Jan. 1954

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON 25, D. C.

1-14-54

UNCLASSIFIED

SUBJECT: [redacted]) Production of M101 Cluster, Bomb, [redacted] Filled

TO: Assistant Chief of Staff, G-4 Logistics
Department of the Army
Washington 25, D. C.

1. The Air Force is concerned over the lack of a toxic chemical warfare offensive capability. This capability is largely contingent upon the availability of the M101 Cluster, Bomb, [redacted] filled, now under procurement with the Army Chemical Corps. In March 1951 the initial M101 procurement schedule was received which indicated production would begin May 1951 and would be completed by September 1952. Since that time five revised schedules have been received. The latest schedule on 2 December 1953 indicated that production would begin the 4th Quarter FY 1953 and would be completed by the 4th Quarter FY 1955. To date no acceptable munitions have been received.

2. These repeated changes in production schedules, along with the lack of approved information on storage, surveillance, handling, and disposal, have forced the Air Force to withdraw the M101 temporarily from planning consideration. This is considered to be a serious matter inasmuch as the Air Force has a directed responsibility to attain a chemical warfare capability at the earliest possible date.

3. For the reasons cited above, it is requested that the M101 project be reviewed and that the Air Force be advised when this munition, along with the necessary technical and logistical information, will be available so that the M101 can be reinstated in the Air Force chemical warfare capability plans.

UNCLASSIFIED

T. H. LAWTON
Major [illegible], USAF
Assistant Deputy Chief of Staff
Operations

[redacted]

[illegible] AT 3 YEAR INTERVALS.
[illegible] AT 12 YEARS.
DOD DIR 5200.10

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RECRADED Undetermined 20 Jun '54

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SUBJECT: ([redacted]) Production of E101 Cluster, Bomb, GB Filled

G4/F3-392(SF) 1st Indorsement JAN 21 1954
(14 Jan 54)

Office, ACofS, G-4, Department of the Army, Washington 25, D. C. [redacted]

TO: Chief Chemical Officer [redacted]

1. It is requested that the E101 program be reviewed and comments be submitted to G-4 detailing the series of events occurring in this program since May 1951 which have occasioned this delay.

2. It is also requested that the present production schedules be reviewed and G-4 informed when this munition can be made available to meet this urgent U. S. Air Force requirement.

BY DIRECTION OF THE ASSISTANT CHIEF OF STAFF, G-4:

B. FURUHOLMEN
Colonel, GS
Chief, Development Branch
Research and Development Division

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10 February 1954

Mr. Charles H. Young
Manager, Chemical Engineering
Tennessee Valley Authority
Wilson Dam, Alabama

Dear Mr. Young:

As a result of the recommendations of my Advisory Council, who convened last month at Muscle Shoals, I have decided to proceed with certain changes in the design of MSPDW. Pursuant to this decision, I am planning to transfer operational and technical control of the project from the Chemical Corps Materiel Command to the Chemical Corps Research and Engineering Command. I am writing this letter to inform you of the transfer, which I expect to become effective on or about 1 March 1954. This change is not expected to affect the basic relationships which now exist between your organization and the Chemical Corps organization at the site. It is expected to result in an intensification of the engineering effort without jeopardizing the objective of getting sustained production as early as possible.

Colonel A. W. Meetze, presently Commanding Officer of Rocky Mountain Arsenal, is being assigned to take charge of the Project. You may expect a visit from him in the near future. Major Trathen is to remain as an assistant to Colonel Meetze.

I take this opportunity to again mention my sincere appreciation for the assistance which you and your staff have given to this project. We in the Chemical Corps who know the details feel particularly indebted to you for your work in developing and refining the Aluminum Chloride Process and for your assistance to our contractor in initiating production by this method. The quantity of intermediate which we have been able to obtain thereby has permitted vital production to proceed despite our difficulties at MSPDW. The success achieved with that process to date is ample proof of the value of your work.

Sincerely,

E. F. BULLENE
Major General, USA
Chief Chemical Officer

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[redacted]

CMLPC 2d Ind
(14 Jan 54)
SUBJECT: ([redacted]) Production of E101 Cluster, Bomb, GB Filled

DA, OCCml0, Gravelly Point, Washington 25, D. C. 24 FEB 1954 UNCLASSIFIED

TO: Assistant Chief of Staff, G-4

1. As requested in the first Indorsement, there is attached hereto a statement of the difficulties encountered in the E101 cluster production.

2. An examination of the record indicates that the delay to date is due to the attempt to telescope development engineering and production engineering of both the nerve gas facility and the E101 cluster in accordance with policies in effect in the fall of 1950. The attempt was successful in that the development of the GB process and the construction of a production and loading facility was compressed into four years instead of seven or eight, and the development of the E101 cluster was compressed into three years instead of the four or five that would have been required under the normal development and standardization procedures.

3. The telescoping process has required frequent revisions in production schedules. The first production schedule submitted to the Air Force on 14 March 1951 called for initial deliveries of completed clusters in January 1952. The date of May 1951 quoted in the Air Force letter is based on a misinterpretation of a D/F to Hq. USAF from G-4 dated 23 March 1951 (G4/E1-17762). This D/F cited cluster and agent production programs extending from May 1951 to January 1953 which would "involve the procurement of major quantities of industrial chemicals and of metal components." This was not a production schedule.

4. Close coordination between all elements of the Chemical Corps and the Department of the Air Force has been continuously maintained with respect to the development of the E101 cluster and the nerve gas facility which has proceeded parallel thereto. Both services have cooperated in drop tests of the cluster beginning in August 1951. In March and April 1953, the Chemical Corps furnished to the Department of Air Force information for the storage, handling, decontamination and disposal of GB munitions.

5. To date, approximately 2,700 of the E101 clusters have been delivered to the Department of Air Force account. These clusters require minor modification as a result of recent functioning tests. This modification, the replacement of a chamber cap in the cluster, is effected at the storage locations as new caps are received from production and complete replacement will be accomplished during February 1954.

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24 FEB 1954

CMLPC(14 Jan 54)
SUBJECT: ([redacted]) Production of E101 Cluster, Bomb, GB Filled

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6. Present production of filled clusters is proceeding at a rate of 2,000 a month and a rate of 3,200 a month should be attained by March 1954. The slippage encountered to date should be made up during the fourth quarter FY 1954 and thereafter proceed according to the present schedule (approved by Department of Defense) which calls for completion by June 1955.

CONFIDENTIAL

1 Incl
Stmt of Sig Steps
in the Dev and Prod
of E101 Clusters (C)

E. F. BULLENE
Major General, USA
Chief Chemical Officer

Concurrences:

Materiel Div C, A, M
R&D Div [illegible]

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Statement of Significant Steps In The Development and Production of E101 Clusters

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1. General. The development and production delays in the supply of E101 clusters are the results of delays in the production of the agent, the nerve gas, GB, and in the development and production of the cluster metal parts.

Ordinarily, a chemical production process undergoes a pilot plant test and evaluation before a full-scale production plant is built. Ordinarily an experimental munition undergoes full development engineering tests and formal standardization before being released for mass production. When procurement begins, further engineering is ordinarily required to adapt the item for mass production. Under the Army policy in effect during the early months of the Korean conflict, the decision was made to telescope these various engineering steps in the hope of saving time in the overall process. However, it was recognized that the period of the combined process would be longer than either process taken separately.

2. Agent-Production Facility. Original pilot plant data in support of the design and construction of the production plant at Site A - the plant that performs the first three steps in GB production - were obtained from German documents and from two contracts with Monsanto Chemical Company. Under the first contract, Monsanto operated a pilot plant to produce a small quantity of GB. This plant was modified between successive stages of the process and was destroyed by corrosion. The second contract called for the payment of $450,000 for production of dichlor (third step product). Monsanto sustained a substantial loss in producing this material, and again none of the equipment could be salvaged. In extrapolating the data gained from these operations to a full-scale production plant design, it became evident that certain data were vague or missing entirely. In these instances, best engineering judgment, based on theoretical and laboratory studies, was used in the design of the plant.

Construction of the plant was authorized in the fall of 1950. The plant was to be built in two sections - Site A at Muscle Shoals, Alabama and Site B at Rocky Mountain Arsenal, near Denver, Colorado. Site B has been tested and is now in operating condition. Present delays in production are at Site A only.

Original estimates of this project based on the work indicated above were that total cost of the two sections would be $30 million and that Site A would be completed 1 November 1951 and Site B, one month later. As a result of this estimate, the first production schedule was provided the Air Force on 14 March 1951, indicating that deliveries of filled clusters would begin in January 1952.

On 2 November 1951 the Engineers revised the estimated date of completion of Site A to 1 July 1952. Two developments at this period indicate some of the difficulties encountered. One was administrative - an urgency

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designation had been established whereby the National Production Authority would process all requests for materials and production equipment on a high priority basis. This was suspended in December 1951 to permit a G-4 review; and was not reassigned until 29 February 1952. This cost much more than the two months' apparent delay, since other high priority claimants obtained delivery of vital long-lead time production equipment in the interval. The other development was the realization that certain by-products could not be disposed of by sale, and that re-processing plants must be constructed at Site A. On 19 February 1952, the completion date of Site A was estimated as 31 July 1952, of Site B 31 August 1952, and of the by-products facility 31 October 1952. On 3 September 1952, the Engineers advised that while production could begin at Site B on 15 September 1952, Site A would be held-up until December 1952. This was later revised to 1 June 1953, and on 18 May 1953 an explosion during a test of one unit necessitated a further delay to 1 September 1953. Final estimates of the costs exceed $100 million.

The facilities at Site A are completed in accordance with the original design, but production and operating difficulties are now preventing continuous production. It is presently estimated that continuous production can be achieved by June 1954.

At each notification of delay in the completion of construction, the Air Force has been advised and has been provided with a revised schedule of deliveries. In June 1953, the Chemical Corps began production of clusters at Site B using an intermediate product manufactured by batch process commercially. The schedule dated 20 June 1953 and approved by OSD, called for initial deliveries in June 1953 and final deliveries in July of 1954 of the total quantity of 62,931 clusters. Actual production has experienced some slippage but this should be made up by June 1954. Future production has been stretched out in the latest approved schedule in order to keep the facility in operation. A rate of 3,200 a month will be achieved in March 1954 and final deliveries will be received in June 1955.

If Site A is in production by June 1954, as at present estimated, the entire plant will have been put into production in approximately four years - a substantial telescoping of development, construction, production and procurement activities that would normally have taken seven or eight years.

3. The E101 Cluster. A satisfactory method of disseminating GB from a 10-lb cylindrical bomb by a centrally located explosive charge was obtained as a result of field tests conducted in the summer of 1949. With this establishment of the disseminating system, the design and preliminary tests of a bomb suitable for clustering in a 1000-lb cluster were undertaken shortly thereafter.

By June 1950, a GB bomb design had been evolved and designated as the E54R4. It consisted of a 10-lb bomb, an all-ways fuze, E21, a parachute stabilizing system and diaphragm sealing system. Preliminary tests were begun and drawings prepared.

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In August, 1950, although the munition had not completed development engineering tests, and although it was known that more development work was required, the Chief Chemical Officer directed that design be finalized so that large scale procurement of materials for production purposes could be initiated within six months.

The first cluster, which was model E10lR2, was tested in February 1951, to determine the effectiveness of the fuze and of parachute design. Also, early in 1951, the design and construction of the filling and clustering plant were begun, based on the hope that this first experimental design would prove reasonably firm. By May 1951, drawings had been prepared and released for production of an item that had not been fully tested. No live clusters had been drop tested, nor had any automatic filling, sealing or leak testing equipment been designed.

(b)(3):10 USC 130

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USC 130

These difficulties were overcome and final engineering tests were essentially completed in February 1952. Only additional high speed, high altitude tests remained and some additional tests to obtain munitions expenditure data.

Almost the entire year of 1952 was devoted to improving the design of metal components to increase their suitability for mass production. Seamless stainless steel tubing was in extremely short supply; silver solder could not be handled successfully by existing plant equipment; parachute dimensions were critical and could not be held by many manufacturers; new test equipment had to be designed for testing of the fuze; delay mechanisms were incorporated in the bomb; and the design and fabrication of a chamber cap in the cluster adapter required improvement.

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To date, 2,700 filled clusters have been delivered to a Chemical Corps storage area for the Air Force account. These require replacement of the chamber caps. Replacement is being performed at the storage sites, and should be made up during the fourth quarter FY 54, and the entire program should be complete by the end of FY 55. The stretch out is due to directives from Department of Defense to keep production facilities in operation for as long a time as possible.

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DIFFICULTIES ENCOUNTERED IN CONSTRUCTION OF GB FACILITIES

1. Upon the establishment of a nerve gas requirement, approval was obtained and construction authorized in the Fall of 1950 for two facilities. For security purposes these facilities were designated collectively as the EDM project and individually as Site A, located at Musale Shoals, Alabama, for intermediate product production, and Site B, located at Rocky Mountain Arsenal, for end product production. Tentative completion dates of 1 November 1951 and 1 December 1951 for Sites A and B respectively were established as "target objectives" in order to press construction contractor personnel and suppliers to put forth maximum efforts toward establishing the facilities. However, it was realized at the time that the dates were probably unrealistic inasmuch as accurate estimates could not be made because of lack of engineering and procurement data. As an indication of how sketchy available information was at that time, it is noted that the initial "guestimate" of the total cost of the project was $30,000,000, whereas the final construction cost of these facilities exceeds $100,000,000. However, the urgency of the project was such that Architect-Engineering work was initiated with an initial $954,000 which had been appropriated for process design under the normal FY 1951 Industrial Mobilization Preparedness Measures Program. Based upon the 1 November and 1 December 1951 completion dates of Sites A and B, the Chemical Corps as of 14 March 1951 scheduled initial production of E101 Clusters to commence in January 1952 and to continue as follows:

1952:	January	3500
	February	9000
	March	10000
	April	2500

2. After ground had been broken and engineering had progressed sufficiently to initiate equipment design and procurement, the magnitude of the project became more apparent. Accordingly, a revised estimate was submitted and additional funds were requested by the Corps of Engineers on 2 November 1951 and the completion date of Site A was revised to 1 July 1952.

3. To speed the construction of the facilities, a procedure was established whereby the National Production Authority would process all requests for materials and production equipment priorities assistance, in connection with the EDM facilities, on a high relative urgency basis. Such requests for assistance to NPA were processed under the classified project code "SKELP," equivalent to a "Brick-Bat" urgency category. In December 1951 the Munitions Board requested that the urgency of the project be reviewed. Pending this review, the "SKELP" priority was suspended and not re-assigned until 29 February 1952. This resulted in considerable delay

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in equipment deliveries and resulted in re-scheduling of work on construction. In addition, delays in construction because of labor difficulties were encountered. Aside from these difficulties, it was realized that certain by-products of Site A could not be disposed of by sale and that auxilliary reprocessing facilities would have to be provided. Accordingly, construction of a $POCl_3$ reprocessing plant was initiated at Site A, costing approximately $9,000,000 and necessitating additional time to complete the facilities. On 19 February 1952 the Corps of Engineers furnished the following completion schedule:

a.	Start of Beneficial Occupancy	11 April 1952
b.	Completion of Site A Production Facilities	31 July 1952
c.	Completion of Site B Facilities	31 August 1952
d.	Completion of Site A By-Products Facilities	31 October 1952

Based upon these estimated completion dates, the Chemical Corps on 31 October 1952 revised the E101 Cluster production program to commence in January 1953 and continue as follows:

1953:	January	500 each
	February	1000 each
	March	5500 each
	April thru October (ea mo)	7000 each
	November	6931 each

4. On 3 September 1952, the Corps of Engineers submitted a revised construction schedule which indicated that, although production of end product from Site B could be expected by 15 September 1952, completely integrated operable facilities for sustained production would not be available prior to December 1952 because of delays in completion of by-product disposal facilities at Site A. Based upon this estimated completion date, the CmlC on 12 January 1953 again revised the E101 Cluster program as follows:

1953:	March	500 each
	April	2000 each
	May	3250 each
	June	3750 each
	July	5500 each
	August thru Dec (ea mo)	7000 each
1954:	January	5931 each

5. Further construction difficulties resulted in a re-scheduling of the completion of the Site A facilities to 1 June 1953. An additional delay in the estimated start-up date of Site A, to 1 September 1953, was necessitated by an explosion during the testing of one of the units on 18 May 1953. Although the facilities for GB production have been completed insofar as the original construction scope is concerned, they are still

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not fully operable because of deficiencies and operating "bugs" mainly at Site A which have plagued the process because of the accelerated program. In this connection it should be considered that the urgency of the project has telescoped process development, construction, production and procurement activities which normally would have taken seven to eight years into a space of four years.

6. To avoid further delays in production of M101 Clusters for the Department of the Air Force, intermediate product was contracted for with Shell Chemical for supply to Rocky Mountain Arsenal pending availability of Site A product, and the M101 production schedule was again revised on 20 June 1953, and approved by OSD as follows:

1953:	June	680 each
	July and August (ea mo)	1750 each
	September thru Dec (ea mo)	3500 each
1954:	January thru June	7000 each
	July	2751 each

7. The M101 Cluster Production Schedule was further revised and approved by OSD 23 November 1953, for the following reasons in addition to difficulties in construction and start-up operations of the GB facilities:

a. Cancellation of procurement for certain DAF munitions requiring GB.

b. Delay in the standardization of Ordnance munitions to be filled with GB.

c. Desire of the CmlC to retain in operation, the GB facility at an economical rate, thereby providing the Department of Defense with a facility in operation thru FY 1955. This latest schedule is as follows:

1953:	June	(Actual)	240
	July	"	719
	August	"	394
	September	"	906
	October thru Dec (ea mo)		1200 each
1954:	January thru completion		3200 each

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11 February 1954

DIFFICULTIES ENCOUNTERED IN E101 CLUSTER DEVELOPMENT AND PRODUCTION

I. STATUS SUMMARY AS OF MAY 1951:

A satisfactory method of disseminating GB from a 10-lb cylindrical bomb, by a centrally located explosive charge, was obtained as a result of field tests conducted in the summer of 1949. With the dissemination system established, the design and preliminary tests of a bomb suitable for clustering in a 1000-lb Cluster Adapter was undertaken shortly thereafter.

During the first half of 1950, problems in connection with the design of a satisfactory seal, method of filling, stabilization of the bomb and its fuzing were under study and preliminary prototypes of bombs were fabricated and tested. Consideration was also being given to the problem of dispersing bombs over an area compatible with the dissemination efficiency of the bomb. Concurrently, the design of a suitable 1000-lb Cluster Adapter was proceeding on the basis of information being obtained from a 500-lb Nose Ejection Adapter then undergoing high-speed, high-altitude tests. In June 1950, a 10-lb GB bomb design designated as the E54R4 consisting of an all-ways fuze E21, a parachute stabilizing system and diaphragm sealing system was available for further testing and preliminary drawings were prepared.

This Command was requested in August 1950 to finalize on the design of the GB aerial munition so that large scale procurement of materials for production purposes could be initiated within six months. When this decision was made, it was clearly understood that the munition had not been through development-engineering tests and that considerable more development work was required.

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On this basis, a new fuze, E24, compatible with the parachute stabilization device was designed, replacing the all-ways fuze E21, which was considered too sensitive from a clustering and functioning (airburst) point of view.

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FOIAXpress Annotation

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This design was available for fabrication by the middle of November 1950 and a contract for fuzes was awarded the Precision Casting Company. Drawings of the E101R2 Cluster were concurrently prepared.

At the end of 1950, no hardware except experimental parachutes was available for tests of the 1000-lb nonpersistent cluster E101R2. Considerable difficulty was experienced in obtaining seamless steel tubing required for the fabrication of 10,000 E54R4 bombs then on order. The problem of sealing and filling the bomb was being coordinated with various industrial concerns and the contractor responsible for the design of the filling plant.

The first E101R2 cluster was tested in February 1951 to determine the effect of porosity and diameter of the parachutes on the stabilization and dispersion of the E54R4 bombs; no bursters were used. A fuze functioning of 89% was obtained, but additional development of the parachute attachment was indicated. Subsequent tests were conducted and by May 1951, the parachute problem appeared to be solved, [redacted] Inert bursters were used in all tests. [redacted]

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At the time the Chemical Corps Engineering Agency was formed (May 1951), most of the drawings of the E101R2 Cluster and its components had been completed and released for procurement purposes.

The production stage was instituted early in Calendar Year 1951 when design and construction of the filling and clustering plant were undertaken. Component tooling was prepared and the manufacture of millions of parts was started. Plant construction totaling approximately 12.6 million dollars was based on the hope that the experimental design of Fiscal Year 1950 would prove firm.

In summary then, it should be noted that by May 1951, drawings had been prepared and released for production for an item that had not been fully tested. At this stage of the program, no live clusters had been drop tested nor had any automatic filling, sealing or leak testing equipment been designed.

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II. DIFFICULTIES ENCOUNTERED - JUNE TO DECEMBER 1951

After drawings were released, numerous requests were received from various sources for alternate methods of fabrication and materials of construction.

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A program of tests to ascertain the critical aspects of alternate designs was outlined. This program involved fabrication of bombs from welded and seamless tubing, copper and silver brazed. In addition, experimental production of deep-drawn bomb casings was to be conducted by Edgewood Arsenal. Compression, pressure and fragmentation tests were planned. At this stage of the program, materials were becoming available for the preparation of approximately 25 E101R2 Clusters, which were originally destined for development tests. But, in order to expedite the program, an agreement was reached between the Air Force and the Chemical Corps to consider this test a joint Chemical Corps Final Engineering-Air Force User Test. Meanwhile,

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[redacted] (b)(2) HIGH

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To resolve questions regarding the aimability of the E101R3 cluster and to improve the functioning of the cluster, a program involving the test of approximately 20 clusters was initiated; fifteen of these clusters to be tested at Eglin Air Force Base. Ten of the latter clusters were released in December [redacted] and air-lifted to Eglin Air Force Base for completion of the tests.

(b)(3):10 USC 130

(b)(3):10 USC 130

In August 1951 a contract was awarded to Berley Earhardt Corporation for the production of E24 fuzes. Original delivery schedule called for first lots to be delivered by October 1951. As of November 1951, no fuzes had been delivered by the contractor. In the interim, some minor dimensional changes were authorized as a result of requests from the contractor

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to facilitate production. Also in this interim period, tests were conducted with E24 fuzes and a fuze, incorporating certain design changes, which was designated E24R1. In these tests basic functioning of the E24 fuze was below the Air Force requirement. This was indicated in the 25 cluster drop tests conducted at Dugway Proving Ground.

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Drawings of the E24R1 fuze were completed during the early part of December 1951; however, due to insufficient lead time, gaging and test equipment was not made available until the middle of January 1952, at which time the contractor was allowed to proceed with production of the E24R1 fuze.

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III. DIFFICULTIES ENCOUNTERED - 1 January 1952 to 31 December 1952

The remaining five clusters at Eglin Air Force Base were released on 24 January 1952 (b)(2) HIGH

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The final engineering test phase was essentially completed at this time (February 1952). The only tasks requiring resolution were additional high speed, high altitude releases at Edwards AFB in connection with the ballistics of the cluster; release of 1,000-lb clusters at high altitudes to ascertain the functioning of the cluster adapter chamber caps, and completion of tests to obtain munition expenditure data. At this stage of the program, the latest design E54R6 bomb bodies and parachute delay assemblies were not available from production for furnishing clusters required for the above tests. Aside from various rough handling and safety tests conducted on the E10lR3 Cluster and the E24R1 fuze, no appreciable munition development effort was expended on the E10lR3 Cluster due to the lack of hardware.

In May 1952, initial shipment of copper brazed bombs from John Bean and Company was received by the Cml C Chemical & Radiological Laboratories. These bombs were not the production type (ordered initially in September 1951). Ten functioning clusters and 18 inert E10lR3 clusters were assembled for ballistic tests at Edwards AFB upon receipt of these bombs. Other bombs were filled with agent and placed in surveillance. Materials were also being procured slowly for the assembly of six agent-filled E10lR3 Clusters for munition expenditure data.

Almost the entire year of 1952 was devoted to improving the design of the components for suitability for mass production and awarding the required contracts. A contract was awarded the Standard Products Company at the end of December 1951 for production of parachutes. Although the drawings were based on recommendations made by a manufacturer who developed the parachute, extreme difficulties were encountered by the sub-contractors of Standard Products Company in holding the tolerances shown on the drawings for the parachute canopy. After many production delays, a meeting was held early in November 1952 at which the Standard Products Company and representatives of all their sub-contractors were present, in addition to personnel from Chicago Procurement District and Engineering Agency. A composite drawing was made by all the sub-contractors reflecting the tolerances which they believed could be held in making the parachute canopy. This drawing

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resulted in the incorporation of a number of minor revisions of the Chemical Corps drawings of the parachute in order to insure mass producibility of the parts. Production of parachutes resumed shortly after this meeting with some minor difficulties encountered at times but no further major delays were experienced. Hence, parachutes used on all previous tests were not production type.

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Although a contract was awarded to UNEXCELLED Chemical Corporation on 13 June 1952 for the manufacture of the ELOR1 type delay with delivery scheduled for completion in February 1953, no delay mechanisms were manufactured during the year 1952. Hence, the delay mechanisms used in tests performed were not strictly the production type.

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Six (6) agent filled M10lR3 Clusters were assembled near the end of 1952 utilizing the M13 delay and airlifted to DPG. These clusters were to be used to obtain munition expenditure data. Three clusters were released [redacted] (b)(3):10 USC

b(3) 10 USC 130

As previously indicated, no M10R1 delays were produced by the contractor during the year 1952. Hence, a calculated risk was taken in the conduct of these tests with the M13 delays. The remaining three M10lR3 Clusters were held at DPG until sufficient M10R1 delays could be manufactured and substituted for the M13 delays for further testing.

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IV. DIFFICULTIES ENCOUNTERED - 1 January 1953 to 31 December 1953

In September 1952, the Air Force requested that 40 clusters be made available for Phase VI tests in order to meet scheduled target dates under Project RESPONDENT (E10LR3 Cluster operationally ready by July 1953). These clusters, however, were to be production line clusters; no other type being acceptable. In addition, munition expenditure data were also requested. As a partial fulfillment of the latter, ten clusters were dropped at Dugway Proving Ground and-

b(3) 10 USC 130

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Unexcelled Chemical Corporation had been purchasing Ordnance M26 Primers which were inspected and accepted by the Ordnance Corps. When these primers were retested by the Chemical Corps, [redacted] (b)(3):10 USC 130 Unexcelled Chemical Corporation was then permitted to make their own primers. [redacted] (b)(3):10 USC 130 This condition has been corrected. The ten clusters were not strictly of the production type desired by the Air Force for their Phase VI type tests. These tests were directed by the OCCml0 and were conducted primarily to obtain data required by the Chemical Corps.

In accordance with the above request, 40 clusters were sent to Eglin AFB for functioning tests. However, since these clusters contained 8-inch carbon steel chamber caps, 40 additional clusters were assembled, simulant filled and forwarded to Edwards AFB, Calif. (July 1953). The latter clusters utilized on 8-inch forged steel alloy cap which was satisfactory in all previous static tests conducted. The tests performed by the Air Force Armament Center at Edwards AFB (July-Aug 1953)

b(3) 10 USC 130

[redacted] (b)(3):10 USC 130

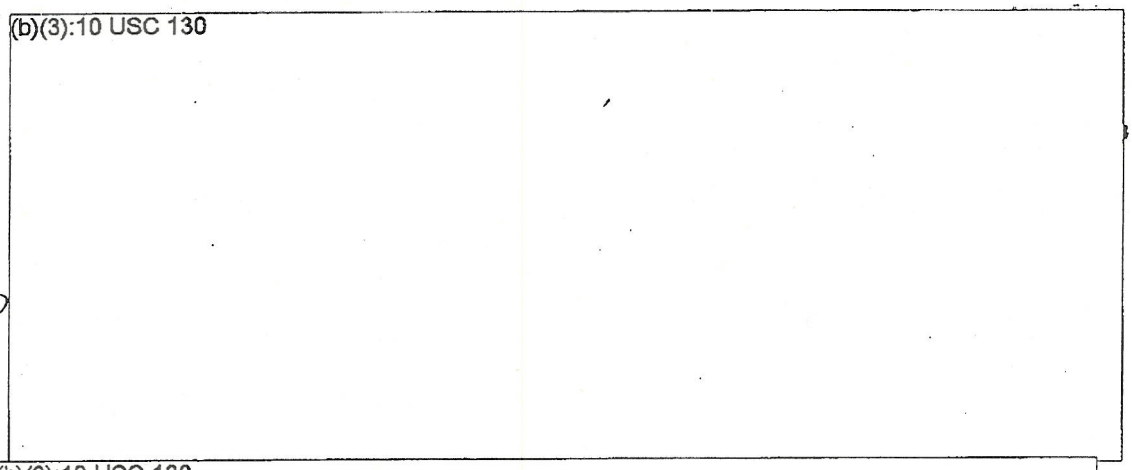
The delay in furnishing the required 40 clusters to the Air Force for Phase VI tests was caused by the failure of the contractor to deliver the E10R1 delay mechanisms and the change-over to a new pressure chamber cap. (Requested in Sep 52, delivered July 53). The contract for production for E10R1 delays was awarded in June 1952 and scheduled for completion in February 1953. As of March 1953, the contractor was not yet in production on E10R1 delays. This was mainly due to the long time it took this company to get tooling and production lines set up, award sub-contracts, hire and train competent personnel, and to adequately recognize and make decisions on these matters.

[redacted]

[redacted]

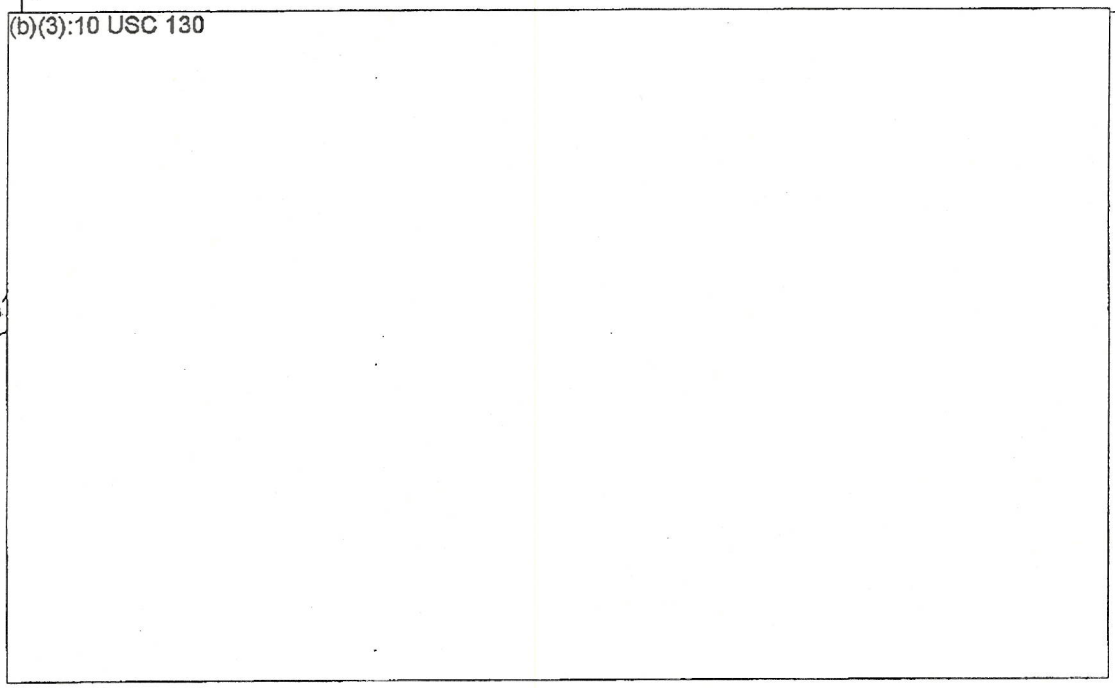
[redacted]

(b)(3):10 USC 130



b(3)
10 USC 130

(b)(3):10 USC 130



b(3)
10 USC 13

Before the end of year 1953, operational suitability tests were conducted by the U.S. Air Force. As of this date, however, results of these tests have not yet been made available to this Command.

[redacted]

[redacted]

[redacted]

V. DIFFICULTIES ENCOUNTERED - 1 January 1954 to 31 January 1954

(b)(2) HIGH

(b)(3):10 USC 130

[redacted]

[redacted] [redacted] 4817-T

CMLWX 1 March 1954

MEMORANDUM FOR RECORD:

UNCLASSIFIED

SUBJECT: British Request for GB (JCS 1837/47)

1. Reference:

a. Memorandum for Gen Loucks from Chief, Programming Coordinating Officer, dated 17 April 1953 (4426-T).

b. Memorandum for Col King from Asst for Plans, Materiel Division, dated 11 Sep 1953. (4648-T).

2. The JCS has been directed by Mr. Wilson to re-examine their recommendations, as recorded by JCS 1837/47, of last April. Col F. J. Zeller is the action officer.

3. Col Zeller, through G-4 (Col Yankey), contacted Materiel Division this date, and discussed the GB program in order to revise and bring up-to-date JCS 1837/47. The following changes were suggested:

4817-T

a. The GB stockpile requirement has been reduced from 26,000 tons to 14,400 tons, as a result of USAF cancelation of Spray Tank.

b. The quantity of GB to be produced by 1 July 54 to be approximately 2600 tons.

c. The quantity of GB expected to be produced in FY 55 to be approximately 4500 tons. (this figure was quoted as that actually expected rather than what the plant capacity may be).

d. To fill British request immediately, at the present production rate, would delay fulfillment of the U.S. stockpile requirement by 6 months. (The original paper stated this to be 2 months).

e. Under the present funding plan for planned production, the U.S. stockpile requirement will not be met until 1 Jul 56, if then. This is a deferment of one year, because of insufficient funding by the Marine Corps, Navy and Army. However, the statement was made that if the stockpile is funded and hardware made available, the U.S. stockpile could be met by 1 Jul 56.

f. The cost of the 2500 tons of GB was quoted to be $20 million instead of $10 million, previously quoted. The figure of $20 million is in line with the quoted price to Navy of $4.00 per pound.

g. Information was provided that the 750-lb cluster of GB would not be fully tested until Sep 54. The previous estimate on paper was Jan 1954.

4. Col Zeller will revise and redraft the JCS reply and will collaborate with this Corps prior to submission. He will contact the undersigned who will coordinate the data with Col Greens prior to stating a Chemical Corps position.

This document consists of 1 pages
1 of 2 Copies, Series [redacted]

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C. A. MORGAN, JR., Lt Col, CmlC
Asst for Plans, Materiel Division

[redacted]

10-87-6275