[redacted]

To: J. R. Zacharias

8/3/45

[redacted]

It is felt that a section should be established for the purpose of handling test information. This section would provide and operate the informer equipment, and would analyze and report the test results.

This represents a departure from the current system in which each group is responsible for its own results unless it can persuade another group to do the job. Group O-3, being the first in the field, has carried the ball admirably for a number of other groups, but has not been given the overall responsibility for the obtaining of test information. The work has been well done, but on an informal and insufficiently considered basis. It is quite possible for example that the information now obtained by O-3 for the operation of its own equipment could be curtailed somewhat to allow added information on equipment not yet proven.

It is expected that this scheme will meet both support and opposition, and in both cases should be taken up with you.

L. Fussell, Jr.

LF/vt

cc: Zacharias
Kistiakowsky
Bacher
Oppenheimer
Brode
Staley
Judd
Greisen
Higinbotham
Titterton
Hornig
Godbold
Wright
Blake
Thomas
Fowler
Larkin
Bradbury
Lofgren
Fussell

[redacted]

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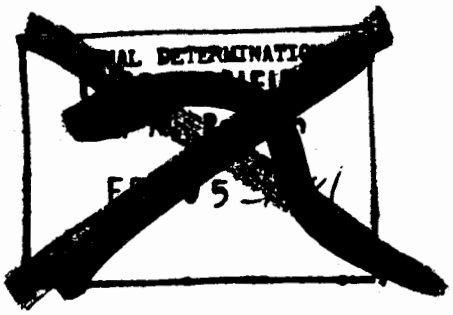
A-84-014
67-7

Classification changed to: UNCLASSIFIED
ADC/ADD
1st reviewer signature/title/org./date/authority
N/A ADD
2nd reviewer signature/title/org./date/authority



25 June 1945

To: W. S. Parsons

From: Ensign D. P. Irons

Subject: July Kingman Schedule

UNIQUE DOCUMENT #SAB2000866600000

1. Due to the uncertainty of delivery schedules from [illegible] suppliers, the schedule for July as it now stands is a partial one with regard to schedule dates. At present, units have not been specifically scheduled beyond 7 July. The total number of units to be tested are listed in Table I and will be scheduled realistically as delivery occurs or is known to be certain. It should be noted that the first four (4) FL's and seven (7) LB's are to be tested at Kingman.

2. Table I lists the units in numerical order with a description of each test.

3. Table II is in effect a calendar. In Table II, the units are listed by date giving the test number and place dropped. Space is provided for pencil revision or pertinent personal notes by the reader.

4. Revisions will be reported as briefly as possible each week in an effort to keep the schedule as up to date as possible.

5. Table III with preliminary results of the tests will be added as the tests occur.

D. P. IRONS

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW DATE: 3-11-96
DETERMINATION (CIRCLE ONE): CLASSIFICATION RETAINED / CLASSIFIED INFORMATION DELETED / DOES NOT CONTAIN CLASSIFIED INFO
AUTHORITY: DOE OMNIBUS
NAME: [illegible] DATE: 3-20-96

cc: Ramsey ✓, Simmons, Ashworth, Bastick, DeSabitino, Corry, S. Dike, Bolstad, Brin, Lauritsen, Oppenheimer, Lockridge, Allison, Higinbotham, Kistiakowsky, Bradbury, Warner, Bainbridge, Henderson, Doan, Cornog, Calloway, Davis, Machen, Brode, Doll, Sillbee, Dick, Staley, Colby, Anders[illegible], Lauritsen, T., Birch, Fussell, Reynolds, Stevenson, McCord, Caughey, Waldman, Alvarez, Shapiro, Polish, Delloff[illegible]man, De[illegible], [illegible]enson, Shields, Lamb, Kuster, Heflin, Tibbetts, Hoagland.

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UNCLASSIFIED

95SA20B000260

TABLE I

Serial Number	Date Scheduled	Nature of Unit and Test
T-46	-	FM, box of X-unit switches with clock or barc unit trigger-through Brode's delay network, 4 Brode informers, plaster blocks, no O-3 fuses or complete X-unit, mild steel ellipsoid, three to six hour fly around test prior to release.
T-47	-	FM, Same as T-46
T-101	-	FM, live unit with unarmed fuse and 1773's, no X-unit, no O-3 fuse and no informers, this unit will have an expendable pit handled similarly as possible to conditions planned for Destination 9,000 ± .003 Unit to be dropped in the ocean [redacted] from 5,000 ft to determine whether it detonates. b(3)
T-102	-	FM, X-unit, 3 AB's, mild steel ellipsoids, impact fuses [redacted] DOE b(3)
T-103	-	FM, Same as T-102
T-126	2 July	FM, [redacted] 1773's with tetryl pellets removed, 48 bare bridge wires, 8 Blake MK II switches, X-unit Model II, Brode Informers on detonation, MK III plaster blocks, mild steel ellipsoids, 3 A's, O-3 informers on O-3 fuses, normal ballistic data, four impact fuses with complete fuse trains should be used, 3 to 6 hours fly around prior to release to test X-Unit. DOE b(3)
T-127	4 July	FM, Same as T-126 DOE b(3)
T-128	6 July	FM, [redacted] X-unit Model II, Brode informers on detonation, MK III plaster blocks, mild steel ellipsoids, 3A's, O-3 informers on O-3 fuses normal ballistic data, four impact fuses with complete fuse trainsshould be used, 3 to 6 hours fly around prior to release [redacted]
T-129	7 July	FM, Same as T-128
T-130	-	FM, Same as T-128
T-131	-	FM, Same as T-128

Table I (Continued)

Serial Number	Date Sch[redacted]	Nature of Unit and Test
T-142		FM, 3 to 6 Hour Fly Around test of X-unit to be used in T-132.
T-143	-	FM, 3 to 6 hour fly around test of X-unit to be used in T-133.
T-152	6 July	1792, unit will have no primer, charge or fusing. It will include G-3 impact switch and smoke puff, C1-370 projectile, C1-353 insert, and decelerometers. It will be dropped from approximately 500 ft. at low velocity and is to be recovered.
T-153	-	1792, Testto be determined.
T-154	2 July	1850, Unit will have a 9# charge, 3 AR's, 4 IN's, C1-322 projectile, C1-353 insert and will be recovered.
T-155	3 July	1850, Same as T-154
T-156	3 July	1850, Same as T-154
T-157	4 July	1852, otherwise same as T-154
T-158	5 July	1852, otherwise same as T-154
T-159	5 July	1852, otherwise same as T-154
T-160	-	1792, Testto be determined
T-161	-	FM, Same as T-128
T-162	-	FM, Same as T-128
T-163	-	FM, Same as T-128
T-164	-	FM, Same as T-128
T-165	-	FM, Same as T-128
T-166	-	FM, Same as T-128
T-167	-	FM, Same as T-128
T-168	-	FM, Same as T-128
T-169	-	FM, Same as T-128
T-170	-	FM, Same as T-128
T-171	-	FM, Same as T-128
T-172	-	FM, Same as T-128
T-173	-	FM, This unit will have MK III HE. Test to be determined.

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[redacted]

INTER-OFFICE MEMORANDUM

[redacted]

DATE 30 April 1945

A-84-019
70-24

TO: C. S. Smith

FROM J. R. Oppenheimer

SUBJECT: 25 Purity Specifications

[redacted]

UNIQUE DOCUMENT # SAB200086670000

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW DATE: 3-11-96 DETERMINATION (CIRCLE NUMBER(S))
AUTHORITY: DADC DADD 1. CLASSIFICATION RETAINED
NAME: James C. Lewis 2. CLASSIFICATION CHANGED TO:
2ND REVIEW DATE: 3-20-96 3. CONTAINS NO DOE CLASSIFIED INFO
AUTHORITY: ADD 4. COORDINATE WITH:
NAME: 5. CLASSIFICATION CANCELED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY):

1st reviewer signature/title/org./date/authority
2nd reviewer signature/title/org./date/authority
ADD

This will confirm the agreements reached at a meeting on 25 purity specifications held on the afternoon of April 28, 1945.

I. The basis for the agreement lies in the following facts:

A. When sufficient care is taken, and in the first casting of 25 metal from the tetrafluoride, there is every evidence that the neutron emission from the α, n neutrons is less than required by the tolerance specifications of my memorandum of 5 February 1945.

B. After repeated recasting, samples of material have been prepared which almost certainly do not meet the tolerances indicated above.

C. The corrections for multiplication which must be applied when measurements are carried out in actual geometry, and using actual components for the gun assembly, are fairly large and fairly uncertain, making absolute neutron counting problematical.

Also, although chemical analysis certainly can be carried out to see whether the tolerances above mentioned have been met, this cannot be done in a significant way without the partial destruction of the units in question.

II. On the basis of these facts the following recommendations have been made:

[redacted]

DOE b(3)

B. Neutron counts will be made on all other units and to be acceptable, the neutron count of the unit, suitably corrected for isotopic constitution, must lie within twenty percent of the standard.

C. Only if units appear which fail to meet the above specifications will there be need for more detailed consideration of chemical analyses and neutron assay.

III. This may be a good place to mention that provision should be made for the isotopic analysis of an aliquot of each of the fundamental units involved in the gun assembly.

UNCLASSIFIED

[redacted] J. R. Oppenheimer

Form 25

cc: Segre, Allison, Kennedy, Dodson, Birch, Parsons.

95SA20B000260

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[redacted] Weekly Report - Bill Vogel - April 2[redacted] 194[redacted] UNCLASSIFIED

UNIQUE DOCUMENT #SAB2000086690000

Recent firing of 1-E 3 silver wire detonators indicates rather good simultaneity with one failure. Table I summarizes these results.

DOE b(3)

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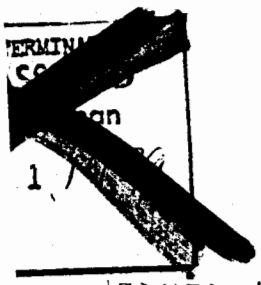
2nd reviewer signature/title/org./date/authority



DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW-DATE: 3-11-96
AUTHORITY: DADC DADD
NAME:
2ND REVIEW-DATE: 3-12-96
AUTHORITY: ADD
NAME:
DETERMINATION [CIRCLE NUMBER(S)]
1. CLASSIFICATION RETAINED
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
4. COORDINATE WITH:
5. CLASSIFICATION CANCELLED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY):

Several shots of 1-E 3 500 U P I platinum detonator have been made under conditions as stated above for silver wire detonators. Results are as follows:

DOE b(3)

[redacted] JAN. 1973

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[redacted]

DOE
b(3)

In connection with these shots a list of voltage thresholds of some representative lots follows:

DOE
b(3)

The azide spark detonators, while still quite scarce, have given some very good times.

DOE
b(3)

It is probably sightly worse than the previous shot

cc: T. Lauritsen
Roach
Fowler
McMillan
Welton
Bacher
Russel
Yost
Lofgren-Bradner
Buchanan
Fisher
Johnston
Knudsen
McDonald
Seelig
Vogel

[redacted]

UNCLASSIFIED

K. T. Bainbridge

15 February 1945

D. F. Hornig

Performance of Electrical Detonators (Page 2)

It is fairly evident by now that the new detonators live up to what was claimed for them in respect to simultaneity.

D. F. Hornig

DFH:om

cc: Bacher
Alvarez
Kistiakowsky
Parsons
Feynman

UNCLASSIFIED

23 February 1945

R. B. Brode

L. B. Doll

Field Test Program for March 1945

X-2 equipment will cause no damage to the bomb such that O-3 equipment cannot continue to operate after operation of X-2 equipment.

X-2 can use relay No. 6 in the bomb bay to operate the special informer on its internal power supply prior to release.

No test circuit will be provided in the airplane for the X-2 equipment.

The O-3 technical observer in the airplane will turn on the X-2 equipment upon instructions from the ground.

These drops must take place from the old airplane, since the old model of airplane test equipment will be used.

6. Group IV: This group consists of three concrete loaded 1560's, which are to be equipped identically as follows:

CLASSIFICATION CANCELLED

O-3 Equipment:

Clock Box (Model 11L2)
6 or 9 clocks for arming and informing.
6 Barometric Switches:
2 Switches in parallel for auxiliary arming of firing line.
2 Switches in parallel for delayed R. F. arming of Archies and Amoses.
2 Switches, one in each of two informers.
2 Archies (set for approximately 1250 ft.)
2 Amoses (set for approximately 500 ft.)
1 Fuse line activated by relay network when first two A units operate, and armed by clocks and barometric switches.
1 set of two puffs excited by fuse above.
1 Arming line receptacle (plug furnished by O-3) to arm X-2 equipment directly from the fuse line.
1 Delay relay combination to deliver delayed firing signal to X-2 from fuse line. This delay to be sufficient to allow the Amoses to operate prior to destruction of equipment by X-2 detonators and boosters.
1 Safety plug in series with firing signal to X-2
1 Set of two puffs excited by firing line.
Hold down on the two Archies when fuse line is activated.
Informers - one for each A unit and associated apparatus. Upon excitation of the firing lines the A1 and A2 Informers will be transferred to X-2 apparatus for measurement purposes.

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23 February 1945

R. B. Brode

E. B. Doll

Field Test Program for March 1945

O-3 will transfer the A2 informer to A-2 immediately upon operation of the delay relay, simultaneously indicating excitation of the firing line. The A-2 firing switch will have auxiliary contacts which supply 110 v., 400 c.p.s. to the O-3 clock box for connection to the informer when the firing switch operates. This will give an informer check of the operation of the A-2 firing switch in case of a dud detonating system.

The above two circuits are to enter the O-3 clock box by three pins of the 5 conductor plug supplying the pull out switch to A-2.

The Titterton informer and antenna may be installed at the center of the rear plate provided there is no antenna interference, and provided that O-3 is given the choice of space on the rear of the armor bulkhead in the tail for mounting the informer battery box.

Upon completion of new airplane test equipment, complete facilities will be provided for testing both O-3 and A-2 equipment in the airplane. Arrangements for this have been made by Doll & Russell, and the test boxes will be supplied by O-3. With these test boxes, these units may be dropped by either the old or the new airplane.

Relay No. 6 in the bomb bay may be used for A-2 equipment if desired.

[redacted] REVIEW JAN 1973 DOE b(3)

7. Group V:

This is a H. E. 1560.

[redacted] Since the H. E. target is remote from the normal test target, and since it is impractical to move the observation equipment for one drop, no informer measurements will be made on this unit. A complete gadget proximity fuse will be installed, using 4 A'S, and all the associated apparatus. This fuse will be the contemporary version of what the final gadget fuse is to be, except that the operation may be a little higher than desired since four Archies will be used. The use of Amoses for this application is not practical in this case, since they are not developed to the point where four units may be used simultaneously, and since they will not be available in sufficient quantities to justify such an application at this time. It would perhaps be wise to add two sets of puffs on this bomb, the first puffs to go when the arming signal is given to the detonator with the second puff going when the firing signal is given to A-2. In case of a dud this would give information on the fuse operation.

67

23 February 1945

R. B. Brode

E. D. Doll

Field Test Program for March 1945

8. Little Boys: A total of 9 of these units are listed in Mastick's schedule. Although all of these are listed as 1491-1791, it is possible that a sufficient number of these units may not be available. For reasons made obvious by the discussion below, it is suggested that this program be divided into two groups at this time.

Group VI - 2 1418's
Group VII - 7 1491-1791's (No live gun charges, and equipped with 1721 fixtures for O-3 equipment.)

9. Group VI: This group consists of 2 - 1418's previously prepared for the January tests. These units will be dropped with equipment exactly as planned in January. This equipment includes: 3 Archies, exciting a firing line when any 2 Archies operate; clocks for arming the firing line, and for informing; barometric switches for informing; 4 Informers, and associated apparatus. These must be dropped from the old airplane unless new airplane test equipment becomes available in time. The firing line will fire two puffs in parallel. Clock Box Model 8L1.

10. Group VII: This group consists of 7 - 1491-1791's. These units are to be assembled at Y and fitted with 1721 hardware at Y. No live guns will be used. In the event that a sufficient number of these units are not available, 1418's will be used for fuse testing. These seven units will include the following O-3 equipment.

Clock Box suitably connected (Model 8L4)
6 - 9 clocks for arming firing line and for informing
3 Archies
Relay net to fire when two Archies operate.
6 Barometric Switches:
  2 Switches in parallel to arm firing line
  2 Switches in parallel for R. F. arming of Archies
  2 Switches for connection to Informers
Two parallel puffs fired by firing line through safety plug.
One safety plug

11. All except the H. E. drops scheduled above are to be made at Sandy Beach. Some of the Little Boys may be dropped on a secondary dry target at Sandy Beach for recovery if a suitable target may be located which will not require movement of the O-3 field observation station.

12. Serious consideration should be given to the use of puffs in any or all of the units discussed above. It is believed that the puffs

23 February 1945

R. B. Brode

E. B. Doll

Field Test Program for March 1945

are a security hazard, and that they should be eliminated. Except in the second H. E. drop of a 1560 mentioned above, puffs are not necessary in the gathering of O-3 fuse data, since far more accurate data of firing line excitation is obtained from the informer records.

13. The one point in favor of puffs should be mentioned. Puffs give a rather harmless method of becoming familiar with the fusing of explosives. In particular, if it is thought that fusing prematures are at all likely in or near the airplane, the puffs are a relatively innocous method of illustrating such prematures. Without puffs, it is rather unlikely that knowledge of such prematures would be obtained.

14. Since the transit observation of puff height adds very little to the O-3 data, and since to obtain transit puff height requires two additional O-3 observers, O-3 will no longer provide observers to spot puff operation and impact splash. The follow camera, however, should still be used to give puff operation time when possible.

15. It is not expected that this memorandum is to furnish a sequence of drops in March. However, because of the obvious advantages of experiences gained to be applied later, and because of the availability of material, it is strongly urged that the 1560's be dropped in the sequence discussed above, and that the Little Boys be dropped in the sequence discussed above. It is quite proper, however, to intermix the Fat Men and Little Boys, since a considerable improvement of test efficiency should result from this.

E. B. Doll

EBD:mk
cc: Parsons
Ramsey
Bainbridge
Fussell
Birch
Ashworth.
Dick
3 - O-3 File

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[redacted]

[redacted]

11 Feb
U.S.P.

Ramsey

February 8, 1945

A-84-019
67-7

Mr. R. W. Henderson

K. T. Bainbridge

Units for the Kingman Test with the Raytheon Unit and Titterton Informer

UNIQUE DOCUMENT #SAB200086720000

The latest information from Ramsey gives a schedule for Kingman tests which would involve the use of 11 special units in March and one standard unit. The first three units which will be dropped are mainly to check the behaviour of the informer and to provide practice in the reception and recording of the informer information.

DOE
b(3)

cc - You and Bice are familiar with the agreements reached in our discussions with Titterton. There is a lot of new design and procurement involved, as the concrete blocks are new. Special coax, terminating explosion switches and plugs are needed. Two single coax cables must go from the pit to the rear section of the cone.

DOE
b(3)

In addition, Titterton has agreed to supply his pulse adding network, and that must be mounted within the pit.

DOE
b(3)

The enclosing case of the 1560 requires two types of alterations. One is provision for clamping the RG54/AU cable to the case, which should be as close to the final design as possible, and the other is provision of two additional holes through the case to take the signal output coax from the pit and to lead in the voltage supply from the rear cone space to the network within the pit.

Ramsey's schedule considers that eight drops will be made with the

[redacted]

[redacted]

I contains information affecting [redacted]

transmi[redacted]

manner to an unauthorized person is prohibited

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Classification changed to [redacted]
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N/A ADD
2nd reviewer signature/title/org./date/authority

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW-DATE: 3-11-96
AUTHORITY: ☐ADC ☒ADC ☐ADD
NAME: Wayne C. Lewis
2ND REVIEW-DATE: 3-20-96
AUTHORITY: ADD
NAME:
DETERMINATION [CIRCLE NUMBER(S)]
1. CLASSIFICATION RETAINED
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
4. COORDINATE WITH:
5. CLASSIFICATION CANCELLED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY):

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Raytheon unit and Titterton informer, starting not earlier than the 18th of March, but assembly would have to begin one week prior to that time. Your schedule is very difficult, and Titterton is in hot water too. At present he hopes to have a suitable unit available for ground tests on February 15, and two weeks work with this on the ground will be required prior to any Kingman tests.

The final unit of the 12 would use the Raytheon unit and H.E. without any informer, and it will not be used unless the eight prior tests show that the Raytheon unit has functioned properly with no danger of pre-ignition.

KTB/bea
cc - L.Fussell
N.F.Ramsey
file

K. T. BAINBRIDGE

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To: Comdr. N. E. Bradbury

12. X-unit dolly attached.

13. X-unit detached and removed to SW corner on dolly.

14. Hornig leaves for "Y".

15. Friday and Saturday, 6 and 7 July: Free time for any further work on McKibben's and Titterton's equipment. Bare bridge wires on hand for tests. Also firing for Greisen's tests. Brown and Vogel under Greisen's direction during this time.

16. Saturday afternoon, 7 July, Hornig and Lofgren leave for TR.

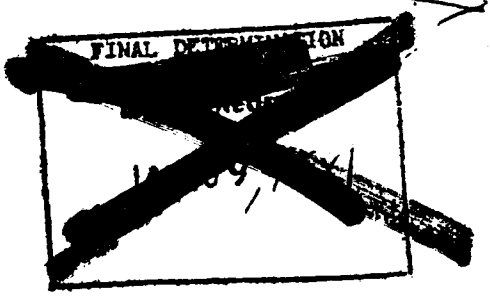
17. Sunday, 8 July: First inert rehearsal. Use cables from dry run if 1773's or 2064's used. Two sets of cables on hand if 1E3's used.

18. Confusion.

D. F. Hornig

DFH/vt

cc: G. B. Kistiakowsky
K. T. Bainbridge
F. Oppenheimer
K. Greisen
E. Lofgren



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55-9

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June 28, 1945

Classification changed to CONFIDENTIAL
By authority of TSM FSS-16 9/3/95 ADC/ADD
1st reviewer signature/title/org./date/authority
N/A ADD
reviewer signature/title/org./date/authority

To: Commander N. E. Bradbury

From: R. W. Williams

Subject: X-7 Responsibilities at TR

A. Site Y Preparation

UNIQUE DOCUMENT # SAB2000867400000

DOE b(3)

Before July 4, the following must be prepared (principally by Caleca and Irwin):

[redacted] spare switches-and-cables, for each length of cable used; 15 additional switches-and-cables, connectors not installed, with longest length of cable used; 15 10 ft. cables with Raytheon connectors on one end, the other end prepared to be staked to 1E5's for informer tests; H.E. kit containing 1E5's, tetryl pellets, and lucite adapters for 15 such tests; tool kit containing detonator stakon tools, 1E5 stakon tool, wire strippers, Simpson meter, extra switch parts, etc.

Caleca obtains from R. A. Bice complete sets, with spares, of switch retainers, switch retainer plates, and mounting brackets for informer delay-line boxes (Machen takes leaf springs down). (Note: whoever fastens X-unit to sphere must get special stand-off bushings from Bice and be responsible for them. (Is this Machen?) Caleca obtains two delay-line boxes and one spare delay line from Titterton on June 29. Caleca obtains three sets of Raytheon-terminated cables of proper length from Hornig, and prepared the ends for 1773's on at least one set. Caleca obtains 70 inert 1773's, with bridge-wires and copper caps, from Kauzmann.

On June 30, Caleca, with Machen, goes over wiring and installations on dry-run sphere, which at that time is in Delta. Any errors in location of holes will be corrected at that time. When the hot run sphere is finished in the shop, it will be carefully checked for all hole location and skin thickness by a member of X-7. This is extremely important, since a shop error here would hold up the final shot several days.

Titterton ships all electronic equipment.

B. The Dry Run

(Changes entailed by the use of 2064's will be obvious, since Lofgren then has detonator responsibility.)

Greisen, Anderson, and Caleca leave Y for TR at 8:00 A.M., July 4. Starting at 8:00 A.M. July 5, they (and Machen) wire the sphere, install inert detonators, install switches and delay-line boxes. Titterton will have, at TR, the battery box and the requisite leads connecting the informer to the outside world. At this point these leads will have been removed, but the battery box is connected to the informer. To test the informer at this point, short the "input" terminals of the battery box. 180 volts should appear on the delay lines. Greisen makes final check on

1ST REVIEW DATE: 3-11-96 AUTHORITY: DADC DADC DADD NAME: 2ND REVIEW DATE: 3.20.96 AUTHORITY: ADD NAME:
DETERMINATION [CIRCLE NUMBER(S)] 1. CLASSIFICATION RETAINED 2. CLASSIFICATION CHANGED TO: 3. CONTAINS NO DOE CLASSIFIED INFO 4. COORDINATE WITH: 5. CLASSIFICATION CANCELLED 6. CLASSIFIED INFO BRACKETED 7. OTHER (SPECIFY):
DEPARTMENT OF ENERGY DECLASSIFICATION

RESTRICTED DATA
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54. Unauthorized disclosure [redacted]
Administrative [redacted]
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informers and detonators.

At the end of the Dry Run, Greisen and Co. remove the detonators and informers, leaving the detonators attached to the cables.

C. Interim Period, Rehearsals and Tests

On June 6, our jumbino (which Harry Allen will have delivered to the base of the tower) is hauled up, and Greisen et al, with cooperation of Hornig and Titterton, make informer tests (delay-line calibrations) by firing one set of switches in jumbino, with special 1E5 set-up. Greisen returns to Y in P.M.

On July 7, Caleca and Anderson make more informer tests if necessary. They prepare cable ends on auxiliary sets of cables. Williams leaves Y for TR.

On July 8, A.M., they help prepare for first rehearsal, hooking up one live detonator to a switch in jumbino, as in tests above. [redacted] They help Hornig and Lofgren install these. July 9 and 10: same as July 8, but on last rehearsal, use inert 1773's left over from Dry Run. Greisen returns to TR on July 10.

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On July 11, 75 highest quality detonators materialize.

On July 12, Greisen, Williams, Caleca, Anderson put detonators and switches on hot sphere, test as described in Dry Run, and hope for the best.

RW:jr

R. Williams

cc. K. Bainbridge
G. B. Kistiakowsky
V. Caleca
J. Anderson
E. W. Titterton
R. A. Rice
D. F. Hornig
E. J. Lofgren
K. Greisen
R. Williams
E. Machen
file

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PER DOC REVIEW JAN. 1973

FINAL DETERMINATION
UNCLASSIFIED
L. M. Redman
JAN 09 1981

[redacted]

2293 1 2 3

[redacted]

[redacted]

INTER-OFFICE MEMORANDUM

TO:

DATE

FROM: ~~[redacted]~~

SUBJECT: Unsatisfactory Features of Weapons Program

2. Detonater-Boosters - Continued

B. If so they should be omitted since unnecessary complications necessarily reduce the reliability of the gadget.

3. General Design - The present design is the result of a number of compromises and guesses at a time when our ignorance was much greater than even now. I believe that as soon as possible an integrated design based on current knowledge and with no commitments to past production should be started. This should not, however, be allowed to interfere with the primary job of debugging the present model. Some features which I think should be seriously considered for inclusion in the new design and where possible for incorporation in present design as well are:

a. Reduction of assembly complication. The present design is more in the nature of a laboratory apparatus requiring a highly skilled scientific crew to supervise the assembly than of a weapon. Assembly tools and fixtures should be redesigned concurrently with the design of the unit.

b. Complete pressurization unless it can be completely proved the pressurization is unnecessary. It is my own conviction that pressurization is necessary although a number of key personnel at this site disagree. The present partial pressurization system is not very satisfactory at best and has the unfortunate characteristic of having been just around the corner for months but of never having satisfactorily arrived.

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d. Reduction in complications introduced as a result of unfounded fears. I am convinced that as we learn which design factors are pertinent and which are not that the design of the bomb will become much simpler.

Alternatively the detonater and assembly problems would be simplified by a reduction in the number of detonation points.

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[redacted]

Form 26

7. Jettisoning

a. Too little is still known concerning the feasibility of jettisoning the unit and subsequently recovering it. The recovery will certainly be an unpleasant divers operation.

C. Little Boy Design and Test

1. From a design and development point of view the Little Boy is so far ahead of the Fat Man that little need be said concerning it.

2. However, from a more fundamental point of view the Little Boy has two very serious objections as a weapon:

a. The frequency of availability of active units will be sufficiently low for some time that their military effectiveness will probably be relatively small.

b. The first unit will be completely untested as a nuclear bomb.

3. It is my own personal opinion that complete pressurization of the unit would be desirable.

4. The same comments on fusing and jettisoning given under the Fat Man discussion apply here.

D. Aircraft

1. Although the British F-G mechanism is working with admirable success at present, the basic design in several respects is sufficiently unpromising that I and a number of others are constantly expecting to hear of failures. For this reason I think that an improved release should be worked on as a long range improvement. A contract with the Douglas Company for such a development is now under consideration.

2. As soon as the following radar attachments become available, I believe that they should be installed in the attrition aircraft and perhaps in the earlier aircraft by a field modification. Sims McGrath of the M.I.T. Radiation Lab, who is now assigned to Colonel Tibbets, should be able to advise on this. The devices are:

a. Broader fish to give a sharper beam and less aircraft drag.

b. Better gig in between the radar equipment and the Norden bomb sight, preferably with provision for offset bombing provided the latter feature can be obtained without undue delay or serious reduction in operating

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[redacted] It was also argued that: 1) PETN is much safer than fulminate of mercury or lead azide against heat or mechanical shock,

DOE b(3)

DOE b(3)

4. The design background of the condenser-detonator unit is sketched above. To this it should be added that since this unit is only three months from the bread-board stage, and since it is recognized to be less developed than other key FM components, there is an understandable tendency to rush ahead and get something. Accelerated development is imperative - it is also imperative to guard against a tendency to let down the bars each time a failure occurs. Each failure or surprise in a development test is a godsend and should be treated as such - in every case the last thing to be blamed is the test.

5. Test policy.

(a) The effect of a premature detonation of an HE loaded FM in a B-29 airplane during development tests would be so serious on the morale of both the Air Forces and our own people, that we have set a policy which forbids charging the condensers before release of an HE loaded FM, in a development test. In this case, development test includes every flight up to (but not including) initial battle delivery.

(a) Continued.

It is possible that ground tests in April, 1945 will indicate that detonation of the tetryl boosters in a FM should not cause serious damage to the airplane. If this is the case, then charging the condensers before release will be permitted, using boosters against concrete blocks - if boosters alone can cause damage, then inert boosters must be used.

It is believed that adequate development tests of HE loaded FM with all electrical components can be conducted, using the high-voltage generator carried in the bomb, to charge the condensers after release.

(b) Every effort should be made to measure the acceleration and vibration conditions which obtain in the condenser unit as mounted in the FM in all expected flight conditions of the B-29, and particularly during the critical minute of bomb flight after release (a whip of the bomb may take place when it encounters the slip stream, depending on the attitude of the plane at release). Acceptance test of design (prototype) should exceed in duration and severity the single accelerations and vibrations for both conditions given above, and should be carried to destruction. On these results should be based criteria for design, and inspection during manufacture. It is believed that each unit should be required to pass mechanical acceleration and vibration tests exceeding by 50% the severity expected in a typical bomb delivery. If units fail under these tests, then the unit must be ruggedized.

WSP/hg

W. S. Parsons

cc: Oppenheimer
Kistiakowsky
Major Derry (for showing to General Groves and Mr. Rowe)

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[redacted]

Mr. Oppenheimer
(Target)

July 26, 1945

[redacted]

DOE b(3)

DOE b(3)

Cyril Stanley Smith

I. C. Schoonover

CSS:ICS:mf

Distribution:
Bethe
Birch
Kennedy ✓
Marshall
Maxwell
Oppenheimer
Parsons
Schiff
Schoonover
Serber
Smith (2)
Wichers

[redacted]

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[redacted] This document contains information affecting the nation- [redacted] of [redacted] ission [redacted] an [redacted]

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