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PROPOSED

PLAN FOR ATOMIC BOMB TEST

AGAINST NAVAL VESSELS

Submitted by

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DESIGNATION

It is recommended that the joint task force for conducting the atomic bomb test against naval vessels be designated as Joint Task Force ONE, and that for brevity in despatches the operation be given the code name "CROSSROADS." This name has been cleared with Joint Security Control.

MISSION

A. PRIMARY

To determine the effects of the atomic bomb upon naval vessels by exploding bombs of this type under various conditions and at various distances from such vessels in order to gain information of value to the national defense.

B. SECONDARY

(a) To determine the effect of the atomic bomb upon military installations and equipment.

(b) To afford training for Army Air Forces personnel in attack with the atomic bomb against ships.

GENERAL CONCEPT OF OPERATION

1. The Joint Chiefs of Staff directive calls for three distinct tests:

A. Explosion of a bomb in air;

B. Explosion of a bomb at the surface of the water and/or at approximately 100 feet below the surface;

C. Explosion of a bomb several thousand feet below the surface.

Stationing of the ships with respect to the explosion shall be such that they shall receive graded damage from maximum to slight.

Tests A and B can be readily carried out with the ships at anchor in a harbor of normal depth, while Test C would appear to require one of the following arrangements: (a) special ground tackle for anchoring ships in great depth; (b) securing the ships by cables to the outer shores of islands or reefs of a coral atoll; or (c) allowing a single line of a few ships to drift in the open sea, secured one to another by towlines, with the fastest drifter to leeward, and the bomb suspended under the weather ship, or under a special non-target ship or barge still farther to windward.

The desired characteristics of the location for the tests at anchor are:

(a) Protected anchorage six miles in diameter.

(b) 300 miles or more from urban area.

(c) Less than 1000 miles from B-29 base.

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(d) Region free of violent storms.

(e) Predictable currents of known and great lateral and vertical dispersion. Good fast surface currents which avoid fishing areas, steamer lanes and inhabited shores.

(f) Minimum distance from continental United States.

(g) Unpopulated region.

(h) Owned or controlled by the United States.

(i) Temperate or tropical climate.

After consideration of numerous areas in both the Atlantic and Pacific Oceans, the best location for the harbor tests appears to be the lagoon of BIKINI ATOLL in the Marshall Islands. While the islands are not uninhabited, the population is less than 200 and can be readily moved to another atoll. The Interior Department is studying this location with respect to possible injury to fisheries and the whaling industry.

Although greater accuracy of placement of the bomb for the air test might be achieved by suspending it from a blimp or other dirigible, the uncertainties and hazards of this method, including loss of the bomb in the water, with consequent delay for recovery and reconditioning, make it undesirable. Furthermore, this is the only test of the three which can offer attack training to the Army Air Forces, as the present design of the bomb will not permit water impact or penetration, and

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the limited time available will not permit development of another type. Naval demobilization requires the completion of the harbor tests approximately by the end of the current fiscal year.

It is therefore proposed to drop this bomb from a B-29 as at Hiroshima and Nagasaki, from 30,000 feet altitude, with the proximity fuse set to explode the bomb at 600 feet altitude. A radial type of formation will be used for the anchored target ships. The center position will be occupied by an aircraft carrier, and closely adjacent positions by battleships or cruisers in order that the bomb will burst near some major type of ship. Ships of lighter construction, such as destroyers, tank landing ships, infantry landing craft, and vessels with merchant type hulls, will be stationed at various greater distances from the center. Army ground equipment will be placed on the decks of target ships in order to get close exposure to the bomb, though additional equipment and supplies and installations may be exposed on the beach.

For the surface and underwater tests at anchor, the bomb will be placed on a barge (suspended 100 feet or more below it for the underwater test), with an aircraft carrier, a battleship and a partially submerged submarine each moored bow and stern at a distance of 200 yards from the barge. It is believed by the bomb scientists that the surface explosion may prove lethal to these three ships.

The remaining target ships and Army ground equipment will be disposed approximately as for the air explosion test.

It is recommended that the decision whether to hold the harbor underwater test or not should depend upon the results obtained from the surface test. The scientists believe the surface explosion will be more damaging than the underwater explosion, as they expect from the former, maximum wave action --perhaps waves 100 feet high from trough to crest, in the immediate vicinity of the bomb--plus some blast damage and underwater pressure and shock damage.

If the expected effects materialize in the surface test, the underwater harbor test will be unnecessary, and probably impracticable due to shortage of undamaged target ships. If, on the other hand, the surface explosion causes considerably less than the expected damage, and leaves many ships intact, A it would appear highly desirable to conduct the underwater test. I therefore recommend that the Joint Chiefs of Staff reserve to themselves the decision as to whether or not this harbor underwater test should be conducted, pending a despatch report and recommendation from the Task Force Commander upon completing the surface test.

Present information indicates that a bomb container adequate to resist the hydraulic pressure at 2000 feet or greater depth cannot be produced, tested, and shipped to the

testing grounds in time to accompany the other tests this summer. In fact, the date of readiness now predicted for this test is 1 March 1947.

EVALUATION BOARD

The Joint Chiefs of Staff directive states that they will appoint as a separate agency, directly responsible to them, a board or committee for the express purpose of evaluating the results of the tests, and that the board will be available to
E the Task Force Commander for advice during the preparation of the tests. As this preparation is now going forward, it is recommended that the board be appointed at an early date. I suggest a board of seven members: Three civilians, two Army officers (one to be from Army Air Forces), and two naval officers (one to be an aviator).

OBSERVERS

One of the most troublesome and at the same time most important problems of this test will be to maintain the proper balance between public information and security. The public interest in the test will probably be too great to deny all
C members of Congress, press representatives, civilian scientists, etc., the opportunity to attend the event. No one can actually witness the test at close hand, of course, but the explosions can be seen by observers on board ships a few miles away, and a few in aircraft. Observers can also observe resulting damage from aircraft, and can go on board such target

ships as remain afloat after each test, when detectors of radio-activity indicate it is safe to do so. It would seem possible to permit observation to this extent by other than service personnel without disclosing secret technical information obtained by instrumentation and minute inspection, such as the relationship between exact distances, pressures, structural strengths, details of damage, effects of shock, radio-activity, etc.

Included in the information and security problem is the question of permitting foreign officers, scientists and press representatives to attend the tests. My recommendation is to limit foreign representation to British and Canadian officers and scientists, and even in their case, have it clearly understood that it is an American test, which they are privileged to observe -- not a combined U.S.-British operation.

This entire matter of observers is one requiring early decision by the Joint Chiefs of Staff, in order to permit orderly planning for transportation, quartering and messing. It is suggested, in this connection, that the Joint Chiefs of Staff issue invitations to the appropriate committees of the Congress to appoint members to witness the tests, if a decision is reached to permit such attendance.

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