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subject: Updated value of WAS\_AREA:PROBDEG

The parameter WAS\_AREA:PROBDEG is a sampled indicator function which tells BRAGFLO whether microbial gas-generation occurs and what type of material biodegrades. The probability distribution for PROBDEG is a delta function. The type of distribution will not be changed for the upcoming 2004 CRA PABC, but the allowed values and probabilities will, as described below.

In the 1997 PAVT, and the 2004 CRA PA, PROBDEG had the following values and probabilities (P):

PROBDEG = 0no microbial degradation(P = 0.5)PROBDEG = 1microbial degradation of cellulose only(P = 0.25)PROBDEG = 2microbial degradation of all CPR material(P = 0.25)

In the above definition, CPR means all cellulosics, plastics and rubber. In the case of PROBDEG = 0, BRAGFLO sets the rates of microbial gas generation equal to zero. In the case of PROBDEG = 1, BRAGFLO sets the initial inventory of biodegradable material equal to only cellulosics material, such as wood, paper and cloth. In the case of PROBDEG = 2, BRAGFLO sets the initial inventory of biodegradable material equal to all cellulosics, plus rubber and plastics.

In the March 4, 2005 letter for the upcoming 2004 CRA PABC (Cotsworth, 2005), EPA dictated to DOE that the probability of microbial degradation and gas generation must be changed from 0.5 to 1. EPA's position is that given new science on extremophiles, they believe that there is

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always some possibility of microbial activity. For the 2004 CRA PABC, DOE has agreed to implement EPA's position and thus the parameter PROBDEG will be changed. In response to EPA, DOE argued that the probability of cellulosics decomposing should be increased but not the probability of all CPR degrading. This assertion comes from experiments performed at Brookhaven National Laboratory in which cellulosics and plastics & rubbers were inoculated with microbes and allowed to biodegrade for 10 years (Francis et al., 1997). In these experiments, cellulosics yielded significant microbial gas generation, but plastics and rubbers did not. EPA accepted this assertion which leads to the following values and probabilities for WAS\_AREA:PROBDEG

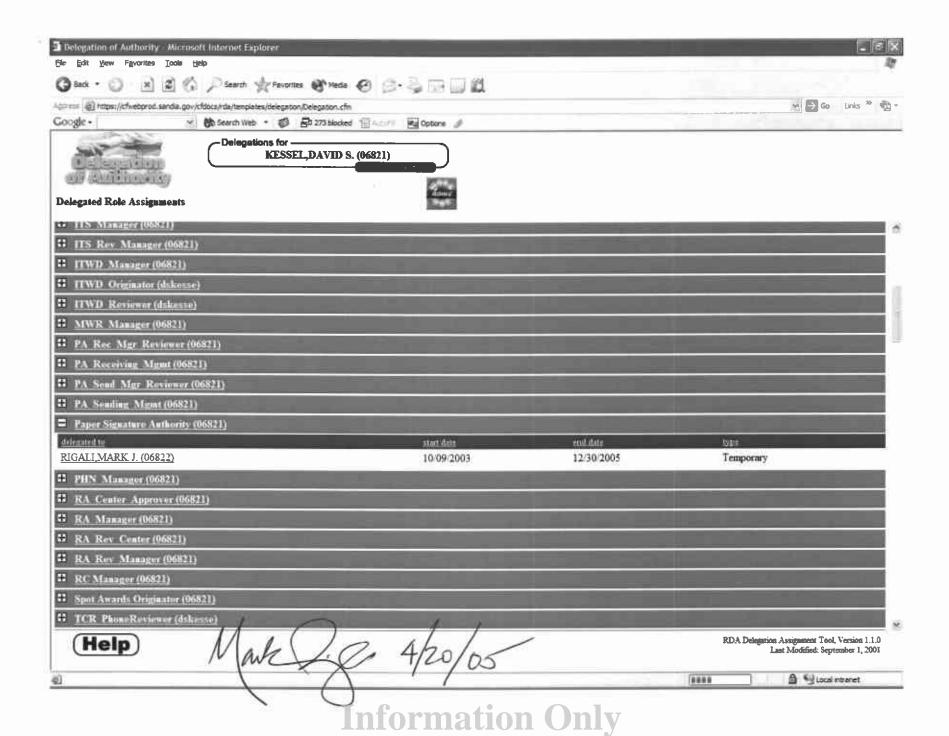
PROBDEG = 0	no microbial degradation	(P=0)
PROBDEG = 1	microbial degradation of cellulose only	(P = 0.75)
PROBDEG = 2	microbial degradation of all CPR material	(P = 0.25)

This will be implemented in the WIPP parameter database by changing the range of values assigned to PROBDEG from 0,1,2 (CCA, 1997 PAVT, 2004 CRA PA) to 1 or 2, and assigning the probabilities to each value as given above.

## References

Cotsworth, E. (2005). EPA letter on conducting the performance assessment baseline change (PABC) verification test. U.S. EPA, Office of Radiation and Indoor Air, Washington, D.C. ERMS# 538858.

Francis, A. J., J. B. Gillow and M. R. Giles (1997). Microbial Gas Generation Under Expected Waste Isolation Pilot Plant Repository Conditions. Sandia National Laboratories, Albuquerque, NM. SAND96-2582. ERMS#244883.



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