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Improved Cook-off Modeling of Multi-component Cast Explosives[1] ALBERT NICHOLS, Lawrence Livermore National Laboratory — In order to understand the hazards associated with energetic materials, it is important to understand their behavior in adverse thermal environments. These processes have been relatively well understood for solid explosives, however, the same cannot be said for multi-component melt-cast explosives. Here we describe the continued development of ALE3D, a coupled thermal/chemical/mechanical code, to improve its description of fluid explosives. The improved physics models include: 1) Chemical potential driven species segregation. This model allows us to model the complex flow fields associated with the melting and decomposing Comp-B, where the denser RDX tends to settle and the decomposing gasses rise, 2) Automatically scaled stream-wise diffusion model for thermal, species, and momentum diffusion. These models add sufficient numerical diffusion in the direction of flow to maintain numerical stability when the system is under resolved, as occurs for large systems. And 3) a slurry viscosity model, required to properly define the flow characteristics of the multi-component fluidized system. These models will be demonstrated on a simple Comp-B system.

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