



ENVIRONMENTAL EVALUATION GROUP

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June 23, 2000

Mr. Steve Zappe
New Mexico Environment Department
2044 A Galisteo Street
Santa Fe, NM 87502



Dear Mr. Zappe:

Attached are the EEG comments on the three proposed Class 2 WIPP Hazardous Waste Facility Permit modifications for which the comment period ends on June 25, 2000.

Our review leads to the following observations and recommendations.

- 1) EEG agrees with the modification proposed by DOE to rely on a solid volatile organic chemical sample from a single site along the core, while retaining the flexibility to use the three sub-sample method.
- 2) EEG agrees with the DOE proposal that the miscertification rate can be determined by summary category groups. However, the EEG recommends that wording be added to the modification to ensure that re-establishment of the initial year's miscertification rate by visual examination of a 50 container lot will be of a representative sample of the summary category group containers planned to be characterized in that initial year.
- 3) EEG sees no technical reason to require a gross or specific radionuclide measurement in the HWFP if the only purpose is to serve as a surrogate to detect a release of RCRA regulated materials. If the requirement remains, the HWFP should include a list of radionuclides to be reported to NMED.

Sincerely,

Matthew K. Silva
Director

MKS:JC:BAW:pf

cc: Dr. Inés Triay, DOE/CAO



Class 2 Modification Comments for June 25 Submission to NMED (Core Sampling, VE Miscertification Rates, and Gross Alpha/Beta Counting)

The DOE has proposed three Class 2 modifications to the WIPP Hazardous Waste Facility Permit (HWFP); the public comment period on these proposed modifications is usually listed as extending from April 20, 2000 to June 25, 2000. An overall EEG conclusion is that implementation of these modifications is acceptable with consideration of our recommendations.

Item 1 - Three Sub-sample Requirement for VOCs During Solid Sampling

The DOE proposes that the requirement that solid volatile organic chemical (VOC) samples be produced from three sub-samples from different sites along a sampling core extracted from a waste container be altered to allow taking the complete sample from a single site. The DOE points out that the NMED had indicated previous to issuance of the HWFP that VOC samples from a single site would be acceptable; that EPA guidance indicates that radial distance into the core is the key to representative sampling, rather than the number of sub-sampling sites; that NMED's stated preference is for consistency in sampling processes, and the HWFP SVOC and metals sampling allow single, rather than multiple sites, along the core; and that the use of one large sample, rather than three smaller sub-samples, will reduce sample surface area, thereby better limiting loss of VOCs from the sample during sampling operations. The proposal retains allowance of the three sub-sample method, merely adding the capacity for single-site sampling.

The DOE arguments are well-developed, and convincing--though with the caveat that the DOE does not adequately cite source material, even quoted material, so that the argument can be thoroughly checked. For instance, what "...EPA guidance..." indicates that representativeness of a VOC sample is related to distance from the sample surface" (p. A-2)?

The NMED's written testimony (New Mexico Environment Department's Direct Testimony Regarding Regulatory Process and Imposed Conditions, March 1999), argues with parts of the rationale submitted by the DOE in the HWFP application, but does clearly state that single samples are to be allowed ("Composite Sample" Issue, p. 1):

For the analysis of Volatile Organic Compounds (VOCs), the Applicants must collect either: (1) three (3) sub-samples from the vertical axis of the sample core, place the sub-samples in a single sample container, and prepare and analyze that sample; or (2) collect a representative core subsection, provided the appropriate SW-846 sample preparation methods and containers are used. This condition provides a reasonable VOC sampling approach which is consistent with EPA guidance regarding soil/gravel and solid matrix sampling for VOCs, and which maximizes the representativeness of the sampling process while minimizing worker exposure and the loss of VOCs from the sample.

It appears to have been an oversight that this proposed modification was not included in the final version of the HWFP. The DOE's proposed wording of the text in the HWFP is well done, and the EEG supports acceptance of the modification as proposed by the DOE.

Item 2 - Miscertification Rate on a Waste Stream Basis

The DOE proposes that the radiography miscertification rate requirement be modified so that the rates are based on summary category groups (homogeneous solids, soil/gravel, and debris categories) rather than individual waste streams. VE is used to verify that radiography has properly identified prohibited items and the waste matrix code group of a waste container; the miscertification rate during a year is used to determine the number of waste containers that must undergo VE over the course of the next year. The DOE points out that the principal consideration for radiographic acuity is the type of waste material, which is reflected in the summary category groups, and that waste streams are not necessarily a reflection of the waste material type.

The proposed modification is a move toward the established practices and assumptions for the miscertification rate that has been accepted by other regulatory agencies (NRC and EPA) with much the same interests in radiography accuracy as is necessary for HWFP considerations. These organizations had accepted calculation of a single miscertification rate based on all containers processed in a single year, regardless of waste matrix. The current HWFP requirements apparently is a result of testimony at the HWFP hearings in 1999, at which perceived defects in the miscertification process at generator sites were prominent in testimony concerning waste characterization.¹ While these generator site problems were important considerations, the requirement to use miscertification rates for individual waste streams would neither prevent nor mitigate these problems.

Adoption of this modification could significantly reduce waste characterization costs. Since the hypergeometric distribution used for determining the number of containers to undergo VE at a given miscertification rate develops higher percentages of VE containers from smaller lots, applying it to each waste stream rather than to a summary category group creates an enormous increase in the number of containers to be examined. For example, consider a single 2000-drum summary category group consisting of 10 waste streams with 200 drums in each waste stream. The initial miscertification rate at each site is set at 11%, and the lowest possible is 1%. At an 11% miscertification rate, under the current HWFP 1520 drums would undergo VE; with the modification, only 441 drums would need to have VE. At a 1% miscertification rate the current HWFP would require that 220 drums undergo VE, but under the modification only 16 would be

¹WIPP Hazardous Waste Facility Permit Hearings, Reporter's Transcript of Proceedings, Technical Testimony, Volume 1 (1999); pp. 553-573, 674-678.

required. The DOE has estimated it costs about \$2,900 per container² to perform VE, which means the cost savings from the modification for the 2000 drums at the 11% miscertification rate would be about \$3.1 million dollars, and \$590,000 at the 1% rate. A current target for WIPP is to receive 17 shipments a week; at 33 drums per shipment about 28,000 drums would be received in a year.³ If these containers were all retrievably stored waste, the modification would produce an annual savings at a 1% miscertification rate of about \$8.3 million; at 11% the annual savings would be \$44 million. There should be clear benefits in terms of health and safety before costs of this magnitude are added to the project.

The EEG is unaware of any such compelling argument for using waste-stream level miscertification rates. While it might be marginally useful to require more VE for waste streams that either present greater difficulties for radiography, or which are more likely to contain prohibited items, it also appears that there would be great difficulty in establishing an enforceable requirement in the HWFP to do so. Since the DOE's proposed modification to the wording in the HWFP consists of simply replacing the term "waste stream" with the term "Summary Category Group" where miscertification is discussed, the EEG recommends that these DOE modifications be accepted as proposed.

The EEG also believes, however, that the modification should also include change to a related miscertification rate condition. VE based on an 11% miscertification rate is mandatory for the first year, but the HWFP and the proposed modification also allows re-establishment of the first year rate, according to the following process (proposed modification Section B2-1, in redline/strikeout of the current HWFP language; p. A-7):

Sites may establish a site-specific miscertification rate by characterizing a ~~waste stream or waste stream~~ lot of no less than fifty containers in a single Summary Category Group at the initial 11% miscertification rate. The results of this initial characterization shall then serve as the site-specific miscertification rate until reassessed annually...

The EEG agrees that this revision of the initial miscertification rate should also be adjusted to summary category groups, but also recommends that selection of the containers should reflect an effort to obtain a representative sample of the waste streams within each summary category group for which characterization during the initial year is planned. The site should be required to

²*Findings and Recommendations of the CAO Waste Characterization Task Force Final Report* (August 9, 1999), Table 3 (p. 10). The DOE apparently did not assign a reference number to this report; the EEG library number is DOE/WIPP 99*3158. The cost estimate is cost-per-container averaged from past waste characterization activities at LANL, RFETS, and INEEL; the actual figure generated was \$2937.00. The number only applies to retrievably stored wastes--visual examination for newly generated wastes was calculated to be \$237.00 per container.

³The DOE stated at the HWFP hearings that shipment modeling assumed 30-36 drums per shipment (HWFP Hearings Transcript, p. 642); the EEG calculations assume a 50-week year.

document the rationale for the waste streams selected, and the permittees should be required to confirm that the process met these requirements during the recertification audit following that initial year.

The concern is that the sites will pick a single waste stream within the summary category group for which miscertification is very unlikely to use for the 50-container lot. This would be a waste stream in which prohibited items were not a part of the process that produced the waste stream, and there is high confidence already that the contents are in a single waste matrix code. The effect would be negligible as long as the rate applied to each waste stream (at least 15 containers in each waste stream would still require VE), but would be of much greater significance if the DOE's modification is approved (as few as 15 containers from the entire summary category waste group would undergo VE).

Item 3 - Substitution of Radionuclide-Specific Data for Gross Alpha and Gross Beta Data

The DOE proposes to change the HWFP requirement for reporting of gross alpha and gross beta as a part of the groundwater monitoring program to reporting of selected radionuclides, rather than the totals for each of the two types of radiation. The DOE points out that the high salinity and dissolved solid content in WIPP groundwater causes attenuation of alpha particles, so that only small samples can be analyzed. The use of small samples in turn results in elevated minimum (or higher) detectable activities for both alpha and beta measurements, as well as large uncertainties in values when measurable amounts are detected. This is the reason why EEG concluded in 1999 that it is better to analyze directly for VOCs and hazardous metals than use gross radioactivity measurements as a surrogate.⁴

The EEG can also supply independent confirmation of the DOE argument. Samples are required to be analyzed by a commercial laboratory (HWFP, Section L-4c)). During the years 1985-1987 the EEG collected Rustler formation samples and used a commercial laboratory to perform gross alpha/beta analysis. The results were reported in EEG-43, *Preoperational Radiation Surveillance of the WIPP Project by EEG 1985-1988*. These results show a remarkable variability for gross alpha/beta measurements. For example, the measurements from the DOE-1 groundwater well samples taken in the Culebra formation were as follows (the units are fCi/ml, counting errors are at the 95% confidence level):⁵

⁴Neill, Robert H., "EEG Perspectives-Issues Associated with NMED RCRA. Requirements for WIPP", a presentation to the N.M. Radioactive Waste Consultation Task Force, November 18, 1999.

⁵It's important to note that DOE-1 is not the same well as "Well #1" listed in Table 2 of the DOE modification submittal (p. A-12). The DOE-listed wells are a set of wells drilled in the 1990's for the Detection Monitoring Plan, and DOE-1 was drilled as a part of the WIPP site characterization program at a much earlier date.

Date Sampled	Gross Alpha	Gross Alpha Counting Error	Gross Beta	Gross Beta Counting Error
04-24-85	-10	±780	200	±1000
07-03-86	700	±1700	2000	±1000
07-28-87	-700	±1200	600	±1000

All wells showed this kind of variability; some were much worse. These measurements indicate that releases from WIPP wastes would need to exceed release limits by at least several multiples before changes in gross alpha/beta measurements from the background could be confidently detected. The HWF requirement for gross alpha and gross beta monitoring of groundwater does not seem likely to provide useful data.

The EEG has one recommendation and one observation concerning the DOE's proposed modification:

1. The DOE submittal does not state in the HWFP modification what specific radionuclides are to be reported—the DOE argument indicates that ^{241}Am , ^{238}Pu , $^{239/240}\text{Pu}$, ^{234}U , ^{235}U , ^{238}U , ^{90}Sr , ^{40}K , ^{137}Cs and ^{60}Co will be monitored for, but the actual modifications to the HWFP only cite “radionuclide-specific” analysis and data. The EEG recommends that the modification to the HWFP include the list of radionuclides for which data is to be supplied to the NMED. Tables V.D and Table L-3, where the proposed modification deletes the gross alpha/beta parameters, would seem a logical place to include them. The DOE's proposed modifications to Sections VJ.2.c and L-5c, which establish the requirements to report the radionuclide-specific information should also be altered to point to the list of radionuclides to be reported.
2. Unless there is a regulatory requirement, the only use radionuclide measurements have for the HWFP is as a surrogate for migration of HWFP-regulated materials. The measurement of specific radionuclides will be a sensitive and certain methodology for detecting any migration of radionuclides from the repository. However, detection of radionuclide migration would not prove the HWFP-regulated hazardous materials have migrated to the wells, nor would it provide any estimate of possible hazardous material concentrations. Table V.D of the HWFP already provides for the groundwater analysis of specific hazardous waste components that would show the occurrence of migration, and would also provide the concentrations. Therefore, EEG sees no technical reason for either a gross or specific radionuclide measurement requirement in the HWFP if their only purpose is as a surrogate.