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AEC 129/55

November 27, 1953

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ATOMIC ENERGY COMMISSION

PART III - WEAPONS -
PROGRESS REPORT TO THE JOINT COMMITTEE
JUNE THROUGH NOVEMBER 1953

Note by the Secretary

Attached for the consideration of the Commission during the week of November 30, 1953, is Part III, Weapons, of the Progress Report to the Joint Committee. As indicated in AEC 129/54, Part III, Weapons, will be transmitted to the Joint Committee as a separate document.

ROY B. SNAPP

Secretary

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in the Pacific in March 1954, at which tests seven thermonuclear shots are to be fired, five at Bikini and two at Eniwetok. Three of the seven shots will be [redacted] and are designated [redacted] four will be thermonuclear devices to test new design possibilities and are designated [redacted] Table 1 shows the order in which these weapon prototypes and devices are scheduled to be fired and the kinds of fusionable material to be employed.

4. The results of Operation CASTLE should furnish guidance in selecting the most effective emergency capability weapons for stockpiling, in judging the value of lithium 6 as a thermonuclear fuel, in comparing the relative advantage of "wet" and "dry" thermonuclear systems, and in evaluating other data needed to improve thermonuclear designs. Of the 5 models containing lithium, the [redacted] is the only one employing normal lithium exclusively.

5. As indicated in Table 1, the thermonuclear weapons program is dependent upon the work of both Los Alamos Scientific Laboratory and University of California Radiation Laboratory (Livermore); Los Alamos Scientific Laboratory will be responsible for five shots, and University of California Radiation Laboratory for two.

6. Plans for the thermonuclear production program are proceeding on the basis of guidance furnished by the DOD, September 28, 1953. While production of thermonuclear weapon materials and components based on earlier DOD requirements has been underway for some time, quantity production plans are being kept flexible

TABLE 1.

Contemplated Scope of Operation CASTLE

Shot No.	Designation	Date (1954)	Predicted Yield (Megatons) 1/	Fusionable Material 2/	Location and Type	Responsible Laboratory
1		March 1	6 (4-8)		SW reef of Namu (cab) (Bikini)	LASL
2		March 11	3-4		Yurochi (barge) (Bikini)	LASL
3		March 22	8 (6-10)		Yurochi (barge) (Bikini)	LASL
4	DELETED	March 29	125 KT (65-275 KT)	DELETED	Eberiru (cab) (Eniwetok)	UCRL
5		April 5	(1.5-2)		Yurochi (barge) (Bikini)	LASL
6		April 15	4 (1.5-7)		Yurochi (barge) (Bikini)	LASL
7		April 22	1		Enirman (cab) (Bikini)	UCRL

1/ Probable range of yields is given in parenthesis.

2/ In addition to the materials indicated, small quantities of tritium are used for boosting the primary [redacted] fission reactions involved in these devices.

[redacted]

to facilitate the adaption of CASTLE results. The design of each of the three emergency capability weapon prototypes was released for procurement during the third quarter 1953, and components for each of the models are now being fabricated. The first production unit of each of two prototypes is scheduled to enter stockpile as follows: [redacted] The [redacted] depending on CASTLE results (See Chart III-A - Weapon Development Schedules).

Future Weapon Tests

7. The proposed schedule of full-scale weapon tests after Operation CASTLE is substantially as outlined in the preceding Progress Report (see Part III, page 11, Table 2). Operation TEAPOT, the next continental test series, is now scheduled for the spring of 1955.

Fission Weapon Research and Development

8. New bombs and projectiles. The development status of each of the new bombs and the new artillery projectile shown on Chart III-A is summarized below:

a. TX-11 (Gun-Type bomb of advanced design for subsurface detonation). This weapon, described in the preceding Progress Report, is expected to provide advances over the Mark 8 now in stockpile but no longer being produced (see Page 10.) Under the authority granted by the President in February 1953, the development and production responsibilities for the non-nuclear portions of this weapon have been transferred to the Department of Defense.

b. TX-12-XI (Implosion-type bomb; diameter about 22 in.; weight 1,100 lbs.) This weapon is designed primarily for carriage by fighter-type aircraft at high speeds. It is scheduled for design release in January 1954 and for stockpile entry in November 1954.

c. TX-13 (Implosion-type bomb; outside diameter 60 in.; approximate weight 7,400 lbs.) This weapon, described in the preceding Progress Report, is an advanced design of the Mark 6 type now in stockpile. It is scheduled for design release in May 1954 and for stockpile entry a year later.

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WEAPON DEVELOPMENT SCHEDULE

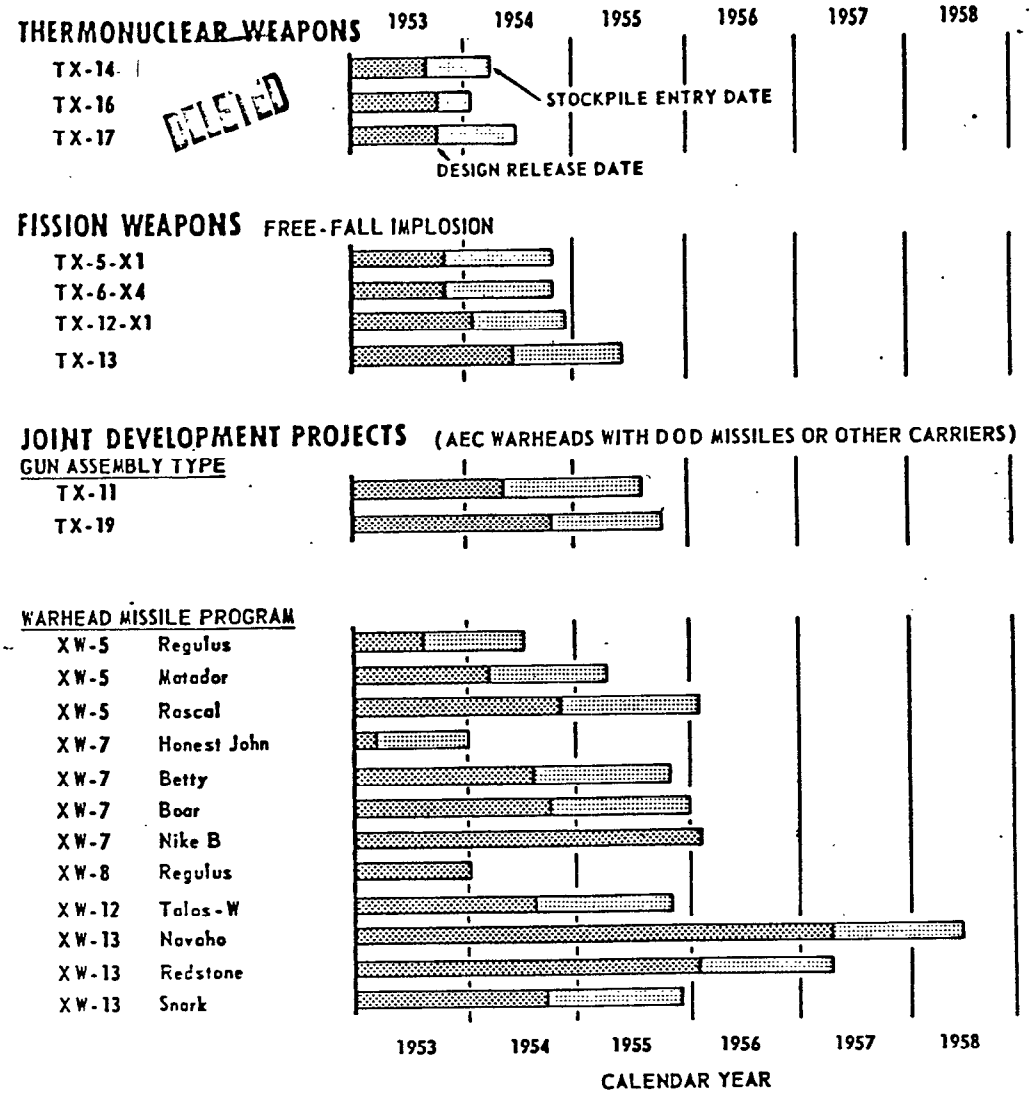

CHART III - A

[redacted]

[redacted]

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d. TX-19 (Improved artillery-fired atomic projectile) Design, development, and fabrication of non-nuclear portions of this weapon have been transferred to the Department of Defense.

e. Alias (XW-7) Betty (Atomic depth bomb). The Navy is responsible for development of non-nuclear components and the AEC for the warhead. Design release of the warhead is scheduled for July 1954 and stockpile entry for October 1955.

9. Warhead Installations for Guided Missiles. The development status of atomic warhead installations for guided missile combinations is shown on Chart III-A.

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_____ (It is discussed more fully in the succeeding section on Weapon Production and Stockpiling.)

11. Continental weapon tests in 1952 and 1953 involving external initiation demonstrated that gains in yield can be achieved by [redacted] Work is proceeding on development of such an initiator suitable for use in the TX-13 (advanced design of the Mark 6), but the first production unit is not expected until the summer of 1956.

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[redacted]

[redacted]

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Fission Weapon Production and Stockpiling

13. Nuclear Assemblies. Chart III-B, Nuclear Assemblies, shows the growth of the stockpile since 1949, measured in terms of indexes of the actual number in the stockpile [redacted]. As mentioned in the preceding Progress Report, the number of nuclear assemblies added to the stockpile in a particular period is influenced not only by the current quantity of plutonium and uranium 235 being produced but also by changes in the kinds of nuclear assemblies being produced, by changes in the quantity of fissionable material in the production and fabrication pipeline, by diversions of material for weapon tests, and by diversions required to enrich the Hanford reactors and for reactor research and development. During the latter part of 1952 and the early part of 1953 the diversion of fissionable materials for these purposes was appreciable compared with total output during that period. Thus, during the first half of 1953 the number of nuclear assemblies added to the stockpile was less than [redacted] the number added during 1952. In the third quarter of 1953, however, the number added rose sharply, in part because fissionable material availability increased and in part because the production of

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14. The production of the [redacted] was stopped during the second quarter; by the end of the third quarter, 1953, about [redacted] of the [redacted] placed in the

[redacted]

NUCLEAR ASSEMBLIES

NET ADDITIONS TO STOCKPILE

INDEX:

DELETED

49 50 51 52 1st Qtr 2nd 3rd 4th
CALENDAR YEAR 1953

NUMBER IN STOCKPILE

INDEX:

DELETED

49 50 51 52 1st Qtr 2nd 3rd 4th
CALENDAR YEAR 1953

CHART III-B

[redacted]

[redacted]

[redacted]

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16. Initiator production. Following the acceptance of the new [redacted], mentioned above, the production of the standard polonium-beryllium initiator (Tom) used in implosion weapons was ended in October 1953. All new implosion-type assemblies are now being fitted [redacted] and all Toms in the stockpile will be replaced. A possible small loss in the yield of implosion weapons, amounting to some [redacted] percent, with a consequent small loss in weapon effect may result from [redacted] This disadvantage is more than offset by the substantially lower cost [redacted] the resulting elimination of the complex logistic problem growing out of the frequent replacement of the short shelf-life Tom initiator.

[redacted]

[redacted]

17. Non-nuclear Assemblies. The composition of the stockpile of non-nuclear assemblies on September 30, 1953, and the composition of quarterly production during 1953 are shown in Chart III-C, Non-Nuclear Assemblies.

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18. The production of three non-nuclear assemblies was terminated during the third quarter of 1953. The Mark 5 output was stopped because military requirements for this type bomb were reduced; production of the Mark 8 gun-type bomb for subsurface detonation was ended because the stockpile goal by July 1955 had been met; and the output of the Mark 9 (280-mm. artillery-fired projectile) was transferred to the Department of Defense in accordance with the President's action in February 1953. (See page 15 of Part III, preceding Progress Report.)

19. Comments on the status of the three non-nuclear assemblies now being produced for stockpile follow:

a. Mark 6 (Implosion-type weapon, outside diameter 61 in., approximate weight 8,500 lbs.) The design of a new model having improved fuzing is about to be completed and will shortly be released for production.

NONNUCLEAR ASSEMBLIES
COMPOSITION OF STOCKPILE - SEPT. 30, 1953 *

ASSEMBLY	PERCENT OF TOTAL NUMBER IN STOCKPILE
MARK 6	
MARK 7	
MARK 5	DELETED
MARK 9	
MARK 8	

* Excludes small number of Mark 18 assemblies produced in third quarter.

COMPOSITION OF CURRENT PRODUCTION

CALENDAR YEAR 1953	PERCENT OF TOTAL NUMBER ADDED TO STOCKPILE
1st QUARTER	
2nd QUARTER	DELETED
3rd QUARTER	
4th QUARTER	

CHART III-C

[redacted]N

[redacted]

[redacted]

b. Mark 7 (Implosion-type weapon, approximate outside diameter 30 in., approximate weight 1,600 lbs.) A new model having improved fuzing is now being stockpiled.

c. Mark 18 (Implosion-type bomb, outside diameter 61 in., approximate weight 8,500 lbs.) This weapon, described above, is essentially the Mark 6 but incorporates changes required by the special nuclear component and its nuclear safing.

20. DOD participation in non-nuclear weapon production. The preceding Progress Report described the President's action in February 1953 which directed the Commission to authorize the DOD to assume primary responsibility for the production of non-nuclear components of gun-assembly-type weapons as mutually agreed upon. More recently, the AEC and the DOD jointly recommended to the President that he direct the Commission to authorize the DOD to assume responsibility for (1) the manufacture, production, or acquisition of such non-nuclear components of weapons utilizing implosion-type nuclear systems as may be mutually agreed upon and (2) the custody of such non-nuclear components of the types for which they assume production responsibility, as may be mutually agreed upon.

New Weapon Facilties

21. Production. The Rocky Flats Plant near Denver, Colorado, for core fabrication, inspection, and assembly has been completed and is now in full operation. A special review of present and projected HE plant capacity has been completed; based on this study the Commission has cancelled the construction of the Spoon River plant, near Macomb, Ill., described in the preceding Progress Report.

22. Storage. The AEC now has nine weapon storage sites in operation, the most recent Site Jig, [redacted] having been brought into use in July 1953. The three remaining storage sites currently under construction are scheduled to be completed as follows: Site Love [redacted], October

[redacted]

[redacted]

1954; Site Item [redacted], December 1954; and Site King [redacted], July 1955. These additional storage facilities will meet fission weapon storage requirements until the summer of 1955 according to present projections of weapon production.

23. After 1955 the weapon storage requirement becomes so great that the cost of constructing present types of structures would be prohibitive. AEC and the DOD have agreed that future fission weapon storage will consist of "satellite" facilities. These storage sites will be adjacent to or near national storage sites; stockpile weapons will be stored in warehouses in a standby or depot-type condition, instead of being stored in operational or ready condition as is done with stockpile weapons at the present sites.

24. New thermonuclear weapon requirements and the projected production of such weapons have also prompted additional construction and partial modification of storage vaults, warehouses, and plants. The modification of existing storage sites has begun in order to provide storage facilities for such high-yield weapons needed up to July 1956. (End of TOP SECRET section.)