The IAEA Q system for the calculation of A1 and A2 values is excessively conservative in a number of ways.
1. For submersion radionuclides they use semi-infinite dose factors for a 3x10x10m room. For the majority of gamma emitters this is NOT an semi-infinite condition and use of that dose factor is excessively conservative. E.g., for Ar-41 it is conservative by almost a factor of 100. If a small room is to be used an appropriate dose factor should be used.
2. The IAEA uses the ICRP quality factor for neutrons. For domestic U.S. shipments the A1/A2 values should be adjusted a factor of 2 upwards to reflect the U.S. accepted quality factors.
3. For tritium oxide a confined volume (of unstated size) is assumed. Given the exposure mode (inhalation) if the tritium concentation is at (or less than) the number that can produce the airborne concentration of concern the quantity can be unlimited. That is, one cannot produce greater than 100% humidity. This should be reflected in the Table 1 values.
4. The final, detailed models for computing the Table 1 values should be available for comment prior to implementation of a new rule. Comments 1-3 are based on an early draft version which may not reflect the final numerical assignments.
5. Exposure modes, dose criteria, release fractions, uptake fractions are all, individually selected on a very conservative basis. The compounding of these conservatisms results in extremely (if not excessive) conservative limits, on top of which are then applied additional conservatisms in terms of packaging and practices. It would seem that we have enough years of experience to apply a more holistic approach to this hazardous material control process with a more realistic, explicit level of desired conservatism at the end of the process rather than by the current compounding scheme.