the elite Strategic Army Corps, commonly known as STRAC. This four-division force had the support of twenty of the Chemical Corps units possessing a high degree of readiness. Priority classification of STRAF units was revised in FY 1958 in order to better meet requirements for the tentative deployment schedules of STRAC units. The revision established certain standards for personnel and equipment readiness for each of eight categories. Chemical units were placed in four categories, 1, 2, 6, 8. Standards for Class 1 units were 100 percent strength, 100 percent POM qualified, and with full TOE equipment; for Class 2: 100 percent strength, 90 percent POM qualified, and with full TOE equipment; Class 6: 90 percent strength, 80 percent POM qualified, and with full TOE equipment. Class 8 units, the least ready, were to be filled and equipped to the extent that available resources would permit. The Chemical Corps units earmarked for STRAC fell in either Class 1, 2, or 6.[108]

(S) Keeping the Chemical Corps units at top strength and fully qualified proved to be a problem. DCSLOG on 6 September 1957 called attention to a tendency in the technical services of having the TOE units at less strength than the units formed under tables of distribution and asked that the imbalance be corrected. Compliance, of course, would mean transferring men from TD to TOE units. The Chemical Corps Training Command was faced with the problem of transferring troops from

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108
(1) Interv, Hist Off with Mr Elgar Stabler, OACCmlO for P&D, 14 Jan 59. (2) Ltr, DA to Dist, 15 Nov 57, sub: STRAF and US ARADCOM Class Designations. (3) Quart Rev, Class Sup, Apr - Jun 58, p.1. (4) Interv, Hist Off with Maj Stephen D. Noyes, 100th Cml Gp, 29 Jan 59.

the TD unit supporting the Chemical Corps School to units of the 100th Chemical Group. Protests registered by the commanding officer of the Training Command brought relief for this situation, although by this time the attainment of the strength percentage requirements of STRAC units, mentioned above, had proved to be equally serious.[109]

(S) One of the outstanding features of the FY 58 Chemical Corps Troop Program was the activation of units of a new type. These were the 22d Chemical Company (Combat Support) and the 50th and 502d Chemical Platoons (Combat Support), located at Fort McClellan, Ala., Fort Ord, Calif., and Fort Bragg, N.C., respectively. The 22d and the 502d were manned by personnel released by the inactivation of the 30th Chemical Company (Decon) and the 8th Chemical Company (Depot). The 50th formerly had been designated a chemical service platoon. It was envisioned that the 246-man chemical company, combat support, would be assigned to a corps, with one of its six platoons attached to each division of the corps. The remaining one or two platoons would remain with corps. Missions of the new unit included chemical technical intelligence, third echelon maintenance of organic chemical equipment, operation of a divisional chemical supply point, CBR monitoring and radiological surveys, and the supervision of unit decontamination. A chemical company, combat support, could replace a current chemical service battalion comprised of

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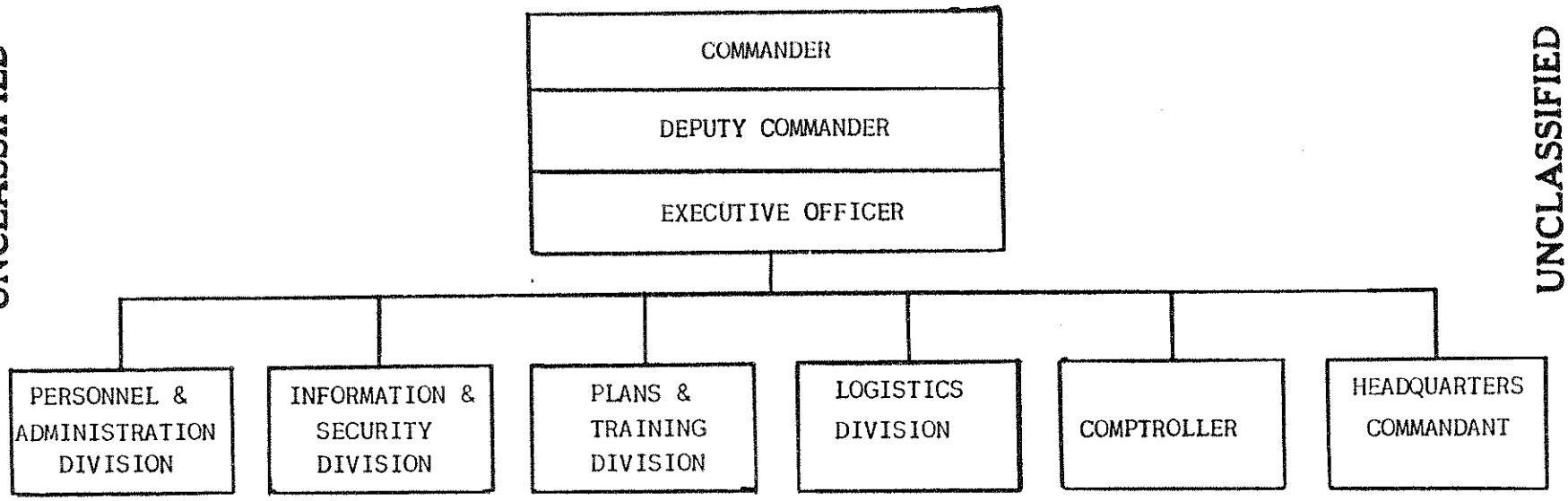
109
(1) Conference, Hist Off with Col John M. Palmer, et al, CmlC TNGCOM, 28 Jan 59. (2) Stabler interv, 14 Jan 59. (3) Statement, Lt Col Julian A. Newlander, CmlC TNGCOM, 29 Jan 59.

CHEMICAL CORPS

HEADQUARTERS, UNITED STATES ARMY CHEMICAL CORPS TRAINING COMMAND

UNCLASSIFIED



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1 June 1958

Chart No. 5

single maintenance, depot, and decon companies.[110]

(C) In another important troop action, the 2d Chemical Weapons Battalion at Dugway Proving Ground was deactivated effective 7 January 1958, and its personnel reorganized into the HHD, 2d Chemical Battalion, Smoke Generator, and the 45th and 46th Chemical Companies, Smoke Generator. These new units provided additional support for the European Reinforcement Troop List and would participate in activities at Dugway Proving Ground in so much as this did not interfere with their primary mission.[111]

Training

Chemical Corps Training Command

(U) The U.S. Army Chemical Corps Training Command, located at Fort McClellan, Ala., is a Class II activity of the Chief Chemical Officer which functions under the staff supervision and operational control of the ACCmlO for Planning and Doctrine. It is charged with the supervision, co-ordination, and inspection of all training of military personnel and units assigned to the Chief Chemical Officer. The major elements of the Training Command are the U.S. Army Chemical Corps School, the 100th Chemical Group (COMZ), the First Radiological Support Unit (RSSU),

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110 (1) Stabler interv, 14 Jan 59. (2) Memo, OCCmlO, 15 Jan 58. (3) Quart Hist Rpt, OACCmlO for P&D, Jan - Mar 58. (4) This particular chemical company, combat support, designated the 1st in January 1958, was redesignated the 22d later in the fiscal year.

111 (1) OCCmlO GO 5, 16 Feb 59. (2) R&A Briefing Notes, OACCmlO for P&D, 2d Quart FY 58.

and the School Support Battalion.

(FOUO) The interest in radiological warfare which the ACCmlO for P&D displayed during the year was noticeable in the activities at the Chemical Corps Training Command. The First Radiological Safety Support Unit, whose entire mission concerned RW, was particularly active.[112] It provided radiological safety support for Operation PLUMBOB held at the Nevada Test Site during the period April - October 1957 and during Operation HARDTACK which took place at the Eniwetok Proving Ground between February and August 1958.

(FOUO) The First RSSU participation in the latter operation was as individuals, not as a unit.[113] Before leaving for the Pacific its personnel was supplemented by Air Force, Navy, and Los Alamos Scientific Laboratories representatives, most of whom received training at Fort McClellan before departure. This group became Task Unit 6, the radiological safety unit of Task Group 7.1, the scientific task group of Joint Task Force SEVEN.

(FOUO) The specific mission of Task Unit 6 included performance of all ground monitoring services connected with scientific missions; provision of laboratory services and technical assistance; provision and maintenance of radiac equipment and protection for the scientific task

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112 The general mission of the First RSSU was the provision of radiological safety support during atomic tests for the Armed Forces Special Weapons Project and for Joint Task SEVEN.

113 The HARDTACK account is based upon (1) Rpt, CO First RSSU to CO CmlC TNGCOM, 1 Jul 58, sub: Report of Participation in Operation HARDTACK - 1958. (2) Interv, Hist Off with Maj Fred E. Rosell, Jr and Lt Gary L. Gallier, 28 Jan 59.

group, another task group, Headquarters, Joint Task Force SEVEN, and specified recovery personnel; and maintenance of a radiological safety center for the operation of two task groups.

(U) Several shortcomings were revealed in the radiological safety activities in support of Operation HARDTACK. For one thing, too many short term officers and men took part in the operation which meant the unique experience gained at the Eniwetok Proving Ground would soon be lost to the Chemical Corps. This situation was to be corrected in future operations by sending, as far as possible, career Chemical Corps personnel.[114] Also deemed questionable was the policy which placed the Radiological Safety Advisor of Task Group 7.1, a staff officer, in command of Task Unit 6 in that this practice deprived the commanding officer of the First RSSU of his normal functions. In the matter of equipment, activities at the Eniwetok Proving Ground demonstrated that the Army had no satisfactory radiac instrument for aerial survey work.

(U) In August 1957 the First RSSU organized and trained the first emergency monitoring team and later trained teams from the Army Chemical Center, Fort Detrick, Pine Bluff Arsenal, Rocky Mountain Arsenal, and Dugway Proving Ground.[115] During September and October the rad safety unit took part in a Chemical Corps School project which determined that

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114 (1) Palmer conference, 28 Jan 59. (2) Newlander statement, 29 Jan 59.

115 See above pp. 30 - 31 for more on these teams.

it was feasible to conduct surveys from armored vehicles using existing instruments if certain modifications were made on the instruments. The tests also determined the optimum placement of these instruments on the vehicles.[116]

(U) During the year the Chemical Corps Training Command made great strides in the program to memorialize deceased Chemical Corps personnel by naming streets and facilities at Fort McClellan in their honor. The names and bases for memorialization of officers and men of both combat and technical background from World War I through the Korean War were provided by the U.S. Army Chemical Corps Historical Office. The list of names included Col. George J.B. Fisher (Chemical Corps School Library), Col. Lewis M. McBride (Hall), Capt. Edward H. Sandell (Field), Maj. Gen. Egbert F. Bullene (Parade Ground), Col. Joseph D. Coughlan (Chemical Corps School Auditorium), M/Sgt. John Kaiser (Circle), and Maj. Gen. Walter C. Baker (Road).[117]

(U) Two noteworthy accomplishments took place in FY 1958 in keeping with DA policy concerning the enhancement of prestige of noncommissioned officers. Noncommissioned Officers Advisory Councils were organized within the Training Command as well as within the 100th Chemical Group (COMZ) and the Chemical Corps School Support Battalion. These councils,

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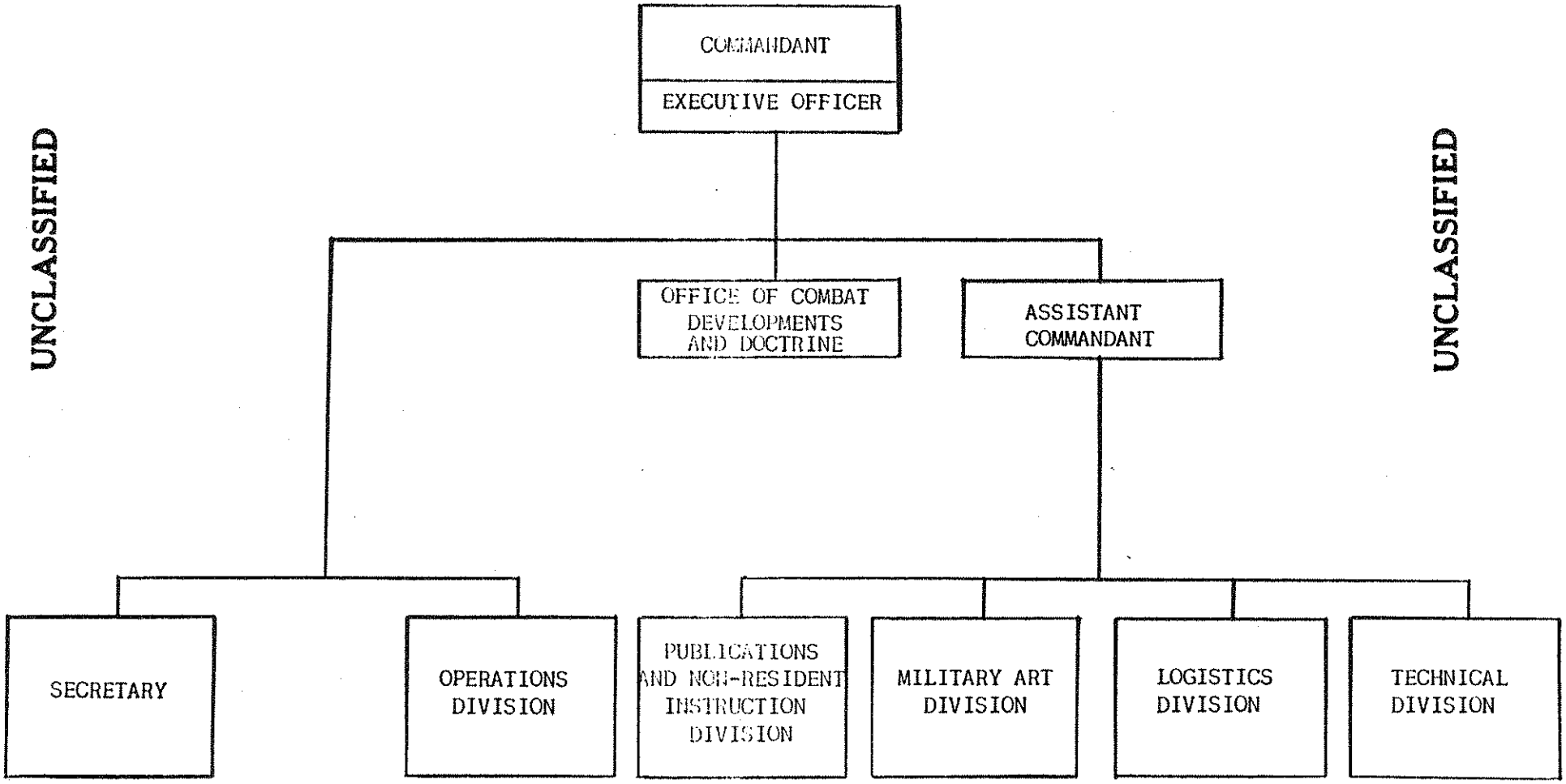
116 (1) Rosell-Gallier interv, 28 Jan 59. (2) Rpt of Test, Field Test of Tank/Armored Vehicle - Radiac Instrument System, CmlC TNGCOM, 27 Jan 58.

117 (1) Hq Ft McClellan GO 23, 26 Nov 57; GO 1, 20 Feb 58; GO 5, 3 Jun 58. (2) Statement, Maj Camille B. Swigert, CmlC TNGCOM, 29 Jan 59.

UNITED STATES ARMY CHEMICAL CORPS SCHOOL

Chart No. 6



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composed of senior NCO's, discussed areas where welfare and morale could be improved and made recommendations to the appropriate commanders. A measure aimed at increasing the prestige and esprit de corps of non-commissioned officers was the establishment in the 100th Chemical Group area of Bachelor NCO Quarters, which consisted of two buildings, each with a capacity of fifty. NCO's of Grade E-6 or higher who were assigned to the Training Command, the Chemical Corps School, post headquarters, and the Army hospital were eligible to occupy these quarters.[118]

(U) During the summer of 1958 elements of the 100th Chemical Group (COMZ) again contributed to the training program at Fort McClellan of National Guard and Army Reserve units. The 83d Chemical Battalion (Service) received this mission on 12 May 1958 and normal training activities for battalion headquarters and for the 501st Chemical Company (Depot) were suspended as of that date. Although two organic units of the battalion, the 22d Chemical Company (Combat Support) and the 317th Chemical Company (Processing) were excluded from this program, five other companies from the 100th Group were attached to the 83d for these support operations for different periods during the summer. Overall, these units expended a total of 12,558 man-days in the accomplishment of this mission.[119]

Chemical Corps School

(U) Although there was no major reorganization at the Chemical Corps

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118 (1) Newlander statement, 29 Jan 59. (2) Interv, Hist Off with Capt Oral L. Sewall, 100th Cml Gp, 29 Jan 59.

119 (1) Quart Hist Rpt, 83d Cml Bn, Apr - Jun 58. (2) Ltr, CO 83d Bn to CO 100th Gp, 2 Sep 58, sub: After Action Report.

School during FY 1958 there was one major addition to its organizational structure and there was time to survey the results of the comprehensive changes in organization which took place in FY 1957.[120]

(U) The major addition to the School organization was an Aviation Branch which was added to the Operations Division on 1 January 1958. Its authorized strength was eleven officers and twenty-three enlisted men, and its principal mission was the provision of instruction in air radiological survey methods. Filling the branch with pilots, crew chiefs, and mechanics experienced with all the varied types of allotted aircraft proved to be a slow process. These officers and men were usually proficient in one or two of the types of aircraft assigned to the branch but not in all of them. (Aircraft assigned included 3 light cargo heliocopters, 2 recon helicopters, 1 L20, and 1 L19). The Atlanta General Depot, Fort Benning, and the Army Aviation School supported the Chemical Corps School with maintenance and flying instruction.[121]

(U) How did the rather sweeping organizational changes of the previous year work out? One innovation called for the instructional divisions to prepare the initial drafts of the several types of training publications on the theory that those who teach doctrine are in the best position to write about it. These drafts then were put in proper form

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120 See Summary of Major Events and Problems, FY 57, pp. 73 - 75, for an account of the FY 1957 reorganization.

121 (1) Quart Hist Rpt, CmlC Sch, Jan - Mar 58. (2) Interv, Col Carl V. Burke, Cmdt CmlC Sch, 28 Jan 59. (3) Quart Hist Rpt, OACCmlO for P&D, Jan - Mar 58.

for publication by a staff of editors in the Publications and Non-Resident Instruction Division. The experience during FY 1958 with this system indicated that it would work out. The idea was good, and the instructional division produced excellent raw material. A factor which qualified its success was the overworking of instructor personnel, particularly that nucleus of experienced field grade officers whose review of almost all material was deemed essential.[122]

(U) One of the novelties of the FY 1957's reorganization was the elimination of branches within the instructional divisions. The chiefs of each of these divisions were given an overall mission; the use of personnel to accomplish this mission was left up to the individual chief. Although this system seemed to be working from the point of view of the Commandant, it encountered external opposition. The annual training inspection by OCCmlO of the Chemical Corps School, for example, resulted in a recommendation that the organization of instructional divisions be revised to reflect appropriate branches. Manpower surveys also objected to instructors performing administrative duties, a matter which would not have come up if branch chiefs had been designated. Consequently, by the end of the fiscal year branches in the instructional divisions were reinstated.[123]

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122 (1) Burke interv, 28 Jan 59. (2) Interv, Hist Off with Mr James D. Edwards, OACCmlO for P&D, 14 Jan 59.

123 (1) Burke interv, 28 Jan 59. (2) Ltr Rpt, Lt Col Arent O. Wiken, Sr Insp to CCmlO, 6 Mar 58, sub: Annual Training Inspection of the U.S. Army Chemical Corps School.

(U) Another feature of the previous reorganization was modified but without any detrimental results. Last year the Special Troops had been changed to the School Support Battalion, from a position parallel to the School in the overall structure to a place within the School organization. This change had been in line with the policy of having the School control those units which provided its support. During the current year the Chemical Corps School Support Battalion was reassigned to the Chemical Corps Training Command with attachment to the Chemical Corps School. While this moved placed the Support Battalion back in a position parallel with the School on the organizational chart, the attached status of the Battalion meant that the School would continue to supervise its activities.

(U) A final innovation, the creation of an Office of Combat Developments and Doctrine within the School structure remained unimplemented because of a lack of qualified personnel. As a stopgap measure to provide a focal point within the School for the consideration of doctrinal problems an AD Hoc Chemical Corps School Doctrine Committee was established. Its Executive Secretary was the Chief of the Writing Branch, Publications and Non-Resident Instruction Division, its chairman, the Assistant Commandant. The latter was a permanent member of the committee as were the chiefs of the instructional divisions. Meetings were to be held when need for the clarification of a doctrinal position arose.[124]

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124 Quart Hist Rpt, CmlC Sch, Oct - Dec 57.

(U) The fact that the Office of Combat Developments and Doctrine could not be manned with officers of appropriate rank and experience represented one aspect of a rather chronic personnel problem which has faced the Chemical Corps School for some time. Not only had the overall strength of the staff and faculty been declining, while the work had remained constant or had increased, but the rank and experience spectrum of the assigned officers was poor.[125] Quite possibly enough officers could have been spared for assignment to the Office of Combat Developments and Doctrine but these would have not been officers with the prime requirements for the job -- grade and experience. Poor grade distribution also affected the overall operations of the School. Junior officers in many cases did not have the background required of instructors.[126] The officers making the annual training inspection concluded that the assignment level in the rank of lieutenant colonel and major was "significantly" less than the authorized strength and recommended that this be corrected.[127]

(U) In contrast with problems of number and rank of officers assigned to the Chemical Corps School, there continued to be an improvement in the quality of personnel, a situation which in great measure

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125 Actually, the last quarter of FY 1958 showed a decided improvement in assigned officer strength at the School, although the increase was in the form of lieutenants. This was not the case for the first three quarters nor the quarter which followed (Quart Hist Rpts, CmlC Sch, 1958, 1959).

126 Newlander statement, 29 Jan 59.

127 Ltr Rpt, Annual Training Inspection.

resulted from the good offices of the Career Management Division, OCCmlO.[128]

(U) One new course was inaugurated during FY 1958 and plans were made for two more. In line with the recent emphasis on RW matters, a Radiological Safety Course was established on 19 March 1958, designed to train officers and civilians in the detection and control of hazards associated with the use and handling of radioactive materials or with nuclear detonations. Two classes of the two-week course were held before the end of the fiscal year.[129]

(U) One new course approved but not conducted in FY 1958 was the Radiological Warfare Orientation Course, a one-week course designed for senior Chemical Corps officers and civilians.[130] Another one, which the Chief Chemical Officer on 13 June 1958 recommended that USCONARC approve was entitled "Nuclear Weapons Effects Officer Course." At the same time he forwarded for approval a draft program of instruction. The twelve-week course would train officers of all arms and services to perform staff functions associated with the operational aspects of nuclear warfare, including offensive employment and defensive measures. Officers completing this course would be given the MOS 7330, Nuclear Effects Officer, formerly awarded only to graduates of the Navy's

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128 Burke interv, 28 Jan 59.

129 (1) Quart Hist Rpt, OACCmlO for P&D, Apr - Jun 58. (2) Quart Rev, Jan - Mar 58, p. 16.

130 Quart Hist Rpt, OACCmlO for P&D, Apr - Jun 58.

two-year course at Monterey or to officers having equivalent academic and/or practical experience. To differentiate between the two applications of the Nuclear Effects Officer MOS, prefix 4, signifying competence in research and development, was added to the MOS of those graduating from Monterey or otherwise meeting the R&D requirements.[131]

(U) Another action regarding prefixes should be mentioned. In January 1958 the Commandant, Chemical Corps School, received permission to grant prefix 5, indicating nuclear weapons training, to graduates of the Chemical Officer Advanced Course and to those of the Atomic Defense Course. This action partly stemmed from a USCONARC directive requiring a greater number of officers with this competence on the staffs of division, corps, armies, and logistical commands.[132]

(U) The enrollment of students at the Chemical Corps School dropped from a total of 2,549 in FY 1957 to 2,299 in 1958. This represented 96.5 percent of the revised figure of input and was considerably lower than the number scheduled at the beginning of the fiscal year, 2,870. The drop in enrollment was caused by undersubscription of several officer and enlisted classes, factors largely under the control of TAG and CG USCONARC.[133]

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131 (1) Quart Rev, Apr - Jun 58, p. 18. (2) Quart Hist Rpt, OACCmlO for P&D, Apr -Jun 58. (3) Burke interv, 28 Jan 59. (4) Edwards interv, 14 Jan 59. (5) Cerar-Sills interv, 12 Feb 59.

132 (1) Quart Rev, Jan - Mar 58, p. 16. (2) Cerar-Sills interv, 12 Feb 59. (3) Memo, OCCmlO, 15 Jan 58. (4) USCONARC Memo 19, 23 Jul 57.

133 Quart Revs, Jul - Sep 57, p. 23; Oct - Dec 57, p. 24; Jan - Mar 58, p. 16; Apr - Jun 58, p. 18.

CBR Orientation Course

(U) On 17 June 1958 the Vice Chief of Staff, U.S. Army, approved the establishment by the Chemical Corps of a high level course to orient senior commanders and key staff officers on the capabilities of chemical and biological warfare. This represented the fruit of several years planning by the Chief Chemical Officer,[134] who thought that any "indifference" to CBR on the part of these senior officers resulted primarily from a "lack of understanding and knowledge." General Creasy felt the CBR Orientation Course would be a vehicle to overcome this lack of understanding and knowledge.[135] The course would be taught at the newly organized U.S. Army Chemical Corps CBR Weapons School located at Dugway Proving Ground. The first class was scheduled for the first quarter of FY 1960.[136]

Pulications

(U) For several years adjustments had been made in the Chemical Corps training literature program in an attempt to co-ordinate the publication of manuals with the programs which produced the basic data from which the manuals were prepared. In FY 1956 a two-year literature program was adopted in the hope of achieving the necessary correlation.

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134 See Summary of Major Events and Problems, FY 56, p. 108, FY 57, p. 79.

135 Biennial Rpt, Maj Gen Creasy.

136 (1) Quart Hist Rpt, OACCmlO for P&D, Apr - Jun 58. (2) Edwards interv, 14 Jan 59.

Experience proved that even this was an insufficient time.[137] During FY 1958 both the publication program and the Combat Developments Program were extended to five years. As explained above, the synchronization of the programs of these interdependent activities was expected to be mutually beneficial.[138]

(U) As a matter of fact, the accomplishments in the production of training literature in FY 1958 were considerable, nontheless. Four of the seven field manuals programmed for the year were completed, although not all were printed and distributed. These were: FM 3-5, Tactics and Techniques of CBR Warfare; FM 21-40, Small Unit Procedures in Atomic, Biological and Chemical Warfare; FM 21-41, Soldiers Manual for Nuclear, Biological and Chemical Warfare; FM 3-130, U.S. Army Chemical, Biological and Radiological Warfare (CBR) Intelligence. Of the others, one was suspended, one was changed to a training circular, and the third, FM 3-50, Chemical Smoke Generator Battalion and Chemical Smoke Generator Company, was carried over to the following year.

(U) Three of the four scheduled technical manuals were completed during the year -- TM 3-225, Radiological Survey of Field Military Installations; TM 3-200, Capabilities of Employment of Toxic Chemicals; and TM 3-366, Fire Bomb and Flame Thrower Fuels. The fourth was suspended.

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137 Summary of Major Events and Problems, FY 57, p. 80.

138 See above, pp. 39, 41.

(U) Outstanding progress was made with training films. Thirteen were programmed for FY 1958 and during the course of the year seven more were converted from film strips. Of this total of twenty, eighteen were completed, reviewed, and approved for distribution, while the other two were in their final phase of completion. All programmed graphic training aids were finished except the one for the E13 protective mask which remained unfinished because of the status of development of that item.

(U) The Chemical Corps School prepared an ROTC brochure entitled "Chemical Corps Careers in the U.S. Army." Approved by DCSLOG, published in June 1958 by TAG, and distributed to all colleges and universities having an ROTC program, this brochure was aimed at arousing the interest of cadets in a career with the Chemical Corps.[139]

Field, Command Post, and Logistical Exercises

(FOUO) During FY 1958 three exercises, one field, one command post and one logistical, proved to be of particular interest to the Chemical Corps. The first was Exercise INDIAN RIVER held at the Yakimo Firing Center, Wash., in May 1958; the second was Exercise CUMBERLAND HILLS, which took place at Fort Bragg, N.C., during the last week in May; and the last was the annual logistical exercise LOGEX 58, held as usual in May at Fort Lee, Va.

(FOUO) The first two exercises included tests of a new organization,

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139
(1) Quart Rev, Apr - Jun 58, p. 18. (2) Interv, Hist Off with Mr J. P. Coyle, OACCmlO for P&D, 14 Jan 59. (3) Aylesworth-Trathen interv, 28 Jan 59. (4) Quart Hist Rpt, OACCmlO for P&D, Apr - Jun 58.

the Radiological Center (RADC). Developed jointly by the U.S. Army Field Requirements Agency and the U.S. Army Chemical Corps School, the Radiological Center had as its mission the prediction, survey, computation, plotting, and dissemination of fallout information from enemy nuclear weapons.[140] USCONARC directed that Exercise INDIAN RIVER, primarily a maneuver for the 4th Infantry Division, include a troop test of the radiological monitoring and survey capabilities of the pentomic infantry division (ROCID). The Chemical Corps Field Requirements Agency prepared the troop test plan.[141]

(U) Specific test objectives were (1) the determination of ROCID capability to obtain, process, and disseminate fallout data using the authorized radiac instruments and communication equipment, (2) the determination of the adequacy of current doctrine on radiological matters, (3) the determination of the radiological survey support to ROCID of the chemical platoon, combat support, and (4) an evaluation of the radiation survey training set 48E1a in field exercises.[142]

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140 (1) See above p. 47 for more on the origins of the Rad Center. (2) Quart Hist Rpt, CmlC Sch, Apr - Jun 58.

141 This plan (Project CMLFR 56) published on 20 December 1957 and approved by USCONARC on 10 January 1958 appears as Annex B of Final Report, Troop Test Radiological Monitoring and Survey Capabilities of ROCID, Exercise INDIAN RIVER, May 1958.

142 (1) Final Report, Troop Test Radiological Monitoring and Survey Capabilities of ROCID, Exercise INDIAN RIVER, May 1958, p. 1. (2) The 48E1a, developed by the Navy, consisted of a radio transmitter and ten small transistorized radio receivers which simulated radiac instruments. It was the only safe, realistic device for introducing atomic defense training into field exercises without involving actual radiation (Quart Hist Rpt, CmlC Sch, Apr - Jun 58).

(FOUO) Among the conclusions resulting from the test were (1) the division radiological center was capable of handling fallout prediction for both friendly and enemy nuclear weapons, (2) no basic flaws were revealed in the organization and concept of operation of the combat support platoon, although it did not get enough utilization to thoroughly evaluate its capabilities, and (3) the radiological survey training set worked well with certain limitations. Recommendations included (1) the revision of the appropriate training circular to include information on multiple yield fallout prediction, (2) the revision of doctrine to place on the RADC responsibility for fallout prediction for friendly as well as enemy nuclear weapons, and (3) the provision of radio communication for the RADC.[143]

(FOUO) The CUMBERLAND HILLS CPX had as a secondary mission the testing of the radiological centers of the three participating infantry divisions. A report submitted by the eight Chemical Corps officers at the exercise stressed the difference in preparedness, training, and composition of the divisional RADCs, the 1st having one which was well equipped and well trained, the 101st having one which was well equipped but poorly trained, and the 82d having virtually no RADC at all.[144]

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143 Final Report, Troop Test Radiological Monitoring and Survey Capabilities of ROCID, Exercise INDIAN RIVER, May 1958, pp. 8 - 10.

144 Report on Radiological Center Operations in Exercise CUMBERLAND HILLS, Fort Bragg, N.C., 25 May - 31 May 1958, p. 2.

Some of the conclusions of the unofficial report advocated a radiological center with a full complement of well trained personnel and one which was completely mobile, completely equipped with communication facilities, and, ideally, equipped with its own aircraft. The Chemical Corps observers felt that at this particular exercise the command personnel were not properly oriented on the purpose and responsibilities of the radiological center.[145]

(FOUO) Eighty Chemical Corps officers, including the members of the Advanced Class, participated in LOGEX 58, held 12 - 17 May, either as players or umpires. In addition, ten Corps officers were present as observers. Pre-exercise preparation for Chemical Corps Advanced Class students took the form of CHEMEX, a forty-hour period of special classes presented by the Chemical Corps School.

(FOUO) The objectives of LOGEX 58 were (1) practical application by students of instruction received at service schools, (2) training of certain Reserve officers, (3) stress of the importance of maintaining continuous logistical support under assumed combat conditions and against an enemy with mass destruction weapons, and (4) emphasis of inter-technical service team play and the need for interservice co-operation of Army, Navy, and Air Force for the fulfillment of the logistics mission in the theater of operations.[146]

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145 Ibid., pp. 20 - 21.

146 Report of the Maneuver Director, LOGEX 58.

(FOUO) The total number of personnel involved in LOGEX 58 was 5,793, 10 percent of whom were observers. Doubtless, this was the reason for a conclusion in the Chemical Corps final report concerning the interruption of student play by the excessive number of visitors in the area. The Chemical Corps also concluded that LOGEX 58 attained its stated objectives and proved an excellent vehicle for all participants -- players, umpires, Reserve officers on active duty for training, and enlisted men. It felt that the exercise did not provide for the realistic play of radiological contamination and that a radiological center in the major commands would have resulted in more realistic atomic play. As far as chemical warfare was concerned, the only large scale attack of this nature took place during the last day, a circumstance of timing which reduced the full impact of CW on the overall operations.[147]

Intelligence

(U) On 21 March 1958 the Chemical Corps Intelligence Agency (CCIA) moved from Building T-7 to Arlington Hall Station, the home of the Army Security Agency (ASA) and the intelligence agencies of several other technical services.[148] There it acquired similar facilities but

147 Final Report LOGEX 58, incl to ltr, Comdt, CmlC Sch to Maneuver Director LOGEX 58, 29 May 58.

148 This section on intelligence activities is based upon the following: (1) Interv, Hist Off with Maj Winifred H. Tindal, CCIA, 15 Jan 59. (2) Interv, Hist Off with Capt Frank C. Meine, CCIA, 15 Jan 59. (3) Quart Hist Rpts, CCIA, FY 58. (4) Quart Revs, Class Sups, FY 58.

of increased capacity. The CCIA underwent a few organizational changes during the year which were designed to improve efficiency and tighten security. The Adjutant was placed in charge of the Administrative Division, and the former Chief, Administrative Division, in a position directly under the Deputy Commander, was made responsible for all budget, fiscal, and programming activities. The Document Library Branch was moved from the Administrative Division to the Collection and Operation Division, whose Chief was made Security Officer for the entire Agency. As the year ended plans were underway for a major reorganization early in FY 1959.

(U) Throughout the year this Agency had a civilian strength very close to its authorized number of forty. The shortage in its military strength lay primarily in the enlisted area. In May 1958 the Chief Chemical Officer delegated most civilian personnel responsibilities to the Chief, CCIA, who in turn delegated them to the commanding officer ASA. The consolidation of these civilian personnel responsibilities at Arlington Hall was proving to be extremely satisfactory.

(U) FY 1957 had seen the establishment at Fort Detrick of a Technical Intelligence Office, CCIA, and in the year under discussion a like organization was activated at the Army Chemical Center. The latter took over the facilities of the 42d Chemical Laboratory which was inactivated in June 1958. The function of these organizations was the integration of intelligence activities with other activities of the Chemical Corps. The Office at Army Chemical Center assumed the

responsibilities of the former 42d Laboratory in the evaluation of foreign equipment and materiel.

(C) During the year the 51st and the 52d Chemical Detachments (TI) were inactivated and the fate of the 503d Chemical Detachment (TI) in Camp Zama, Japan, was in doubt as the year ended.

(S) Collection activity during the year included the completion of the program sponsored by the Assistant Chief of Staff, Intelligence (ACSI), and the CIA for the interrogation of Hungarian refugees.[149] CCIA personnel interviewed nine of these people who had some experience with industrial or military chemical activities. The resulting information, some new and some confirmatory, included: (1) that Hungary was actively interested in offensive CW, especially mustard, (2) that it could not sustain chemical warfare without Soviet assistance, and (3) that the USSR and its satellites would initiate CW and RW if they felt the conditions warranted it.

(S) The Canadian Joint Intelligence Bureau asked the CCIA to participate in the interrogation of an escaped Polish Major who had had experience with the chemical branch of his country's armed forces. Not only did the interrogation result in some valuable information, but it was an indication of the good rapport that exists between this country and the Dominion of Canada.

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149 Summary of Major Events and Problems, FY 57, p. 86.

(C) An exchange of protective masks was arranged with Switzerland. Three U.S. M9A1 masks were sent to that country in return for three Swiss masks. The latter were tested by the Technical Intelligence Office at Army Chemical Center and the results sent to Chemical Corps agencies and to the Swiss government.

(S) The CCIA continued to improve techniques for the collection of information. Chemical Corps delegates to the 12th Tripartite Conference held in September in England were briefed on the subject, and CCIA provided increased guidance to collectors in the field.

(U) The year saw a number of changes in intelligence publications. A consolidated Combat Equipment Technical Intelligence Bulletin, in which the Chemical Corps was allocated almost 100 pages, replaced DA Pamphlet 30-12-1, Foreign Military Weapons and Equipment Reference Handbook, first published in 1955. The Army eliminated four types of publications -- Intelligence Collection Guide, Specific Request for Information, Intelligence Collection Memo, and Summary of Current Needs -- and replaced them generally with four others -- DA Long Range Intelligence Needs, DA Short Range Intelligence Needs, DA Consolidated Statement of Intelligence Requirements, and DA Technical and Scientific Intelligence Guide.

(S) Among the important CBR Intelligence Studies produced by CCIA were "Soviet Development and Production of G and V Agents," which concluded that the USSR had a 6 or 7 year lead over the United States in the former agent and 4 in the latter; "Economic Import to Crop and Animal Losses"; and "Role of the Soviet Chemical Service in Support of Nuclear Warfare." Other studies appeared on all known Soviet Bloc chemical unit

RESEARCH, DEVELOPMENT AND ENGINEERING

Administration

(U) Research and Development activities in the Chemical Corps were carried on by the Research and Development Command (RDCOM) and by the Engineering Command (ENCOM) (Charts 7 and 8). At the end of September the command of RDCOM changed hands when Brig. Gen. Jacquard H. Rothschild left the Army to accept a professorship of chemical engineering at the University of Colorado, and was succeeded by Col. Graydon C. Essman.

(U) In the spring of 1958 Colonel Essman carried out a reorganization within the headquarters of RDCOM by combining the Process Development Division and the Products Development Division into a Development Division, as shown in Chart 9.[150]

(U) At Dugway Proving Ground Col. David Armitage carried out a reorganization at the end of 1958. This was done to economize on operations, and to conform to the latest testing requirements. Colonel Armitage divided the Proving Ground's activities into two phases; support and technical. Under the Director of Technical Operations he placed 4 divisions - chemical warfare, technical services, biological warfare, radiological operations. Under the Director of Post Operations he placed all the supporting activities,

150
Hq RDCOM GO 1, 3 Apr 58. (2) Interv, Hist Off with Mr William F. Hodgkinson, 3 Mar 59.

UNCLASSIFIED

U.S. ARMY CHEMICAL CORPS RESEARCH AND DEVELOPMENT COMMAND

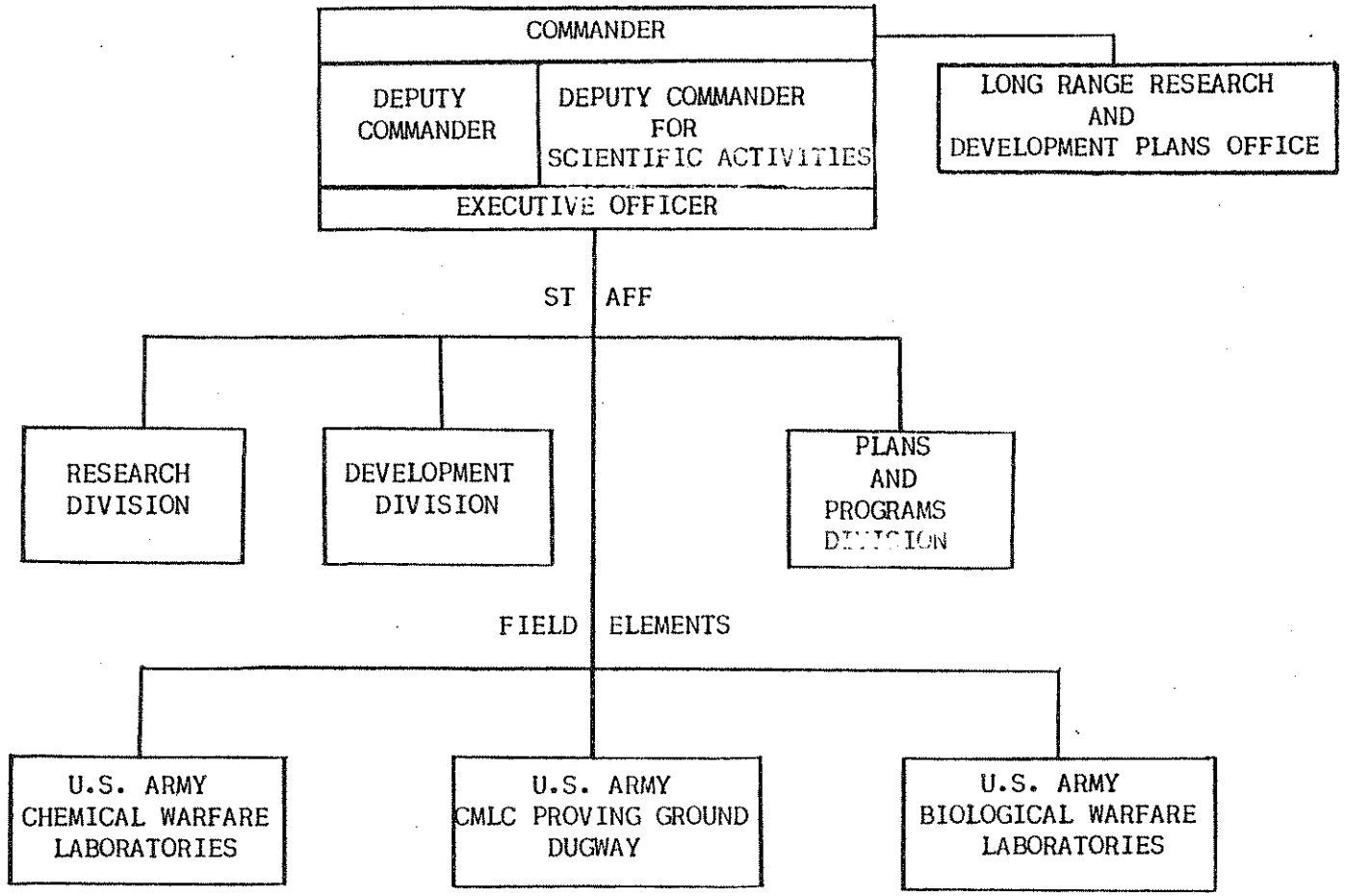
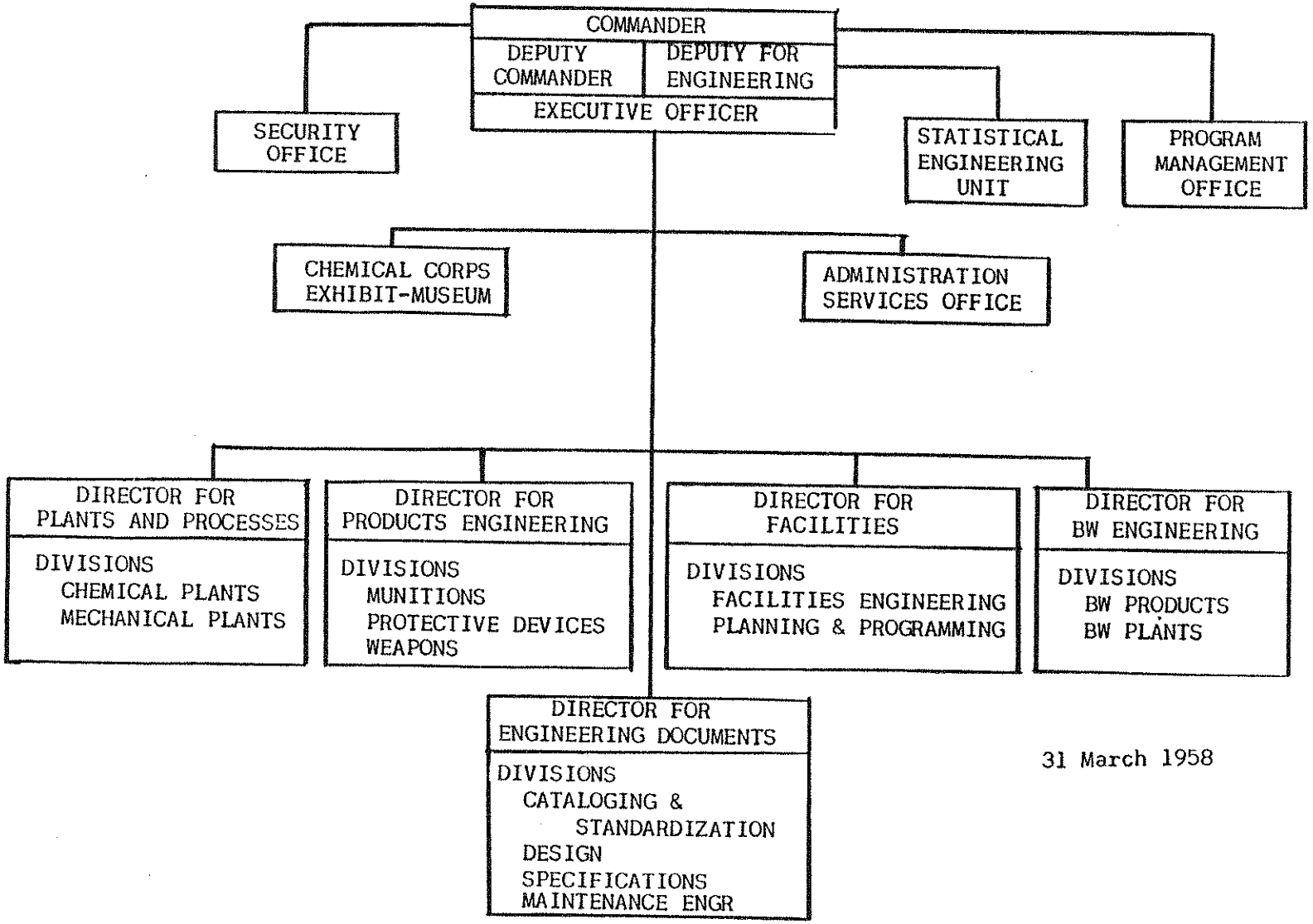


Chart No. 7

UNCLASSIFIED

U.S. ARMY

CHEMICAL CORPS ENGINEERING COMMAND



31 March 1958

Chart No. 8

UNCLASSIFIED

UNCLASSIFIED

HEADQUARTERS, U.S. ARMY CHEMICAL CORPS

RESEARCH AND DEVELOPMENT COMMAND

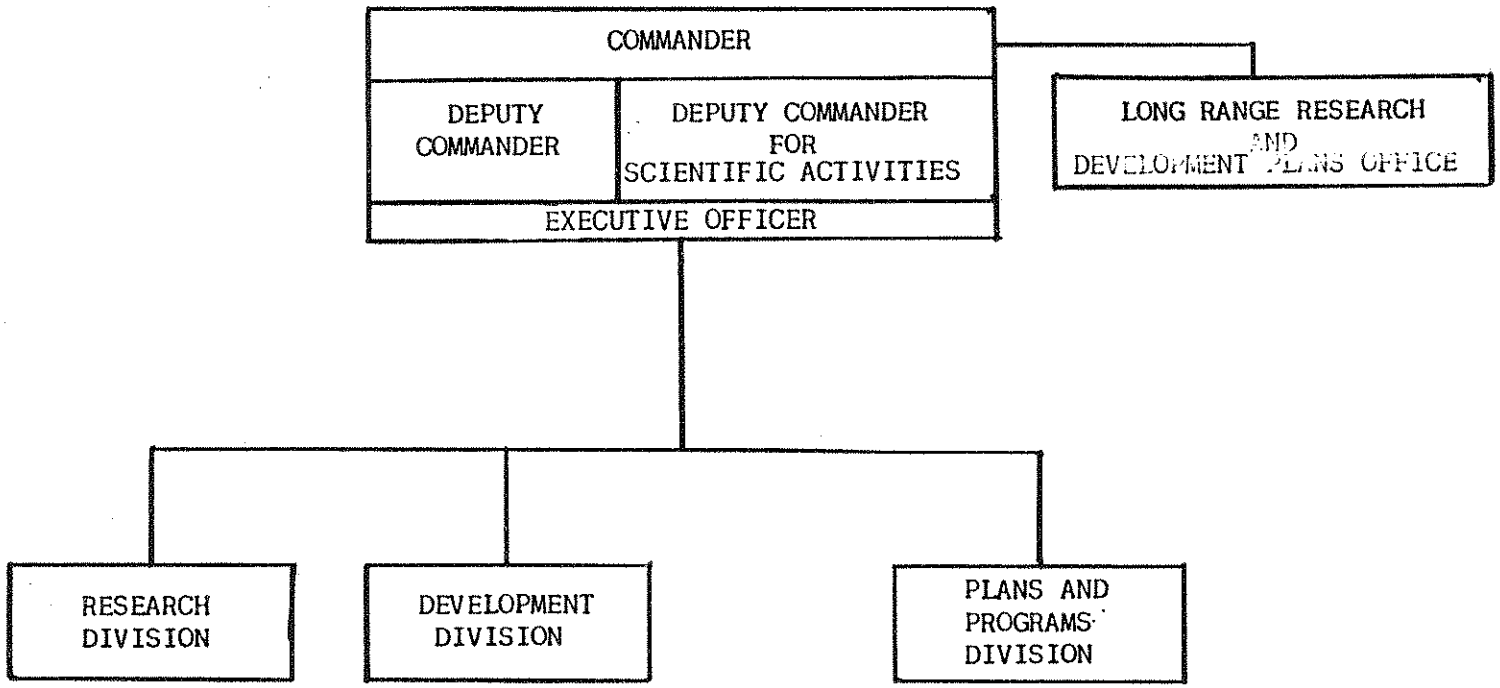


Chart No. 9

UNCLASSIFIED

U.S. ARMY CHEMICAL CORPS RESEARCH AND DEVELOPMENT COMMAND

U.S. ARMY CHEMICAL CORPS PROVING GROUND

DUGWAY PROVING GROUND

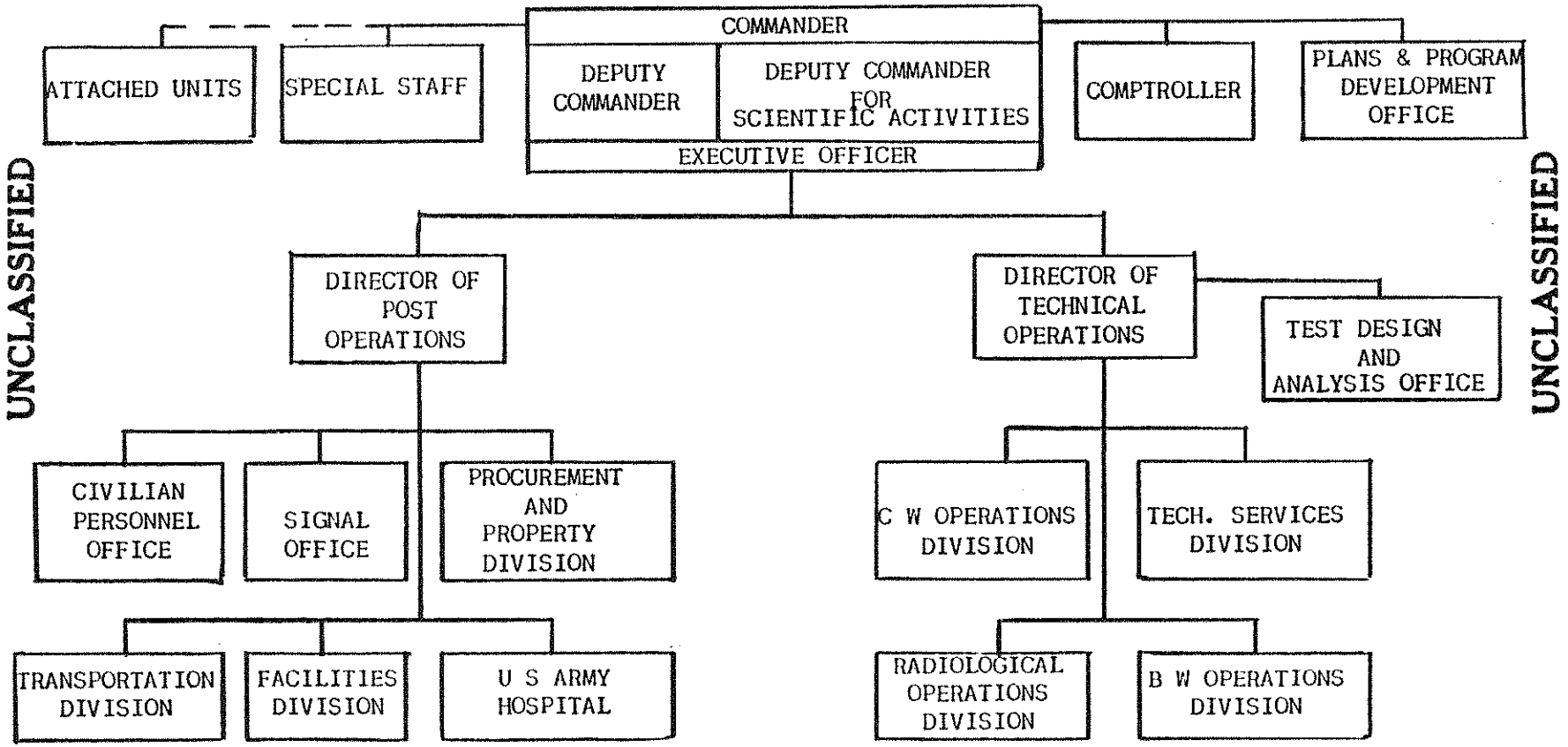


Chart No. 10

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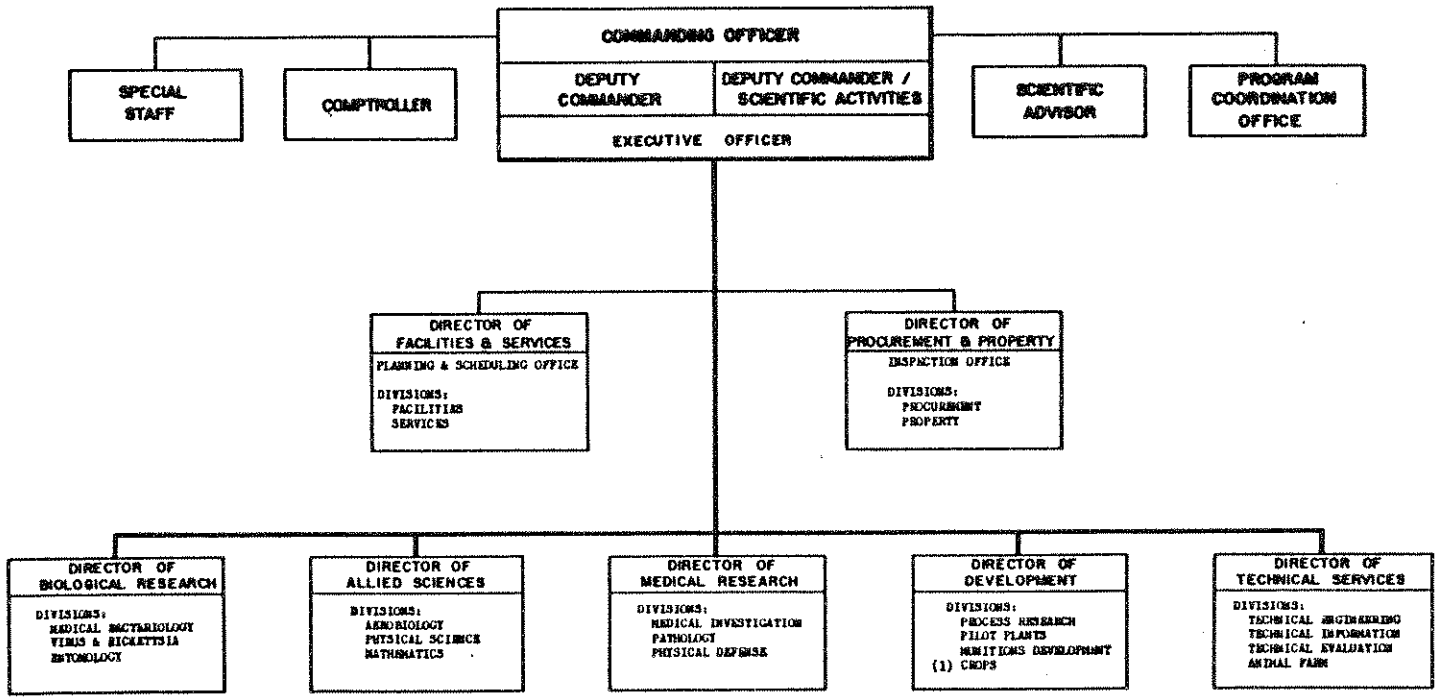
U.S. ARMY CHEMICAL CORPS RESEARCH AND DEVELOPMENT COMMAND

U.S. ARMY BIOLOGICAL WARFARE LABORATORIES

FORT DETRICK

Chart No. 11



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SUBMITTED:
O. G. HAUGHAUS
COLONEL, OnlC
COMMANDING

APPROVED:
GRAYDON C. ENSMAN
COLONEL, OnlC
COMMANDING, CMLCRDCOM

DATE: 1 February 1950

as shown in Chart 10.[151]

(U) At Fort Detrick Col. Donald G. Grothaus assumed command of the U.S. Army Biological Warfare Laboratories on 5 August 1957. Before coming to Fort Detrick Colonel Grothaus had been the Commanding Officer of Rocky Mountain Arsenal, Denver, Colorado. Col. John J. Hayes, who had commanded Fort Detrick since 3 October 1953 went to the Army War College at Carlisle Barracks, Pennsylvania.

(C) On 1 February 1958, Colonel Grothaus realigned the organization of the Biological Laboratories. (Chart 11). This was necessary because of the decrease in the amount of money made available for biological warfare research and development, because of the phasing out of anticrop research and development, and because of a reduction in force of more than 200 civilian employees. The major changes resulted in (1) the separation of the research portion of the program into three major organizational elements: Medical, Biological, and Allied Sciences; and (2) the grouping together of technical service elements under one directorate, which included a new central engineering organization. The changes clarified and defined more precisely the organizational missions, and led to increased co-ordination between the various elements of the Laboratories.

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151 (1) Quart Hist Rpt, Dugway Proving Ground, Oct - Dec 57. (2) Hodgkinson interv, 3 Mar 59.

(U) During the fiscal year the Engineering Command increased its responsibilities by the acquisition of the U.S. Army Chemical Corps Museum. On 29 March 1958 the Chief Chemical Officer merged the Museum, located at Army Chemical Center, Maryland, with the U.S. Army Chemical Corps Exhibit and assigned the new unit to the Engineering Command. Col. William J. Allen, Jr., appointed Maj. Samuel V. Cox director of the unit and the Chemical Warfare Laboratories transferred the museum curator and his assistants, who had been on the CWL payroll, to the unit.[152]

(U) The Mission of the U.S. Army Chemical Corps Exhibit - Museum was the following:

a. Maintain and operate a Museum for exhibit and display of various devices and models of domestic and foreign products of Chemical Warfare, both of defensive and offensive nature.

b. Maintain and display upon request a traveling exhibit of specially designed panels and items of Chemical Corps materiel that relate to the Corps' role in the Department of Defense (DOD) and in support of Civil Defense.[153]

(U) Another change in the organizational structure of ENCOM took place during the year as Colonel Allen reorganized the Directorate of Engineering Documents, establishing Maintenance Engineering as a separate division and

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152 (1) OCCmlO GO 11, 19 Mar 58. (2) USA CmlC ENCOM GO 4, 29 Mar 59. (3) See above p. 29 for more about Exhibit.

153 Annual History, USA Chemical Corps Exhibit-Museum Unit, 31 Dec 58, p. 1.

thereby increasing the efficiency of the Directorate. At the end of the period under review, the Engineering Command was organized along the lines shown in Chart 8.[154]

(U) On 24 June 1958 Colonel Allen left the Engineering Command to take command of Rocky Mountain Arsenal, Denver, Colorado. Col. Roy W. Muth, who had been chemical officer, USCONARC, Fort Monroe, became the new Commanding Officer of ENCOM.

(U) The funds allocated for research and development as of 30 June 1958 were $35,867,000, approximately 33 percent of the Corps' obligations, and a decrease from the $38,065,000 obligated by the end of FY 1958. This decrease in funds continued a trend that had been going on for several years. It has been of considerable concern to the Chief Chemical Officer and all those engaged in the scientific activities of the Corps because the combination of inflation and smaller appropriations has meant a real cut in the money available for technical work.[155]

154
Interv, Hist Off with Mr Charles J. Helmer, Prog Mgmt ENCOM, 26 Feb 59.

155
(1) Summary of Major Events and Problems, FY 57, p. 88. (2) Quart Rev, Apr - Jun 58, p. 90. (3) Presentation by Dr Per K. Frolich, Meeting of the U.S. Army Chemical Corps Advisory Council, 5 - 6 Dec 57, p. 9.

(U) The research and development funds received from other agencies were as follows:

Source	Amount as of 30 June 1957 [156]	Amount as of 30 June 1958 [157]
Navy	$1,064,904	$634,754
Air Force	1,066,778	297,670
Ordnance	333,147	14,500
Surgeon General	405,204	150,000
Quartermaster	122,735	175,000
Armed Forces Special Weapons Project	289,616	249,016
Walter Reed	---------	104,399
Corps of Engineers	---------	27,000
Working Funds	---------	791,971

(C) At the start of FY 1958 the Corps was conducting its research and development program through 38 projects in the CW-RW area, 21 in the BW area, and 3 in the testing area. In order to keep the project program in agreement with the Department of the Army program, the Research and Development Command realigned the program in November, 1957, decreasing the number of projects in the CW-RW area from 38 to 19. In January 1958, the Command decreased the number of BW projects from 21 to 16, the action

156 CCTC Item 3323.

157 CCTC Item 3422.

to take effect at the beginning of the next fiscal year.[158]

Ad Hoc Committee on Assessment

(FOUO) On 25 June 1957 General Creasy established an Ad Hoc Committee on Assessment to evaluate the Chemical Corps' assessment and testing programs and to recommend improvements in these fields. Two important reasons for the establishment of this committee were the high cost of tests, particularly in the face of the decreasing research and development funds available to the Corps, and the feeling that the Corps might not be getting the maximum amount of information from its tests.

(FOUO) General Creasy appointed Col. Fred W. Ludecke, Chemical Corps Board, chairman of the Committee. On the Committee with Colonel Ludecke were representatives of the Engineering Command, Proving Ground, Materiel Command, Chemical Warfare Laboratories, Chemical Corps Board, Biological Warfare Laboratories, and Operations Research Group.

(FOUO) The Committee began its task by ascertaining the views of Dr. Per K. Frolich, Deputy Chief Chemical Officer for Scientific Activities (DCCm1O/SA). It then went on to study all documents relating to Chemical Corps tests in order to learn what agencies were involved and how tests fitted into the agencies' programs. The Committee next interviewed executives in those agencies to find the problems involved in testing and to obtain suggestions for solving the problems.

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158 (1) CCTC Item 3388. (2) CCTC Item 3402.

[redacted]

(FOUO) From all this information the group sought to develop simple, practical measures for improving the assessment program, without disrupting morale, projects, or organizations. Its report took the form of a series of conclusions, refined by sufficient discussion to prevent misunderstanding, and followed by recommendations and suggestions.

(FOUO) On 19 June 58 General Creasy distributed the report and directed his commanders to implement it. By following the recommendations of the Committee, the Corps hoped to improve its ability to define and to meet objectives and to provide greater responsiveness from the assessment program.[159]

Technical Operations

V-Agents[160]

(C) During the year the Corps standardized a new toxic agent, VX. The history of the V-type agents goes back several years, when chemists at Imperial Chemicals, Ltd., searching for new insecticides, came across compounds that were extremely toxic to humans. The discovery of V-agents by industrial chemists working with insecticides is reminiscent of the discovery of the G-agents in the same manner in 1936. Imperial Chemicals sent samples

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159 (1) Assessment and Related Problems. A Report to the Chief Chemical Officer, US Army, by the Ad Hoc Committee on Assessment, 1 Apr 58. (2) Ltr, CCmlO to Distribution, 19 Jun 58, sub: Report of Ad Hoc Committee on Assessment.

160 This section is based on the following: (1) CCTC Item 3386, Classification of Persistent Agent, VX, as a Standard Type, 12 Dec 57. (2) Meeting of the Engineering and Production Committee, USA CmlC Advisory Council, 26 - 27 May 58, pp. 74 - 83.

treatment consists of artificial respiration and injection of atropine.

(S) Chemists devised several possible ways of preparing the agent. The method adopted by the Corps starts with a reaction between phosphorus trichloride and methane to form methyldichlorophosphine. The latter is reacted with ethyl alcohol to produce diethylmethylphosphonite. The reaction between the latter and diisopropylaminoethanol produces a compound commonly called the transester. In the final step the transester and sulfur are heated to form VX.

(S) In the first stage of production the Chemical Warfare Laboratories constructed a pilot plant capable of turning out 20 pounds of VX on an eight hour shift. This operation provided data for a larger pilot plant, funded in part by Industrial Preparedness Measure, having a capacity of 250 pounds a day. On the basis of data from the pilot plants plans were drawn up for the full-scale plant to be constructed and operated by an industrial firm and having a capacity of ten tons per day. The Corps hopes to have the V-plant in operation in 1960.

(S) Looking forward to the date when VX would be available in quantity, the Corps decided on the disseminating devices that would be employed with the agent. Plans called for the use of VX in the following munitions: the 155-mm. shell containing about 6 pounds of VX and covering 3,500 square meters from an airburst at an altitude of 50 feet; the 8-inch howitzer shell carrying 12 pounds of VX and covering 9,000 - 13,000 square meters from an airburst 50 feet in the air; the E5 land mine holding 12 pounds of VX; the T238 rocket; the HONEST JOHN and LITTLEJOHN rockets; the

SERGEANT missile; and aircraft spray tanks.

(C) Chemical Corps scientists believe that when sufficient stocks of VX are on hand the Corps will be capable of employing a new, quick-acting, persistent agent. The reign of mustard gas, which has been called the King of Battle gases since it was first used in July 1917, will probably come to an end.

K-Agents[161]

(C) In contrast to the lethal V-agents are the harmless, incapacitating K-agents. These are compounds that affect a person's mind temporarily, causing him to have hallucinations, to be depressed or stimulated, to lose partial control of his senses or muscles, or to behave abnormally in other ways.

(S) For seven years the Corps has been studying K-agents. Attention has centered on three classes of compounds: lysergic acid and its derivatives, tetrahydrocannabinol derivatives (marijuana-type compounds), and mescaline and its derivatives. In 1956 the Department of the Army approved a Corps plan to ascertain the effects of K-agents on human volunteers. Several experiments have been conducted using a derivative of lysergic acid. One of the most interesting investigations was carried out to see if the drug

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161 This section is based on the following: (1) CmlC Consolidated R&D Annual Report, 31 Dec 57, Project 4-08-03-016-07. (2) Presentation by Dr Van M. Sims, Meeting of the Agents Committee, USA CmlC Advisory Council, 12 - 13 May 58, pp. 80 - 87.

would affect a squad of men who were undergoing routine training. First the squad was given the drug. The leader, however, did not receive the compound. The men paid little attention to their leader's commands. Their motions were slow, they were quite happy and unconcerned with the leader's attempt to drill them. In the second experiment the squad leader as well as the men received the drug. When an officer told the leader to drill the men he refused and told the officer to do it himself. The entire group laughed and joked. When the officer told the squad leader to leave the field, he refused and had to be escorted away.

(C) It seems possible that the K-agents, if brought to the point of military usefulness, could be valuable in softening enemy troops, causing them to lose their morale and judgment, putting them in an euphoristic state where they have no interest in warfare, making them halt any offensive action, and prevent them from resisting attack and capture. Possibly entire enemy positions or forces could be subjected to the K-agents and captured without resistance or casualties.

Kharasch Program

(U) The death of Professor Morris S. Kharasch, University of Chicago, in October 1957 dislocated temporarily the Kharasch Program, under which academic chemists collaborated with the Chemical Corps.[162] Professor Kharasch

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162 "Morris Selig Kharasch, 1895 - 1957," Proceedings of the Chemical Society (Dec 1958), pp. 361 - 62.

had suggested this program for two reasons: to enhance the Corps chemical warfare potential by means of outside research, and to increase the number of American scientists who would be aware of the Corps' program and who therefore would be prepared to be assigned to the Corps in case of national emergency.

(C) Under the Kharasch program the Corps has signed a contract with the University of Chicago, under which Dr. Kharasch had been appointed principal investigator. Dr. Kharasch, in turn, prepared and monitored a number of subcontracts with university researchers. During 1958 there were 7 contracts. Each contractor works on a long-range project of his own choosing, unrestricted in any way except that it had to be of interest to the Corps. Dr. Charles G. Overberger, Polytechnic Institute of Brooklyn, was trying to make synthetic polymers with functional groups that would react with toxic agents. Dr. William J. Bailey of the University of Maryland was working on high molecular weight polymers. Dr. Sidney Winehouse, Lankenau Hospital Research Institute, was trying to obtain basic information on brain metabolism. Dr. John A. Hinckley, of John A. Hinckley & Associates, was conducting research on photography of fast moving aerosol particles. Dr. Peter A. S. Smith, of the University of Michigan, was investigating isocyanides. Dr. Heller, at the New England Institute for Medical Research, was working on botulinum toxin, to find the relation between the physical chemical properties and the biological activity. Dr. Kopple, at the University of Chicago, was studying mechanism of very fast reactions to improve the Chemical Corps detection procedures.

(U) With the death of Dr. Kharasch the program no longer had a principal investigator. The University of Chicago tried to make a replacement, but those men who were desirable because of their stature would not accept the responsibility of administering the contract, supervising the contractors, evaluating results in terms of benefits to the Corps, and recommending any changes needed in the program. The University finally decided to drop the contract after the expiration date. This left the Corps with two problems: finding someone to administer the program, and finding someone to take Dr. Kharasch's place as supervisor. At the end of the fiscal year the feeling was that both the administration and technical supervision would be carried on by the Chemical Warfare Laboratories with the same subcontractors continuing their work.[163]

Toxic Agents[164]

(C) In addition to the research mentioned above under V-agents, K-agents, and the Kharasch program, the Chemical Corps worked on several other classes of toxic compounds. Boston University, under contract, was developing methods for the synthesis of highly toxic solid carbamates.

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163 (1) CmlC Consolidated R&D Annual Report, 31 Dec 57, Project 4-08-03-016-07. (2) Presentation by Dr William Summerson, Meeting of the Agents Committee, USA CmlC Advisory Council, 12 - 13 May 58, pp. 87 - 92.

164 This section is based on the following: CmlC Consolidated R&D Annual Report, 31 Dec 57, Project 4-08-03-016-07.

The College of Medical Evangelists, under contract, was isolating puffer fish poison, which comes from puffer fish viscera. The New England Institute for Medical Research and Fort Detrick were studying the relation between the chemical physical properties of the Botulinum toxin molecule and its biological activity. The Chemical Warfare Laboratories were isolating shellfish poison, with a view to determining the molecular structure.

BW Anticrop Agents

(S) As a part of the biological warfare program started in World War II, the Chemical Corps searched for agents that could be used to destroy crops on the farmland of enemy nations. Early in 1957 the Chief of Research and Development, Department of the Army, informed General Creasy that the Army did not have funds to carry on the experimentation in anticrop warfare in FY 1958. General Creasy protested, pointing out that the Corps would have to discharge a fine group of highly specialized men, difficult to replace if the program started again, and he asked that the matter be brought to the attention of the Chief of Staff. The Chief of Staff stated that he regretted that budgetary restrictions made the action necessary, but he agreed with the Chief of Research and Development that no alternative was available.[165]

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165 (1) Summary of Major Events and Problems, FY 59, p. 103. (2) Cmt 1, Col James W. Sutherland, Jr., GS, Executive, 13 Aug 57, sub: Anticrop Warfare Program, on Cmt 2, CCmlO to C/R&D, sub: Anticrop Warfare Program, 31 May 57.

(S) Later the Department of Defense noted the absence of the Anticrop research and development program, and wrote to the Department of the Army, stating that this was contrary to DOD directives. The Joint Chiefs of Staff then took the matter up, but the outcome remained the same. The Army, Air Force, and Navy stated they had no funds, and the Chemical Corps had to phase out the program by the end of December 1957.

(S) During the years when the Corps had been engaged in anticrop research, it standardized two biological agents, TX and SX. Sufficient work had also been done on Piricularia oryzae to warrant the inclusion of this organism in the BW offensive arsenal. Piricularia oryzae is a parasitic, spindle-shaped fungus that infects rice, causing the destructive disease known as rice blast. A number of races and strains are known, and these vary in the virulence toward different varieties of rice. The plan of the Corps was to employ a mixture of races as the agent.

(S) In March 1958 the Corps classified Piricularia oryzae as a standard anticrop BW agent. The Corps continued to produce the agent, even though the anticrop program had been phased out, under an Industrial Preparedness Measure. The study would permit the Corps to convert laboratory production procedures into a limited production capability, to determine the adequacy of the agent against varieties of rice found in the Orient, and to determine the effectiveness of the agent by means of large scale field tests.[166]

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166 CCTC Item 3412, 27 Mar 58.

(S) The biological agents mentioned above, TX, SX, and Piricularia oryzae, belonged to one of the two classes of anticrop agents investigated by the Chemical Corps. The other class was made up of chemical compounds capable of killing plants or inhibiting their growth. From 1944 to 1957 Fort Detrick screened a large number of compounds and found two, LNA and LNB, that were suitable for adoption as standard agents. It also found certain phenoxyacetic acids that were very effective in reducing the yield of cereal crops. Olin Mathieson Chemical Corporation, under an Industrial Preparedness Measure contract, prepared esters of these compounds for Detrick's test program. One compound, butyl 2-chloro-4-fluorophenoxyacetate, greatly reduced the yield of rice, soybeans, sugar beets, and other crops. This compound the Chemical Corps adopted as a standard anticrop agent in March 1958.

(C) The new agent is a liquid with an extremely low freezing point, and a relatively high boiling point. It would be disseminated in the form of a spray from aircraft. While it is harmful to plants, it has been handled by research workers for several years at Fort Detrick without ill effects. Rain, following on the heels of a spray operation, will not decrease the effectives of the chemical. Most important, no feasible counter measures are known that can be employed to protect a crop against the effects of the agent, once the crop has been sprayed.[167]

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167 (1) CCTC Item 3413, 27 Mar 58. (2) Special Report No. 256, Fluorophenoxyacetic acids as Chemical Anticrop Agents, Fort Detrick, Dec 55 (S).

BW Antipersonnel Agents

(S) Ten years ago the Corps established a project to investigate the usefulness of Bacterium tularense as a BW agent. Bacterium tularense is a microorganism that occurs naturally in many species of animals and causes the illness called Tularemia in man. When a man inhales or ingests the organism it incubates for a few days and then erupts, causing high fever, chills, prostration and toxemia. The man's chance of dying is about one out of three, and if he survives he will be on the side lines for two or more months.

(S) The problem facing Fort Detrick was to choose a suitable strain of B. Tularense, take it through pilot plant production, determine storage conditions, find a means of dispersal, and develop measures to safeguard the men working with the organism.

(S) The Fort successfully produced a wet suspension of the organism in the pilot plant, growing it in a casein acid digest medium. The Directorate of Biological Operations also produced the bacteria at Pine Bluff Arsenal. Surveillance showed that the agent would retain one-half of its viability for 40 days at 4°C. Laboratory and field trials showed that liquid suspensions of B. tularense dropped in E120 bomblets from a plane were capable of producing significant casualties. From research experience and safety studies the Fort found that the organism could be cultivated, processed, and filled into munitions with a minimum of risk under the proper conditions.

(S) By the end of the fiscal year Fort Detrick felt that B. tularense

was ready for classification as a standard BW antipersonnel agent. In case germ warfare would be resorted to in the future, it was probable that B. tularense would be an agent of retaliation employed by the United States.[168]

Operation LAC

(C) Operation LAC, which received its name from the initials of the words, "Large Area Coverage," was the largest test ever undertaken by the Chemical Corps. The test area covered the United States from the Rockies to the Atlantic, from Canada to the Gulf of Mexico. In brief, the Corps dropped a myriad of microscopic particles from a plane, and determined the distance and direction these particles traveled with the wind. The Corps wanted to learn these things: would it be feasible to contaminate a large area by this method using, for example, BW organisms, and if so, what logistics would be involved.

(S) The first test took place on 2 December 1957. A C119 "flying boxcar," loaned to the Corps by the Air Force, flew along a path leading from South Dakota to International Falls, Minnesota, dispersing fluorescent particles of zinc cadmium sulfide into the air. A large mass of cold air moving down from Canada carried the particles along. Meteorologists expected the air mass to continue south across the United States, but instead it turned and went northeast, carrying the bulk of the material

168
(1) Technical Study No. 6, Military Effectiveness of Bacterium Tularense (c), Program Co-ordination Office, Fort Detrick. (2) CCTC Item 3458, 27 Aug 58.

into Canada. The test was incomplete, but it was partially successful since some stations 1200 miles away in New York State detected the particles.

(S) Dugway ran a second trial in February 1958. This time the "polar outbreak," as the Canadian cold air masses are generally called, continued on to the Gulf of Mexico, carrying fluorescent particles with it. As the air mass moved south the front broadened so that the line of particles 200 miles long at the aircraft's path had spread out to 600 miles at the Gulf.

(C) The sampling scheme set up by Dugway was quite elaborate. Scientists at Fort Detrick devised a collecting device consisting of a filter and a pump to draw the air through the filter. The filter trapped fluorescent particles in the inspirated air. A special counting device was used to ascertain the number of particles on the filter. The Civil Aeronautics Authority co-operated by having its personnel at 63 CAA stations collect samples, and the Weather Bureau did the same at 112 stations. The stations mailed the 2200 filters employed in each test to Dugway, where technicians made the count.

(S) During the spring of 1958 Dugway conducted two additional tests, this time with the wind blowing haphazardly instead of steady from the north. In the first, the plane flew south from Toledo, Ohio, and then turned west to Abilene, Texas. In the second, the course ran from Detroit to Springfield, Illinois, then west to Goodland, Kansas. Sampling stations on both sides of the flight path reported particles, proving that random flight over a target area would disperse small particles widely.

(C) These tests proved the feasibility of covering large areas of a country with BW agents. Many scientists and officers had believed this was possible, but LAC provided the first proof. While the tests were a great step forward, they did not provide the Corps with nearly as much data as the Corps would like to have had in order to predict the behavior of particles released in clouds. To obtain additional data the Corps planned further tests for the next fiscal year.[169]

One-Shot Flame Thrower

(U) During World War II one of the problems that arose in the use of flame throwers was the servicing that had to be done in theaters of operation before weapons could be used. The Corps decided that one way of by-passing this obstacle was to design a single shot flame thrower that could be shipped from the United States ready for use. Engineers worked on the weapon but did not perfect it in time for battle. Development continued until 1949, when the Corps, forced to economize, cancelled the project.

(U) During the Korean War the experiences of American troops in flame warfare caused the Corps to take up the one-shot weapon again. Aerojet General Corporation, under contract, devised a new model consisting essentially of a U-shaped aluminum tube 3½ inches in diameter, jacketed

169
(1) Presentation by Clair B. Olsen, Meeting of the Dissemination and Field Testing Committee, USA CmlC Advisory Council, 6 - 7 - 8 Nov 57, pp. 14 - 20. (2) Presentation by Dr William W. Dorrell, Meeting of the Dissemination and Field Testing Committee, USA CmlC Advisory Council, 22 - 23 - 24 May 58, pp. 30 - 41.

with plastic insulation and a fibre glass cover. The weapon weighed approximately 13 pounds when empty and 25 pounds when filled with two gallons of thickened fuel. It was provided with a shoulder strap for carrying. When the operator fired the weapon, the following sequence of actions took place. A solid material in the gas generator burned, giving off gas. The gas passed thru a small tube into one end of the U-tube, where it shoved a synthetic rubber ball forward, like a piston. The ball traveled down one side of the U, around the curve and up the other side, pushing the fuel before it. The fuel rushed through the nozzle in a single, continuous burst, lasting about 4 seconds. An incendiary charge at the nozzle ignited the fuel, which ranged about 60 yards. In December 1957, the Corps standardized the weapon as Flame Thorwer, Portable, One-Shot, M8. In March 1958, a service kit and a maintenance kit were standardized for the use of Chemical Corps Combat Support and Maintenance Companies, which would recover weapons on the battlefield, clean them and recharge them. The completion of the one-shot flame thrower ended the Corps work on this type weapon. In the future, engineers were to concentrate on the improvement of the portable flame thrower.[170]

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170 (1) CCTC Item 3331, Classification of the Flame Thrower, Portable, One-Shot, M8 (E30R1); Firing Kit, One-Shot Flame Thrower, M2; & Service Kit, One-Shot Flame Thrower, M8 as Standard Types, 12 Dec 57. (2) CCTC Item 3415, Classification of Service Kit, One-Shot Portable Flame Thrower, M21 & Maintenance Kit, One-Shot Portable Flame Thrower, M22 as Standard Types, & Cancellation of Related M8 Service Kit, 27 Mar 58. (3) CCTC Item 3400, Classification of the Flame Thrower, Portable, One-Shot, M8 (E30R1); Firing Kit, One-Shot Flame Thrower, M2; & Service Kit, One-Shot Flame Thrower, M8 as Standard Types, 27 Mar 58.

Mechanized Flame Thrower

(U) At the other extreme from the small one-shot flame thrower was a huge flame thrower intended for tanks. Several years ago the Corps developed a mechanized, main armament flame thrower for the Marine Corps. The Marine Corps installed the device on M48A1 tanks in such a way that the flame thrower was an integral part of the tank. These flame-throwing tanks were known as model M67. In 1956 the Army tested Marine Corps flame throwing tanks and found that, with certain modifications, the flame throwers would be satisfactory for use by the Army. The Chemical Corps changed the flame thrower assembly as requested by USCONARC and in December 1957 standardized the weapon as the Flame Thrower, Mechanized, Main Armament, Turret Mounted, M7-6.

(U) In the meantime the Army had improved the M48A1 tank by the adoption of a better engine, engine deck, gun control system, and fire control equipment. It designated the new model the M48A2. The Army then decided that it would be preferable to place flame throwers in the new model rather than the old for reasons of economy and to provide up-to-date equipment for troops. Chemical Corps engineers and contractors had to modify the flame thrower assembly to fit the new model tank. This was done and the new assembly standardized as Flame Thrower, Mechanized, Main Armament, Turret Mounted, M7A1-6 in FY 1958. The M48A2 tank complete with flame thrower was designated as Tank, Combat, Full Tracked, Flame Thrower, M67A1. The Corps M7-6 type flame thrower is the only mechanized flame thrower now

in the Army's supply system.[171]

Fire Bomb

(U) Another important action in flame warfare was the standardization of the improved 750 pound fire bomb as model M116A2. The Corps adopted the original model, M116, in July 1953. Assembled from three aluminum alloy sections, the streamlined munition was approximately 131 inches long and 18½ inches in diameter. It held 100 gallons of napalm and was ignited upon impact by white phosphorus igniters. American planes dropped a large number of these bombs on enemy positions during the Korean War.

(U) In Korea handlers found it difficult to assemble fire bombs. To meet the objection the Corps changed position of the assembly bolts, the position of the filling caps, and also strengthened the braces. The modified fire bomb, M116A1, was declared standard in December 1954.

(C) In the meantime the Air Force was bringing out a plane, type F100, with a forced ejection release system for fire bombs. Unfortunately, the M116A1 fire bomb was not strong enough for ejection from F100 planes. The bombs either had to be discarded or strengthened. The Air Force found that the center bulkhead of the bomb could be strengthened readily, making

171 CCTC Item 3336, Classification of Flame Thrower, Mechanized, Main Armament, Turret Mounted, M7-6 for Army Issue & Use in M67 Flame Thrower Tank, 12 Dec 57. (2) CCTC Item 3417, Classification of the Flame Thrower, Mechanized, Main Armament, Turret Mounted, M7A1-6 as a Standard-A Type & Related Actions, 27 Mar 58.

the bomb sufficiently rigid to stand the ejection force of approximately 30,000 pounds. In November 1957 the Air Force and Chemical Corps held a conference at which both parties agreed that modified bombs would be suitable as an interim munition (a new fire bomb was under development) for use in F100D and F100F aircraft. The Corps standardized the modified bomb as model M116A2 in March 1958.

(C) The Corps planned to convert 43,000 M116A1 bombs into M116A2 bombs at Chemical Corps Depots. These would be used until the Air Force High-Nest Ratio Fire Bomb, which tests indicated would be much superior, was completed and adopted.[172]

Gasoline Thickeners

(U) During World War II the Chemical Corps and its contractors uncovered three agents for thickening gasoline in incendiary bombs and flame throwers. These were isobutyl methacrylate (IM), pyrotechnic fuel (PT), and napalm, the latter standardized as M1. After V-J Day the Corps continued its work along this line and standardized two additional thickeners, M2 (Antiagglomerated Napalm) and M3 (Octal). One of the reasons for the development of Octal was to obtain a thickener that could be produced from domestic materials, since napalm was dependent upon imported cocoanut oil.

172
CCTC Item 3409, Classification of the Bomb, Fire, 750-lb., M116A2 as a Standard Type with Reclassification of Superseded Types, 27 Mar 58.

The Corps kept searching for other substitutes for napalm which could be obtained from domestic materials. Finally, Standard Oil of Indiana, under contract, developed a thickener derived from petroleum. The firm oxidized mixed heptenes from petroleum to form iso-octyl alcohols, and then oxidized these into iso-octoic acids. The di-acid aluminum soap of these acids made an excellent gasoline thickener.

(U) When Military boards in the United States and in Alaska tested the new thickener in portable flame throwers and in mechanized flame throwers, they found that the range of the new thickener was greater than that of napalm and that the effects on the target were superior. Further the new thickener mixed with gasoline in one-half or less the time needed for napalm. The superior thickening properties of the new agent, plus the fact that it could be made from American materials, led the Army to standardize it as Thickener, Incendiary Oil, M4 in December 1957. At the same time napalm, the great thickening discovery of World War II, was relegated to the position of limited standard.[173]

Smoke

(U) The major action in the field of smoke production was the standardization of the M3A3 smoke generator. This model was a further improvement of the M3 generator that the Corps had been using for large

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173 CCTC Item 3346, Classification of Thickener, Incendiary Oil, M4 (E4R1) as a Standard Type & Reclassification of the Superseded M1 Thickener to Limited Standard, 12 Dec 57.

area smoke screening since 1952. The M3 was a pulse jet generator which produced smoke by injecting fog oil into the extremely hot exhaust gases coming from the engine. It had only one moving part, an engine valve, which simplified maintenance and operation.

(U) American troops employed the original M3 model for area screening in the Korean War. When battlefield operations showed that various components needed improvement the Corps corrected the faults, redesignating the revised models as the M3A1 then as the M3A2. The M3A2 weighed about 137 pounds, could be carried by several men or moved in trucks or boats. It consumed 25 - 45 gallons per hour of fog oil.

(U) While Corps engineers improved the design considerably, one inconvenient feature remained; the method of supplying fog oil to the generator. In the original generator exhaust gas from the engine passed through a hose into the drum of fog oil, building up pressure that forced fog oil through another hose into the generator. This method of getting fog oil into the engine was not completely satisfactory. The hoses were bulky and inconvenient and at times the pressure could not be maintained. Several years ago the Corps began to develop a special pump that might be used to force fog oil from drums into the generator. The problem was complicated because the generator did not have any moving parts capable of transmitting power. Engineers, therefore, decided to develop a pump that would be driven by exhaust gas from the generator.

(U) Their labor resulted in a air-motor, oil-pump assembly that can pump 50 gallons per hour. Made from aluminum castings, the pump weighs

approximately 16 pounds. It is self-starting, self-priming, self-lubricating, and is extremely efficient and free from friction.

(U) The M3A2 pulse-jet generator, modified to carry the new fog oil pump, was standardized as model M3A3 in March 1958. The Corps planned to convert the existing stocks of M3A2 generators into the M3A3 type by adding motors, and in the future would procure only M3A3's.[174]

Irritant Hand Grenade

(U) During the year the Corps adopted a new irritant hand grenade. The previous model, M6, had been a standard item in the Corps for many years and had proved effective in controlling Prisoner of War (POW) riots during the Korean conflict. It was not a lack of effectiveness that caused the Corps to modify the munition, but the difficulty that the M6 grenade had in meeting post World War II surveillance criteria. The Corps decided that the grenades should be able to withstand storage conditions of 160°F. At this temperature CN-DM fillings in some sample lots of grenades were not stable, and the grenades would not pass inspection. To correct this situation the Chemical Warfare Laboratories modified the munition.

(U) The new grenade differed from the old in only one important respect: the CN and DM were kept separate instead of mixed. Each ingredient

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174 CCTC Item 3410, Classification of the Generator, Smoke, Mechanical, Pulse Jet, M3A3 (E19R5) as a Standard Type & Reclassification of the M3A2 Generator to Standard-Mod Code B Type, 27 Mar 58.

was placed in a metal cup and the cups inserted back-to-back in the grenade. Asbestos spacer rings kept the cups fitting tightly within the grenade. When the grenade functioned, CN-DM smoke issued from 4 holes at the top and one in the bottom. The grenade, in tests, gave off about as much DM as the earlier model but only about one-half as much CN. To prove mass reproducibility of the munition Edgewood Arsenal produced approximately 13,000 grenades as an Industrial Preparedness Measure. The Corps standardized the munition as Model M6A1 in December 1957.[175]

Detector Kit

(U) Since 1952, the standard detector kit had been model M9A2, consisting essentially of an air sampling pump, detector tubes, reagents, bottles, vials, and instruction cards, all carried in a canvas case weighing 2½ pounds. The Army issued this kit down to the Company level, where it was intended for use by qualified personnel.

(U) While this kit provided satisfactory tests for toxic agents that might be found on the battlefield, the Corps had constantly been searching for new reagents and equipment that would permit the soldier, who would be under considerable strain, to make tests more quickly and simply. As a result the Corps arranged a kit containing the following new components: an improved G-agent test, modified blue dot tubes (H, HN, CK, G-Agent

175 CCTC Item 3330, Classification of Grenade, Hand, Irritant, CN-DM, M6A1 (E17R1) as a Standard Type. Reclassification of the Superseded M6 Grenade, 12 Dec 57.

detectors), M6 Vesicant Detector Paper, and two rubber aspirator sampling bulbs to replace the C9 pump of the M9A2 kit. The entire kit was approximately the same size and weight as the M9A2 kit.

(U) The Corps adapted the new kit, M18, as a standard item of equipment in December 1957, relegating the M9A2 to the position of limited standard. While the new kit contains direct tests for some toxic agents, it still requires reagents for the detection of others. The Corps planned to continue research with the hope of uncovering other direct tests.[176]

The Non-Combatant Mask

(U) In 1936 the Chemical Corps began development of a mask for civilians employed at military installations. The device was standardized as the Non-Combatant Mask, MI-I-I, in 1940. During the war the Office of Civilian Defense procured large quantities of a modified version, the MIA2-I-I, for civilians. The mask was fairly satisfactory but not entirely so. To overcome the flaws and in addition to modify the mask so that it would protect the wearer from radioactive particles and biological warfare agents that might be used in future war, the Corps began development of a better mask in 1948. Among the problems involved in the development of this mask were these: it had to fit people of all age groups except very small children, it had to be wearable without undue discomfort for at least an

176
CCTC Item 3348, Classification of Detector Kit, Chemical Agent, M18 (E28) and Refill Kit, Chemical Agent Detector, C18 as Standard Types and Reclassification of the Superseded M9A2 Kit to Limited Standard.

hour, it had to be effective over a range of temperatures from -30 degrees F to 120 degrees F, it had to be easily disinfected, water repellent, mildew-proof, corrosion resistant, and it was to be made from noncritical and nonstrategic materials.

(U) The new mask consisted of a facepiece, canister and carrier. The stockinette facepiece was coated on both sides with GRS rubber, and held a one-piece, wide vision, vinyl plastic eye lens. The canister was the same as that used in the standard M9A1 Field Protective Mask. Incoming air, purified in the canister, swept over the eyepiece. Exhaled air passed through an outlet valve. For ease in carrying, the mask was provided with a shoulder strap.

(U) The designers made provision for six sizes, from size 1 (child) to size 6 (large), but the Federal Civil Defense Administration, which will be the using agency for the mask, had indicated it would not procure the smaller two sizes of the mask. The cost of the mask was relatively low, $9.50 each.[177]

Filter Units

(U) Following World War II the Chemical Corps designed collective protectors, now called filter units, capable of removing CBR agents from air entering Army command posts, field shelters, and mobile units. These devices

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177 CCTC Item 3334, Classification of Mask, Protective, Noncombat, M16 (E51R15-11-22R1) as a Standard Type, 12 Dec 57.

were not entirely suitable for permanent structures and in 1953 the Corps opened a project to develop filter units that would purify large volumes of air, would cost less, and would be adaptable to buildings such as those found in rear areas and on naval shore installations. The devices were completed in late 1957 and standardized shortly thereafter.

(U) The filter units functioned in this manner: A blower, driven by an electric motor or gasoline motor, forced contaminated air through a charcoal filter to remove chemical agents and then through a particulate filter to remove biological agents or radioactive particles. The pure air then passed through large flexible pipes into the protective shelter. The apparatus was sheltered in a plywood housing and mounted on a skid. The unit was made in several sizes, from 600 CFM (cubic feet per minute) capacity to 5,000 CFM, and weighing from 800 pounds for the former to 2,800 pounds for the latter. The potential users of these filter units were the Navy Department's Bureau of Yards and Docks, the Federal Civil Defense Agency, NIKE sites, NATO, the Corps of Engineers, the USAF and Atomic Energy Commission.[178]

Filter Units for Vehicles

(U) In addition to developing filter units for shelters, the Corps worked on units to protect troops in tanks, tank recovery vehicles, and

178 CCTC Item 3329, Classification of Filter Unit, Gas-Particulate, GED, 600 CFM, M9 (E28R2) as a Standard Type, 12 Dec 57. (2) CCTC Item 3411, Type Classification of Seven (7) Fixed Installation Gas-Particulate Filter Units & Four (4) Gas-Particulate Filters, 27 Mar 58.

personnel carriers. It standardized a unit, consisting of a blower, air purifier, hoses and masks, in November 1953 and a revised version of the unit in 1956. When development was first undertaken the Chemical Corps, Ordnance Department, and Army Field Forces held a conference, at which time the Ordnance Department agreed to provide detailed drawings of the mounts that would be needed to install the filter units inside the vehicles, and the Chemical Corps to procure and issue the necessary equipment for installation. The Ordnance Department furnished the drawings for steel frames, shock mounts, cable assemblies, etc., in 1956, and the Chemical Corps standardized a kit in December 1957. Approximately 3,500 kits would be needed to permit installation of filter units in vehicles.[179]

Protective Mask Repair Kit

(U) The protective mask repair kit had been a useful item of equipment since the days when the Army first adopted the mask. It remained more or less uniform for almost three decades, until the Corps switched from the hose-type mask to the snout-type in 1948. Designers then had to make drastic changes in the kit, which was standardized as Model 9. Subsequently the Army Field Forces found that the new repair kit was largely unnecessary, because the new mask was well constructed and simpler in design than the old mask. The AFF finally decided to restrict first echelon protective gas mask repairs to the replacement of parts, leaving major repairs to Chemical

179
CCTC Item 3347, Classification of the Installation Kit, Gas-Particulate Filter Unit, Armored Vehicle, M20 (E20) as a Standard Type, 12 Dec 57.

Corps Maintenance Units. The effect of this decision was to make the repair kit unnecessary and the AFF recommended that it be dropped from the Army supply system. With this recommendation the Chief of Staff, G - 3, concurred. The Navy, however, which had no Chemical Corps Maintenance Units, felt that it needed the repair kit. Chemical Corps thereupon revised the kit to meet several suggestions sent by the Bureau of Yards and Docks and then standardized it as the Repair Kit, Field Protective Mask, M19, in December 1957.[180]

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180 CCTC Item 3335, Classification of Repair Kit, Field Protective Mask, M19 (E22R2) as a Standard Type for Navy use, 12 Dec 57.

MATERIEL

Management and Organization

(U) The major events and problems in the Chemical Corps materiel field in fiscal year 1958 reflected the two major areas of emphasis: (1) continued striving to achieve maximum efficiency and economy in all materiel operations; (2) renewed effort to maintain and improve current and mobilization procurement and production capability. The assignment of responsibility for supply control of all Chemical Corps major end-items to the Headquarters, U.S. Army Chemical Center and Chemical Corps Materiel Command (US ACC and MATCOM), and the concomitant establishment of a National Inventory Control Point (NICP) within that headquarters were the principal events in the achievement of increased efficiency. With respect to procurement and production capability, the declining trend which first became apparent in fiscal year 1954 again characterized fiscal year 1958. [181]

Supply Control

(U) During the last half of fiscal year 1957 the phased transfer of

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(1) Interv, Hist Off with Brig Gen Harold Walmsley, CG, US ACC and MATCOM, and the following members of his staff: Col Clarence B. Drennon, Jr., Dep Cmdr; Col Dominic J. Chiminiello, Exec O; Col Pyueng S. Pyuen, Dir QA; Lt Col Dale L. Vincent, Dir IMP; Mr William J. Hewitt, Dep Dir IMP; Lt Col Roy I. Olson, Dir Sup Opns; Mr David F. Bourque, Dep Dir Sup Opns; Lt Col Joseph P. Ilardi, Dir Indl Opns; Mr Herbert G. Fredericks, Dir Indl Opns; Maj William J. Cribb, Jr., Dir Fac; Mr Joseph G. Schaffner, Log Mgmt Bd; 20 Dec 58. (2) Interv, Hist Off with Col Gilbert P. Gibbons, Log Pl Div, OCCml0, 21 Jan 59.

stock control and accountability to the headquarters, Materiel Command, from chemical depots and chemical supply sections of three general depots was accomplished. In the last two months of that fiscal year the records and functions of requirements determination, supply control, inventory distribution and procurement direction were transferred from Logistics Planning Division, OCCmlO, to the Headquarters, U.S. Army Chemical Center and Chemical Corps Materiel Command. This transfer was completed and became officially effective on the first day of fiscal year 1958, and the functions were internally assigned to Supply Division, Materiel Command. The designation, National Inventory Control Point, was assumed as a result of these actions.[182] Subsequently, effective 18 November 1957, in order further to centralize inventory control and accountability internally within the materiel headquarters, the responsibility for these functions with respect to quality assurance inspection aids was transferred from the Directorate for Quality Assurance (Dir QA) and the Quality Assurance Technical Agency (QATA) to the Supply Division. Another internal action to centralize responsibility came on 4 February 1958 when Supply Division assumed the responsibility, formerly delegated to Industrial Division (Indus Div), for staff supervision of supply activities at Materiel Command installations and activities. Supply

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182 Supply Division became the NICP for all chemical items other than repair parts. The Chemical Corps NICP for repair parts is located at Memphis General Depot (Summary of Major Events and Problems, FY 54, pp. 115 - 17; FY 55, pp. 149 - 52).

Division also assumed responsibility for receipt, storage, issue, and stock control of all industrial reserve components at all Chemical Corps Materiel Command Class II field activities and installations. On 28 February 1958, in recognition of the centralization of all supply control functions throughout the Chemical Corps and in keeping with the provisions of AR 700-5 on the organization and operation of inventory control points, Brig. Gen. Harold Walmsley, Commanding General, U.S. Army Chemical Center and Chemical Corps Materiel Command, was designated as the Chemical Corps Supply Manager, responsible for the overall direction, co-ordination and supervision of the activities of the Chemical Corps National Inventory Control Points and related procurement, distribution and maintenance activities.[183]

(U) Judged on the basis of a full year's experience, the centralization of supply control promoted efficiency and permitted a number of measures to be taken in the interest of economy. General Walmsley, as Chemical Corps Supply Manager, dealt directly with higher authority on many aspects of the supply program, and this direct communication simplified the transmittal of operating instructions and the submission of reports. Administrative

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183
(1) Summary of Major Events and Problems, FY 57, pp. 122 - 23. (2) Quart Hist Rpts, MATCOM, Jul - Sep, Oct - Dec, 57; Jan - Mar, 58. (3) OCCmlO GO 17, 11 Jun 57. (4) US ACC and MATCOM GO 43, 8 Jul 57 (assignment, operating responsibility). (5) US ACC and MATCOM GO 82, 24 Dec 57 (inspection aids). (6) US ACC and MATCOM GO 5, 26 Feb 58 (staff supervision, supply activities). (7) OCCmlO GO 5, 25 Feb 58. (8) AR 700-5, 18 Sep 57. (9) Briefing, Lt Col Roy I. Olson, Dir Sup Opns, MATCOM, for Maj Gen Marshall Stubbs, CCmlO, 6 Nov 58. (10) Interv, Hist Off with Mr Glen I. Rhorer, Log Pl Div, OCCmlO, 23 Jan 59.

arrangements were made which permitted Logistics Planning Division, OCCmlO, to gather the supply control information essential to the Chief Chemical Officer, and Logistics Planning Division continued to provide guidance and liaison to the Materiel Command when necessary or desirable for expediting action. Since the Materiel Command was able, under the centralization of procedures, to deal directly with all requisitioners, world-wide, all requisition information was integrated and distribution expedited. The centralization of accountability and the operating improvements afforded by the installation of a transceiver network to Chemical Supply Sections of general depots and the elimination of shipping document typing reduced time required for the transmission of shipping documents from about five days to a matter of minutes. At the end of the fiscal year, plans were complete to install transceiver networks to all overseas supply agencies, and it was hoped to extend transceiver service to all Chemical Corps branch depots in fiscal year 1959. A measure of the fiscal 1958 accomplishment was the outstanding overseas supply performance record. For the year 96 percent of shipments were on time, and the Director of Supply Operations, Office of the Deputy Chief of Staff for Logistics forwarded a commendation to the Chief Chemical Officer for a record of 100 percent on time shipments in both overseas troop supply and Mutual Assistance Program supply during the months of April and May 1958. These accomplishments were the principal events in the management of the Chemical Corps materiel distribution

system during fiscal year 1958. [184]

(U) Materiel Command commodity managers were able, after the inauguration of the centralized system, to direct every element of the supply process from the determination of initial requirements to disposal actions for every item. Utilizing the information and control thus generated, the Command planned and forecast the entire Chemical Corps supply status not only for the period then current but also for some years in advance. Individual item Supply Control Studies are forwarded to OCCmlO with Five Year Materiel Program Item Data Sheets in the process of planning, and the consolidated information allows early computation of procurement, maintenance, storage, distribution, surveillance, and disposal requirements. The result was greatly improved supply management within the Materiel Command and the Chemical Corps.[185]

Procurement and Production Capability

(U) The problem of maintaining and improving current and mobilization

184
(1) Rhorer interv, 23 Jan 59. (2) Briefing, Lt Col Olson, 6 Nov 58. (3) Interv, Hist Off with Mr E. R. McDaniel, Log Pl Div, OCCmlO, 21 Jan 59. (4) Interv, Hist Off with Miss Eva Misler, Dir Sup Opns, MATCOM, 3 Feb 59. (5) Quart Revs, Oct - Dec 57, p. 60; Jan - Mar 58, p. 54; Apr - Jun 58, p. 64.

185
(1) Walmsley and Staff interv, 20 Dec 58. (2) Rhorer interv, 23 Jan 59. (3) Briefing, Lt Col Olson, 6 Nov 58. (4) McDaniel interv, 21 Jan 59. (5) Statement, Dir Sup Opns, MATCOM, to Hist Off, 20 Dec 58, sub: Establishment of National Inventory Control Point in Headquarters, U.S. Army Chemical Center and Chemical Corps Materiel Command. (6) Interv, Hist Off with Mr George L. Cole, Log Mgmt Bd, MATCOM, 30 Jan 59.

capability consists of two interrelated elements: (1) the necessity for retaining operating personnel and facilities ready for rapid action and/or expansion to meet current or emergency requirements; (2) the necessity for retaining or acquiring a sufficiently large materiel mission to support operating personnel and facilities and to build up an adequate item stockpile for current needs and emergency expansion. Fiscal year 1958 saw a decline with respect to personnel and facilities, and, while there was some gain in mission, the year also reflected a decline in item status.

(U) For the fifth consecutive year there was a reduction in procurement personnel during fiscal year 1958, and for the second consecutive year there was a reorganization of procurement districts to accomodate to the reduced circumstances. The reduction in personnel again, as in previous years, resulted in a loss in the trained procurement nucleus and hence in a loss of procurement and planning capability for the Corps.[186] Prime cause of the FY 1958 retrenchment was a further decline in the availability of funds and a drop in the amount of new procurement and production business of about $6.1 million from the fiscal year 1957 level. The Chemical Corps procurement and production program for fiscal year 1958 by the end of the year totaled $11.4 million of which $9.1 million was Chemical Corps funds and the remainder was allotted from other services. Actual expenditures in the

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(1) See below, pp. 143,145 for discussion of procurement district reorganization. (2) Summary of Major Events and Problems, FY 54, pp. 97 - 100; FY 55, pp. 122 - 23; FY 56, p. 164; FY 57, pp. 125 - 26.

procurement and production field, including funds carried over from previous years, amounted to slightly more than $30 million, a drop of more than $9 million from the previous fiscal year.[187]

(C) The declining availability of funds had an even more serious impact on the arsenals than on the procurement districts since a total new workload of $16.9 million was necessarily divided into the sums of $10.2 million for district action and $6.7 million for arsenal action.[188] This small amount of new business plus carryover business in the arsenals was barely enough to sustain those facilities in minimum operation. The toxic production schedule at the U.S. Army Chemical Arsenal, Rocky Mountain, for example, was completed during the first quarter of the fiscal year, and the toxic facility was processed for lay-away. The Ordnance shell program at the same installation was greatly reduced while the bomb clustering program was completed. By the end of the fiscal year, Rocky Mountain had only four active manufacturing orders and two of these were for the demilitarizing of munitions.[189]

(C) The U.S. Army Chemical Arsenal, Pine Bluff, was in better state for

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187 (1) See below, pp.145 - 63 for details on procurement and production. (2) Quart Rev, Apr - Jun 58, pp. 54, 90. (3) Summary of Major Events and Problems, FY 57, pp. 129 - 30.

188 Figures obtained from Dir Indl Opns, MATCOM, 4 Feb 59. The total is greater than that cited for the total procurement and production program since part of the allotted workload was supported from other funding programs.

189 Quart Hist Rpts, USA Cml Ars, RM, FY 58, Classified Appendixes, Sect II.

maintaining its operating capability. Four small schedules for smoke munitions were in production during the fiscal year, and industrial mobilization production development projects were carried on in the Directorate for Biological Operations. Three production schedules were to be carried on in fiscal year 1959, but it is probable that these schedules will be stretched out to be in production alternately so that only one full crew will be employed.[190]

(C) The one other U.S. Army Chemical Arsenal, Edgewood, during the fiscal year had from six to fourteen small orders for smoke munitions, protective equipment, and engineer-test, user-test items.[191] Considering the unique character of the Chemical Corps arsenals,[192] and in line with the desire of the Deputy Chief of Staff for Logistics to maintain Army production facilities for which there is no commercial counterpart, a determined effort was made to retain arsenal production capability. The programming of more development and engineering work into the arsenals, along the pattern already established in Edgewood arsenal and in the Directorate for Biological Operations at Pine Bluff, was one method, providing

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190 (1) Quart Hist Rpts, USA Cml Ars, PB, FY 58. (2) Interv, Hist Off with Mr Owen R. Mullen and Mr William Van Sant, Log Pl Div, OCCml0, 21 Jan 59. (3) Interv, Hist Off with Lt Col Charles M. Bartlett and Mr Frank A. Abbruscato, Dir Indl Opns, MATCOM, 28 Jan 59. (4) Rhorer interv, 23 Jan 59.

191 Quart Hist Rpts, USA Cml Ars, E, FY 58.

192 Summary of Major Events and Problems, FY 57, pp. 126 - 27.

a measure of relief, to be given more emphasis for fiscal year 1959 and the following years. There is an insufficient amount of work available in the development and engineering field, however, to provide a basis for extensive planning. Requirements for smoke pots and smoke grenades, approved during fiscal year 1958, will serve to continue minimum production at Pine Bluff while Edgewood can retain a portion of its valuable rush-order and experimental capability with its present combination of development and production work. It was hoped that a sufficient amount of rocket and missile warhead work could be obtained to avoid the lay-away of the entire production complex at Rocky Mountain arsenal, but, while requirements exist, funding prospects seemed dim at the end of the fiscal year.[193]

(U) The decline in personnel and workload in the arsenals and the districts during fiscal year 1958 had a serious impact on that element of the capability problem having to do with operating personnel and facilities. While any peacetime mobilization plan must depend upon reserve production facilities, the eventual value of such facilities is directly proportional to the ability to operate those facilities in event of an emergency. The ability to operate, in turn, is dependent upon the retention and modernization of production techniques, a function of current production, and upon the

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(1) Walmsley and Staff interv, 20 Dec 58. (2) Mullen-Van Sant interv, 21 Jan 59. (3) Bartlett-Abbruscato interv, 28 Jan 59. (4) Rhorer interv, 23 Jan 59. (5) Quart Hist Rpt, Log Pl Div, OCCmlO, Oct - Dec 57.