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DATE 23 Feb 1956

CHEMICAL CORPS
ANNUAL
RESEARCH AND DEVELOPMENT REPORT
(Including Terminated Projects)

Vol. II



EXCLUDED FROM GENERAL DECLASSIFICATION SCHEDULE;
DOD DIR 8320.10 DOES NOT
APPLY

31 December 1955

Excluded from General Declassification Schedule

Headquarters

Chemical Corps Research and Engineering Command

Army Chemical Center, Maryland

REGRADING DATA CANNOT BE PREDETERMINED

~~RESTRICTED DATA~~
ATOMIC ENERGY ACT - 1954

Edition A

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PUB-1-RDS (56)

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RDB PROJECT CARD

TYPE OF REPORT		Progress	REPORTS CONTROL SYMBOL DD-R&D(A) 119
PROJECT TITLE		2. SECURITY	3. PROJECT NUMBER
Agents (U)		[REDACTED]	4-08-03-016
G-AGENTS)		4. INDEX NUMBER	5. REPORT DATE
		4-08-03-016-02	31 Dec 55
BASIC FIELD OR SUBJECT		7. SUB FIELD OR SUBJECT	7A. TECHNICAL OBJECTIVE
Chemical Warfare		Agents	CW-1a
COGNIZANT AGENCY		12. CONTRACTOR AND/OR LABORATORY	CONTRACT/W.O. NUMBER
CmlC		Cml Div, CmlC Cml and Rad Labs	DA-18-108-CML-2525
DIRECTING AGENCY		National Bureau of Stds.	DA-18-108-CML-5407
CmlC R&E Cmd, A Cml C, Md.		Southern Research Inst.	DA-18-108-CML-5396
REQUESTING AGENCY		13. RELATED PROJECTS	17. EST. COMPL. DATES
CmlC		4-92-03-013	RES. Cont.
PARTICIPATION AND/OR COORDINATION		4-04-15-029	DEV.
(AR) Army		4-08-06-029	TEST
Funds - N-FY55; 3.6M; FY56 -		14. DATE APPROVED	OP. EVAL.
AIF-FY55; 1.7M; FY56 -		26 Sep 46, CCTC Item 1703	FY 18. FISCAL ESTIMATES
AF-FY55, --; FY56-1.4M		15. PRIORITY	55 183 M
		1-B	56 78 M
		16. MAJOR CATEGORY	57
		7.1	Cont.

JECT 3. PROJECT NO. 4-08-03-016
5. REPORT DATE 31 Dec 55

- IL-5390
- IL-5265
- IL-5399
- IL-5736
- IL-5408
- IL-5533
- IL-5632
- IL-5506
- IL-5463

Formerly project 4-08-03-005

REQUIREMENT AND/OR JUSTIFICATION
 is required in large quantities as a toxic, quick-acting, nonperistent chemical agent for tactical use. (GB was designated a standard agent on 5 Apr 1951 CCTC Item 2310). Information on corrosiveness, methods of stabilization and protection, and other chemical and physical properties is necessary.

BRIEF OF PROJECT AND OBJECTIVE
 Brief. (Applied Research) Current plans in the Chemical Corps include the development of improved processes for the synthesis of GB. Information will be obtained on the reactions involved, methods of analysis and control of intermediates, stabilization, and inhibition of corrosion. Research will be continued with GB to develop improved methods of detection, protection, and decontamination, to obtain basic thermodynamic data applicable to synthesis, analysis, and detection, and to improve methods of dissemination.

- Approach.** Effort is directed along six major lines:
- (1) Research will be conducted to improve existing processes for the manufacture of the more important G agents and to obtain physico-chemical data relevant to processes, intermediates, and agents. Determinations will be made of the effects of impurities on the stability of compounds and on the processes involved.
 - (2) Work will be conducted to develop new methods or to improve old methods for the analysis and evaluation of intermediates in the HTM, APC, or other processes. This will include spectroscopic and electrical methods.

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 RDB FORM 1A, 1 APR 1947.
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RDB PROJECT CARD
CONTINUATION SHEET

PROJECT CARD
CONTINUATION SHEET

1. PROJECT TITLE G Agents (U)	2. SECURITY OF PROJECT [REDACTED]	3. PROJECT NO. 4-08-03-016
	4. 4-08-03-016-02	5. REPORT DATE 31 Dec 55

PROJECT TITLE
G Agents (U)

21. b. Continued.

- (3) Investigations will be carried out to improve methods of stabilization of G agents, assess their corrosiveness, and develop methods for the prevention of corrosion.
- (4) Reactions of G agents will be investigated with the view of adapting the more promising ones into improved detection, protective, and decontamination devices.
- (5) Studies will be made with mixtures of GB and other compounds with the view of enhancing toxicity or other characteristics of military interest. This will include a search for a thickening agent for GB which will form a stable system suitable for airplane spray dissemination.
- (6) Thermodynamic studies will be made to obtain basic information on the heats and free energies of formation and bond energies in G agents and intermediates and basic phosphorus compounds. There are required to obtain data applicable to plant design requirements and to the development of methods of analysis, control, and detection, and to stabilization.

- d. Continue
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- Background.

c. Subtasks. None.

d. Other Information.

- (1) Scientific Research: Tasks undertaken may be classified as process research, analysis, detection and decontamination, reaction mechanism, stability and corrosion, studies of GB mixtures, thickening processes of GB, infrared studies, nuclear magnetic resonance work, and supervision of contract work. Contractors and related information follow:

National Bureau of Standards, DA-18-108-CML-2525, The Study of Certain Chemical Reactions, 29 Jun 51.

Southern Research Institute, DA-18-108-CML-5407, Electrical Methods for the Analyses and Detection of G Agents, 12 Apr 54.

Clark University, DA-18-108-CML-5396, Study of the Reactions of Metal Chelates, 1 Apr 54.

- (2) Standardization Item: Not applicable.
- (3) Engineering Test: Not applicable.

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PROJECT CARD
CLASSIFICATION SHEET

PROJECT	3. PROJECT NO. 4-08-03-016	TITLE Agents (U)	2. SECURITY OF PROJECT [REDACTED]	3. PROJECT NO. 4-08-03-016
16-02	5. REPORT DATE 31 Dec 55		4. 4-08-03-016-02	5. REPORT DATE 31 Dec 55

- d. Continued.
- (4) Operational Availability Date: Not applicable.
- (5) Same or Related Items: None.
- (6) Specific Review Points: Not applicable.

Background.

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(b)(2) HIGH

[REDACTED]

valuable reagent is mesoxalaldehyde-1,3-dialdoxime (diisonitrosoacetone; DIA).

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RDB PROJECT CARD

TYPE OF REPORT

Progress

REPORTS CONTROL SYMBOL
DD-R&D(A) 119

PROJECT TITLE

Agent Pilot Plants (U)
(CW AGT PILOT PLT)

2. SECURITY

4. INDEX NUMBER

3. PROJECT NUMBER

5. REPORT DATE

3. PROJECT NO.
4-92-03-013

5. REPORT DATE
31 Dec 55

BASIC FIELD OR SUBJECT
Processing & Manufacturing
Methods & Techniques & Equipment

7. SUB FIELD OR SUBJECT

Chemicals

7A. TECHNICAL OBJECTIVE

CW-1a

COGNIZANT AGENCY

CmlC

12. CONTRACTOR AND/OR LABORATORY

Plants Div, CmlC Cml & Rad Labs

CONTRACT/W.O. NUMBER

DIRECTING AGENCY

CmlC R&E Cmd, A Cml C, Md.

REQUESTING AGENCY

CmlC

13. RELATED PROJECTS

17. EST. COMPL. DATES

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TEST

OP. EVAL.

FY 18. FISCAL ESTIMATES

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PARTICIPATION AND/OR COORDINATION

(AR) Army

14. DATE APPROVED

11 Sep 53, CCTC Item 2730

15. PRIORITY

1-B

16. MAJOR CATEGORY

7.27

Formerly project 4-92-03-012

REQUIREMENT AND/OR JUSTIFICATION

There is a continuing need for the design, construction, installation, maintenance, and operation of pilot plants for the manufacture of CW agents and intermediates and for the development and evaluation of processes and of engineering data for unit plant design.

BRIEF OF PROJECT AND OBJECTIVE

Brief. (Applied Research) This project is designed to cover work incidental to the development of new CW agents, products, and processes. Production of agents and agent intermediates in sufficient quantity for development test programs and the production of process information and data will be undertaken. In addition, special investigations will be carried on as required to improve unit operations and processes, to improve product yield and quality, and to improve protective materials.

Approach. The approach taken in the development of sound technical and economical products and processes is:

- (1) Determine in the process laboratory physical and chemical characteristics of reactants and reactions leading to an end product or process.
- (2) Select a sound technical and economical process for development.
- (3) Develop the controls necessary for sound technical and economical processing.
- (4) Develop data for the design of piloting facilities.
- (5) Design and build piloting facilities for processing development.

RDB SN CN IC & P X I C

DD FORM 613
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REPLACES RDB FORM 1A, 1 APR 1947,
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**RDB PROJECT CARD
CONTINUATION SHEET**

1. PROJECT TITLE CW Agent Pilot Plants (U)	2. SECURITY OF PROJECT [REDACTED]	3. PROJECT NO. 4-92-03-013
	4. 4-92-03-013-02	5. REPORT DATE 31 Dec 55

21. b. Continued.

(6) Operate piloting facilities to furnish complete processing information, engineering data, and process products for use in further development.

c. Subtasks.

(b)(2) HIGH

**PROJECT CARD
CONTINUATION SHEET**

PROJECT TITLE
Agent Pilot

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PROJECT CARD
CONTINUATION SHEET

3. PROJECT NO. 4-92-03-013
5. REPORT DATE 31 Dec 55

PROJECT TITLE Agent Pilot Plants (U)	2. SECURITY OF PROJECT [REDACTED]	3. PROJECT NO. 4-92-03-013
	4. 4-92-03-013-02	5. REPORT DATE 31 Dec 55

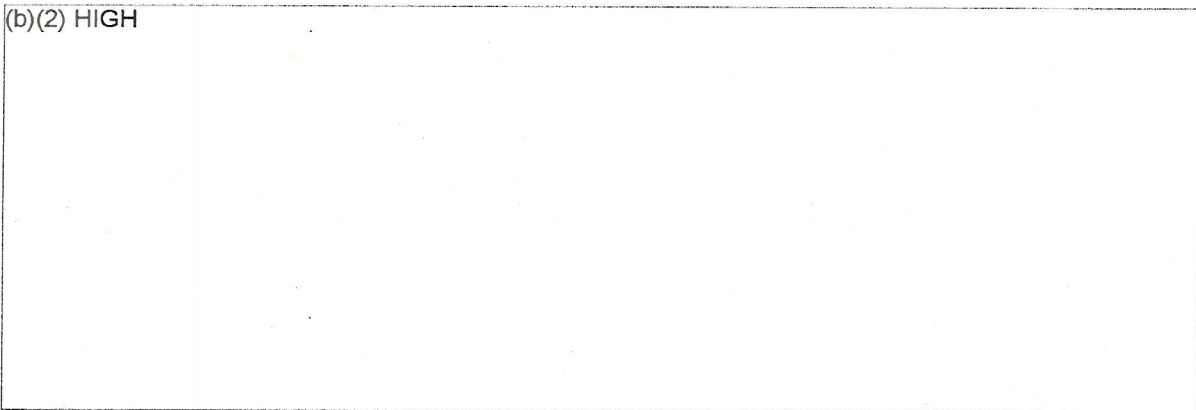
Continued.

Other Information.

- (1) Scientific Research: None.
- (2) Standardization Item: Not applicable.
- (3) Engineering Test: Not applicable.
- (4) Operational Availability Date: See 21 c.
- (5) Same or Related Items: Not applicable.
- (6) Specific Review Points: None.

*publicly
release*

(b)(2) HIGH



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FI 55.

Other contracts in effect under this project are:

Contract DA-18-108-CML-5423, Standard Oil Development Company. The scope of this contract covered the development work done in the contractor's laboratory and at Site A on the operational control of step II DMHP process.

Contract DA-18-108-CML-5569, M.W. Kellogg Company, to obtain information on a dichloro process developed by the contractor.

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6. Background.

(b)(2) HIGH



(b)(2)



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