UNCLASSIFIED

AD NUMBER

AD366736

CLASSIFICATION CHANGES

TO: unclassified

FROM: confidential

LIMITATION CHANGES

TO:

Approved for public release, distribution unlimited

FROM:

Notice: Release only to U. S. Government Agencies is authorized. Other certified requesters shall obtain release approval from Director, Defense Atomic Support Agency, Washington, D. C. 20301.

AUTHORITY

DSWA ltr., 9 Apr 97; DSWA ltr., 9 Apr 97

THIS PAGE IS UNCLASSIFIED

XRD 46

CONFIDENTIAL
Security Information

BUREAU OF SHIPS GROUP [redacted]

TECHNICAL INSPECTION REP[redacted]T.

CONFIDENTIAL

Classification (Cancelled) (Changed to Security Information)
By Authority of JOINT CHIEFS OF STAFF JCS 1795/36 DATED 15 APRIL 1949
By John H. Ryette 23 SEP 1953

OPERATION CROSSROADS.

U.S.S SKIPJACK (SS184)

TEST ABLE [U].

U. S. GOVERNMENT [illegible] COPIES OF THIS REPORT DIRECTLY FROM DDC. ON[illegible] THROUGH

Director
Defense Atomic Support Agency
Washington, D. C. 20301

CONFIDENTIAL
Security Information

1947,
56p.

~~OPERATION CROSSROADS~~

XRD-46

~~DIRECTOR OF SHIP MATERIAL~~

~~JOINT TASK FORCE ONE~~

[redacted]

NOV 2 - 1965
RECEIVED
TISIA B

CONFIDENTIAL

[redacted]

GROUP-3
Downgraded at 12 year intervals;
Not automatically declassified.

1 JAN 1965

SECRET

REG. NO.

3632

CONFIDENTIAL

BUREAU OF SHIPS GROUP

TECHNICAL INSPECTION REPORT

U. S. GOVERNMENT [illegible] DIRECTLY
FROM DOD. [illegible]

Director
Defense Atomic Support Agency
Washington, D. C. 20301

"This document contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U. S. C., Section 793 and 794. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law."

SUBMITTED:

C. L. Gaasterland,
Commander, U.S.N.

APPROVED:

F. X. Forest,
Captain, U.S.N.

SECRET

USS SKIPJACK (SS184)

[illegible] Automatic Declassification

CONFIDENTIAL

GROUP-3 1 JAN 1965
Downgraded at 12 year intervals;
Not automatically declassified.

TABLE OF CONTENTS

	PAGE NO.
Ship Characteristics Sheet	3
Midship Se ction	4
Overall Summary of Damage	5
Hull Technical Inspection Report (Section I)	9
Machinery Technical Inspection Report(Section II)	15
Electrical Technical Inspection Report(Section III)	20
Photographic Section (Section IV)	28
Commanding Officer's Report (Appendix)	36

U.S.S. SKIPJACK (SS184)

SHIP CHARACTERISTICS

Building Yard: Electric Boat Company.

Commissioned: 30 June 1938.

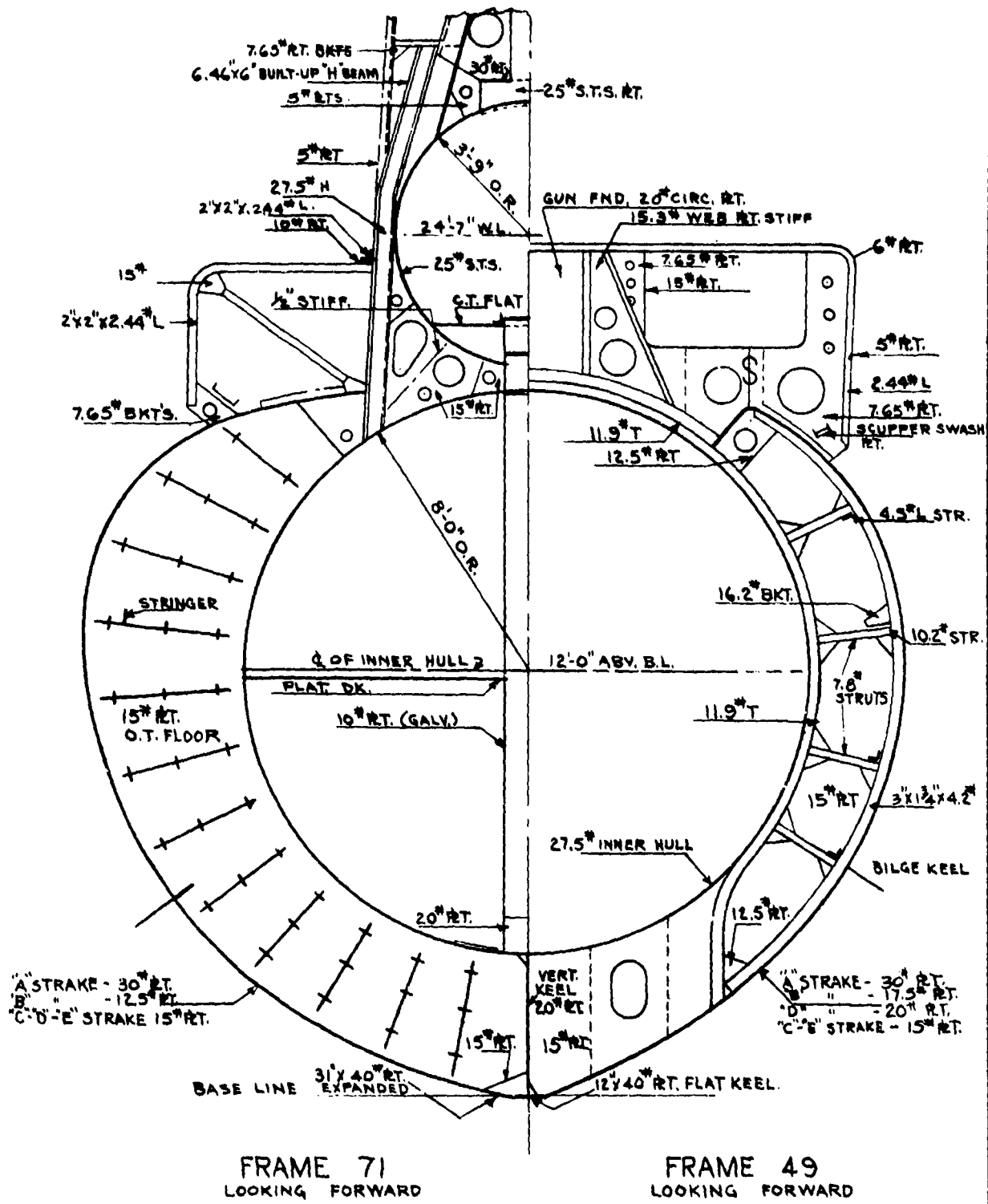
HULL

Light Hull Construction.
Length Overall: 308 feet 0 inches.
Length (between perpendiculars): 300 feet 0 inches.
Beam (extreme): 26 feet 2 inches.
Beam (molded): 25 feet 7 inches.
Height (lowest point of keel to top of periscope supports): 43 feet 5 inches.
Drafts (at time of test): Fwd. 16 feet 6 inches.
Aft. 17 feet 6 inches.
Standard Displacement: 1435 tons.
Displacement (at time of test): 1820 tons.

MAIN PROPULSION PLANT

Main Engines: Four General Motors, 16 cylinder Type 16-278A.
Auxiliary Engine: General Motors, 8 cylinder, Type 8-241.
Main Motors and Generators: Elliott.
Main Storage Battery: Gould.
Main Controls: Cutler-Hammer.
Reduction Gears: Farrell-Birmingham.
Composite Drive.

[redacted]



TEST A

[redacted]

U.S.S. SKIPJACK (SS 184)

3632

TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

Draft and list were normal after the test; no flooding occured.

(b) Structural damage.

There is no structural damage of any consequence. One coat of paint on the exposed vertical surface of the port side of the superstructure and conning tower fairwater is scorched. The deck access cover to the windlass gear was apparently blown upward, fracturing the single remaining hinge which had not corroded through before the test. (There were originally three hinges). Two other small deck access covers, the fastenings of which were previously severly corroded, were blown off. This is one of the oldest operating submarines and her entire superstructure and main deck would have required replacement had she continued in active service.

(c) Other damage.

Machinery, electrical, ship control, and fire control equipment was fully operable after the test. Radio equipment temporarily inoperable due to loss of antennas caused by broken insulators. The master gyro showed a 7.5° easterly error and the auxiliary gyro a 6.4° easterly error after the test.

II. Forces Evidenced and Effects Noted.

(a) Heat.

On the port side, 93% of the vertical and less than 10% of the horizontal paint is scorched. The apparent direction of the attack was 220° relative. As stated above, one coat of paint is scorched along the port side. The paint scorching is more severe on vertical than on horizontal surfaces. However, some horizontal surfaces show scorching. There are several examples of the reflection of the heat wave. Exposed topside cables and insulators were covered with light char or soot which could be rubbed off with the fingers, but in no case was insulation damaged.

(b) Fires and explosions.

No fires or explosions occured.

(c) Shock.

There is no evidence of shock other than broken non-standard 10" strain insulators which may have been broken by flying debris from other ships or by blast pressure.

(d) Pressure.

The blowing off of access covers as described in paragraph I(b) above indicate that a relatively small dynamic pressure wave attacked the superstructure. The "Coordinator's Report on Air Blast and Water Shock for Tests A and B" of 27 September 1946 indicates that the peak pressure was approximately 13.5 lbs. per square inch and the duration of the positive pressure phase was about 0.76 seconds. The elastic deformation of the single hull, measured at four stations, was not greater than 0.03 inches.

(e) Any effects peculiar to the atom bomb.

Sufficient heat to scorch paint on the por side and slight damage to the superstructure by a pressure wave were the only effects noted peculiar to the atom bomb.

III. Effects of Damage.

(a) Effect on machinery, electrical, and ship control.

None.

(b) Effect on Gunnery and Fire Control.

None.

(c) Effect on watertight integrity and stability.

None.

(d) Effect on personnel and habitability.

It is believed there would have been no effect on personnel inside the sealed pressure hull but the exposed topside personnel would have suffered severe flash burns. Habitability is unimpaired.

(e) Total effect on fighting efficiency.

There is no reduction in fighting efficiency from a material standpoint. Exposed personnel topside would have been at least temporarily out of action.

IV. General Summary of Observer's Impressions and Conclusions.

The SKIPJACK had been moored on the surface at a distance of approximately 1150 yards from the burst. From inspection, the impression is formed that this ship was subjected to a directional flash of more or less instantaneous heat followed by a relatively high velocity wind. It is concluded that a submairne on the surface at this distance from an explosion of the type

experienced in test Able will not be affected from a material standpoint but would have casualties among exposed topside personnel. Had the submarine been submerged, there would have been no damage and no casualties. For general views of the SKIPJACK after test Able see photographic section on pages [illegible]

V. Preliminary General or Specific Recommendations of Inspecting Group.

If it is expected that submarines will be subjected to such an attack it appears desirable to protect topside personnel to the maximum practicable extent with clothing and structural enclosures. As there is no significant material damage to this vessel no further recommendations are submitted herein.

TECHNICAL INSPECTION REPORT

SECTION I - HULL

GENERAL SUMMARY OF HULL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

There was no change in draft or list, hence no flooding.

(b) Structural damage.

There is no structural damage of any consequence. One coat of paint on the exposed vertical surfaces of the port side of the superstructure and conning tower fairwater is scorched. The deck acess cover to the windlass gear was apparently blown upward, fracturing the single remaining hinge which had not corroded through before the test. (There were originaaly three hinges). Two other small deck access covers, the fastenings of which were previously severly corroded, were blown off. This is one of the oldest operating submarines and her entire superstructure and main deck would have required replacement had she continued in active service.

(c) Other damage.

Not observed.

II. Forces Evidenced and Effects Noted.

(a) Heat.

The apparent direction of the attack was 220° relative. On the port side, 95% of the vertical and less than 10% of the horizontal paint is scorched.

(b) Fires and Explosions.

None.

(c) Shock.

No evidence.

(d) Pressure.

The blowing off of the access covers as described in paragraph I(b) above indicate that a relatively small dynamic pressure wave attacked the superstructure. The "Coordinator's Report on Air Blast and Water Shock for test A and B" of 27 September 1946 indicates that the peak air pressure was approximately 13.5 pounds per square inch and the duration of the positive pressure phase was about 0.76 seconds. The elastic deformation of the single hull, measured at four stations, was not greater than 0.03 inches.

(e) Effects peculiar to the atom bomb.

None except as described elsewhere.

III. Effects of Damage.

(a) Effect on machinery, electrical and ship control.

Not observed.

(b) Effect on gunnery and fire control.

Not observed.

(c) Effect on water-tight integrity and stability.

None.

IV. General Summary of Observer's Impressions and Conclusions.

From inspection, the impression formed is that this ship was subjected to a directional flash of more or less instantaneous heat followed by a relatively high velocity wind. It is concluded that a submarine on the surface at such distance from an explosion of the type expierenced in Test A will not be affected as far as hull material condition is concerned.

V. Preliminary Recommendations.

If it is expected that submarines will be subjected to such an attack it appears desirable to protect topside personnel to the maximum practicable extent with clothing and structural enclosures. As there is no significant material damage no further recommendations are submitted herein.

DETAILED DESCRIPTION OF HULL DAMAGE

A. General Description of Hull Damage.

No damage except as covered in B and T.

B. Superstructure.

The deck access cover to the windlass gear was apparently blown upward, fracturing the single remaining hinge which had not corroded through before the test. Two other small deck access plates, the fastenings of which were previously severely corroded, were blown off.

C. Turrets Guns and Directors.

No damage.

D. Torpedo Mounts, Depth Charge Gear.

No damage.

E. Weather Deck.

No damage.

F. Exterior Hull.

No damage.

G. Interior Compartments (above w.l.).

No damage.

H. Armor Decks and Miscellaneous Armor.

Not applicable.

I. Interior Compartments (below w.l.).

No damage.

J. Underwater Hull.

No damage.

K. Tanks.

No damage.

L. Flooding.

None.

M. Ventilation.

No damage.

N. Ship Control.

No damage.

O. Fire Control.

No damage.

P. Ammunition Behavior.

No damage.

Q. Ammunition Handling.

No damage.

R. Strength.

No damage.

S. Miscellaneous.

No comment.

T. Covering.

The top coat of paint on the exposed vertical surfaces of the port side of the superstructure and conning tower fairwater is moderately scorched and charred.

U. Welding and Rivetting.

No damage.

TECHNICAL INSPECTION REPORT

SECTION II - MACHINERY

GENERAL SUMMARY OF MACHINERY DAMAGE

I. Target Condition After Test A.

(a) Drafts after test; list; general areas of flooding sources.

Draft and list were normal; no flooding occured.

(b) Structural Damage.

No structural damage was observed.

(c) Other Damage.

All machinery and equipment was undamaged and operable.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Momentary extreme heat from the direction of the bomb burst is evidenced by heavily scorched and blistered paint on vertical surfaces toward the burst,

(b) Fires and explosions.

No fires or explosions occured onboard.

(c) Shock.

No indication of shock was evidenced.

(d) Pressure.

None evidenced.

(e) Effects apparently peculiar to the Atom Bomb.

Slight radioactivity and heat were the only effects noted peculiar to the atom bomb.

III. Effects of Damage.

(a) Effect on machinery and ship control.

None. No damage.

(b) Effect of gunnery and fire control.

None. No damage.

(c) Effect on watertight integrity and stability.

None. No damage.

(d) Effect on personnel and habitability.

It is believed there would have been no effect on personnel inside the sealed pressure hull. Habitability was unimpaired.

(e) Total effect of fighting efficiency.

None to material. Any personnel topside would have been at least temporarily out of action.

IV. General Summary.

It is apparent that a submarine sealed up as for diving and rigged for depth charge attack yet still on the surface would be undamaged by an air burst of an atomic bomb of similiar strength and at similiar range as the test A bomb.

V. Preliminary Recommendations.

No comment.

A. General Description of Machinery Damage.

(a) Overall condition.

Undamaged.

(b) Areas of major damage.

No damage.

(c) Primary cause of damage in each area of major damage.

No damage.

(d) Effect on target test on overall operation of machinery plant.

None. All equipment was operated under service conditions with vessel underway. Diving equipment was tested by stationary test dive.

B. Boilers.

Not applicable.

C. Blowers.

Not applicable.

D. Fuel Oil Equipment.

No damage.

E. Boiler Feedwater Equipment.

Not applicable.

F. Main Propulsion Machinery.

No damage.

G. Reduction Gears.

No Damage.

H. Shafting and Bearings,

No Damage,

I. Lubricating System.

No Damage.

J. Condensers and Air Ejectors.

Not Applicable.

K. Pumps.

No Damage.

L. Aux. Generators (Turbines and Gears).

Discussed under Item F.

M. Propellers.

No Damage.

N. Distilling Plant.

No Damage.

O. Refrigeration Plant,

No Damage,

P. Winches, Windlasses and Capstans.

No Damage.

Q. Steering Engine.

No Damage.

R. Elevators, Ammunition hoists, etc.

Not applicable.

S. Ventilation (Machinery)

No damage.

T. Compressed Air Plant.

No damage.

U. Diesels (Generators and Boats)

Not applicable. See Item F.

V. Piping Systems.

No damage.

W. Hydraulic System.

No damage.

X. Navigational Instruments.

No damage.

Y. Periscopes.

No damage.

Z. Radar and Sonar.

No damage.

AA. Miscellaneous.

None.

TECHNICAL INSPECTION REPORT

SECTION III - ELECTRICAL

GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

Not observed.

(b) Structural damage.

Not observed.

(c) Damage.

No electrical equipment was inoperable due to the test. The master gyro compass had a 7.5° easterly error and the auxiliary gyro had a 6.4° easterly error after the test.

II. Forces Evidenced and Effects Noted.

(a) Heat.

There was no evidence of heat having affected any equipment inside the pressure hull. On the topside charring of paint on vertical surfaces of the superstructure had occured along the port side. Topside cables in some few instances, when completely exposed, had a light covering of char or soot which could be rubbed off with the fingers, but in no case was the insulation damaged at all.

(b) Fires and explosions.

None.

(c) Shock.

It is believed the errors in the gyro compasses

may have been caused by shock. The starter for the wardroom fluorescent light was jarred loose.

(d) Pressure.

There was no evidence of pressure damage.

(e) Any effects apparently peculiar to the atom bomb.

Other than slight radioactivity, the charring of the ship's superstructure on the side toward the blast is the only phenomenon noted that may be considered peculiar to the atom bomb.

III. Effects of Damage.

(a) Effect on propulsion and ship control.

None.

(b) Effect on gunnery and fire control.

There was no effects on electrical equipment except that the error developed in the master gyro compass affected the accuracy of fire control instruments which utilize feed-in from from the gyro compass.

(c) Effect on water-tight integrity and stability.

Not observed.

(d) Effect on personnel and habitability.

None except for possible radioactivity effects and probable heat or blast effects on exposed personnel.

(e) Total effect on fighting efficiency.

None except the necessity of correcting for gyro compass errors.

IV. General Summary of Observers' Impressions and Conclusions.

There was no vitally important effect from the atom bomb on electrical equipment in this ship. It is considered that, even though, on the surface, this submarine was outside the range of significant damage by the atom bomb.

V. Any Preliminary General, or Specific Recommendations of The Inspecting Group.

None.

DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

A. General Description of Electrical Damage.

(a) Overall condition.

The only electrical damage which occured was minor in nature. The master and auxiliary gyro compasses suffered slight damage which did not render them inoperable, but introduced appreciable errors.

(b) Areas of major damage.

None.

(c) Primary causes of damage in each area of major damage.

None.

(d) Effect of target test on overall operation of electric plant.

1. Electric propulsion.

No effect. Operable.

2. Main storage batteries.

No effect. Operable.

3. Auxiliary power.

No effect. Operable.

4. Communications.

No effect. Operable.

5. Fire control circuits.

A 7 .5° easterly error in the master gyro compass would be reflected in the automatic feed of Own Ship's Course to the torpedo data computer.

6. Lighting.

A starter for a fluorescent light jarred loose. Otherwise lighting equipment was undamaged and operable.

7. Ventilation.

No effect. Operable.

(e) Types of equipment most affected.

Master and auxiliary gyro compasses.

B. Electric Propulsion Rotating Equipment.

No damage.

C. Electric Propulsion Control Equipment.

No damage.

D. Generators - Ship's Service.

Not applicable.

E. Generators - Emergency.

Not applicable.

F. Switchboards, Distribution and transfer panels.

No damage.

G. Wiring, Wiring Equipment and Wireways.

No damage. Topside cables in some few instances, where completely exposed, suffered slight scorching of paint but in no case was the insulation damaged.

H. Transformers.

No damage.

I. Submarine Propelling Batteries.

No damage. Batteries were fully charged and on open circuit during the test. Analysis of electrolyte samples after the test by Pearl Harbor Naval Ship Yard revealed no significant changes attributable to the atom bomb.

J. Portable Batteries.

No damage.

K. Motors, Motor-Generator Sets and Motor Controllers.

No damage.

L. Lighting Equipment.

No damage occured except that one of the two starters for a 15 watt wardroom fluorescent light was jarred out of its socket. The starter was not damaged however.

M. Searchlights.

No damage.

N. Degaussing Equipment.

Not applicable.

O. Gyro Compass Equipment.

(a) Master.

The master gyro compass was operable after the test but had an easterly error of 7.5°. No evidence of damage could be found from visual inspection. The sensitive element was removed and sent to the tender, USS FULTON. The oil in the north bearing was found to be low. Oil was added and the element was balanced and

tested. The sensitive element was then re-installed in the compass but the error was still present.

Further inspection revealed that the securing screws for the lubber ring were loose and there was evidence that the ring had moved from its original position. The lubber ring was moved west 7.5° and secured.

After resetting the lubber ring, the ship was operated on various headings. The master gyro compass then settled to a constant error of 30 minutes. This is an Arma Mark VII compass.

Commanding Officer's Report No.11 states that the compass error was not present prior to the test.

(b) Repeaters.

No damage.

(c) DRT and DRA.

No damage.

(d) Auxiliary.

The auxiliary gyro compass was operable after the test but had an easterly error of 6.4°. No evidence of damage could be found from visual inspection.

The sensitive element was removed and sent to the tender, USS FULTON. Oil in the north bearing was found to be low and there was evidence of slight mercury spillage. After replenishing the oil, balancing and testing the sensitive element it was re-installed in the compass and the constant error was found to be less than one degree.

It is understood that this type of Arma compass is now obsolete.

Commanding Officer's Report No. 11 states that the compass error was not present prior to the test.

P. Sound Powered Telephones.

No damage.

Q. Ships Service Telephones.

Not applicable.

R. Announcing Systems.

No damage.

S. Telegraphs.

No damage.

T. Indicating Systems.

No damage.

U. I.C. and F.C. Switchboards.

No damage.

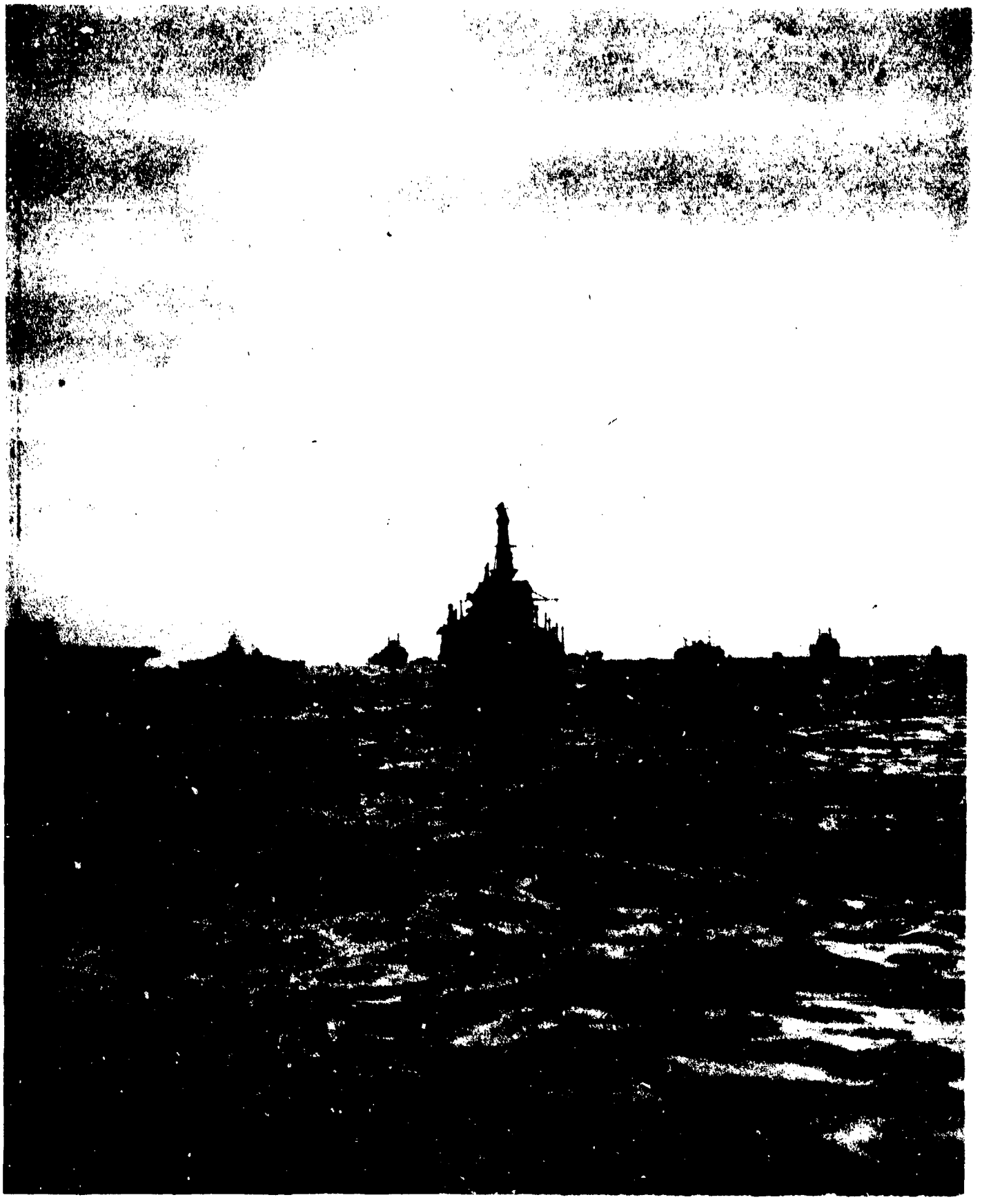
V. F.C. Switchboards.

No damage.

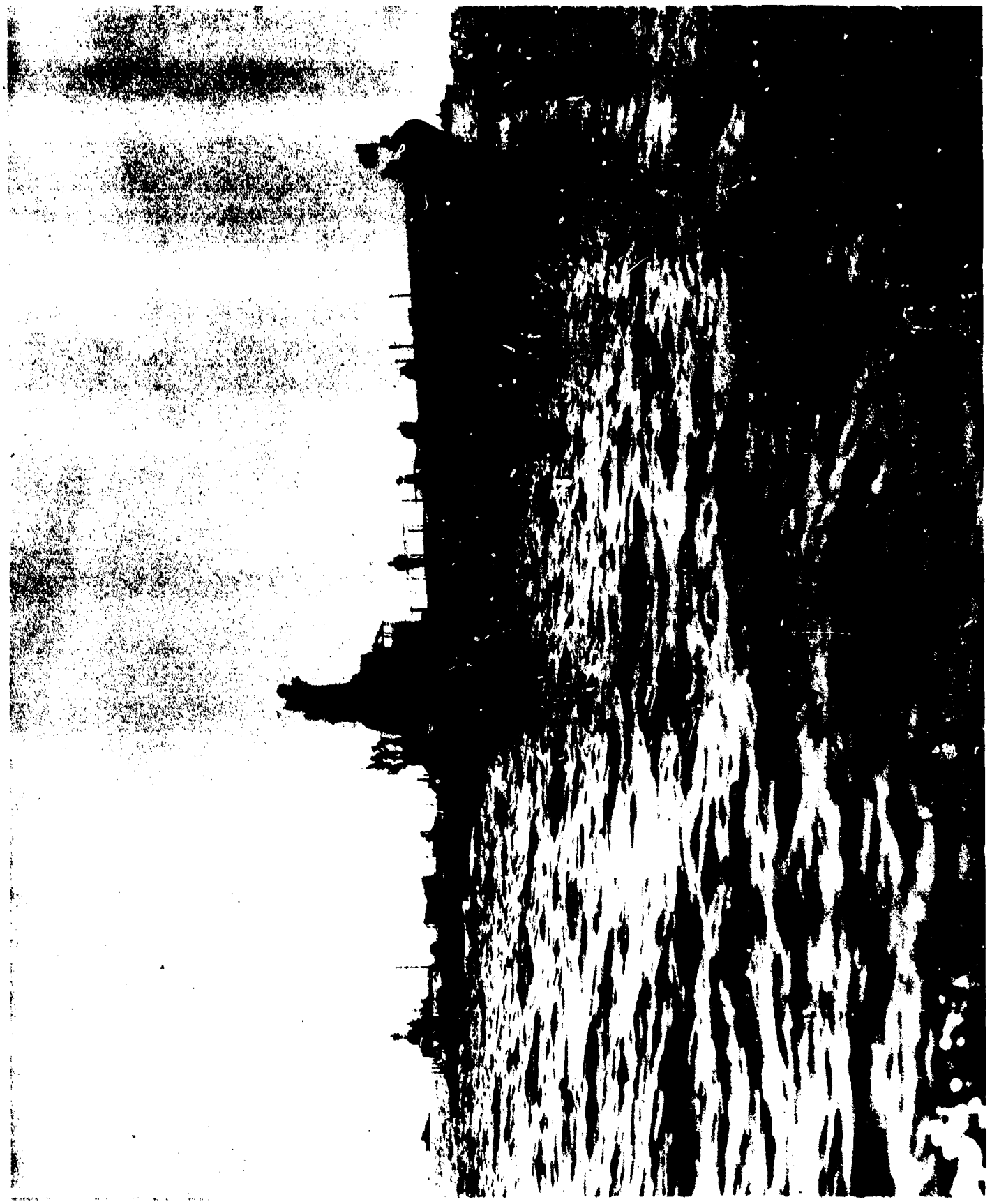
SECTION IV

PHOTOGRAPHS

TEST ABLE



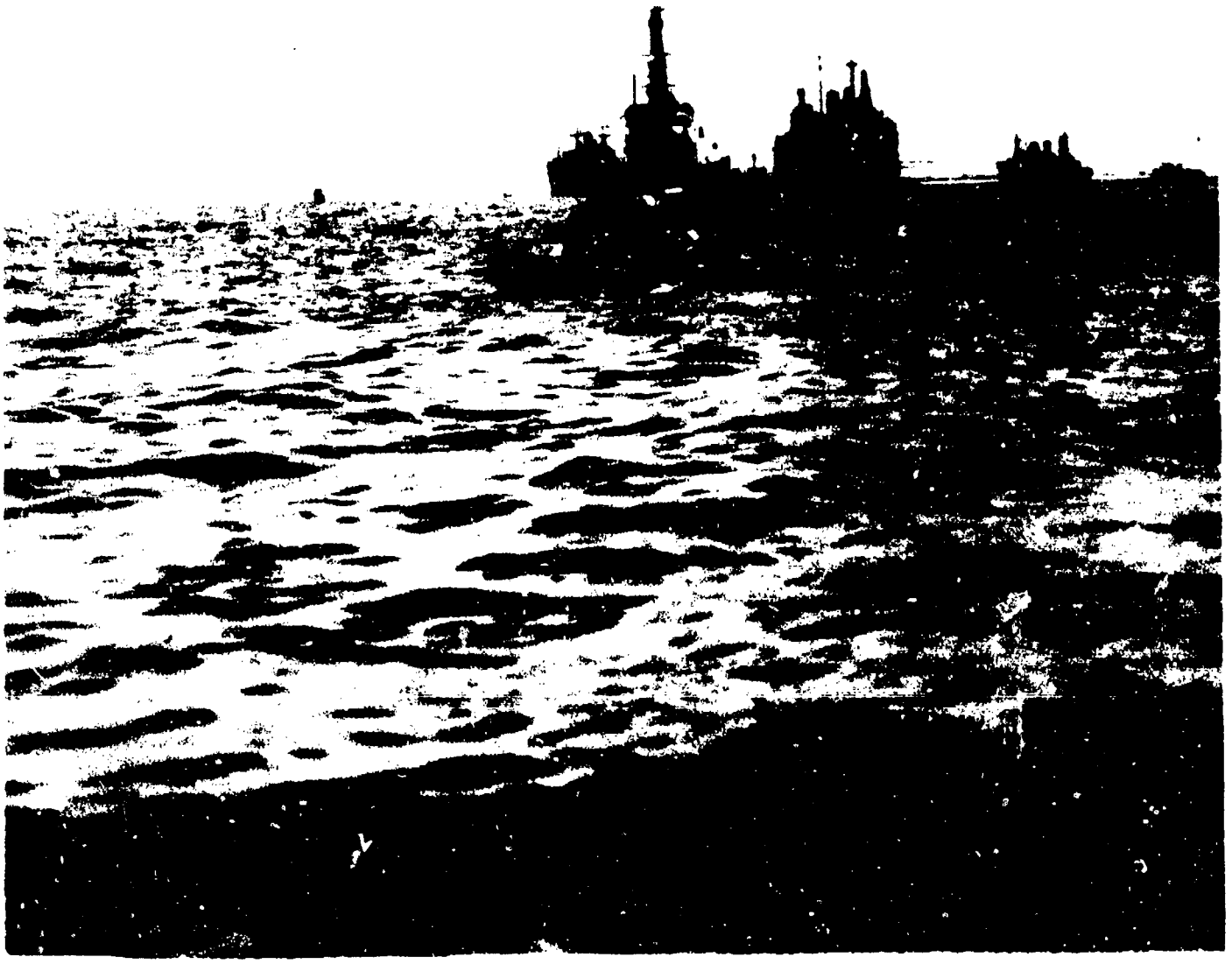
AACR-227-92-84. General view from ahead.



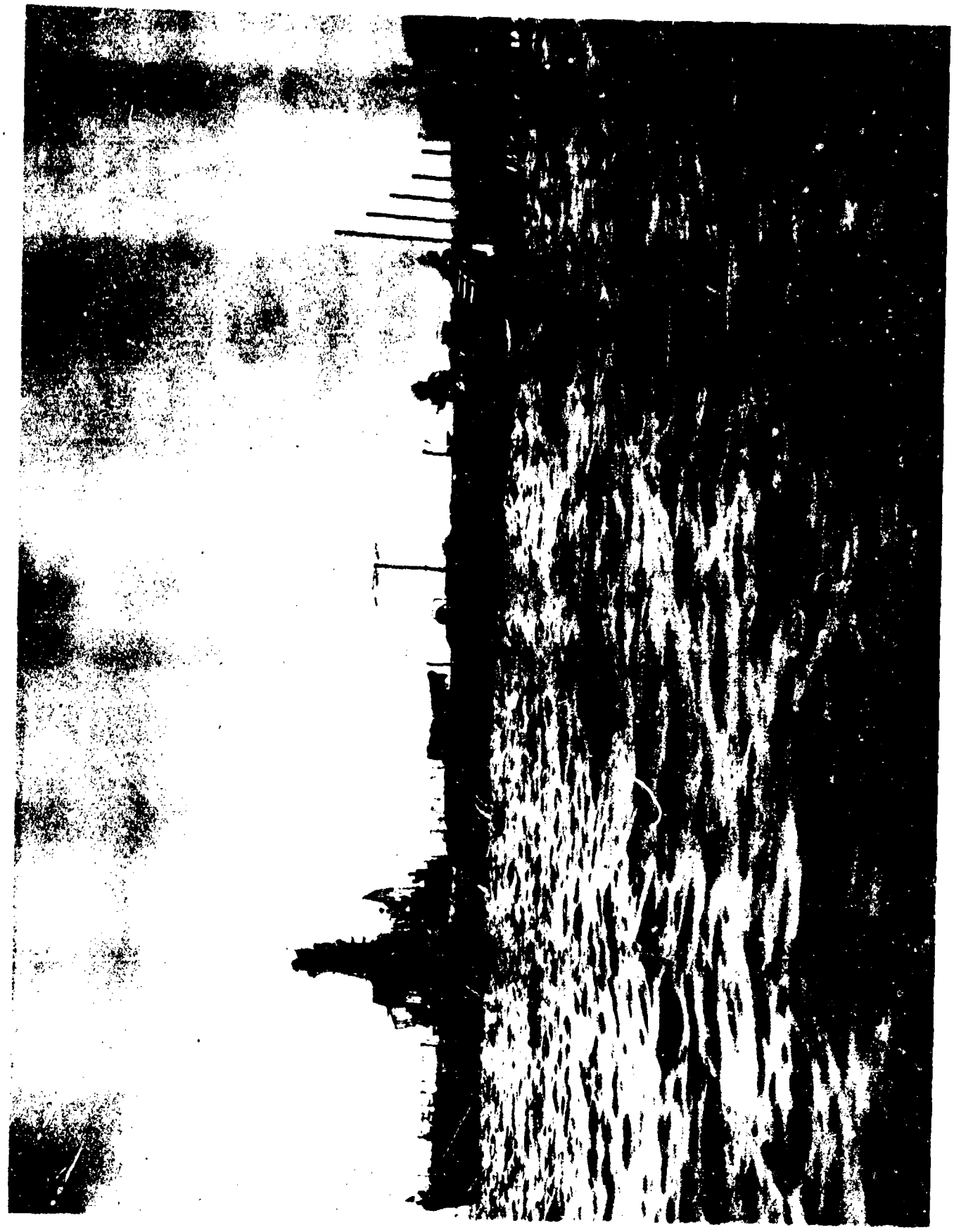
AACR-227-92-85. General view from starboard bow.

AACR-227-92-86. General view from starboard beam.

AACR-227-92-87. General view from starboard quarter.



AACR-227-92-88. General view from astern.



AACR-227-92-82. General view from port quarter.

AACR-227-92-83. General view from port bow.

APPENDIX

COMMANDING OFFICER'S REPORT

TEST ABLE

SECTION I

1. Name of Ship: USS SKIPJACK (SS184)

2. Type of Ship: Submarine

3. Class of Ship: Salmon (SS182)

4. Location in array: Anchored in center of berth 200 with 105 fathoms of chain.

5. Material Condition of Ship and Equipment at Time of Test.

The USS SKIPJACK was commissioned on 30 June 1938. It was last overhauled at Naval Ship Yard, Mare Island, July 1944. At time of test the overall condition of equipment was good. The condition of the superstructure was poor. The condition of the pressure hull fair. There was no special equipment installed which would affect the ability of the ship to resist damage.

SECTION II

SUMMARY OF DAMAGE

1. Port side of superstructure, conning tower fairwater, bridge and periscope shears scorched.

2. One deck access hatch 16" x 23" at frame 15 port missing.

3. Portable deck plate over anchor gear raised out of place and moved about two feet forward.

4. Conning tower fairwater at frame 86 port dished in a maximum depth of two inches over an area of about six square feet.

5. Two port radio antennas carried away at forward antenna outrigger at frame 68 port.

6. One small section of side plating at frame 96 starboard missing.

7. Master gyro compass developed a 7.5° easterly error. Auxiliary compass a 6.5° easterly error.

8. "Starter" in wardroom fluorescent light jarred loose.

This damage has in no way impaired the fighting efficiency of the ship. Repairs to the antenna were within capacity of ship's force. The gyro error once determined could always be applied to fire control and navigation problems.

SECTION III

PART A. GENERAL SUMMARY

I. Target Condition after test.

(a) Draft: forward 16'9", aft 17'9".
List: Zero
Flooding: none.

(b) Structural Damage:

(1) Superstructure: a. One deck access hatch at frame 15 port side missing. b. Portable deck plate over anchor gear at frame 15 raised out of place and moved about two feet forward. c. Conning tower fairwater at frame 86 port dished in a maximum depth of two inches over an area of about six square feet. d. One small section of side plating at frame 96 starboard missing.

(2) There was no apparent damage to pressure hull or ballast tanks.

(3) There was no damage to compartments.

(c) The master and auxiliary gyro compasses developed 7.5° and 6.5° easterly errors respectively. Both port radio antennas carried away at the forward outrigger. Starter in wardroom fluorescent light jarred loose. There was no other damage to machinery and equipment and all equipage was operable after the test. Repairs to the above items were readily accomplished.

(d) Ninety five percent of the port side of superstructure conning tower, fairwater, bridge and periscope shears were scorched. Less than ten percent of horizontal surfaces were scorched. There was no evidence of fires. Maximum and minimum thermometers indicated a maximum temperature of 85° in the magazine and after torpedo room. It is believed that all topside personnel directly exposed to the intense heat evidenced above would have been fatally injured. Other topside personnel not directly exposed could expect to suffer injuries in proportion to the amount they are shielded.

II. Forces Evidenced and Effects Noted.

(a) Heat.

The apparent direction of the blast was 220° relative. Almost all vertical surfaces on the port side and approximately twenty five square feet of the horizontal surfaces were scorched but not burned. Close examination of miscellaneous loose gear in the superstructure indicated that the flame had no apparent effect on items not directly exposed.

(b) Fires and explosions.

There were no fires or explosions. A 225 cu. ft. cylinder of acetelyne stowed in the starboard side of the dog house was not touched. Ammunition stowed in the 4" 50 cal. ready service lockers at frame 57 were not affected.

(c) Shock.

The apparent direction of the blast was 220° relative. The general pre-test condition of the superstructure was poor It is considered that a relatively small shock would cause the damage outlined in I(b). The 7.5° easterly error in the master gyro was probably produced by the blast.

(d) An inclinometer located in the control room indicated that the ship took a maximum roll of 20° port and starboard prior to reboarding.

III. Results of Test on Target.

(a) Effect on propulsion and ship control.

None.

(b) Effect on gunnery and fire control.

None.

(c) Effect on watertight integrity and stability.

None.

(d) Effect on personnel and habitability.

It is believed that with the ship operating on the surface, in addition to topside casualties, all hands below decks would have been affected by radioactive matter and gasses generated by the bomb.

(e) Total effect on fighting efficiency.

With the exception of personnel casualties, an unknown item, the total effect of the bomb on fighting efficiency is considered negligible.

IV. Conclusion.

My reaction to the damage sustained is that the ship was struck by a pressure wave accompanied by a flash of fire. The flame must have been instantaneous because it did nothing but scorch the paint work. The blast could not have been too great because it did relatively little damage to a superstructure in poor condition.

SECTION III

PART C - INSPECTION REPORT

SECTION A - HULL

A. General Description of Hull Damage.

(a) Overall condition is good.

(b) Damage occurred to superstructure deck, at frame 15, conning tower fairwater at frame 86 port and side plating frame 96 starboard. Because of the pre-test condition of the hull a relatively small blast could have produced the above damage. Also, for the damage at frames 15 and 96 it would have been necessary for the blast to come from under the deck. This may have occurred when the ship took the 20° roll to starboard.

(c) There was no flooding.

(d) Hull damage has no effect on operability of ship.

B. Superstructure and Weather Decks.

(a) Description and causes of damage.

1. Forward of conning tower.

a. Deck access hatch 16" x 23" at frame 15 port blown off.
b. Portable deck plate at frame 15 sheared one brass stud and a cast iron hinge allowing plate to be blown about two feet forward.
c. Paint scorched on vertical surfaces.
d. Negligible portion of wooden deck scorched.

2. Conning tower fairwater.

a. Plating at frame 86 port dished in an area of six square feet, depth of two inches.

b. Paint blistered on vertical surfaces and 10 percent of forward 20mm gun platform.

3. Aft of conning tower.

a. One small plate 12'' x 24'' at frame 96 starboard blown off.

b. Paint scorched on vertical surfaces and very small sections of wooden deck.

4. Miscellaneous stowages in superstructure.

No damage was sustained by these stowages.

(b) No evidence of fires.

(c) Estimate of relative effectiveness against heat and pressure wave.

1. The dished in section of the conning tower fairwater presented a rigid, flat surface at an angle of about 30° to the blast.

(d) It is believed the damage to the conning tower fairwater could be prevented by using curved surfaces or by installing lightening holes in the present flat surfaces.

C. Turrets, Guns and Directors.

(a) Guns.

1. There was no change in the pre-test condition (poor) of the forward 20mm gun mount. This was the only mount installed.

(b) Target Bearing Transmitter foundations.

No Comment.

(c) Periscope and Radar masts.

1. No damage, equipment still in operating condition.

(d) Constructive criticism of design or construction.

No Comment.

D. Torpedo Tubes and Appurtenances:

No Comment.

E. Weather Deck:

Combined with Item B.

F. Exterior Hull Above Waterline:

No Comments.

G. Compartments:

No Comment.

H. Armor Decks:

Not fitted.

I. Interior Compartments:

Combined with Item G.

J. Underwater Hull.

Underwater hull can not be examined without dry-docking or divers. No apparent damage.

K. Tanks.

No comments.

L. Flooding.

No comments.

M. Ventilation.

No comments.

N. Ship Control and Fire Control Stations.

(a) There was no damage to control stations due to failure of compartment boundaries.

(b) Unless a fireproof and possibly blast proof plastic shield can be designed to cover the entire bridge it is considered that the present "open" type bridge with its exposed personnel is essential for the satisfactory operation of a surfaced submarined.

O. Fire Control.

Combined with Item N.

P. Ammunition Stowage.

No comments.

Q. Ammunition Handling.

No comments.

R. Strength.

No comments.

S. Miscellaneous.

1. Life lines.

Manila life lines (21 thread) were scorched but still servicable.

T. Coverings.

(a) Condition and cause of damage to.

1. Paint.

Exterior above water paint on port side vertical surfaces had the appearance of a very hot torch having been passed rapidly over these surfaces. Some of the paint was blistered and scaling off whereas other paint was only scorched. Horizontal surfaces were scarcely touched.

2. There was no apparent damage to the Bitumastic covering the periscope shears although some of the paint was burned completely off.

U. Welding and Rivetting.

No comments.

SECTION III

PART C - INSPECTION REPORT

MACHINERY

A. General Description of Machinery Damage:

No comments.

B. Boilers (S-51)

Not Applicable.

C. Blowers (S-53)

Not applicable.

D. Fuel Oil Equipment (S-55)

No comments.

E. Boiler Feedwater Equipment (S55)

Not applicable.

F. Main Propulsion Machinery (S-41)

No Comments.

G. Reduction Gears (S-42)

No Comments.

H. Shafting and Bearings (S-43)

No Comments.

I. Lubrication System (S-45)

No Comments.

J. Condensers and Air Ejectors:

Not applicable.

K. Pumps (S47)

No Comments.

L. Auxiliary Generator (S61)

No Comments.

M. Propellers (S-44)

Services of diver or dry docking required for examination. No apparent damage,

N. Distilling Plant (S59)

No comment.

O. Refrigerating and Air Conditioning Plants (S59)

No Comment.

P. Winches, Windlasses, and Capstans (S20, S26)

No Comments.

Q. Steering and Diving (S-22)

No comment.

R. Elevators, Ammunition Hoists, Etc. (S78, S83)

Not applicable,

S.. Ventilation (Machinery) (S38)

No Comments.

T. Compressed Air Plant (S-49)

No Comments.

U. Diesels (S-50)

Not applicable. See Item F.

V. Piping Systems (S-48)

No comments.

W. Hydraulic System (S-21)

No Comments.

X. Navigational Instruments (S-24)

No Comments.

Y. Periscopes (S 71)

No Comments.

Z. Radar and Sonar (S-67 , S-68)

No Comments.

AA. Miscellaneous:

Not applicable.

SECTION III

PART C - INSPECTION REPORT

ELECTRICAL

A. General Description of Electrical Damage.

(a) The master gyro compass and auxiliary gyro compass have errors of 7.5° and 6.5° East respectively which were not present before the test. Starter on one side of wardroom fluorescent lamp jarred loose.

(b) It is believed that the shock produced by the bomb caused this damage.

B. Electric Propulsion Rotating Equipment (S-41).

No comments.

C. Electrical Propulsion Control Equipment (S-41).

No comments.

D. Generators - Ship's Service (S-61).

See Item K.

E. Generators - Emergency (S-61).

Not applicable.

F. Switchboards, Distribution and Transfer Panels (S-62).

No comments.

G. Wiring, Wiring Equipment, and Wireways (S-62)

No Comments.

H. Transformers:

No Comments.

I. Submarine Propelling Batteries (S-62)

No Comments.

J. Portable Batteries (S-62)

No Comments.

K. Motors, Motor Generator Sets, And Motor Controllers:

No Comments.

L. Lighting Equipment (S-64)

(a) One starter for wardroom fluroescent light was jarred loose. The light was still operable however, because the starter for the other lamp was still in place.

M. Searchlights: (S-66)

No Comment.

N. Degaussing Equipment (S-81)

Not applicable,

O. Gyro Compass Equipment (S-24)

(a) The master and auxiliary gyro compasses have errors of 7.5° E and 6.5°E which were not present before the test. Both compasses are located in the control room and it is believed these errors were caused by the shock.

P. Sound Powered Telephones (S-65)

No Comments.

Q. Ship's Service Telephones (S65)

No Comments.

R. Announcing Systems (S65)

No Comments.

S. Telegraphs (S65)

No Comments.

T. Indicating Systems (S65)

No Comments.

U. I.C. and A.C.O. Switchboards:

No Comments.

V. F.C. Switchboards (S71)

No Comments.

SECTION III

PART C - INSPECTION REPORT

ELECTRONICS

A. General Description of Electronics Damage.

(a). The overall condition of electronics equipment is good.

(b) Both port radio antennas carried away at the antenna outrigger frame 68 port.

(c) Damage apparently caused by heavy weight falling across antennas.

(d) This damage did not effect the operability of any equipment.

B. Fire Control.

No comments.

C. Surface Search Radar.

Included in Item B.

D. Air Search Radar.

No comments.

E. Radar Repeaters.

Not applicable.

F. Radar Counter Measure Equipment.

Not applicable.

G. Radar and Radio Beacons.

Not applicable.

H. IFF Equipment.

Not applicable.

I. Communication Transmitters (Radio).

No comments.

J. Communication Receivers (Radio).

No comments.

K. Communication Antenna (Radio).

(a) Upon reboarding both port radio antennas were discovered down.

(b) On the outboard antenna the forward 12" porcelain suspension insulator was shattered and two strands of the lead in antenna were ruptured at the clamp. On the inboard antenna the suspension insulator broke at the eye and the lead in cable was completely ruptured at the clamp.

(c) This damage appeared to have been caused by a heavy weight falling on the antennas. However, there was no shrapnel or other miscellaneous gear found in the area.

L. Radio Transceivers (Combined Transmitters and Receivers).

No comments.

M. Sonar Echo Ranging and Listening Equipment:

A. No apparent damage but sound heads can not be examined without services of a diver or dry docking.

N. Sonar Echo Sounding Equipment and Altimeters:

No Comments.

O. Loran Navigational Equipment.

Not applicable.

P. Power Supplies (Motor Generators and Filters):

No Comments,

Q. Television and Teletype Equipment:

Not applicable.

R. Test Equipment (Including Frequency Meters):

No Comment.

S. Instrumentation:

No Comment.

T. Telephone Equipment:

No Comment.

U. Direction Finders (Radio):

Not applicable,

V. Spare Parts:

No Comment.

END 11-65

Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC 9 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER
ATTENTION: OMI/Mr. William Bush

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency (formerly Defense Nuclear Agency) Security Office has reviewed and declassified the following reports:

+ ST-H

AD-366748	XRD-65
AD-366747	XRD-64
AD-366746	XRD-63
AD-376826	XRD-60
AD-376824	XRD-58
AD-376825	XRD-59
AD-376823	XRD-57
AD-376822	XRD-56
AD-376821	XRD-55
AD-366743	XRD-54
AD-376820	XRD-53
AD-366742	XRD-52
AD-366741	XRD-51
AD-366740	XRD-50-Volume-2
AD-366739	XRD-49-Volume-1
AD-366738	XRD-48
AD-366737	XRD-47

TRC 9 April 1997

SUBJECT: Declassification of Reports

AD-366736	XRD-46
AD-366735	XRD-45
AD-366723	XRD-37
AD-366721	XRD-35
AD-366717	XRD-31-Volume-2
AD-366716	XRD-30-Volume-1
AD-366751	XRD-68-Volume-2
AD-366750	XRD-67-Volume-1
AD-366752	XRD-69
AD-366744	XRD-61.

All of the cited reports are now **approved for public release. Distribution statement "A"** now applies.

Ardith Jarrett
ARDITH JARRETT
Chief, Technical Resource Center

Completed
1 mar 2000
B.W