statement indicating satisfactory completion of training in accordance with written practice (initial qualification)
- Results of Physical Examination (eye examination)
- Current examination (copies) or evidence of successful completion of the examinations
- Composite grades or suitable evidence of grades
- Dates of qualification and requalification and dates of assignment to RTR
- Signature of designated representative

Attachment 4 – NDE Level 2 Radiography Training Requirements

RCRA Hazardous Waste Management Job Descriptions

Position Title: Radiographer NDE Level 2 (Radiography Independent Technical Reviewer)

Duties: Performs confirmation of waste using radiography
Reviews radiography record performed by another radiographer

Requisite Skills, Experience and Education:

Academic or vocational high school diploma or equivalent.

Training (Type/Amount):

- General Employee Training (GET-19X/GET-21X)
- General Employee Training Refresher (GET-20XA/GET-21XA)
- Radworker II (RAD-201)
- Hazardous Waste Worker (HWW-101/102)
- Respiratory Protection (SAF-630/631)
- Conduct of Shift Operations (OPS115)(Once)
- Technical Safety Requirements (OPS 122) (Once)
- Subject Matter Expert/On the Job Trainer (TRG 293/298)(Biennial)
- Waste Handling Systems (STC-003) (Once)
- Radiography Training (NDE Level 2)

Attachment 5 – NDE Level 2 (HWFP-F2) Requirements

COURSE: Radiography (NDE Level 2)

TYPE: Classroom/OJT

OBJECTIVES:

Upon completion of this course, the student will be able to perform radiography in a safe manner and will be able to confirm whether waste contains ignitable, corrosive, or reactive waste.

Successfully pass a comprehensive exam based upon training enabling objectives. The comprehensive exam will address the radiography operation, documentation, and procedural elements stipulated in this WAP.

Perform practical capability demonstration in the presence of appointed site Permittee radiography subject matter expert.

REFRESHER: Biennially

COURSE DESCRIPTION:

NDE Level 2 radiography operators shall be instructed in the specific waste generating practices and typical packaging configurations expected to be found in each Waste Matrix Code at each site shipping waste to WIPP. The OJT and apprenticeship shall be conducted by an experienced, qualified radiography operator prior to qualification of the training candidate.

The Permittees' NDE Level 2 radiography training program includes:

Formal Training:

- Project Requirements
- State and Federal Regulation
- Basic Principles of Radiography
- Radiographic Image Quality
- Radiographic Scanning Techniques
- Application Techniques
- Radiography of Waste Forms
- Standards, Codes, and Procedures for Radiography
- Waste Stream-Specific Instruction

Attachment 5 – NDE Level 2 (HWFP-F2) Requirements

On-the-Job Training:

- System Operation
- Identification of Packaging Configurations
- Identification of Waste Material Parameters/Waste Matrix Codes
- Identification of liquid in excess of TSDF-WAC limits and compressed gases
- Verification of waste stream description

A radiography training drum shall include items common to the waste streams to be confirmed by the Permittees. The training drums shall be divided into layers with varying packing densities or different drums may be used to represent different situations that may occur during radiography examination by the Permittees. The following elements will be in a radiography training drum(s):

- Aerosol can with puncture
- Horsetail bag
- Pair of coveralls
- Empty bottle
- Irregular shaped pieces of wood
- Empty one gallon paint can
- Full container
- Aerosol can with fluid
- One gallon bottle with three tablespoons of fluid
- One gallon bottle with one cup of fluid (upside down)
- Leaded glove or leaded apron
- Wrench

These items shall be successfully identified by the operator as part of the qualification process.

Requalification of operators shall be based upon evidence of continued satisfactory performance (primarily video/audio reviews) and shall be done at least every two years. Unsatisfactory performance will result in disqualification. Unsatisfactory performance is defined as the misidentification of liquid in excess of the limits (as defined in the TSDF-WAC) or compressed gases in a training drum or a score of less than eighty percent (80%) on the comprehensive exam. Retraining and demonstration of satisfactory performance are required before a disqualified operator is again allowed to operate the radiography system for the Permittees.

Attachment 6 – NDE Level 2 Summary Sheet

The NDE Level 2 Summary Sheet shall contain the following information:

- Name of certified individual
- Level of certification(s) and test method(s)
- Educational background
- NDE experience
- Statement indicating satisfactory completion of training in accordance with written practice (initial certification)
- Results of Physical Examination (eye examination)
- Current examination (copies) or evidence of successful completion of the examinations
- Other suitable evidence of satisfactory qualifications when such qualifications are used in lieu of examination
- Composite grades or suitable evidence of grades
- Dates of certification and recertification and dates of assignment to NDE
- Signature of designated representative

Attachment 7 –RES – Waste Confirmation Program

**WRITTEN PRACTICE FOR THE QUALIFICATION AND CERTIFICATION OF
NONDESTRUCTIVE PERSONNEL ASSIGNED TO WASTE CONFIRMATION**

1.0 SCOPE

- 1.1 This Written Practice establishes requirements for the qualification and certification of RES personnel assigned to Waste Confirmation, whose specific jobs require appropriate knowledge of the technical principles underlying the nondestructive tests they perform, witness, monitor, or evaluate. This written practice meets the guidelines established by the American Society for Nondestructive Testing (ASNT), Recommended Practice Number SNT-TC-1A 1980 edition.
- 1.2 Qualification and certification of nondestructive testing (NDT) personnel in accordance with this procedure is applicable to the following method:
- (a) Radiographic Testing (RT)
- 1.3 Personnel certified in accordance with this written practice are considered to meet the qualification and certification recommendations of the previous editions of SNT-TC-1A.

2.0 DEFINITIONS

- 2.1 The terms included in this procedure are defined as follows:

ASNT Certificate Holder: An individual possessing a current valid ANST (American Society for Nondestructive Testing) certification in one or more nondestructive methods.

RES Level 3: An ASNT Level 3 Certificate Holder in radiographic and nondestructive testing employed by PQT Services, VJ Technologies, or Wheelis NDT, certified as a NDE Level 3 in accordance with this written practice. This individual may provide assistance to the Certifying Authority in the administration of this certification procedure, evaluation of NDE personnel competency, preparation, and grading of certification examinations and the development of standard operating procedures. The Certifying Authority may delegate to the PQT Level 3, VJ Technologies, or Wheelis NDT, NDE Level 3 various activities associated with the certification of personnel with the exception of the authority to certify personnel to any level of competency. When the term "Level 3" is used in this procedure, the term "Outside Level 3" is synonymous.

Certification: Written testimony of qualification to a specific level of competency, issued by PQT Services, VJ Technologies, or Wheelis NDT.

Certifying Agencies: PQT Services, VJ Technologies, Wheelis NDT

Attachment 7 –RES – Waste Confirmation Program

Certifying Authority: The person or persons properly designated by the Program Supervisor of RES Waste Confirmation to sign certification documents and to act in the capacity described in the Written Practice. This designation shall be in writing and shall be kept of file. When the Certifying Authority is not certified as a NDE Level 3 in the applicable method, the Certifying Authority shall seek input from an approved certified NDE Level 3, when evaluation and approving items requiring specific NDE technical knowledge, as indicated in this written practice.

Closed Book Examination: An examination administered without access to reference material except for materials supplied with or in the examination.

Documented: The condition of being in written form or in RES personnel work history file.

Employer: Regulatory Environmental Service (RES).

Experience: Work activities accomplished in a specific NDE method under the guidance of a qualified NDE Level 1 or NDE Level 2, including the performance of the NDE method and related activities, but not including time spent in the initial organized training programs to meet the minimum requirement of Table I. Upon completion of the experience required for each level of qualification, the individual must be fully capable of operating independently at the desired level of qualification. If the individual is determined by the NDE Level 3 or Certifying Authority to be incapable of operating at this desired level, the individual shall receive additional experience, as determined by the Certifying Authority. Refresher training and specific job function training may be credited as experience when the individual has documented evidence of meeting the minimum required initial organized training indicated in Table I.

Initial Organized Training: An organized program developed to impart the knowledge and skills necessary for qualification to a specific level of competency as specified in Table I.

NDE Level 3 Examiner: A certified NDE Level 3 individual having responsibility for preparing, administering and grading the examinations for certification. The NDE Level 3 Examiner shall be certified for RTR Method and approved by the RES Certifying Authority.

Nondestructive Testing: A process that involves the inspection, testing or evaluation of materials, components and assemblies for materials discontinuities, properties and without further impairing or destroying the parts serviceability.

Outside Agencies: A company or individual who provides NDE Level 3 services and whose qualifications to provide these services have been reviewed and approved by RES Certifying Authority.

Attachment 7 –RES – Waste Confirmation Program

Outside Level 3: An individual indirectly employed by RES to assist the Certifying Authority in the administration of this written practice. The Certified Authority may delegate to the Outside Level 3 various activities associated with the certification of personnel with the exception of the authority to certify personnel to any level of competency. When the term "Level 3" is used in this written practice, the term "Outside Level 3" is synonymous.

Qualification: Demonstrated skill and knowledge, along with documented training and experience required for personnel to properly perform the duties of a specific level of competency.

Qualified Individual: A RES employee meeting the qualification requirements of this written practice for a specific level of competency.

Refresher Training: An organized program developed to reinforce the knowledge and skills necessary for continued satisfactory performance to a specific level of competency. This training shall be conducted by a NDE Level 3 qualified in the specific method. Refresher training may be credited as experience to achieve the next level of competency, when the following conditions are met:

- a. Individuals have previously met the minimum training requirements for the specific level of competency as specified in Table 1.
- b. Individuals have passed the examinations for the specific level of competency as specified in Section 1.0 of this attachment and received certification in that method.
- c. Training program focuses on the specific duties the individual is required to perform on a routine basis. This focus must include the specific requirements of RES Standard Specifications, SNT-TC-1A 1980, Contract Special Provisions, and RES Standard Procedures and Protocols.

Recommended Practice: A set of guidelines to assist RES in developing uniform procedure for the qualification and certification of NDE personnel to satisfy RES specific requirements.

Training: An organized program developed to impart the knowledge and skills necessary for qualification.

RES: Regulatory and Environmental Services

Attachment 7 –RES – Waste Confirmation Program

3.0 REFERENCE DOCUMENTS

3.1 Unless otherwise specified, the following documents of the issue listed form a part of this written practice.

a. SNT-TC-1A, 1980

4.0 GENERAL REQUIREMENTS

4.1 This written practice has been prepared to establish guidelines for the qualification and certification of RES Waste Confirmation Personnel whose specific jobs require appropriate knowledge of the technical principles underlying the nondestructive tests they perform, witness, monitor, or evaluate. This written practice shall be used for the control and administration of RES NDE Personnel, training, qualification, examination, and certification.

4.2 RES Confirmation personnel performing, witnessing, monitoring, or assuring procedure compliance of any nondestructive testing shall be trained, qualified, examined and certified in accordance with this written practice.

4.2.1 The training outlines, examination results, and records of qualification and certification of RES personnel shall be kept complete and available for inspection.

4.2.2 All initial certifications shall be by means of examinations as described in paragraph 8.0 of this attachment.

4.3 The NDE Level 3 personnel responsible for administering the qualification and certification program, conducting the training, preparing and administering examinations for qualification in accordance with this procedure, must be knowledgeable of the procedures, codes and specifications utilized by RES. In addition, the NDE Level 3 must possess a current ASNT Level 3 certification in that discipline.

5.0 LEVELS OF QUALIFICATION

5.1 There shall be three basic levels of qualification in NDE methods.

5.1.1 Trainee: Prior to certification, while in the process of being trained and qualified, an individual shall be considered a Trainee. A Trainee shall work with a certified individual and shall not independently conduct, interpret, evaluate, or report the results of any NDE test.

5.1.2 NDE Level 1: Reviews radiography record performed by another radiographer (with specific instructions). An NDE Level 1 individual shall be qualified to

Attachment 7 –RES – Waste Confirmation Program

perform specific calibrations, specific NDE, and specific evaluations for acceptance or rejection determinations according to specific written instructions and to record the results. The assigned duties and responsibilities of the NDE Level 1 shall be clearly defined by the Certifying Authority. The NDE Level 1 shall receive the necessary specific instruction or guidance from a certified NDE Level 2 or NDE Level 3.

- 5.1.3 NDE Level 2: Performs confirmation of waste using radiography/reviews radiography record performed by another radiographer (with specific written instructions). An NDE Level 2 individual shall be qualified to set up and calibrate equipment for testing to perform examinations, and to interpret and evaluate the results with respect to applicable codes, standards and specifications. The NDE Level 2 shall be familiar with the scope and limitations of the methods for which they are qualified and shall exercise assigned responsibility for on-the-job training and guidance of trainees.
- 5.1.4 NDE Level 3: Individual shall be capable of establishing techniques and procedures; interpreting codes, standards, specifications, and procedures; and designating the particular NDE methods, techniques, and procedures to be used. The NDE Level 3 shall possess and maintain a current ASNT Level 3 certificate in each of the NDE methods for which they are responsible. The NDE Level 3 shall have sufficient practical background in applicable materials, fabrication, and/or product technology to establish techniques and to assist in establishing acceptance criteria where none is otherwise available.

6.0 EDUCATION, TRAINING, AND EXPERIENCE

- 6.1 Personnel considered for certification shall have sufficient education, training, and experience to ensure an understanding of the principles and procedures of those methods in which they are being considered for certifications.
- 6.1.1 Table 1 states the minimum required training and experience for initial qualification to NDE Level 1 and NDE Level 2.
- 6.1.2 To be considered a candidate for certification as a NDE Level 3 the individual must possess and maintain a current ASNT Level 3 certificate and one of the following criteria shall be satisfied for each NDE method for which certification is sought.
- a. Graduate of a four-year college or university with a degree in Engineering or Science plus one additional year of experience beyond the NDE Level 2 requirements in an assignment comparable to that of an NDE Level 2 in that applicable test method.

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- b. Completion with a passing grade of at least two year of engineering or science at a university, college, or technical school, plus two additional years of experience beyond the NDE Level 2 requirements in an assignment at least comparable to that of an NDE Level 2, in the applicable test method.
 - c. Four years experience beyond the NDE Level 2 requirements in an assignment at least comparable to that of an NDE Level 2, in the applicable test method.
- 6.1.3 Training shall be conducted as outlined in the appendix to SNT-TC-1A, 1980 Edition, "Recommended Training Courses" (as applicable), except that subjects which do not apply to NDE applications in use by RES may be deleted from the training, when approved by the NDE Level 3 and Certifying Authority. The prescribed training hours may not be reduced below those shown in attached Table 1 for the applicable method as a result of such deletions. The training program should include sufficient examinations to ensure understanding of the necessary information. Training administered by technical institutions, industrial organizations, colleges, universities, and service organizations shall be considered equivalent to the training outlined in the appendix subject to the approval of the NDE Level 3 and Certifying Authority.
- 6.1.4 Documentation of prior certification may be accepted as evidence of meeting the education, training, and experience requirements for comparable levels of certification, when approved by the Certifying Authority.

7.0 TRAINING PROGRAMS

- 7.1 Personnel considered for certification to a specific level of competency shall complete RES approved training courses to become thoroughly familiar with the principles and practice of the applicable NDE method as they relate to RES specific applications. Other approved training, which meets the requirements of Sections 7.2 and 7.3 of this attachment, can be accepted by the RES and/or Outside Level 3 or the designated RES Certifying Authority. The NDE Level 3 may provide additional individual training for personnel receiving other training to ensure that RES specific requirements are understood.
- 7.2 A training manual will be used in all initial organized training programs, which incorporates training course texts, notes, and practical exercises. The training material shall include as a minimum those areas detailed in SNT-TC-1A, 1980 Edition, that are applicable to RES.
- 7.3 All NDE training programs shall be conducted by an individual who is a certified NDE Level 3 in the method to be taught and shall include basic principles and theory of the specific NDE method. The program shall also include practical training to help the individual develop the practical skills necessary to carry out

Attachment 7 –RES – Waste Confirmation Program

the responsibilities of the applicable level of certification. The training program shall include sufficient examinations to assure that the necessary information has been comprehended.

7.4 A minimum General Examination grade of 80% will be considered as evidence that the individual has comprehended the necessary information.

8.0 EXAMINATIONS

8.1 To be considered eligible for certification, the candidate must meet the following requirements.

8.2 An NDE Level 3 Examiner, Outside NDE Level 3, or RES Level 3 shall be responsible for preparing, administering, and grading the examinations for certification. The designated NDE Level 3 may delegate the administration of examinations to a designated representative; however, the NDE Level 3 shall complete the final grading of examinations. If the administration of examinations is delegated by the NDE Level 3, it shall be recorded.

8.3 NDE Level 1 and NDE Level 2 examinations shall consist of the following;

8.3.1 General Examination: A written examination consisting of questions relating to the basic principles and techniques of the applicable NDE (RTR) method. The minimum number of questions shall be:

| NDE Method | Level 1 | Level 2 |
|-------------------|---------|---------|
| Radiography (RTR) | 40 | 40 |

8.3.2 Specific Examination: A written examination consisting of questions relating to the equipment, specifications, and test procedures the individual will be using to carry out their work assignments in the applicable (RTR) method. The minimum number of questions shall be:

| NDE Method | Level 1 | Level 2 |
|-------------------|---------|---------|
| Radiography (RTR) | 20 | 20 |

8.3.3 NDE Level 1 Limited Practical Examination: The candidate for NDE Level 1 certification shall demonstrate proficiency by performing the applicable nondestructive testing technique within the method, and evaluating the results to the degree of responsibility described in this written practice, on one or more samples, approved by the NDE Level 2 and Certifying Authority. At least ten different checkpoints requiring an understanding of the test variables and the

Attachment 7 –RES – Waste Confirmation Program

applicable standards or procedures shall be used by the NDE Level 2 in determining the candidate's proficiency.

8.3.4 NDE Level 2 Practical Examination: The candidate for NDE Level 2 certification shall demonstrate proficiency in selecting and performing the applicable nondestructive testing technique within the method, interpreting, and evaluating the results on one or more samples, approved by the NDE Level 3 and Certifying Authority. At Least ten different checkpoints requiring an understanding of the NDE variables and the applicable standards or procedures shall be used by the NDE Level 3 in determining the candidate's proficiency.

8.3.5 All written examinations shall be taken without access to reference material (closed book), except that necessary data, such as graphs, tables, specifications, procedures, and codes may be provided by the NDE Level 3.

8.3.6 NDE Level 3 Examination: Basic examination (Required only once when more than one method of examination is taken.)

- a. Twenty (20) questions relating to understanding the SNT-TC-1A document.
- b. Fifteen (15) questions relating to applicable materials, fabrication, and product technology.
- c. Fifteen (15) questions which are selected from or are similar to published Level 2 questions for other appropriate NDE methods.

8.3.7 Method Examination:

- a. Thirty (30) questions relating to fundamentals and principles, which are selected for or are similar to published ASNT Level 3 questions for each method.
- b. Fifteen (15) questions relating to application and establishment of techniques and procedures which are selected from or are similar to the published ASNT Level 3 question for each method.
- c. Twenty (20) questions relating to capability for interpreting codes, standards, and specifications relating to the method.

8.3.8 Specific Examination:

Twenty (20) questions relating to specifications, equipment, techniques, and procedures applicable to the employer's product(s) and methods employed, and to the administration of the employer's written practice.

Attachment 7 –RES – Waste Confirmation Program

8.3.9 On the basis of demonstrated ability, achievement, experience, and education as defined in Step 5.1.4 of this Attachment, the employer may waive examination for the Level 3 individual. Written certification should be provided, and evidence supporting the certification should be held on file and be made available when verification is required.

8.4 Vision Examinations: All NDE Personnel shall be given vision examinations as a condition for initial certification as follows:

8.4.1 Near distance, such that the individual is capable of reading with at least one eye the Jaeger 1 type, or equivalent at a distance of not less than 12 inches on a standard Jaeger test chart.

8.4.2 A color contrast differentiation test that demonstrates the capability of distinguishing and differentiating contrast used in the method.

8.4.3 Near vision contrast and differentiation tests shall be conducted annually. These results shall be kept on file for the period of certification.

9.0 GRADING OF EXAMINATIONS

9.1 The NDE Level 3 shall be responsible for administering and grading of examinations. The grading of examinations may be delegated to a designated representative of the NDE Level 3 and so recorded; however, the NDE Level 3 shall perform the final grading and sign off all examination grades.

9.2 NDE Levels 1 and 2 Grading: A composite grade shall be determined by a simple averaging of the general specific, and practical examinations. A passing composite grade of at least 80% is required for certification with no individual examination having a grade less than 80%.

9.3 NDE Level 3 Grading:

9.3.1 The employer shall be responsible for administration and grading of examinations for Level 3 personnel. The actual administration and grading of Level 3 examinations may be performed by a designated representative of the employer.

9.3.2 A composite grade based upon the general, specific, and practical or upon the basic, method, and specific examinations should be developed by the employer. The composite grade may be a simple average of the examinations. A passing composite grade of at least 80% is required for certification with no individual examination having a grade less than 80%.

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10.0 CERTIFICATION

- 10.1 The certification of all levels of NDE personnel is the responsibility of RES.
- 10.2 An Outside Agency such as PQT Services, VJ Technologies, or Wheelis NDT may be used to provide NDE Level 3 Services.
- 10.3 The personnel records of the certified individual shall be maintained on file by RES. It is the responsibility of the RES Certifying Authority to update and maintain these records. These records shall include the following:
- a. Name of certified individual
 - b. Level of certification and limitations for each test method certified.
 - c. Educational background and experience of certified individuals.
 - d. Statement and certificate indicating satisfactory completion of training.
 - e. Results of vision examinations.
 - f. Current examination copy(ies) or evidence of successful completion of examinations.
 - g. Other suitable evidence of satisfactory qualifications when such qualifications are used in lieu of the specified examinations prescribed in Section 8.0 of this attachment.
 - h. Composite grade(s) or suitable evidence of grades.
 - i. Signature of NDE Level 3, or employer's designated representative that verified qualifications of candidate for certifications.
 - j. Date of certification and/or recertification and date of assignment to NDE.
 - k. Certification expiration date.
 - l. Signature of Certifying Authority.

11.0 RECERTIFICATION

- 11.1 NDE Level 1 and NDE Level 2 shall be re-certified at a maximum interval of two years.

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- 11.2 NDE Level 1 personnel shall be re-certified by evidence of continuing satisfactory performance acceptable to the Certifying Authority of RES.
- 11.3 NDE Level 2 personnel shall be re-certified by the successful completion of a practical examination or other examinations as described in Section 8.0 of this attachment and approved by the Certifying Authority of RES.
- 11.4 NDE Level 3 personnel should be recertified at least once every three years in accordance with the following criteria:
- Evidence of continuing satisfactory performance.
- 11.5 All NDE personnel may be re-examined at any time at the discretion of the RES Certifying Authority and have their certifications extended or revoked.
- 11.6 An individual shall be re-examined and re-certified when service is interrupted for a period of six months or more. Interrupted service shall be defined as being completely removed from the applicable NDE discipline. Review of RES Procedures, batch data reports, and radiography review shall qualify as continued service for NDE Level 1 and NDE Level 2 individuals.
- 12.0 TERMINATION
- 12.1 All certifications shall be automatically terminated when an individual leaves the employment of RES.
- 13.0 REINSTATEMENT
- 13.1 An individual previously certified by RES as an NDE Level 1 or NDE Level 2 may have their certifications reinstated by the certifying authority when the following conditions are met:
- a. The individual successfully completes a proficiency examination in the test method, as prescribed by the Certifying Authority. This proficiency examination may be similar to the examinations utilized for the initial certifications as described in Section 8.0 of this attachment. The results of the proficiency examination shall be no less than 80%. Regardless of the type of examination specified by the Certifying Authority.
 - b. The individual's certifications are reinstated within one hundred fifty days of the expiration or termination date.
 - c. The individual was working to the capacity of the level certified within the past six months of the expiration or termination date.

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13.2 A Level 3 whose certification has been terminated may be recertified to his former NDE level by a new employer based on examinations, provided the following conditions are met to the employer's satisfaction.

- a. The employee has proof of prior certification.
- b. The employee was working in the capacity to which they are certified within six months of termination.
- c. The employee is being recertified within six (6) months of their termination.

| TABLE 1 | | | |
|-------------|--------------------------|-----------------------|----------------------------------|
| NDE LEVEL 1 | | | |
| METHOD | INITIAL TRAINING (Hours) | | EXPERIENCE HOURS (as Trainee) |
| | Education Option 1 | Education Option 2 | |
| RTR | 40 | 30 | 40 |

| NDE LEVEL 2 | | | |
|-------------|-----------------------------|-----------------------|----------------------------------|
| METHOD | INITIAL TRAINING (Hours) | | EXPERIENCE HOURS (as Trainee) |
| | Education Option 1 | Education Option 2 | |
| RTR | 40 | 35 | 80 |

Notes:

- 1. For NDE Level 2 certification, the experience shall consist of time at NDE Level 1 and NDE Level 2.

RES Waste Confirmation Program Manager Signature of Approval:

Signature Date

Outside NDE Level 3 Signature of Approval:

Signature Date

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Attachment 8 – Sample RES Physical (Vision Examination)

| RES PHYSICAL (Vision Examination) | | |
|--|-------------------------------|-------------------------------|
| Name: | Examination Date: | |
| Examination shall be conducted by the RES NDE Level 3, WTS Health Services, or qualified person designated by the RES NDE Level 3. | | |
| Near Distance Acuity Jaeger 1 in at least one eye @ 12" minimum | Pass <input type="checkbox"/> | Fail <input type="checkbox"/> |
| Corrective Lenses Required: | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| Color Contrast Differentiation Optional: Colored Wire Test | Pass <input type="checkbox"/> | Fail <input type="checkbox"/> |
| Corrective Lenses Required: | Yes <input type="checkbox"/> | No <input type="checkbox"/> |
| | | |
| Examiner Signature | Date | |
| This record has been reviewed and accepted by the RES NDE Level 3. | | |
| NDE Level 3 Signature | Date | |

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Attachment 9 – Sample NDE Test/Training Drum Inventory

| NDE TEST/TRAINING DRUM INVENTORY | | | | |
|---|-------------------------------------|-----------------------|-----------|------|
| Test/Training Drum Identification # | | | Location: | |
| Drum Contents | | | | |
| HWFP-Required Items | Items Identified Y= Yes N= No | Comments | | |
| 1. Aerosol can with puncture | | | | |
| 2. Horsetail bag | | | | |
| 3. Pair of coveralls | | | | |
| 4. Empty bottle | | | | |
| 5. Irregular-shaped pieces of wood | | | | |
| 6. Empty one-gallon paint can | | | | |
| 7. Full container | | | | |
| 8. Aerosol can with fluid | | | | |
| 9. One-gallon bottle with three (3) tablespoons of fluid | | | | |
| 10. One-gallon bottle (upside down) with one (1) cup of fluid | | | | |
| 11. Leaded glove or leaded apron | | | | |
| 12. Wrench | | | | |
| Identification/Discussion of the following | Satisfactory | Unsatisfactory | | |
| Packaging Configuration(s) | | | | |
| Waste Material Parameters | | | | |
| Waste Stream description Summary Category-Waste Matrix Code | | | | |
| Operator: | | | | |
| | Printed Name | Signature | Time | Date |
| **SME/PCR: | | | | |
| | Printed Name | Signature | Time | Date |
| **SME/PCR – Subject Matter Expert/Permittee Confirmation Representative | | | | |