

# TOP SECRET DISPATCH

DRAFTER	EXT.	ADDRESSEES	PRECEDENCE
FROM	JOINT CHIEFS OF STAFF EVALUATION BOARD ATOMIC TESTS	ASTERISK (*) MAILGRAM ADDRESSEE	
RELEASED BY		FOR ACTION JOINT CHIEFS OF STAFF	PRIORITY 1
DATE	30 JULY 46		ROUTINE 2
TOR CODE ROOM	1655		DEFERRED 3
DECODED BY	LYON		BASEGRAM 4
PARAPHRASED BY	BECKER	FOR INFORMATION DECLASSIFIED BY: JCS-CCS DECLASSIFICATION WORKING GROUP DATE 30 Jan 75	PRIORITY 5
CHECKED BY			ROUTINE 6
ROUTED BY	BECKER		DEFERRED 7
			BASEGRAM 8

UNLESS OTHERWISE INDICATED THIS DISPATCH WILL BE TRANSMITTED WITH DEFERRED PRECEDENCE

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Originator fill in DATE AND TIME GROUP (Use G. C. T.)

ON OUTGOING DISPATCHES PLEASE LEAVE ABOUT ONE INCH CLEAR SPACE BEFORE BEGINNING TEXT

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PRELIMINARY REPORT FOLLOWING SECOND ATOMIC BOMB TEST.  
 PARA 1. IN COMPLIANCE WITH YOUR DIRECTIVE OF 27 FEBRUARY 1946,  
 THE EVALUATION BOARD PRESENTS A SECOND PRELIMINARY REPORT OF  
 THE ATOMIC BOMB TESTS HELD AT BIKINI ATOLL.

SECTION 1 SUPPLEMENTAL TO PRELIMINARY REPORT ON TEST A.  
 PARA 1. IN GENERAL THE OBSERVATIONS ON SHIP DAMAGE PRESENTED  
 BY THIS BOARD IN ITS FIRST REPORT WERE CONFIRMED BY ENGINEERING  
 SURVEYS. THE LOCATION OF THE BOMB BURST, ACCURATELY DETERMINED  
 FROM PHOTOGRAPHS, WAS SUCH THAT ONLY 1 SHIP WAS WITHIN 1,000  
 FEET OF THE SURFACE POINT OVER WHICH THE BOMB EXPLODED. THERE  
 WERE ABOUT 20 SHIPS WITHIN A HALF MILE, ALL OF WHICH WERE BADLY  
 DAMAGED, MANY BEING PUT OUT OF ACTION AND 5 SUNK. IT REQUIRED  
 UP TO 12 DAYS TO REPAIR ALL OF THOSE SHIPS LEFT AFLOAT  
 SUFFICIENTLY SO THAT THEY COULD HAVE STEAMED UNDER THEIR OWN

POWER TO A MAJOR BASE FOR REPAIR.  
 PARA 2. IT IS NOW POSSIBLE TO MAKE SOME ESTIMATE OF THE  
 RADIOLOGICAL INJURIES WHICH CREWS WOULD HAVE SUFFERED HAD THEY  
 BEEN ABOARD THE TEST A TARGET VESSELS. MEASUREMENTS OF

No. 1 ADMIRAL. No. 2 FILE. No. 3F-1 OR CHARTROOM. No. 4 SPECIAL.

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RADIATION INTENSITY AND A STUDY OF ANIMALS EXPOSED IN SHIPS SHOW THAT THE INITIAL FLASH OF PRINCIPAL LETHAL RADIATIONS, WHICH ARE GAMMARAYS AND NEUTRONS, <sup>central group of</sup> WOULD HAVE KILLED ALMOST ALL PERSONNEL NORMALLY STATIONED ABOARD THE SHIPS WITHIN A HALF MILE

~~OF THE AIRBURST~~ AND MANY OTHERS AT GREATER DISTANCES. PERSONNEL PROTECTED BY STEEL, WATER OR OTHER DENSE MATERIALS WOULD HAVE BEEN RELATIVELY SAFE AT DISTANCES <sup>in the outlying target vessels.</sup> GREATER THAN 1 1/2 MILES. THE EFFECTS OF RADIATION EXPOSURE WOULD NOT HAVE INCAPACITATED

ALL VICTIMS IMMEDIATELY; EVEN SOME OF THE MOST SEVERELY AFFECTED MIGHT HAVE REMAINED AT THEIR STATIONS SEVERAL HOURS. THUS IT

IS POSSIBLE THAT INITIAL EFFORTS AT DAMAGE CONTROL MIGHT HAVE KEPT SHIPS OPERATING BUT IT IS CLEAR THAT VESSELS WITHIN A MILE

OF AN ATOMIC BOMB AIR BURST WOULD EVENTUALLY BECOME INOPERATIVE DUE TO CREW CASUALTIES.

SECTION 2 OBSERVATIONS ON TEST B.

PARA 1. THE BOARD DIVIDED INTO 2 GROUPS FOR THE OBSERVATION

OF TEST B. 4 MEMBERS, AFTER SURVEYING THE TARGET ARRAY FROM THE AIR, WITNESSED THE EXPLOSION FROM AN AIRPLANE 8 MILES

AWAY AT AN ALTITUDE OF 7500 FEET. THE OTHER 3 MEMBERS INSPECTED THE TARGET ARRAY FROM A SMALL BOAT THE DAY BEFORE THE TEST AND

OBSERVED THE BOMBS EXPLOSION FROM THE DECK OF THE USS HAVEN, 11 MILES AT SEA TO THE EAST OF THE BURST.

PARA 2. THE BOARD REASSEMBLED IN THE HAVEN ON 26 JULY AND THE MEMBERS HAVE SINCE EXAMINED PHOTOGRAPHS, DATA ON RADIO

ACTIVITY AND REPORTS OF OTHER PHENOMENA, AND HAVE INSPECTED SOME OF THE TARGET VESSELS. THEY ALSO CONSULTED WITH MEMBERS

OF THE TASK FORCE TECHNICAL STAFF.

PARA 3. AS SCHEDULED, AT 0835 BIKINI TIME ON 25 JULY, A BOMB

~~OF THE NAGASAKI TYPE WAS DETONATED WELL BELOW THE SURFACE OF THE LAGOON, WHICH AT THIS POINT IS 100 FEET DEEP. THIS BOMB WAS~~

SUSPENDED FROM THE LSM-60 NEAR THE CENTER OF THE TARGET ARRAY. THE EXPLOSION WAS OF PREDICTED VIOLENCE AND IS ESTIMATED TO HAVE

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BEEN AT LEAST AS DESTRUCTIVE AS 20,000 TONS OF TNT.  
 PARA 4. TO A DEGREE WHICH THE BOARD FINDS REMARKABLE, THE  
 VISIBLE PHENOMENA OF EXPLOSION FOLLOWED THE PREDICTIONS MADE  
 BY CIVILIAN AND SERVICE PHENOMENOLOGISTS ATTACHED TO JOINT TASK  
 FORCE 1. AT THE MOMENT OF EXPLOSION, A DOME WHICH SHOWED THE  
 LIGHT OF INCANDESCENT MATERIAL WITHIN, ROSE UPON THE SURFACE OF  
 THE LAGOON. THE BLAST WAVE WAS FOLLOWED BY AN OPAQUE CLOUD  
 WHICH RAPIDLY ENVELOPED ABOUT HALF OF THE TARGET ARRAY. THE  
 CLOUD VANISHED IN ABOUT <sup>two</sup> SECONDS TO REVEAL, AS PREDICTED, A  
 COLUMN OF ASCENDING WATER. FROM SOME OF THE PHOTOGRAPHS IT  
 APPEARS THAT THIS COLUMN LIFTED THE 26,000-TON BATTLESHIP  
~~ARKANSAS~~ FOR A BRIEF INTERVAL BEFORE THE VESSEL PLUNGED TO THE  
 BOTTOM OF THE LAGOON. CONFIRMATION OF THIS OCCURRENCE MUST  
 AWAIT THE ANALYSIS OF HIGH-SPEED PHOTOGRAPHS WHICH ARE NOT YET  
 AVAILABLE.

PARA 5. THE DIAMETER OF THE COLUMN OF WATER WAS ABOUT 2200 FEET,  
 AND IT ROSE TO A HEIGHT OF ABOUT 5500 FEET, AT AN INITIAL RATE OF  
~~3200 FEET PER SECOND~~. SPRAY ROSE TO A MUCH GREATER HEIGHT.  
 THE COLUMN CONTAINED ROUGHLY <sup>ten</sup> ~~10~~ MILLION TONS OF WATER. FOR  
 SEVERAL MINUTES AFTER THE COLUMN REACHED MAXIMUM HEIGHT, WATER  
 FELL BACK, FORMING AN EXPANDING CLOUD OF SPRAY WHICH ENGULFED  
 ABOUT HALF OF THE TARGET ARRAY. SURROUNDING THE BASE OF THE  
 COLUMN WAS A WALL OF FOAMING WATER SEVERAL HUNDRED FEET HIGH.

PARA 6. WAVES OUTSIDE THE WATER COLUMN, ABOUT 1000 FEET FROM  
 THE CENTER OF EXPLOSION, WERE 80 TO 100 FEET IN HEIGHT. THESE  
 WAVES RAPIDLY DIMINISHED IN SIZE AS THEY PROCEEDED OUTWARD, THE  
 HIGHEST WAVE REACHING THE BEACH OF ~~BIKINI~~ ISLAND BEING <sup>seven</sup> ~~7~~ FEET.  
 WAVES DID NOT PASS OVER THE ISLAND, AND NO MATERIAL DAMAGE  
 OCCURRED THERE. MEASUREMENTS OF THE UNDERWATER SHOCK WAVE ARE  
 NOT YET AVAILABLE. THERE WERE NO SEISMIC PHENOMENA OF SIGNIFICANT  
 MAGNITUDE.

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(PARA) <sup>7</sup> ~~THE EXPLOSION PRODUCED INTENSE RADIOACTIVITY IN THE WATERS OF THE LAGOON. PART OF THIS WAS BY REASON OF THE NEUTRON~~ <sup>2</sup>

~~BOMBARDMENT OF THE SODIUM IN THE SALT BUT THE WATER WAS FURTHER DANGEROUSLY CONTAMINATED BY FISSION PRODUCTS FROM THE BOMB~~

~~ITSELF.~~ RADIOACTIVITY IMMEDIATELY AFTER THE BURST IS ESTIMATED TO HAVE BEEN THE EQUIVALENT OF MANY HUNDRED TONS OF RADIUM.

A FEW MINUTES EXPOSURE TO THIS INTENSE RADIATION AT ITS PEAK WOULD, WITHIN A BRIEF INTERVAL, HAVE INCAPACITATED HUMAN BEINGS

AND HAVE RESULTED IN THEIR DEATHS WITHIN DAYS OR WEEKS.

(PARA) <sup>8</sup> GREAT QUANTITIES OF RADIOACTIVE WATER DESCENDED UPON

THE SHIPS FROM THE COLUMN OR WERE THROWN OVER THEM BY WAVES. THIS HIGHLY LETHAL RADIOACTIVE WATER CONSTITUTED SUCH A HAZARD

THAT AFTER <sup>four</sup> 4 DAYS IT WAS STILL UNSAFE FOR INSPECTION PARTIES, OPERATING WITHIN A WELL-ESTABLISHED SAFETY MARGIN, TO SPEND ANY

USEFUL LENGTH OF TIME AT THE CENTER OF THE TARGET AREA OR TO BOARD SHIPS ANCHORED THERE.

(PARA) <sup>9</sup> AS IN TEST "A", THE ARRAY OF TARGET SHIPS FOR TEST "B" DID NOT REPRESENT A NORMAL ANCHORAGE BUT WAS DESIGNED INSTEAD TO

OBTAIN THE MAXIMUM DATA FROM A SINGLE EXPLOSION. OF THE 84 SHIPS AND SMALL CRAFT IN THE ARRAY, 40 WERE ANCHORED WITHIN

<sup>one</sup> 1 MILE AND 20 WITHIN ABOUT <sup>one-half</sup> 1/2 MILE. TWO MAJOR SHIPS WERE SUNK, THE BATTLESHIP ~~ARKANSAS~~ IMMEDIATELY AND THE HEAVY-HULKED AIRCRAFT

CARRIER ~~SHINANO~~ AFTER 7 AND 1/2 HOURS. A LANDING SHIP, A LANDING CRAFT, AND AN OILER ALSO SANK IMMEDIATELY. THE

DESTROYER ~~HUGHES~~, IN SINKING CONDITION, AND THE TRANSPORT ~~FALCON~~, BADLY LISTING, WERE LATER BEACHED. THE SUBMERGED SUBMARINE

~~APOGON~~ WAS SENT TO THE BOTTOM EMITTING AIR BUBBLES AND FUEL OIL, AND <sup>4</sup> TO <sup>3</sup> OTHER SUBMERGED SUBMARINES ARE BELIEVED TO HAVE SUNK.

<sup>Five one three</sup> 5 DAYS AFTER THE BURST, THE BADLY DAMAGED JAPANESE BATTLESHIP ~~YAGATO~~ SANK. IT WAS FOUND IMPOSSIBLE IMMEDIATELY TO ASSESS

DAMAGE TO HULLS, POWER PLANTS AND MACHINERY OF THE TARGET SHIPS BECAUSE OF RADIOACTIVE CONTAMINATION. FULL APPRAISAL OF DAMAGE

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WILL HAVE TO AWAIT DETAILED SURVEY BY ENGINEER TEAMS. EXTERNAL OBSERVATION FROM A SAFE DISTANCE WOULD INDICATE THAT A FEW

ADDITIONAL SHIPS NEAR THE TARGET CENTER MAY HAVE SUFFERED SOME HULL DAMAGE. THERE WAS NO OBVIOUS DAMAGE TO SHIPS MORE THAN

*one-half*  
1/2 MILE FROM THE BURST.

SECTION III OBSERVATIONS AND CONCLUSIONS, BOTH TESTS.

PARA 21 THE OPERATIONS OF JOINT TASK FORCE <sup>one</sup> 4 IN CONDUCTING THE TESTS HAS SET A PATTERN FOR CLOSE, EFFECTIVE COOPERATION

OF THE ARMED SERVICES AND CIVILIAN SCIENTISTS IN THE PLANNING AND EXECUTION THIS HIGHLY TECHNICAL OPERATION. MOREOVER, THE TESTS

HAVE PROVIDED VALUABLE TRAINING OF PERSONNEL IN JOINT OPERATIONS REQUIRING GREAT PRECISION AND COORDINATION OF EFFORT.

PARA 22 IT IS IMPOSSIBLE TO EVALUATE AN ATOMIC BURST IN TERMS OF CONVENTIONAL EXPLOSIVES. AS TO DETONATION AND BLAST EFFECTS,

WHERE THE LARGEST BOMB OF THE PAST WAS EFFECTIVE WITHIN A RADIUS OF A FEW HUNDRED FEET, THE ATOMIC BOMB'S EFFECTIVENESS CAN BE

MEASURED IN THOUSANDS OF FEET. HOWEVER, THE RADIOLOGICAL EFFECTS HAVE NO PARALLEL IN CONVENTIONAL WEAPONS. IT IS NECESSARY THAT

A CONVENTIONAL BOMB SCORE A DIRECT HIT OR A NEAR MISS OF NOT MORE THAN A FEW FEET TO CAUSE SIGNIFICANT DAMAGE TO A BATTLESHIP.

AT BIKINI THE SECOND BOMB, BURSTING UNDERWATER, SANK A BATTLESHIP IMMEDIATELY AT A DISTANCE OF WELL OVER 500 FEET. IT DAMAGED AN

AIRCRAFT CARRIER SO THAT IT SANK IN A FEW HOURS, WHILE ANOTHER BATTLESHIP SANK AFTER 5 DAYS. THE FIRST BOMB, BURSTING IN AIR,

DID GREAT HARM TO THE SUPERSTRUCTURES OF MAJOR SHIPS WITHIN A HALF MILE RADIUS, BUT DID ONLY MINOR DAMAGE TO THEIR HULLS. NO

SHIP WITHIN A MILE OF EITHER BURST COULD HAVE ESCAPED WITHOUT SOME DAMAGE TO ITSELF AND SERIOUS INJURY TO A LARGE NUMBER OF

ITS CREW.

PARA 23 ALTHOUGH LETHAL RESULTS MIGHT HAVE BEEN MORE OR LESS

EQUIVALENT, THE RADIOLOGICAL PHENOMENA ACCOMPANYING THE <sup>two</sup> BURSTS WERE MARKEDLY DIFFERENT. IN THE CASE OF THE AIRBURST BOMB, IT

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SEEMS CERTAIN THAT UNPROTECTED PERSONNEL WITHIN <sup>one</sup> 1 MILE WOULD  
HAVE SUFFERED HIGH CASUALTIES BY INTENSE NEUTRON AND GAMMA  
RADIATION AS WELL AS BY BLAST AND HEAT. ~~THOSE~~ SURVIVING  
IMMEDIATE EFFECTS WOULD NOT HAVE BEEN MENACED BY RADIOACTIVITY

PERSISTING AFTER THE BURST.  
PARA 4c IN THE CASE OF THE UNDERWATER EXPLOSION, THE AIR BURST  
WAVE WAS FAR LESS INTENSE AND THERE WAS NO HEAT WAVE OF SIGNI-  
FICANCE. ~~MOREOVER~~, <sup>because of</sup> DUE TO THE ABSORPTION OF NEUTRONS AND GAMMA

RAYS BY WATER, THE LETHAL QUALITY OF THE FIRST FLASH OF  
RADIATION WAS NOT OF HIGH ORDER. ~~BUT~~ <sup>2</sup> THE SECOND BOMB THREW 3  
LARGE MASSES OF HIGHLY RADIOACTIVE WATER ONTO THE DECKS AND INTO  
THE HULLS OF VESSELS ~~WITHIN 1 MILE~~. THESE CONTAMINATED SHIPS

BECAME RADIOACTIVE STOVES, AND WOULD HAVE BURNED ALL LIVING  
THINGS ABOARD THEM WITH INVISIBLE AND PAINLESS BUT DEADLY

RADIATION.  
PARA 5e IT IS TOO SOON TO ATTEMPT AN ANALYSIS OF ALL OF THE  
IMPLICATIONS OF THE ~~BIKINI~~ TESTS. ~~BUT~~ IT IS NOT TOO SOON TO

POINT TO THE NECESSITY FOR IMMEDIATE AND INTENSIVE RESEARCH  
INTO SEVERAL UNIQUE PROBLEMS POSED BY THE ATOMIC BOMB. ~~THE~~

POISONING OF LARGE VOLUMES OF WATER PRESENTS SUCH A PROBLEM.  
~~STUDY~~ MUST BE GIVEN TO PROCEDURES FOR PROTECTING NOT ONLY SHIPS  
CREWS <sup>1</sup> BUT ALSO THE POPULATIONS OF CITIES AGAINST SUCH RADIO-  
LOGICAL EFFECTS AS WERE DEMONSTRATED IN ~~BIKINI~~ LAGOON.

PARA 6 <sup>two</sup> OBSERVATIONS DURING THE ~~2~~ TESTS HAVE ESTABLISHED THE  
GENERAL TYPES AND RANGE OF EFFECTIVENESS OF AIR AND SHALLOW

UNDERWATER ATOMIC-BOMB BURSTS ON NAVAL VESSELS, ARMY MATERIEL,  
INCLUDING A WIDE VARIETY OF ~~QUARTERMASTER~~ STORES, AND PERSONNEL.

~~FROM~~ THESE OBSERVATIONS AND FROM INSTRUMENTAL DATA IT WILL NOW  
BE POSSIBLE TO OUTLINE SUCH CHANGES, NOT ONLY IN MILITARY AND

NAVAL DESIGN BUT ALSO IN STRATEGY AND TACTICS, AS FUTURE EVENTS  
MAY INDICATE.

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~~PART 7. NATIONAL SECURITY DICTATES THE ADOPTION OF A POLICY OF INSTANT READINESS TO DEFEND OURSELVES VIGOROUSLY AGAINST ANY THREAT OF ATOMIC WEAPON ATTACK AT ANYTIME AND ADHERENCE TO THIS POLICY UNTIL IT IS CERTAIN THAT THERE CAN NEVER BE AN ATOMIC WAR. ONE ENDURING PRINCIPLE OF WAR HAS NOT BEEN ALTERED BY THE ADVENT OF THE ATOMIC WEAPON. OFFENSIVE STRENGTH WILL REMAIN THE BEST DEFENSE. THEREFORE, SO LONG AS ATOMIC BOMBS COULD CONCEIVABLY BE USED AGAINST THIS COUNTRY, THE BOARD URGES THE CONTINUED PRODUCTION OF ATOMIC MATERIAL AND RESEARCH AND DEVELOPMENT IN ALL FIELDS RELATED TO ATOMIC WARFARE.~~

SIGNED: L. H. BRERETON  
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JCS(#1)....ACT  
BUORD(#2)....BUSHIPS(#3)....CJTF1(RE)(#4)....OOR(#5)....OO7(#6)....  
WAR (COS AND COMGENAAF)(#7)....OPO3(#8-13)....SECNAV(#14)....  
NAVAIDE(#15)....23(#16)....ADM LEAHY(#17)....

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FROM: JCS EVALUATION BOARD

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(CHANGED PORTION UNDERLINED)

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CORRECT ROUTING TO READ:

JCS(#1)....ACT

007(#6)....NAVAIDE(#15)....ADM LEAHY(#17)

WAR DEPT(FOR GEN SPAATZ AND GEN EISENHOWER) (#7)....

CORRECTED:

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THIS SHEET ROUTED TO:

JCS(#1)....

007(#2)....NAVAIDE(#3)....ADM LEAHY(#4)....

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