UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
AIR AND RADIATION

Dr. Inés Triay, Acting Manager
U.S. Department of Energy
Carlsbad Field Office
P.O. Box 3090
Carlsbad, NM 88220

Dear Dr. Triay:

As you know, the U.S. Environmental Protection Agency (EPA) has been reviewing and evaluating the U.S. Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) Compliance Recertification Application (CRA) since it was submitted on March 26, 2004. To date, our primary focus has been on determining the completeness of the CRA documentation. In addition to the completeness review, we have begun our technical adequacy review of the CRA. Through this technical review, EPA will determine whether new or changed information has been appropriately incorporated into the WIPP performance assessment (PA) calculations, or whether the potential effects of changes are properly characterized.

During the review process thus far, both DOE and EPA have identified several technical changes and corrections that are necessary to the CRA performance assessment. These changes include, but are not limited to, using more complete and up-to-date inventory projections and corrected implementation of calculational requirements that ensure appropriate statistical confidence in the PA results. In addition, there are a number of modeling assumptions that we believe have not been sufficiently justified; in these cases, alternative assumptions must be used.

During the initial Certification Decision, EPA addressed similar technical issues with performance assessment by requiring a Performance Assessment Verification Test (PAVT), which incorporated revised parameters, values and modeling assumptions directed by EPA. The PAVT was a key factor in our decision-making because it provided analysis on the collective effect of PA changes on the projected performance of WIPP. For similar reasons, and based on the extent and nature of the changes identified to date, we believe that such a revised performance assessment is warranted for recertification. Due to regulatory and technical issues related to statistical confidence (as discussed further in our enclosure), the new CRA performance assessment must be comprised of three full replicates (i.e., 300 iterations of the

models) and will be considered to replace – not simply supplement – the current CRA performance assessment provided to us in March 2004. The revised CRA performance assessment, once completed, will establish the baseline against which future changes at WIPP are evaluated.

Enclosure 1 to this letter describes necessary changes and corrections to the Recertification PA, based on our review to date. Because we have not yet completed our technical evaluation of the CRA, a complete list of the exact changes to the PA is unknown at this time. (For example, we expect that an updated value for uranium (+VI) solubility will need to be incorporated, but are not yet directing what value should be used.) We do not expect, nor would it be productive for DOE to produce a full and revised PA until we complete our review and provide additional direction. Nevertheless, we appreciate that changing the PA may be time- and work-intensive. This letter provides early notification of our intent for DOE to conduct a revised PA to allow as much time as possible for DOE and Sandia National Laboratories (SNL) to incorporate key changes.

The Department and SNL should proceed with revisions to the PA based on the enclosure to this letter. DOE must appropriately document the new performance assessment, including a discussion of the changes made to computer codes, parameters, and input files. Examples of other appropriate documentation include: a discussion of the results of the new performance assessment; an updated transuranic waste inventory database; an analysis that identifies the sensitivity of the top parameters by release mechanism, similar to that provided in response to our comments; and the mean and 95% confidence limit of the results. Upon completion of a new performance assessment, DOE must conduct a thorough review to ensure that the errors have been corrected and that the new calculations are accurate.

We appreciate DOE's and Sandia National Laboratories' responsiveness thus far to EPA's Recertification issues, both completeness and technical. We are particularly pleased with the manner in which problems and weaknesses in the performance assessment have been identified and dealt with by DOE . We will continue to raise performance assessment issues and other issues in a timely manner as we progress with our technical evaluation and a new performance assessment.

If you have any questions regarding the conduct of a new performance assessment, please contact Ms. Betsy Forinash at 202-343-9233.

Sincerely,

Elizabeth Cotsworth

Elizabeth Cotsworth, Director
Office of Radiation and Indoor Air

cc: Frank Marcinowski, DOE/HQ
Lynne Smith, DOE/HQ
Alton Harris, DOE/HQ
Russ Patterson, DOE/CBFO
Steve Zappe, NMED
EPA WIPP Team
EPA Docket

Enclosure 1

Performance Assessment Issues

Our issues arise from DOE's response to our comments [Docket A-98-49, Items II-B2-34 to Item-B2-41], items identified by both EPA and DOE in the development of those comments, and computer code and input corrections that have been identified to date. Additional issues may be added to the list below.

Parameters

There are several parameters that need to be changed. EPA's review found that there has been additional technical work done related to uranium (+VI oxidation state) solubility which was not considered in the CRA. It appears that the solubility estimates from this recent work is higher than that used in the CRA. The new performance assessment needs to update the uranium (+VI) solubility to account for new information. EPA will provide direction on this before the new PA calculations begin.

The current CRA performance assessment fails to use up-to-date solubility uncertainty ranges for the other actinide oxidation states. Since the submission of the CRA, DOE identified new information which produces a new set of uncertainty ranges for the +III, +IV, and +V oxidation states (see response to comment C-23-16, January 19, 2005 letter, Docket A-98-49, Item II-B2-41). The new uncertainty ranges need to be incorporated into the new performance assessment.

In the CRA performance assessment, DOE assumes that the probability that microbial degradation will occur and thus produce significant gas is 50 percent. However, based on our review to date, including DOE's response to EPA comments (see response to comment G-9, August 16, 2004 letter from DOE, Docket A-98-49, Item II-B2-35), EPA believes that there are reasonable alternative interpretations to DOE's responses. It is EPA's position that microbes will survive over the regulatory period and be able to produce some gas, albeit with the possibility that sometimes the resulting gas generation rate may be low or near zero. The revised performance assessment must implement a change so that the modeled probability of microbial degradation is 1. DOE may propose different ranges of gas production or microbe effectiveness as long as it is supported by data (see notes of January 11-12, 2005 meeting; Docket A-98-49, Item II-B2-42).

Methanogenesis

For the CRA performance assessment, DOE assumed that the dominant microbial degradation pathway would be methanogenesis, which produces less carbon dioxide than the denitrification and sulfate reduction pathways. This assumption directly affects the amount of MgO necessary to maintain expected chemical conditions. DOE also did not account for the presence of sulfate in the anhydrites ($CaSO_4 \bullet nH_2O$) that are found in the disturbed rock zone. Since DOE has not conclusively shown that methanogenesis will be the dominant pathway, the new PA must use the approach used in the CCA.

Inventory

The WIPP waste inventory has had corrections and updates since the submission of the CRA. EPA understands that DOE incorrectly included in the PA a remote-handled waste stream identified as a contact-handled waste stream (waste stream LA-TA-55-48), such that the waste would violate fissile gram equivalent shipping requirements. The identification of this waste stream needs to be corrected in the revised performance assessment along with other waste inventory-related items identified by Sandia National Laboratories (Analysis Plan 113, Analysis Plan for Inventory Reconciliation: Compliance Recertification Application).

DOE has stated that INEEL plans to ship compressed (supercompacted) waste drums from its Advance Mixed Waste Treatment Facility to WIPP. In response to an earlier inquiry from EPA (comment C-15-1, September 2, 2004 letter, Docket A-98-49, Item II-B3-74), DOE replied that no other sites planned to compress waste (Docket A-98-49, Item II-B2-39). However during our site visit to Oak Ridge National Laboratory (ORNL), we were informed that ORNL does plan to compress waste in drums (Docket A-98-49, Item II-B2-46). DOE needs to account for additional compressed waste and confirm whether any other sites will compress any of their waste.

Also, at an October 26, 2004 technical exchange (Docket A-98-49, Item II-B2-43), DOE staff indicated that the sites have waste update changes, such as modifications to waste stream volumes, and that DOE would like to include buried pre-1970 TRU waste from INEEL in the PA inventory. This information needs to be included in the new performance assessment.

Packaging Materials

In a response to EPA's comment about whether cellulosics, plastics and rubber (CPR) in packaging materials were included in the CRA performance assessment, DOE stated that the packaging materials were not included in the performance assessment and that they would increase the CPR in repository by nearly 13% (July 15, 2004 letter from Paul Detwiler, Docket A-98-49, Item II-B2-34). Since this material can increase the amount of gas that could be generated in the repository, this packaging material must also be included in the revised performance assessment.

Ten Drum Overpack

In the CRA performance assessment, DOE assumed that one ten-drum overpack (TDOP) would occupy the space of three seven-packs of 55-gallon drums. However, as identified in an inspection of WIPP waste emplacement (December 9, 2003 letter to DOE, Docket A-98-49, Item II-B3-65), EPA found that one TDOP may occupy the space of only two seven-packs of 55-gallon drums. The revised performance assessment inventory must reflect EPA's finding.

Computer Codes and Inputs

At this stage in our review, we are aware of several changes in computer code(s) and input files that need to be made for a new performance assessment. These changes are detailed by DOE during the completeness review process (see, for example, the revised response to EPA comment C-23-11, January 19, 2005, Docket A-98-49, Item II-B2-41). There was an omission in the code for CCDFGF Version 5.00 of a correction of spalling releases for the volume fraction of

contact handled waste in the repository. There was an error in the input control files for SUMMARIZE used for the CRA that incorrectly used spall area for spall volume. Corrected, these errors result in an increase of spallings releases by a factor of 1.5. An error in the input control files to SUMMARIZE resulted in reading the ^{234}U collidal mobilization fraction as the values for ^{230}Th and vice versa.

There are several errors identified to date that affect the CRA PA's compliance with EPA's regulation relating to results of performance assessment in section 194.34 that pertain to uncertainty. Incorrect LHS transfer files were used as input to PRECCDFGF for replicates 2 and 3, thus some of the same parameter inputs were used multiple times instead of being appropriately sampled. Furthermore, it appears that only 50 vectors for DRSPALL calculations were run for the CRA performance assessment instead of a full set of 100 vectors, thus potentially reducing the range of spallings releases. While we expect that these issues will not affect compliance with the numerical release standards in 40 CFR 191.13, they do appear to affect the uncertainty requirements in 40 CFR 194.34, Results of Performance Assessments, subsections (c) and (f). In the new PA, DOE must run a full set of vectors for each replicate.

Culebra Transmissivity Fields

The revised performance assessment must also incorporate the updates to the Culebra transmissivity fields (T fields) as a result of EPA comments (see the response to comment G-11, January 19, 2005 letter, Docket A-98-49, Item II-B2-41). The updated T fields will better represent the mining areas around the WIPP site.