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

APR 28 2006

OFFICE OF
AIR AND RADIATION

Dr. David C. Moody, Manager
U.S. Department of Energy
Carlsbad Field Office
P.O. Box 3090
Carlsbad, NM 88221

Dear Dr. Moody:

I am writing in response to your April 10, 2006, letter requesting approval to reduce the amount of excess magnesium oxide (MgO) emplaced in the Waste Isolation Pilot Plant (WIPP). The Department of Energy (DOE) has requested Environmental Protection Agency (EPA) approval to reduce the amount of excess MgO in the system from 1.67 to 1.20 of that needed in the system, under current conditions and assumptions.

The emplacement of MgO is an important element of EPA's 1998 WIPP Certification Decision because it is the only engineered barrier at WIPP and it is important for maintaining proper chemical conditions in the repository. MgO is expected to moderate brine pH and sequester carbon dioxide (CO_2) gas that is produced from microbial processes, should they occur. DOE presently assumes that all cellulose, plastic, and rubber (CPR) materials will degrade by microbial processes in the WIPP. DOE currently places excess MgO (1.67 of that necessary) in the repository to account for uncertainties in the MgO effectiveness, such as the amount of MgO that actually reacts chemically.

In DOE's Compliance Certification Application (CCA), DOE calculated that the MgO emplacement plan would create a "1.95 factor of safety" (EPA Docket A-93-02, Item II-I-10, February 26, 1997). EPA found this MgO excess to be reasonable to ensure adequate performance of the engineered barrier. In 2001, EPA approved DOE's request to remove the MgO mini-sacks and lower the excess to 1.67 (EPA Docket A-98-49, Item II-B2-58).

In the certification decision, EPA's acceptance of MgO as an engineered barrier was based, in part, on the knowledge that DOE would emplace excess MgO. With a relatively high excess amount of MgO, EPA believed that the MgO would maintain the chemical conditions assumed in the performance assessment, and that the extra MgO would overwhelm any perceived uncertainties that the chemical reactions would take place as expected. However, as the excess amount of MgO is lowered and approaches 1.00, it is less clear to EPA that the uncertainty in the MgO reactivity is adequately captured.

The concept of reducing the amount of MgO seems reasonable if appropriately justified, however, reducing the amount to near the "fully effective" amount is not justified by the information provided in your planned change request. In the April 10, 2006, letter, DOE discusses cost savings and transportation risks. EPA appreciates the importance of transportation and operational safety and cost savings to DOE, however, before EPA can evaluate DOE's request to lower the excess MgO emplaced to nearly the "fully effective" range (1.00), DOE needs to address the uncertainties related to MgO effectiveness, the size of the uncertainties, and the potential impact of the uncertainties on long-term performance. For example, EPA would like DOE to discuss how the presence of supercompacted waste, and the uncertainties in the amount of CPR disposed of at WIPP, affect the results of analyses like that done for the removal of mini-sacks.

DOE provided this type of information in its request to eliminate the MgO minisacks in 2001. In that request, DOE provide a number of impact assessments, such as the effect of diffusion. EPA believes it is prudent to revisit and update these assessments to assure that any additional change in excess MgO is thoroughly evaluated.

Since DOE has not yet provided adequate justification for the 1.20 safety factor, EPA cannot, at this time, approve DOE's request to lower the safety factor from 1.67. If you have any questions regarding this request, please call Sharon White at (292) 343-9457.

Sincerely,

for

Bonnie C. Gitlin, Acting Director
Radiation Protection Division