~~CONFIDENTIAL~~

~~SECRET Security Information~~

UNCLASSIFIED

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

FY 1953

Security classification will be reviewed by issuing officer 1 September 1954.

Historical Office
Office of the Chief Chemical Officer

4 September 1953

UNCLASSIFIED

PAGE 1 OF 80 PAGES

COPY 14 OF 16 COPIES

~~SECRET Security Information~~

~~CONFIDENTIAL~~

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

[redacted]

TABLES (Continued)

INTRODUCTION

This paper records events and developments in Chemical Corps operations during the Fiscal Year 1953 which are of historical significance. Since a previous report[1] covered the activities of the first six months of the fiscal year, this report treats primarily the events and problems of the second six months.
(UNCLASSIFIED)

In several respects the Fiscal Year 1953 was the most important in the peacetime history of the Chemical Corps. During that period the three-way command structure of the Corps was well established, many of the recommendations of the Army Scientific Advisory Board (Killian Committee) were made effective, and activities generally were reoriented to conform to the policies of a new political administration of the Federal Government. From the fiscal point of view, the year was one of the busiest the Corps ever witnessed, some 400 million dollars having been obligated (See Table 1).
(UNCLASSIFIED)

Fiscal 53 saw greater stress by the Army than ever before on economy and efficiency in obtaining objectives. Emphasis was placed

---

1 Summary History of Chemical Corps Activities 9 September 1951 to 31 December 1952. Hereafter referred to as Summary History.

on the Army Primary Programs,[2] for the coordination of which the Chief Chemical Officer established a Program Coordinating Office in December 1952.[3] During the year particular emphasis was placed on the planning and execution phase of the following programs: Training (Program No. 6), Industrial Mobilization (No.8), Materiel (No.9), Supply and Distribution (No. 10) and Services (No.11).[4]

(UNCLASSIFIED)

Further evidence of increased economy and efficiency in the Corps was the implementation and extension of the Army Industrial Fund and preparation for the inauguration of the Army Stock Fund. At the end of the fiscal year both Rocky Mountain and Pine Bluff Arsenals were under the Army Industrial Fund and preparations had been completed to initiate the fund at Dugway Proving Ground as of 1 July 1953. Out of a total of eight installations in the entire Army under Army Industrial Fund operations, three are Chemical Corps installations.[5]

---

2 DA SR's of 11-10 series provide for these programs.

3 OC Cml O, GO 3, 11 Dec 53.

4 Interv Hist O, OC Cml O with Col. Robert W. Breaks, Project Coordination Officer, OC Cml O, 21 Aug 53.

5 DA Cir 59, 21 Jul 53.

The ACofS (G-4) stated on 26 March that, "a relatively large percentage of the practical army 'know-how' in the use of the Industrial Fund has been developed by personnel of the Chemical Corps".[6] More details on the Army Industrial Fund and the Army Stock Fund appears below.[7] (UNCLASSIFIED)

The Chemical Corps' record on safety was outstanding. In April the Department of the Army presented its Award of Merit for Safety to the Chemical Corps "for superior achievement in the prevention of accidents by the establishment and maintenance of a comprehensive and effective safety program embracing all of its operations and activities during 1952." The Corps' accident frequency and severity rates showed a 30 percent reduction during the calendar year 1952. Major General Boniface Campbell, Army Deputy Assistant Chief of Staff, (G-1), presented the award to Major General E. F. Bullene, Chief Chemical Officer.[8] (UNCLASSIFIED)

---

6 D/F, File G4-B1 19190, G-4 to C Cml O, 26 Mar 53, sub: Standard Procedural Guidance Materials for the Installation and Conduct of the Army Industrial Fund. This D/F referred by name to the following Cml C Personnel among those who were particularly instrumental in the development of AIF procedures: Lt Col J.J. Hayes, Lt Col R.E. Stover, Major C.E. Hughes, Major John Moran, and Mr. E.C. DeWitt.

7 See pp. 65-67

8 Army, Navy, Air Force Register, 9 May 53.

Fiscal Data

Table 1 shows the funds obligated by the Chemical Corps for the Fiscal Year 1953. Appendix A contains additional fiscal tables and charts.[9] (UNCLASSIFIED)

Table 1 - Fiscal Year 1953 Funds Obligated by Chemical Corps by Source and Amounts of Funds Obligated[10]

Source of Funds	Amounts Obligated
Chemical Corps Appropriations	
Maintenance & Operations	$ 33,787,980
Procurement & Production	42,087,476
Research & Development	38,411,394
Working Funds	6,554,390
Other	136,100
Allotments to Chemical Corps from other Agencies	
Technical Services, Army	18,772,516
Navy	8,994,388
Air Force	270,992,154
Military Defense Assistance Program	3,857,767
Other	48,593
Total Funds	$ 423,692,758

The trend during the last six months of the fiscal year, under the new Administration, was toward greater economy in the use of both personnel and funds. Eighteen Chemical Corps construction

---

9 This appendix, which is entitled, "Statistical Summary of the Chemical Corps Program, 30 June 1953", was prepared by the Review and Analysis Section, Office of the Comptroller, Chemical Corps and contains statistical data on all Chemical Corps activities.

10 Figures furnished by Comptroller, Chemical Corps.

projects, totaling $5,590,740, were deferred or cancelled after review of essentiality required by Executive Order, 4 February 1953. This same order resulted in the freezing of all construction not more than 15 percent complete as of 31 December 1952. On 26 May the ACofS (G-4) directed the Chief Chemical Officer to submit all research and development contracts over $50,000 to G-4 for review and to re-examine all contracts under $50,000 in the Office of the Chief Chemical Officer.[11] This action resulted in the Chemical Corps' not expending some 3 million dollars of its 1953 funds. Meanwhile the Research and Development Senior Review Board, Department of the Army, acting under a directive from the Secretary of Defense to the Secretary of the Army dated 19 May[12] cut back the 1954 funds, eliminating entirely funds for the BW antianimal program and the defensive anticrop program, and reducing drastically funds for the BW program. In accordance with the directive of the Secretary of Defense, Maintenance and Operations and Procurement and Production funds were also considerably reduced. [redacted]

[redacted]

11 Memo, G-4 to CCO, 26 May 53.

12 Copy of this directive in CMLHO.

In the closing days of the fiscal year an innovation in policy was introduced when the Chemical Corps was directed to let contracts on as large a part as practicable of its BW and R & D programs.[13] Heretofore contracts had been let out on part of this work, but the new policy was toward much larger contracts. [redacted]

Nor was the new policy confined exclusively to BW and R & D contracts, but it extended also to procurement contracts. On 24 June the Chief Chemical Officer recommended to the ACofS (G-4), that nerve gas production at Rocky Mountain Arsenal be let out on contract.[14] This was the first instance in the history of the Army that a proposal had been made to engage a private concern to operate a toxic producing plant. [redacted]

Organizational Developments

Certain organizational changes were effected in the Corps as a consequence of the Killian Report.[15] The Research and Development Division in the Chief's Office underwent a complete reorganization.

---

13 Memo for Record, 26 Jun 53, sub: BW Program Contract Proposal to Mathieson Chemical Company. In executive files, R & D Div, CC Cml C.

14 1st Ind C Cml C, 24 Jun 53, on ltr fr Asst CO, Mat Comd to C Cml C, 23 Jun 53, sub: Proposed Contract No. DA-11-021-Cml-469(PC-CHS-334).

15 In May the Killian Committee reconvened and invited the Chief Chemical Officer, General Bullene, to comment on developments in the Corps under the Killian concept. No report of the Committee's findings had appeared as of 30 Jun 53.

DEPARTMENT OF THE ARMY

OFFICE OF THE CHIEF CHEMICAL OFFICER

Chart 1

Chief Chemical Officer
Civ - 4 Mil - 4

Deputy Chief Chemical Officer

Scientific Director - for BW & TJW	Director of Industrial Operations

Executive

Chemical Corps Advisory Council
Civ - 9 Mil - 0

Legal Advisor
Civ - 4 Mil - 1

Program Coordinator Office
Civ - 1 Mil - 1

Senior Scientific Advisor
Civ - 1 Mil - 1

Chemical Corps Inspector General
Civ - 3 Mil - 7

Comptroller
Civ - 60 Mil - 8

Chemical Corps Technical Committee
Civ - 4 Mil - 0

Research & Development Division
Civ - 25 Mil - 5

Branches:
- Administration
- Toxic CW
- BW
- RW
- Plans & Coordination
- Resources

Materiel Division
Civ - 97 Mil - 5

Branches:
- Facilities
- Materials
- Procurement
- Inspection
- Supply

Plans, Training and Intelligence Division
Civ - 40 Mil - 17

Branches:
- Plans and Operations
- Intelligence
- Training

Administration Division
Civ - 65 Mil - 15

Branches:
- Military Personnel
- Civilian Personnel
- Technical Safety
- Cml C Provost Marshal
- Technical Liaison
- Administrative Service

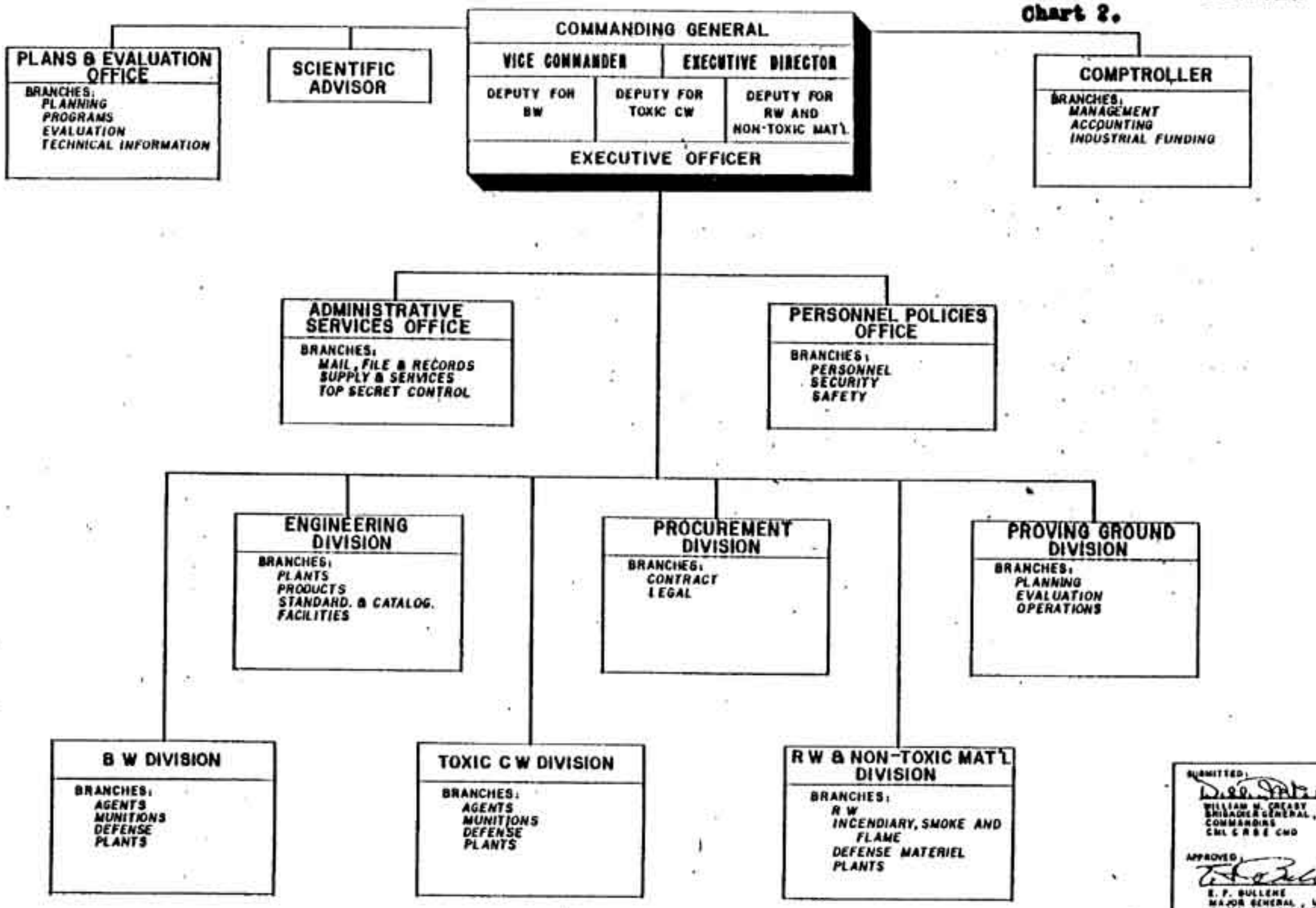
Strength Figures of the Chief's Office as of 30 June 1953. Total Civilian: 313 Total Military: 64
Compiled by Manpower Section, Budget Branch - CMLWM

CHEMICAL CORPS RESEARCH AND ENGINEERING COMMAND

HEADQUARTERS

UNCLASSIFIED

Chart 2.



SUBMITTED:
WILLIAM M. CREASY
BRIGADIER GENERAL, USA
COMMANDING
CML C R & E CMD

APPROVED:
E. F. BULLENE
MAJOR GENERAL, USA
CHIEF CHEMICAL OFFICER

DATE: 6 MAY 1958

PREPARED BY:
COMPTROLLER
R & E COMMAND

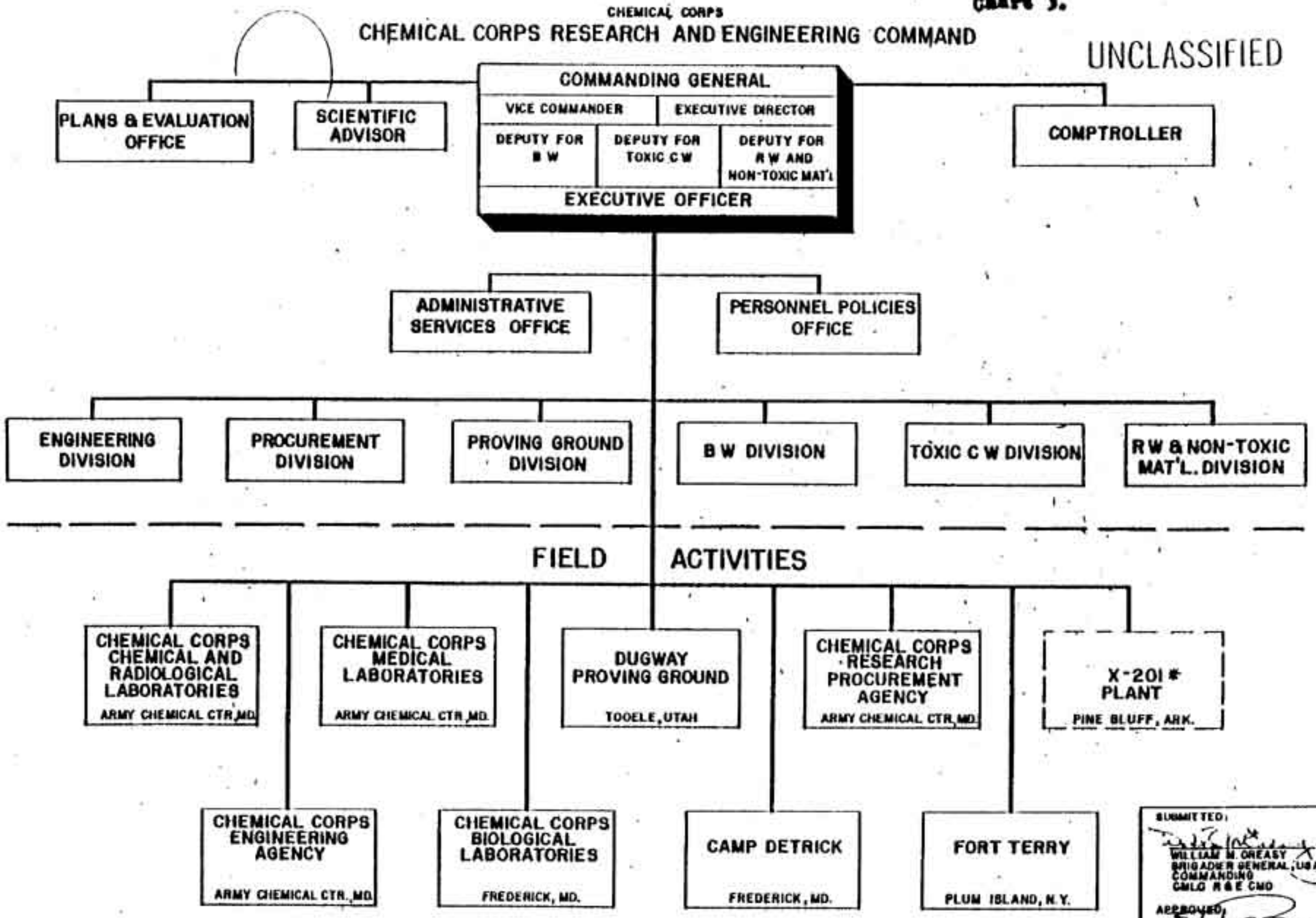
UNCLASSIFIED

Chart 3.

CHEMICAL CORPS

CHEMICAL CORPS RESEARCH AND ENGINEERING COMMAND

UNCLASSIFIED



* COMMAND JURISDICTION AS PERTAINS TO TECHNICAL MISSION.

SUBMITTED:

WILLIAM M. CREASY
BRIGADIER GENERAL, USA
COMMANDING
CMLC R&E CMD

APPROVED:

E. P. BULLENE
MAJOR GENERAL, USA
CHIEF CHEMICAL OFFICER

DATE: 28 JULY 1953

PREPARED BY:
COMPTROLLER
R&E COMMAND

PAGE 13 OF 80PAGES

COPY 16 OF 16 COPIES

UNCLASSIFIED

Existing branches were superseded by: Toxic CW; HW. Smoke, Flame and Protection; BW; Resources; and Plans and Coordination.[16] (See Chart 1) The Chemical Corps Research and Engineering Command Headquarters was also reorganized; deputies were appointed by the Commanding General for BW; Toxic CW, and HW and Non-Toxic Materiel and separate divisions to carry out these functions were set up (See Chart 2). Other organizational changes resulting from the Killian Report included the transfer of the following activities from the Materiel Command to the Research and Engineering Command; The Chemical Corps Procurement Agency, which was re-named the Chemical Corps Research Procurement Agency[17] and the X-201 Plant at Pine Bluff Arsenal.[18] Chart 3 indicated the organization of the R & E Command at the close of the fiscal year. (UNCLASSIFIED)

In addition to the organizational changes made as a result of the Killian Report, there was one other organizational change in General Bullene's Office. In April an Administration Division was established.[19] This was occasioned by the need for reducing the number of staff agencies reporting directly to the deputy chief and executive. (UNCLASSIFIED)

---

16 This action was taken pursuant to a verbal order by C, Cml O Ch, R & D Div, 7 Apr 53.
Interv Hist O, OC Cml O with Ex O, R&D Div, 3 Aug 53.

17 OC Cml O GO 6, 20 Mar 53.

18 OC Cml O GO 12, 29 Jun 53.

19 OC Cml O GO 7, 1 Apr 53, provided for activation of this division. On 17 June the Historical Office, a class II activity at A Cml C under the direct supervision of the Chief Chemical Officer was assigned to the Ch, Adm Div for "staff supervision and control".

Personnel Administration[20]

There were no significant changes in the personnel strength of the Chemical Corps during the last six months of the fiscal year, although there was a slight downward trend in the number of civilians employed. (UNCLASSIFIED)

Table 2 lists the personnel figures from January to June.

Table 2 - Personnel Strength Figures*

Continental United States

	Officers	Warrant Officers	Enlisted Men	Civilians
31 January 1953	812	40	2,536	13,538
28 February 1953	847	41	2,461	13,673
31 March 1953	839	43	2,388	13,794
30 April 1953	850	44	2,310	13,506
31 May 1953	857	44	2,330	13,112
30 June 1953	856	46	2,600	13,119

* Figures taken from Cml C Personnel Allotment Control, CMLNM-190, Cml C Form 2937A. Data for first six months of FY appears in Summary History, p.4 [redacted]

20 This section is based on information from quarterly reports of Military and Civilian Personnel Branch, OC Cml O, to Cml Hist O and Interv Hist O, OC Cml O with Mr. F. C. Hall, Adm Div, OC Cml O.

[redacted]

The following changes in assignment of senior officers of the Corps occurred during the fiscal year:

Brigadier General Leonard J. Greeley, relieved as Commanding General, Chemical Corps Training Command, assigned as Deputy Commandant, Armed Forces Industrial College, 18 July 1952.

Colonel John R. Burns, relieved as Chief, Personnel Division, OC Cml C, assigned as Commanding Officer, Chemical Corps Training Command, July 1952.

Colonel Ragnar E. Johnson, relieved as Commandant, The Chemical Corps School, Fort McClellan, Alabama, assigned as Chemical Officer, EUCOM, March 1953.

Colonel Thomas H. James, relieved as Chemical Officer, EUCOM, assigned to Chemical Corps Materiel Command, March 1953.

Colonel Edwin Van Keuren, relieved as Commandant, Chemical School, FECOM, assigned as Commandant, The Chemical Corps School, Fort McClellan, Alabama, March 1953.

Colonel Adam W. Meetze, designated Commanding Officer, Rocky Mountain Arsenal, October 1952.

Colonel Norman D. Gillet, relieved as Chief, Intelligence Branch, PT&I Div., OC Cml C, assigned as Chief, Personnel Division, OC Cml C, July 1952. (UNCLASSIFIED)

The following Chemical Officers were retired from active duty during the year:

Colonel Sterling E. Whitesides, April 1953.

Colonel Crawford M. Kellogg, 30 November 1952. (UNCLASSIFIED)

During the period there continued to be a shortage of experienced field grade officers. Under the provisions of Section 233(d) of the Armed Forces Reserve Act of 1952[21] the Chemical Corps was allotted

---

21 P.L. 476, 82nd Cong.

[redacted]

[redacted]

[redacted]

58 officers, in grades captain through colonel under the voluntary recall program.[22] Letters were sent to 271 Chemical Corps reserve officers inviting them to volunteer for two years active duty. Of the 209 replies received, 31 indicated an interest. By the close of the fiscal year, briefs of the records of these 31 had been furnished to the appropriate commanders of the Corps. [redacted]

The Corps had 88 percent of its authorized enlisted strength at the end of the fiscal year and was anticipating that full strength would be attained shortly. Scientific and professional replacements were being received at a somewhat slower rate than formerly, but it was expected that this situation would be rectified following June graduation. (UNCLASSIFIED)

Civilian personnel rolls were cut in conformity with directives from the Bureau of the Budget and the Department of Defense. These cuts are indicated in Table 2. Where possible, reductions were effected through normal attrition. (UNCLASSIFIED)

Liaison With Theaters

A liaison office established in Plans, Training and Intelligence Division, OC Cml O, was found to be necessary in order to properly coordinate a constantly increasing volume of business with overseas theaters. This office was set up to correspond to the overseas liaison office which was found to be so effective during World War II.

22
(1) G-4 advised the OC Cml O orally of this allotment.
(2) Hall Interv.

Colonel James H. Batte was appointed theater liaison officer in December 1952. He visited both the European and Far East theaters during the year, where he personally investigated matters relating to Chemical Corps personnel and materiel. The knowledge gained through these personal contacts proved of considerable value in the handling of [redacted] technical correspondence with overseas commands, which is routed through the liaison office. ([redacted])

General Bullene visited the European Theater in September 1952, and the Far East Theater later in the year. General Loucks visited Europe to attend the 75th meeting of Der Verband der Chemische Industrie in Frankfurt, Germany during October 1952 and incidentally inspected EUCOM Chemical Corps activities. He also visited British and French activities and U.S. personnel in the United Kingdom and France. General Black visited the European theater and General Creasy the Far East Theater in the last six months of the fiscal year. Visits to the theaters were also made by other senior officers of the Corps, as will be indicated below. ([redacted])

As a result of this active liaison with the theaters, widely scattered activities in which Chief Chemical Officer has responsible concern were brought into proper focus and the support of overseas operations facilitated. (UNCLASSIFIED)

A feature of General Creasy's visit to the Far East was meeting with Generalissimo Chiang Kai-Shek on Formosa. The Chinese leader was particularly interested in defense against possible BW attack.[23] ([redacted])

23 Interv Hist O, OC Cml O with Brig Gen William M. Creasy, 7 Aug 53.

Facilities[24]

The curtailment of operating funds following the President's order referred to above brought about several revisions in construction programming, particularly in the BW field. The FY 53 construction program at Fort Terry, a BW research facility under Research and Engineering Command, was cancelled.

Construction accomplishments during the last half of the fiscal year included completion of the Incendiary Oil Plant at Rocky Mountain Arsenal, which was transferred to the Chemical Corps for production of nerve gas on 1 May 1953. Plant capacity exceeded design specifications.[25] The X-201 plant at Pine Bluff Arsenal was 99.5 percent complete at the end of the fiscal year when this plant was transferred to Research and Engineering Command. The Muscle Shoals Chlorine Plant was being readied for leasing. A mishap which occured when final tests of the adjoining Phosphate Development Works were begun in May caused final testing to be postponed until the fiscal year 1953. A 400 unit Wherry housing project at Dugway Proving Ground was completed and was being occupied at the end of fiscal year 1953.

---

24 Unless otherwise noted, material for this section is from statement to Hist O, OC O by Lt. Col C.A. Morgan, Jr, Actg Ch, Facilities Br, Materiel Div, OC Cml O, 13 Aug 53.

25 See below pp. 63-64.

[redacted] rmation

UNCLASSIFIED

Table 3 VALUE OF CHEMICAL CORPS FACILITIES - EXISTING AND AUTHORIZED AS OF JUNE 1953

[redacted]

allation or Activity	Capital Cost a/o 30 June 1953	Cost Index	Replacement Cost	Construction Pending MCA	Construction Pending EPF	Total Replacement Cost	FY 1954 MCA Program
docky Mountain Arsenal	73,648,964 *	1.82	134,041,114	0	11,200,000	145,241,114	0
Pine Bluff Arsenal	53,040,920 **	1.82	96,534,474	20,831,209 #	64,819,981	182,185,664	0
Midwest Chemical Depot	12,508,800	1.82	22,766,016	0	0	22,766,016	216,000
Army Chemical Center (R&D Hq)***	47,161,059	2.08	98,095,003	5,408,222	0	103,503,225	0
Edgewood Arsenal	8,581,726	2.76	23,685,564	500,000	912,371	25,097,935	0
Eastern Chemical Depot	(8,079,500)##	2.76	(22,299,400)	0	0	(22,299,400)	0
Deseret Chemical Depot	10,652,169	1.40	14,913,037	0	293,045	15,206,082	540,000
Camp Detrick ***	29,077,895	1.40	40,709,053	43,451,067	0	84,160,120	0
Dugway Proving Ground ***	35,239,964	1.40	49,335,950	829,000	0	50,164,950	0
Fort Terry ***	5,383,994	4.16	22,397,423	50,000	0	22,447,423	0
Vigo Plant x	12,003,835	2.08	24,967,977	0	0	24,967,977	0
Seattle Plant x	913,105	2.08	1,899,258	0	0	1,899,258	0
Marshall Plant xx	5,304,566	2.08	11,033,497	0	0	11,033,497	0
STB Plant xx	0	-	0	0	3,810,000	3,810,000	0
New Cumberland Plant x	663,595	2.08	1,380,278	0	0	1,380,278	0
Habus Plant x	728,560	2.08	1,515,405	0	0	1,515,405	0
Kansas City Plant x	765,725	2.08	1,592,708	0	0	1,592,708	0
Owl Plant x	4,098,342	2.08	8,524,551	0	0	8,524,551	0
Niagara Falls Plant xxx	6,534,274	2.08	13,591,290	0	0	13,591,290	0
Muscle Shoals (Chlorine Plant) 1	22,966,500	1.0	22,966,500	0	0	22,966,500	0
Phosphate Development Works 1	0	-	0	23,758,030 #	28,819,946	52,577,976	0
St. Louis Plant x	5,342,492	2.08	11,112,383	0	0	11,112,383	0
Fort McClellan	4,720,968	2.76	13,029,872	8,298,750	0	21,328,622	0
GRAND TOTAL CHEMICAL CORPS FACILITIES	339,337,453		614,091,353	103,126,278	109,855,343	827,072,974	756,000
R&E Command facilities	116,862,912		210,537,429	49,738,289		260,275,718	
Materiel Command Facilities	217,753,573		390,524,052	45,089,239	109,855,343	545,468,634	756,000
Fort McClellan	4,720,968		13,029,872	8,298,750		21,328,622	

* $35,000,000 construction on classified project included in this figure, although facility not yet completed.

** It will be noted none of the cost of X-201 has yet been included in this total.

\# FY 1951 P110 Contingency of Army and Contingency of OSD funds

\#\# Estimated figure, included in ACC total

x Industrial Mobilization Reserve Plant in Standby, Inactive, Partially or fully leased or used by other elements of the Army.

xx Industrial Mobilization Reserve Plant in Standby, Inactive, for rehabilitation and construction.

xxx Industrial Mobilization Reserve Plant in Standby, Active during FY 53 reverts to inactive FY 54.

1 Industrial Mobilization Reserve Plant in Standby, Active, In preparation for leasing.

Material furnished by Facilities Br, Materiel Div, OC Cml O. Industrial Mobilization Reserve information from Rpt, Program Director, ACofS (L-4), subj: Installations Program FY 1953-1957 (13 Mar 53), and Annex (13 Apr 53).

[redacted]

Work in the $7,200,000 construction program for the permanent Chemical Corps Training Command facilities at Fort McClellan was 31 percent complete by the end of FY 1953. With a few minor exceptions, Area 32, the 2000 man troop housing area, was completed on 29 May 1953. By 1 June 1953 the area housed the 100th Chemical Group, the Composite Troop Unit, the Chemical Corps School Detachment, and students of the Chemical Corps School. (UNCLASSIFIED)

Table No. summarizes the value of Chemical Corps' facilities and construction pending at the end of the period (under consideration). (CONFIDENTIAL)

General

Early in the second half of the fiscal year, the policies and purposes of a new secretary of defense made themselves felt. Their most immediate effect was a curtailment of activities in line with new budgetary limitations. Downward revisions of FY 54 budget were announced and instructions were issued that expenditures during last quarter of FY 53 would be scaled down to conform therewith. Influence on Chemical Corps financing is shown by the chart and table on page 7 in Appendix A. This effected particularly activities of Research and Engineering and Materiel Commands. (CONFIDENTIAL)

Other new policies of concern to Chemical Corps were (a) greater employment of civilian agencies in research and development, (b) curtailment of work at arsenals in favor of civilian producers, and (c) centralization in higher echelons of civilian control of technical corps activities. The prompt implementing of all of these policies required the constant attention of the Chief, Chemical Corps, during the latter months of the fiscal year, as well as close staff supervision by appropriate divisions of his office. (CONFIDENTIAL)

RESEARCH AND DEVELOPMENT IN THE CHEMICAL CORPS

Administration

Generally, the research and development programs continued to be directed toward the completion of short-term developments, which was necessarily at the expense, to some extent, of basic research. Emphasis was placed on end item development, on weapons and munitions for the dissemination of the nerve gases (G-agents), and on the entire field of biological warfare.

As indicated above,[1] several organizational changes took place during the latter six months of the fiscal year as a result of the Killian Report.[2] During the period there was a slight increase in civilian personnel, but the number of Enlisted Scientific and Professional Personnel dropped from 968 (31 December 1952) to 875 (30 June 1953).[3]

The Fiscal Year 1953 funding program had called for the expenditure of approximately $41,500,000 for research and development activities. By 30 June 1953 the amount actually obligated was $38,411,394 (see Table 1) of which approximately 42 percent was for biological warfare, 30 percent for chemical warfare, 9 percent for atomic warfare, and the remainder for miscellaneous activities.[4]

---

[1] See page 10.

[2] See charts 1, 2, 3.

[3] Figures furnished by the Office of the Comptroller, R&E Command

[4] Ibid. For further details see "Summary of the Chemical Corps Program", Appendix A to this rpt, p. 19

[redacted] Security Information

Chemical Research and Development

During the period from January to June 1953, research and development proceeded in both the offensive and defensive aspects of chemical, biological, and radiological warfare. The search for new toxic agents continued, and hundreds of compounds that had possible toxic chemical structures were considered. The interest was not confined to gaseous substances, but extended on a larger scale to poisonous solids.[5] [redacted]

Methods of disseminating Sarin (GB) by bombs, spray tank, shells, and other means continued under development. Work was begun on a 750-lb. cluster, comprising 126 3-pound vase-shaped bombs to disseminate Sarin from high speed aircraft. In the GB 1000-lb. cluster class, the E10lR3, carrying 76 GB-filled bombs, was modified for external stowage, and the bombs (E54R6) were put through all tests with the exception of the USAF operational suitability tests. For the dissemination of GB vapor by means of airplane spray tanks, a tank, E28, capable of being externally mounted on jet aircraft was developed, and later modified (E29) to utilize the ram-jet principle. Studies were likewise made on the dosage of GB vapor obtainable from

---

5
Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

spray tanks. The 4.5-inch GB rocket, T164, underwent final engineering tests. Because the 4.2-inch GB mortar shells behaved erratically during ballistic tests, redesign was necessary. Standardization of 105-mm. and 155-mm. Sarin-filled artillery shells was delayed at the request of the Ordnance Department pending development of a device of detecting leaks. Research on the thermal dissemination of Sarin was continued in an effort to formulate a pyrotechnic mixture that would not destroy the agent.[6] An ingenious thermal generator having two compartments, in one of which was a thin walled collapsible tube, and in the other a fuel block, was developed. When put into use, the gases from the burning fuel exerted pressure on the tube, and forced out the agent through an atomizing nozzle.[7]

In the field of guided missiles, an experimental investigation was undertaken to determine the principles governing the use of chemical warheads. Development of both toxic and incendiary warheads for strategic surface-to-surface and air-to-surface missiles continued, and missiles carrying BW bombs were tested, using inert E61R4 bombs.[8] [redacted]

[redacted] CONFIDENTIAL

6
(1) Interv Hist O, OC Cml O with Lt Preston C. Rogers, Toxic CW Div, R & E Comd, 29 Jul 53.
(2) Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

7
Semi-annual Progress Rpt, Cml C R & D, 1 Jan-30 June 53.

8
(1) Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.
(2) Semi-annual Progress Rpt, Cml C R & D, 1 Jan-30 June 53.

In flame warfare, development of the flame gun of the light-weight portable flame thrower, E32, reached final stages. When finished the gun was expected to weigh one-third less than the M2A1 portable flame thrower model. The contractors, however, had difficulty producing an all-plastic fuel tank, which was expected to weigh less than half of the equivalent all-metal tank. Final engineering tests were started on the mechanized flame thrower, E24-29, while the E-25-30 developed for the United States Marine Corps, was made ready for final engineering tests, the first prototype being ready for testing in May. Development work continued on a long range incendiary oil projector. In the aerial incendiary field, an important action was the standardization of the M116 (E74) fire bomb.[9] [redacted]

In smoke screening modifications were made in some components of the M3 pulse-jet smoke generator to decrease the frequency of breakdowns.[10] The machine was made more versatile by the development of an adapter, E10, designed to disseminate Sarin at the rate of

---

9
(1) Interv Hist O, CC Cml O with Mr. C.G. Andrews, HW and Non-Toxic Materiel Div, R & E Comd., 31 Jul 53.
(2) Semi-annual Progress Rpt, Cml C R & D, 1 Jan-30 Jun 53.

10
See pp. 43-44 below for details on the breakdowns.

20 gallons per hour, and theoretical studies were begun on the problem of making large area attacks using the device.[11] In the nonmechanical screening field, development procurement was begun on the floating smoke pot, AN-M7. Research continued on infra-red screening agents, designed to prevent enemy use of infra-red guided weapons and viewing devices, and on anti-radar screening agents.[12]

[redacted]

11
Interv Mr. Andrews.

12
Quart Hist Rpt, Cal C Advisory Council, Jan-Mar 53.

[redacted]

Biological Warfare[13]

Work on BW agents reached the point where, in addition to the antipersonnel and the anticrop agents already standardized by the end of FY 1952, a number were approaching the stage where consideration could be given to their adoption as standard types. Insofar as research and development of antianimal agents was concerned, the limiting factor was the lack of facilities. Two new laboratory buildings were under construction at Camp Detrick for work on animal diseases. (~~Secret~~) [redacted]

Two chemical type anticrop agents were standardized during the latter half of FY 1953. The special advantage of these agents is their ability to withstand weathering and the fact that field concentrations are nontoxic to men and animals. Moreover, no method exists for arresting their action.[14] (~~Secret~~)

Since the size of BW particles is of critical importance, the determination of methods for the reduction of dried agents to the proper size, and the collection and classification of these sized particles are essential features of the drying program. (~~Secret~~)

[redacted]

---

13 Except as otherwise noted this material on BW is based on the Seventh Annual Report, Cml C Biol Labs, 1 Jul 52-30 Jun 53.

14 Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

[redacted]

In order to centralize responsibility and to achieve coordination on the important problem of drying BW agents, a research group was established at the Biological Laboratories during this period, a large part of whose work was performed by contract with other government agencies and with private firms. Spray drying and freeze drying were both investigated. [redacted]

Six pilot plants, including one for simulant agents, were nearing completion at the Biological Laboratories. At Pine Bluff Arsenal, the X-201 plant was nearly completed by 30 June 1953.[15] Meanwhile, a new process for the production of the preferred BW antipersonnel agent was recommended to the X-201 facility, and piloting of this was begun in June 1953. [redacted]

The largest single portion of BW research and development funds, 45.9 percent, was devoted to the design and engineering of munitions. Two new aerial munitions were being developed, the first of which was expected to be ready for its agent filling in 1954. A problem still confronting the engineers was the development of a satisfactory needle size for filling the bomb with the preferred agent.[16] Two naval munitions for dissemination the BW agents were being developed and successful tests with a prototype were conducted with simulants

15 Ibid. [redacted]

16 Cml C Advisory Council Newsletter No. 3, 21 May 53.

on land and off the Florida coast. A new means of BW dissemination was discovered in FY 1953. This was the ultrasonic generation of aerosols, which showed much promise and will be investigated in future munition development. ([redacted]) [redacted]

In addition to tests with BW agents and munitions conducted at Dugway Proving Ground, Eglin Air Force Base, and a number of other places, field trials with simulant agents were held at Fort McClellan, Alabama (SHORTHORN I & II) in the fall of 1952. The objective of the latter was to determine tactical potentialities of BW. The results indicated that a considerable number of casualties could have been produced in similar combat situations involving the use of pathogenic agents. [redacted]

Radiological Research and Development

Under the Radiological Warfare program, two types of bombs had been developed by the Spring of 1953. One was an explosive, highly aimable munition, which was effective for small targets, and the other a large area munition, based on the dispersion of surface modified spheres, effective for large targets.[17] [redacted]

By the end of the fiscal year, the RW program came almost to a stand-still as a result of a decision by the Senior Review Board, Department of the Army.[18] [redacted]

[redacted]

17 Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

18 See p. 9.

Some very useful results had been attained in the three and one half years of the program's existence. Those results included:[19]

(1) Discovery of a variety of agents for munitions including those utilizing waste fission products and hence not competing with the atomic program.

(2) Development of a highly aimable bomb.

(3) Development of a large-area bomb.

(4) An experimental facility placed in operation at Dugway Proving Ground for handling, processing, loading, and filling munitions of megacurie quantities.

(5) Tentative solutions to problems of transporting and transferring large quantities of radio-active agents.

(6) Some decontamination work. [redacted]

[redacted] Defensive Measures C

Research and development work on detection, protection against, and decontamination of CBR agents continued to show advances.[20]

---

19 Memo, Actg Dep for RW and Non-Toxic Material for Lt Col Morris Shoes, Office Assistant Secretary of Defense for Atomic Energy, 28 Jul 53; sub: Summary and Status of the RW Program.

20 See Summary History p. 20-23 for the advances in the first half of FY 1953.

The agents of most immediate concern for detection have been the nerve gases, and a promising system for their detection was underway with applied research and development contracts amounting to $500,000.[21] Work on a G-agent alarm for industrial installations was completed, and a feasibility study on an infra-red alarm for scanning paths several hundred yards long was undertaken.[22] This system, if successful, would reduce the expense of maintaining spot samplers at large installations such as airfields. A new color reaction useful for the identification of G-agents was discovered, and a BW field sampling kit was being field tested at the close of FY 1953.[23] ([redacted]

A large program to produce protective masks adopted to new agents was underway during this period. It included masks for non-combatants, civilians, and the military. Development work on the civilian mask, however, was slowed by lack of funds.[24] An impermeable boot was

---

21 Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

22 Interv Hist O, OC Cml O with Dr. Harris, Toxic CW Div, R & E Comd, 29 Jul 53.

23 Semi-Annual Progress Rpt, Cml C R&D 1 Jan-30 Jun 53.

24 Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

UNCLASSIFIED

standardized during the fiscal year. (C[redacted])

Under collective protection, work on diffusion board material was continued and test samples showed good protection against high concentrations of cyanogen chloride. Combined gas and particulate filters ranging in capacity from 600 to 5000 cubic feet per minute were developed. When one of these was tested against BW agents in a Navy building it was 100 percent effective. Cooperative tests were also run with the Navy on the continuous operation of collective protectors and electrostatic precipitators.[25] (CONFIDENTIAL)

In the field of AW protection the attenuation of thermal radiation by means of fog oil smoke was determined from preliminary calculations to be 88-99 percent. Field tests generally indicated that absorbing and scattering smokes could appreciably reduce thermal radiation from atomic devices. (CONFIDENTIAL) (RESTRICTED DATA)

As for CBR decontamination, the most important projects dealt with decontaminating methods and materials, an improved, power-driven, truck-mounted decontamination apparatus, and a new, improved non-corrosive decontaminating agent. Equipment and agents for decontamination were found to require revision. The standard DANC, for

---

25
(1) Ibid.

(2) Semi-Annual Progress Rpt, Cml C R&D 1 Jan-30 June 53.

instance, did not destroy G-agents and was actually corrosive. The replacement agent was an aqueous solution which neutralized G-agents as well as vesicants. Work was also initiated to develop equipment and techniques for the field manufacture of bleach.[26] (C[redacted]L)

For the dissemination of BW decontamination agents such as formaldehyde, a commercial-type fog applicator was field tested and found to be suitable. The most promising agent for BW decontamination continued to be a mixture of ethylene oxide and Freon 12, which had the special advantage of being non-inflammable.[27] [redacted]

---

26 Quart Hist Rpt, Cml C Advisory Council, Jan-Mar 53.

27 Semi-annual Progress Rpt, Cml C R&D 1 Jan-30 Jun 53.

Proving Activities

The Edgewood Proving Ground was deactivated on 30 June 1953.[28] This action was taken in order to reduce costs and to effect a more economical utilization of available test facilities and personnel. The functions controlling the environmental surveillance testing installations at Yuma, Canal Zone, and Big Delta, Alaska, were transferred to Dugway Proving Ground.[29] The arctic test program at Big Delta, was authorized in November 1952, and the first detachment arrived in Alaska in May 1953. By the end of June, however, the testing program had not yet started.[30] (C)

At Dugway Proving Ground new grids were laid out and old ones extensively improved. Wiring and equipment for meteorological assessment was extended. An extensive series of firing tests with munitions were conducted with toxic agents, and the methods of using mustard, hydrogen cyanide and cyanogen chloride under low temperature conditions were explored. Tests were conducted on various modifications of spray tanks for dissemination of GB from aircraft, and on the capabilities of a small BW bomb under varying weather conditions.[31] (C)

28 QC Cml O GO-9, 4 Jun 53.

29 Ltr, C Cml O to CG, R&E Comd, 15 Apr 53, sub: Discontinuance of Edgewood Proving Grounds.

30 Interv Hist O, OC Cml O with Mr. Howard E. Norton, Proving Ground Div, R&E Comd, 4 Aug 53.

31 Security Information
Interv Hist O, OC Cml O with Mr. E.K. Long, Proving Gound Div, R&E Comd, 4 Aug 53.

PLANS, OPERATIONS, TRAINING, AND INTELLIGENCE ACTIVITIES

Plans

A revision of the Estimate of the CBR Situation as of 1 January 1953 was completed and forwarded to ACofS (G-4) on 4 March. It was approved and distribution was made by The Adjutant General.[1] (CONFIDENTIAL)

On 1 June 1953, the OC Cml O published and distributed the Chemical Corps Alternate Headquarters Plan (Cml C-DARAH). As directed by the DA plan of the same name, Cml C-DARAH prescribes the preparation of detailed plans for alternate headquarters and command succession for the CC Cml O. It is designed to preserve continuity of Chemical Corps operations in the event of the total or partial destruction of the Washington headquarters. (CONFIDENTIAL)

Several chemical annexes to the Engineer Barrier Plans for Europe were completed during this period. In March Lt Col Jack F. Lane and Captain T. B. Flynn presented a portion of these annexes to Headquarters, United States Army Europe (USAREUR) where they were well received. Major questions pertained to the provision for personnel to implement them and to the stockage of toxics in Europe. (CONFIDENTIAL)

---

1 TAG ltr, 13 Apr 53, File AGAC-C 385TSSI (7 Apr 53) CMLWO-P, subj: Distribution of CBR Estimate.

Operations

During the year the 2d Chemical Mortar Battalion, one of the oldest chemical combat units, with distinguished service in World War II and in the Korean campaigns, was transferred from Far East Command (FEC) to Zone of Interior (ZI) (less personnel and equipment) and was redesignated as the 2d Chemical Weapons Battalion.[2] The new unit was formally constituted at Dugway Proving Ground on 5 February with an authorized strength of 38 officers, 1 warrant officer, and 209 enlisted men (T of D No. 92-7276). Personnel for the new unit came from the inactivated 3d Chemical Mortar Battalion, as well as through normal replacement channels. [redacted] UNCLASSIFIED

The primary mission of the 2d Chemical Weapons Battalion is to support operations of the combined arms by offensive employment of CBR agents. It is presently employed as an experimental unit at Dugway Proving Ground under supervision of the Chemical Corps Board. The battalion will also assist Research and Engineering Command in engineering tests and will conduct exercise to provide Training Command with data for formulation of tactical doctrine. [redacted] UNCLASSIFIED

Arrangements were completed for the activation on 1 July 1953

---

2 TAG ltr AGAO-I(M) 322 (16 Jan 53) G-1, 23 Jan 53, sub: Change in Status of Certain General Reserve Units.

of the 1st Radiological Safety Support Unit. Previously radiological tests of the Armed Forces Special Weapons Project (AFSWP) were supported by the 216th Chemical Service Company and a provisional safety support unit, an arrangement that did not prove entirely satisfactory. Organizational structure and personnel requirements of the new unit were determined at a conference between Chemical Corps and AFSWP representatives on 14 April 1953. Recommended quotas of 27 officers and 150 enlisted men were approved and 15 officers and 100 enlisted men were made available to Chemical Corps for this duty, the remainder to be provided by the Air Force and Navy. ([redacted])

The Far East Theater

With the transfer of the personnel and equipment of the 2d Chemical Mortar Battalion to the Army Field Forces as the 46lst Infantry Heavy Mortar Battalion, the principal Chemical Corps contributions to the United Nations' effort in Korea became flame and smoke. Important work was also carried on by Chemical Corps service and intelligence units. (UNCLASSIFIED)

UNCLASSIFIED

Flame Weapons

The supply of flame fuel and weapons continued to represent a major portion of the Corps' activities in Korea.[3] Several types of weapons employing napalm were in use such as portable and mechanized flame throwers, and bunker bombs made from 30 or 50 caliber ammunition boxes filled with napalm and ignited by

---

3 Except where otherwise noted, material on flame is based on quarterly reports of the 25th, 40th, and 45th U.S. Inf. Div.

white phosphorus grenades. The relatively static nature of the battle front resulted also in increased defensive use of flame. Mechanized flame throwers were dismounted from tanks and emplaced to cover avenues of approach. The various divisions laid large mine fields utilizing the X-200 napalm land mine composed of a five gallon can filled with napalm. For illuminating the battlefield the Husch flare, made from two 81-mm. napalm-filled mortar cases inverted in a three or five gallon can of napalm, served to silhouette enemy troops. Plans for the calendar year 1953 anticipated the use of at least 100,000 of the five gallon napalm land mines. [redacted]

One of the new incendiary chemical items developed during the period as a field expedient was a small fougasse or mine designed to hurl blazing napalm horizontally over a path up 100 yards long and 30 yards wide. Although the principle of the fougasse has long been known this was a novel application by the chemical section, 25th Infantry Division of considerable value in Korea. Aside from the casualty producing factor, the effect on enemy morale was striking.[4] Still another weapon which was tested was a Navy Depth Charge Projector Mark 6 Mod 2. As developed in the 45th Infantry Division, it was capable of throwing a 150-pound

---

4 This fougasse is composed of a five gallon can filled with thickened fuel, a WP grenade with the fuze removed, a ½-pound block of TNT, and an electric blasting cap. When the exploding TNT hurls the container into the air the scattered WP grenades ignites the napalm. For detailed drawings see Quart Act Rpt, Cml Sec, 25th Inf Div, Jan-Mar 53, in GMLHO-C-513.25/25.

napalm-filled projectile as much as 180 yards. After experimental use in battle aerial recoonnaissance revealed that large areas might be burned out with this weapon. The Eighth Army chemical officer, however, viewed this as a weapon with many limitations and useful only in special situations. A primary fault of the weapon was its inability to put sufficient napalm on the target to rout the Communists from deep underground tunnels, the targets for which a new flame weapon was needed. The projector itself proved to be quite heavy and relatively inflexible in aiming.[5] With the exception of the flame throwers, all these weapons were field expedients that have become an important part of our arsenal through their widespread use in Korea. ([redacted])

UNCLASSIFIED

Smoke

Increased smoke operations during the first half of FY 1953 served to emphasize, in some instances for the first time, several organizational and logistical inadequacies in chemical smoke units.[6] In order to alleviate the critical shortages of smoke generator units and personnel, several organizational and administrative changes were made. One modification was the deactivation on 25 March of the 25th Chemical Decontamination Company and the simultaneous

5
Spec Rpt, Hq 45th Inf Div to CG 45th Inf Div, 15 Apr 53, sub: Operation SCORCH. In CMLHD-C-513.25/45-1.

6
Except where noted, material on smoke is based on quarterly and monthly activity reports of chemical smoke generator companies and battalions, and chemical staff sections of Korean Base Section, Korean Communications Zone, Eighth Army, and Army Forces, Far East.

overstrength authorization for the 388th Chemical Smoke Generator Company in order to permit the absorption of the Decontamination Company's personnel. This move provided additional personnel spaces which could eventually be filled by trained smoke generator operators in place of personnel trained for the decontamination company. The augmented company continued to utilize Koreans as smoke generator operators.[7] The Headquarters and Headquarters Detachment, 453d Chemical Smoke Generator Battalion, then located in Japan, was assigned on 5 April to Eighth Army. Concurrent with this move, the 71st and 388th Chemical Smoke Generator Companies, together with the 21st Chemical Decontamination Company and the 92d Chemical Service Company, were relieved from assignment to Hq, Eighth Army and assigned to the 453d Chemical Smoke Generator Battalion in May.[8] These changes made possible more closely coordinated administrative and logistical support, and the addition of the 71st Chemical Smoke Generator Company from Okinawa provided additional tactical smoke support in Eighth Army. [redacted] CONFIDENTIAL

The 68th, 69th, and 375th Chemical Smoke Generator Companies under the administrative supervision of the 4th Chemical Smoke Generator Battalion provided smoke coverage for such vital areas

7
(1) Hq EUSAK GO 283, 13 Mar 53.
(2) Hq EUSAK GO 307, 18 Mar 53, effective 25 Mar 53.

8
(1) Hq EUSAK GO 363, 3 Apr 53, effective 5 Apr 53.
(2) Hq EUSAK GO 517, 28 May 53, effective 27 May 53.

in Korean Communications Zone as the port of Pusan and the Inchon-Seoul region. In order not to interfere with port operations smoke generators were operated only briefly each day and the making of a practice smoke screen was permitted once a month. [redacted]

The combat elements of Eighth Army received tactical smoke support from the augmented 388th Chemical Smoke Generator Company and after April, from the 71st Chemical Smoke Generator Company. The 388th Chemical Smoke Generator Company frequently provided smoke eight to ten hours daily and averaged 5000 generator hours per month, often under direct enemy fire. Four widely separated platoons from the augmented company maintained smoke on or near the main front line, and in one case in front of the main line of resistance. Logistical and administrative difficulties arose from the fact that the nearest platoon was 40 miles from the company headquarters, the farthest, 130 miles. As a result of these distances most organizational maintenance was performed at the platoon level.[9] [redacted]

Smoke generators screened supply routes, artillery positions, bridge-building, troop movements, and bunker construction. Smoke was also used in a relatively new field, that of psychological warfare. After a build-up by loudspeaker broadcasts and the dropping of propaganda leaflets from light aircraft, smoke screens

---

9 Rpt of Inspection, Lt Col R.C.Morris, Ch, Supply Div, Mat Comd. and Mr. G.M. Dingee, OC Cml O, 23 Jun 53, sub: Report of Inspection of Chemical Corps Equipment Maintenance. In CMLHD-C-514.2

gave enemy personnel an opportunity to approach friendly lines and surrender without being fired upon by the Communist forces. In at least two instances it appeared that enemy soldiers made use of this [redacted] cover to pass over to the UN lines and surrender.[10] [redacted]

The latter months of the fiscal year witnessed a substantial improvement in the supply situation. There was little evidence of items being in critical short supply and where such situations did arise the causes were frequently improper distribution and improper maintenance of operating equipment in the field. The recognition of these conditions as significant causes of reported shortages in the field resulted in the revision, generally downward, of unrealistic requisitioning objectives. Increased operations along a wide front and the use of World War II generators, however, were also causes for maintenance operations to continue to be plagued with temporary shortages of certain spare parts.[11] In KComZ this situation appeared to be improved somewhat by the arrival in March of overdue shipments from ZI. [redacted]

Supply shortages were occasionally aggravated by damaged equipment. Nine Lawson engines for the M-2 smoke generator when received at Pusan Chemical Base Depot on 10 March were all found

---

10 Mo Act Rpt, 388th Cml Smk Gen Co, Feb 53. In CMLHO-C-512.21/388

11 (1) Rpt, Col J.H. Batte, 12 Feb 53, sub: Report of Official Travel.
(2) Comments to Hist O, OC Cml O, Brig Gen H.M. Black, CG, Mat Comd. 26 Aug 53.

to be damaged, apparently the result of improper packaging and handling. The absorption of moisture by the ignition system of smoke pots at times rendered 50 percent of them inoperative with electrical hook-ups.[12] Many smoke pots used by the 69th Chemical Smoke Generator Company failed due to corrosion caused by weather and age. These pots had been manufactured in August 1944. Finally, weather conditions seriously hindered smoke operations as the annual spring thaw covered the Korean hills with a network of muddy roads and swollen streams.

Some use of smoke pots was made in accordance with existing doctrine, not only to supplement smoke generators, but also as a means of alleviating the shortage of smoke units in Korea. Tests conducted at Pusan and in the Paeam Valley confirmed the value of smoke pots in areas inaccessible to smoke generators and in screening the exact location of smoke generators from enemy fire.

The M-3 pulse-jet smoke generator had been introduced in Korea as a means of improving operating efficiency. Compared with the M2A1 smoke generator the lighter M-3 employs a new principle involving fewer moving parts, requiring neither water nor lubricating oil to operate, and using less fog oil in producing smoke. Actual combat operations brought out several technical difficulties, however, and a Chemical Corps Board team went to Korea in February

---

12 Quart Act Rpt, 45th Inf Div, Cml Sec, Jan-Mar 53.

to investigate these weaknesses. This team recommended a number of structural changes be made in the M-3.[13] At the close of the fiscal year Engineering Agency and Materiel Command were acting on these recommendations.[14]

Grenades

While the M15 white phosphorus grenade was a popular weapon with the combat forces, tear gas and irritant gas grenades proved exceptionally useful in the control of prisoner of war compounds on Koje Island and elsewhere. Guards frequently used the M6 irritant grenade to put down riots and disturbances. Although this grenade caused violent nausea and tears there was little if any loss of life and in almost every instance which warranted the use of gas grenades the desired control and discipline was obtained.[15]

Chemical Service Units

Three Chemical Corps service type companies - the 92d and 95th Chemical Service Companies and the 21st Chemical Decontamination Company - supported UN and Republic of Korea (ROKA) troops. In

13 Rpt, Col S.P.Coblentz to Pres. Cml C Bd, 23 Mar 53 (w/additions 11 May 53) sub: Interim Report of My Findings to Date on the Tactical Field Tests of the M-3 Smoke Generator. Filed in Cml C Bd.

14 (1) Rpt, Col S.P. Coblentz, 14 May 53, sub: Report of Official Travel.
(2) Rpt, Chicago Cml CPD, Apr-Jun 53. In CMLHO-C-511.3233/3

15 Rpt, Col James H. Batte, 12 Feb 53, sub: Report of Official Travel. In CMLHO-C-513.1/8.

addition to the basic support mission of the 92d Chemical Service Company, maintenance work was performed on smoke generators, flame throwers, and other pieces of Chemical Corps equipment. The 92d operated the Eighth Army Field Chemical Depot and maintenance shop at Seoul as well as three sub-depots. Teams from the company assisted in the operation of six ammunition supply points (ASP's) in Eighth Army area. In the third quarter of FY 1953 this company handled the movement of over five thousand tons of supplies and equipment. The unit also furnished thickened fuel mixing teams for various units on special jobs requiring large quantities of napalm.[16] ([redacted])

The 95th Chemical Service Company operated the Chemical Base Depot at Pusan under the staff supervision of the chemical officer of Korean Base Section. It operated a sub-depot on the east coast of Korea at Sokchi-Ri, a location in Eighth Army area but under Korean Base Section control. In addition the 95th Chemical Service Company provided a maintenance reserve for the 92d Chemical Service Company at Seoul. These diverse activities brought about inadequacies in personnel allocations to the 95th since there is no provision in the T/C&E for a depot headquarters. Even though the company's activities were divided this work had to be done by unit headquarters. In order to correct this situation and to gain for the unit and its depots the same recognition given depots of

---

16 Quart Act Rpt, 92d Cml Svc Co, Jan-Mar 53. In CMLHD-C-512.45/92

other technical services, it was recommended by the 95th that the name and organization of the unit be changed to that of a chemical depot company.[17] (CONFIDENTIAL)

The third Chemical Corps service type unit in Korea was the 21st Chemical Decontamination Company. This company had a number of functions in addition to its primary mission of decontamination should CBR warfare break out in Korea. Perhaps the most important of these was that of providing napalm mixing teams to various UN and ROKA divisions which in FY 1952 had been serviced by teams from the 92d Chemical Service Company. Another function, one that was popular with combat troops, was that of providing showers by using the decontamination apparatus. Thirteen shower teams operated with U.S. divisions or were in company reserve. Each of these teams consisted of two men and one power-driven decontaminating apparatus, and in one month the unit was able to give showers to over forty-five thousand soldiers.[18] By the last quarter of FY 1953, however, the 21st anticipated the end of its shower mission. Plans were made to turn over the decontaminating apparatus to the infantry divisions and employ the personnel thus released in the formation of a napalm-mixing and flame thrower service team for each US and ROKA division. In the third quarter of FY 1953 alone the unit mixed almost one hundred twenty-five thousand gallons of napalm and also repaired flame throwers. (CONFIDENTIAL)

---

17 Quart Act Rpt, 95th Cml Sv Co, Jan-Mar 53. In CMLHO-C-512.43/95.

18 (1) Quart Act Rpt, 21st Cml Decon Co, Jan-Mar 53. In CMLHO-C-512.44/21.
(2) Rpt, Col J.H. Batte, SECRET Security Information 12 Feb 53, subj: Report of Official Travel. In CMLHO-C-514.1/8.

Intelligence Detachments

The 401st and 503d Chemical Technical Intelligence Detachments operated in Korea as a joint organization under the operational control of the Eighth Army chemical officer. Five field teams of three men each and a headquarters team of five men, formed from the aggregate personnel of the two units, were located across the Army front so as to insure their most efficient utilization. During the last half of FY 1953 these units were primarily concerned with analyzing the operational effect of flame warfare against the Communist forces.[19] ([redacted]

Aid to Korea

Chemical Corps units and chemical staff officers continued to contribute to the development of a chemical corps within the Republic of Korea Army (ROKA). Of 14 ROKA chemical units scheduled for activation four had been activated by 30 June 1953 including two smoke generator and two service companies. As these units have been activated they were attached to similar US units in KCOMZ for basic unit training. It was anticipated that the 71st and 72d ROKA Chemical Service Companies would be ready for operation by 15 August 1953. Inasmuch as supply channels from US chemical stores were through ROKA Engineers or Quartermaster which had increasingly

---

19
(1) Quart Act Rpt, 401st CTSID and 503d CTID, Jan-Mar 53. In CMLEC-C-512.32/401
(2) Spec Rpt, 401st CTSID and 503d CTID, 21 Mar 53, sub: Chemical Technical Intelligence, Korea, 22 Mar 52 to 21 Mar 53. In CMLEC-C-512.32/401-1.

caused difficulty, it was hoped that the ROKA chemical units would alleviate this situation. The chemical section of G-3, Korean Military Advisory Group, assisted the ROKA in planning for the use of US Chemical Corps personnel as advisors in staff sections and in various ROKA Chemical Corps units. The 14 units to be trained are considered adequate for a 16 to 20 division army.[20] (CONFIDENTIAL)

The European Theater (CONFIDENTIAL)

(Data as yet received from EUCOM is inadequate for the purposes of this report. Additional information is being obtained from the theater and will be forwarded as a supplement hereto).

CONFIDENTIAL

20
(1) Quart Act Rpt, Cml Sec G-3 KMAG, Jan-Mar 53. In CMLHO-C-513.264/K
(2) Quart Act Rpt, Cml Sec IX Corps, Jan-Mar 53. In CMLHO-C-513.24/9
(3) Staff Sec Rpt, Cml Sec EUSAK, Jun 53. In CMLHO-C-513.23/8.

Training Command[21]

Army Field Forces

A comprehensive study of training of Zone of Interior troops in CBR warfare was completed by Army Field Forces (AFF) during FY 1953. This study was carefully evaluated in a classified report, "CBR Training in the Continental U.S. Armies," issued by the Office of the Chief, Army Field Forces (OCAFF), on 29 January 1953. The report indicated beyond question that the Army's program for defensive training in this field was not meeting the desired objectives. Its first conclusion was: "Neither individuals nor units are sufficiently trained to undergo CBR attack without disasterous loss of operating efficiency."[22] Corrective measures were promptly taken by the issuance of AFF Training Memo No. 7 (Chemical, Biological and Radiological Warfare) 31 March 1953. [redacted] [redacted]

Although training of field forces in CBR warfare is not an immediate responsibility of the Chemical Corps, the Corps nevertheless contributes directly to this training by instruction of its own

---

[21] Unless otherwise noted the section on training is based on:
(1) Intervs Hist O, OC Cml O with Col Hugh W. Bowan, Lt Col Martin L. Denlinger, Mr. Delbert H. Flint, Maj C.O.Duty, Maj J.H.Watts, Maj G.G. Cannity, PT&I Div, OC Cml O, 23 Jul 53, and 2 Sep 53.
(2) Quart Act Rpts, PT&I Div, OC Cml O, Jan-Mar 53; Cml C Trng Comd, Jan-Mar and Apr-Jun 53.

[22] CBR Training in the Continental U.S. Armies, OC AFF, 29 Jan 53. In Cml C Sch Lib 600.1 (1).

officers at the Chemical Corps School. The formulation of tactical doctrine governing employment of CBR weapons is also largely a Chemical Corps responsibility. The situation revealed as to the status of training in the continental armies therefore indicated the necessity for close coordination by Chemical Corps Training Command and OCAFF to bring about better understanding at all levels of means and methods for countering enemy attacks with gas, biological, and radiological weapons. This was so directed by the Chief Chemical Officer. [redacted]

[redacted] CONFIDENTIAL

Heightened appreciation of the value of CBR situations in field exercises was illustrated in connection with Exercise SNOW STORM conducted at Camp Drum, N.Y., during the winter of 1952-53. Here simulated gas warfare agents were used extensively by AGGRESSOR, thus affording opportunities for the study of both offensive and defensive aspects. AGGRESSOR use of biological warfare was assumed for the training of intelligence personnel only.[23] [redacted]

Publications

As a result of increased emphasis upon the program for publication of manuals covering aspects of CBR warfare several field

---

23 Technical Rpt, Cml Sec First Army, no date, sub: Chemical Corps Activities in Exercise SNOW STORM, Jan-Mar 53. In CMLHO-C-513.23/1-1.

and technical manuals were published or sent to The Adjutant General for approval. Among those published were FM 21-41, "Soldier's Manual for Defense Against CBR Attack," TM 3-290, "Miscellaneous CBR Protective Equipment", and TM 3-400, "Chemical Bombs and Clusters."[24] The responsibility for the preparation of equipment manuals was transferred from Training Command to the Engineering Agency, Research and Engineering Command. [redacted]

Chemical Corps School

UNCLASSIFIED

Graduates of the several courses at the school totaled 1,999 officers and 849 enlisted men during the year. Input of 580 trainees during January represented the highest peak for a single month since the end of World War II. Statistical data on school training are shown in charts and tables included in Appendix A (CTIN-6-64-1). (CONFIDENTIAL)

A total of nine courses were being scheduled at the end of the fiscal year. The Chemical Mortar Officers Course, instituted during World War II, was cancelled for chemical officers, but a class for the training of infantry officers as heavy mortar instructors was held early in 1953. Instructional material pertaining to this

24
Interv Hist O OC Cml O with Maj James Watts, Trng Br, OC Cml O, 2 Sept 53.

CONFIDENTIAL

UNCLASSIFIED

course was also made available to the Infantry School. The Chemical Officers Special Orientation Course was superseded during the year by the Senior Chemical Officers Course, which was designed to acquaint older officers with latest information in CBR warfare as well as in operations and logistics involving chemical troops.

Based on information developed in visits to overseas theaters, the Chief Chemical Officer directed that instruction of Chemical Corps officers be pointed more directly to current operational needs, including the employment of historical examples to illustrate tactical and logistical concepts.[25] (C)

The Commanders' CW-BW Orientation Team had practically completed its script at the end of the fiscal year preparatory to presentation to the Department of the Army in July and to Army Field Forces later in the summer. (C)

Replacement Training

The training of 1,664 enlisted replacements was completed at Fort McClellan during the year. Under current Department of the Army instructions, the Chemical Corps Replacement Training Center is being

---

25
Ltr, C Cml O to Cml C Trng Comd, 28 Apr 53, subs Trng of Cml C Commissioned Personnel at Cml C School.

phased out to meet a deactivation date in October 1953. Thereafter, training of selected enlisted personnel will be limited to instruction in Chemical Corps military occupational specialties after the regular infantry basic training has been completed. (C[redacted])

Reserve Officers Training Corps

Department of the Army policy has encouraged colleges which maintain ROTC units to shift from particular services to Branch General. The Chemical Corps requirement of certain scientific courses, if the student were to acquire a Chemical Corps commission upon graduation, prompted several liberal arts colleges with Chemical Corps ROTC units to change to Branch General in order to make the ROTC program available to more students.[26] The schools which thus transferred their ROTC affiliation were St. Peters, Canisius, Delaware, Vanderbilt, and Idaho State. [redacted]

26
Interv Hist O, OC Cml O with Maj Jack Whitley, Trng Comd Ln O to R & E Comd, 2 Sep 53.

Intelligence[27]

In order to facilitate the efficient testing and evaluation of intelligence materiel the Intelligence Branch assumed the direction of the 390th Chemical Field Laboratory Company at the Army Chemical Center, Maryland. Previously the Chemical and Radiological Laboratories had performed this test work for the Intelligence Branch but, because of the pressure of other duties with higher priorities, delays resulted which often lessened the value of the intelligence information. Not only did this new arrangement result in the production of current information when it was most valuable, but the members of 390th Laboratory Company also received training in the same kind of operations they would experience in overseas employment. The company furnished valuable guidance to the 51st and 52d Chemical Technical Intelligence Detachments which were attached for training.[28] UNCLASSIFIED

The work of Intelligence Branch in collecting and distributing technical intelligence information continued. The Chief of Intelligence Branch, Lt Col Frank L. Schaf, Jr., attended the annual technical intelligence meeting held in London under the auspices of the British

[redacted]

27 Intervs for Intelligence Section were: Interv Hist O, OC Cml C with Majors Roy Branson and Paul J. Walsh, PT&I Div, OC Cml C, 27 Jul 53, and with Major Harry L. Davis and Mr. James A. Clayton, R&E Comd, 7 Aug 53.

28 (1) Ltr, OC Cml C to CG A Cml C, Md, 4 Feb 53.
(2) D/F, C Cml C to C PT&I Div, 26 Feb 53.

Government. One of the prime purposes of this meeting was the interchange of technical intelligence information among friendly powers. Lt Col Schaf then made a liaison tour of various agencies in Europe which were concerned with the collection of technical intelligence. (CONFIDENTIAL)

In the field of counter-intelligence measures were taken in accordance with Department of Defense policy to tighten security control. The impetus for this program came from a Joint Chiefs of Staff Memo (SM-2077-53, 3 Sep 52) directed to the Chiefs of Staff of the Army, Navy, and Air Force. Representatives of the PT&I Division, OC Cml O, held conferences with various echelons of Chemical Corps security personnel to determine the best means of improving security. Several Chemical Corps regulations directed new procedures in matters of visitor control and the clearance of informational material for release outside of the military establishments.[29]

(CONFIDENTIAL) UNCLASSIFIED

29 Cml C Reg 30-3 (12 May 53), 50-1 (27 Feb 53).

PROCUREMENT AND SUPPLY

Administration

The setting up of Chemical Corps Materiel Command during fiscal year 1952 paved the way for handling a substantially increased procurement and supply program during fiscal year 1953.[1] With increased experience in the Corps and refinement of procedures by higher echelons, significant advances were made in reporting, analysis, and monitoring of Chemical Corps materials programs both at the staff level of Materiel Division, OC Cml O, and at the command level of Chemical Corps Materiel Command. (UNCLASSIFIED)

Emphasis was placed at both staff and command levels on standardizing procedures under the army Primary Programs. Requirements and replacement factors were recomputed by refined statistical methods on the firm basis of extended Korean experience. More simplified procedures were adopted in distribution, storage, inspection, and surveillance, while recording was improved in these areas to develop more useful and readily available monitoring information. Organizational and administrative changes were made to accomplish these improvements and to clarify lines of responsibility, as discussed in detail below. (UNCLASSIFIED)

---

1 Summary History, pp 2-3, 39, and Chart 4, for reorganization; see below pp. 62-70 and accompanying charts and tables for increased programs.

Planning for a revised procurement organization[2] was completed in the latter half of the fiscal year. Chicago Chemical Procurement District, as Rocky Mountain Arsenal Procurement Office, will become a sub-activity of Rocky Mountain Arsenal on 1 July 1953. Dallas Chemical Procurement District also will be redesignated and assigned to Pine Bluff Arsenal on that date. Boston Chemical Procurement District, which was to have been deactivated, will become a sub-office of New York Chemical Procurement District on 1 January 1954.[3] In line with Killian Committee recommendations and Chemical Corps procurement reorganization plans, all research procurement functions, including procurement responsibility for Camp Detrick and Dugway Proving Ground were transferred from Materiel Command to Research and Engineering Command. As part of this transfer Chemical Corps Procurement Agency, located at Army Chemical Center, on 1 April 1953 was redesignated Chemical Corps Research Procurement Agency and was placed under Research and Engineering Command.[4] In order to avoid duplicate procurement facilities at Army Chemical Center, Brigadier General Henry M. Black, Commanding General, Chemical Corps Materiel Command and Brigadier General William M. Creasy, Commanding General

---

2 See Summary History, pp. 43-44.

3 (1) DA GO 32, 13 April 1953.
(2) OC Cml O GO 8, 2 June 1953.

4 OC Cml O GO 6, 20 March 1953.

Chemical Corps Research and Engineering Command, agreed that Chemical Corps Research Procurement Agency would arrange local and emergency maintenance and operating procurement for Edgewood Arsenal, a Materiel Command function at Army Chemical Center. Production procurement for Edgewood Arsenal was made a responsibility of New York Procurement District.[5] (UNCLASSIFIED)

A further change made as a result of Killian Committee recommendations was the transfer of responsibility for industrial pilot plant development and operation from General Black to General Creasy. As mentioned above, the X-201 pilot plant at Pine Bluff Arsenal was transferred to Research and Engineering Command as of 1 July 1953.[6]

[redacted]

Other significant administrative developments within Materiel Command included the following:

1. Safety Division, a part of Materiel Command organization which was not staffed until September 1952, was augmented in February 1953 to provide more adequate supervision of the safety program. Technical Escort Detachment, a unit stationed at Army Chemical Center having supervision and control over transportation and disposal of hazardous materials, was transferred

---

5 Interv, Hist O, OC Cml O with Brig Gen H. M. Black, CG, Cml C Mat Comd, 16 Jul 53.

6 See above, pp. 13-14.

for staff supervision from Supply Division to Safety Division, 4 February 1953. Since safety is the primary unit mission of Technical Escort Detachment, the transfer clarified responsibility. Safety directives for the entire command were formalized early in calendar year 1953 by the publication of the Materiel Command safety program.[7] (UNCLASSIFIED)

2. Inspection Division was reorganized to fix responsibility for review, analysis and recording of inspection and surveillance plans and reports, and to incorporate statistical analysis into practical inspection procedures.[8] (UNCLASSIFIED)

3. The reorganization of the Office of the Comptroller which had been effected in September 1952 to provide an Administrative Inspection Section directly responsible to the Comptroller

---

7
(1) Interv Hist O, OC Cml O with Mr. David Abernethy, Safety Div, Mat Comd, 24 Jul 53.
(2) Cml C Mat Comd Dir 12-1, 27 Feb 53 (safety program).
(3) Cml C Mat Comd Reg 75-1, 15 Jul 53 (Revised safety program completed by the end of Fiscal Year 1953).

8
(1) Quart Hist Rpt, Mat Comd, Oct-Dec 52.
(2) See below, p. 76 for quantitative accomplishments.

resulted in better monitoring of comptroller type activities at Materiel Command installations and insured assistance to inspecting and auditing teams reviewing those activities. The work of Administrative Inspection Section delimited functional areas for all elements of the command, provided a basis for official travel authorization and responsibility, and caused the adoption of improved procedures for recording and supervising time and payroll accounts. A second Comptroller's Office reorganization in the last half of the fiscal year established a Mobilization Planning Office which by the end of the fiscal year made possible, command-wide, the near completion of mobilization plans, the beginning of a new set of permanent peace-time plans, and the scheduling of reserve training. Arrangements were nearly complete at the end of the year to establish a Financial Policy Section for making and reviewing funding decisions at the command level. A saving in time and a simplification of procedures was expected to result from the centralization of funding policy responsibility

which has been divided between the branches of the Comptroller's Office, Materiel Command, and the Comptroller's Office, OC Cml O.[9] (UNCLASSIFIED)

Procurement and Production

A continuing Chemical Corps procurement problem was that of coordination with agencies using differing program procedures. This problem was intensified in Fiscal Year 1953 since the volume of Chemical Corps procurement for other services, especially Air Force and Navy, was nearly tripled over that of the previous fiscal year. Liaison with all major recipients of material purchased and produced by the Chemical Corps was improved during the year, and more efficient reprogramming resulted. A comprehensive solution, minimizing revision of schedules, was foreseen for future fiscal years by arrangements in process at the end of Fiscal Year 1953 to obtain complete programming forecasts.[10] (UNCLASSIFIED)

9
(1) Quart Hist Rpts, Mat Comd, Oct-Dec 52 and Jan-Mar 53.
(2) Intervs, Hist O, OC Cml O with Mr. V. E. Werner, (13 Aug 53), Mr. J. L. Hill (13 Aug 53), Mr. D. J. Hanlon (21 Jul 53), Office of the Comptroller, Mat Comd.

10
Interv Hist O, OC Cml O with Mr. R. A. Bergseth, Materiel Div, OC Cml O, 28 Jul 53.

Table 5 - Accepted Item Production of Principal Items - 2nd Half FY 1953*

Item	Unit	Cumulative FY 51-52 and 1st Half FY 53	Jan 53	Feb 53	Mar 53	Apr 53	May 53	Jun 53	Cumulative FY 51-52 and 53
Mask, Prot., Field, M9A1	ea.	2,756,426	137,662	119,029	125,084	105,212	108,705	86,919	3,439,017
Canister, M11, Spare Parts for Mask, M9A1	ea.	1,662,895	15,700	2,446	106,787	94,788	127,501	137,412	2,136,529
Protector, Collective, Field, M6	ea.	945	195	250	195	175	101	100	1,961
Decontaminating Apparatus, Portable, 3 gal, M1	ea.	25,832	0	0	4,812	5,568	3,136	4,972	44,320
Impregnite, XXCC3	lb.	3,165,225	301,500	296,975	306,025	301,500	170,025	0	4,541,250
Chemical Set, Clothing Impregnation, M3	ea.	133,762	12,588	9,646	7,006	Complete	-	-	163,002
Thickener, M-1	lb.	7,224,271	119,700	460,725	10,200	6,300	34,272	Complete	7,855,468
Thickener, M-2	lb.	20,165,640	0	0	365,400	662,100	541,500	300,100	22,034,740
Grenade, Incendiary, AN-M14	ea.	882,820	139,061	111,764	59,221	0	0	8,908	1,201,774
Grenade, Hand, Smoke, WP, M15	ea.	659,024	0	0	0	7,104	Complete	-	666,128
Grenade, Hand, Tear, CN, M7A1	ea.	475,226	0	7,637	42,763	Complete	-	-	525,626
Candle, Smoke, Oil, SGF 2, M6	ea.	0	20,016	20,000	8,512	0	3,922	Complete	52,450
Generator, Smoke, M-3	ea.	0	5	84	3	2	1	80	175
Pot, Smoke, Floating, M4A2	ea.	172,607	21,980	27,137	9,452	50	Complete	-	231,226
Pot, Smoke, Floating, SGF 2, Mk 5, Mod 2	ea.	Pilot Lot 179	0	0	1,000	10,000	10,000	Complete 18,821	40,000
Pot, Smoke, HC, M1	ea.	941,231	11,136	2,910	8,294	12,491	0	1,065	977,127
Igniter, Fire Bomb, M23	ea.	315,100	65,100	45,375	65,100	38,925	53,550	31,041	614,191
Cluster, Incendiary Bomb, PT 1; 500-lb, M-31	ea.	39,052	2,000	2,072	2,000	2,750	3,269	772	51,915
Cluster, Incendiary Bomb, 500-lb, M32	ea.	48,555	2,440	1,304	1,344	1,250	4,762	1,283	60,938

*Source: Extraction from "9 Cml C", Cml C Procurement Status Report, Hq, Cml C Mat Comd, 30 Apr 53 (CMLMC-ZP-13); Monthly Summary of Procurement Performance, Hq, Cml C Mat Comd, 31 May 53 and 30 Jun 53 (CMLMC-ZP-23). Compare, Summary History, Table 3, p. 46.

A production problem arose in the period January to July 1953 in adjusting production schedules in accordance with Department of Defense stretch-out policies. Production was reprogrammed with reduced schedules, but optimum employment of all facilities and manpower could not be obtained.[11] (UNCLASSIFIED)

Procurement accomplishments are indicated in Table 4. In actual production as differentiated from initiated or authorized procurement, material in value of approximately $101,000,000 was contracted for manufacture by private industry while accepted production at Chemical Corps arsenals was valued at approximately $63,500,000.[12] (UNCLASSIFIED)

Table 5 lists the principal items of accepted production.

Table 4 - Dollar Magnitude of Procurement Initiated or Authorized During FY 53 by User [13]

Chemical Corps (Army)	$21,397,000
Air Force	$269,600,000
Navy (including Marine Corps)	$7,882,000
Ordnance Corps	$21,754,000
Mutual Defense Assistance Program	$554,000
Other	$882,000

(UNCLASSIFIED)

11
(1) Annual Rpts, FY 53, Rocky Mountain and Pine Bluff Arsenals.
(2) Interv Hist O, OC Cml O with Mr. F. L. Nickle, Industrial Div, Mat Comd, 13 Aug 53.

12
(1) Interv Hist O, OC Cml O with Mr. C. D. Yeffman and Mrs. H. B. Wickham, Materiel Div, OC Cml O, 28 Jul 53.
(2) Arsenal figures from Miss Mary Walsh, Industrial Div, Mat Comd. This figure includes the cost of certain commercially procured components use at the arsenals.

13
(1) Information from Mr. O. R. Mullen, Materiel Div, OC Cml O and Comptroller's O, Mat Comd.
(2) See Appendix A, p. 22 for more complete analysis

A production event in the last month of the fiscal year was the delivery of the first lot of 1,000 lb. Sarin filled bomb clusters (E10IR3) from the new plant at Rocky Mountain Arsenal.[14] ([redacted] [redacted])

Two new 750 lb. incendiary clusters (E115 and E117), the development of which is the result of a trend toward heavier clusters required for higher speed aircraft and higher altitude bombing, were scheduled during this period for production in the latter half of Fiscal Year 1954. These clusters may partially or wholly replace the 500 lb. clusters (M-31 and M-32) which were the principal production items of this type during Fiscal Year 1953.[15] ([redacted])

Industrial Mobilization[16]

During the period covered by this report emphasis was placed on Army Primary Program No. 8, "Mobilization Planning" and particularly on these categories concerning industrial reserve plants in standby, industrial mobilization equipment reserve, and industrial preparedness measures. The goal for plants in standby was to attain a state of readiness which

---

14
See above p. 19.

15
(1) Interv Hist O, OC Cml O with Mr. O. R. Mullen, Materiel Div, OC Cml O, 29 Jul 53.
(2) See above p. 62.

16
(1) Material for this section from Interv, Hist O, OC Cml O with Mr. F. C. Muller, Materiel Div, OC Cml O, 29 Jul 53.
(2) See, above, Table 3 for a list of industrial reserve plants.

would permit operations within sixty days. None of the Chemical Corps plants reached that goal, but substantial progress was made during the period. A continuing survey of industrial reserve equipment was made to determine critical and long lead-time items to be scheduled for purchase in future budgets. (UNCLASSIFIED)

A feature of industrial preparedness measures was the placing of commercial contracts for the evaluation of production procedures, mass-production features of item design, use of critical materials, and educational orders. During Fiscal Year 1953 contracts in these categories totaling $988,000 were awarded to private engineering firms. (UNCLASSIFIED)

Army Industrial Fund [17]

The Army Industrial Fund became an increasingly more useful tool in Chemical Corps production management during Fiscal Year 1953. In September 1952, the Reimbursement Billing Office was transferred from OC Cml O to Headquarters, Chemical Corps Materiel Command. This action resulted in a reduction of personnel performing this function and in reducing the time

17 Data in this section was obtained from the Annual Reports of Financial Conditions and Operations for FY 53 of Rocky Mountain Arsenal and Pine Bluff Arsenal and from comments furnished by Office of Comptroller, OC Cml O and Office of Comptroller, Mat Comd.

required to transfer funds to Army Industrial Fund installations. Chemical Corps Materiel Command has indicated that the receipt of Army Industrial Fund report data permitted closer analysis of monthly operations by all staff elements, resulting in improved coordination of staff actions. The "buyer-seller" relationship between Materiel Command and Army Industrial Fund installations caused closer scrutiny of costs of end items produced and provided a basis for programming production more efficiently and economically. (UNCLASSIFIED)

As of 30 June 1953, Rocky Mountain Arsenal had completed its second year under the Army Industrial Fund and Pine Bluff Arsenal its first year. During Fiscal Year 1953 Rocky Mountain Arsenal continued to progress under the fund in the fields of production, supply, management and accounting. Pine Bluff Arsenal reported that one year's experience under the Army Industrial Fund had "demonstrated conclusively the high potential value of this mechanism as a management tool." Advantages similar to those experienced at Rocky Mountain Arsenal characterized the experience of Pine Bluff Arsenal during this first year of Industrial Fund operation.[18] (UNCLASSIFIED)

---

18 See Summary History, p. 41.

Benefits aside, there were a number of problems which arose in connection with the operations of the Fund at both installations. Some of these problems, such as change in requirements by higher echelons and changes in specifications and designs, are inherent in the supply procedures of the Armed Forces. Requirements during the six month period January-July 1953, for example, were effected particularly by policies of the new administration on stretching out the national rearmament effort. Other problems, such as the lack of standard cost data, had their origin in the installations' limited experience. Still other problems existed, such as the administrative problem resulting from the large number of reports required by high echelons and the many requests for information which demanded recasting data in a form not useful for management purposes at the installation level. (UNCLASSIFIED)

Supply

Sufficient data had accumulated during the period covered by this report for a recomputation of replacement factors and requirements. Korean experience, checked by refined statistical methods and crosschecked by World War II data, and actual field testing of item life served as a basis for this recomputation. The resulting

[redacted] Security Information

Table 6 - Materials Handling Performance
Chemical Corps Depots and Depot Sections, FY 53 [20]

Tonnage Handled

	Tons
Total received	73,574
Total shipped	69,751
Total rewarehoused	51,483
Total intra-depot movement	214,183
Total handled	408,991

Maintenance Tonnage

	Tons
Renovated and repaired	12,514
Care and preservation	38,713

Storage Situation at Close of FY 53

Gross space available, sq.ft.	12,711,000
Covered space available, sq.ft.	5,361,000
Open space available, sq.ft.	7,350,000
Percent of total space occupied	
Covered	66
Open	46
Serviceable material stored, tons	425,044
Unserviceable material stored, tons	75,773
Total material on hand, tons	500,817
Estimated value, material on hand	$361,365,593

Property Disposal, Dollar Value

Excess & surplus property generated FY 53	$ 32,800,000
Excess & surplus property redistributed or transferred	5,940,500
Surplus property salvaged	3,075,900
Surplus property demilitarized	19,037,800
Excess property being processed at the end of FY	3,487,800

Spare Parts Handled, Dollar Value

Issued	$ 3,014,000
Procured	5,023,448

[20] Information furnished by Mr. S.W. Ingram and Major W.T. Carney, Supply Div., Mat.Comd.

See Appendix A, pp.33-41 for more complete analysis.

information permitted a detailed reappraisal and adjustment of programs in current procurement, mobilization reserves and storage needs.[19] Spare parts requirements and reserves were a distinct problem which will be discussed in more detail below. (UNCLASSIFIED)

Materials handling performance accomplishments by Chemical Corps depots and depot sections in the fiscal year are tabulated in Table 6. [redacted]

Spare Parts[21]

At the beginning of Fiscal Year 1953, relocation of the Chemical Corps spare parts depot and supply control point at the Chemical Supply Section, Memphis General Depot, had been completed. This change in location did not, however, provide an automatic cure for long existent spare parts ills. (UNCLASSIFIED)

Spare parts supply suffered from overstockage left from World War II, from parts improperly identified, classified and marked, and from discrepancies in stock records caused by the many physical transfers of stocks since World War II. Deficiencies in requirements and usage data and a lack of policy guidance further hampered computation of stockage objectives. A requisitioning

---

19 Interv Hist O, OC Cml O with Mr. B. H. Daniel and Mr. G. I. Rhorer (4 Aug 53), and Mr. B. A. Yeargin (28 Jul 53), Materiel Div, OCCmlO

21 Unless otherwise noted, data for this section from:
(1) Comments to Hist O, OCCml O by Brig Gen E. M. Black, CG, Mat Comd, 26 Aug 53.
(2) Interv Hist O, OC Cml O with Mr. Ritchie Buckingham, Supply Div, Mat Comd, 16 Jul 53.
(3) See Summary History, pp. 48-49.

objective of 45 months' supply at Memphis had been established to provide for current issues and unknown reserve requirements.

By the middle of the fiscal year, issues of spare parts to FECOM had increased so markedly that stocks were being exhausted at an alarming rate. Representatives of the ACofS (G-4), who inspected the Chemical Supply Section, Memphis General Depot, criticized the existence of apparent overstockage in some items, the lack of requisitioning objectives in other items, and the absence of reserve requirements and retention levels. The spare parts situation was definitely in need of correction.

In March the Chief Chemical Officer directed that a committee be established to make a complete study of all spare parts problems and to recommend necessary corrective actions. Colonel Harold Walmsley, Deputy Commander, Materiel Command, was designated chairman of this committee which included representatives of Materiel Division, OC Cml O, Materiel Command, Research and Engineering Command and the Memphis General Depot. Such problems as authorizations, requisitioning, procurement, specifications, inspection and funding were being investigated at the end of the fiscal year.[22] Meanwhile, Materiel Division, OC Cml O, had provided

22
Rpt, CMLMC-SPP, Col H. Walmsley, Chairman, Ad Hoc Committee on Spare Parts, Hq., Mat Comd to C Cml O, 22 Jul 53, sub: Report of the Second Meeting of the Ad Hoc Committee on Spare Parts.

end item density data and criteria for establishment of authorized spare parts reserves. By the end of the fiscal year the necessary recomputations were in process at Memphis to apply assets against reserve requirements and to determine quantities in excess of the newly established retention levels. Stockage and requirements data were also being computed for an estimated 2900 common spare parts items prior to the transfer of logistic responsibilities to other technical services under SR's of the 700-51-100 series. On the recommendation of the spare parts committee policy guidance on these stockage and requirements problems as well as on other supply control and issue procedures was prepared for issue in July as Chemical Corps Materiel Command Instructions No. 9.5-6. [redacted])

Distribution

The largest distribution problem in the Chemical Corps was the world-wide supply of the new field protective mask (M9A1). Overseas distribution was accomplished during the year, and distribution was well advanced in the Zone of the Interior at the end of the year. Instructions were issued on a world-wide basis for disposition of the replaced protective masks.[23] [redacted])

23
(1) Interv Hist O, OC Cml O with Mr. Ira Speer, Materiel Div, OC Cml O 29 Jul 53.
(2) OC Cml O, Cml C Materiel Instructions No. 3.3-12, 22 May 53.

Plans were complete for the introduction of the Army Simplified Supply System at the beginning of Fiscal Year 1954. Two manuals covering requisitioning, records and stock reporting procedures under the system were published by Supply Division, Materiel Command. The simplified supply system is, in part, preparation for the revision of the Financial and Property Accounting System and the introduction of the Army Stock Fund.[24] (UNCLASSIFIED)

During the period preparatory steps were taken by the Department of the Army to initiate the Army Stock Fund concept in the technical services. Public Law 216, 1949 had provided for this type of fund to be applied to supply activities, as the Industrial Fund concept was applied to production activities. Before a stock fund could be set up, however, it was necessary to have a more suitable system of Financial and Property Accounting, or in other words, a complete record of all stocks on hand in terms of dollar value. Since the spring of 1950 the Chemical Corps had had such a system for the entire Corps centralized at the Army Chemical Center. For purposes of the Army Stock Fund, however, this system proved to be too centralized, and was also lacking in other particulars.[25] On 18 June the ACofS (G-4) directed the chiefs of

---

24
(1) Interv Hist O, OC Cml O with Mr. W. J. Patro, Supply Div. Mat Comd, 21 Jul 53.
(2) Chemical Corps Simplified Supply System Manual, two parts, Supply Div, Mat Comd, June 1953.
(3) DA Cir 42, 12 Jun 53.

25
Interv Hist O, OC Cml O with Mr. R. D. Rogers, Comptroller's Office, OC Cml O, 29 Jul 53.

the technical staffs and services of the Army to inaugurate a more workable system by 1 January 1954. On 30 June a $225,000 contract to devise such a system for the Chemical Corps was awarded to the accounting firm of Touche, Niven, Bailey and Smart.[26]
(UNCLASSIFIED)

Storage and Maintenance[27]

Storage space and storage of material by condition is indicated in Table 6 and Appendix A. The following were the principal developments in storage and maintenance activities during the last half of the fiscal years

1. The Chemical Sections of San Antonio and Atlanta General Depots were closed at the end of the fiscal year. The Chemical Section of Memphis General Depot assumed responsibility for general supplies issued by the two discontinued sections while branch depots will handle ammunition. Phasing out is to be accomplished by attrition to avoid transportation expense.[28]
(UNCLASSIFIED)

26 Contract DA 41-040-Cml-248. All negotiations on the contract were between the Office of the Secretary of the Army and the prospective contractor. The contract was then sent to OC Cml C for signature.

27 Material for this section from Interv, Mr. Daniel and Mr. Rhorer, and as noted below.

28 Interv Hist O, OC Cml C with Mr. William Connell, Materiel Div, OC Cml C, 28 Jul 53.

2. In order to simplify storage and to make best use of space, in the future general supplies will be issued only from chemical sections of general depots and ammunition will be issued only from branch depots. This change is to be accomplished only as procurement is delivered; no physical transfer of stocks will be made except on issue.[29] (UNCLASSIFIED)

3. Improvements and economies were made in packing and packaging, especially of spare parts, by carefully segregating items to receive domestic packaging and export packaging. Materiel Command Directive 9.2-1 was reissued 31 March 1953 to regularize storage, classification, packing and packaging procedures, and a guide to packing, shipping, handling and storage of general supplies was published by Supply Division, Materiel Command.[30] (UNCLASSIFIED)

4. Maintenance divisions at Chemical Corps depots were reorganized early in calendar year 1953

29
(1) Ibid.
(2) Interv, Hist O, OC Cml O with Mr. R. F. Hall, Supply Div, Mat Comd, 21 Jul 53.

30
Intervs, Mr. Connell and Mr. Hall.

to eliminate duplication and overlapping with other divisions. Maintenance Division performance after the reorganization reached a high level, and duplication was at a minimum.[31] (UNCLASSIFIED)

5. Materiel Command Headquarters actively assisted Continental Army Commanders in instituting field maintenance facilities for chemical material within their areas. Six field maintenance shops were established within Fourth Army Area and two with Fifth Army Area. Sixth and Third Armies had such facilities before Fiscal Year 1953. Field maintenance missions have been requested in First and Second Army Areas, with approval pending action by ACofS (G-4).[32] (UNCLASSIFIED)

Inspection

Inspection Division, Materiel Command, placed great stress on regularization of procedures during the fiscal year as experience with the command structure and definition of functional areas

---

31
(1) Interv Hist O, OC Cml O with Mr. G. M. Dingee, Materiel Div, OC Cml O, 3 Aug 53.
(2) Statement, Capt. W. J. Tisdale, Supply Div, Mat Comd to Hist O, OC Cml O, 23 Jul 53.

32
Comment, General Black, 26 Aug 53.

permitted specific assessment of responsibilities. Department of the Army reporting forms replaced five Chemical Corps forms after a Materiel Command study in economy and clarification of reporting. The culmination of a testing and evaluation program of inspection equipment, a field in which expedients rather than standardization had been the rule, resulted in the approval for standardization of approximately 137 items. An example of regularization of procedures was the preparation for standardization, in protective materials inspection alone, of 37 inspection procedures. Monitoring progress was made in Inspection Division after the establishment of Quality Assurance Branch, assigned to statistical review and analysis of performance. During the last half of the fiscal year this branch each month processed from 3,000 to 5,000 surveillance reports, each week devised four or five inspection sampling plans and maintained a half dozen special analytical projects.[33]
(UNCLASSIFIED)

An outstanding accomplishment in inspection during the fiscal year was the establishment of radiographic inspection facilities at Pine Bluff Arsenal. Immediate gains were possible in determination of height-of-fill in ammunition. With the prospective

---

33 Intervs Hist O, OC Cml O with Captain F. W. Tippitt (21 Jul 53), Mr. G. P. Titcomb (13 Aug 53), Mr. Joseph Mandelson (6 Jul 53), Mr. Henry Ellner (21 Jul 53), Mr. H. A. O. Baller (20 Jul 53), and Mr. G. J. Horwitz (24 Jul 53), Inspection Div, Mat Comd.

increase in radiographic facilities, a considerable saving will be made by radiographic inspection of rejected lots of ammunition rather than reworking of entire lots according to previous practice. This saving amounted to more than $100,000 on a single test schedule at Pine Bluff Arsenal. Radiographic inspection procedures were being defined and verified by practical destructive testing experience at the end of the year.[34] (UNCLASSIFIED)

Theater Supply

Theater visits were made by Generals Bullene, Black and Creasy, as well as Colonels Batte and Hutchinson, during the fiscal year. An inspection of maintenance activities in FECOM by Lt Colonel R.C. Morris and Mr. G. M. Dingee revealed serious deficiencies in all echelons of maintenance, but in particular a neglect of the basic principles of preventive maintenance in the operation of M2A1 smoke generators. Also pointed up were over-stockage and maldistribution of spare parts and inadequate recording of parts usage. These problems were subject to corrective action in the theater.[35] [redacted]

34
(1) Hist Rpts, Mat Comd July-Sept 52, Oct-Dec 52, Jan-Mar 53.
(2) Intervs, Mr. Baller and Mr. Titcomb.

35
Rpt of Inspection, Lt Col R. C. Morris and Mr. G. M. Dingee to ACofS (G-4) through channels, 23 Jun 53.

[redacted]

There were no critical shortages of chemical material in the theaters during the last half of Fiscal Year 1953 except for the white phosphorus grenade (AN-M14) which was not issued for a brief period because of technical difficulties. The report of Colonel Morris and Mr. Dingee demonstrated that some theater reports of temporary shortages were incorrect because faulty requisitioning and stock control procedures had not allowed an accurate accounting of stocks and issue experience.[36] [redacted])

UNCLASSIFIED

36
(1) Intervs, Mr. Daniel, Mr. Rhorer and Mr. Yeargin.
(2) Interv Hist O, OC CmlO with Lt Col R. C. Morris, Supply Div., Mat Comd, 12 Aug 53.
(3) See above, pp. 41-44.

[redacted]

[redacted]

UNCLASSIFIED

SUMMARY

During the fiscal year 1953 Chemical Corps activities in CBR warfare and support of the Korean conflict reached a new peak. This was the busiest fiscal year since the close of World War II, over 400 million dollars having been obligated. (UNCLASSIFIED)

During the year procedures formulated by higher echelons reached new degrees of refinement and better administrative and operating skill was attained in the Chemical Corps. Emphasis was placed on the Army Primary Programs, the Army Industrial Fund and the initial stages of the Army Stock Fund. Organizational changes were effected in conformity with the recommendations of the Killian Committee and a new Administration Division was activated in the Office of the Chief Chemical Officer. (UNCLASSIFIED)

Chemical Corps research and development was geared to the development of end items, weapons and munitions for the dissemination of nerve gases, and BW munitions. Among the munitions investigated for the dissemination of nerve gases were heavy clusters, spray tanks, a rocket, artillery shells, and a thermal generator. The ultrasonic generator of aerosols was investigated for disseminating BW agents. In the closing days of the fiscal year the research and development program was re-evaluated in order to conform to the policies of the Department of Defense.([redacted]

A new type Chemical Corps unit was created when the 2d Chemical Mortar Battalion was redesignated the 2d Chemical Weapons Battalion. Preparations were made for the activation of another unit as of 1 July

[redacted]

[redacted]

UNCLASSIFIED

1953, the 1st Radiological Safety Support Unit. The Corps contributed to the United Nations effort in Korea with flame and smoke support, in addition to its standby role in the event of possible enemy initiation of CBR warfare. On the basis of increased emphasis on CBR warfare in the Army, the Chief Chemical Officer took steps to redirect the training of future chemical officers. [redacted]

The Chemical Corps procurement program in the Fiscal Year 1953 nearly doubled in dollar value that of Fiscal Year 1952 and the tonnage handling peak was approximately 20,000 tons greater than that of the preceding year. Among the outstanding developments under procurement and supply were manufacture of the first lot of experimental clusters from the newly completed nerve gas plant at Rocky Mountain Arsenal, the recomputation of requirements and replacement factors, basic improvement of stock control of spare parts, world-wide distribution of the new field protective mask, and the demonstration of serious theater maintenance and stock control deficiencies in theater supply. [redacted]

The latter half of the fiscal year witnessed the advent of a new national administration and preparations for an armistice in Korea. A more pronounced emphasis was placed on the conservation of manpower and money than during the first half, although even then the emphasis was considerable. As the year drew to a close, the Chemical Corps was making every effort to adjust its sights to the new goals. ([redacted]).