

## **RUGGED EMULSION EXPLOSIVE FORMULATION #37 - CANDIDATE PERMISSIBLE**

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### **ABSTRACT**

Delay blasting in underground coal results in shock waves traveling through the coal that can damage delay charges remaining in the blast pattern. Undetonated explosives which are dynamically desensitized or react sympathetically from shock wave impact ruin blast results. Such malfunctions, sometimes manifest as misfires, more frequently are covert weak detonations, and result in poor coal breakage and fumes with above normal toxicity. To reduce these mining hazards and resolve charge performance problems, the Bureau of Mines has developed and tested forty prototype rugged explosives in the laboratory. Rugged explosives work properly under difficult circumstances because they not only retain their shock initiation sensitivity but also are resistant to shock damage. This research investigation resulted in one candidate emulsion explosive, formulation #37, which passed all the permissibility tests required by MSHA approval regulations. However, approval was not granted because it reached shelf-life (would not shoot properly) seven months into testing. For research purposes, the remaining tests were conducted with a second batch of formulation #37. This paper discusses the prototype rugged explosive composition and permissibility test results. Where possible, for reference purposes, comparisons are made to a commercial product that has been approved. Further research work is required to overcome the noted deficiency of short shelf-life.