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# SUMMARY OF MAJOR EVENTS AND PROBLEMS

## United States Army Chemical Corps

Fiscal Year 1956

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[redacted]

November 1956

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# SUMMARY OF MAJOR EVENTS AND PROBLEMS
(Reports Control Symbol CSHIS-6)

UNITED STATES ARMY CHEMICAL CORPS

Fiscal Year 1956

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Summary of Major Events and Problems
Fiscal Year 1956

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## Charts



## Tables



## Appendixes

# U.S. ARMY CHEMICAL CORPS

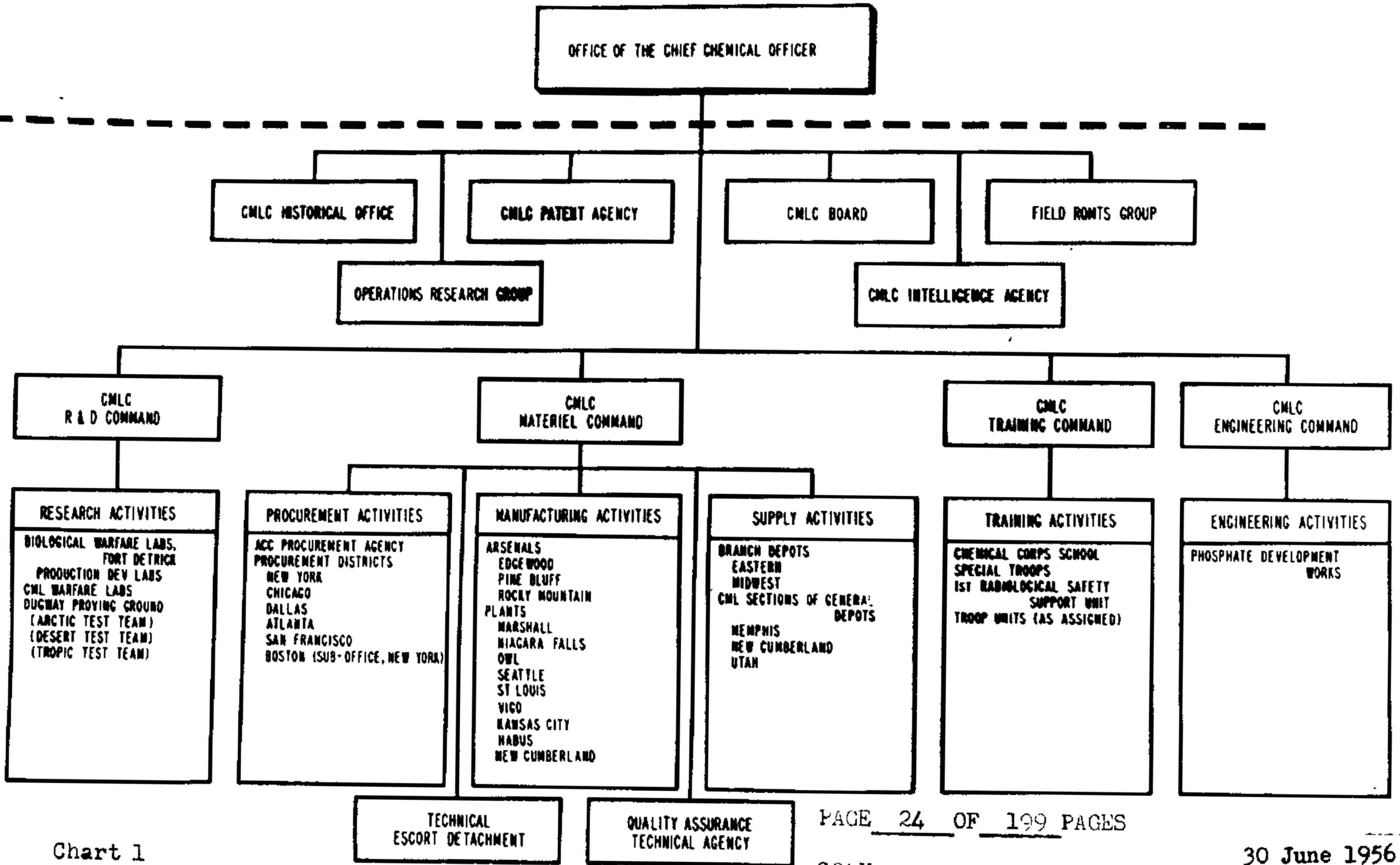


Chart 1

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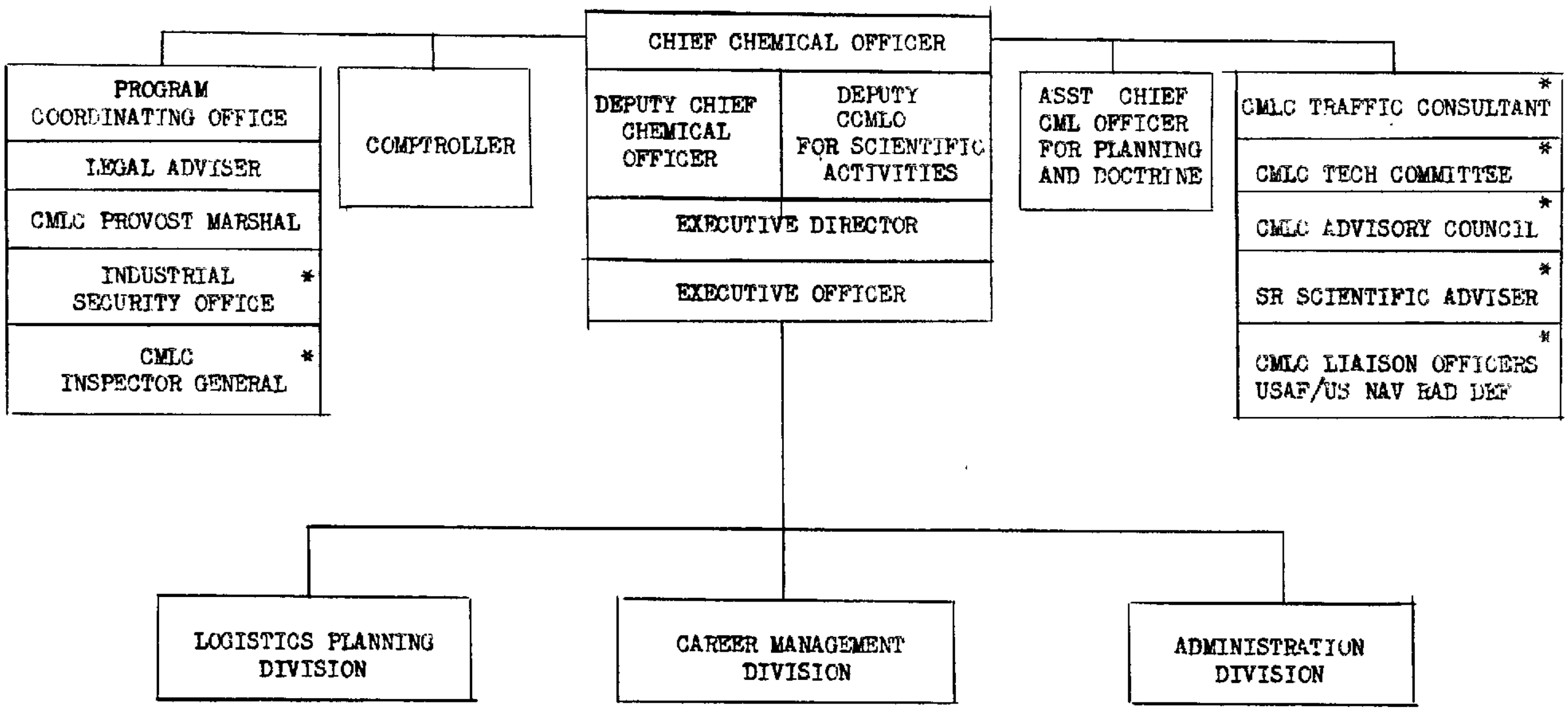
30 June 1956

Chart 2 - OFFICE OF THE CHIEF CHEMICAL OFFICER

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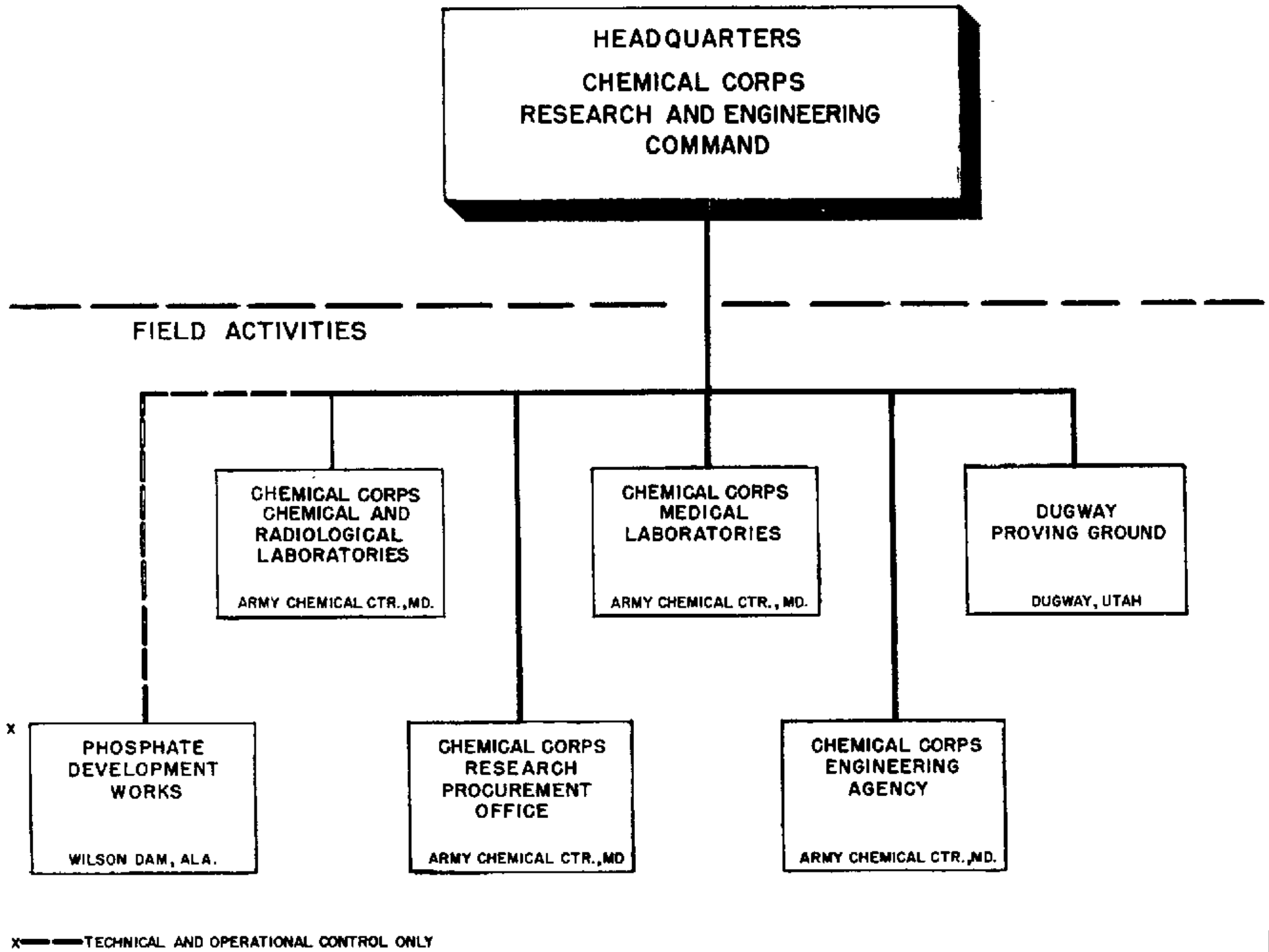
30 June 1956

CHEMICAL CORPS

CHEMICAL CORPS RESEARCH AND ENGINEERING COMMAND




DATE 1 JULY 1954

PREPARED BY:
MANAGEMENT BRANCH
COMPTROLLER OFFICE

CHART 7

# CHEMICAL CORPS RESEARCH AND DEVELOPMENT COMMAND

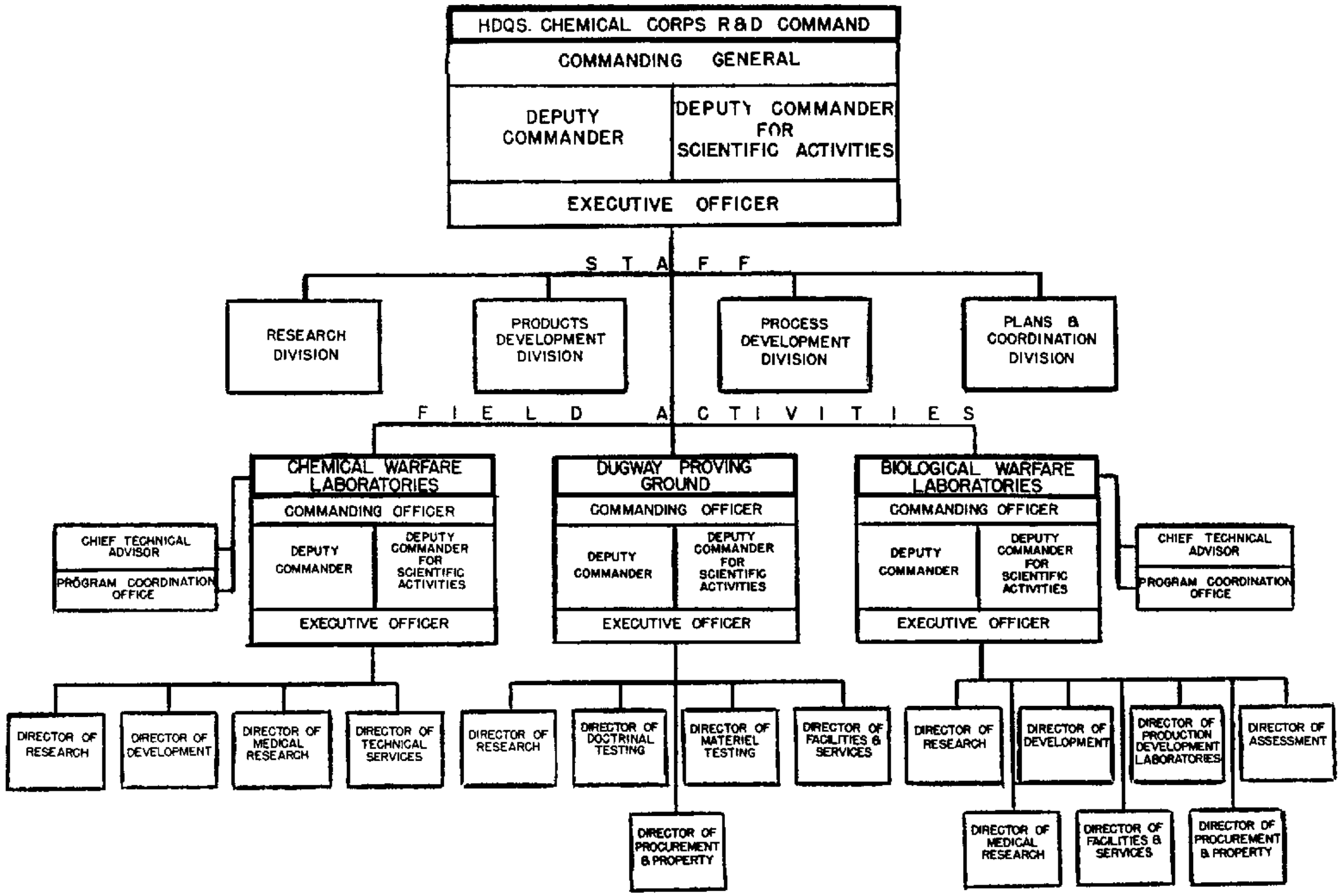
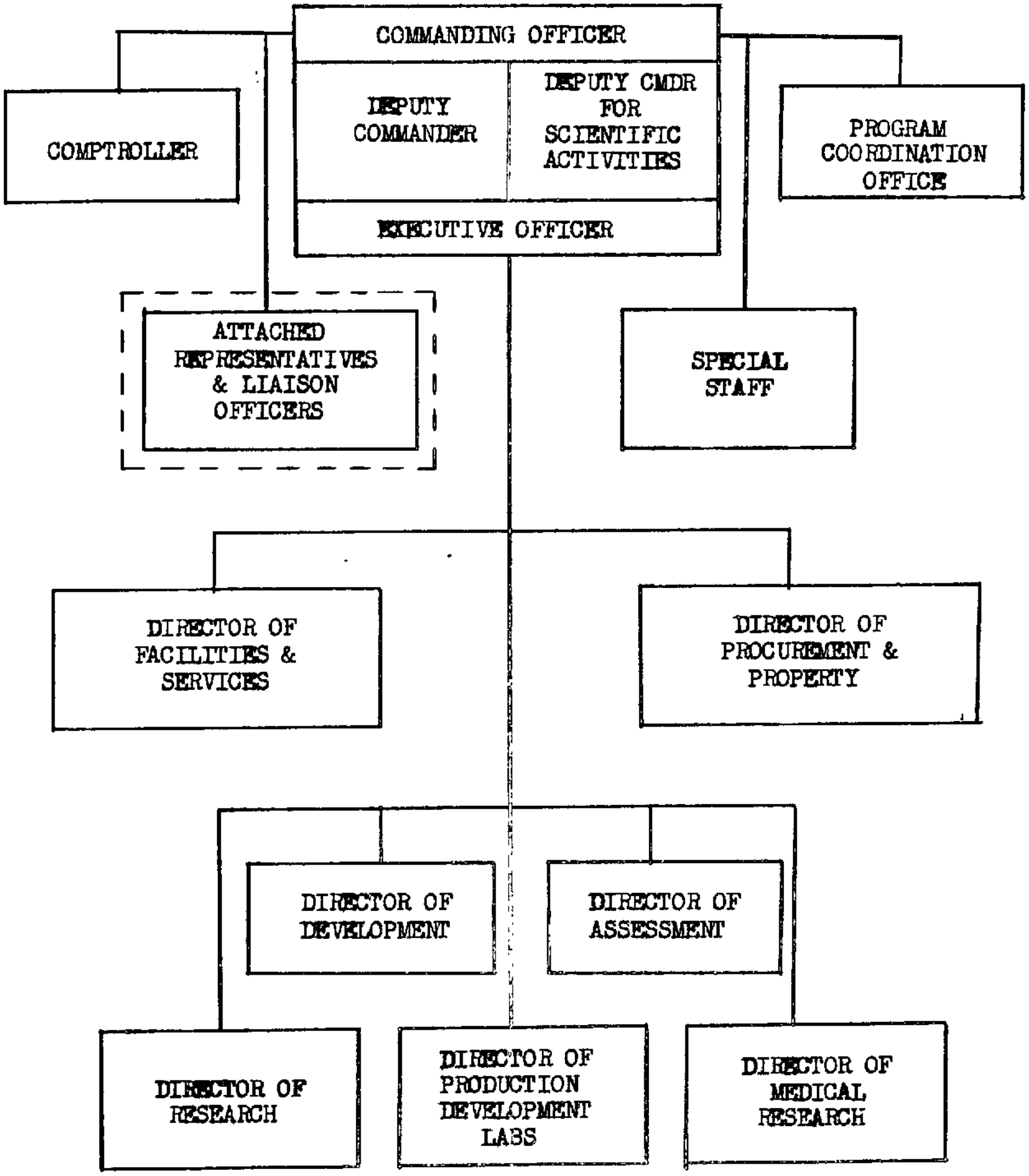



CHART 8

Chart 13 - BIOLOGICAL WARFARE LABORATORIES
Fort Detrick, Maryland

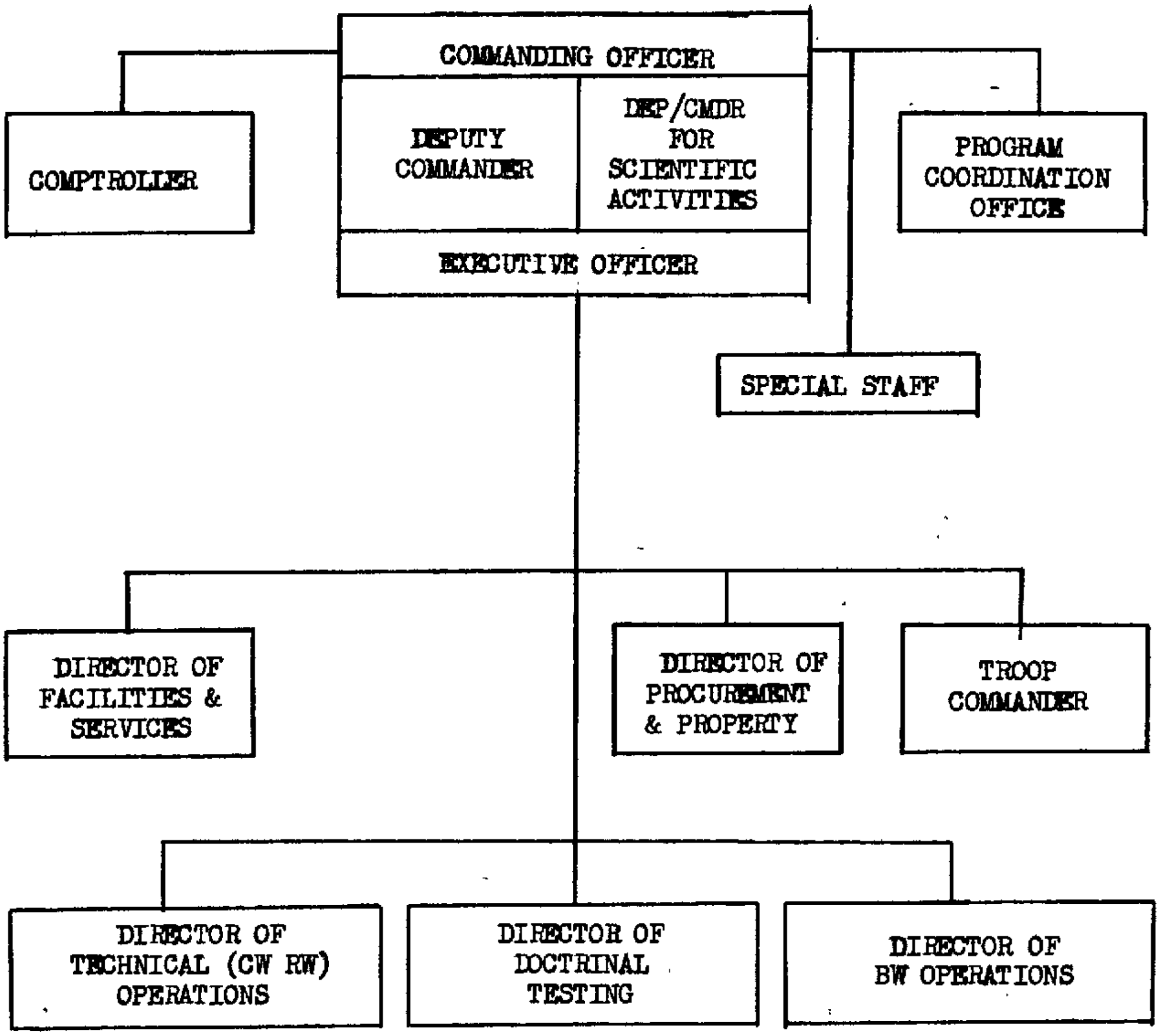


## Organization and Administration

(U) The major reorganizational changes that took place within the Corps as a result of the recommendations of the Ad Hoc Advisory Committee were within the area of research and development. General Creasy abolished the old Research and Engineering Command (Chart 7) and established a Research and Development Command (Chart 8) and an Engineering Command (Chart 9). The Research and Development Command was given a management type structure, with a small headquarters for guidance and a lateral-type organizational structure at the working levels, rather than the normal military pyramid of command-type structure.[180] The Command, under Brigadier General Jacquard H. Rothschild, was made up of a headquarters and three agencies: the Chemical Warfare Laboratories at the Army Chemical Center, the Biological Warfare Laboratories at Fort Detrick, and Dugway Proving Ground. The Chemical Warfare Laboratories (Chart 10) were formed by the union of the Chemical & Radiological Laboratories (Chart 11) with the Medical Laboratories (Chart 12). The new organization was composed of a command block, beneath which were placed four directorates: Research, Development, Medical Research, and Technical Services. The directors served as operating chiefs and as technical advisers to the top management. Each directorate was composed of several divisions, each division of several branches. The Biological Laboratories were reorganized along the same lines as the CW Laboratories; i.e., a command block and several directorates (Chart 13). When the position

180 Talk by Dr Per K. Frolich, Deputy Chief Chemical Officer for Scientific Activities before the Armed Forces Chemical Association, 14 Jun 56.

Chart 14 - DUGWAY PROVING GROUND
Dugway, Utah



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of Assistant Chief Chemical Officer for Biological Warfare was abolished,[181] the Commanding Officer of the BW Laboratories was made responsible to the Commanding General, Research & Development Command. The organization at Dugway Proving Ground followed the general pattern established for the Chemical and the Biological Laboratories (Chart 14).

(U) The Engineering Command, under Col. William J. Allen, Jr., was organized into a headquarters and five directorates: Biological Warfare Engineering, Engineering Documents, Facilities, Plants and Processes, and Products Engineering (Chart 9). Each directorate in turn was made up of several divisions. The Muscle Shoals Phosphate Development Works at Wilson Dam, Ala., where G-agent intermediates are produced, was placed under the technical direction of the Engineering Command for the remainder of the fiscal year.

(U) The Research and Development Command was given charge of the research and development of an item from inception to completion of final engineering, while the Engineering Command was responsible for seeing that the item was properly designed for mass production. From the inception of a project, the ENCOM engineers worked closely with research and development personnel to insure that the finished item would be sound from an engineering standpoint. After an item went into production the Engineering Command acted as a consultant to the Materiel Command and advised it of any new processes or equipment for producing the item. The same pattern was to be followed in the research, development and production of a chemical agent.

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181 See above, p. 22.

(C) The research and development program included 41 projects and 135 subprojects in chemical warfare, 1 project and 4 subprojects in radiological warfare, and 25 projects in biological warfare.[182]

(C) The funds obligated for research and development as of 30 June 1956 totalled $41,953,000 (44 percent of the Corps' actual obligations), a decrease of $1,897,000 from FY 1955 and the lowest amount since the $38,709,000 of FY 1952.[183]

(U) The technical activities of the Corps still suffered from a deficiency of professional and scientific personnel, there being 83 unfilled requisitions on 30 June 1956. These 83 vacancies represented 5 percent of the Corps' scientific and professional strength, about the same percentage understrength as the entire army. In an effort to recruit the needed men, the Army received approval from the Civil Service Commission to advance the hiring rates for physical scientists and engineers in grades GS 9 - 11. The increases allowed the salaries offered by the Corps to compete more reasonably with those offered by industry.[184]

(U) The problem of obtaining highly qualified scientific and professional personnel was felt strongly by the Operations Research Group (ORG), located at

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182
(1) Cml C Annual Research and Development Report, 31 Dec 55. (2) Cml C Research and Development BW Project Report, 31 Dec 55.

183
(1) Quart Rev, 4th Quart, FY 56. (2) Summary of Major Events and Problems, FY 55, pp. 44 - 46.

184
Quart Rev, 4th Quart, FY 56.

the Army Chemical Center. The ORG was established in 1951 by the Chief Chemical Officer, Maj. Gen. Anthony C. McAuliffe, to analyze and evaluate problems connected with Chemical Corps operations in areas as authorized or directed, and to provide the Chief Chemical Officer with scientific data, technical evaluations and/or reports. The Group employs statistical methods chiefly in evaluating technical information for the administrative staff. It attempts to solve problems submitted by the Chief Chemical Officer as well as problems which ORG itself generates. At the close of the fiscal year ORG's chief project was the revision of the Corps' source data book, for which the number of personnel was increased by twenty and which is scheduled for completion by 1 July 1957. The original concept in establishing ORG was to staff the organization with civilian scientists on leave of absence from universities. But this plan proved impractical, and the personnel has been drawn from the civil service and the military establishment. Owing to the specialized, highly competitive type of personnel required, the ORG has had considerable difficulty in filling its spaces, and vacancies existed in grades GS 15, 14, and lower.[185]

## Technical Operations

### Psychochemical Agents

(S) In the closing months of the previous year, the Corps established a new subproject, 4-08-03-016-05, Psychochemical Agents, in an effort to uncover

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185 Interv, Hist Off with Lt Col John A. Bacon, Jr., Dir, Cml C Operations Research Group, 7 Sep 56.

compounds that would cause temporary mental and/or motor incapacitation of enemy soldiers or civilians. During this fiscal year considerable preliminary work was done. The chairman of the Research and Development Coordinating Committee on Biological and Chemical Warfare, in a memorandum dated 3 June 1955, requested the Technical Advisory Panel on Biological and Chemical Warfare to study the problem of psychochemical agents. The Panel appointed a Study Group to examine the general field. On this Group were: Harold G. Wolff (chairman), Robert W. Hyde, Brig. Gen. S. L. A. Marshall (USAR), Maurice Seevers, Thomas P. Carney, and Lawrence E. Hinkle. The Wolff Committee made recommendations on the project, and on 1 February 1956 Van M. Sim assumed responsibility for the CW Laboratories' clinical research program. On 24 May the Corps received authority to enlist the services of human volunteers for the tests.[186]

(S) A survey of the numerous compounds included within the category of potential psychochemical agents has led to a concentrated study of three prototype groups of compounds: (1) mescaline and related compounds which cause hallucinations, (2) lysergic acids, which produce anxiety and hallucinations, (3) active ingredients of marijuana and related tetrahydrocannabinol derivatives, which cause depression. A major difficulty has been finding compounds that are active in concentrations sufficiently small for military purposes. To date, 45 compounds have been delivered for study, 22 have been studied on

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186
(1) Report of the Ad Hoc Study on Psychochemical Agents, 19 Nov 55.
(2) Summary of Major Events and Problems, FY 55, pp. 48 - 49.

animals. Compounds screened by animal tests will eventually be evaluated on human volunteers.[187]

V-Agents

(S) For many years the research and development staff has been seeking toxic agents which would not have to be inhaled, but would enter the body through the skin, thereby by-passing the protective mask. By modifying the electronegative group of the G-agents, chemists prepared such a series of compounds, christened in 1955 the V-agents.[188] The Corps gave top priority to the investigation of these compounds.

(S) During FY 1956 a number of new compounds of the V-agent type were prepared and screened for toxicity. Various approaches to the synthesis of the agents were studied. Candidate agent 1701, designated as VX, was selected for process and pilot plant development and for initial dissemination studies. This compound is representative, from a structural point of view, of the V-agents, and the data obtained will therefore provide basic information in the development of the compound that is finally chosen for standardization.[189]

187 (1) E. Ross Hart, Psychochemical Program, Status Report as of 31 Dec 55, CWLR 2021, 3 May 56. (2) Eleventh Tripartite Conference on Toxicological Warfare, U.S. Discussion Paper, Medical Aspects Agenda.

188 Summary History of Major Events and Problems, FY 55, pp. 46 - 47.

189 (1) Quart Rev, Classified Supplement, 4th Quart, FY 56. (2) Quart Hist Rpt, CW Laboratories, Apr-Jun 56.

(S) In the development of the V-agents there were a number of technical problems requiring solution. One of the most important of these was the tendency of the compounds to decompose during storage. During the year considerable progress was made studying the factors that cause decomposition. The problem is still under investigation.[190] Efforts were also continued to find a material which would be practical in decontaminating surfaces touched by V-agents. A large number of compounds were tested, and some found to destroy certain agents rapidly.[191]

G-Agents

(S) Early in the fiscal year a detailed study of the various processes used to produce GB and its intermediates was completed and submitted to the Office of the Chief, the Research and Development Command, and the Materiel Command. This report evaluated in detail the advantages and disadvantages of each process so that higher authority could use the report as a basis for determining any future expansion program.[192]

(S) G-agents are currently being produced by the so-called DMHP (dimethyl hydrogen phosphite) process. Two other processes are feasible, the Salt and the HTM (high temperature methane). The Corps is interested in these two processes because they may prove to be less expensive and more efficient and practical than the present method. During the fiscal year the Chemical

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190 Interv, Hist Off with Dr Per K. Frolich, 6 Aug 56.

191 Cml C Annual Research and Development Report, 31 Dec 55.

192 GB Expansion Program (TOP SECRET report).

Warfare Laboratories, the Engineering Command and a contractor, the Food Machinery and Chemical Corporation, carried on further planning of the unit plant design for the HTM process. The contract consisted of two parts; phase 1 for development of the pilot plant, and phase 2 for the design of a semi-works plant. Considerable work was done by the laboratories and the contractor on phase 1, with engineers from the Engineering Command on hand to familiarize themselves with the operation and thus expedite the later work on phase 2.[193]

(S) The evaluation of the Salt Process was carried out in conjunction with the Olin Mathieson Chemical Corporation. During the first half of 1956 the completion date of the contract was extended, owing to personnel turnover of the contractor, but by the end of the fiscal year the contract was practically completed. The technical work, including the writing and publication of manuals, was completed, leaving only the administrative details to be concluded.[194]

(C) During the year, chemical engineering studies at the Phosphate Development Works led to two improvements, both of which should save considerable amounts of money in the production of GB. First, the heat exchangers

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193

(1) Summary of Major Events and Problems, FY 55, pp. 49 - 50. (2) Contract No. DA-8-108-CML-5725, in the amount of $773,590, with the Food Machinery and Chemical Corporation. (3) Cml C Annual Research and Development Report, 31 Dec 55. (4) Quart Hist Rpt, Cml C Engineering Cmd, Jan-Mar 56; Apr-Jun 56.

194

(1) Contract No. DA 11-021-CML-488, in the amount of $426,556, with the Olin Mathieson Chemical Corporation. (2) Quart Hist Rpts, Cml C Engineering Cmd, Jan-Mar 56; Apr-Jun 56.

and condensor coils were replaced by equipment constructed of nickel and special alloys. The saving in maintenance costs amounted to $100,000. Secondly, the process was modified, resulting in a gain of 5 percent in the yield, and the purity was increased, allowing the elimination of expensive redistillation. At the rates of production that would be carried on under full mobilization, it was estimated that the savings would approach three-quarters of a million dollars annually.[195]

LOPAIR G-agent alarm

(U) It is difficult for humans to detect the presence of G-agents by the senses alone. For this reason the Corps has been endeavoring to develop an automatic device which sould sound an alarm when a G-agent was in its vicinity. Such a device could be used to scan the atmosphere continuously in advance of troops, and give warning when G-agents were spotted.

(S) In 1954 the Corps began development of a small, simple alarm commonly called LOPAIR (long-path infrared). The principle behind this device is that the G-agents absorb certain portions of the infrared spectrum. The first prototype, E33, was constructed in co-operation with the Armor Research Foundation and the Farrand Optical Company. It performed satisfactorily, having a range of 300 yards, but it was too heavy (250 pounds) and consumed too much electrical power (250 watts).

(S) To overcome the objections to the E33, a revised model, the E33R1,

195 Cml C Research and Development Command, CW Labs, Outstanding Accomplishments FY 56.

was produced by the Farrand Company. It was similar to the E33 but made use of a difference, instead of a ratio, system for wave length comparison. The unit weighed only 34 pounds, consumed only 50 watts of power, and had a range of 100 yards. Three to ten seconds were necessary for the unit to respond to the presence of the agent. It did not sound a false alarm when an opaque object blocked the path of radiation.

(S) Following evaluation of the E33 and E33R1, a third instrument, E33R2, was designed. This incorporated the best features of the earlier devices as well as some new ideas. The unit was slightly heavier than the previous model, but consumed less power (30 watts) and had a much longer range (1/4 mile). The alarm was sufficiently sensitive to detect a few ounces of GB exploded thirty to fifty yards upwind under normal conditions. The developers expect that this model will satisfy the military characteristics when it is submitted for the final development tests.[196]

One-Shot Portable Flamethrower

(C) In the area of flame warfare the Corps had under development two types of mechanized flame throwers (one for tanks, the other for combat vehicles) and two flame throwers for use by the individual soldier, the portable and the one-shot. These weapons were in different stages of development, ranging from fabrication of the prototype to the final development test. The Corps developed its first one-shot flame thrower in World War II. The weapons were cylindrical

196 (1) CWTC item 2868, 29 Jul 54. (2) Cml C Annual Research and Development Report, 31 Dec 56.

in shape, held from two to three gallons of petroleum fuel, and weighed approximately thirty pounds. The fuel was expelled through and ignited by a nozzle at one end. Two propellant systems were tested, one consisting of a piston which pushed the fuel, the other of a collapsible bag which squeezed the fuel through the nozzle. The propelling force came from compressed carbon dioxide gas or from gas given off by burning cordite. The range extended from twenty yards with unthickened fuel to fifty yards with thickened fuel. By the end of the war the weapon had reached the stage where limited procurement of 1500 was authorized, but the project was dropped upon advice from the AFF before it went any further. In 1953 the Marine Corps and CONARC stated a requirement for the one-shot, and work was resumed under project 4-09-02-018.[197]

(S) The new flame thrower is considerably different than the World War II models. Instead of being cylindrical in shape the tube is bent into the shape of a U. In place of a piston or a collapsible bag is a rubber ball. At one end of the U is the propellant, at the other a nozzle. In operation combustion gas from the propellant forces the rubber ball down one leg of the U, around the bend and up the other leg to the nozzle. The ball pushes the thickened fuel through the nozzle, where it is ignited. The weapon has a capacity of two gallons, a firing time of four seconds, and weighs twenty-five pounds loaded. Ranges of from fifty to seventy-five yards are attained.[198]

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197
(1) Leo Finkelstein, Flame Throwers (monograph in series, History of Research and Development of the CWS in World War II). (2) CWS Rpt of Production, 1 Jan 40 through 31 Dec 45. (3) CWTC item 2626, 5 Mar 53.

198
(1) A full-scale plexiglass model of the weapon is in the briefing room, CW Labs. (2) Cml C Annual Research and Development Report, 31 Dec 55.

(S) During FY 1956 the Corps negotiated a contract with Aerojet General Corporation for the manufacture of forty E30R1 one-shot flame throwers. Those were to be used by the Corps in final development tests and by the Marine Corps and CONARC in preliminary user tests. The weapon performed satisfactorily in final engineering tests at 0°F, but at a lower temperature of -25°F the rubber ball lost its elasticity. In an effort to find a material that would function perfectly the Munitions Development Division investigated rubber compounds not affected by low temperature.[199]

Field Protective Mask

(S) in 1954 CONARC began to test new experimental field masks with the object of choosing a model to replace the standard M9A1 mask. The specimens included the E10, E12, E13, and E73, with the M9A1 present for comparison. The test program emphasized the ability of the mask to protect the wearer against CW and BW agents, as well as its ruggedness, comfort, and wearability. In 1955 the AFF decided that model E13 was most satisfactory. The E13 has no canister, the inhaled air passing through pads of filtering material inside of the snout-like facepiece. It has only one-half the breathing resistance of the M9A1, is lighter and more compact, has a larger field of vision, and provides for speech transmission.

(S) The first schedule for production of the E13 mask called for completion of the final development tests by 31 January 1957. The Corps thereupon

199 (1) Interv, Hist Off with Mr R. L. Ortynsky, Munitions Dev Div, CW Labs, 10 Jul 56. (2) Progress Reports from Aerojet General Corp under contract DA-18-108-CML-5658.

worked out plans to telescope user test procurement, final development tests, and CONARC user tests. At this rate the Corps hopes to have the mask ready for type classification at the end of calendar year 1957.[200]

(S) During the development of the E13 type mask, the Corps continued to improve the standard M9A1 mask, so as to keep it at maximum effectiveness during the period needed to complete its successor. The Continental Rubber Works, under contract, produced M9A1 faceblanks in three sizes with smooth face-sealing surfaces. Continental also modified the mask to permit insertion of a speech unit-outlet valve and thus improve speech transmission.[201]

Radiological Warfare Agents

(S) During the year the Research and Development Command completed a study on the probable quantity of radioactive waste material that will be available for conversion into radiological warfare agents during the period 1960 - 1980. They found that radioactive waste will be available at industrial atomic energy plants in 1965. Thereafter the supply will increase rapidly. The Corps had been interested in this type of agent, but little effort had gone into this field recently because studies had shown that there was not sufficient radioactive material available to produce RW agents.[202]

200 Quart Rev, Classified Section, 2d Quart, FY 56.

201 (1) Cml C Annual Research and Development Report, 31 Dec 55. (2) Progress reports for Continental Rubber Works under contract DA-18-108-CML-5077.

202 (1) Cml C Research and Development Command, CW Labs, Outstanding Accomplishments FY 56. (2) Project 4-12-10-007-03, Ground Delivery of RW Agents, (RD).

Biological Warfare

(S) At Fort Detrick the screening and evaluation of bacteria, fungi, viruses, and rickettsiae produced additional information on C. immitis, M. mallei, M. pseudomallei, Myco. Tuberculosis, R. rickettsiae, Japanese B encephalitis, and variola. Genetic research led to the detection and isolation of a salt-resistant strain of Brucella suis which had much greater aerosol stability than the parent type. The virulence and stability of Pasteurella pestis was increased. Research was started to apply large scale tissue culture as a technique in the production of viruses and rickettsiae.[203]

(S) In munition development, four projects were completed during the fiscal year:

(S) (1) Project 4-04-14-020, Amphibious BW Aerosol Generator. This project was started in 1952 by request of the Navy Bureau of Ordnance. The munition was a mine from which the agent was forced out and atomized by pressure from carbon dioxide. It was developed to the point where a series of tests (Operation FOG BOUND) was conducted at Dugway. In July 1955 the Navy terminated the project.[204]

(S) (2) Project 4-04-14-022, 1/2-lb. Biological Bomb. This item was a small antipersonnel bomb (E61R4) designed for use in a 750-lb. aimable cluster adapter. The agent was atomized from the bomb by a fast-burning

[203] (1) Tenth Annaul Report, Ft Detrick, 1 Jul 56. (2) Annual Chemical Corps Research and Development BW Project Report, 31 Dec 55. Hereafter cited as CmlC R&D BW Proj Rpt, 1955.

[204] (1) Tenth Annual Report, Ft Detrick, pp. 187 - 88. (2) CmlC R&D BW Proj Rpt, 1955, pp. 247 - 52.

powder charge, initiated by an impact fuze.[205] The development was completed, and the bomb was ready for standardization.[206]

(C) (3) Project 4-04-14-023, Biological Bomb for Balloon Delivery. This bomb consisted of a gondola holding five containers of agent grouped around a heating device. A fuze opened the gondola at a preselected altitude, releasing the agent.[207] All engineering tests were completed, and standardization should follow.[208]

(S) (4) Project 4-04-14-025, BW Mine. This munition was designed to be laid in river mouths and harbors by means of submarine. It was designed to be fired from a torpedo tube, to sink to the bottom for a specified period up to two hours, and then rise to the surface and expell a cloud of atomized agent. Fort Detrick developed the aerosol generator, while the Naval Ordnance Laboratory produced the mine case. In July 1955, after successful trials, the Navy halted the project.[209]

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205 Tenth Annual Report, Ft Detrick, pp. 176 - 79.

206 Ft Detrick Special Report 251, Final Engineering Report, E61R4 and E133R3, Mar 56.

207 Tenth Annual Report, Ft Detrick, pp. 173 - 74.

208 Ft Detrick Special Report 255, Final Engineering Report on the E125, n.d.

209 (1) Tenth Annual Report, Ft Detrick, pp. 186 - 88. (2) Ft Detrick Special Report 237, Moby Dick: Sea-to-Land Travel of Simulated Aerosols generated by the XB - 14 B Mine, Aug 55.

(C) In addition, Project 4-04-14-026, 750-lb. Biological Bomb, was completed except for publication of the final engineering report; and Project 4-04-14-024, Biological Bomb, Continuous Generator, was cancelled because it did not offer significant advance over the 1/2-lb. Biological Bomb.[210]

(S) In the field of anticrop BW, the Biological Bomb for Balloon Delivery and the 750-lb Biological Bomb (both mentioned above), were completed. The Bomb for Balloon Delivery is one of the munitions being considered for use in the CD-30 project, an Army - Navy - Air Force test group concerned with the problem of completing a weapon system utilizing cereal rusts in munitions. Cereal rusts received the greatest emphasis among anticrop agents, particularly in regard to dissemination and spread.[211]

(C) In FY 1956 Project CD-22, the first attempt to obtain information concerning the vulnerability of military personnel to BW attack, was completed. In tests at Dugway Proving Ground thirty volunteers were exposed to an aerosol containing Coxiella burnetii, the cause of Q fever. These tests gave valuable data on the infectivity of this agent, and also corroborated earlier results obtained from the Horton Test Sphere.[212] This project was carried out with

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210
(1) Tenth Annual Report, Ft Detrick, pp. 174 - 75, 185 - 86. (2) CmlC R&D BW Proj Rpt, 1955, pp. 321 - 28, 337 - 44.

211
(1) Tenth Annual Report, Ft Detrick, pp. 196 - 97, 127 - 48. (2) Review and Analysis of Cml C BW Program, 4th Quart, FY 56.

212
Tenth Annual Report, Ft Detrick, pp. 203 - 04.

assistance from the Medical Department under an agreement between the Chief Chemical Officer and The Surgeon General.[213]

Standardized Items

(C) During the fiscal year the Corps completed the development of, and standardized the following items:

(U) (a) Incendiary, Emergency Document Destroyer, M3 (E12R1). This document destroyer was developed at the request of the Armed Forces Security Agency to insure complete destruction of classified or vital documents to prevent their capture and reconstruction by an enemy.[214]

(U) (b) War Gas Identification Set, Detonation, AN-M1A1 (E7). This set, which replaces the M1 set, broadens the range of gases which can be identified, eliminates the tests for Levinstein mustard and chloropicrin, and adds ampoules for identifying the newer agents (distilled mustard, cyanogen chloride, nitrogen mustard and agents of the G-series).[215]

(C) (c) Winterizing Kit, Protective Mask, M1 (E14R14). This kit was developed to extend the protective capabilities of the M9A1 Field Protective

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213 CWTC 3162, 17 May 56.

214 CWTC Item 3123, Classification of Incendiary, Emergency Document Destroyer, M3 (E12R1) as a Standard Type, 29 Nov 55.

215 CWTC Item 3125, Classification of War Gas Identification Set, Detonation, AN-M1A1 (E7) as a Standard Type and Reclassification of the M1 Set to Limited Standard, 29 Nov 55.

Mask to operations performed at temperatures down to -65°F.[216]

(C) (d) Breathing Apparatus, Compressed Air, M15. This apparatus was developed to meet the requirement of guided missile battalions and related Ordnance research, development and training organizations for respiratory protective equipment.[217]

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216
CWTC Item 3189, Classification of Winterizing Kit, Protective Mask, M1 (E14R14) as a Standard Type, 17 May 56.

217
CWTC Item 3192, Classification of Breathing Apparatus, Compressed Air, M15 as a Standard Type & Reclassification of Breathing Apparatus, Oxygen Generating, M13 to Limited Standard, 17 May 56.