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Copy No. 100

Minutes of the Meeting of the
Chemical Corps Technical Committee
30 June 1955

3034-3672

Meeting No. 2, 1955

~~SECRET SUPPLEMENT~~

GROUP 3
DOWNGRADED AT 12 YEAR INTERVALS;
NOT AUTOMATICALLY DECLASSIFIED.
DOD DIR 5200.10

Items

3034, 3036, 3042, 3044, 3054
3059, 3060, 3072, 3076

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READ FOR RECORD

Copy No. _____

(4 Pages)

Item 3036

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
Chemical Corps Technical Committee
Army Chemical Center, Maryland

CMLWH

14 June 1955

MEMORANDUM FOR THE SECRETARY, CHEMICAL CORPS TECHNICAL COMMITTEE

SUBJECT: Symbols for Candidate V-Agents

1. Reference is made to the attached correspondence which identifies five (5) candidate CW agents four (4) of which are identified by EA numbers, the other being the G-agent, GF. The four numbered compounds belong to the group known collectively as V-agents which consist of high boiling compounds similar in action to the G-agents but differentiated therefrom by their very high percutaneous toxicity.

2. As candidate agents the four (4) V-agents listed in the inclosed correspondence are assigned the following symbols which have been coordinated with the UK and Canada in accordance with informal Tripartite agreements:

<u>Number</u>	<u>Symbol</u>
EA 1508	VG
EA 1511	VP
EA 1517	VE
EA 1664	VM

3. This memorandum will be recorded before the Chemical Corps Technical Committee for the information of all concerned.

Incl
Ltr, CMLRE-CWD-1
dtd 11 Apr 1955

/s/William E. R. Sullivan
WILLIAM E. R. SULLIVAN
Colonel, Cml C
Chairman, CCTC

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Item 3036

HEADQUARTERS
CHEMICAL CORPS RESEARCH AND ENGINEERING COMMAND
OFFICE OF THE COMMANDING GENERAL
ARMY CHEMICAL CENTER, MARYLAND

CMLRE-CWD-1

11 April 1955

SUBJECT: Candidate CW Agents

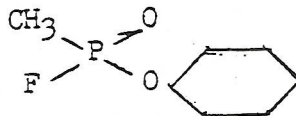
TO: Chairman
Chemical Corps Technical Committee
Army Chemical Center, Maryland

1. You are advised that upon recommendation of the Advisory Committee on New CW Agents, the following compounds are designated as Candidate CW Agents:

Number or Symbol
GF

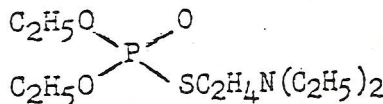
Name and Formula

cyclohexyl methylphosphonofluoridate



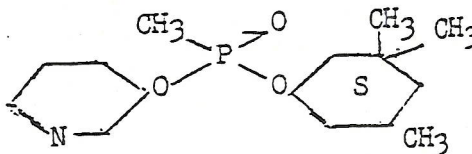
EA 1508

O, C-Diethyl S-2-diethylaminoethyl phosphorothioate



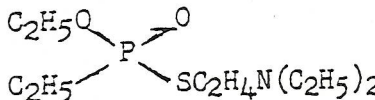
EA 1511

3-pyridyl 3,3,5-trimethylcyclohexyl methylphosphonate



EA 1517

O-ethyl S-(2-diethylaminoethyl) ethylphosphonothioate



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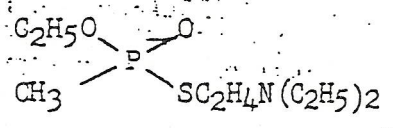
Incl

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Form 3036

Number or Symbol
EA 1664

Name and Formula
O-ethyl S-(2-diethylaminoethyl)
methylphosphonothioate



2. It is requested that this information be made a matter of record.
3. It is also requested that appropriate Cml C symbols be assigned to those compounds still referred to by EA number.

FOR THE COMMANDING GENERAL:

Elmer J. Collins, Col, CmlC
 for DONALD H. HALE
 Colonel, Cml C
 Deputy Commander

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Item 3036

BRITISH LIAISON OFFICE
U.S. Army Chemical Corps
Building No. 1
Army Chemical Center, Maryland

CW/2-1-1/BLO 12,497

27 May 1955

SUBJECT: Symbols for Candidate CW Agents

TO : Dr. T. S. Eckert
Chemical Corps Technical Committee
Building No. 1
Army Chemical Center, Maryland

1. Reference CMLWH (WH6165), dated 6 May 1955.
2. Herewith the following comment from Ministry of Supply on your letter regarding V symbol for new agents:
"Apart from ease of reference cannot see V symbol serves valid purpose since distinction is one of degree not of kind. Have, however, no rooted objection to its use."

/s/J.B.S. Hamilton, Lt Col
J. B. S. HAMILTON, Lt Colonel, RE
British Liaison Officer

25158/mtk
cc-Dr. Fox

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Item 3044

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
Chemical Corps Technical Committee
Army Chemical Center, Maryland.

RECORD FOR RECORD

Copy No. _____
(4 pages)

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CMLWH

25 May 1955

MEMORANDUM FOR RECORD

SUBJECT: ARDC Project 8855, Development and Improvement of BW-CW Test
Facilities (C)

The attached data sheet for the subject Air Force project is re-
produced as information pertinent to the Chemical Corps BW and CW R&D
programs.

FOR THE CHAIRMAN, CHEMICAL CORPS TECHNICAL COMMITTEE:

T. S. Eckert

Incl
Data Sheet
Project 8855

T. S. ECKERT
Secy, CCTC

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WH6397

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~~S-E-C-R-E-T~~

Rewritten Project

Item 3024

PROJECT DATA SHEET

1. PROJECT TITLE: Development and Improvement of CW Test Facilities (C)
2. SECURITY CLASSIFICATION: Secret
3. PROJECT NUMBER: 8855
5. REPORT DATE: 21 Jan 1955
6. BASIC FIELD OR SUBJECT: Operational Support Development (Test and Instrumentation)
7. SUB FIELD OR SUBJECT: Chemical, Biological and Radiological Weapons
- 7a. TECHNICAL OBJECTIVE: SR-4, SR-5
8. COGNIZANT AGENCY: ARDC
9. DIRECTING AGENCY: AFAC
10. REQUESTING AGENCY: Hq. USAF
11. PARTICIPATION, COORDINATION, INTEREST: U. S. Army Chemical Corps (C)
APCC (C)
12. CONTRACTOR AND/OR LABORATORY: Ralph M. Parsons Co. Contract W.O. No. AF 18(600)-716
13. RELATED PROJECTS:
14. DATE APPROVED: 25 March 1953
15. PRIORITY: 1-B
16. MAJOR CATEGORY: 6-8855
17. ESTIMATED COMPLETION DATES: Res -
Dev -
Test - 1 Jan 58
Op. Eval -
18. FISCAL ESTIMATES: FY 54 - 61M
FY 55 - 37M
FY 56 - 55M
FY 57 - 65M
FY 58 - 65M
19. SUPERSEDED REPORTS: This project supersedes Project No. R920-002-22, dated 20 March 1953.
20. REQUIREMENT AND/OR JUSTIFICATION:

a. Present concept of modern warfare places an ever-increasing emphasis upon technology in the development of effective weapon systems. As the technical features of these systems become more intricate, the problems associated with such systems increase in scope and complexity, particularly when the weapons under development are relatively new in the field of warfare. (Conf)

b. Complete data does not exist on the use of biological and chemical warfare munitions in past hostilities. In order to determine their potential as portions of a weapons system, they are being subjected to intensive study. Laboratory investigations and field experimentation have indicated the potential value of further research and development. Since biological and chemical weapons are relatively new and untried, both the weapon and its component parts must be tested. In addition, information which is independent of the weapon itself but which concerns various factors affecting the effective use of the weapons must be obtained and correlated to weapon functioning. (Secret)

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20. REQUIREMENT AND/OR JUSTIFICATION: (Continued)

c. The acquisition of such data requires the availability of organized groups of highly trained personnel to evaluate new concepts of handling, safety, and testing techniques, laboratories for research and development, field testing facilities for the production of test data and other facilities where such data may be analyzed in order to evaluate developed munitions and to provide information for perfecting better weapons. The need for these will continue until such time as the reservoirs of background knowledge is sufficient to provide answers to the problems encountered in BW-CW weapon development and testing. Concurrently, it will be necessary to provide for the understanding and successful evaluation of those factors which affect the efficient functioning of these weapons in the field. (Secret)

21. BRIEF OF PROJECT AND OBJECTIVE:

a. Brief. The objectives to be accomplished under Project 8855 are as follows:

- (1) To study and set forth the range, laboratory and instrumentation facilities that will be required to test the BW-CW weapons that are expected to emerge from the development program during the next (7) years. (Secret)
- (2) To design the ranges, laboratory and special test equipment which will best implement the selected plan. (Uncl)
- (3) To develop and install the specialized instrumentation necessary to meet the test requirements.

b. Approach. Continuous study and review of test range instrumentation and facility requirements is accomplished within AFAC. As needs become apparent, a plan for satisfying the need is presented to the AFAC Planning and Review Panel for determination of the relative importance of the need and the conformity of the plan with the long range plans and policies of the Center. Tasks determined to be necessary for the advancement of the BW-CW testing capability and in keeping with the policy of the Center are approached under the procedure outlined under 21a. The sequence is study, design and prototype fabrication. If the task permits, the study is eliminated. (Secret)

c. Sub-tasks: None

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21. BRIEF OF PROJECT AND OBJECTIVE: (Continued)

d. Other Information:

Block 18 funding breakdown:

	<u>Previous</u>	<u>FY-54</u>	<u>FY-55</u>	<u>FY-56</u>	<u>FY-57</u>	<u>FY-58</u>
Labor		10 M	11 M	14 M	14 M	14 M
Travel		1 M	1 M	1.4M	1.4M	1.4M
Contract Serv.		50 M	25 M	40 M	50 M	50 M
Total R&D Funds		61 M	37 M	55.4M	65.4M	65.4M 6

e. Background History. In April 1952, the Air Research & Development Command assigned the Air Force Armament Center the responsibility for the conduct of Phase II test of BW-CW munitions and the responsibility for support of contractor tests in this field (Phase I through V as described in AFR 80-14). At this time no facilities for BW-CW testing had been planned or developed within the Air Force structure. After the assignment of this responsibility, growth of the Armament Center's BW-CW facilities were dictated by assignment tests, and until the inauguration of Task 88550 very little future planning had been done. If this project is implemented it will give the Air Force a BW-CW test facility. (Secret)

f. Future Plans: Beyond completion of the development work to provide an adequate sampler and laboratory test equipment for future programmed tests, AFAC does not foresee any additional program of this type. (Uncl)

g. References: None

h. Project Engineer: Mr. W. F. Spence, ACLB, Ext. 6210

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Item 3059

REPORT "G"
Copy No. . . .
(4 Pages)

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
Chemical Corps Technical Committee
Army Chemical Center, Maryland

TSE/25110/imh
20 May 1955
Rev: 15 Jun 55

CMLWH

SUBJECT: Establishment of Subproject 4-08-03-016-04, V-Agents (U)

TO: Chairman, Chemical Corps Technical Committee

1. References:

- a. Project 4-08-03-016, Toxic Chemical Warfare Agents, Approved by CCTC Item 2962, 9 Dec 1954.
- b. Letter (S), CMLRE-CWD-1 R&E Command, 20 May 1955, same subject as above, to Chm, CCTC, w/Incl (Data Sheet).
- c. CCTC Item 3036, Symbols for Candidate V-Agents, 14 June 1955 (S).

2. Discussion:

a. Reference a. identifies the currently approved Cml C R&D project which has as its objective the investigation and development of natural and synthetic toxic compounds which may eventually be selected as candidate agents for subsequent type classification. Currently this project consists of three subprojects, namely, 4-08-03-016-01, New Compounds; 4-08-03-016-02, G-Agents; and 4-08-03-016-03, Agent SS. It is the purpose of this report to incorporate the subject subproject under this work.

b. Reference b. requested that the subject subproject, which is concerned with studies and investigations of V-Agents as candidates for further development and type classification, be established in the FY 56 project program and inclosed the attached data sheet incorporating necessary information thereon. V-Agents are described as high boiling compounds similar in action to the G-agents but differentiated therefrom by their very high percutaneous toxicity. Reference c. assigned symbols to four (4) of these agents. The recommendations below indicate the action required to establish this subproject in accordance with current regulations and directives.

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3. Recommendations:

It is recommended that:

- a. Subproject 4-08-03-016-04, V-Agents, be established in the FY 56 Cml C project program.
- b. The requirement, brief, and approach for subproject 4-08-03-016-04, as indicated in the attached data sheet, be approved.
- c. Subproject 4-08-03-016-04 be assigned to Technical Objective CW-1a, be accorded a 1-B priority, and be classified Secret with the title therefor Unclassified.
- d. The records of project 4-08-03-016, Toxic Chemical Warfare Agents (Ref. a.) and the Cml C FY 56 R&D project program be revised in accordance with this action.

Incl
Data Sheet
4-08-03-016-04

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Item 3059

New Subproject

Project Data Sheet

1. PROJECT TITLE: V-Agents (U)
2. SECURITY CLASSIFICATION: Secret
3. PROJECT NUMBER: 4-08-03-016-04
5. REPORT DATE: 20 May 1955
6. BASIC FIELD OR SUBJECT: Chemical Warfare
7. SUBFIELD OR SUBJECT SUBGROUP: Agents
- 7a. TECHNICAL OBJECTIVE: CW-1a
8. COGNIZANT AGENCY: Cml C
9. DIRECTING AGENCY: Cml C R&E Command, Army Chemical Center, Md.
10. REQUESTING AGENCY: Cml C
11. PARTICIPATION AND/OR COORDINATION: AR (Army)
12. CONTRACTOR AND/OR LABORATORY: Cml Div, Cml C Cml & Rad Labs,
A Cml C, Md.
13. RELATED PROJECTS: 4-08-03-016-01
4-08-03-016-02
4-08-03-016-03
14. DATE APPROVED:
15. PRIORITY: 1-B
17. ESTIMATED COMPLETION DATES: Res - Cont'g
Dev -
Test -
Op. Eval. -
18. FISCAL ESTIMATES: FY 56 - 260M
FY 57 - 260M
19. SUPERCEDED PROJECTS: Formerly subtask under subproject 4-08-03-016-01
20. REQUIREMENT AND/OR JUSTIFICATION: There is an urgent military requirement (tactical and strategic) for a highly lethal chemical agent which can be used to circumvent the protection provided by protective equipment, especially masks. The agent should be difficult to detect and to decontaminate. Immediate and extensive research is mandatory to discover and develop agents of this type.
21. BRIEF OF PROJECT AND OBJECTIVE:

a. Brief: (Applied Research) A logical method for circumventing the protection provided by protective masks appears to be through the percutaneous route. Certain of the G-agents were found to be effective through this route. Further work on these G-agents (modification of the "electronegative" group) has yielded compounds having a high order of percutaneous toxicity and are effective in aerosol form through either the percutaneous or respiratory route. Examples of these compounds are EA 1517 (VE) and 1664 (VM). These compounds would normally be classed as persistent agents since they have a low order of volatility and are not readily decomposed by atmospheric or soil conditions. However, these agents must be developed for use in either a persistent or nonpersistent role. The objective of this project is to expedite this work to develop the compound which will most favorably fulfill the military requirement.

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b. Approach: Studies carried out within the Chemical Corps, the United Kingdom, and Canada have shown that the development of an agent with a percutaneous toxicity several hundred times more effective than the percutaneous toxicity of GB is feasible. A thorough chemical investigation of promising compounds is required to determine those which are suitable for use as CW agents. Effort will be directed primarily towards compounds which are at least as favorable from the field logistical viewpoint as is compound EA 1517. Basic chemistry applicable to manufacturing methods must be developed for the most promising compounds. Storage characteristics must be determined and if unfavorable, attempts must be made to correct the deficiencies either by incorporation of additives or by modification of the basic structure of the molecule. An attempt will be made to vary the persistency of the agents and their penetration of clothing. Information must also be obtained on physical constants, corrosion characteristics, and thermodynamic data. Problems relating to protection, detection, decontamination, and quantitative estimation of field concentrations required must be investigated.

c. Subtasks: None

d. Other Information: None

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Item 3059

Establishment of Subproject 4-08-03-016-04, V-Agents (U)

CONCURRENCE SIGNATURES

/s/R.N. Skaggs, Col, GS Dev&Test Sec, CONARC	/c/C.F. Filter Quartermaster Corps	/s/A.L. Russell BuYds&Dks, Navy Dept
/s/L.E. Fellenz, Col, CmlC Cml Sec, CONARC	/s/R.E. Horne, Capt, USAF Air R&D Comd	/s/F.A. Abbruscato Cml C Mat Comd
/s/J.F. Schaeffer Chemical Corps Board	/s/L.D. Fothergill Scientific Adv/BW	/s/B.R. Bierer, LtCol, CmlC PT&I Div, OCCmLO
/c/J.A. Keeney, Ph.G. Army Medical Service	/s/Leo F. Walsh Mat Div, OCCmLO	/s/L.T. Fleming Transportation Corps
/c/E.L. Claussen Corps of Engineers	/s/S.R. Walton R&D Div, OCCmLO	/s/E.H. Lewis, LtCol, CmlC P&E O, R&E Comd
/s/F.V. Ludden Ordnance Corps	/s/W.P. Swain BuOrd, Navy Dept	/s/R.L. Fox A/TCW, CmlC R&E Comd
/s/Donald H. Hale, Col, CmlC Dep Comdr, CmlC R&E Comd	/s/B. Berger A/RW&NTM, CmlC R&E Comd	

ACCEPTED BY THE CHEMICAL CORPS
TECHNICAL COMMITTEE, 30 June 1955:

/s/T. S. ECKERT
Secy, CCTC

APPROVED FOR THE CHIEF CHEMICAL
OFFICER, 30 June 1955:

/s/WILLIAM E. R. SULLIVAN
Colonel, Cml C
Chairman, CCTC

APPROVED BY ORDER OF THE SECRETARY
OF THE ARMY, 30 June 1955:

/s/DALE L. VINCENT
Lt Colonel, GS
DSC/Plans & Research

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Item 3060

REPORT "H"
Copy No. _____
(6 Pages)

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
Chemical Corps Technical Committee
Army Chemical Center, Maryland

~~CONFIDENTIAL~~
4-08-03-016-05
TSE/25110/imh
29 May 1955

CMLWH

SUBJECT: Establishment of Subproject 4-08-03-016-05, Psychochemical Agents (C); Short Title - MML605 (U).

TO: Chairman, Chemical Corps Technical Committee

1. References:

- a. Project 4-08-03-016, Toxic Chemical Warfare Agents, Approved by CCTC Item 2962, 9 Dec 1954.
- b. Letter (S), CMLPE-CWD-1, R&E Command, 20 May 1955, subject as above, to Chm, CCTC, w/Incl (Data Sheet).

2. Discussion:

a. Reference a. identifies the currently approved Cml C R&D project which has as its objective the investigation and development of natural and synthetic toxic compounds which may eventually be selected as candidate agents for subsequent type classification. Currently this project consists of three subprojects, namely, 4-08-03-016-01, New Compounds; 4-08-03-016-02, G-Agents; and 4-08-03-016-03, Agent SS. Establishment of 4-08-03-016-04, V-Agents, is being recommended in another report to this Committee. It is the purpose of this paper to incorporate the subject development as the fifth subproject of the series.

b. Reference b. requested that the subject subproject which is concerned with the investigation and development of compounds for use as psychochemical agents, be established in the FY 56 project program and inclosed the attached data sheet incorporating essential information thereon. The recommendations below indicate the action required to establish subproject 4-08-03-016-05 in the FY 56 Cml C program.

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Item 3060

3. Recommendations:

It is recommended that:

- a. Subproject 4-08-03-016-05, Psychochemical Agents, be established in the FY 56 Cml C R&D program.
- b. The requirement, brief, and approach for subproject 4-08-03-016-05, as indicated in the attached data sheet, be approved.
- c. The military characteristics for psychochemical agents as listed in par 21.a. of the data sheet, be approved.
- d. Subproject 4-08-03-016-05, be assigned to Technical Objective CW-1a, be accorded a 1-B priority, and be classified Secret with the title therefor considered Confidential.
- e. Subproject 4-08-03-016-05 be assigned the Unclassified Short Title, MM1605.
- f. The records of project 4-08-03-016, Toxic Chemical Warfare Agents (Ref. a.) and the Cml C FY 56 R&D project program be revised in accordance with this action.

Incl

Data Sheet

4-08-03-016-05

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Item 3060

Project Data Sheet

1. PROJECT TITLE: Psychochemical Agents (C)
2. SECURITY CLASSIFICATION: Secret
3. PROJECT NUMBER: 4-08-03-016-05
5. REPORT DATE: 20 May 1955
6. BASIC FIELD OR SUBJECT: Chemical Warfare
7. SUBFIELD OR SUBJECT SUBGROUP: Agents
- 7a. TECHNICAL OBJECTIVE: CW-1a
8. COGNIZANT AGENCY: Cml C
9. DIRECTING AGENCY: Cml C R&E Command, A Cml C, Md.
10. REQUESTING AGENCY: Cml C
11. PARTICIPATION AND/OR COORDINATION: AR (Army)
12. CONTRACTOR AND/OR LABORATORY: Cml Div., Cml C Cml & Rad Labs
13. RELATED PROJECTS: 4-08-03-016-01
4-08-03-016-02
4-08-03-016-03
14. DATE APPROVED:
15. PRIORITY: 1-B
17. ESTIMATED COMPLETION DATES: Res. - Cont'g
Dev. -
Test -
Op. Eval. -
18. FISCAL ESTIMATES: FY 56 - 45M
FY 57 - 100M
19. SUPERSEDED PROJECTS: Formerly subtask under subproject 4-08-03-016-01.
20. REQUIREMENT AND/OR JUSTIFICATION: Major emphasis in CW agent research in recent years has been in the direction of increase in lethality. However, it is considered that in certain military situations, use of an agent causing temporary mental and/or motor incapacitation of troops or civilian populations will be required. Research is required to discover and develop promising agents for this use.
21. BRIEF OF PROJECT AND OBJECTIVE:
 - a. Brief (End Item) The possible military usefulness of affecting the minds of masses of troops by the use of chemical agents was developed in a preliminary report by the Technical Director, C&RL, in 1949. Possible applications of this concept were outlined, and a preliminary discussion of mental abnormalities of interests as well as means by which they might be produced, were presented. To define the term, psychochemical compounds are ones which affect adversely the human mind and/or produce physiological effects which in turn cause significant psychological disturbances. Personnel were then assigned to make literature studies and plan chemical investigations which, it was hoped, would yield agents suitable for biological and psychiatric research. These studies led to (1) the formulation of a basic list of abnormal physical and mental symptoms considered to have possible military significance, and (2) the selection of several specific fields for

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Item 3060

Par 21.a. Continued

chemical investigation, believed to lead most directly to compounds having a mentally disturbing effect. The objective of this project is to continue this work, and in particular, to conduct a synthetic program based on the above-mentioned planning and other leads which may develop as the work proceeds, in order to discover and develop agents having mental and/or motor incapacitating effects. The following military characteristics will apply:

- (1) Type of Action: Psychochemical agents should cause temporary mental and/or motor incapacitation (such as a state of suspended animation) of personnel.
- (2) Rapidity of Action: The agents should act promptly after administration, preferably in less than an hour. For sabotage (covert) operations, agents with delayed action (several hours) prior to onset of symptoms may be useful.
- (3) Duration of Action: It is desirable, but not essential, that the agents have no permanent effects. The minimum time for duration of action (symptoms) should be 24 hours. Agents whose action lasts for several days (even a week) may be desirable for some purposes.
- (4) Effectiveness: These agents should have a potency at least equal to the nerve gases. This means that a dosage of 0.50 - 0.75 mg. should incapacitate a man. This should not restrict research and experimentation on less potent compounds which may furnish data and information leading to a greater understanding of and/or better psychochemicals.
- (5) Toxicity: These agents should have a low intrinsic toxicity; however, comparatively high toxicity should not be the basis for discarding substances having the desired incapacitating properties.
- (6) Dissmination: The agents should be capable of being disseminated in airborne form under all environmental conditions likely to be encountered.
- (7) Stability: The agents should be capable of being stored for long periods of time under all extremes of environmental conditions.

b. Approach: Studies carried out to date within the Chemical Corps and elsewhere have indicated the following three fields as being highly promising for the purposes of this project: (1) lysergic acid

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Par 21.b. Continued

and its indole derivatives, e.g. diethylamide (LSD), (2) tetrahydrocannabinol series. (3) the phenethylamines (especially those related to mescaline), and related substances. Many members of the above classes of compounds show desirable incapacitating i.e., psychochemical, effects although very few of them are active in dosage ranges of interest in a study of CW agents. An Ad Hoc Subcommittee of the Advisory Committee for New CW Agents in 1951 furnished the following symptoms or groups of symptoms as being of most likely value in psychochemical or incapacitating, non-lethal type CW.

- (1) Delusion, hallucination, mania, delirium
- (2) Defects in hearing, sight and/or judgment
- (3) Psychosis, depression, suicidal tendencies
- (4) Incoordination, paralysis (spastic or fluid)
- (5) Convulsions
- (6) Anemia, listlessness, weakness
- (7) Headache, nausea, dizziness
- (8) Cutaneous disorders like urticaria

The approach to be followed in this subproject will be to explore the leads given above and to develop others based on literature study and experimental results. For the immediate future, synthetic programs will be based on the given leads in the following order of preference, (1) the indole derivatives and substances related to LSD, because of the very high psychic activity of LSD, (2) derivatives related to tetrahydrocannabinol, because of the high incapacitating action of one member of this series, and (3) the least promising because of the comparatively large dosages required, the phenethylamine series. The data and information available from workers in this field at colleges, universities, and ethical drug houses will not be overlooked. Their use as contractors or consultants will be solicited.

c. Subtasks: None

d. Other Information: Short title for this project is "M1605." (Unclassified)

g. Bibliography and References:

- (1) CRL Report ETF 1500-1 "Psychochemical Warfare - A New Concept of War," by L. W. Greene, 17 August 1949

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- (2) Report of Ad Hoc Subcommittee of the Advisory Committee for New CW Agents, February 1951
- (3) Air Force Military Characteristics No. 318, AFDRQ No. SAB-52-M11, dated 18 December 1952
- (4) Minutes of 58th Meeting of the Advisory Committee on New CW Agents and Summary
- (5) TCIR 603 - Mescaline and Related B -(alkoxyphenyl) - alkylamines, by C. L. Leightner, 30 October 50
- (6) TCIR 611 - Psychochemical Warfare: Mental and Other Physiological Abnormalities of Military Value, by C. L. Butler, 14 November 1950
- (7) TCIR 614 - Psychochemical Warfare: Substances Causing Mental & Other Sub-lethal Effects of Psychochemical Interest I Preliminary Survey, by C. L. Butler, 8 January 1951
- (8) TCIR 617 - Psychochemical Warfare: Substances Causing Mental and Other Sub-lethal Effects of Psychochemical Interest II Brief Discussion of Specific Groups of Substances, by C. L. Butler, 17 February 1951
- (9) TRLIR 37 - Psychochemical Warfare: Substances Causing Mental and Other Sub-lethal Effects of Psychochemical Interest I Preliminary Survey Supplement I, by C. L. Butler, 3 August 1951

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Establishment of Subproject 4-08-03-016-05, Psychochemical
Agents (C); Short Title - MML605 (U)

CONCURRENCE SIGNATURES

/s/R.N. Skaggs, Col, GS /c/C.F. Filter /s/A.L. Russell
Dev&Test Sec, CONARC Quartermaster Corps BuYds&Dks, Navy Dept

/s/L.E. Fellenz, Col, CmlC /s/R.E. Horne, Capt, USAF /s/F.A. Abbruscato
Cml Sec, CONARC Air R&D Comd Cml C Mat Comd

/s/J.F. Schaeffer /s/L.D. Fothergill /s/B.R. Bierer, LtCol, CmlC
Chemical Corps Board Scientific Adv/EW PT&I Div, OCCmlO

/c/J.A. Keeney, Ph.G. /s/Leo F. Walsh /s/L.T. Fleming
Army Medical Service Mat Div, OCCmlO Transportation Corps

/c/E.L. Claussen /s/S.R. Walton /s/E.H. Lewis, LtCol, CmlC
Corps of Engineers R&D Div, OCCmlO P&E.O, R&E Comd

/s/F.V. Ludden /s/W.P. Swain /s/R.L. Fox
Ordnance Corps BuOrd, Navy Dept A/TCW, CmlC R&E Comd

/s/Donald H. Hale, Col, CmlC /s/B. Berger
Dep Comdr, CmlC R&E Comd A/RW&NIM, CmlC R&E Comd

ACCEPTED BY THE CHEMICAL CORPUS /s/T. S. ECKERT
TECHNICAL COMMITTEE, 30 June 1955: Secy, CCTC

APPROVED FOR THE CHIEF CHEMICAL /s/WILLIAM E. R. SULLIVAN
OFFICER, 30 June 1955: Colonel, Cml C
Chairman, CCTC

APPROVED BY ORDER OF THE SECRE- /s/DALE L. VINCENT
TARY OF THE ARMY, 30 June 1955: Lt Colonel, GS
DSC/Plans & Research

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READ FOR RECORD

Copy No. _____
(11 pages)

Item 3072

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF CHEMICAL OFFICER
Chemical Corps Technical Committee
Army Chemical Center, Maryland.

CMLWH

20 June 1955

MEMORANDUM FOR RECORD

SUBJECT: Chemical Corps R&D Program 15A, FY 1956 (U)

1. Reference is made to the following papers:

a. Mimeo letter (S), CMLWR-P OCCm10, 23 Mar 55, Chemical Corps Research and Development Program 7A (16A) FY 1956 (U), to Secy, CCTC, w/Incl (original FY 56 Program 15A as 7A).

b. Letter (S), CMLWR-P OCCm10, 15 June 55, Program Document for Chemical Corps Research and Development Program 15A, Fiscal Year 1956 - Change No. 1 (U), to CG, R&E Comd, w/3 Incls, which revised the basic document (ref a.):

2. The inclosure to reference a., as revised by the inclosures of reference b., is reproduced herewith for the information and guidance of all concerned.

FOR THE CHAIRMAN, CHEMICAL CORPS TECHNICAL COMMITTEE:

T. S. Eckert

Incl
15A Program

T. S. ECKERT
Secy, CCTC

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PROGRAM DOCUMENT FOR THE CHEMICAL CORPS
RESEARCH AND DEVELOPMENT PROGRAM 15A

FY 1956

23 March 1955

Revised

15 June 1955

Prepared by:

Research and Development Division
Office of the Chief Chemical Officer

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Incl

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SECTION I
OBJECTIVES AND GUIDANCE

1. Program Objectives

The broad objectives of the Research and Development Program 7A (15A) are the timely development of superior chemical and radiological agents, incendiaries, flame agents, smokes and other screening agents; and the means of disseminating them to produce death or casualties in man, to destroy materials, to screen operations, or to make it hazardous to occupy areas; the development of defensive measures against such action by an enemy; and to protect against thermal radiation from nuclear weapons.

2. General Guidance

General guidance for the Chemical Corps Research and Development Program is outlined as follows:

- a. A proper balance will be maintained to fulfill the program objectives with the resources which are available or which are anticipated within the program fiscal year. Human resources will be conserved optimumly.
- b. Projects will be continued or new projects will be initiated to support unfulfilled requirements stated in the Army Equipment Development Guide for principal items of equipment and supplies.
- c. Full consideration will be given to R&D of new and significantly improved materiel and techniques, rather than dissipating effort on minor engineering changes in existing types.
- d. The program will be under constant review to eliminate items which have been overtaken by technical progress, which will prove economically infeasible, or which are no longer desirable for other reasons. Time schedules will be reviewed to assure consistency with related programs, e.g., timing of air munitions in relation to the operation status of pertinent aircraft.
- e. Intelligence, particularly on foreign research and development, will be studied to insure an essential margin of superiority in our weapons and equipment.
- f. Operational effectiveness under extreme environmental conditions will be assured by the development of adequate equipment, materials and techniques. Applicable findings of environmental research will be considered at each stage of development.

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g. Specific review points will be established at which time the item design will be checked during the development phase for maximum use of standard component parts to effect greater standardization.

h. Where suitable testing facilities are not available to CONARC (e.g. testing of toxics or required testing of material in a toxic environment) appropriate planning will be accomplished for combined engineering user tests.

i. Coordination of research and development projects between U.S., U.K. and Canada will be accomplished to the maximum extent practicable, and economy of U.S. effort will be practiced in areas where dependence can be placed on U.K. or Canadian efforts.

j. In achieving the program objectives, funds will be obligated for the most important and promising projects at productive levels without the dilution which would result from attempting to carry a large number of inadequately funded projects or subprojects.

3. Specific Guidance

a. A balanced research and development program will be pursued to:

(1) Develop a more adequate offensive toxic chemical warfare capability;

(2) Develop a more adequate defensive capability;

(3) Develop an improved flame, smoke, and incendiary capability; and

(4) Develop new systems on a long-range basis, including agents, munitions, and protective devices, which effect major improvements.

b. The current status and the planned rate of progress for most major end items are covered in the Chemical Corps Program 7A (15A) Operating Schedules which will be issued at a later date.

c. Within each of the above four categories, selected top priorities for FY 1956 are recorded below.

4. Emphasis to develop a more adequate offensive toxic chemical warfare capability will be directed in order of priority to the following:

a. Improved materiel for dissemination of G-agents, including the determination of munitions expenditure and weapons effects data.

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- b. Development of a quick-acting, highly persistent lethal chemical agent (V-agent) and materiel for dissemination.
 - c. Development on new and/or improved processes for synthesis of GB.
 - d. Intensive laboratory and field studies of selected candidate agents.
 - e. Prepare a sufficient quantity of candidate agents for performance evaluation.
 - f. Devices and techniques for evaluation of CW agents, munitions, and agent-munition combinations, including determination of flow patterns of clouds of gases and/or aerosols and toxicological investigations, with emphasis on estimation of casualty rates.
 - g. Improved materiel for dissemination of mustard, including the determination of munitions expenditure and weapons effects data.
5. Emphasis to develop a more adequate defensive capability will be directed in order of priority to the following:
- a. Complete development of a reliable automatic field alarm for detecting potentially dangerous amounts of all G-agents.
 - b. An improved field protective mask utilizing the canisterless principle.
 - c. Conduct of fall-out studies.
 - d. Thermal radiation attenuation cloud (TRAC) studies.
 - e. Clinical, toxicological, pharmacological, physiological, biochemical, and biophysical studies to develop methods to prevent or treat poisoning by CW agents, with particular emphasis on GB and GA.
 - f. Improved materiel and techniques in connection with individual respiratory and body CER protection.
 - g. New and improved materiel, equipment and techniques for collective CER protection.
 - h. Radar and infrared screening agents and dissemination means therefor.
 - i. An improved tactical radiation dosimeter.
 - j. Materiel for detection and/or analysis of toxic agents.
 - k. Improved agents, equipment and techniques for CER decontamination.

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6. Emphasis to develop an improved flame, smoke and incendiary capability will be directed in order of priority to:

- a. One-shot flame thrower.
- b. Improved lightweight (multi-shot) portable flame thrower.
- c. Mechanized flame throwers for AUV/APC vehicles and tanks.
- d. Flame thrower service equipment.
- e. Evaluation of casualty effects of flame and incendiaries, to determine optimum sizes and types of munitions, and development of new methods to utilize flame.
- f. Improved fuel thickeners, equipment for field evaluation of thickened fuels and more effective incendiary and smoke agents.
- g. Improved smoke generator with simpler design and greater smoke production capability than the standard item.
- h. Development of the warhead for flame rockets in coordination with the Ordnance Corps.
- i. Smoke canisters for artillery shell; smoke grenades.

7. Emphasis to develop new systems on a long-range basis (including agents, munitions, protective devices and therapy), to achieve major improvements, will be directed in order of priority to:

- a. Isolation or development of new agents and related means of dissemination, including toxic fragments, which will effect a major improvement in offensive capability under all environmental conditions, possibly including agents that will cause protracted incapacitating but nonlethal effects.
- b. Development of new and improved devices and techniques for the evaluation of CW offensive and defensive capabilities.
- c. Development efforts on guided missile warheads.
- d. Research and development on medical aspects of toxic CW agents.
- e. New methods, materials and equipment for major improvements in detection, protection and decontamination of toxic chemical agents.
- f. Monitor the potential for RW agent production and continue studies on delivery systems for RW warheads for tactical guided missiles.

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8. Documents which provide basic information pertinent to Chemical Corps Program 7A (15A) are listed below for reference:
- a. Army Equipment Development Guide;
 - b. Department of the Army Research and Development Program, FY 1956;
 - c. Logistics Policies and Priorities;
 - d. Tripartite recommendations approved by the Chief Chemical Officer;
 - e. Recommendations of the Chemical Corps Advisory Council and the American Chemical Society Committee Advisory to the Chemical Corps, as approved by the Chief Chemical Officer.

S E C T I O N I I

RESEARCH AND DEVELOPMENT FUNDING GUIDANCE

1. The technical project listing herein is your approved FY 1956 program as outlined by the Army Research and Development Review Board and the Department of the Army.
2. The funding as indicated herein is predicated on appropriation by Congress of the full research and development budget requested by the Army. This program will be executed upon receipt of FY 1956 funds from this Office.
3. The funding data herein does not include costs charged to Maintenance and Operations Army, as support to research and development and funded in Budget Program 3800 and 3900 during FY 1955 or Cost of Supplies and Minor Equipment formerly procured under M&O Army (fiscal project 2321) and furnished without reimbursement to the R&D activities during FY 1955. This information will be furnished as soon as it becomes available.
4. Advance planning for funding items required for engineering tests from P&P and M&O appropriations will be based on the criteria as outlined in letter from Chief of Research and Development, OCS, 3 May 1955, subject, "Funding of Items Required for Engineering or User-Service Tests," and, upon approval of the procedure, will be implemented through Primary Program No. 7, "Procurement."
5. Funding through pilot plant stages will be charged to the research and development program. Unit plant design costs will normally be funded and implemented through Primary Program No. 8, "Industrial Mobilization." Specific funding problems created as a result of the recent change in policy which concern supplements to existing contracts;

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planning and administration of continuing R&D unit plant design projects; review, maintenance, and revisions of existing unit plant designs will be referred to OCCMO for resolution.

6. Funding changes for specific projects will be reported in accordance with existing procedures (CSGLD-344 Report). Changes aggregating \$50,000 or more for a specific project will be explained concurrently with the submission of the CSGLD-344 Report.

7. Research and development funded from other sources will be as specified in MIPR's and similar documents, and will be pursued in the order of priority specified in Section I herewith insofar as resources other than money are involved (e.g., when manpower or facility limitations apply).

CHEMICAL CORPS PLANNED OBLIGATIONS OF FUNDS FOR RESEARCH & DEVELOPMENT. ARMY. FY 1956 CHEMICAL AND RADIOLOGICAL WARFARE PROGRAM 15A

AGENCY: CHEMICAL			(In Thousands of Dollars)
Tech	Project	Project Title	ESTIMATED OBLIGATIONS
Obj	Number		FY 1956
<u>Budget Program No. 2 - Guided Missiles and Related Equipment</u>			
CW-3	4-16-16-020	CBR Warheads for Rockets and Missiles	389
SUBTOTAL - Budget Program No. 2			389
<u>Budget Program No. 4 - Combat Support Vehicles and Related Equipment</u>			
LC-5	4-09-02-019	Mechanized Flame Throwers and Related Equipment	486
SUBTOTAL - Budget Program No. 4			486
<u>Budget Program No. 5 - Artillery and Other Weapons and Related Equipment</u>			
LC-5	4-09-02-018	Portable Flame Thrower	201
SUBTOTAL - Budget Program No. 5			201
<u>Budget Program No. 6 - Ammunition and Related Equipment</u>			
CW-3	4-04-15-028	Shells and Rockets for Toxic CW Agents	187
CW-3	4-04-17-019	Smoke Canisters, Artillery Shell	23
CW-3	4-04-17-020	Smoke Munitions and Services	235

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CW-3	4-04-16-022	Incendiary Aerial Munitions	—
CW-3	4-07-06-001	Persistent Gas Land Mine	65
CW-3	4-08-05-003	Mechanical Irritant Gas Dispenser	43
CW-3	4-09-06-004	Incendiary Ground Warfare	355
		SUBTOTAL - Budget Program No. 6	908
<u>Budget Program No. 7 - Other Equipment</u>			
CW-4a	4-08-06-029	CW Agent Detection	252
CW-4a	4-08-06-030	Automatic Gas Alarms	268
CW-4c	4-08-06-031	Toxic Agent Decontamination	104
AW-5a	4-12-80-005	Tactical Dosimeter	75
CW-1b	4-30-07-007	Radar and Infrared Screening Agents	97
CW-1b	4-30-07-009	Fuel Contaminants	16
CW-4b	4-80-02-030	Individual Protection, Masks	700
CW-4b	4-80-04-013	Individual Protection, Clothing	163
CW-4b	4-80-12-007	Collective Protection	392
CW-4a	4-90-16-002	Theater Chemical Laboratory	—
		SUBTOTAL - Budget Program No. 7	2,067

Budget Program No. 8 - Military Sciences

CW-3	4-04-15-029	CW Agent Dissemination Studies	590
CW-5	4-08-02-016	Toxicological Aspect of CW	535
CW-5	4-08-02-017	Biochemical Aspects of CW	350
CW-5	4-08-02-018	Medical Aspects of CW	520
CW-5	4-08-02-019	Physiological Basis of CW	450
CW-1a	4-08-03-016	Toxic CW Agents	726
CW-3	4-08-04-011	Field Test Methods and Equipment	536
AW-5b	4-12-10-007	Radiological and Atomic Warfare	316

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AW-5b	4-12-90-001	Health Physics	
FO-14	4-61-14-002	Health Hazards of Military Chemicals	20
CW-3	4-72-05-015	Engineering Design, Specifications and Testing	572
CW-3	4-72-08-001	Design Criteria for Technical Facilities	245
SR-12	4-91-86-002	Packaging and Materials Development	86
CW-1a	4-92-03-013	CW Agent Pilot Plants	1,287
CW-1a	4-98-01-003	Environmental Field Trials, DFG	250
CW-3	4-98-05-026	CW Field Testing & Technology, DFG	1,150
CW-5	4-99-02-002	Wound Ballistics	80
		SUBTOTAL - Budget Program No. 8	7,713
		T/Operations	11,764
<u>Budget Program No. 9 - Operation and Management of Facilities</u>			
		Direct Support Costs	5,925
TOTAL RECOM			17,689

SECTION III

REVIEW AND ANALYSIS

1. Reports and schedules will be prepared to provide the Chemical Corps R&D Program Director and Staff agencies concerned with reference data as to the technical and fiscal status and progress of the program to include the following:

- a. Annual Project Progress Report - Reports Control Symbol CSPRD-1. Report as of 31 December to be submitted annually by 1 March of the following year. Reference, DA Memo 705-45-1.

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- b. R&D Annual Guided Missile Report - Reports Control Symbol CSPRD-2. Report as of 1 October. To be submitted annually to reach Office of the Chief Chemical Officer by 25 October for submission to Chief of Ordnance by 1 November. Reference, DA Memo 705-45-1.
- c. DD Form 613 submitted for all proposed and revised projects within 45 days following approval by Technical Committee. Reference, DA Memo 705-45-1.
- d. Army Research and Development Summary Schedule of Selected Items and Study Projects of Major Importance. Reports Control Symbol CSPRD-4, to reach OCCm10 20 May each year. Reference, SR 11-10-70.
- e. Army Progress Report Research and Development 15A. Reports Control Symbol CSGLD 415-R1. Submission for each FY quarter, to reach OCCm10 by the 10th day of the month following the reporting quarter. Any major progress or accomplishments for the reporting quarter should be included in a separate section. Reference, DA Memo 335-100-2.
- f. Report on Changes to Planned Obligations. Reports Control Symbol CSGLD-344-R1, submission monthly to reach this office by the 3rd of each month. Reference, DA Memo 705-20-2.
- g. Chemical Corps RECCM 15A (R&D) Program Operating Schedules.
To be submitted quarterly, to reach OCCm10 no later than six weeks following the reporting quarter (slippages in excess of six months from previously planned schedules will be appropriately explained). A section will also include significant accomplishments during the past quarter.

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