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DETONATION ELECTRIC EFFECT
AND
COMPOSITE EXPLOSIVES

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DEVELOPMENT DIVISION

OCTOBER - DECEMBER 1971

Normal Process Development
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The purpose of this report is to employ the detonation electric effect as an economical tool for studying the unusual behavior of composite explosives.

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Section AA

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ABSTRACT

Materials were obtained to allow formulation of a heavy-metal loaded HE similar to one which displayed strange behavior in previous detonation electric effect studies.

A series of C-J pressure tests will be conducted on LX-09-0 as part of a parameter study and familiarization series.

RX-25-AA samples are being prepared for testing at the present time.

DISCUSSION

Several months ago, the detonation electric effect (DEE) (sometimes also called the "Hayes" effect, after Bernard Hayes of LASL, who first published about it definitively) was employed to measure the C-J pressure of three variations of RX-12, a heavy-metal loaded explosive. In two of the variations, the calculated pressures differed considerably from results of aquarium tests. The latter values seemed to be more reasonable than the former. There were some differences in the geometries of the two setups and it is felt that therein lies the explanation for the pressure differences. Nevertheless, until the cause of the problem is positively located, some doubt is cast on the use of the DEE with such materials. A testing program involving both the DEE and the aquarium method was planned and materials necessary for formulation of a similar HE were ordered. This testing was to be conducted before any other work started, but a series of delays caused a change in the experimental schedule.

The first goal for the DEE with composite explosives is to measure C-J pressure as a function of input pressure and run distance. A large number of RX-25-AA samples are currently being prepared.

Since RX-25-AA is expected to exhibit unusual pressure characteristics and little work in pressure measurements with DEE has been performed at Pantex, a preliminary series is to be conducted on LX-09-0. Of primary concern will be a parameter study concentrating on the effects of the charge length, monitor thickness, and the ratio of these two quantities. These quantities are known to strongly affect the observed pressure and the relationships should be established on a well behaved explosive before a study can be conducted on a composite material such as RX-25-AA.

By the time that studies have been conducted on LX-09-0 and RX-25-AA, it is hoped that the RX-12 will be ready for further testing.