Additional Comments on the Proposed Plan for the 200-UW-1 Operable Unit

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While reviewing the detailed analyses in the Focused Feasibility Study (FFS) for the costs and doses arising from the Excavation alternative and the Surface Barrier alternative, it became apparent that there are some serious disconnects when comparing the volumes and depths predicted for contaminants in the soils beneath sites like 216-U-1/U-2 in Appendix D and the model used when calculating the costs and doses associated with both of those alternatives.

For example, in looking at the excavation model presented in Figure G-1, Appendix G, it is assumed that the contaminants are contained in a rectangular column with the dimensions 174 ft x 102 ft x 200 ft high, with a resulting contaminated volume of 3,549,600 ft^3, as given in Table F-3, Appendix F. The region surrounding the contaminant column is excavated from the surface to a depth of 200 ft, with an average slope of 1.5:1. This region surrounding the postulated contaminant column is presumably clean soil. The lateral dimensions of the excavation are given as 934 ft and 862 ft at the surface, and 174ft and 102 ft at the –200 ft depth. The total volume of this truncated inverted pyramid can be calculated from the formula: $V = \frac{1}{3} [A_1 + A_2 + \sqrt{(A_1 \times A_2)}] h$, where A_1 and A_2 are the areas of the upper and lower surfaces and h is the height of the truncated pyramid. For the U-1/U-2 pyramid, the total volume is calculated to be 71,436,736 ft^3. Subtracting the contaminated column volume, the clean soil removed is found to be 67,887,330 ft^3. However, in Table F-3, the volume of clean soil removed is given as 183,230,234 ft^3. Obviously, the tabular value for clean soil volume does not agree with the volume calculated from the excavation model. Thus, the costs associated with clean soil handling appear to be overestimated by roughly a factor of three.

The predicted contaminant distributions beneath the cribs are given in Figure D-2 of the FFS. These distributions are said to be developed using the STOMP model and represent the results from the liquid inputs over the operating life of the cribs. Examining the figure for uranium metal contaminants, it is seen that the contaminated soils actually extend beyond the surface limits of the soil excavation postulated in the excavation model, and in fact occupy almost the entire volume of the inverted truncated pyramid postulated in the excavation model. Thus, the contaminated soil volume, based on the STOMP model distributions, would be more like 70 million ft^3 than the 3.5 million ft^3 used in the cost analyses. Thus, the costs associated with contaminated soil handling appear to be underestimated by roughly a factor of 20.

A similar problem arises in the cost calculations for the surface barrier alternative. The cost analysis assumes that the barrier extends 20 ft beyond the boundary of the contaminated soil column. Thus, the area of the costed cap is 210 ft x 141 ft = 29,610 ft^2. However, if the contaminant distributions predicted by the STOMP calculations shown in Figure D-2 are correct, and the assumption that the cap extends 20 ft beyond the edge of the contaminated area, then the area of the cap would be come 974 ft x 902 ft = 878,548 ft^2. Thus, the cost of the surface cap appears to underestimated by roughly a factor of 30.

Because the worker dose calculations are apparently based on the rectangular contaminated column from the excavation model, those estimated doses are also probably grossly underestimated for the excavation alternative.

Because of the rather large differences between the volumes and the geometries used in the cost and dose analyses and the volumes and geometries predicted by the STOMP calculations, and the apparent errors in the cost and dose results arising from these differences, the appropriate contaminant distributions should be selected and the cost and dose calculations revisited and appropriately revised in both the FFS and the Proposed Plan.

If the excavation model were modified to assume excavation only to a depth of about 50 ft, as suggested in my previous comments on these studies, the contaminated soil volume handled would be about 980 ft x 904 ft x 50 ft = 44,318,244 ft^3. This contaminated volume is about a factor of 12 more than given in the FFS cost analysis, but is about a factor of 1.6 less than the volume of contaminated soil arising from the STOMP distributions excavated to a depth of 200 ft.