

United States Government

Department of Energy

memorandum

Carlsbad Field Office
Carlsbad, New Mexico 88221

DATE: JUN 09 2005

REPLY TO
ATTN OF: CBFO:OOM:IRT:VW:05-0031:UFC:5822

SUBJECT: Clarify a Proposed Method of Random Selection of Waste Containers for Coring

TO: Jeff Snook, DOE-ID



The purpose of this memo is to clarify a proposed method of random selection of waste containers for coring. This method complies with Section B2-2a of the Waste Analysis Plan; however, I would like to clearly outline this approach to ensure there is no confusion in its implementation.

Currently, the Advanced Mixed Waste Treatment Project (AMWTP) is retrieving waste and staging the containers until they have an adequate population of containers on which to perform the random selection process for coring. They would like to send containers for coring as soon as they are retrieved. This requires the random selection of containers in the population to be performed before the containers are retrieved and before the actual container numbers are known.

The method by which to do this is to select a population size (say 1000 or 1500), and randomly sort the integers in that number. The first integers in that sort will represent the containers that will be sampled (minimum of five). As containers from a waste stream are retrieved, they will be numbered sequentially in the order that they are retrieved (the first one out is "1," the next is "2" and so on). As soon as a container representing an integer that was randomly selected for sampling is retrieved, it can be sent for sampling and analysis. None of the containers in the lot can be shipped for disposal until the entire lot is retrieved; however, the solids sampling and analysis can progress in parallel with retrieval rather than waiting until all of the containers in the population have been retrieved.

Section B2-2a of the Waste Analysis Plan does not require the knowledge of the actual container numbers, only that an unbiased representation of the true mean contaminant concentration is obtained for each waste stream. It is not relevant what form the container number takes, only that the population is identified. This method allows the AMWTP, and any other site with similar populations, to perform some waste characterization without the need to retrieve all of the containers in a waste stream lot prior to beginning characterization work.

In the event that the population size is actually smaller than the number initially selected and certain containers selected for sampling do not exist, containers in the population not already sampled would be used to randomly select the remaining required number of containers to be sampled.

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Jeff Snook

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JUN 09 2005

If you have any questions, please contact me at (505) 234-7357.



Kerry W. Watson, Director
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2-21-05

AMWTP "Real Time" Drum Selection for RCRA Analysis

Rod Arbon, Bechtel

Background:

Prior to the shipment of homogeneous solids to the Waste Isolation Pilot Plant (WIPP), RCRA sampling and analysis is performed on waste stream "lots". For the Advanced Mixed Waste Treatment Project (AMWTP), this is implemented in AMWTP Management Procedure MP-TRUW-8.25 "RCRA Statistical Sampling". Lot processing in MP-TRUW-8.25 is currently being implemented as follows: drums are retrieved, stored, randomly selected for coring, and then cored/RCRA sampled.

Proposed Implementation:

When the lot size is known AMWTP Management Procedure MP-TRUW-8.25 could be implemented in a "real time" manner that reduces lot-processing time and potentially increases the "lot" size. This would be done as follows. The drum lot size would be defined prior to retrieval e.g. 1000 or 1500. The lot size could be based on the expected drums within a retrieval area or a retrieval time period. Using preliminary data, if available, the number of drums requiring coring is determined. Using the random number function on Excel the required number of random numbers, based on the number of drums that require coring and the waste stream lot size, are selected. For example, if 5 drums require coring and 1500 drums is the lot population then 5 numbers would be selected e.g. drum # 32, 362, 477, 748, and 980. During retrieval, drums within the "lot" would be sequentially numbered. When the selected number is reached the drum would be sent for coring. No drums would be shipped until data from the lot is complete. It is believed that this process is consistent with the guidance currently given in AMWTP Management Procedure MP-TRUW-8.25.

Technical Justification:

Statistical selection of a random sample of n drums from a lot of size N can be accomplished in two comparable ways. The first is to excavate N drums, number them (1 through N), choose n sample numbers from a random number generator, and sample those drums whose numbers match the sample numbers. The second is to generate n random sample numbers, number the drums as they are excavated, and sample those drums whose numbers correspond to the sample numbers generated. These methods are used interchangeably in process control and other sampling applications. The random sample properties are the same for both approaches, provided the lot size is fixed. In the event that, at the end of an excavation project, less than N drums were retrieved the current approach would be used to select the remaining number of drums. In both cases the required number of samples will be recalculated to ensure that a sufficient number of samples were collected. Either method is compliant with the Waste Analysis Plan statistical selection of containers for totals analysis and consistent with AMWTP Management Procedure MP-TRUW-8.25.

Benefits:

Allowing for the selection of the drum "real time" to retrieval would facilitate lot processing and result in a larger number of drums profiled for essentially the same effort.

Retrieval and storage prior to selection is eliminated. This allows for extended retrieval increasing the lot population. Figure 1 demonstrates the advantages of "real time" selection given a retrieval rate of 500 drums per week. As shown in Figure 1, the overall duration to RCRA characterize a lot processing is reduced with a net shippable population 1/3 larger. In addition, on a per drum basis the analytical costs are reduced. Implementing real time drum selection would not jeopardize the random selection of containers while ensuring a shippable inventory of sludge waste. Either selection process provides an unbiased representation of the true mean contaminant for each lot.

Sludge Drum Selection Comparison

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