

UNCLASSIFIED

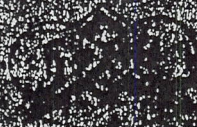
~~CONFIDENTIAL~~

Review

~~CONFIDENTIAL~~

CHEMICAL CORPS
QUARTERLY
TECHNICAL PROGRESS REPORT

October 1954



RESEARCH AND ENGINEERING DIVISION

Army Chemical Center, Picatinny Arsenal

DA FORM 2000 (REV. 5-54)

FOR OFFICIAL USE ONLY

Case Number

UNCLASSIFIED

~~CONFIDENTIAL~~

UNCLASSIFIED

~~CONFIDENTIAL~~

CML-C R & E PERIODIC PROJECT PROGRESS REPORT

| | | | | | | |
|--|-------------------------------|--|---------------------------------------|---------------------------|---|------------------------------------|
| 1. TITLE Munitions for G-Series Munitions | | 2. PROJECT NO. B 10.5 4-04-15-05 | | 3. DATE 1 Oct. 1947 | | |
| 4. SECURITY CLASSIFICATION CONFIDENTIAL | | 5. PRIORITY 2 A | 6. COGNIZANT AGENCY Chemical Corps | | 7. W. D. INTERESTED AGENCIES | 8. DIRECTING AGENCY Tech. Comd. |
| 9. CONTRACTOR AND/OR LABORATORY (NAME & LOCATION) Munitions Division | | | | 10. CONTRACT NO. | 11. EST. COMP. DATE OF CONT. | |
| 12. R&D STATUS Research | 13. ACTIVITY STATUS Active | 14. DATE STARTED 1 July 1947 | 15. EST. COMP. DATE 30 June 1951 | 16. STATUS REMARKS | | |
| 17. SUMMARY OF PROGRESS | | | | | | |
| <p>In view of the importance of G-series agents, this project was initiated to develop optimum munitions for the dispersal of these agents. During 1947 work was started on the modifications of standard munitions for use with GA. The munitions considered included the 4.2-in. chemical mortar shell, the 10-lb. bomb E45, and the 115-lb. bomb M70.</p> <p>Progress made during the period covered by this report included tests on bomb E45 to determine the optimum ratio of chemical agents to bursting charge. The fabrication of 70 bombs E45 was 75% completed.</p> | | | | | | |
| | | | | | 18. PROJECT SUPERVISOR CONFIDENTIAL | |

UNCLASSIFIED

~~CONFIDENTIAL~~

UNCLASSIFIED

~~CONFIDENTIAL~~

CML-C R & E PERIODIC PROJECT PROGRESS REPORT

| | | | |
|--|-------------------------------|--|--------------------------------------|
| 1. TITLE Agents of the G Series | | 2. PROJECT NO. A L.13 4-08-03-05 | 3. DATE 1 Oct. 1947 |
| 4. SECURITY CLASSIFICATION CONFIDENTIAL | 5. PRIORITY 2-A | 6. COGNIZANT AGENCY Chemical Corps | 7. W. D. INTERESTED AGENCIES None |
| 8. DIRECTING AGENCY Tech. Comd. | | 9. CONTRACTOR AND/OR LABORATORY (NAME & LOCATION) * University of Michigan, Ann Arbor, Mich. University of Notre Dame, South Bend, Ind. University of Pennsylvania, Philadelphia, Pa. | |
| 10. CONTRACT NO. ** W-18-035-CWS-1339 W-18-035-CWS-1312 W-18-035-CWS-1311 | | 11. EST. COMP. DATE *** OF CONT. 30 June 1948 15 Sep. 1947 | |
| 12. R&D STATUS Research, development, and test. | 13. ACTIVITY STATUS Active | 14. DATE STARTED May 1945 | 15. EST. COMP. DATE Indefinite |
| 16. STATUS REMARKS Research continuing | | | |

17. SUMMARY OF PROGRESS

The general chemistry of G compounds was studied through the literature, a bibliography was completed through 1938, and many new reactions were accomplished. Synthesis of GB by the German di-di method was completed in the laboratory pilot plant, and the need for a more economical method was demonstrated. The dianisidine color reaction and the indole fluorescence method for G compounds identification and analysis were discovered. A field method using the dianisidine method was developed, and development of a continuous analyzer was started. Many analogs of the G-type compounds were prepared for screening tests.

Progress made during the period covered by this report was as follows: A bibliography on aliphatic phosphorus chemistry is near completion, and an outline for a monograph was prepared. Several silicon analogs of the G type were prepared, characterized, and forwarded to Toxicity Laboratory, University of Chicago, for screening. Infrared absorption studies on GB and three analogs were made in an effort to develop a method of analysis for the G agents. A number of analogs of dianisidine were prepared for use in peroxide method of analysis. None was found more sensitive than dianisidine. It was shown that the hydrolysis of FF3 is catalyzed by acids and bases and catalysts studied conform to the Brønsted relation. Catalytic constants were determined for the solvent, the hydroxyl and hydrogen ions, and a number of bases. Effort was also devoted to preparation of very pure samples of GB and GE for large-scale medical tests. GE was prepared, and a method of purifying di-di process GB by sodium fluoride treatment was discovered. The process laboratory reactors for the di-di process were improved, a continuous method for the first stage was designed, and construction was started. The dianisidine field test method was used in tests of bomb E46 resulting in mechanical improvement in use of the method. Field trials with this bomb to date indicate that practically enough information has been obtained on Ct values, persistency, and other factors to permit evaluation of the bomb. The second model of the continuous analyzer using the dianisidine color reaction was constructed. An experimental model of an analyzer using the indole fluorescence method (100 times as sensitive as the dianisidine) was constructed.

* Southern Research Institute **W-18-035-CWS-1382 *** 15 Jan. 1949
Birmingham, Ala.

* Chemical Division, Test Division

18. PROJECT SUPERVISOR

~~CONFIDENTIAL~~

UNCLASSIFIED

~~CONFIDENTIAL~~

UNCLASSIFIED

~~CONFIDENTIAL~~

CML-C R & E PERIODIC PROJECT PROGRESS REPORT

| | | | |
|--|-------------------------------|--|--------------------------------------|
| 1. TITLE GB Plant, Process Development | | 2. PROJECT NO. A 1.13-2.1 4-92-03-02 | 3. DATE 1 Oct. 1947 |
| 4. SECURITY CLASSIFICATION CONFIDENTIAL | 5. PRIORITY 2-A | 6. COGNIZANT AGENCY Chemical Corps | 7. W. D. INTERESTED AGENCIES None |
| 8. CONTRACTOR AND/OR LABORATORY (NAME & LOCATION) Plants Division | | 10. CONTRACT NO. None | 9. DIRECTING AGENCY Tech. Comd. |
| 12. R&D STATUS Development | 13. ACTIVITY STATUS Active | 14. DATE STARTED Feb. 1946 | 15. EST. COMP. DATE June 1948 |
| 16. STATUS REMARKS Preparing plant for operation of final steps. | | | |

17. SUMMARY OF PROGRESS

A pilot plant, built during f. y. 1947 to produce a quantity of GB for field tests, was operated to produce, prior to 1 July 1947, approximately 750 lb. of the second intermediate compound required for GB manufacture.

Progress made during the period covered by this report included the rearrangement of the plant equipment necessary to accomplish the final two steps of the GB process. This work was delayed by a small fire in the plant that destroyed a number of the control instruments and necessitated the reconstruction of a part of the plant ventilating system. The intermediate compound was purified by fractional distillation in preparation for the final steps of the process. It was learned that the principal difficulties to be overcome in the present process lie in the corrosive qualities of the materials to be handled.

18. PROJECT SUPERVISOR

UNCLASSIFIED

~~CONFIDENTIAL~~