INHIBITED EMULSIONS FOR USE IN BLASTING IN REACTIVE GROUND OR UNDER HIGH TEMPERATURE CONDITIONS

RELATED APPLICATIONS

[0001] This application claims priority to United States Provisional Application No. 62/632,818 filed February 20, 2018, and titled “INHIBITED EMULSIONS FOR USE IN BLASTING IN REACTIVE GROUND OR UNDER HIGH TEMPERATURE CONDITIONS,” and U.S. Provisional Application No. 62/773,766 filed November 30, 2018, and titled “INHIBITED EMULSIONS FOR USE IN BLASTING IN REACTIVE GROUND OR UNDER HIGH TEMPERATURE CONDITIONS,” which are both hereby incorporated by reference in their entireties.

TECHNICAL FIELD

[0002] The present disclosure relates generally to explosives. More specifically, the present disclosure relates to methods for delivering inhibited emulsions and systems related thereto. In some embodiments, the methods relate to methods of using an inhibited emulsion to blast in reactive ground and/or under high temperature conditions.

SUMMARY OF INVENTION

[0002A] The present disclosure relates to a method of delivering an inhibited emulsion to a blasthole. The method can include: supplying an emulsion comprising a discontinuous oxidizer phase and a continuous fuel phase; supplying a separate inhibitor solution comprising water, an inhibitor, and a crystallization point modifier; mixing the emulsion with the inhibitor solution to form an inhibited emulsion; and conveying the inhibited emulsion to a blasthole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The embodiments disclosed herein will become more fully apparent from the following description and appended claims, taken in conjunction with the accompanying drawings. The drawings depict primarily generalized embodiments, which embodiments will be described with additional specificity and detail in connection with the drawings in which:

[0004] FIG. 1 is a process flow diagram of one embodiment of a system for delivering explosives.

[0005] FIG. 2 is a flow chart of one embodiment of a method of delivering an inhibited emulsion to a blasthole.

[0006] FIG. 3 is a flow chart of one embodiment of blasting in reactive ground.

DETAILED DESCRIPTION

[0007] Explosive compositions for use in reactive ground and/or under high temperature conditions are disclosed herein, along with related methods. Explosives are commonly used in the mining, quarrying, and excavation industries for breaking rocks and ore. Generally, a hole, referred to as a “blasthole,” is drilled into a surface, such as the ground. An explosive composition may then be placed in the blasthole. Subsequently, the explosive composition may be detonated.

[0008] In some embodiments, the explosive composition is an emulsion or blend including the emulsion. In some embodiments, the emulsion includes fuel oil as the continuous phase and an oxidizer as the discontinuous phase. For example, in some embodiments, the

Claims:

1. A method of delivering an inhibited emulsion to a blasthole, the method comprising:

supplying an emulsion comprising a discontinuous oxidizer phase and a continuous fuel phase;

supplying a separate inhibitor solution comprising water, an inhibitor, and a crystallization point modifier;

mixing the emulsion with the inhibitor solution to form an inhibited emulsion; and

conveying the inhibited emulsion to a blasthole.

2. The method of claim 1, wherein the emulsion is supplied on a mobile processing unit, wherein the separate inhibitor solution is supplied on the mobile processing unit, wherein the emulsion is mixed with the inhibitor solution on the mobile processing unit to form the inhibited emulsion, and wherein the inhibited emulsion is conveyed to a blasthole from the mobile processing unit.

3. The method of claim 1, wherein supplying the separate inhibitor solution comprises mixing on the mobile processing unit water, the inhibitor, and the crystallization point modifier.

4. The method of claim 1, wherein supplying the emulsion comprises supplying an emulsion matrix.

5. The method of claim 4, further comprising introducing a sensitizing agent to the emulsion matrix to form an emulsion explosive.

6. The method of claim 5, wherein the sensitizing agent is introduced to the emulsion matrix to form the emulsion explosive proximal an outlet of a delivery conduit.

7. The method of claim 1, wherein supplying the emulsion comprises supplying an emulsion explosive.

8. The method of claim 1, further comprising varying a concentration, a flowrate, or both of the inhibitor solution to achieve a desired inhibition of reactive ground by the inhibited emulsion.