

ATTACHMENT ~~B~~ C7

~~PERMITTEE~~ ~~DOE LEVEL~~ TRU WASTE CONFIRMATION ~~PROCESSES~~

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ATTACHMENT ~~B~~C7

~~PERMITTEE DOE LEVEL~~ TRU WASTE CONFIRMATION ~~PROCESSES~~

Introduction

~~This part of the Waste Analysis Plan (WAP) describes the actions that the Permittees or the co-Permittee U.S. Department of Energy Carlsbad Field Office (DOE) will take to approve and accept waste for storage and disposal at the Waste Isolation Pilot Plant (WIPP), including waste confirmation activities.~~

~~The Permittees DOE The Permittees~~ demonstrate compliance with the Permit by ensuring that the waste characterization processes performed by generator/storage sites (**sites**) produce data compliant with the WAP and through the waste screening and verification processes. Verification occurs at three levels: 1) the data generation level, 2) the project level, and 3) the ~~Permittee DOE Permittee~~ level. ~~The Permittees DOE The Permittees~~ also examines a representative subpopulation of waste prior to shipment to confirm that the waste contains no ignitable, corrosive or reactive waste; and that assigned Environmental Protection Agency (EPA) hazardous waste numbers are allowed by the Permit. The waste confirmation activities described herein occur prior to shipment of the waste from the generator/storage site to WIPP.

BC7-1 ~~Permittee DOE Permittee~~ Confirmation of TRU Mixed Waste

Waste confirmation is defined in ~~Module I Part 1~~ as the activities performed by ~~the Permittees the Permittees or the co-Permittee the U.S. Department of Energy (DOE), pursuant to this Permit Attachment~~, to satisfy the requirements specified in Section 310 of Pub. L. 108-447. Waste confirmation occurs after waste containers have been certified for disposal at WIPP. The general confirmation process for WIPP waste is presented in Figure ~~B~~C7-1.

BC7-1a ~~Permittees' DOE's~~ Confirmation of a Representative Subpopulation of the Waste

~~The Permittees DOE The Permittees~~ shall confirm that the waste contains no ignitable, corrosive, or reactive waste through radiography (Section ~~B~~C7-1b) or the use of visual examination (Section ~~B~~C7-1c) of a statistically representative subpopulation of the waste. Prior to shipment to WIPP, waste confirmation will be performed on randomly selected containers from each CH and RH TRU mixed waste stream shipment. Figure ~~B~~C7-1 presents the overall waste verification and confirmation process.

~~The Permittees' DOE's w/W~~aste confirmation encompasses ensuring that the physical characteristics of the TRU mixed waste correspond with its waste stream description and that the waste does not contain liquid in excess of TSDF-WAC limits or compressed gases. These techniques can detect liquid that exceeds 1 percent volume of the container and containerized gases, which are prohibited from storage or disposal at the WIPP facility. The prohibition of liquid in excess of TSDF-WAC limits and containerized gases prevents the storage or disposal of ignitable, corrosive, or reactive wastes. Radiography and/or visual examination will ensure that the physical form of the waste matches its waste stream description (i.e., Homogeneous Solids, Soil/Gravel, or Debris Waste). The results of ~~the Permittees' DOE's~~ waste confirmation activities, including radiography and visual examination records (data sheets, packaging logs, and/or video and audio recordings) will be maintained in the WIPP facility operating record.

1 Noncompliant waste identified during waste confirmation will be managed as described in
2 Section ~~B_C~~7-2.

3 ~~The Permittees DOE The Permittees~~ shall randomly select at least 7 percent of each waste
4 stream shipment for waste confirmation. This equates to a minimum of one container from each
5 fourteen containers in each waste stream in each designated shipment. If there are less than
6 fourteen containers from a waste stream in a particular shipment, a minimum of one container
7 from the waste stream shipped will be selected. If the random selection of containers in a
8 shipment occurs prior to loading the waste containers into the Shipping Package, the randomly
9 selected containers may be consolidated into a single Type B package consistent with
10 transportation requirements. Documentation of the random selection of containers for waste
11 confirmation will be placed in the WIPP facility operating record.

12 For each container selected for confirmation in accordance with the process above, ~~the~~
13 ~~Permittees DOE the Permittees~~ will examine the respective nonconformance report (NCR)
14 documentation to verify NCRs have been dispositioned for the selected container as required by
15 Permit Attachment ~~B_C~~3, Section ~~B_C~~3-13.

16 ~~BC~~7-1a(1) Confirmation Training Requirements

17 Waste confirmation may be completed by performing actual radiography/visual examination on
18 the waste container(s) or by a review of radiography/visual examination media and records.

19 Waste confirmation personnel may be trained to either review of radiography/visual examination
20 media and records (Level 1) or to perform actual radiography/visual examination on the waste
21 container(s) (Level 2). Level 2 personnel may also perform waste confirmation by review of
22 media and records.

23 ~~The Permittees DOE management representative must be trained to the requirements of Level~~
24 ~~2.~~

25 ~~BC~~7-1b Radiography Methods Requirements

26 Radiography has been developed by ~~the Permittees DOE the Permittees~~ specifically to aid in
27 the examination and identification of containerized waste. ~~The Permittees DOE The Permittees~~
28 shall describe all activities required to achieve the radiography objectives in standard operating
29 procedures (SOPs). These SOPs shall include instructions specific to the radiography system(s)
30 used by ~~the Permittees DOE the Permittees~~ at an off-site facility (e.g., the generator/storage
31 site). For example, to detect liquid, some systems require the container to be rotated back and
32 forth while other systems require the container to be tilted.

33 A radiography system (e.g., real time radiography, digital radiography/computed tomography)
34 normally consists of an X-ray-producing device, an imaging system, an enclosure for radiation
35 protection, a waste container handling system, a video and audio recording system, and an
36 operator control and data acquisition station. Although these six components are required, it is
37 expected there will be some variation within a given component between radiography systems.
38 The radiography system shall have controls or an equivalent process which allow the operator
39 to control image quality. On some radiography systems, it should be possible to vary the
40 voltage, typically between 150 to 400 kilovolts (kV), to provide an optimum degree of
41 penetration through the waste. For example, high-density material should be examined with the

1 X-ray device set on the maximum voltage. This ensures maximum penetration through the
2 waste container. Low-density material should be examined at lower voltage settings to improve
3 contrast and image definition. The imaging system typically utilizes either a fluorescent screen
4 and a low-light television camera or x-ray detectors to generate the image.

5 To perform radiography, the waste container is scanned while the operator views the television
6 screen. A video and audio recording is made of the waste container scan and is maintained in
7 the WIPP facility operating record as a non-permanent record. A radiography data form is also
8 used to document the Waste Matrix Code, ensure that the waste container contains no
9 ignitable, corrosive, or reactive waste by documenting the absence of liquid in excess of TSDF-
10 WAC limits or compressed gases, and verify that the physical form of the waste is consistent
11 with the waste stream description documented on the WSPF. Containers whose contents
12 prevent full examination of the remaining contents shall be subject to visual examination unless
13 ~~the Permittees certify~~ DOE certifies the Permittees certify that visual examination would provide
14 no additional relevant information for that container based on the acceptable knowledge
15 information for the waste stream. Such certification shall be documented in the WIPP facility
16 operating record.

17 For containers that have been characterized using radiography by the generator/storage sites in
18 accordance with the method in Attachment B C1, Section B C1-3, ~~the Permittees~~ DOE the
19 Permittees may perform confirmation by review of the generator/storage site's radiography
20 audio/video recordings.

21 For containers which contain classified shapes and undergo radiography, the radiography will
22 occur at a facility with appropriate security provisions and the video and audio recording will be
23 considered classified. The radiography data forms will not contain classified information.

24 BC7-1b(1) Radiography Training

25 The radiography system involves qualitative and semiquantitative evaluations of visual displays.
26 Operator training and experience are the most important considerations for ensuring quality
27 controls in regard to the operation of the radiography system and for interpretation and
28 disposition of radiography results. Only trained personnel shall be allowed to operate
29 radiography equipment.

30 ~~The Permittee~~ DOE The Permittee radiography operators performing waste confirmation shall
31 be trained in accordance with the requirements of Permit Attachment H F1.

32 BC7-1b(2) Radiography Oversight

33 ~~The Permittees~~ DOE The Permittees shall be responsible for monitoring the quality of the
34 radiography data and calling for corrective action, when necessary.

35 A training drum with internal containers of various sizes shall be scanned biennially by each
36 Level 2 operator. The video and audio media shall then be reviewed by a radiography subject
37 matter expert to ensure that operators' interpretations remain consistent and accurate. Imaging
38 system characteristics shall be verified on a routine basis.

39 Independent replicate scans and replicate observations of the video output of the radiography
40 process shall be performed under uniform conditions and procedures. Independent replicate

1 scans shall be performed on one waste container per day or once per shipment, whichever is
2 less frequent. Independent observations of one scan (not the replicate scan) shall also be made
3 once per day or once per shipment, whichever is less frequent, by a qualified radiography
4 operator other than the individual who performed the first examination. When confirmation is
5 performed by review of audio/video recorded scans produced by the generator/storage site as
6 specified in Permit Attachment B_C1, Section B_C1-3, independent observations shall be
7 performed on two waste containers per shipment or two containers per day, whichever is less
8 frequent.

9 BC7-1c Visual Examination Methods Requirements

10 Visual examination (VE) may also be used as a waste confirmation method ~~by the Permittees~~
11 ~~DOE~~. VE shall be conducted by ~~the Permittees DOE the Permittees~~ in accordance with written
12 SOPs to describe the contents of a waste container. Visual examination shall be conducted to
13 identify and describe all waste items, packaging materials, and waste material parameters. VE
14 may be used ~~by the Permittees DOE~~ to examine a statistically representative subpopulation of
15 the waste certified for shipment to WIPP to confirm that the waste contains no ignitable,
16 corrosive, or reactive waste. This is achieved by confirming that the waste contains no liquid in
17 excess of TSDF-WAC limits or compressed gases, and that the physical form of the waste
18 matches the waste stream description documented on the WSPF. During packaging, the waste
19 container contents are directly examined by trained personnel. This form of waste confirmation
20 may be performed by ~~the Permittees DOE the Permittees~~ at a generator/storage site. The VE
21 may be documented on video and audio media, or by using a second operator to provide
22 additional verification by reviewing the contents of the waste container to ensure correct
23 reporting. When VE is performed using a second operator, each operator performing the VE
24 shall observe for themselves the waste being placed in the waste container or the contents
25 within the examined waste container when waste is not removed. The results of all VE shall be
26 documented on VE data forms, which are used to document (1) the Waste Matrix Code, ensure
27 (2) that the waste container contains no ignitable, corrosive, or reactive waste by documenting
28 the absence of liquids in excess of TSDF-WAC limits or compressed gases, and verify (3) that
29 the physical form of the waste is consistent with the waste stream description documented on
30 the WSPF.

31 In order to keep radiation doses as low as reasonably achievable at generator/storage sites, ~~the~~
32 ~~Permittees DOE the Permittees~~ may use their own trained VE operators to perform VE for
33 waste confirmation by reviewing generator/storage site VE data, which includes audio/video
34 media, VE data forms, and waste packaging records, and may also include audio/video media.
35 ~~DOE The Permittees shall document their review of generator/storage site VE data on DOE's~~
36 confirmation data forms.

37 If the generator/storage site documented VE using audio/video media in accordance with Permit
38 Attachment C1, Section C1-4, DOE the Permittees must use the audio/video media to perform
39 confirmation prepared by the generator/storage site during their VE of the waste. If the
40 Permittees DOE the Permittees performs waste confirmation by review of audio/video media,
41 the audio/video record of the VE must be sufficiently complete for the Permittees DOE the
42 Permittees to confirm the Waste Matrix Code and waste stream description, and verify the
43 waste contains no liquid in excess of TSDF-WAC limits or compressed gases.
44 Generator/storage site VE video/audio media subject to review by the Permittees DOE the
45 Permittees shall meet the following minimum requirements:

- 1 • The video/audio media shall record the waste packaging event for the container such
2 that all waste items placed into the container are recorded in sufficient detail and shall
3 contain an inventory of waste items in sufficient detail that a trained ~~Permittee~~ DOE
4 Permittee VE operator can identify the associated waste material parameter.
- 5 • The video/audio media shall capture the waste container identification number.
- 6 • The personnel loading the waste container shall be identified on the video/audio media
7 or on packaging records traceable to the loading of the waste container.
- 8 • The date of loading of the waste container will be recorded on the video/audio media
9 or on packaging records traceable to the loading of the waste container.

10 VE audio/video media of containers that contain classified shapes shall be considered classified
11 information.

12 If the generator/storage site did not document VE using audio/video media, ~~The Permittees~~
13 ~~DOE the Permittees~~ may also use their own trained VE operators to perform VE for waste
14 confirmation by reviewing VE data forms or packaging ~~logs-records~~ prepared by the
15 generator/~~storage site during their packaging of the waste~~. To be acceptable, the
16 generator/storage site VE data ~~forms or packaging records~~ must be signed by two
17 generator/storage site personnel who witnessed the packaging of the waste and must provide
18 sufficient information for ~~the Permittees~~ DOE the Permittees to determine that the waste
19 container contents match the waste stream description on the WSPF and the waste contains no
20 liquids in excess of TSDf-WAC limits or compressed gases. ~~The Permittees will document their~~
21 ~~review of generator/storage site VE data on Permittee VE data forms.~~ Generator/storage site VE
22 forms or packaging records subject to review by ~~the Permittees~~ DOE the Permittees shall meet
23 the following minimum requirements:

- 24 • At least two generator site personnel shall approve the data forms or packaging
25 records attesting to the contents of the waste container.
- 26 • The data forms or packaging records shall contain an inventory of waste items in
27 sufficient detail that a trained ~~Permittee~~ DOE Permittee VE operator can identify the
28 associated waste material parameters.
- 29 • The waste container identification number shall be recorded on the data forms or
30 packaging records.

31 Visual examination video media of containers which contain classified shapes shall be
32 considered classified information. Visual examination data forms will not contain classified
33 information.

34 BC7-1c(1) Visual Examination Training

35 The Permittees' ~~DOE's~~ The Permittees's VE operators performing waste confirmation shall be
36 trained in accordance with the requirements of Permit Attachment ~~H~~ F1.

1 BC7-1c(2) Visual Examination Oversight

2 ~~The Permittees DOE~~ ~~The Permittees~~ shall designate at least one VE expert. The VE expert
3 shall be familiar with the processes that were used to generate the waste streams being
4 confirmed using VE. The VE expert shall be responsible for the overall direction and
5 implementation of ~~the Permittees' DOE's~~ ~~the Permittees' s~~ VE program. ~~The Permittees DOE~~
6 ~~The Permittees~~ shall specify the selection, qualification, and training requirements of the visual
7 examination expert in an SOP.

8 BC7-1d Quality Assurance Objectives (QAOs) for Radiography and Visual Examination

9 The QAOs ~~the Permittees DOE~~ ~~the Permittees~~ must meet for radiography and visual
10 examination are detailed in this section. If the QAOs described below are not met, then
11 corrective action as specified in Permit Attachment ~~B C~~3, Section ~~B C~~3-13 shall be taken.

12 BC7-1d(1) Radiography QAOs

13 The QAOs for radiography are detailed in this section. If the QAOs described below are not met,
14 then corrective action shall be taken.

15 Data to meet these objectives must be obtained from a video and audio recorded scan provided
16 by trained radiography operators. Results must also be recorded on a radiography data form.
17 The precision, accuracy, representativeness, completeness, and comparability objectives for
18 radiography data are presented below.

19 Precision

20 Precision is maintained by reconciling any discrepancies between two radiography operators
21 with regard to the waste stream waste confirmation, identification of liquid in excess of TSDF-
22 WAC limits, and identification of compressed gases through independent replicate scans and
23 independent observations.

24 Accuracy

25 Accuracy is obtained by using a target to tune the image for maximum sharpness and by
26 requiring operators to successfully identify 100 percent of the required items in a training
27 container during their initial qualification and subsequent requalification.

28 Representativeness

29 Representativeness is ensured by performing radiography on a random sample of waste
30 containers from each waste stream in each shipment.

31 Completeness

32 A video and audio media recording of the radiography examination and a validated radiography
33 data form will be obtained for 100 percent of the waste containers subject to radiography.

1 Comparability

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

4 BC7-1d(2) Visual Examination QAOs

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

7 Precision

8 Precision is maintained by reconciling any discrepancies between the operator and the
9 independent technical reviewer with regard to the waste stream waste confirmation,
10 identification of liquid in excess of TSDF-WAC limits, and identification of compressed gases.

11 Accuracy

12 Accuracy is maintained by requiring operators to pass a comprehensive examination and
13 demonstrate satisfactory performance in the presence of the VE expert during their initial
14 qualification ~~and subsequent requalification.~~ VE operators shall be requalified as specified in
15 Permit Attachment F2.

16 Representativeness

17 Representativeness is ensured by performing VE on a random sample of waste containers
18 within each waste stream in each shipment.

19 Completeness

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

21 Comparability

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

24 BC7-1e Review and Validation of Radiography and Visual Examination Data Used for Waste
25 Examination

26 This section describes the requirements for review and validation of radiography and VE data by
27 ~~the Permittees~~ DOE, the Permittees.

28 BC7-1e(1) Independent Technical Review

29 The radiography and/or VE confirmation data for each shipment shall receive an independent
30 technical review. This review will be performed before the affected waste shipment is shipped to
31 the WIPP facility. The review shall be performed by an individual other than the data generator
32 who is qualified to have performed the work. The review will be performed in accordance with
33 approved ~~Permittee~~ DOE-Permittee SOPs and will be documented on a review checklist. The

1 reviewer(s) must approve the data as evidenced by signature, and as a consequence, ensure
2 the following:

- 3 • Data generation and reduction were conducted in a technically correct manner in
4 accordance with the methods used (procedure with revision). Data were reported in
5 the proper units and correct number of significant figures.
- 6 • The data have been reviewed for transcription errors.
- 7 • Radiography video and audio media recordings have been reviewed (independent
8 observation) on a waste container basis at a minimum of once per shipment or once
9 per day of operation, whichever is less frequent. The radiography video/audio
10 recording will be reviewed against the data reported on ~~the Permittees' DOE's the~~
11 ~~Permittees 's~~ radiography form to ensure that the data are correct and complete. If
12 review of radiography scans recorded by the generator/storage site was used to
13 perform confirmation, two observations must be performed for each shipment or two
14 observations per day, whichever is less frequent.

15 BC7-1e(2) ~~Permittee-DOE~~ Management ~~Representative~~ Review

16 The radiography and/or visual examination data ~~forms and independent technical review~~
17 ~~checklist (confirmation data package)~~ for each shipment shall receive a ~~Permittee-DOE~~
18 management review. This review will be performed before the affected waste shipment is
19 disposed of at the WIPP. The review shall be performed by a designated ~~member~~
20 ~~representative~~ of ~~Permittee-DOE~~ management. The review will be performed in accordance with
21 approved ~~Permittee-DOE~~ SOPs and will be documented on a review checklist. The reviewer(s)
22 must approve the ~~confirmation~~ data ~~package~~ as evidenced by signature, and as a consequence,
23 ensure the following:

- 24 • The data are technically reasonable based on the technique used.
- 25 • The data have received independent technical review.
- 26 • The data indicate that the waste examined contained no ignitable, corrosive, or
27 reactive waste and that the physical form of the waste was consistent with the waste
28 stream description in the WSPF.
- 29 • QC checks have been performed (e.g., replicate scans, image quality checks).
- 30 • The data meet the established QAOs

31 Upon completion of the ~~Permittee-DOE~~ management ~~representative~~ review, the waste
32 confirmation data for the shipment shall be submitted to the WIPP facility operating record as
33 non-permanent records. Waste confirmation data includes radiography and VE data forms,
34 video/audio media, and review checklists.

35 BC7-2 Noncompliant Waste Identified During Waste Confirmation

36 If ~~the Permittees identify~~ ~~DOE identifies the Permittees identify~~ noncompliant waste during
37 waste confirmation at a generator/storage site (i.e., the waste does not match the waste stream

1 description documented in the WSPF or there is liquid in excess of TSDF-WAC limits or
2 compressed gases) the waste will not be shipped. ~~The Permittees DOE~~ will suspend further
3 shipments of the affected waste stream and issue a CAR to the generator/storage site.
4 Shipments of affected waste streams shall not resume until the CAR has been closed. NMED
5 will be notified within 24 hours of any suspension of waste stream shipments due to the
6 identification of noncompliant waste during waste confirmation.

7 As part of the corrective action plan in response to the CAR, the generator/storage site will
8 evaluate whether the waste characterization information documented in the Characterization
9 Information Summary and/or WSPF for the waste stream must be updated because the results
10 of waste confirmation for the waste stream indicated that the TRU mixed waste being examined
11 did not match the waste stream description. The generator/storage site will thoroughly evaluate
12 the potential impacts on waste that has been shipped to WIPP. ~~The Permittees DOE~~ will
13 evaluate the potential that prohibited items were shipped to WIPP and what remedial actions
14 should occur, if any. The results of these evaluations will be provided to NMED before
15 shipments of affected waste streams resume. If the Characterization Information Summary
16 ~~and~~ or WSPF requires revision, shipments of the affected waste stream shall not resume until
17 the revised waste stream waste characterization information has been reviewed and approved
18 by ~~the Permittees DOE~~.

19 If a generator/storage site certifies noncompliant waste more than once during a running 90-day
20 period, ~~the Permittees DOE~~ will suspend acceptance of that site's waste until ~~the Permittees~~
21 ~~DOE~~ finds that all corrective actions have been implemented and the site complies with all
22 applicable requirements of the WAP.

1

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1

FIGURES

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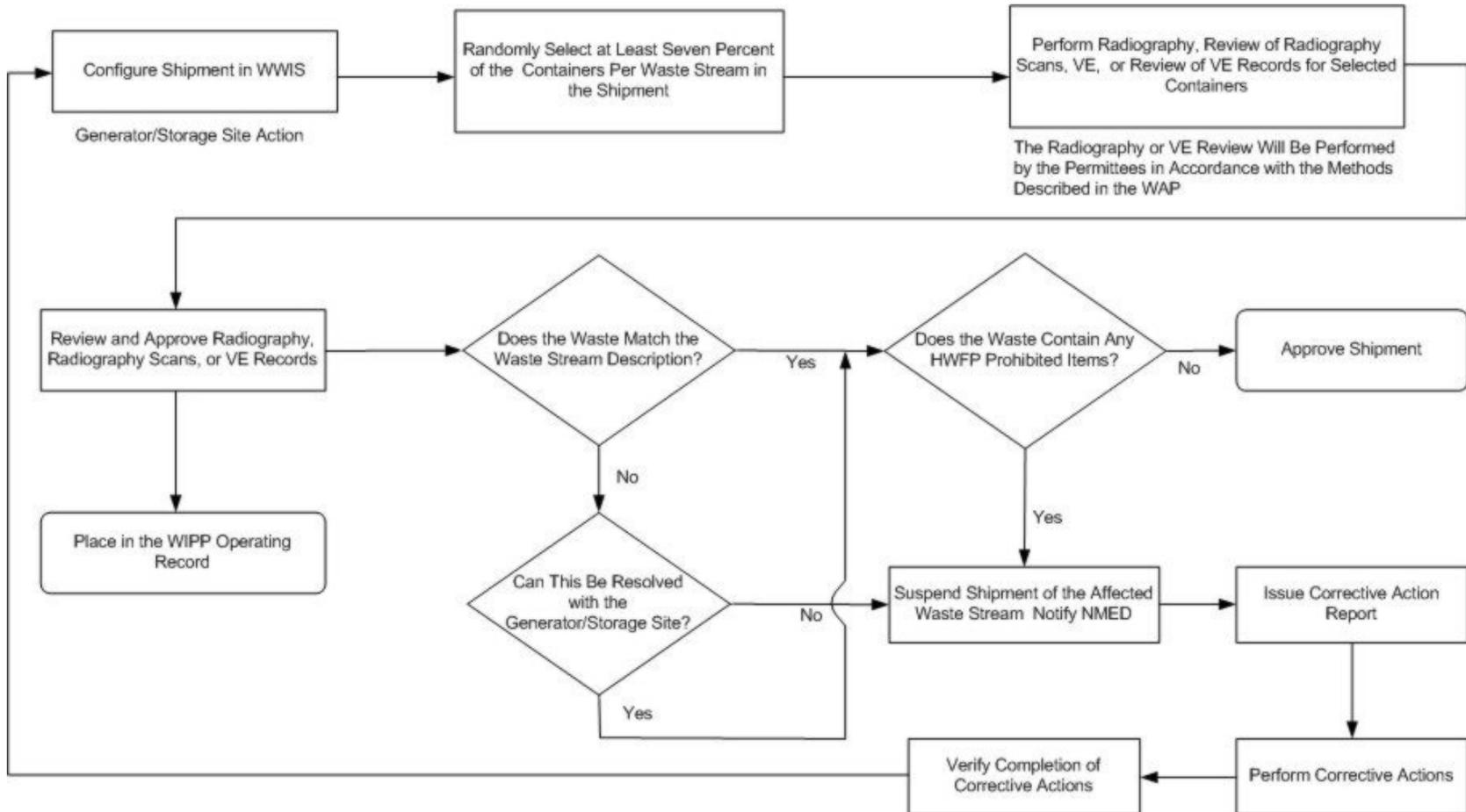


Figure B_C7-1
Overview of Waste Confirmation