

CCP-TP-162

Revision 1

CCP

Random Selection of Containers for Solids and Headspace Gas Sampling and Analysis

EFFECTIVE DATE: 12/29/2010

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PRINTED NAME

APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	06/19/2009	Initial issue to combine CCP-TP-160, <i>CCP Random Selection of Containers for Headspace Gas Sampling and Analysis</i> , and CCP-TP-161, <i>CCP Random Selection of Containers for Solids Sampling and Analysis</i> , into single procedure and incorporate freeze file changes and Central Characterization Project (CCP) Management Assessment, CCP-MA-0027-08 findings.
1	12/29/2010	Minor revision to update references to the <i>Waste Isolation Pilot Plant Hazardous Waste Facility Permit</i> .

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1.0 PURPOSE

CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*, Section C2, requires that containers be randomly selected for solids and headspace gas (HSG) sampling and analysis. This procedure describes the process the Central Characterization Project (CCP) uses for random selection of contact-handled (CH) and remote-handled (RH) transuranic (TRU) waste containers for Solids and HSG sampling and analysis.

1.1 Scope

This procedure applies to retrievably stored, repackaged or treated, and newly generated S5000 debris, S4000 soil/gravel, and S3000 homogeneous solids waste streams that require solids or HSG sampling and analysis for waste characterization.

2.0 REQUIREMENTS

2.1 References

- CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-QP-002, *CCP Training and Qualification Plan*
- CCP-QP-008, *CCP Records Management*
- CCP-TP-003, *CCP Data Analysis for S3000, S4000 and S5000 Characterization*

2.2 Training Requirements

2.2.1 Personnel performing this procedure will be trained and qualified in accordance with CCP-QP-002, *CCP Training and Qualification Plan*, prior to performing this procedure.

3.0 RESPONSIBILITIES

3.1 Site Project Manager (SPM) or Designee

- 3.1.1 Reviews the Acceptable Knowledge (AK) documentation to determine the number of containers in the waste stream Random Selection (RS) lot.
- 3.1.2 Identifies the containers in the waste stream RS lot, **AND** records identified containers for electronic delivery to the SPM performing RS.
- 3.1.3 Estimates the number of containers expected for indeterminate subsequent RS lots, if any, as needed for selection of subsequent RS lot samples.
- 3.1.4 Documents the justification for any deviation from the list of selected containers developed by the SPM performing RS as occurring.
- 3.1.5 Ensures containers identified for sampling are properly staged and sampled or sent for coring as soon as practical in coordination with the Vendor Project Manager (VPM).
- 3.1.6 Reports those containers that have completed sampling and analysis to the SPM performing RS so that they may be released from shipping exclusion lists.

3.2 SPM Performing Random Selection

- 3.2.1 Obtains listing of containers in the accessible portion of the waste stream RS lot and estimated range of numbers of indeterminate containers for subsequent RS lots from the responsible SPM or Designee.
- 3.2.2 Performs random selection of containers to be sampled and analyzed.
- 3.2.3 Prepares and submits the Headspace Gas Random Sample Selection Memorandum or Solids Random Sample Selection Memorandum, as appropriate.

- 3.2.4 Prepares and submits the Subsequent Headspace Gas Random Sample Candidate Selection Memorandum or Subsequent Solids Random Sample Candidate Selection Memorandum, as appropriate.
 - 3.2.5 Prepares and submits the Subsequent Headspace Gas Random Sample Selection Memorandum or Subsequent Solids Random Sample Selection Memorandum, as appropriate.
 - 3.2.6 Ensures that the appropriate RS Lot Identification (RS Lot ID) numbers and Exclusion Listing holds are placed on the containers in the CCP Data Center container and data tracking system.
 - 3.2.7 Performs the assignment of container identification (ID) numbers in Indeterminate Waste Stream RS lots as previously indeterminate containers are identified and added to the corresponding AK Tracking Spreadsheets.
 - 3.2.8 Removes Exclusion Listing holds as sampled containers are reported by the SPM or Designee or when RS lot sampling is complete and contingency selections are no longer needed.
- 3.3 Vendor Project Manager (VPM)
- 3.3.1 Ensures that the containers selected for sampling go through the appropriate sampling process in coordination with the SPM or Designee.

4.0 PROCEDURE

NOTE

If there are fewer containers than the minimum required number of samples in a waste stream, then each container will be sampled at least once as described in Section 4.2.

4.1 Determining Random Sampling Population

SPM or Designee

- 4.1.1 Review the AK documentation to determine the number of containers in the waste stream or waste stream RS lot.
 - 4.1.2 Identify the containers in the waste stream RS lot, **AND** record identified containers for electronic delivery to the SPM performing the random selection.
 - 4.1.3 Estimate the number of containers expected for indeterminate subsequent RS lots, if any, as needed for the SPM performing RS.
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NOTE

Specific steps used in performing the random selection of containers for sampling cite spreadsheet functions and menu selections associated with Microsoft Excel[®]. If another commercial spreadsheet program is used, the functionally equivalent functions and menu selections should be used.

SPM Performing Random Selection

- [A] **IF** the entire population of the waste stream is accessible for sampling and analysis,
THEN GO TO Section 4.2.
- [B] **IF** the entire population of the waste stream is known, **AND** only a portion of the waste stream is accessible for sampling and analysis,
THEN GO TO Section 4.2.

- [C] **IF** the population of the waste stream as a whole is indeterminate, (e.g., continually generated waste streams from ongoing processes),
THEN divide the waste stream into waste stream RS lots,
AND GO TO Section 4.3.

4.2 Container RS for Sampling from Accessible Waste Stream or Waste Stream RS Lot Populations

NOTE

When the waste stream population is divided into multiple waste stream RS lots, the steps of Section 4.2 will be repeated for each waste stream RS lot for which all containers are known. For RS lots with indeterminate containers, the steps of Section 4.3 will be followed.

NOTE

For the initial sample selection for a solids waste stream RS lot, n will equal five. If the waste stream has fewer than five containers, the entire waste stream will be characterized in one lot and one or more containers will require multiple sampling to yield a total of five samples in addition to the required co-located pair.

For the initial sample selection for a HSG waste stream RS lot, n will equal ten. For HSG waste streams with fewer than ten containers, the entire waste stream will be characterized in one lot and all containers will be HSG sampled.

For subsequent required samples from within the same solids or HSG waste stream RS lot, n will be determined using the minimum required sample size calculations described in CCP-TP-003, *CCP Data Analysis for S3000, S4000 and S5000 Characterization*.

If the RS Lot size permits, the total number of selected and contingency containers identified and held for potential sampling should be at least 15.

- 4.2.1 Create a spreadsheet with the title to include the waste stream identification (WSID) number and waste stream RS Lot ID number, using Microsoft Excel[®] or equivalent.
- 4.2.2 Create a column within the spreadsheet containing the Container ID numbers for the waste stream or waste stream RS lot, excluding all containers identified in previous Solids or Headspace Gas Random Sample Selection Memorandum.

- 4.2.3 Generate a random number associated with each container in the waste stream RS lot in an adjacent column, using the Random Number Function in Microsoft Excel[®] or equivalent.
- [A] The function used in Microsoft Excel[®] is:
- `=RAND()`
- Where:
- `=RAND()` is Microsoft Excel[®] Function that produces a random number greater than or equal to 0 and less than 1.
- [B] Select and copy the column containing the generated random numbers, using the Edit, Copy menu selections.
- [C] Replace the column containing the generated random numbers with its corresponding fixed values, using the Edit, Paste Special, Value menu selections.
- 4.2.4 Sort the container numbers based on the numbers in the random number column in ascending order, using the Data, Sort menu options.
- 4.2.5 Identify the first *n* containers in the resulting Solids or HSG Random Sample Selection Listing as the primary Solids or HSG sample selection for the associated waste stream RS lot.
- 4.2.6 Identify a sufficient additional number of containers in the Solids or HSG Random Sample Selection Listing to serve as contingency selections in the event additional containers require sampling, any selected containers cannot be physically and safely sampled, or any selected containers are subsequently removed from the waste stream by AK reevaluation.
- 4.2.7 Print the completed Solids or HSG Random Sample Selection Listing of all containers, and associated generated random numbers to be included as an attachment to the applicable Solids or Headspace Gas Random Selection Memorandum.

- 4.2.8 Create a Solids Random Sample Selection Memorandum or Headspace Gas Random Sample Selection Memorandum, as applicable, to include the following information as a minimum:
- The name of the SPM performing RS preparing the memorandum.
 - The identification of the waste stream and waste stream RS lot ID number.
 - The date the memorandum is signed by the SPM performing RS.
 - The population size (number of containers in the waste stream RS lot) from which containers have been selected for Solids or HSG sampling and analysis.
 - The quantity of containers selected for Solids or HSG sampling and analysis and number of containers identified as contingency selections.
 - A complete listing of the randomly selected container numbers that were selected by this random selection method with their associated random numbers and order of selection for sampling.
 - Identification of all containers within the entire population of the waste stream RS lot with their associated random numbers.
- 4.2.9 Attach the corresponding Solids or HSG Random Sample Selection Listing, when applicable.
- 4.2.10 Sign the Solids or Headspace Gas Random Sample Selection Memorandum.
- 4.2.11 Forward copies of the completed Solids or Headspace Gas Random Sample Selection Memorandum to the SPM(s) and VPM(s) for the associated site.
- 4.2.12 Submit the signed original Solids or Headspace Gas Random Sample Selection Memorandum for the waste stream RS lot to the CCP Records Center in accordance with CCP-QP-008, *CCP Records Management*.

4.2.13 Apply appropriate Exclusion List holds to selected and contingency containers in the CCP Data Center container and data tracking system to preclude shipping of such containers until required sampling and analysis have been performed.

4.2.14 Apply appropriate RS Lot ID numbers to all containers in the waste stream RS lot population in the CCP Data Center container and data tracking system.

4.3 Container RS for Sampling from Indeterminate Waste Stream Populations

NOTE

For the initial sample selection for a Solids waste stream RS lot, the sample size, n , will equal five. If the waste stream has fewer than five containers, the entire waste stream will be characterized in one RS lot and one or more containers will require multiple sampling to yield a total of five samples in addition to the required co-located pair.

For the initial sample selection for a HSG waste stream RS lot, the sample size, n , will equal ten. For HSG waste streams with fewer than ten containers, the entire waste stream will be characterized in one RS lot and all containers will be HSG sampled.

For subsequent required samples from within the same Solids or HSG waste stream RS lot, the size of n will be determined using the minimum sample size calculations described in CCP-TP-003.

If the RS lot size permits, the total number of selected and contingency containers identified and held for potential sampling should be at least 15.

4.3.1 Determination of Sample Selection for Waste Stream RS Lot 1

[A] Create a spreadsheet with the title to include the WSID number and waste stream RS Lot ID number, using Microsoft Excel[®] or equivalent.

NOTE

The accessible containers in an indeterminate Solids waste stream will be considered the first waste stream RS lot and must include at least five containers.

The accessible containers in an indeterminate HSG waste stream will be considered the first waste stream RS lot and must include at least 10 containers.

- [B] Create a column within the spreadsheet containing the Container ID numbers for the first waste stream RS lot.
- [C] Generate a random number associated with each container in the first waste stream RS lot in an adjacent column, using the Random Number function in Microsoft Excel[®] or equivalent.
 - [C.1] The function used in Microsoft Excel[®] is:

`=RAND()`

Where:

`=RAND()` is Microsoft Excel[®] Function that produces a random number greater than or equal to 0 and less than 1.
 - [C.2] Select and copy the column containing the generated random numbers, using the Edit, Copy menu selections.
 - [C.3] Replace the column containing the generated random numbers with its corresponding fixed values using the Edit, Paste Special, Value menu selections.
- [D] Sort the container numbers based on the numbers in the random number column in ascending order, using the Data, Sort menu selections.
- [E] Identify the first *n* containers in the resulting Solids or HSG Random Sample Selection Listing as the primary Solids or HSG sample selection for the associated waste stream RS lot.

- [F] Identify a sufficient additional number of containers in the Solids or HSG Random Sample Selection Listing to serve as contingency selections in the event additional containers require sampling, any selected containers cannot be physically and safely sampled, or any selected containers are subsequently removed from the waste stream by AK reevaluation.

NOTE

For very small waste stream RS lots the Random Sample Selection Listing of step 4.3.1[G] may be incorporated into the body of the Random Selection Memorandum instead of included as a separate attachment.

- [G] Print the completed Solids or HSG Random Sample Selection Listing to be included as an attachment to the applicable Solids or Headspace Gas Random Selection Memorandum.
- [H] Create a Solids Random Sample Selection Memorandum or Headspace Gas Random Sample Selection Memorandum, as applicable, to include the following information as a minimum:
- The name of the SPM performing RS preparing the memorandum.
 - The identification of the waste stream and waste stream RS lot number.
 - The date the memorandum is signed by the SPM performing RS.
 - The population size (number of containers in the waste stream RS lot) from which containers have been selected for Solids or HSG sampling and analysis.
 - The quantity of containers selected for Solids or HSG sampling and analysis and number of containers identified as contingency selections.
 - A complete listing of the randomly selected container numbers that were selected by this random selection method with their associated random numbers and order of selection for sampling.

- Identification of all containers within the entire population of the waste stream RS lot with their associated random numbers.
- [I] Attach the corresponding Solids or HSG Random Sample Selection Listing, when applicable.
- [J] Sign the Solids or Headspace Gas Random Sample Selection Memorandum.
- [K] Forward copies of the completed Solids or Headspace Gas Random Sample Selection Memorandum to the SPM(s) and VPM(s) for the associated site.
- [L] Submit the signed original Solids or Headspace Gas Random Sample Selection Memorandum for the waste stream RS Lot 1 to the CCP Records Center in accordance with CCP-QP-008.
- [M] Apply appropriate Exclusion List holds to selected and contingency containers in the CCP Data Center container and data tracking system to preclude shipping of such containers until required sampling and analysis have been performed.
- [N] Apply RS Lot ID number 1 to all containers in the RS Lot 1 population in the CCP Data Center container and data tracking system.

4.3.2 Selection of Subsequent RS Lot Samples

NOTE

Normally, waste streams need to be divided into no more than two RS lots.

- [A] In consultation with the SPM or designee, estimate a conservatively low minimum and a conservatively high maximum for the number of containers expected in the subsequent waste stream RS lot population.
- [B] Create a spreadsheet with the title to include the Waste Stream ID Number and RS Lot ID Number, if applicable, using Microsoft Excel[®] or equivalent.

- [C] Create a column in the spreadsheet with sufficient rows for the maximum number of containers identified in step 4.3.2[A]. Fill in the column with the known container IDs and "TBD" for the remaining rows up to the identified maximum.
- [D] Create a second column containing a unique container sequence number for the indeterminate containers (those containers with "TBD" in the container ID column).
- [E] Generate a random number associated with each container and/or container sequence number combination in an adjacent column using the Random Number function in Microsoft Excel[®] or equivalent.

[E.1] The function used in Microsoft Excel[®] is:

=*RAND*()

Where:

=*RAND*() is Microsoft Excel[®] Function that produces a random number greater than or equal to 0 and less than 1.

- [E.2] Select and copy the column containing the generated random numbers, using the Edit, Copy menu selections.
- [E.3] Replace the column containing the generated random numbers with its corresponding fixed values, using the Edit, Paste Special, Value menu selections.
- [F] Sort the container sequence numbers based on the numbers in the random number column in ascending order, using the Data, Sort menu selections.
- [G] Identify the first *n* containers in the resulting sorted listing with sequence numbers less than or equal to the minimum number estimated in step 4.3.2[A] as initial candidate containers for sampling, while preserving the sorted listing order.

- [H] Identify a sufficient additional number of containers in the Solids or HSG Random Sample Selection Listing to serve as contingency selections in the event additional containers require sampling, any selected containers cannot be physically and safely sampled, or any selected containers are subsequently removed from the waste stream by AK reevaluation.
- [I] Create a Subsequent Solids Random Sample Candidate Selection Memorandum or Subsequent Headspace Gas Random Sample Candidate Selection Memorandum, as appropriate, to include the following information as a minimum:
- The name of the SPM performing RS preparing the memorandum.
 - The identification of the waste stream and waste stream RS lot number.
 - The date the memorandum is signed by the SPM performing RS.
 - The estimated minimum and maximum population sizes (number of containers in the waste stream RS lot) from which candidate container sequence numbers have been selected for Solids or HSG sampling and analysis.
 - The quantity of containers selected for Solids or HSG sampling and analysis and number of containers identified as contingency selections.
 - A complete listing of the randomly selected candidate container sequence numbers that were determined to be eligible for selection by this random selection method with their associated random numbers, preserving the random-number-sorted order established in step 4.3.2[G] and showing the associated order of selection for sampling.
 - Description of methodology used for objective assignment of sequential container numbers.

- [J] Attach the corresponding Solids or HSG Random Sample Selection Listing, when applicable.
- [K] Sign the Subsequent Solids or Headspace Gas Random Sample Candidate Selection Memorandum created in step 4.3.2[I].
- [L] Forward copies of the completed Subsequent Solids or Headspace Gas Random Sample Candidate Selection Memorandum to the SPM(s) and VPM(s) for the associated site.
- [M] Submit the signed original Subsequent Solids or Headspace Gas Random Sample Candidate Selection Memorandum for the waste stream RS lot to the CCP Records Center in accordance with CCP-QP-008.
- [N] Apply appropriate Exclusion List holds to selected and contingency containers identified in step 4.3.2[G] and step 4.3.2[H] in the CCP Data Center container and data tracking system to preclude shipping of such containers until required sampling and analysis have been performed.
- [O] Apply appropriate RS Lot ID numbers to all containers in the RS lot population in the CCP Data Center container and data tracking system.
- [P] As additional containers with sequence numbers in excess of the estimated minimum are received, repeat step 4.3.2[G] and step 4.3.2[H] as necessary to select previously non-selected container sequence numbers as they become available and release previously selected containers no longer contained within the first n containers on the listing with sequence numbers less than or equal to the currently encountered population size.
- [Q] Monitor the AK Tracking Spreadsheet updates on the WIPP ftp web site to identify additional containers for the waste stream RS lot.
 - [Q.1] Associate such containers with the next available indeterminate container sequence number.
 - [Q.2] Repeat steps 4.3.2[N] and 4.3.2[O] for the additional identified containers.

[Q.3] Notify the site SPM(s) and VPM(s) by e-mail when any such additional containers are selected for sampling or contingency hold pending potential sample selection.

[R] Upon completion of identification of all containers in the waste stream RS lot or upon reaching the maximum number of containers estimated in step 4.3.2[A], create a Subsequent Solids Random Sample Selection Memorandum or Subsequent Headspace Gas Random Sample Selection Memorandum to include, as a minimum, the following information:

- The name of the SPM performing RS preparing the memorandum.
- The identification of the waste stream and waste stream RS lot number.
- The date the memorandum is signed by the SPM performing RS.
- The title, date, and serial number of the previously issued Subsequent Solids Random Sample Candidate Selection Memorandum or Subsequent Headspace Gas Random Sample Candidate Selection Memorandum associated with this waste stream RS lot.
- The quantity of containers selected for Solids or HSG sampling and analysis and the number of containers identified as contingency selections.
- A complete listing of the randomly selected candidate container sequence numbers that were ultimately selected for Solids or HSG sampling and analysis using this random selection method, preserving the random-number-sorted order established in step 4.3.2[F] and showing the associated order of selection for sampling.
- Identification of all containers within the entire population of the waste stream RS lot.
- A listing of the correlation of randomly generated numbers selected, sequence numbers, and associated actual Container ID numbers.

- [S] Attach the corresponding Solids or HSG Random Sample Selection Listing, when applicable.
- [T] Sign the Subsequent Solids Random Sample Selection Memorandum or Subsequent Headspace Gas Random Sample Selection Memorandum created in step 4.3.2[R].
- [U] Forward copies of the completed Subsequent Solids Random Sample Selection Memorandum or Subsequent Headspace Gas Random Sample Selection Memorandum to the SPM(s) and VPM(s) for the associated site.
- [V] Submit the signed original Subsequent Solids Random Sample Selection Memorandum or Subsequent Headspace Gas Random Sample Selection Memorandum for the waste stream RS lot to the CCP Records Center.

4.4 Implementation of Random Selection for Sampling

VPM

NOTE

Selected containers occupying any of the n positions at the top of the list will never be eligible for replacement by a later sequence numbered container as the encountered population of waste stream RS lot containers grows larger. Such containers are permanently assigned to the sample selection and should be sampled and analyzed as soon as feasible.

- 4.4.1 Locate and assemble the containers selected for sampling by the SPM performing the RS.
- 4.4.2 Arrange for sampling or coring of the selected containers as soon as practical following identification by the SPM performing the RS.

SPM or Designee

- 4.4.3 Upon receipt of the RS Memorandum, verify that the sampling selection is random by confirming that each listed container in the RS lot has an associated random number assigned, **AND** verify that the RS lot has been sorted into ascending random number order for selection of the container to be sampled.
- 4.4.4 Report those containers that have completed sampling and analysis to the SPM performing RS so that they may be released from shipping exclusion lists.

NOTE

If any container selected for sampling **CAN NOT** be sampled because it is removed from the waste stream, **OR CAN NOT** be safely retrieved and sampled, **OR** other adequate justification exists for removal from the RS population, the container may be replaced with a contingency container identified in Section 4.2 or Section 4.3 as next in order using the following step.

- 4.4.5 **IF** any container identified for sampling in Section 4.2 or Section 4.3 **CAN NOT** be sampled, **THEN** perform the following:
- [A] Replace the affected container with the container next in order among the identified contingency selections.
 - [B] **IF** sampling cannot be performed on a selected container or containers **THEN** prepare a Sample Selection Container Replacement Memorandum to include, as a minimum, the following information:
 - Name of the SPM preparing the memorandum.
 - Identification of the waste stream and waste stream RS lot number.
 - The date the memorandum is signed by the SPM.
 - The reasons sampling could not be successfully performed on the selected container(s) taken from the selection listing and substituted for the unsuccessfully sampled container(s).
 - [C] Sign the Sample Selection Container Replacement Memorandum.
 - [D] Forward copies of the completed Sample Selection Container Replacement Memorandum to the SPM performing the RS and VPM(s) for the associated site.
 - [E] Submit the signed original Sample Selection Container Replacement Memorandum for the waste stream RS lot to the CCP Records Center in accordance with CCP-QP-008.

5.0 RECORDS

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

5.1.1 QA/Nonpermanent

[A] **Solid Sampling**

[A.1] Solids Random Sample Selection Memorandum with attached listing when applicable.

[A.2] Subsequent Solids Random Sample Candidate Selection Memorandum with attached listing when applicable.

[A.3] Subsequent Solids Random Sample Selection Memorandum with attached listing when applicable.

[A.4] Sample Selection Container Replacement Memorandum when applicable.

[B] **HSG Sampling**

[B.1] Headspace Gas Random Sample Selection Memorandum with attached listing when applicable.

[B.2] Subsequent Headspace Gas Random Sample Candidate Selection Memorandum with attached listing when applicable.

[B.3] Subsequent Headspace Gas Random Sample Selection Memorandum with attached listing when applicable.

[B.4] Sample Selection Container Replacement Memorandum when applicable.