Ultrasonic Fragmentation of Cast Energetic Materials

Through Small Business Innovation Research (SBIR) funding sponsored by the Army RDECOM-ARDEC, TPL is developing a novel process for the recovery of cast energetic materials using ultrasonication. This process recovers TNT and Comp B explosives from mortar rounds in a state suitable for reuse in military applications. Having successfully completed a Phase I feasibility study in which the process was demonstrated on a laboratory-scale to enable the recovery of TNT, TPL is currently engaged in Phase II of the research and development program, the targeted end result of which is a pilot-scale plant. The process is based on the principal of ultrasonic cavitation whereby sound energy is transmitted through a "sonication" fluid to the surface of the solid material, where it causes fragmentation to occur. Results to date at the bench-scale indicate that the rate of material removal from 81mm mortar rounds is comparable to the conventional autoclave method, with potentially lower amounts of hazardous waste, and the absence of pink water generation. Current efforts are focused on bench-scale process refinement and pilot plant design, fabrication and installation. Future work under the SBIR project will conduct pilot plant testing and process optimization and lead to development of a preliminary design for a prototype process. Future work will also expand to include other explosive materials for which there is no efficient method of recovery for reuse.