

REVIEW OF CANADIAN STUDY ON RESIDUAL DINITROTOLUENES FROM OPEN BURNING OF GUN PROPELLANT

SUMMARY:

Following live fire artillery training, excess propellant bags are routinely open burned on the ground or snow at the firing site. Combustion of these propellant bags is typically incomplete under field conditions resulting in residue deposited on the soil surface. The objective of this study was to measure the residual concentration of Dinitrotoluene after open burning of propellant.

TEST:

The study focused on 3 scenarios which burned propellant in polyester-viscose rayon cloth bags. Two of the scenarios involved burning the bags on snow covered ground and the other scenario was on bare ground.

FINDINGS:

The burning of the bags of propellant was incomplete which resulted in elevated levels of Dinitrotoluenes in the soil after burning it on the ground. The study noted that the melting snow prohibited combustion because of the resulting water: *"Incomplete combustion of the propellant over the snow cover seemed to be in part, attributed to the melting and subsequent consumption of the energy by the resulting water, resulting in a less complete combustion."* The study also could not correlate the residual concentration in the soil after the burn to the initial quantity prior to burning.

STUDY RECOMMENDATIONS:

1. Incorporation of Modular Charge Artillery System
2. A new Burning Scenario
- 3. Burning Gun Propellant in Metal Pans Placed in the Field**
4. Incinerator

1. Incorporation of Modular Charge Artillery System

This is reusing the left over bags. The scenario in the Study is representative of Army practices. The charges come in a variety of weights. To propel a projectile different distances, different combinations of bags are used. For example, one distance may call for one red bag, and one green bag. Another distance requires only a single white bag. After that charge pack has been used, all other bags were put to the side and were not to be used. Those bags are, or were, typically burned in the field following the drill or operation. This alternative suggest the reusing the unused charges for future operations. While it is a good idea, it has no application at Explo.

2. A new Burning Scenario

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This option is simply encouraging other techniques or equipment to be considered. It is not specific to any particular type or kind of equipment.

3. Burning Gun Propellant in Metal Pans Placed in the Field

This option is descriptive of the method that has been selected. The pans prevent the residue coming into contact with soil. The trays that the removal action will employ are engineered to reflect pop-outs. The even spreading of the loose propellant promotes complete combustion. Burning in trays will result in excess oxygen available for combustion. That is more favorable than in the breach of a howitzer, in a bang box in a laboratory, and being placed in the snow. Any unburned pellets will be subjected to additional burns as the trays are reloaded.

4. Incinerator

This is encouraging the use of incinerators with pollution prevention equipment. While it is a good idea, the existing capacity of offsite incinerators is not sufficient to provide a timely solution. No on-site incinerators that can handle the energy of the propellant and provide beneficial pollution prevention equipment are available.