

**ATTACHMENT C3**

**QUALITY ASSURANCE OBJECTIVES AND DATA VALIDATION  
TECHNIQUES FOR WASTE CHARACTERIZATION METHODS**

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## ATTACHMENT C3

### QUALITY ASSURANCE OBJECTIVES AND DATA VALIDATION TECHNIQUES FOR WASTE CHARACTERIZATION METHODS

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1 **ATTACHMENT C3**

2 **QUALITY ASSURANCE OBJECTIVES AND DATA VALIDATION**  
3 **TECHNIQUES FOR WASTE CHARACTERIZATION METHODS**

4 C3-1 Validation Methods

5 The Permittees shall require the generator/storage sites (**sites**) to perform validation of all data  
6 so that data used for Waste Isolation Pilot Plant (**WIPP**) compliance programs will be of known  
7 and acceptable quality.

8 The qualitative data or descriptive information generated by radiography and visual examination  
9 is not amenable to statistical data quality analysis. However, radiography and visual  
10 examination are complementary techniques yielding similar data for determining the waste  
11 matrix code. The waste matrix code is determined to ensure that the container is properly  
12 included in the appropriate waste stream.

13 Data validation will be used to assess the quality of waste characterization data collected based  
14 upon project precision, accuracy, completeness, comparability, and representativeness  
15 objectives. These objectives are described below:

16 Precision

17 Precision is a measure of the mutual agreement among multiple measurements.

18 Accuracy

19 Accuracy is the degree of agreement between a measured result and the true or known value.

20 Completeness

21 Completeness is a measure of the amount of valid data obtained from a method compared to  
22 the total amount of data obtained.

23 Comparability

24 Comparability is the degree to which one data set can be compared to another.

25 Representativeness

26 Representativeness is the degree to which sample represent a characteristic of a population.

27 C3-2 Non Destructive Examination Methods

28 Quality Assurance Objectives

29 The QAOs for non destructive examination (**NDE**) are detailed in this section. NDE can be either  
30 radiography or visual examination (**VE**). If the QAOs described below are not met, then  
31 corrective action shall be taken. It should be noted that NDE is primarily a qualitative  
32 determination. The objective of NDE for the program is to verify that the physical form of the

1 waste matches the waste stream description as determined by AK and the absence of  
2 prohibited items. The Permittees shall require each site to describe all activities required to  
3 achieve these objectives in the site quality assurance project plan (**QAPjP**) and standard  
4 operating procedures (**SOP**).

#### 5 C3-2a Radiography

6 Data to meet these objectives must be obtained from a video and audio recorded scan provided  
7 by trained radiography operators at the sites. Results must also be recorded on a radiography  
8 data form. The precision, accuracy, completeness, and comparability objectives for radiography  
9 data are presented below.

#### 10 Precision

11 Precision is maintained by reconciling any discrepancies between two radiography operators  
12 with regard to identification of the waste matrix code, liquids in excess of TSDf-WAC limits, and  
13 compressed gases through independent replicate scans and independent observations.  
14 Additionally, the precision of radiography is verified prior to use by tuning precisely enough to  
15 demonstrate compliance with QAOs through viewing an image test pattern.

#### 16 Accuracy

17 Accuracy is obtained by using a target to tune the image for maximum sharpness and by  
18 requiring operators to successfully identify 100 percent of the items required to meet the DQOs  
19 for radiography specified in Permit Attachment C, Section C-4a(1) in a training container during  
20 their initial qualification and subsequent requalification.

#### 21 Completeness

22 A video and audio media recording of the radiography examination and a validated radiography  
23 data form will be obtained for 100 percent of the waste containers subject to radiography. All  
24 video and audio media recordings and radiography data forms will be subject to validation as  
25 indicated in Section C3-4.

#### 26 Comparability

27 The comparability of radiography data from different operators shall be enhanced by using  
28 standardized radiography procedures and operator qualifications.

#### 29 C3-2b Visual Examination

30 Results must be recorded on a VE data form. The precision, accuracy, completeness, and  
31 comparability objectives for VE data are presented below.

#### 32 Precision

33 Precision is maintained by reconciling any discrepancies between the operator and the  
34 independent technical reviewer with regard to identification of waste matrix code, liquids in  
35 excess of TSDf-WAC limits, and compressed gases.

1 Accuracy

2 Accuracy is maintained by requiring operators to pass a comprehensive examination and  
3 demonstrate satisfactory performance in the presence of the VE expert during their initial  
4 qualification. VE operators shall be requalified every two years.

5 Completeness

6 A validated VE data form will be obtained for 100 percent of the waste containers subject to VE.

7 Comparability

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

10 C3-3 Acceptable Knowledge

11 Acceptable knowledge documentation provides primarily qualitative information that cannot be  
12 assessed according to specific data quality goals that are used for quantitative techniques. To  
13 ensure that the acceptable knowledge process is consistently applied, the Permittees shall  
14 require sites to comply with the following data quality requirements for acceptable knowledge  
15 documentation:

- 16 • Precision - The qualitative determinations, such as compiling and assessing  
17 acceptable knowledge documentation, do not lend themselves to statistical  
18 evaluations of precision. However, the acceptable knowledge information will be  
19 addressed by the independent review of acceptable knowledge information during  
20 internal and external audits.
- 21 • Accuracy - The percentage of waste containers which require reassignment to a  
22 new waste matrix code and/or designation of different hazardous waste numbers  
23 based on testing data and discrepancies identified by the Permittees during waste  
24 confirmation will be reported as a measure of acceptable knowledge accuracy.
- 25 • Completeness - The acceptable knowledge record must contain 100 percent of the  
26 required information (Permit Attachment C4-3). The usability of the acceptable  
27 knowledge information will be assessed for completeness during audits.
- 28 • Comparability - Comparability is ensured through sites meeting the training  
29 requirements and complying with the minimum standards outlined for procedures  
30 that are used to implement the acceptable knowledge process. All sites must  
31 assign hazardous waste numbers in accordance with Permit Attachment C4-3b  
32 and provide this information regarding its waste to other sites who store or  
33 generate a similar waste stream.
- 34 • Representativeness - Representativeness is a qualitative parameter that will be  
35 satisfied by ensuring that the process of obtaining, evaluating, and documenting  
36 acceptable knowledge information is performed in accordance with the minimum  
37 standards established in Permit Attachment C4. Sites also must assess and  
38 document the limitations of the acceptable knowledge information used to assign

1 hazardous waste numbers (e.g., purpose and scope of information, date of  
2 publication, type and extent to which waste parameters are addressed).

3 The Permittees shall require each generator/storage site to comply with the nonconformance  
4 notification and reporting requirements of Section C3-7 if the results of testing specified in  
5 Permit Attachment C are inconsistent with acceptable knowledge documentation.

6 The Permittees shall require each site to address quality control by tracking its performance with  
7 regard to the use of acceptable knowledge by: 1) assessing the frequency of inconsistencies  
8 among information, and 2) documenting acceptable knowledge inconsistencies identified  
9 through radiography and visual examination. In addition, the acceptable knowledge process and  
10 waste stream documentation must be evaluated through internal assessments by  
11 generator/storage site quality assurance organizations and assessments by auditors external to  
12 the organization (i.e., the Permittees).

### 13 C3-4 Data Review, Validation, and Verification Requirements

14 Procedures shall be developed for the review, validation, and verification of data at the data  
15 generation level; the validation and verification of data at the project level; and the verification of  
16 data at the Permittee level. Data review determines if raw data have been properly collected  
17 and ensures raw data are properly reduced. Data validation verifies that the data reported  
18 satisfy the requirements of this WAP and is accompanied by signature release. Data verification  
19 authenticates that data as presented represent the testing activities as performed and have  
20 been subject to the appropriate levels of data review. The requirements presented in this  
21 section ensure that WAP records furnish documentary evidence of quality.

22 The Permittees shall require the sites to generate the following Batch Data Reports for data  
23 validation, verification, and quality assurance activities:

- 24 • A Testing Batch Data Report or equivalent includes all data pertaining to  
25 radiography or visual examination for up to 20 waste containers without regard to  
26 waste matrix. Table C3-3 lists all of the information required in Testing Batch Data  
27 Reports (identified with an "X") and other information that is necessary for data  
28 validation, but is optional in Testing Batch Data Reports (identified with an "O").

### 29 C3-4a Data Generation Level

30 The following are minimum requirements for raw data collection and management which the  
31 Permittees shall require for each site:

- 32 • All raw data shall be signed and dated in reproducible ink by the person generating  
33 it. Alternately, unalterable electronic signatures may be used.
- 34 • All data must be recorded clearly, legibly, and accurately in field records.
- 35 • All changes to original data must be lined out, initialed, and dated by the individual  
36 making the change. A justification for changing the original data may also be  
37 included. Original data must not be obliterated or otherwise disfigured so as not to  
38 be readable. Data changes shall only be made by the individual who originally  
39 collected the data or an individual authorized to change the data.

- 1           • All data must be transferred and reduced from field records completely and  
2           accurately.
- 3           • All field records must be maintained as specified in Table C-2 of Attachment C.
- 4           • Data must be organized into a standard format for reporting purposes (Batch Data  
5           Report), as outlined in specific testing procedures.
- 6           • All electronic and video data must be stored appropriately to ensure that waste  
7           container and associated QC data are readily retrievable. In the case of classified  
8           information, additional security provisions may apply that could restrict  
9           retrievability. The additional security provisions will be documented in  
10          generator/storage site procedures as outlined in the QAPJP in accordance with  
11          prevailing classified information security standards.

12 Data review, validation, and verification at this level involves scrutiny and signature release from  
13 qualified independent technical reviewer(s) not involved in the generation or recording of the  
14 data under review, as specified below. Individuals conducting this data review, validation, and  
15 verification must use checklists that address all of the items included in this section. Completed  
16 checklists must be forwarded with Batch Data Reports to the project level.

#### 17 C3-4a(1) Independent Technical Review

18 The independent technical review ensures by review of raw data that data generation and  
19 reduction are technically correct; calculations are verified correct; deviations are documented;  
20 and QA/QC results are complete, documented correctly, and compared against WAP criteria.  
21 This review validates and verifies all of the work documented by the originator.

22 One hundred percent of the Batch Data Reports must receive an independent technical review  
23 by a trained and qualified individual who was not involved in the generation or recording of the  
24 data under review. This review shall be performed by an individual other than the data generator  
25 who is qualified to have performed the initial work. The independent technical review must be  
26 performed as soon as practicably possible in order to determine and correct negative quality  
27 trends in the testing process. However at a minimum, the independent technical review must be  
28 performed before any waste associated with the data reviewed is managed, stored, or disposed  
29 at WIPP. The reviewer(s) must release the data as evidenced by signature, and as a  
30 consequence ensure the following:

- 31           • Data generation and reduction were conducted in a technically correct manner in  
32           accordance with the methods used (procedure with revision). Data were reported  
33           in the proper units and correct number of significant figures.
- 34           • Calculations have been verified by a valid calculation program, a spot check of  
35           verified calculation programs, and/or 100 percent check of all hand calculations.  
36           Values that are not verifiable to within rounding or significant difference  
37           discrepancies must be rectified prior to completion of independent technical review.
- 38           • The data have been reviewed for transcription errors.

- 1           • The testing data QA documentation for Batch Data Reports is complete and  
2           includes, as applicable, raw data, calculation records, calibration records (or  
3           references to an available calibration package). Corrective action will be taken to  
4           ensure that all Batch Data Reports are complete and include all necessary raw  
5           data prior to completion of the independent technical review.
- 6           • Radiography tapes have been reviewed (independent observation) on a waste  
7           container basis at a minimum of once per testing batch or once per day of  
8           operation, whichever is less frequent (Attachment C1, Section C1-1). The  
9           radiography tape will be reviewed against the data reported on the radiography  
10          form to ensure that the data are correct and complete.
- 11          • QAOs have been met according to the methods outlined in Sections C3-2 and  
12          C3-3.

### 13    C3-4b    Project Level

14    Data validation and verification at this level involves scrutiny and signature release from the Site  
15    Project Manager (or designee). The Permittees shall require each site to meet the following  
16    minimum requirements for each waste container. Any nonconformance identified during this  
17    process shall be documented on a nonconformance report (Section C3-7).

18    The Site Project Manager shall ensure that a repeat of the data generation level review,  
19    validation, and verification is performed on the data for a minimum of one randomly chosen  
20    waste container quarterly (every three months). This exercise will document that the data  
21    generation level review, validation, and verification is being performed according to  
22    implementing procedures.

### 23    C3-4b(1)    Site Project Manager Review

24    The Site Project Manager Review is the final validation that all of the data contained in Batch  
25    Data Reports from the data generation level are complete and have been properly reviewed as  
26    evidenced by signature release and completed checklists.

27    One hundred percent of the Batch Data Reports must have Site Project Manager signature  
28    release. At a minimum, the Site Project Manager signature release must be performed before  
29    any waste associated with the data reviewed is managed, stored, or disposed at WIPP. This  
30    signature release must ensure the following:

- 31          • Testing batch QC checks (e.g., replicate scans, measurement system checks)  
32          were properly performed. Radiography data are complete and acceptable based  
33          on evidence of videotape review of one waste container per day or once per testing  
34          batch, whichever is less frequent, as specified in Permit Attachment C1, Section  
35          C1-1.
- 36          • Data generation level independent technical review, validation, and verification  
37          have been performed as evidenced by the completed review checklists and  
38          appropriate signature releases.

- 1           • Independent technical reviewers were not involved in the generation or recording  
2           of the data under review.
- 3           • Batch data review checklists are complete.
- 4           • Batch Data Reports are complete and data are properly reported (e.g., data are  
5           reported in the correct units, and with the correct number of significant figures).
- 6           • Verify that data are within established data assessment criteria and meet all  
7           applicable QAOs (Sections C3-2 and C3-3).

8    C3-4b(2)     Prepare Site Project Manager Summary and Data Validation Summary

9    To document the project-level validation and verification described above, the Permittees shall  
10   require each Site Project Manager (or designee) to prepare a Site Project Manager Summary  
11   and a Data Validation Summary. These reports may be combined to eliminate redundancy. The  
12   Site Project Manager Summary includes a validation checklist for each Batch Data Report.  
13   Checklists for the Site Project Manager Summary must be sufficiently detailed to validate all  
14   aspects of a Batch Data Report that affect data quality. The Data Validation Summary provides  
15   verification that, on a per waste container basis as evidenced by Batch Data Report reviews, all  
16   data have been validated in accordance with the site QAPjP. The Data Validation Summary  
17   must identify each Batch Data Report reviewed (including all waste container numbers),  
18   describe how the validation was performed and whether or not problems were detected (e.g.,  
19   nonconformance reports), and include a statement indicating that all data are acceptable.  
20   Summaries must include release signatures.

21   C3-4b(3)     Prepare Waste Stream Characterization Package

22   In the event the Permittees request detailed information on a waste stream, the Site Project  
23   Manager will provide a Waste Stream Characterization Package. The Site Project Manager  
24   must ensure that the Waste Stream Characterization Package (Section C3-6b(3)) will support  
25   waste characterization determinations.

26   C3-4c     Permittee Level

27   The final level of data verification occurs at the Permittee level and must, at a minimum, consist  
28   of reviewing a sample of the Batch Data Reports during audits of generator/storage sites to  
29   verify completeness. During such audits, DOE is responsible for the verification that Batch Data  
30   Reports include the following:

- 31           • Project-level signature releases
- 32           • Listing of all waste containers being presented in the report
- 33           • Listing of all testing, batch numbers associated with each waste container being  
34           reported in the package
- 35           • Site Project Manager Summary
- 36           • Data Validation Summary

1 For each Waste Stream Profile Form (**WSPF**) submitted for approval, DOE must verify that each  
2 submittal (i.e., WSPF and Characterization Information Summary) is complete and notify the  
3 originating site in writing of the WSPF approval. DOE will maintain the data as appropriate for  
4 use in the regulatory compliance programs. For subsequent shipments made after the initial  
5 WSPF approval, the verification will also include WWIS internal limit checks (Attachment C,  
6 Section C-5a(1)).

### 7 C3-5 Reconciliation with Data Quality Objectives

8 Reconciling the results of waste testing with the DQOs provides a way to ensure that data will  
9 be of adequate quality to support the regulatory compliance programs. Reconciliation with the  
10 DQOs will take place at both the project level and the Permittees' level. At the project level,  
11 reconciliation will be performed by the Site Project Manager, while at the Permittees' level,  
12 reconciliation will be performed as described below.

#### 13 C3-5a Reconciliation at the Project Level

14 The Permittees shall require each Site Project Manager to ensure that all data generated and  
15 used in decision making meet the DQOs provided in Section C-4a(1) of Permit Attachment C.  
16 To do so, the Site Project Manager must assess whether data of sufficient type, quality, and  
17 quantity have been collected. For each waste stream characterized, the Permittees shall require  
18 each Site Project Manager to determine if sufficient data have been collected to determine the  
19 following WAP-required waste parameters, as applicable:

- 20 • Waste matrix code
- 21 • Waste material parameter weights
- 22 • If each waste container of waste contains TRU radioactive waste
- 23 • Whether the waste stream exhibits a toxicity characteristic (**TC**) under 40 CFR Part  
24 261, Subpart C
- 25 • Whether the waste stream contains listed waste found in 20.4.1.200 NMAC  
26 incorporating 40 CFR Part 261, Subpart D
- 27 • Whether the waste stream can be classified as hazardous or nonhazardous
- 28 • Whether the overall completeness, comparability, and representativeness QAOs  
29 were met for each of the testing procedures as specified in Sections C3-2 and C3-  
30 3 prior to submittal of a WSPF for a waste stream or waste stream lot.

31 If the Site Project Manager determines that insufficient data have been collected to make the  
32 determinations listed above, additional data collection efforts must be undertaken. The  
33 reconciliation of a waste stream shall be performed, as described in Permit Attachment C4, prior  
34 to submittal of WSPF and Characterization Information Summary to the Permittees for that  
35 waste stream. The Permittees shall not manage, store, or dispose a TRU mixed waste stream  
36 at WIPP unless the Site Project Manager determines that the WAP-required waste parameters  
37 listed above have been met for that waste stream.

1 C3-5b Reconciliation at the Permittee Level

2 The Permittees must also ensure that data of sufficient type, quality, and quantity are collected  
3 to meet WAP DQOs. The Permittees will ensure sufficient data have been collected to  
4 determine if the waste characterization information is adequate to demonstrate the Permittees'  
5 compliance with Attachment C, Section C-4a(1). This is performed during the Permittees' review  
6 of the WSPF and Characterization Information Summary and is documented by DOE's approval  
7 of the WSPF.

8 C3-6 Data Reporting Requirements

9 Data reporting requirements define the type of information and the method of transmittal for data  
10 transfer from the data generation level to the project level and from the project level to the  
11 Permittees.

12 C3-6a Data Generation Level

13 Data shall be transmitted by hard copy or electronically (provided a hard copy is available on  
14 demand) from the data generation level to the project level. Transmitted data shall include all  
15 Batch Data Reports and data review checklists. The Batch Data Reports and checklists used  
16 must contain all of the information required by the testing techniques described in Permit  
17 Attachments C1 through C6, as well as the signature releases to document the review,  
18 validation, and verification as described in Section C3-4. All Batch Data Reports and checklists  
19 shall be in approved formats, as provided in site-specific documentation.

20 Batch Data Reports shall be forwarded to the Site Project Manager. All Batch Data Reports  
21 shall be assigned serial numbers, and each page shall be numbered. The serial number used  
22 for Batch Data Reports can be the same as the testing batch number.

23 QA documentation, including raw data, shall be maintained in either testing facility files, or site  
24 project files for those facilities located on site in accordance with the document storage  
25 requirements of site approved site QAPjPs.

26 C3-6b Project Level

27 The site project office shall prepare a WSPF for each waste stream certified for shipment to  
28 WIPP based on information obtained from acceptable knowledge and Batch Data Reports, if  
29 applicable. In addition, the site project office must ensure that the Characterization Information  
30 Summary and the Waste Stream Characterization Package (when requested by the Permittees)  
31 are prepared as appropriate. The Site Project Manager must also verify these reports are  
32 consistent with information found in batch reports. Summarized testing data are included in the  
33 Characterization Information Summary. The contents of the WSPF, Characterization Information  
34 Summary, and Waste Stream Characterization Package are discussed in the following sections.

35 After approval of a WSPF and the associated Characterization Information Summary by DOE,  
36 the generator/storage site are required to maintain a cross reference of container identification  
37 numbers to each Batch Data Report.

38 A Waste Stream Characterization Package shall be transmitted by hard copy or electronically  
39 from the Site Project Manager to the Permittees when requested.

1 C3-6b(1) Waste Stream Profile Form

2 The Waste Stream Profile Form (WSPF, Figure C-1) shall include the following information:

- 3 • Generator/storage site name
- 4 • Generator/storage site EPA ID
- 5 • Date of audit report approval by NMED (if obtained)
- 6 • Original generator of waste stream
- 7 • Whether waste is Contact-Handled or Remote-Handled
- 8 • The Waste Stream WIPP Identification Number
- 9 • Summary Category Group
- 10 • Waste Matrix Code Group
- 11 • Waste Material Parameter Weight Estimates per unit of waste
- 12 • Waste stream name
- 13 • A description of the waste stream
- 14 • Applicable EPA hazardous waste numbers
- 15 • Applicable TRUCON codes
- 16 • A listing of acceptable knowledge documentation used to identify the waste stream
- 17 • The waste characterization procedures used and the reference and date of the
- 18 procedure
- 19 • Certification signature of Site Project Manager, name, title, and date signed

20 C3-6b(2) Characterization Information Summary

21 The Characterization Information Summary shall include the following elements, if applicable:

- 22 • Data reconciliation with DQOs
- 23 • Radiography and VE summary to document that all prohibited items are absent in
- 24 the waste and to verify that the physical form of the waste matches the waste
- 25 stream description as determined by AK (if applicable).
- 26 • A justification for the selection of radiography and/or VE as an appropriate method
- 27 for characterizing the waste.

- 1           • A complete listing of all container identification numbers used to generate the  
2           WSPF, cross-referenced to each Batch Data Report
  
- 3           • Complete AK summary, including stream name and number, point of generation,  
4           waste stream volume (current and projected), generation dates, TRUCON codes,  
5           Summary Category Group, Waste Matrix Code(s) and Waste Matrix Code Group,  
6           other TWBIR information, waste stream description, areas of operation, generating  
7           processes, RCRA determinations, radionuclide information, all references used to  
8           generate the AK summary, and any other information required by Permit  
9           Attachment C4, Section C4-2b.
  
- 10          • Method for determining Waste Material Parameter Weights per unit of waste.
  
- 11          • List of any AK Sufficiency Determinations requested for the waste stream.
  
- 12          • Certification through acceptable knowledge or testing that any waste assigned the  
13          hazardous waste number of U134 (hydrofluoric acid) no longer exhibits the  
14          characteristic of corrosivity. This is verified by ensuring that no liquid is present in  
15          U134 waste.

16   C3-6b(3)     Waste Stream Characterization Package

17   The Waste Stream Characterization Package includes the following information:

- 18          • Waste Stream Profile Form (WSPF, Section C3-6b(1))
- 19          • Accompanying Characterization Information Summary (Section C3-6b(2))
- 20          • Complete AK summary (Section C3-6b(2))
- 21          • Batch Data Reports supporting the characterization of the waste stream and any others  
22          requested by the Permittees
- 23          • Raw testing data requested by the Permittees

24   C3-6b(4)     WIPP Waste Information System (WWIS) Data Reporting

25   The WWIS Data Dictionary includes all of the data fields, the field format and the limits  
26   associated with the data as established by this WAP. These data will be subjected to edit and  
27   limit checks that are performed automatically by the database, as defined in the *Waste Data*  
28   *System User's Manual* (DOE, 2009).

29   C3-7   Nonconformances

30   The Permittees shall require the status of work and the WAP activities at participating  
31   generator/storage sites to be monitored and controlled by the Site Project Manager. This  
32   monitoring and control shall include nonconformance identification, documentation, and  
33   reporting.

1 The nonconformances and corrective action processes specified in this section describe  
2 procedures between the Permittees and the generator/storage sites.

### 3 Nonconformances

4 Nonconformances are uncontrolled and unapproved deviations from an approved plan or  
5 procedure. Nonconforming items and activities are those that do not meet the WAP  
6 requirements, procurement document criteria, or approved work procedures. Nonconforming  
7 items shall be identified by marking, tagging, or segregating, and the affected generator/storage  
8 site(s) notified. Any waste container for which a nonconformance report (**NCR**) has been written  
9 will not be shipped to the WIPP facility unless the condition that led to the NCR for that  
10 container has been dispositioned in accordance with DOE's Quality Assurance Program  
11 Description (**QAPD**). Disposition of nonconforming items shall be identified and documented.  
12 The QAPjPs shall identify the person(s) responsible for evaluating and dispositioning  
13 nonconforming items and shall include referenced procedures for handling them. For each  
14 container selected for confirmation pursuant to Permit Attachment C7, the Permittees will  
15 examine the respective NCR documentation to verify NCRs have been dispositioned for the  
16 selected container.

17 Management at all levels shall foster a "no-fault" attitude to encourage the identification of  
18 nonconforming items and processes. Nonconformances may be detected and identified by  
19 anyone performing WAP activities, including

- 20 • Project staff - during field operations, supervision of subcontractors, data validation  
21 and verification, and self-assessment
- 22 • Testing Facility staff - during the preparation for and performance of laboratory  
23 testing; calibration of equipment; QC activities; data review, validation, and  
24 verification; and self-assessment
- 25 • QA personnel - during oversight activities or audits

26 A NCR shall be prepared for each nonconformance identified. Each NCR shall be initiated by  
27 the individual(s) identifying the nonconformance. The NCR shall then be processed by  
28 knowledgeable and appropriate personnel. For this purpose, a NCR including, or referencing as  
29 appropriate, results of QC tests, audit reports, internal memoranda, or letters shall be prepared.  
30 The NCR must provide the following information:

- 31 • Identification of the individual(s) identifying or originating the nonconformance
- 32 • Description of the nonconformance
- 33 • Method(s) or suggestions for correcting the nonconformance (corrective action)
- 34 • Schedule for completing the corrective action
- 35 • An indication of the potential ramifications and overall usability of the data, if applicable
- 36 • Any approval signatures specified in the site nonconformance procedures

37 The Permittees shall require the Site Project Manager to oversee the NCR process and be  
38 responsible for developing a plan to identify and track all nonconformances and report this  
39 information to the Permittees. The Site Project Manager is also responsible for notifying project

1 personnel of the nonconformance and verifying completion of the corrective action for  
2 nonconformances.

### 3 Nonconformance to DQOs

4 For any non-administrative nonconformance related to applicable requirements specified in this  
5 WAP which are first identified at the Site Project Manager signature release level (i.e., a failure  
6 to meet a DQO), the Permittees shall receive written notification within seven calendar days of  
7 identification and shall also receive a NCR within 30 calendar days of identification of the  
8 incident. DOE shall require the generator/storage site to implement a corrective action which  
9 remedies the nonconformance prior to management, storage, or disposal of the waste at WIPP.  
10 The Permittees shall send NMED a monthly summary of nonconformances identified during the  
11 previous month, indicating the number of nonconformances received and the generator/storage  
12 sites responsible.

### 13 DOE's Corrective Action Process

14 DOE shall initiate a corrective action process when internal nonconformances and  
15 nonconformances at the generator/storage sites are identified. Activities and processes that do  
16 not meet requirements are documented as deficiencies.

17 When a deficiency is identified by the Permittees, the following process action steps are  
18 required:

- 19 • The condition is documented on a Corrective Action Report (**CAR**) by the individual  
20 identifying the problem.
- 21 • DOE has designated the CAR Initiator and Assessment Team Leader to review the  
22 CAR, determine validity of the finding (determine that a requirement has been  
23 violated), classify the significance of the condition, assign a response due date,  
24 and issue the CAR to the responsible party.
- 25 • The responsible organization reviews the CAR, evaluates the extent and cause of  
26 the deficiency and provides a response to DOE, indicating remedial actions and  
27 actions to preclude recurrence that will be taken.
- 28 • DOE reviews the response from the responsible organization and, if acceptable,  
29 communicates the acceptance to the responsible organization.
- 30 • The responsible organization completes remedial actions and actions to preclude  
31 recurrence of the condition.
- 32 • After all corrective actions have been completed, DOE schedules and performs a  
33 verification to ensure that corrective actions have been completed and are  
34 effective. When all actions have been completed and verified as being effective,  
35 the CAR is closed by the CAR Initiator and Assessment Team Leader on behalf of  
36 DOE.

- As part of the planning process for subsequent audits and surveillances, past deficiencies are reviewed and the previous deficient activity or process is subject to reassessment.

#### C3-8 Special Training Requirements and Certifications

Before performing activities that affect WAP quality, all personnel are required to receive indoctrination into the applicable scope, purpose, and objectives of the WAP and the specific QAOs of the assigned task. Personnel assigned to perform activities for the WAP shall have the education, experience, and training applicable to the functions associated with the work. Evidence of personnel proficiency and demonstration of competence in the task(s) assigned must be demonstrated and documented. All personnel designated to work on specific aspects of the WAP shall maintain qualification (i.e., training and certification) throughout the duration of the work as specified in this WAP and applicable QAPjPs/procedures. Job performance shall be evaluated and documented at periodic intervals, as specified in the implementing procedures.

Personnel involved in WAP activities shall receive continuing training to ensure that job proficiency is maintained. If not specified by this WAP, the due date for required continuing training courses and requalification shall be the end of the month of the anniversary date when the training was previously completed. Training includes both education in principles and enhancement of skills. Each participating site shall include in its QAPjP a description of the procedures for implementing personnel qualification and training. All training records that specify the scope of the training, the date of completion, and documentation of job proficiency shall be maintained as QA Records in the site project file.

The minimum qualifications for certain specified positions for the WAP are summarized in Table C3-2. QAPjPs, or their implementing SOPs, shall specify the site-specific titles and minimum training and qualification requirements for personnel performing WAP activities. QAPjPs/procedures shall also contain the requirements for maintaining records of the qualification, training, and demonstrations of proficiency by these personnel.

An evaluation of personnel qualifications shall include comparing and evaluating the requirements specified in the job/position description and the skills, training, and experience included in the current resume of the person. This evaluation also must be performed for personnel who change positions because of a transfer or promotion as well as personnel assigned to short-term or temporary work assignments that may affect the quality of the WAP. QAPjPs/procedures shall identify the responsible person(s) for ensuring that all personnel maintain proficiency in the work performed and identify any additional training that may be required.

#### C3-9 Changes to WAP-Related Plans or Procedures

Controlled changes to WAP-related plans or procedures shall be managed through the document control process described in the QAPD. The Site Project Manager shall review all non-administrative changes and evaluate whether those changes could impact DQOs specified in the Permit. After site certification, any changes to WAP-related plans or procedures that could positively or negatively impact DQOs (i.e., those changes that require prior approval of DOE as defined in Attachment C5, Section C5-2) shall be reported to DOE within five days of identification by the project level review. The Permittees shall send NMED a monthly summary

1 briefly describing the changes to plans and procedures identified pursuant to this section during  
2 the previous month.

3 C3-10 List of References

4 DOE, 2009. Waste Data System User's Manual. DOE/WIPP 09-3427, Current Revision,  
5 Carlsbad, New Mexico, Carlsbad Area Office, U.S. Department of Energy.

6 Pasternack B. S. and N. H. Harley. 1971. "Detection Limits for Radionuclides in the Analysis of  
7 Multi-Component Gamma-Spectrometric Data." *Nucl. Instr. and Meth*, No. 91: pp. 533-40.

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## **TABLES**

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**Table C3-1  
 Waste Material Parameters and Descriptions**

<b>Waste Material Parameter</b>	<b>Description</b>
Iron-based Metals/Alloys	Iron and steel alloys in the waste; does not include the waste container materials
Aluminum-based Metals/Alloys	Aluminum or aluminum-based alloys in the waste materials
Other Metals	All other metals found in the waste materials
Other Inorganic Materials	Nonmetallic inorganic waste including concrete, glass, firebrick, ceramics, sand, and inorganic sorbents
Cellulosics	Materials generally derived from high-polymer plant carbohydrates; (e.g., paper, cardboard, wood, and cloth)
Rubber	Natural or man-made elastic latex materials; (e.g., surgeons' gloves, and leaded rubber gloves)
Plastics (waste materials)	Generally man-made materials, often derived from petroleum feedstock; (e.g., polyethylene and polyvinylchloride)
Organic Matrix	Cemented organic resins, solidified organic liquids and sludges
Inorganic Matrix	Any homogeneous materials consisting of sludge or aqueous-based liquids that are solidified with cement, calcium silicate, or other solidification agents; (e.g., wastewater treatment sludge, cemented aqueous liquids, and inorganic particulates)
Soils/gravel	Generally consists of naturally occurring soils that have been contaminated with inorganic waste materials
Steel (packaging materials)	55-gal (208-L) drums
Plastics (packaging materials)	90-mil polyethylene drum liner and plastic bags

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**Table C3-2**  
**Minimum Training and Qualifications Requirements**

<b>Personnel</b>	<b>Requirements</b>
Radiography Operators <sup>a</sup>	Site-specific training based on waste matrix codes and waste material parameters; requalification every 2 years

<sup>a</sup> Operators are those persons responsible for the actual operation of testing equipment. QAPjPs shall include the site-specific title for this position.

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**Table C3-3  
Testing Batch Data Report Contents**

Required Information	Radiography	Visual Examination	Comment
Batch Data Report Date	X	X	
Batch number	X	X	
Waste container number	X	X	
Waste stream name and/or number	O	O	
Waste Matrix Code	X	X	Summary Category Group included in waste matrix code
Implementing procedure (specific version used)	X	X	If procedure cited contains more than one method, the method used must also be cited. Can use revision number, date, or other means to track specific version used.
Container type	O	O	Drums, Standard Waste Box, Ten Drum Overpack, etc.
Video media reference	X	X	Reference to Video media applicable to each container. For visual examination of newly generated waste, video media not required if two trained operators review the contents of the waste container to ensure correct reporting.
Imaging check	O		
Camera check		O	
Audio check	O	O	
QC documentation	X	X	
Verification that the physical form matches the waste stream description and Waste Matrix Code.	X	X	Summary Category Group included in waste matrix code
Comments	X	X	
Reference to or copy of associated NCRs, if any	X	X	Copies of associated NCRs must be available.
Verify absence of prohibited items	X	X	
Operator signature and date of test	X	X	Signatures of both operators required for Visual Verification of Acceptable Knowledge
Data review checklists	X	X	All data review checklists will be identified

**LEGEND:**

X - Required in batch data report.

O - Information must be documented and traceable; inclusion in batch data report is optional.

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