ATTACHMENT

The Board has received a set of revised slides from Peter Swift (Sandia National Laboratories/Bechtel SAIC Company, LLC) informing us of changes in his presentation "Department of Energy Performance Assessment and Barrier Analyses" made to the Board at its September 10, 2002, meeting in Las Vegas. Following is a copy of the revised slides and an explanation of what changes were made and why.

EXPLANATION

Only those figures that contain results of the one-on barrier analyses are changed from the 9/10 version of the presentation: i.e., numbers 12, 19-21, and 24-25. Those numbers are noted on the title slide. Changes occur only in the dose plots: all text is the same.

The total system performance assessment (TSPA) team has made two changes in the model setup since the 9/10 results.

1) The treatment of inventory release in the first time step in which water moves through waste has been modified by removing a submodel related to localized corrosion of cladding that caused an unrealistic delay in release in the first time step in the stripped-down versions of the model used in Cases 2 and 3. The visible effect in the plots is an increase in the first time step total mean dose for Cases 2 and 3 only. Minor effects propagate throughout all Cases, but are not visible in the plots.

2) Irreversible colloids (i.e., plutonium) were added to the sequence beginning with the addition of reversible colloids in Case 3. In the September 10 plots, irreversible colloids did not appear in the releases until Case 9, when the invert was added. This modification changes the total mean dose curves for Case 6 (add unsaturated zone (UZ) below), Case 7 (add saturated zone (SZ)), Case 8 (add UZ above and drift effects) and Case 13 (add SZ before UZ), beginning at about 1500 years, which is when water chemistry returns to near-ambient levels (low ionic strength) as decay heat drops. (One of the assumptions we made in setting up the one-on analyses was that we used the thermally-evolved drift-crown water chemistry in all the early Cases, including those that didn't have a drift. This assumption is not, perhaps, as realistic as it might have been, but it was a reasonable and expedient choice given the water chemistry models available in the existing TSPA.) The most noticeable change in the results is that the Case 8 curve is now closer to Case 7 rather than Case 9, and has increased by about a factor of 4 at 10,000 years. Irreversible colloid mobilization, as modeled, is inversely proportional to ionic strength, and the relatively low ionic strength of the drift crown water used in Cases 7 and 8 (low compared to the more concentrated invert water introduced in Case 9) causes total dose in these cases to be dominated by irreversible colloids after 1500 years. The apparent lack of a decrease in total dose when drift effects are added in Case 8 results from flow focusing. In Case 7, without drift or seepage effects, water flux through the waste is simply a function of infiltration flux and the cross-sectional area of the waste. In Case 8, with the upper UZ and drift effects, only approximately one half of the waste is exposed to seepage. However, flow focusing causes the water flux through the fraction of waste

that sees seepage to be approximately double that in Case 7, causing total releases from Case 8 to be similar to those from Case 7 during the period when irreversible colloids dominate.

The changes in the treatment of irreversible colloids do not affect mean total doses from Cases 3, 4, or 5 because those doses are dominated by dissolved species. Colloids do not become a significant contributor to the total dose until sorption effects appear with UZ and SZ transport, reducing the relative contributions from dissolved species.

The changes in the treatment of irreversible colloids have no effect whatsoever on the total doses reported for cases 9, 10, 11, or 12, because those cases included the irreversible colloids in the early results. In particular, the full-barrier analysis presented as Case 12 and also shown as the full horsetail in Slide 12 is essentially unchanged (although recalculated and replotted because of the change in the treatment of waste form release), and remains the TSPA department's current best estimate of overall performance.

These changes and corrections will be documented in a Technical Error Report currently in preparation, and the One-on Barrier Analysis Report will be updated with an interim change notice (ICN) to replace the affected figures.

We have also discovered that slide 12 (overall performance results of the one-on analyses, Case 12) was misprinted in the color handouts distributed to the Board members and staff on September 10. The version of the slide projected on the screen and distributed in black and white to the audience was correct, but in some and presumably all color handouts the overlay of the summary dose curves (mean, median, etc.) was shifted to the left and slightly up with respect to the full horsetail and the axes of the plot. The effect is most visible on the right-hand margin of the plot, where the summary curves terminate at about 700,000 years instead of at 1 million years. The mean curve for this case was plotted correctly in Figures 19 and 21. The error occurred in printing, and does not impact the underlying calculations or the presentation of results in the report.

We have discussed other possibilities for improving realism in the treatment of conceptual model issues in the design of one-on analyses, such as using alternative water chemistry models tailored to the assumptions of the individual Cases and implementing a fracture/matrix flux splitting model in Cases 6, 7, and 8. Although such enhancements could be constructed, they would be specific to the hypothetical conditions of the barrier analyses, and are outside the scope of work needed to support the full system model needed for TSPA for license application. We have therefore chosen to make no additional changes in the ICN update of the document beyond the two discussed above. We believe the current implementation of the models meets the objectives of the one-on analyses, and provides useful insights into the behavior of the system and its component barriers.