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December 28, 2000

Steve Zappe, WIPP Project Leader
Hazardous Waste Permits Program
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2044A Galisteo
Santa Fe, New Mexico 87505

Subject: DAC MODIFICATION REQUEST OF DECEMBER 7, 2000

Dear Mr. Zappe:

An inadvertent error was made on the submission of the Class 2 Drum Age Criteria modification detail December 7, 2000. Within the basis and discussion sections of the preamble, several redline/strikeout occurrences were not incorporated. A revised copy of those pages is attached in which the redline/strikeout has been incorporated.

These changes are administrative only and do not impact any revised text.

Also, attached is the facility mailing for the temporary authorization as required in 20.4.1.900 NMAC.

If questions arise, please contact me at your convenience.

Sincerely,

R. F. Kehrman, Manager
Requirements Management Project

RK:kc

Enclosures (2)

001234

Request For a RCRA Class 2 Permit Modification in Accordance with 20.4.1.900 NMAC (incorporating 40 CFR Part 270)

Waste Isolation Pilot Plant
Carlsbad, New Mexico

December 7, 2000

Request For a RCRA Class 2 Permit Modification in Accordance with 20.4.1.900 NMAC (incorporating 40 CFR Part 270)

Consistent with requirements of 20.4.1.900 New Mexico Administrative Code (NMAC) (hereafter referred to as Part 270 or Section 270.XX) the U.S. Department of Energy (DOE), Carlsbad Field Office (CBFO) is submitting to the New Mexico Environment Department (NMED) a request for a Class 2 modification to the Hazardous Waste Facility Permit (HWFP or Permit) (NM4890139088-TSDF) for the Waste Isolation Pilot Plant (WIPP). Specifically, this information is provided to comply with the requirements of Section 270.42(b).

The requested modification is listed in Table 1. Listed information includes a reference to the applicable section of the permit, a brief description of the item, and the class of the item, as identified in Appendix I to Section 270.42. The relevant permit modification category, as identified in Appendix I, is provided as well. A more complete description of the Class 2 modification is provided in Attachment A.

Table 1. Class 2 Hazardous Waste Facility Permit Modification

No.	Affected Permit Section	Item	Category	Attachment 1 Page #
1	Attachment B1 Attachment B1-1a Attachment B1-1a(1) Attachment B1-1a(2) Attachment B1-1a(3) Attachment B1-1a(3)(i) Attachment B1-1a(3)(ii) Attachment B1-1a(3)(iii) Attachment B1-1c(5) Attachment B1-6 Attachment B1, Table B1-5 Attachment B1, Table B1-6 Attachment B1, Table B1-7 Attachment B1, Table B1-8 Attachment B1, Table B1-9 Attachment B1, Table B1-10 Attachment B6	Drum Age Criteria	20.4.900 NMAC (40 CFR 270.42 Appendix I) Class B.1.d	A-1

Attachment A

Descriptions of the Hazardous Waste Facility Class 2 Permit Modification

Item 1

Description:

A request for a Class 2 modification to establish the drum age criteria (DAC) necessary for taking a representative headspace gas sample based on packaging configuration groups.

Basis:

This permit modification provides additional drum age criteria based on analysis and studies of specific packaging configurations of mixed TRU waste packaging. In addition, the results are applied simply through the addition of look-up tables to the Permit.

In responses to comments on both the draft Permit and the revised draft Permit, the NMED established three points regarding the DAC values:

1. Drum age must assure headspace gas has reached 90% steady-state to preclude the necessity to collect samples from innermost layers of confinement.

2. Additional studies and experimental studies are required to justify alternative values.

3. Standardized values retain simplicity within the Permit.

Section B1-1a of the Permit establishes that a DAC must be met "to ensure that the drum contents have reached 90 percent of steady state concentration within each layer of confinement." The section also establishes a DAC for S5000 (Debris) waste as a minimum of 142 days after packaging and a DAC for S3000 (Homogeneous solids) and S4000 (Soil/gravel) waste as a minimum of 225 days after packaging. These DAC only considered the time necessary to meet the 90 percent steady state concentration criterion for the following packaging configurations, which were considered to be bounding at the time the permit was written:

- Containers are 55-gallon drums
- Containers are filtered at the time of packaging
- Containers of S5000 (debris) waste include 5 layers of packaging
- Containers of S3000 (Homogeneous solids) and S4000 (Soils/gravels) waste include two layers of packaging
- Toluene is the constituent of interest (due to its prevalence in TRU mixed waste and its slow diffusion time)

This Class 2 modification request establishes additional drum age criteria in the form of packaging configuration specific DAC that ensure that 90 percent of steady state criterion

is met for all current and future packaging configurations. The packaging configuration DAC proposed in this modification were developed using the same model and calculation methodology as that used in developing the DAC in the permit.

In addition, this modification proposes to provide clarification within the permit when using the term "unvented rigid container greater than 4 liters." The way this term is used implies that the drum liner is considered an unvented container greater than 4 liters, which is inconsistent with Lockheed (1995) (entitled "Position for Determining Gas Phase Volatile Organic Compound Concentrations in Transuranic Waste Containers", INEL-95/0109, August, 1995, Lockheed Idaho Technologies Company) which is referenced in the permit as the source of the DAC. To address this inconsistency, the Class 2 modification establishes three different sampling scenarios for containers subject to headspace gas sampling.

The Permit also contains language in Sections B1-1a that states that a representative sample cannot be collected until the rigid poly liner has been vented to the drum. This is only applicable to samples that are taken between the drum lid and the unvented poly liner. Samples that are taken from within the rigid drum liner or through the pipe overpack vent hole are representative if the appropriate DAC has been met. Therefore, the language in this section has been modified to clarify this point well.

Discussion:

Section B1-1a of the Permit establishes that the DAC must be met "to ensure that the drum contents have reached 90 percent of steady state concentration within each layer of confinement." The section also establishes the DACs for S5000 (Debris) waste as a minimum of 142 days after packaging and for S3000 (Homogeneous solids) and S4000 (Soil/gravel) waste as a minimum of 225 days after packaging. These values are based on the results of the Lockheed (1995) report. This report describes the model and methodology used to establish the 142 and 225 day DAC. This document based the final DAC on the following packaging configurations, which were considered to be bounding at the time the permit was written:

- Containers are 55-gallon drums
- Containers are filtered at the time of packaging
- Containers of S5000 (debris) waste include 5 layers of packaging
- Containers of S3000 (Homogeneous solids) and S4000 (Soils/gravels) waste include two layers of packaging
- Toluene is the constituent of interest (due to its prevalence in TRU mixed waste and its slow diffusion time)

The DAC is a unique value for each packaging configuration. The computer program that implements a VOC transport model is used to calculate the transient VOC gas-phase concentrations throughout a waste drum. The VOC transport model consists of a series

of material balance equations describing the transient VOC transport across layers of confinement in a container. The primary mechanisms for gas transport across a confinement layer are permeation across a polymeric layer, diffusion through air across an opening between layers, and diffusion through a filter vent in the case of a drum filter or filtered bag. One or all of these mechanisms of transport may be operating depending on the characteristics of the confinement layer. The governing equations for the model are presented in Lockheed (1995) and in BWXT (2000) (entitled "Determination of Drum Age Criteria and Prediction Factors Based on Packaging Configurations", INEEL/EXT-2000-01207, Bechtel BWXT Idaho, October, 2000[1]). The model was validated with actual drum VOC testing data as documented in Lockheed (1995).

In order to provide a basis for generator/storage sites to select the appropriate DAC for their waste, three different sampling scenarios are identified in BWXT (2000) . These scenarios are:

1. Unvented drums that have been packaged for a specified period of time sufficient to achieve equilibrium conditions (i.e, met the DAC for Scenario 1 drums in Table 2) shall be sampled as follows:

   A. Unvented drums without rigid poly liners are sampled at the time of venting through the drum lid.

   B. Unvented drums with rigid poly liners are sampled through the rigid liner

   C. Unvented drums with vented rigid poly liners are sampled through the drum lid

2. Drums that have been packaged for a specified period of time sufficient to achieve equilibrium conditions (i.e., met the DAC for Scenario 1 drums in Table 2) and then are vented, but not sampled at the time of venting.

3. Containers (i.e., drums, SWBs, and pipe components) that are initially packaged in a vented condition and sampled in the container headspace after a specified period of time sufficient to achieve equilibrium conditions.

Only unvented drums fall under Scenario 1. For these drums, the DAC was calculated based on 6 layers of confinement for S5000 waste and 2 layers of confinement for S3000/S4000 waste. Table 2 contains the matrix of DAC values that are applicable to drums that are covered under Scenario 1. Meeting the Scenario 1 DAC ensures that a representative sample may be collected, under the drum lid (unlined drums or unvented drums with vented rigid poly liners) or collected through the rigid poly liner (unvented or vented drums with unvented rigid poly liners).

Scenario 2 is also for drums. In this Scenario, the drums are those that meet the Scenario 1 DAC, but are not sampled at the time of venting. Because a Scenario 2 drum has already reached equilibrium conditions prior to venting, the initial condition used to

[1] BWXT (2000) is included as Attachment B.

determine the DAC applicable after venting is based on equilibrium conditions in the drum rather than the zero concentration conditions in a drum that is filtered at the time of packaging (see Scenario 3 discussion). However, if an unvented drum has not reached equilibrium prior to venting, i.e., not met the Scenario 1 DAC the drum must be classified under Scenario 3. Table 3 contains the Scenario 2 DAC matrix.

To evaluate the development of additional DAC values, a survey of generator/storage sites was performed to identify present and future packaging configurations. This review indicated that the packaging configurations can be summarized under a number of common configurations (BWXT 2000). These common configurations were divided into the two major categories: (1) packaging configurations of containers belonging to summary categories S3000 (Homogenous solids) and S4000 (Soil/gravel), and (2) packaging configurations of containers belonging to summary category S5000 (Debris waste).

Table 4 lists the currently identified packaging configurations applicable to Scenario 3. In addition to the drum packaging configurations, packaging configurations for the pipe component and standard waste box (SWBS) were evaluated. The pipe component is a metal pipe with a filtered lid that contains waste and conceptually is similar to a small drum in its configuration. The pipe component is overpacked in a drum for shipment and disposal. Similarly to other overpacked containers (e.g., drums inside of a standard waste box), the headspace gas sampling for pipe components is focused on the headspace of the pipe component, which then must be conservatively assigned to the overpacked container (in this case the drum).

The VOC transport model computer program was used to generate a matrix of packaging-specific DAC values for Scenario 3 (Tables 5 and 6).

To obtain the appropriate DAC value of a container, the sampling scenario is identified and then, if applicable, the actual container packaging configuration is assigned to one of the packaging configuration groups. The DAC for the container is then located on the applicable sampling scenario matrix by looking up the entry that corresponds to the appropriate summary category group, bounding packaging configuration, filter diffusivity, and rigid drum liner hole size of the container being evaluated.

The permit currently implies that if a container has met the DAC in an unvented condition and the headspace gas sample is not taken at the time of venting, the venting date starts the clock for meeting the DAC. This implication comes from the reference to unvented rigid containers greater than 4 liters which can be interpreted to mean that the reference to unvented sealed rigid containers greater than 4 liters includes the drum liner. This is not the case Lockheed (1995) and BWXT (2000) both indicate that if the drum has met the Scenario 1 DAC in an unvented condition, a specific waiting period equal to the appropriate Scenario 2 DAC is needed for re-equilibration of the headspace gas after venting the drum liner if a sample is not taken at the time of venting. This contradicts the implication in the permit that because the liner is greater than 4 liters and is sealed, the Scenario 3 DAC must be met. Therefore, the language in this permit modification relative to sampling Scenario 2 revises the permit to clarify this point.

If additional packaging configurations are identified at a later date, CBFO will submit

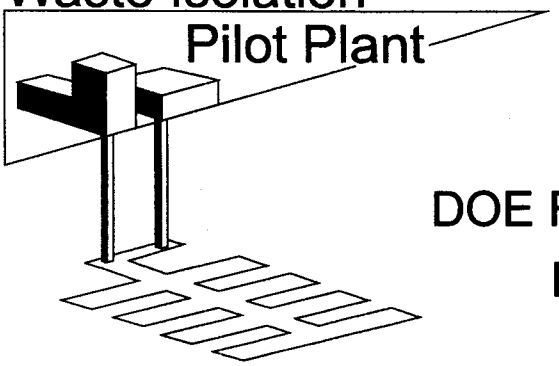
modifications to specify appropriate DAC based on the methodology in the BWXT (2000) report. Sites are being encouraged to use packaging configurations that have a DAC established whenever possible.

References

BWXT, 2000, Determination of Drum Age Criteria and Prediction Factors Based on Packaging Configurations, INEEL/EXT-2000-01207, October 2000, Liekhus, K.J., S.M. Djordjevic, M. Devarakonda, and M.J. Connolly, Bechtel BWXT Idaho, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho.

Lockheed Idaho Technologies Company, 1995, Position for Determining Gas Phase Volatile Organic Compound Concentrations in Transuranic Waste Containers, INEL-95/0109/Revision 1, M.J. Connolly, et. al., Lockheed Idaho Technologies Company.

Waste Isolation
Pilot Plant



DOE Requests Temporary Authorization For Drum Age Criteria Modification

On December 8, 2000, the Department of Energy (DOE) submitted requests for Temporary Authorization and for a Class 2 Permit Modification to the New Mexico Environment Department (NMED) for the limited use of the revised Drum Age Criteria (DAC). Temporary Authorization will allow the Idaho National Engineering and Environmental Laboratory (INEEL) to employ a revised DAC for determining when containers have reached 90% of steady state for headspace gas sampling.

There will be public meetings for this Class 2 permit modification in Carlsbad on January 9 and Santa Fe January 11, 2001.

This notification was inadvertently omitted from the facility mailing list notice dated December 14, 2000.

For more information contact the WIPP Information Center at 1-800-336-WIPP (9477). You also may visit the WIPP Home Page at http://www.wipp.carlsbad.nm.us.

If you prefer, write to:

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U.S. Department of Energy
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P.O. Box 3090