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February 9, 2000

Mr. Steve Zappe
WIPP Project Leader
New Mexico Environment Department
Hazardous & Radioactive Materials Bureau
2044-A Galisteo Street
P. O. Box 26110
Santa Fe, NM 87502-6110

Dear Mr. Zappe:

Attached are what the EEG believes to be technical inconsistencies and editorial errors in the WAP portion (Attachment B) of the Hazardous Waste Facility Permit Issued to the Waste Isolation Pilot Plant by the New Mexico Environment Department, October 27, 1999. Nearly all of these are from a portion of Attachment B3 which was a focus in a recent EEG study.

They are provided in the spirit of helpfulness for any future revisions.

Sincerely,

Robert H. Neill
Director

RHN:BAW:ss:pf
Enclosure

cc: Dr. Inés Triay, CAO
Mr. Robert Kehrman, WID

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WIPP WAP Inconsistencies and Editorial Errors

(The first two items were previously provided to NEED more informally)

1. Section Ba(1) of the WAR establishes a head space gas DO "to ensure compliance with the environmental performance standards of 20 MAC 4.1.500 (incorporating 40 CAR, §264.601(b))." 40 CAR 264.601(b) seems to be the wrong reference for head space gas, as subparagraph (b) is applicable to solid and liquid wastes ("migration of waste constituents in surface water, or wetlands or on the soil"), while subparagraph (c) is likely the correct citation for VOC ("migration of waste constituents in the air").
2. Lines 26-27 on page B2 of the WAP contains the following statement:

"Characterization requirements for individual containers of TRU mixed waste are specified on a waste stream basis."

In several other places the WAP states or implies that characterization requirements will be based on Summary Category Groups (SAGS) rather than individual waste streams. For example Table B-6, Summary of Parameters, Characterization Methods, and Rationale for CH Transuranic Mixed Waste, only specifies characterization methods related to SAGS.

While other parts of the WAP require that the data produced be considered in relation to the waste stream, there is no further support for the concept that characterization requirements are to be tailored to the waste stream.

Developing waste characterization requirements for each waste stream has not been a part of the DOE waste characterization process in the past. The statement quoted may be a point of disagreement either with the DOE (if the statement is enforced) or with others (if the statement is not enforced).

3. Equation B3-4 is used to determine the percent difference between multiple measurements of the same calibration standard. The equation and explanation of terms is as follows (p. B3-2):

$$\%D = \frac{|C_1 - C_2|}{C_1} \times 100 \quad (\text{B3-4})$$

where C_1 is the initial measurement and C_2 is the second or other additional measurement.

The denominator in the equation should be the larger of C_1 and C_2 , rather than based on whichever was the first measurement. For example, if the allowable %D was set at 30%,

and one measurement was 40 p.m. and the other 30 p.m., then the order in which they were measured would determine whether the precision CAO had been met (25%) or not (33%). There is no apparent reason why the order in which measurements were taken should be a factor in determining compliance with a CAO. Nor is it obvious why the larger measurement should be in the denominator to determine the level of precision. Evaluating the precision of multiple measurements by this equation assumes the measurements are close to each other.

This same equation and explanation were in the CAO's Quality Assurance Program Plan, Revision 0, (the QAPP) Section 3.2.1, equation 3-4, p. 3-7.

4. Section B3-2, Headspace Gas Sampling Quality Assurance Objectives, begins with a statement that "Headspace-gas sampling will occur from the headspace within each drum of transuranic (TRU) mixed waste." The terminology should likely be "shipping container," not "drum"; to maintain uniformity of the requirement so that SWBS and TDOPs will have headspace gas samples taken also. The next sentence also refers to "drums," rather than all types of payload containers--the flaw may be generic throughout the Permit, and a search of all references to "drum" to make sure "shipping containers" is not what is intended may be in order.
5. Section B3-2, under the Precision QAO, requires sequential or simultaneous headspace gas field duplicates to be collected, but does not indicate the frequency with which they are to be collected. Table B-1 should be referenced (1 per batch).
6. The WSPF in Figure B-1 has an entry (number 4) for "Date Certified by CAO"; NMED may want this changed to the "TSDF-WAC certification date" so that the terminology is the same as the requirement in Sections B-1d and B-4b(1). B-1d requires the following:

Every waste stream shipped to WIPP shall be accompanied by a Waste Stream Profile Form (Figure B-1), containing the following information:The date of TSDF-WAC certification by the Permittees and the certification document title and date....
7. Section B3-3, Sampling of Homogeneous Solids and Soils/Gravel, under the "Precision" portion, appears to have jumbled two separate processes into a nearly undecipherable combination. In the QAPP Section 8.3, the Relative Percent Difference (RPD) between co-located cores is to be control-charted, and the control chart used to accept/reject each additional pair of co-located cores. However, the QAPP requires at least 30 sample pairs be gathered before establishing the control chart. For acceptance of the first 30 pairs, the QAPP established an interim statistical test to compare the co-located cores with the variance between drums within the same waste stream.

In the WAP, the description of these two separate processes seem to have become intermixed; a statistical method (F-test method) for establishing the acceptance criteria

in the control chart is suggested first, then the requirement for control-charting the RPD is stated in the same paragraph. The next paragraph seems to return to discussion of the initial method of establishing the acceptance criteria, without referencing it. The result is that it appears that the second paragraph in some way refers to the control charts themselves--and it was only by reading the clearer exposition in the QAPP that the probable intent of the section was discernable at all.

The requirement to use "30 or more" co-located pairs in the QAPP, or the "25 to 30 pairs" as found in the WAP, to establish the control chart may both be excessive. The book *Quality Assurance of Chemical Measurements* (Taylor, John K.; 1987) states that far fewer measurements are necessary (p. 132):

As already stated, reliable estimates of the mean and the long-term standard deviation are required to establish control limits. No less than 7 and preferably 15 independent measurements are needed to obtain initial estimates of these statistics.

There is no indication as to why the "25 to 30" number was used in the WAP. The QAPP apparently established the 30-or-more requirement to ensure that the controls are established to a normal distribution of the population without using transformations (see QAPP Section 5.4.1, p. 5-17 for a discussion, in which the Central Limit Theorem is said to be applicable after 30 samples; the same statement is made on p. 5-9, for headspace gas sampling). However, this may simply be one statistician's view of what would be a conservative value to apply. *Statistics for the Engineering and Computer Sciences* (Marshall, William, and T. Sinich; 2nd Ed., 1988) states (p. 257) that the sample size necessary before applying the Central Limit Theorem is dependent on the nature of the population sampled, and may be as small as 10.

Unless the "25 to 30" and "30 or more" statements from the QAPP and WAP can be clearly justified perhaps a lesser number would reduce the dependence on the statistical test rather than the seemingly more appropriate control chart without creating other difficulties.

8. Section B3-3, in the portion concerning Accuracy DQOs, contains the statement that "Sampling accuracy as a function of sampling cross-contamination will be measured" (page B3-9). However, the WAP does not indicate how this might be done. The utility of performing this action seems markedly dubious unless a specific methodology is available that will lend additional credibility to accuracy considerations. The EEG suggests the requirement be dropped.
9. Section B3-4 (p. B3-11) states that the radiography objectives are confirmation of MPCs, identification of prohibited items, and estimation of waste material parameter weights. The section goes on to state that "Data to meet these objectives must be obtained from an audio/videotaped (or equivalent media) scan provided by trained radiography operators at

the site.” It would seem as if the data would be more easily and better obtained from the radiography data forms that are also required than from radiography tapes, and “the trained radiography operators” would seem to in a better position to make the decisions than personnel reviewing a video tape.

The wording is identical to that found in the QAPP (Section 10-2, p. 10-5).

10. Tables B3-5 and B3-7 contains the acronyms “CCC” and “RT”, but these are not explained in the WAP or elsewhere in the Permit. The QAPP Table 13-3 identifies them as Calibration Check Compounds and Retention Time. Tables B3-5 and B3-7 also do not identify “RSD” (though this acronym is defined in Table B3-4 and B3-6).
11. Tables B3-5 and B3-7 uses the term “Average response factor (RRF),” which is listed in QAPP Tables 13-3 and 14-3 as “average *relative* response factor (RRF).” SW-846 Method 8270 uses the term “response factor,” but abbreviates it as “RF.” The WAP tables would be more easily understood if the acronym clearly reflected the terminology.
12. Tables B3-8 and B3-9 uses acronyms for various methods of total metal analysis which are not expanded anywhere in the Permit (ICP-MS, CVAA, FLAA, HAA, GFAA). One of these is “ICP,” which apparently refers to inductively coupled plasma - atomic emission spectroscopy, which is abbreviated elsewhere as ICP-AES.
13. Daily calibration requirements (tune) for ICP-MS in the WAP (Table B3-9) specify that the replicate %RSD be ≤ 5 , and requires a nonconformance report if that limit is exceeded. This requirement appears to be based on a misinterpretation of the SW-846 method for ICP-MS (Method 8020). The Method requires (Section 7.4) the 5% RSD to establish that the ICP-MS instrument has reached an equilibrium *before* performing the calibrations specified in Section 7.5 and 7.6. The implication in the Method is that if the 5% RSD is exceeded then more time should be allowed to reach equilibration, and new measurements taken and compared--the 5% RSD is simply to verify that the instrument is ready for calibration. Immediately *after* calibration, the Method requires verification of calibrations to be within 10%, or analyses are to be terminated and corrective actions are to be instituted (Section 7.8).

The WAP tuning requirements also specifies mass calibration must be “...within 0.9 amu”; Method 8020 specifies less than 0.1 amu (Section 7.5).

The WAP tuning requirements also specify a mass calibration resolution of “... < 1.0 amu full width at 10% peak height.” Method 8020 Section 7.5 requires a slightly less ≤ 0.9 amu full width at 10% of peak height resolution.

It’s worth noting that the correct Method 8020 values were in both 1998 drafts of the Permit, but were changed in the final draft (June 1999) version. The wording in Method 8020 seems very clear.

14. The EEG suggests requirements for waste material parameters could be removed from the WIPP Hazardous Waste Permit. Waste material parameters are not hazardous wastes, and are apparently only included in the Permit because the DOE's application contained these requirements. There are no requirements in the WAP or in the rest of the Permit concerning waste material parameters other than for RTR to estimate their mass, VE to estimate/weigh them, and a comparison of these numbers be performed. No calculations using this data are to be performed, no assessment of the affect these components would have on hazardous materials is required, and no requirements for consideration of how these materials might become hazardous wastes is included in the Permit. The only function of estimating or weighing the waste material parameters seems to be to establish an unnecessary criteria for assessing RTR accuracy.

Waste material parameters were originally included in WIPP documents because of the interactions these materials might have with the radionuclide component of the waste. The EPA's certification under 40 CFR 194 pared the original list of 11 waste material parameters to four (ferrous metals, cellulosic material, rubber, and plastics), and a requirement to estimate/weigh these should still be a part of the WIPP documents. However, there appears to be no rationale for any RCRA-related consideration of these non-hazardous materials.

15. Both Section B3-9 and B4-3e list precision, accuracy, completeness, comparability, and representativeness data quality requirements for AK documentation, but the two sets of requirements are not identical. The differences seem to be minor, and it appears as if Section B4-3e was altered in writing the June 25, 1999, draft while Section B3-9 retained the November 1998 draft version of the same statements. To avoid confusion the two should be made congruent--or, preferably, one set be replaced by a reference to the other set.
16. Section B3-9, under Completeness, requires the AK record to "...contain 100 percent of the required information (Permit Attachment B4-3)." The information required in the AK record is listed in Section B4-2b, Required TRU Mixed Waste Stream Information, not in Section B4-3, Acceptable Knowledge Training, Procedures and Other Requirements.
17. Section B3-9, under Comparability, requires that "All sites must assign hazardous waste codes in accordance with Permit Attachment B4-4...." Section B4-4 is titled Additional Confirmation of Acceptable Knowledge at the WIPP Facility, and does not cover site assignment of hazardous waste codes. Requirements for assigning hazardous waste codes are found in Sections B4-2b, B4-3b, B4-3d, B4-3e, and perhaps elsewhere in the WAP; perhaps all of Section B4 should be cited.