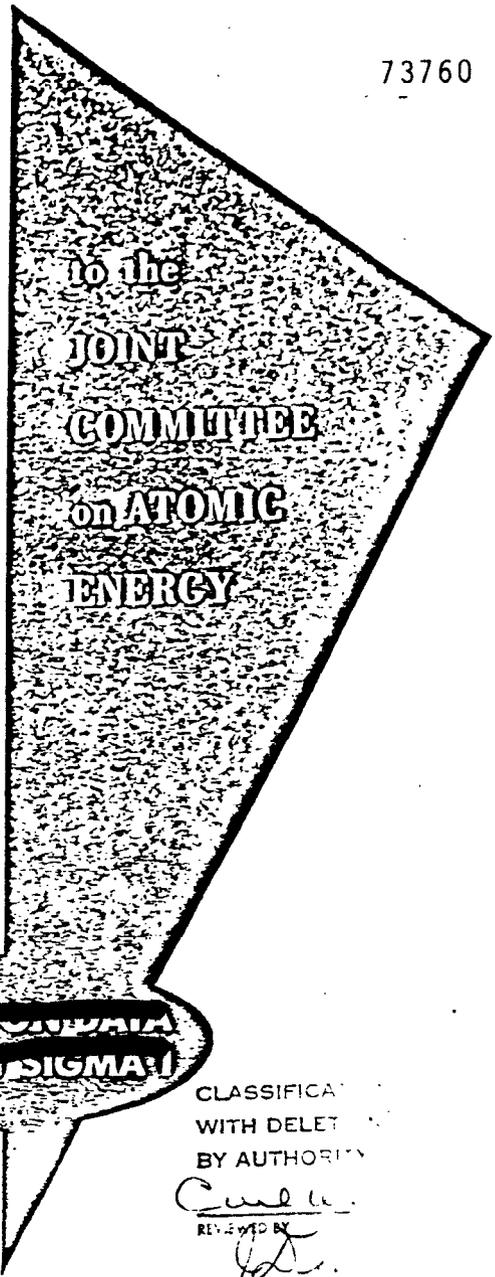


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QUARTERLY PROGRESS REPORT

Part III - WEAPONS



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July - September 1958



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UNITED STATES ATOMIC ENERGY COMMISSION

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Part III

Weapons

WEAPONS PRODUCTION ([REDACTED])

The number of nuclear weapons produced during the July-September quarter was slightly greater than in the preceding quarter, although somewhat less than had been scheduled. The delivery rate attained in September indicated that the production rate could be expected to continue to increase and that the stockpile objective established for June 30, 1959, would essentially be met. Production was highlighted by the startup of Mark 28 thermonuclear bomb production. Difficulties in obtaining certain mechanical and electrical components have revealed that initial production schedules for this and other new weapons systems were too optimistic.

New weapons first produced for stockpile during the quarter were:

1. The Class D thermonuclear bomb, Mark 28 Y1, with a yield of [REDACTED] and a weight of 2,000 pounds, [REDACTED]
2. The Mark 49 Y1 thermonuclear warhead for the Intermediate Range Ballistic Missiles, Jupiter and Thor, with a yield of [REDACTED] and a weight of 1,600 pounds, and [REDACTED]
3. The Class D thermonuclear warhead, Mark 27, for the Regulus and Rascal missiles with a yield of [REDACTED] and a weight of 2,800 pounds. [REDACTED]

WEAPONS DEVELOPMENT

A feasibility study was completed and the Department of Defense requested a development program for a warhead for the Falcon missile and the Davy Crockett recoilless rifle and other weapons in the Battle Group Atomic Weapon System.

A development program was established at the request of the Department of Defense for a laydown version of the Class C thermonuclear bomb, TX-46.

On the basis of Operation HARDTACK test results, the [REDACTED] device was selected over a [REDACTED] design for weaponization as the Class E thermonuclear bomb, TX-41. From the yield of [REDACTED] obtained in the test of the "clean" version, the yield of the conventional version has been calculated as [REDACTED]. Both versions are to be produced. [REDACTED]

The [REDACTED] test of the XW-35 warhead for Intermediate Range and Intercontinental Ballistic Missiles resulted in a yield of [REDACTED]. Inasmuch as a slightly better [REDACTED]

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[REDACTED]

WEAPONS

yield can be obtained in the same weight class using the Mark 49 warhead with [REDACTED] the XW-35 program was canceled.

The weapons laboratories, Los Alamos Scientific Laboratory (LASL), Sandia Laboratory, and University of California Radiation Laboratory at Livermore, were informed that the President directed that every effort should be made to maintain the vigor of the laboratories and weapons development progress during the period of the nuclear weapons tests suspension.

New lightweight weapons, now in research or development, require detonators which will meet severe weight and space limitations.

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Stockpile simplification study. The Armed Forces Special Weapons Project completed an investigation requested by the Joint Chiefs of Staff into the possibility of simplifying the future nuclear weapons stockpile in terms of the number of types of weapons to be provided.

The conclusions reached were as follows:

1. The nuclear weapons stockpile can be simplified as to the number of types of weapons,
2. Warhead designs common to many uses can be established,
3. A simplification program can begin at once,
4. Implementation of a coordinated and continuing simplification plan will assure the Services the greatest capability in the shortest time and at the least expense using existing development facilities.

The study group recommended consolidation of presently contemplated warhead applications and assignment to a technically competent integrated Service agency of continuing responsibility for simplifying and consolidating Service requirements.

WEAPONS TESTING

The completion of tests for Phase I of Operation HARDTACK at Eniwetok Proving Ground and the disestablishment of the danger areas in the Pacific were announced on September 8. Thirty-four nuclear tests and one safety test were conducted. Results of the Phase I nuclear tests are shown in Table 1. The one-point safety test was a [REDACTED] already in early production. Results indicated that the weapon is one-point safe and production will continue with the present design.

After the President's announcement concerning test suspension on August 22, AEC weapons programs were reviewed and Presidential approval was requested for additional nuclear test shots for Phase II of Operation HARDTACK at the Nevada Test Site. The President required that these tests be completed by October 31. Nineteen nuclear test shots directed toward development of very high priority nuclear systems were conducted, and 18 safety tests were conducted of designs likely to be weaponized and not previously proved safe. One scheduled nuclear test was canceled on October 30 because of atmospheric conditions.

Results of the Phase II nuclear tests conducted during September and October are also shown in Table 1.

Exploration of the lower weight limits for thermonuclear devices, originally planned for the 1959 weapon test operation, was included on short notice in HARDTACK Phase I in anticipation of the possibility of nuclear weapon test suspension. The University of California Radia-

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WEAPONS

Table 1—Operation HARDTACK

Name, date, and device	Objective	Actual yield	Results
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Phase I—Eniwetok Proving Ground

Tests Sponsored by the Los Alamos Scientific Laboratory

CACTUS
May 5

~~DELETED~~

18.0 kt.

BUTTERNUT
May 11

~~DELETED~~

DELETED

DELETED

DELETED

KOA
May 12

~~DELETED~~

1.31 mt.

DELETED

HOLLY
May 20

~~DELETED~~

DELETED

DELETED

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WEAPONS

Table 1 — (Continued)

Name, date, and device	Objective	Actual yield	Results
YELLOWWOOD May 25  DELETED			
MAGNOLIA May 28  DELETED			
TOBACCO May 29  DELETED			
ROSE June 2  DELETED			
WALNUT June 14  DELETED			
LINDEN June 17  DELETED			

DELETED

DELETED

DELETED

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WEAPONS

Table 1—(Continued)

Name, date, and device	Objective	Actual yield	Results
ELDER June 27 REDACTED			
OAK June 28 REDACTED		8.9 mt.	
SEQUOIA July 1 REDACTED			
PISONIA July 17 REDACTED			

Tests Sponsored by the University of California Radiation Laboratory

FIR May 11 REDACTED			
NUTMEG May 21 REDACTED			
SYCAMORE May 30 REDACTED			

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WEAPONS

Table 1—(Continued)

Name, date, and device	Objective	Actual yield	Results
MAPLE June 10 	DELETED		
ASPEN June 14 	DELETED		
REDWOOD June 27 	DELETED		
HICKORY June 28 	DELETED		
CEDAR July 2 			
DOGWOOD July 5 	DELETED		

~~DELETED~~

~~DELETED~~

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WEAPONS

Table 1 --(Continued)

Name, date, and device	Objective	Actual yield	Results
---------------------------	-----------	-----------------	---------

POPLAR
July 11
~~DELETED~~

OLIVE
July 22
~~DELETED~~

JUNIPER
July 22
~~DELETED~~

~~DELETED~~

~~DELETED~~

~~DELETED~~

PINE
July 26
~~DELETED~~

QUINCE
August 5
~~DELETED~~

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WEAPONS

Table 1 — (Continued)

Name, date, and device	Objective	Actual yield	Results
---------------------------	-----------	-----------------	---------

FIG

August 17

~~DELETED~~

DELETED

Effects Tests Sponsored by the Department of Defense

YUCCA

April 27

~~DELETED~~

WAHOO

May 15

DELETED

UMBRELLA

DELETED

DELETED

TEAK

DELETED

ORANGE

DELETED

Phase II — Nevada Test Site

Tests Sponsored by the Los Alamos Scientific Laboratory

EDDY

September 19

~~DELETED~~

DELETED

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WEAPONS

Table 1 — (Continued)

Name, date, and device	Objective	Actual yield	Results
*MORA September 29	[REDACTED] TED		
QUAY October 10			DELETED.
*LEA October 13			DELETED.
DONA ANA October 16			
RIO ARRIBA October 18			DELETED.
*SOCORRO October 22			
*DE BACA October 26			
*SANTA FE October 29			

Tests Sponsored by the University of California Radiation Laboratory

TAMALPAIS

DELETED

DELETED

DELETED

DELETED

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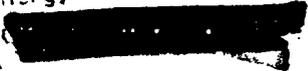
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WEAPONS

Table 1—(Continued)

Name, date, and device	Objective	Actual yield	Results
HAMILTON October 15 DELETED			
LOGAN October 16 DELETED			DELETED
WRANGELL October 22 DELETED			
RUSHMORE October 22 DELETED			DELETED
SANFORD October 26 DELETED			
EVANS October 28 DELETED			DELETED
MAZAMA October 29 DELETED			DOE ARCHIVES



Construction

Expansion of weapon research and development facilities at the University of California Radiation Laboratory at Livermore was 61 percent complete and about on schedule on September 30. Construction of the Sigma Building at Los Alamos was 64 percent complete and slightly behind schedule.

The 1958 expansion of ACF Industries plant at Albuquerque was 60 percent complete.

The design of the building and supporting facilities for a 5-megawatt reactor for testing weapon components by Sandia Corporation in Albuquerque was 92 percent complete and on schedule. Completion of design, scheduled for the end of October, would permit taking bids for construction in November.

EXCHANGE OF WEAPONS INFORMATION WITH THE UNITED KINGDOM

Two exchange-of-information meetings with the United Kingdom were held in the July-September quarter. These meetings were held pursuant to section 144c(1) of the Atomic Energy Act and the new bilateral agreement with the United Kingdom. Highlights of the first meeting, held in Washington, D. C., August 25-27, are as follows:

1. Our transmission to the United Kingdom consisted of a written report and more detailed oral statements concerning certain weapons we now have and will shortly have in production. Included were details of size, weight, shape, yield, amount of special nuclear material, method of nuclear safing, mechanical and electrical design, and vulnerability. The weapons described were: Mark 7, Mark 15/39, Mark 19, Mark 25, Mark 27, Mark 28, Mark 31, Mark 33, and Mark 34.

2. The United Kingdom representatives presented parallel information, together with an indication of weapons they intend to develop. Following completion of all items in the agenda, the United Kingdom representatives gave an oral presentation of their state of achievement in the nuclear weapons field, in which they described two rather sophisticated ~~small, fission devices~~ small, fission devices, one of which had been tested and the other of which was to be tested.

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3. During the first meeting it became obvious that the United Kingdom has achieved an advanced state of weapon research and development in both the fission and thermonuclear fields. Moreover, it appeared likely that certain advances made by the United Kingdom would be of benefit to the United States. Despite these achievements, however, the British apparently do not have an appreciation that plutonium produced from uranium subjected to higher burnup in their power reactors is usable in weapons. This knowledge would be of great significance to their civilian power programs. In addition, they have apparently not exerted major effort toward making their weapons one-point safe.

WEAPONS

Highlights of the second meeting, held in Albuquerque, September 15-17, are as follows:

1. We provided the British with blueprints, material specifications, and relevant theoretical and experimental information related to our XW-47 warhead; Mark 28, 44, 45, and 48 warheads; and the [REDACTED] for our TX-41 and TX-46 weapons now under development.

2. The British provided similar information on their high-yield fission bomb, now in stockpile; 2,200-pound thermonuclear bomb; small [REDACTED] device; two boosted fission designs; planned 1,500-pound thermonuclear weapon; and proposed 6-inch gun device.

3. Both parties discussed in detail neutron sources for initiators, high explosive specifications, yields and designs, and mechanical and electrical components.

We have several observations resulting from these meetings. The British have performed experiments in both [REDACTED] and their program in this regard approximates our own experiments of 1954-55. They have tested radiation-implosion, two-stage devices corresponding to our state of knowledge of about 1954-55. They fully understand the advantage of the [REDACTED] design and their state of knowledge is about the same or somewhat better than ours of 1956. In regard to initiators, they do not have the [REDACTED]

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This is a new technique to United States implosion designers and holds a great deal of interest for us. However, the British have done little work on designing their weapons to be one-point safe.

While it does not appear that we are interested in taking any one United Kingdom weapon or device and weaponizing it for our use, there are specific developments which the United Kingdom scientists have made which hold a great deal of interest for us and which might offer advantages in our weapons systems.

When the information which has been transmitted to both parties has been fully analyzed, the United States and United Kingdom representatives will determine desired areas of co-operation for further exchanges.

Following the initial exchange meeting, the United Kingdom invited the AEC to send representatives to Christmas Island to observe their test operation during September. Two representatives from LASL witnessed one large-yield shot and received detailed information on their diagnostic instrumentation. During the second meeting, the AEC extended a reciprocal invitation for the United Kingdom to send observers to Phase II of Operation HARDTACK during the week of October 5-11. The Commission, with the concurrence of the Department of Defense, recommended to the President that certain information concerning diagnostic techniques and instrumentation be approved for release to the United Kingdom at that time.*

* The third exchange-of-information meeting was held in early October and featured discussions on the instrumentation used in weapons testing.

In anticipation of the disarmament meetings with the Soviets beginning October 31 in Geneva, a fourth exchange-of-information meeting was held in late October. In this meeting, which was sponsored by the Department of Defense and the Central Intelligence Agency, there was an exchange of intelligence information on Soviet nuclear weapons development.

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PROPOSED DELIVERY OF WEAPONS TO NATO

Instead of completely retiring certain weapon components as originally planned, consideration is being given to reconditioning and setting aside a portion of the nonnuclear components of the Mark 5 and Mark 12 bombs for possible North Atlantic Treaty Organization stockpile use.

INFORMATION BULLETIN ON ACCIDENTS

A joint AEC-DOD Technical Information Bulletin on Atomic Weapon Accident Hazards, Precautions and Procedures was published on September 30, 1958. This bulletin was coordinated with the Department of State and interested British agencies. The bulletin has been furnished to Federal, State, and local government agencies. (End of [REDACTED] section.)

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