

ARMY SERVICE FORCES
 MEMO ROUTING SLIP

TO THE FOLLOWING IN THE ORDER INDICATED		CHECK ACTION
TO: (Name, organ., building)	INITIALS	CONCURRENCE
1. <i>Col Lee</i>	<i>lee</i>	SIGNATURE
	DATE	NOTE AND RETURN
2. <i>Col Lee</i> <i>Gen Groves</i>		NOTE AND FORWARD
		COMPLETE ACTION
3. <i>45)</i>		CIRCULATE
		INFORMATION
<i>Report on Test "A"</i>		FILE
<i>Final Draft as requested</i>		
FROM: (Name, organ., building)	DATE	
<i>lee</i>	<i>23 July 46.</i>	
	TEL	

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Report of Observations at Bikini, Test Able. 29 June - 6 July 1946.

During the entire period of the Manhattan Observer Group's presence at Bikini, all members of the party were quartered aboard the USS Cumberland Sound. The program of activity for this group at Bikini was as follows:

- 29 June - Arrived Bikini by destroyer, transferred to USS Cumberland Sound, evening tour of laboratory spaces under the supervision of Dr. Holloway.
- 30 June - Inspected target ships Nevada and Nagato, made preparations for final check of personnel and evacuation of lagoon for Able Day.
- 1 July - The Atomic Bomb was dropped for Test Able at 0900 this date. Cumberland Sound returned to the lagoon at approximately 4:00 PM this date.
- 2 July - Initial briefing conference on the subject of target ship inspection and other activities by Colonel Gee. Conference conducted by Dr. Dunning on basic nuclear physics and the physics of the chain reaction. Evening conference conducted by Dr. Bradbury which included a discussion of the functions of Los Alamos as well as a presentation by Dr. Hirschfelder and McGee on the details of a nuclear explosion. A boat trip was made through the entire target fleet late in the afternoon of 2 July.
- 3 July - Inspection of target ships Prinz Eugen and Pensacola. Conference conducted by Dr. Spedding on chemistry and metallurgy, with particular emphasis on the various types of piles.

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RAYMOND A. CARPENTER	6-22-78
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4 July - Inspection of target ships Arkansas and Nevada.

Evening conference conducted by Dr. Sawyer on the subject of instrumentation for Operation CROSSROADS.

5 July - Conference conducted by Colonel Stafford Warren on the subject of Radiological Safety. Short conference held with Capt. Quackenbush, JTF-One Photographic Officer, during which black and white and colored pictures of the atomic explosion were shown to the observer group.

6 July - Group departed Bikini for Kwajalein enroute to the United States.

During the inspection of target ships, on 30 June, the group boarded the battleship Nevada. Aboard this vessel was a representative display of various types of Army equipment securely fastened to the decks of the Nevada. It was quite obvious that nothing but the best equipment had been selected for this test. All motor vehicles appeared to be brand new and all guns and accessories were in excellent condition. At about the time our party concluded its inspection of the two target ships, the Nevada and the Nagato, animals were being placed in their final positions for exposure during the blast. Ships crews were beginning the evacuation of target vessels and all appeared to be in readiness for Test Able.

On the morning of 1 July, the Cumberland Sound was cruising in its assigned position along a north south line approximately 20 miles east of the center of the target fleet. Upon receipt of the 2 minute warning signal, all hands adjusted the special dark goggles furnished for this operation, turned toward the center of the target array and concentrated on the central ship, the USS Nevada, in order that the first burst of light from the explosion from this fourth Atomic Bomb might not be missed in any of its details. The "bomb away" signal, coming in over the ship's loudspeaker, warned us that there were approxima -

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tely 50 seconds yet to go. I saw clearly the first point of light at the instant of explosion. This was followed immediately by the glow of the ball of fire, which in turn was surrounded by a cloud of vapor, which appeared to be resting on the surface of the lagoon, forming a pattern similar in shape to a derby hat. The rim of the hat being the low lying clouds of smoke which appeared instantaneously on a great majority of the target ships. At this point, I removed my dark glasses to observe the initial cloud which had begun to take on the bright colors ranging through the entire spectrum. At this stage of the cloud formation, the predominate color appeared to be red with the extremities of the cloud showing streaks of dark purple. As the cloud made its way upward, the bright red colors faded giving way to shades of lavender, these in turn fading as the mushroom formed and the cloud gained altitude until in its final position, at an altitude estimated at 42,000 feet, the cloud appeared to have a white color at its extremities which shaded off into a deep peach in the recesses at the top of the mushroom. As the minutes went by, the entire cloud assumed a uniform pale peach color. The shape of the mushroom cloud, caused by this explosion, was exactly that which had been predicted and resembled very closely the clouds which all of us had seen in pictures prior to our departure for Bikini. The principal difference between this cloud and all the others was that no dust was present in any significant quantity to deaden the brilliant colors formed by the products of the nuclear explosion. The colors were brilliant at the beginning of the formation of the cloud and continued to be quite bright until the cloud took on the previously mentioned uniform color of pale peach. The formation of the entire cloud consumed approximately 10 minutes. Immediately after the cloud had reached its maximum height, we were able to locate, with the aid of powerful field glasses, the drone airplanes

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flying into the stem of the mushroom and the top of the mushroom itself.

The drone aircraft operation was reported by Task Group 1.5 to have been completely successful. One Navy F6F Fighter drone, crashed into the sea before the bomb exploded. Three Navy drones passed through the cloud successfully. One of these drones was lost for 55 minutes. It had entered the stem of the mushroom, had emerged 6,000 feet higher than its point of entry and was not picked up by its mother plane until it had flown to a point very near Roy Island. Four B-17 drones, took off, flew through the clouds and returned to base making successful landings. The samples collected by these drone aircraft were reported by the Los Alamos group to have been entirely satisfactory. Some of these drone airplanes remained radioactively hot for a period of 4 or 5 days. Final tests have not yet been completed on the white rats and mice, who were aboard these drone aircraft.

When the Cumberland Sound reentered Bikini lagoon, on the afternoon of 1 July, all of us had been considerably surprised by the great disappointment voiced by certain radio broadcasters on the 10:30 AM broadcast after the shot. We had listened, also, to the first report made by Admiral Blandy. This report, too, painted a very optimistic picture from the Navy point of view. However our earlier suspicions were confirmed when we examined the target fleet through our field glasses to observe that even on the major capital ship, superstructures had been severely damaged. We had a good look at the Jap cruiser Sakawa. Her entire stern had been pounded to a pulp, her after turret was not visible above the level of her main deck, her side plates were twisted and bent inward at an angle of approximately 45° , her stacks were missing entirely. A highly skilled Naval observer, trained in recognizing Japanese Warcraft, admitted that she did not resemble, in any way, the ship which we had seen anchored at that point the day before. Many ships were still burning when we reentered the lagoon. One of the Transports, located at the extreme edge of the ship array, was on fire amidships and to my knowledge the reason for this fire has not yet been explained. Near

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the outer fringe of target ships, one LST was burning fiercely, also for reasons unexplained. It was quite obvious to all of us that the bomb had missed the central target ship, however, there appeared to be a large open space in the ship array which had not existed the day before. This open area was covered with a large oil slick from the sunken vessels.

During the evening of 1 July, I visited the USS Mt. McKinley for the purpose of arranging a schedule of inspection for our group to board the various target ships. I was advised at this time that the entire fleet was still radiologically hot and that it was considered most unlikely that any inspecting parties would be permitted aboard target vessels on 2 July. Early the morning of 2 July, I conducted a conference for the purpose of briefing the entire Manhattan Group on the general situation, with respect to the target fleet, its condition and the expected schedule of inspection. At this conference it was decided that we might improve our time while waiting for the fleet to cool off by organizing conferences to be led by those individuals in the group best qualified to tell us something of basic nuclear physics, the chain reaction, the functioning of various types of piles and other subjects pertaining to the Atomic Bomb which were not classified information and which were of general interest to the entire group. A meeting was held the morning of 2 July, supervised by Dr. Dunning. Dr. Dunning explained, in considerable detail, basic nuclear physics and went on to describe the mechanics of the chain reaction. In the afternoon of this same day, our entire group was authorized to make a trip, by small boat, through the target fleet but we were prohibited from boarding any vessel at this time. We spent the entire afternoon cruising about among the target ships. It was at this time, that all of us realized that the initial radio broadcast had been so much in error. The target fleet had indeed suffered a staggering blow. During the evening, Dr. Bradbury, Dr. Hirschfelder,

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and Dr. McGee conducted an interesting conference on Los Alamos and the details of an Atomic Bomb explosion.

The first target ship our group was permitted to go aboard was the German heavy cruiser Prinz Eugen. Our trip aboard this vessel was made the afternoon of 3 July. The Prinz Eugen was badly burned on the side towards the explosion, she has lost a major percentage of her radar antenna, many of her radio aerials were missing and her superstructure was twisted and damaged to a considerable degree. There appeared to be no interior damage aboard the Prinz Eugen. The second ship we boarded, the USS cruiser Pensacola, presented an entirely different picture. The Pensacola's stacks both had been toppled over and crushed, the blast had continued down into the boilers doing damage on the fire side of all the boilers which had been inspected at the time we were aboard this ship. Her superstructure was badly damaged, radar antenna were missing entirely, all radio antenna was stripped, the vessel was littered from stem to stern with all types of ships gear one normally expects to find aboard a major warship. We saw evidence of damage to fire control equipment, a downward displacement of the after deck and some major failures of bulkheads above the main deck. We were not permitted to go below the main deck of this vessel.

On the morning of 4 July, the Manhattan Observer Party was permitted to go aboard the USS battleship Arkansas. Here we saw spectacular damage to a major warship. There were numerous failures of the main deck of this battleship causing great dimples, all of which were holding water at the time we made our inspection. It was most difficult for personnel to walk on the main deck or on any of the passageways above the main deck at the time of our inspection. The stacks had been crumpled and torn from their foundations, the blast again going down the stacks had damaged the boilers of this battleship. There was spectacular damage throughout the superstructure and all manner of ship gear was scattered indiscriminately throughout the ship. Many bulkheads had failed and bulkhead doors had been blown in through their frames. The ship had lost all

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her radar and radio antenna. Damage to fire control equipment was evident. No attempt has been made to check the main turrets of this ship since she had no power aboard. An interesting phenomena was observed aboard this vessel. The main searchlight had been blown from her after mast forward to a position approximately amidships on the main deck near the port side. This searchlight was undoubtedly moved by the initial shock wave. Soon thereafter, a severe wave must have moved in from the opposite direction because a steel chain boarding net had been blown from its position hanging over the port side back on to the ships main deck covering the wreck of the searchlight like a bedspread. This was pointed out to a number of our party and all of them were quite surprised that the back pressure could have been heavy enough to do this amount of damage. The Army equipment displayed on the deck of the Arkansas was for the most part a complete wreck. Some items of equipment in sheltered spots on the main deck had been relatively well protected, however, even in these locations the equipment was covered with debris from other parts of the ship. As our inspecting party left the Arkansas, the executive officer asked us to tell the folks at home "That the oldest ship in the Navy had simply taken the Atomic Bomb in her stride." We next boarded the USS battleship Nevada, the central target ship and the aiming point for Test Able. The after deck of the Nevada had failed and had been displaced downward about two and one half feet. The Army equipment and the Navy airplanes displayed on the stern of this ship were a shambles. A large section of the main deck just forward of the after turret on the port side had failed completely and was forced downward into the interior of the ship. Considerable damage was done to the superstructure, to the radar antenna, and of course, to the radio antenna of this vessel, however, the equipment on the main deck forward had been well protected by the ships superstructure and was not so seriously damaged. On this vessel, as on the Arkansas, it was quite difficult for the observing party to move about on the main deck and through the various passageways because of the amount of debris scattered

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throughout the ship.

The Manhattan Observer Group returned to the Cumberland Sound after two days of inspection of the target fleet considerably impressed by the results obtained with the explosion of a single Atomic Bomb. The attempts made by various Naval officers, including Admiral Blandy in his brief conference with the Manhattan Observer Group, to discount the effects of the bomb furnished a source of considerable amusement to our entire group. So much emphasis was placed on the fact that the various vessels remained afloat that all of us became convinced that the Navy was indeed grasping at straws in attempting to build up a case for the battleships.

In my final briefing session with the Manhattan Observer Group, I instructed all individuals, who proposed to make public speeches or to write articles for publication, that these speeches and articles must not include a reference to the height of the bomb burst or a reference to exact distances from the point of explosion to a particular vessel by name. These were the only restrictions placed upon the Manhattan Observer Group in my final meeting with them aboard the Cumberland Sound. I am convinced that all members of this group had a most interesting and valuable experience at Bikini. The civilian members of the group, particularly, were most profuse in their thanks for the opportunity afforded them by the Manhattan Project to attend this experiment. All of them returned home with a very healthy respect for the bomb and the damage which it can do and with a feeling of definite friendship towards the Army for the excellent treatment accorded them wherever they were in Army hands. This was in strong contrast with their feeling concerning the treatment accorded by the Navy during our stay aboard the USS Cumberland Sound.

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Col., C.E.

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NO. / of Series. a.

RESUME OF SHIP DAMAGE

- a. Five ships sunk (including two transports, two destroyers and the Jap cruiser SAKAWA).
- b. One aircraft carrier completely demolished.
- c. One heavy hull submarine badly mangled.
- d. Two cruisers and two battleships heavily damaged.
- e. Two battleships and one aircraft carrier with considerable damage to superstructure.
- f. Superstructure damage to German cruiser PRINZ EUGEN and Jap battleship NAGATO.
- g. One fleet oiler plus numerous transports and other non-combatant vessels heavily damaged.
- h. Light damage to many other ships in the Target Array.

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