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XRD 43

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# BUREAU OF SHIPS GROUP

## TECHNICAL INSPECTION REPORT

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By Authority of Joint Chiefs of Staff Action of 11 April 1947  
By John H. Sweeney 2 x 47-51  
U. A. F. S. W. P.

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⑥ OPERATION CROSSROADS.  
U.S.S. ANDERSON (DD411)

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

TEST ABLE [4]

⑪ 1947,  
⑫ 42p.

⑭ XRD-43

OPERATION CROSSROADS

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Domestic Atomic Support Agency,  
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**APPROVED:**

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

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USS ANDERSON (DD 411)

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USS ANDERSON (DD 411)

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U.S.S. ANDERSON (DD 411)

SHIP CHARACTERISTICS

Building Yard: Federal Shipbuilding and Drydock Co.

Commissioned: 19 May 1939.

HULL

Length Overall: 348 feet 4 inches.

Length on Waterline: 341 feet 0 inches.

Beam (extreme): 36 feet 0 inches.

Depth (molded at side, to main deck, amidships):  
19 feet 7 7/8 inches.

Drafts at time of test: Fwd. 13 feet 3 inches.  
Aft. 12 feet 6 inches.

Standard Displacement: 1570 tons.

Displacement at time of test: 2,340 tons.

MAIN PROPULSION PLANT

Main Engines: Two sets of Westinghouse turbines are installed, one set per shaft.

Reduction Gears; Two sets of "De.Laval" double reduction are installed, one per shaft.

Main Condensers: Two are installed in ship.

Boilers: Three Babcock and Wilcox boilers are installed in ship. 565 psi gauge, 715° F.

Propellers: Two are installed in ship.

Main Shafts: Two are installed.

Ships Service Generators: Four are installed in ship, two 150 K.W. - A.C., and two 40 K.W. -D.C. sets.

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USS ANDERSON (DD 411)

7" KEEL BKT. EACH FRAME  
7.65" WEBS 5PCD 63"



## TECHNICAL INSPECTION REPORT

### OVERALL SUMMARY

#### I. Target Condition After Test.

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

The ANDERSON sank approximately seven minutes after the blast. The probable source of flooding was located amidships, port side.

##### (b) Structural damage.

The explosion, as seen in photos Page 16, Page 17, and Page 18, followed by an immediate capsizing to port, indicates structural damage to the port side amidships. Since all photographs taken after damage were of the starboard side, there is no confirmatory evidence available.

Subsequent underwater inspections disclosed that the starboard side of the hull was wrinkled at frame 70 as shown in photos Page 31 and Page 33.

The main deck was also wrinkled at frame 40. Several seams along the starboard side were leaking oil and air. The divers' reports mention no other damage to the hull structure.

The bridge structure, midships deck house and after deck house are severely damaged. Bulwarks and lifelines on several decks were bent or torn off the ship as evidenced in photos, Page 28, Page 30 and Page 38. It is uncertain as to whether the torn and buckled bridge damage was caused by air blast or grounding. This uncertainty likewise applies to the mainmast. Though found erect and still on the ship, the mainmast was found stripped of many fittings and with its yard-arm snapped in half (See photos, Page 39 and Page 40.) The radar antenna and stack are missing. Divers report a number of pieces of corrugated aluminum joiner bulkheads.

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USS ANDERSON (DD 411)

on the bottom of the lagoon near the port side of the wreck. The number 2 gun shield is split open and badly mangled. However, the gun itself is intact and apparently undamaged. Both 5" guns aft were undamaged. The starboard torpedo tubes, though missing torpedoes, appear intact. All eight torpedoes, which had been previously loaded in the tubes, were free of the tubes but found near the ship by the divers. On three of the torpedoes the air flasks were crushed. It is noted in photo, Page 35 that the torpedo crane has been bent through an angle of about 90°. The starboard "Y" guns were missing. There was a hole in the deck where one of the guns had been.

(c) Other damage.

Damage to machinery and electrical systems not observed.

II. Forces Evidenced and Effects Noted.

(a) Heat.

No information obtained. Frame numbers and ships name were clearly visible on the starboard side of the ANDERSON.

(b) Fires and explosions.

The first explosion occurred at burst plus 9 seconds as seen in photo, Page 12.

A second explosion occurred at a clock time of 0903:01 as seen in photos, Page 16, Page 17 and Page 18. Each explosion caused a fire amidships on the port side. The divers who inspected only the starboard side of the ship's hull report no evidence of any explosion.

(c) Shock.

The stack was blown off (See photo, Page 14), number two gun shield split open, and both deck houses crumpled.

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Underwater inspection showed that the SG and SC search radar antennas (See photos, Page 39, and Page 40 ), the gun director (See photo, Page 42 ) and the MK 4-22 fire control radar antenna (See photos, Page 41 , and Page 42 ), were clear of the ship. They are probably blast damage. However, this damage also could have been caused by grounding. Similarly, damage to the foremast (See photos, Page 39, and Page 40), and bridge, and the starboard hull wrinkles (See photos, Page 31, and Page 33), could have resulted from either air blast or grounding. In addition to local damage it was noted from radar pictures and tower pictures that the ANDERSON was blown outward a distance of a hundred yards before sinking.

(d) Pressure.

No damage attributed to this cause.

III. Results of Test on Target.

(a) Effect on propulsion and ship control.

Unknown.

(b) Effect on gunnery and fire control.

Fire control, both radar and optical, entirely inoperative. The five inch guns were apparently undamaged but damage to their minor components probably rendered them below normal if operative at all.

(c) Effect on watertight integrity and stability.

Complete destruction.

(d) Effect on personnel and habitability.

Unknown, except for the hazards of a sinking ship.

(e) Total effect on fighting efficiency.

Sunk.

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

Photographs of the burst taken from towers and planes, after burst photographs taken of the array from PBM Charlie, the reports of the technical observer in PBM Charlie, the underwater photographs, the Bureau of Ships, Interim Report, and the divers' report are the total available sources of material. A study of this information has been made and, although certain details were unobtainable, the results are compiled here in an attempt to give the story of the ships from the time of bomb burst to the time of sinking.

The first information on the ANDERSON is obtained from photo, Page 12, which shows twin explosions occurring 9 seconds after the burst. The ARDC 13 can be seen below the left explosion. Study of the target array and explosion pictures from other towers position the second explosion directly over the ANDERSON. The spoon of a destroyer torpedo tube was found on the ARDC 13 which was approximately 200 yards relative bearing 70° from the ANDERSON. (The divers' report failed to add to this information).

An early picture of the ANDERSON, as she emerges from the smoke, is shown in photo, Page 13. Her stack is missing and the inception of a fire can be seen just abaft the bridge. This picture was taken at a clock time of 0901:25. From this time until her capsizing and subsequent sinking the ANDERSON is visible continuously on timed photographs from various angles. Significant frames from two of the best sequences are included here.

Photo, Page 14, the first in the aerial sequence, was taken at a clock time of 0902:45 (Although burst time is not recorded for these clocks it is estimated to be approximately 0900:35). The fire has reached its maximum intensity.

Photo, Page 15, taken at a clock time of 0902:55, shows that the fire has subsided. Six seconds later, see photo, Page 16, clock time 0903:01, the burning flared up again and in twenty seconds the ANDERSON begins to capsize (See photos, Page 17, and Page 18).

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It appears that a low order explosion has occurred which caused or materially aided the ANDERSON's capsizing. Photos Page 18, Page 19, and Page 20, indicate that the ANDERSON capsized in approximately 15 seconds.

Photo Page 21, clock time 0906:10, indicates the ANDERSON remained afloat for approximately two and a half minutes after she capsized.

Photos, Page 22, Page 23, Page 24, and Page 25, give the capsizing sequence as photographed from Enyu Tower. This set has the advantage that the bomb burst was photographed and times can therefore be given in minutes after burst instead of clock time. Photo Page 22, shows her at burst plus 2 minutes 45 seconds in the process of capsizing, photo Page 23, burst plus 2 minutes 51 seconds, shows the turn of the bilge and capsizing complete. At burst plus 4 minutes the ANDERSON is settling as seen in photo Page 24. In photo Page 25, the ANDERSON's stern has disappeared and her bow is visible under the forward kingpost of the listing CARLISLE. Complete submergence occurs at burst plus 6 minutes 57 seconds.

Photos, Page 26, and Page 27, are of the array as seen on an APQ-7 radar scope. In photo Page 26, the ANDERSON is seen just above the arrow. Photo Page 27, burst plus 2 minutes 38 seconds, is the first frame without an ANDERSON pip. This time corresponds with the capsizing of the ANDERSON, not her sinking.

The divers reported the ANDERSON lying on her port side in about 176 feet of water. The bow of the ship was buried in the bottom up to the main deck back to frame 17 port. The starboard side of the vessel was visible almost to the bow. The stern of the vessel was estimated to be about 15 feet from the lagoon bottom. Off her starboard quarter a large quantity of 40 MM ammunition was strewn about the bottom. The ship was reported to be in one piece. The underwater photographs in general, need no further comment. Photos, Page 28, Page 29, and Page 34, however, show that the superstructure, although heavily damaged, was not demolished.

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## V. Preliminary Recommendations.

(a) Modification of superstructure, mast and stack design should be considered.

(b) Modification of radar installations topside should be considered.

## VI. Pre-test Statistics.

(a) Instructions for loading the vessel specified the following:

ITEM	LOADING
Fuel Oil	95%
Diesel Oil	95%
Ammunition	100%
Potable and Reserve Feed Water	95%
Salt Water Ballast	None

Details of the actual quantities of the various items aboard are included in Report No. 7, Stability Inspection Report, submitted by the ship's force in accordance with "Instructions to Target Vessels for Tests and Observations by Ship's Force" issued by the Director of Ships Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

The ANDERSON at time of burst floated at drafts of 13' 3" forward and 12' 6" aft. She had a list of two degrees to port.

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PHOTOGRAPHS

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DA-CR-T3A-22-77/(-11)/1 July 1946/24"/Bikini/Secret. Print #3. View showing explosion over location of ANDERSON. Arrow to left indicates location of explosion over ARDC 13. Arrow to right indicates location over ANDERSON. Picture taken 9 seconds after burst from Enyu Island tower.

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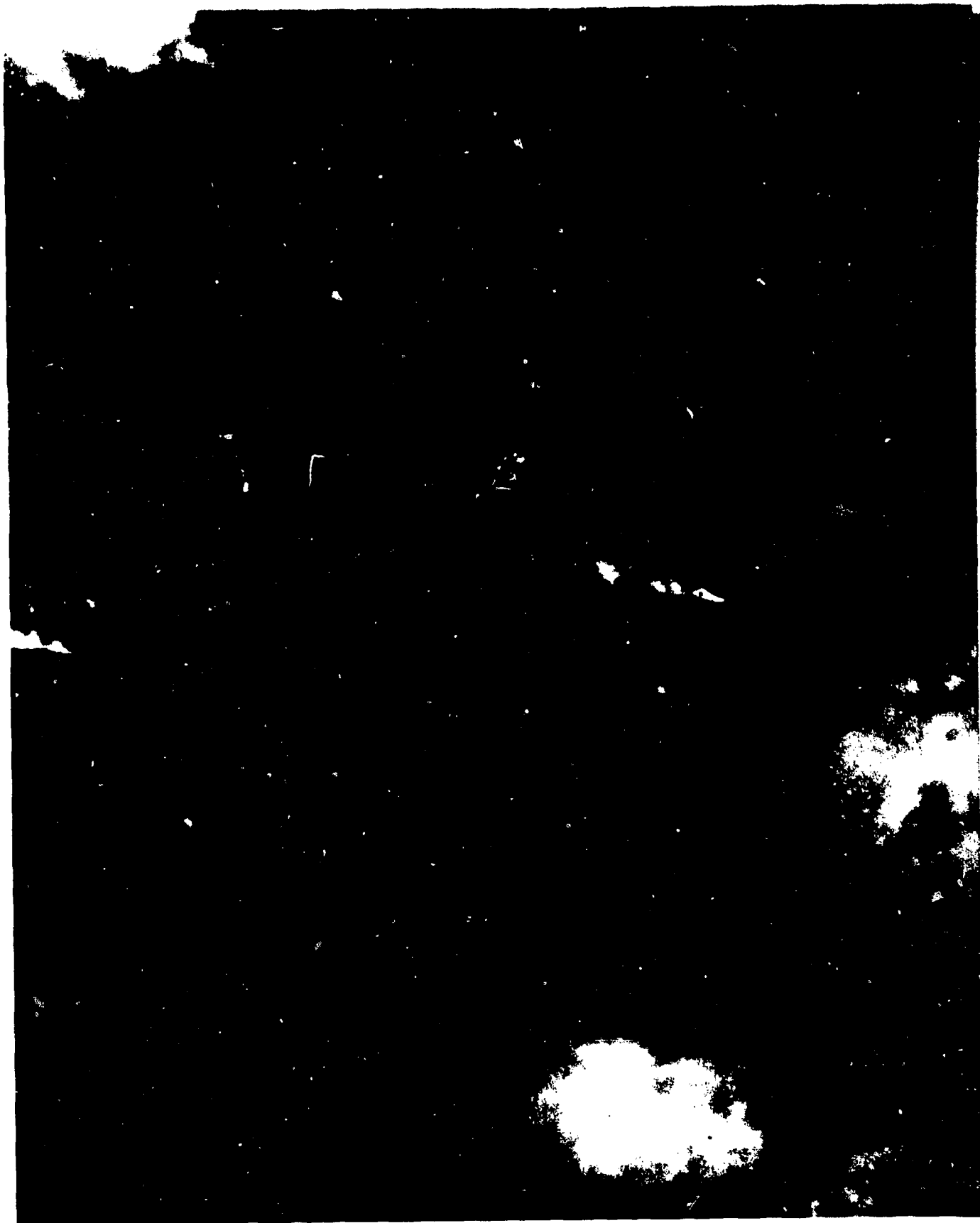
DA-CR-PBM2-48-1 July 46. (-11) F-5-6-40' Obl. 12000' PPt Secret.  
Print #31. Clock time is 0901:25 (No zero time on film). View showing  
stack missing and fire starting just aft of bridge on ANDERSON. Pic-  
ture taken at clocktime of 0901:25.

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DA-CR-PBM2-48-1 July 46. (-11) F56-40' Obl. 12000' PPt Secret. Print #58. (Clock time 0902:45). View showing fire on USS ANDERSON. Picture taken at clock time of 0902:45. Inception of fire shown in photo, page 13.

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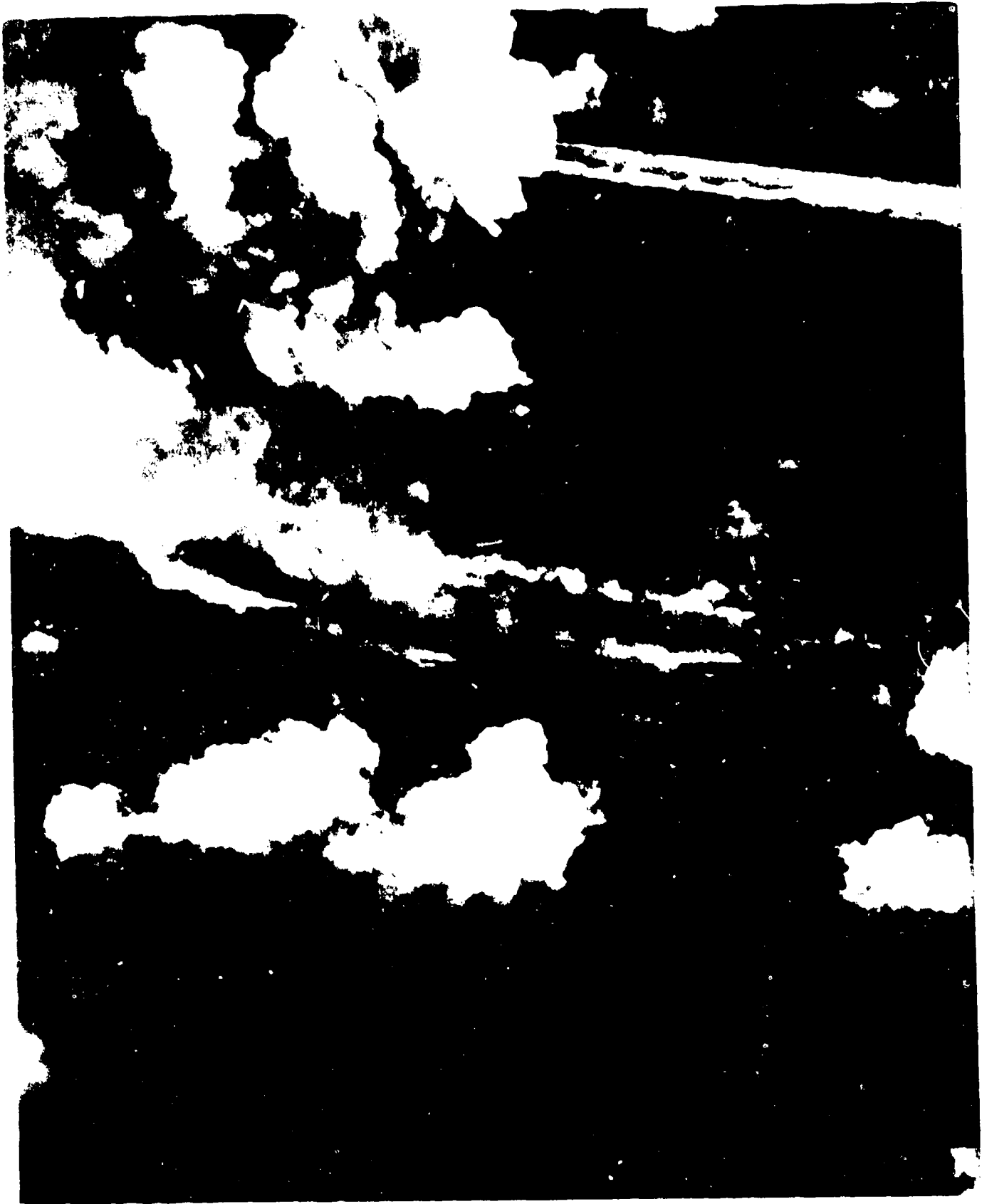


DA-CR-PBM2-47-1 July 46 (-11) F56-20" Obl. 12000' PPt secret. Print #52. (Clock time 0902:55). View showing ANDERSON prior to last visible explosion and capsizing. See photos pages 16 through 21 for continuation of this sequence. Ship burning upper left is CARLISLE. Picture taken at clock time 0902:55.

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DA-CR-PBM2-47-1 July (-11) F56-20' Obl. 12000' PPt Secret. Print #54.  
(Clock time 0903:01). View showing inception of explosion on ANDERSON.  
See photo pages 17 through 21 for continuation of sequence. Clock time  
0903:01.

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DA-CR-PBM2-47-1 July 1946. (-11) F56-20'' Obl 12000' PPT Secret. Print #59. (Clock time 0903:15). View showing fire resulting from explosion. Six seconds later (See photo page 18) ANDERSON begins to heel over. Clock time of picture is 0903:15.

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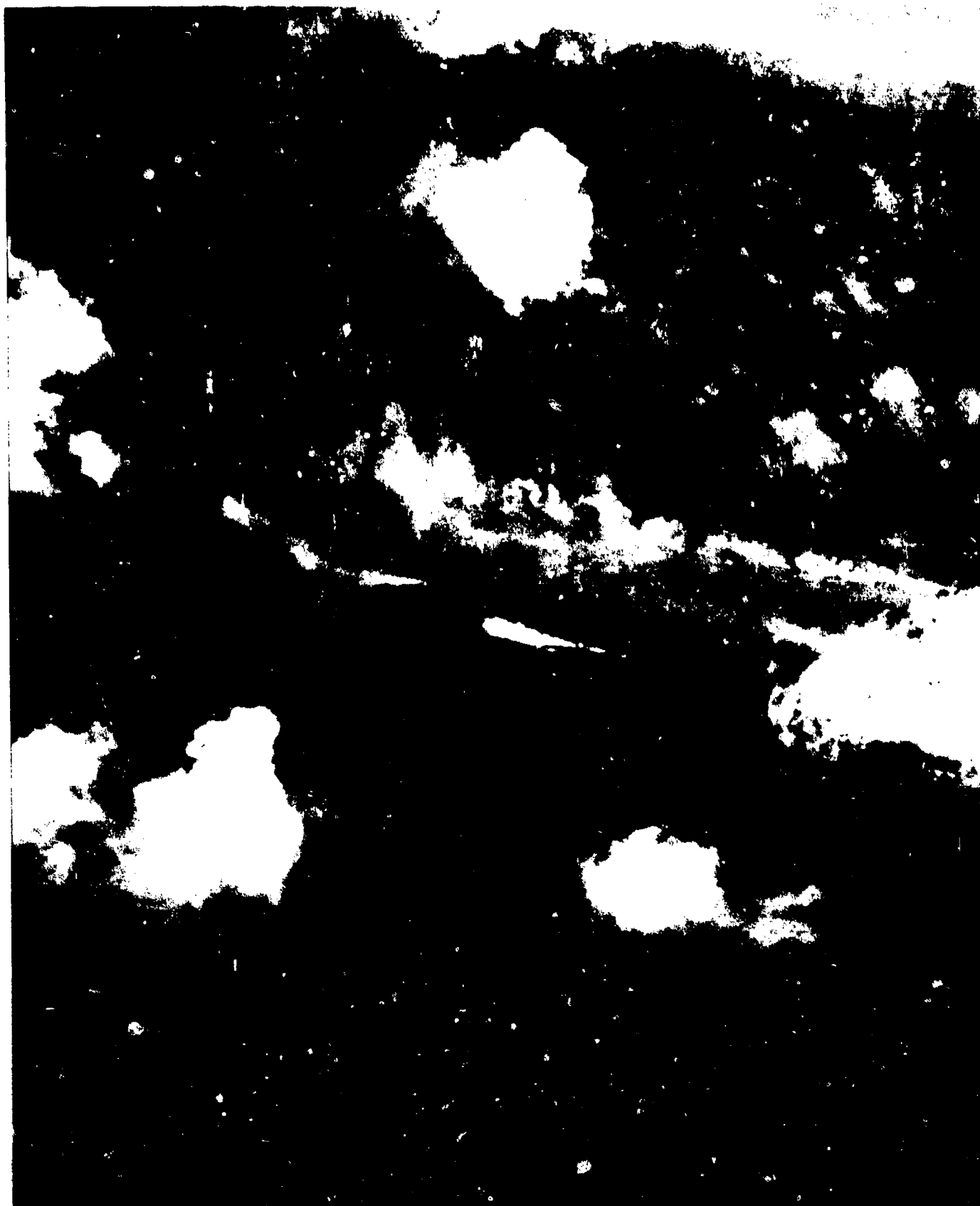
DA-CR-PBM2-47-1 July, 46. (-11) F56-20' Obl. 12000' PPt Secret. Print #61. (Clock time 0903:21). View showing ANDERSON beginning to lay over to port. Six seconds later ANDERSON is on her port side. See photo page 19 clock time 0903:21.

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DA-CR-PBM2-47-1 July, 1946. (-11) F56-20' Obl 12000' PPT Secret. Print #63. (Clock time 0903:27). View showing ANDERSON going over on her port side. Final picture of ANDERSON capsizing taken 9 seconds later. See photo page 20. Clock time of picture 0903:27.

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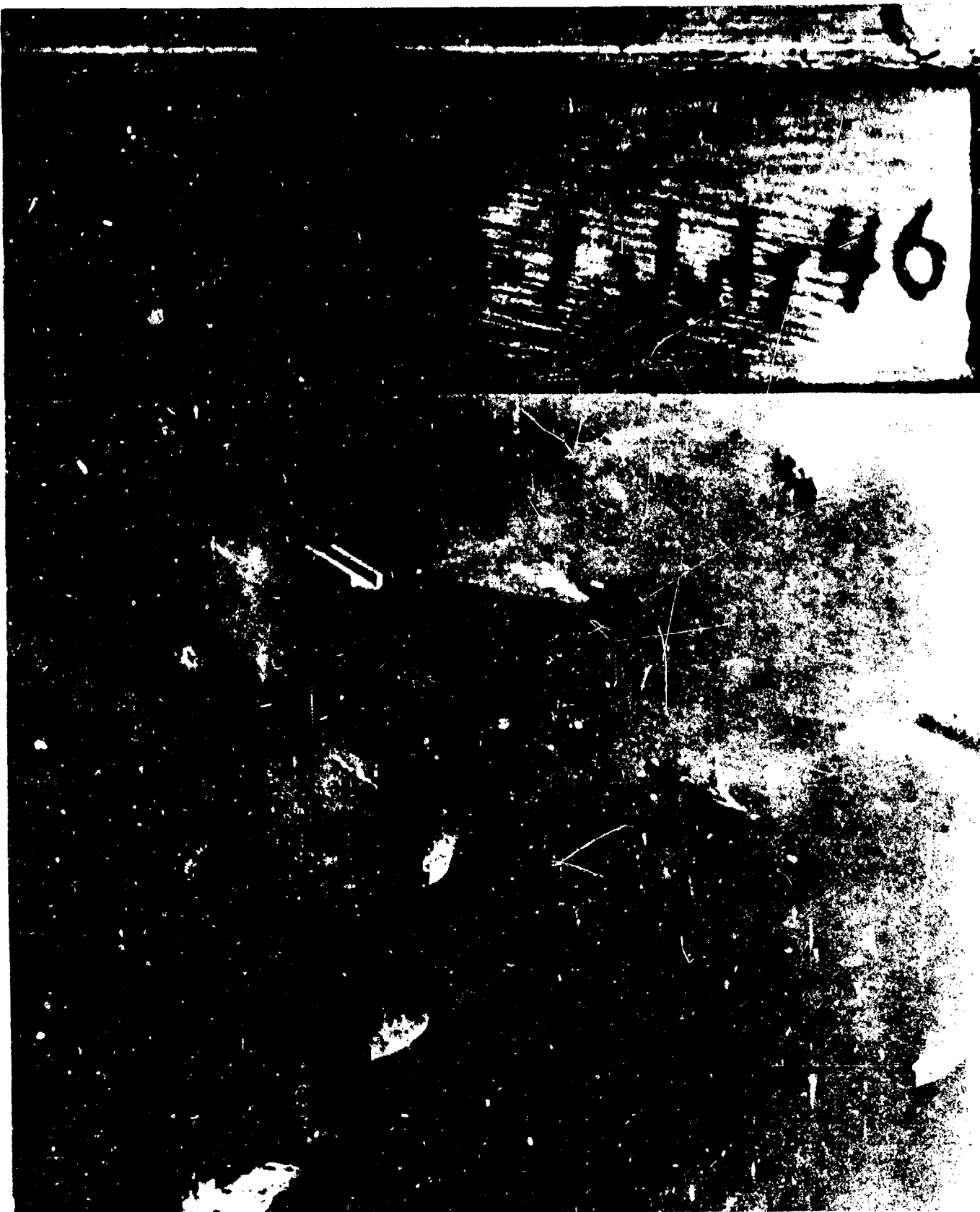
DA-CR-PBM2-47-1 July, 46. (-11) F56-20' Obl 12000' PPt Secret. Print #66. (Clock time 0903:36). Capsizing now complete. ANDERSON begins to sink by the stern. Clock time 0903:36.

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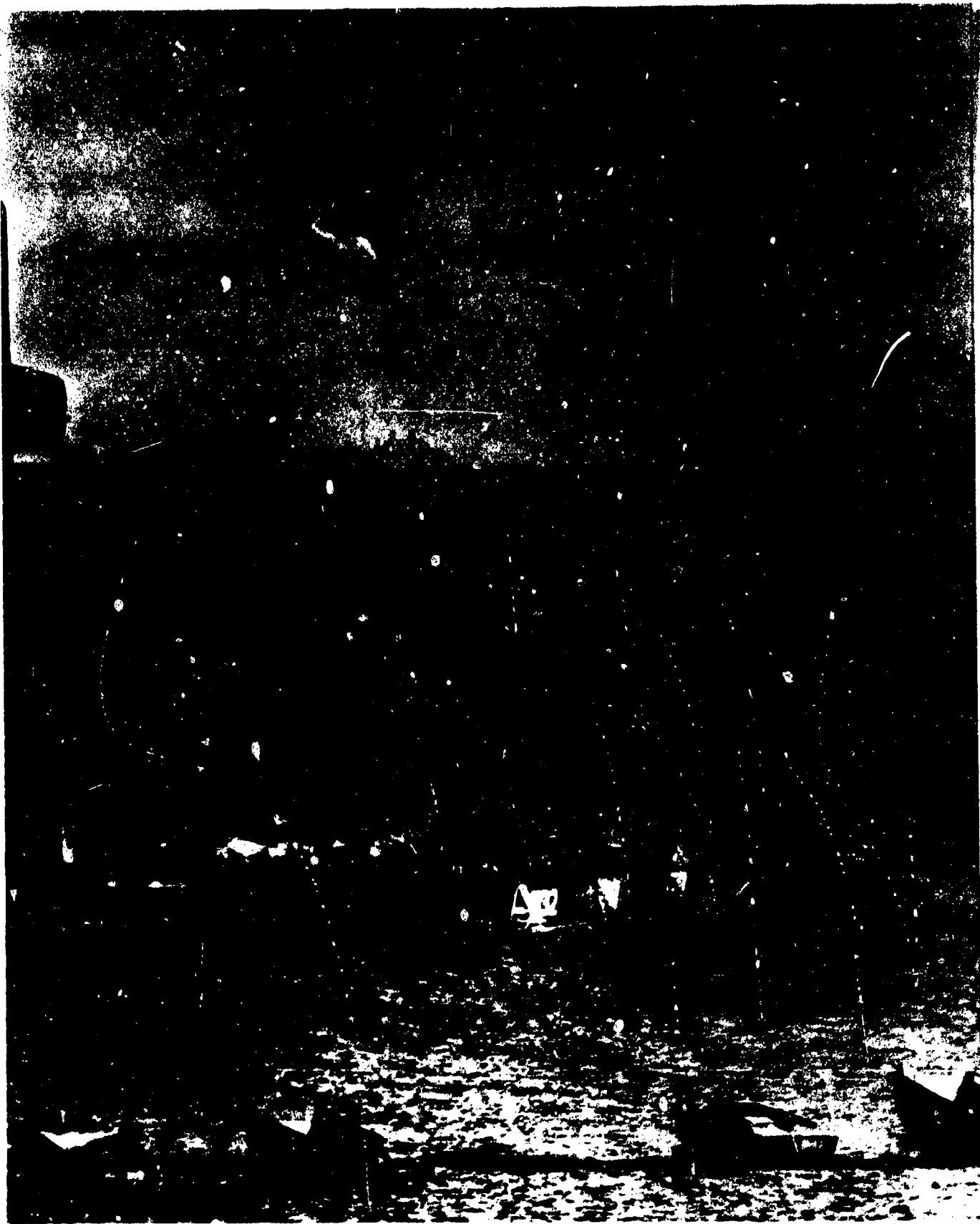
DA-CR-PBM2-48-1 July, 46. (-11) F5C-40' Ohl 12000' PPt Secret. Print #127. View showing ANDERSON on her port side. Picture taken at clock time 0906:10.

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DA-CR-T3A-31-79/ (-11) 1 July 46/40"/Bikini/Secret. Print #55. Enyu Island tower view of stackless ANDERSON in process of capsizing. CARLISLE, listing to starboard, is in background. Burst plus 2 minutes 45 seconds.

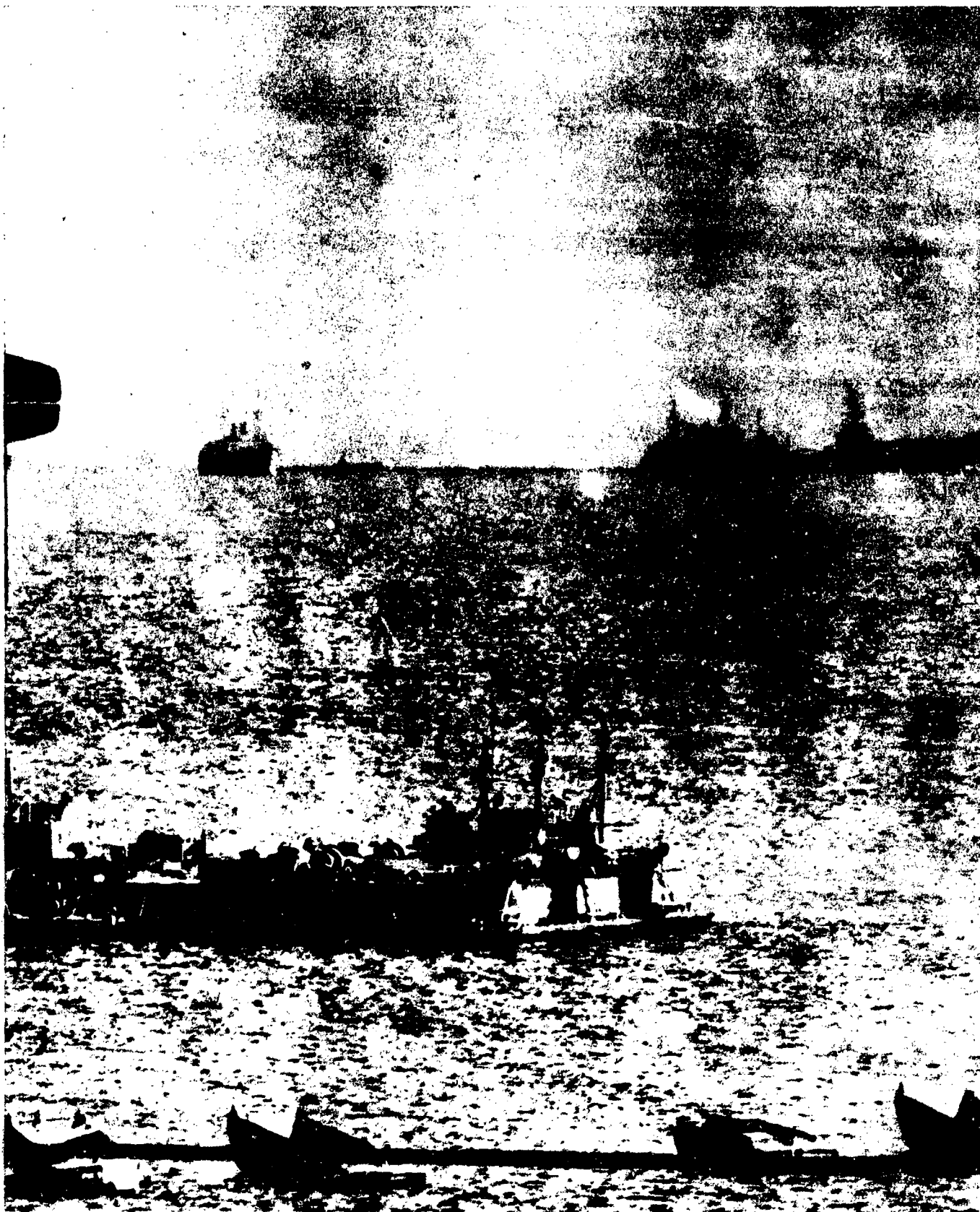
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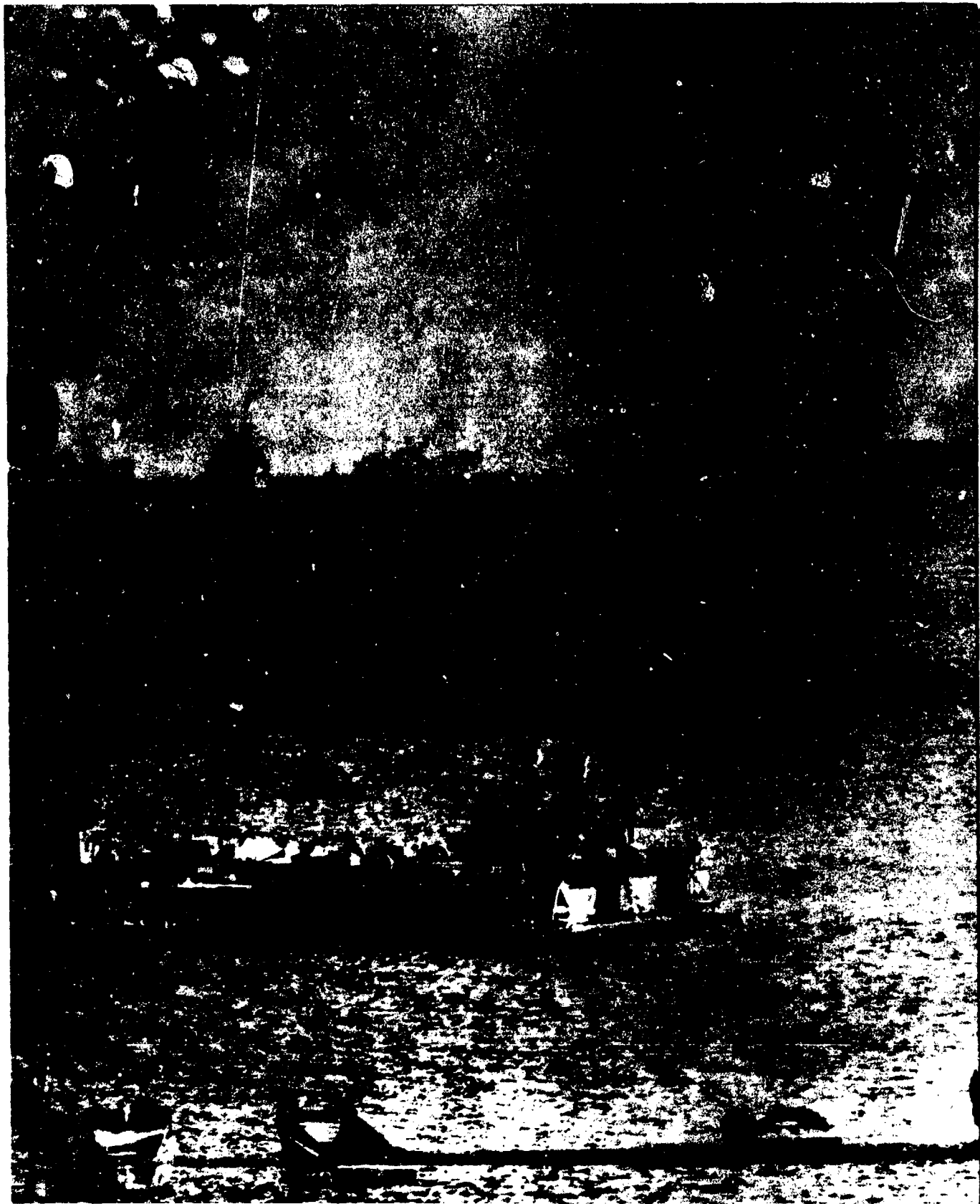




DA-CR-T3A-31-79/ (-11) 1 July 46/40"/Bikini/Secret. Print #57. Turn of the bilge is seen as capsizing is completed burst plus 2 minutes 51 seconds.

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DA-CR-T3A-31-79/ (-11) 1 July 46/40"/Bikini/Secret. Print #80. ANDERSON settles steadily as shown here at burst plus 4 minutes.

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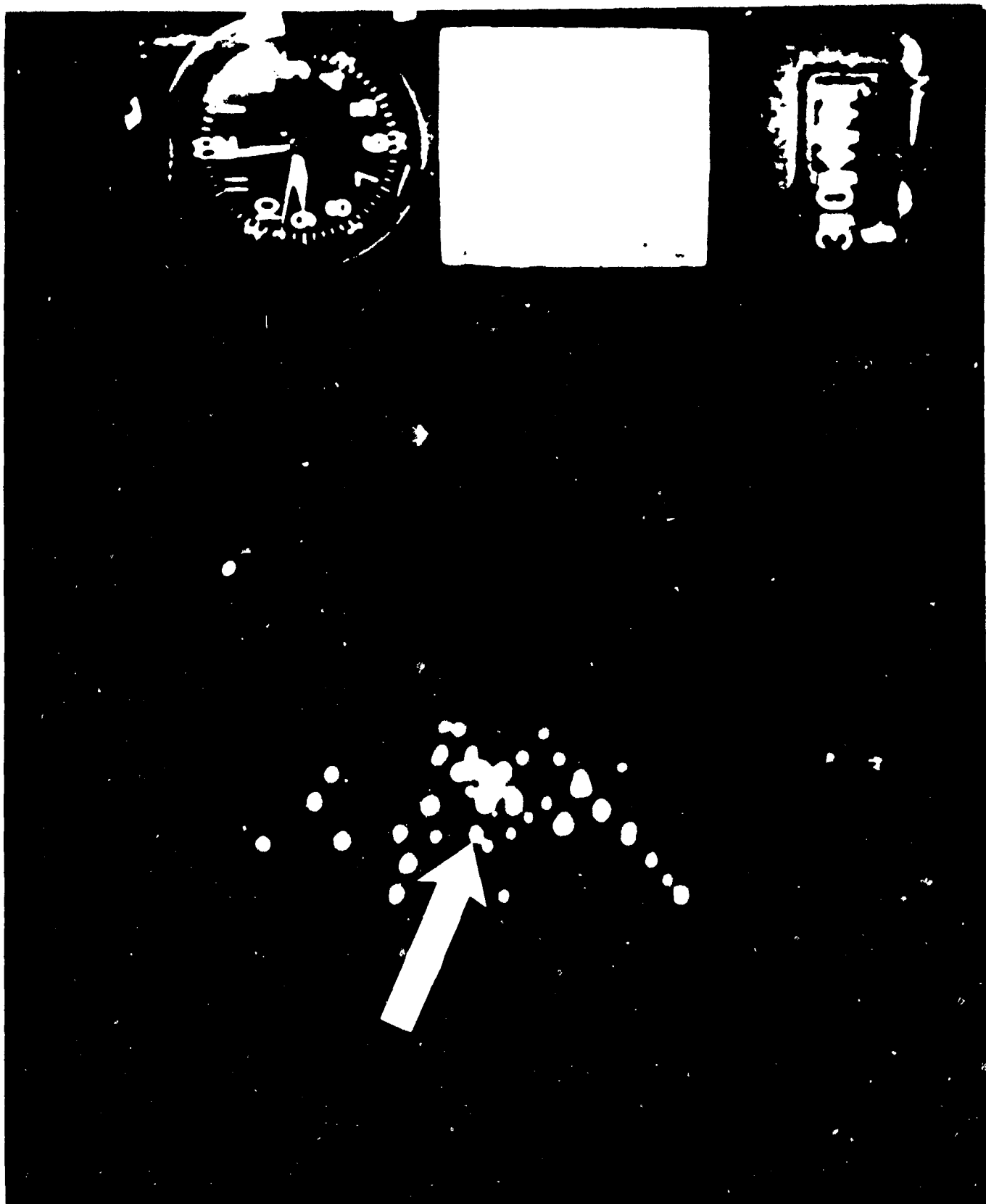
DA-CR-T3A-31-79/ (-11) 1 July 46/40"/Bikini/Secret. Print #134. Stern of ANDERSON has disappeared. Bow is visible under forward kingpost of listing CARLISLE. Complete submergence of ANDERSON occurs at burst plus 6 minutes 57 seconds.

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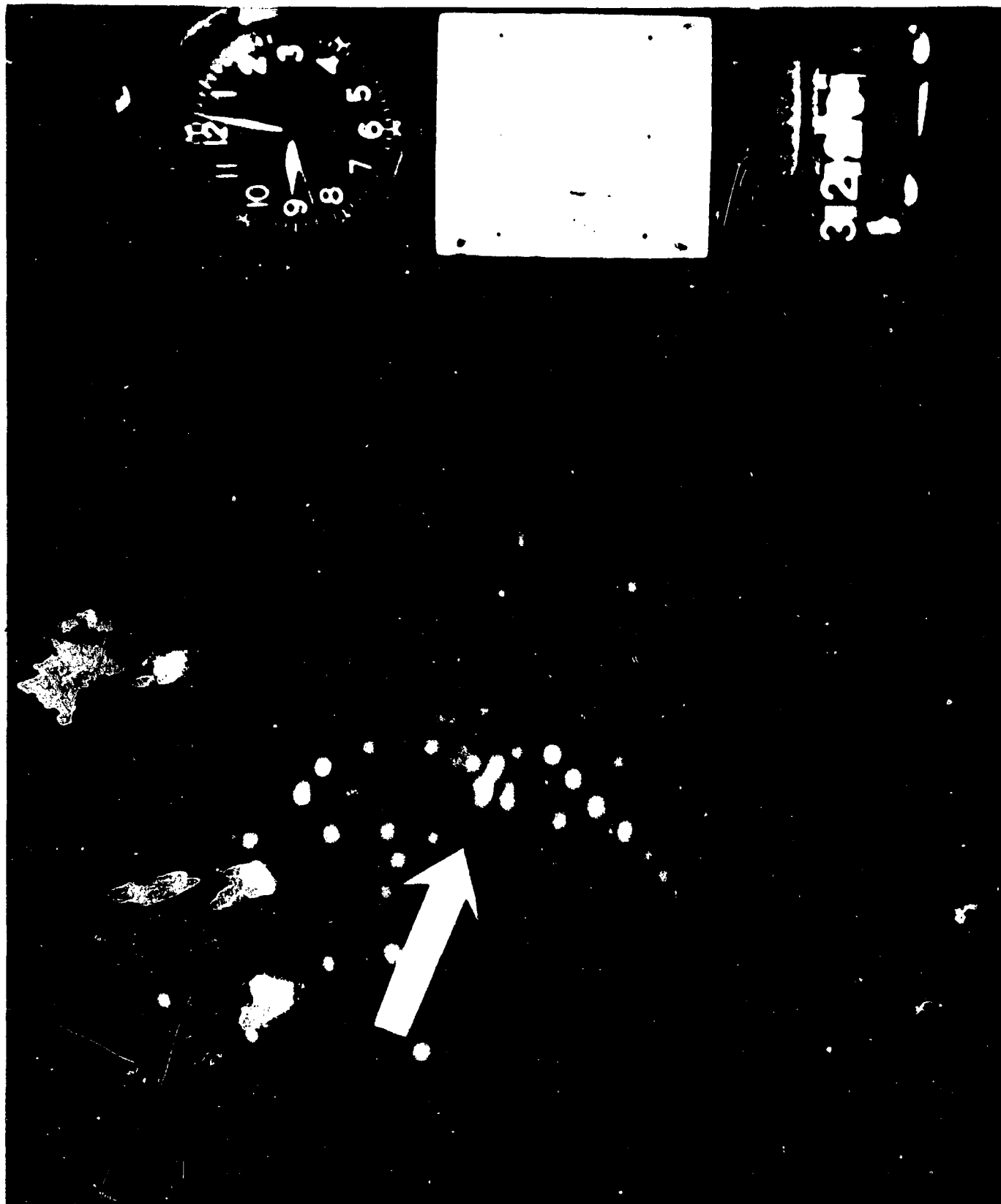
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APQ #7 radar scope photo #3011. View of radar scope taken 3/4 second before blast. Note position of ANDERSON (see arrow) and compare with photo page 27.

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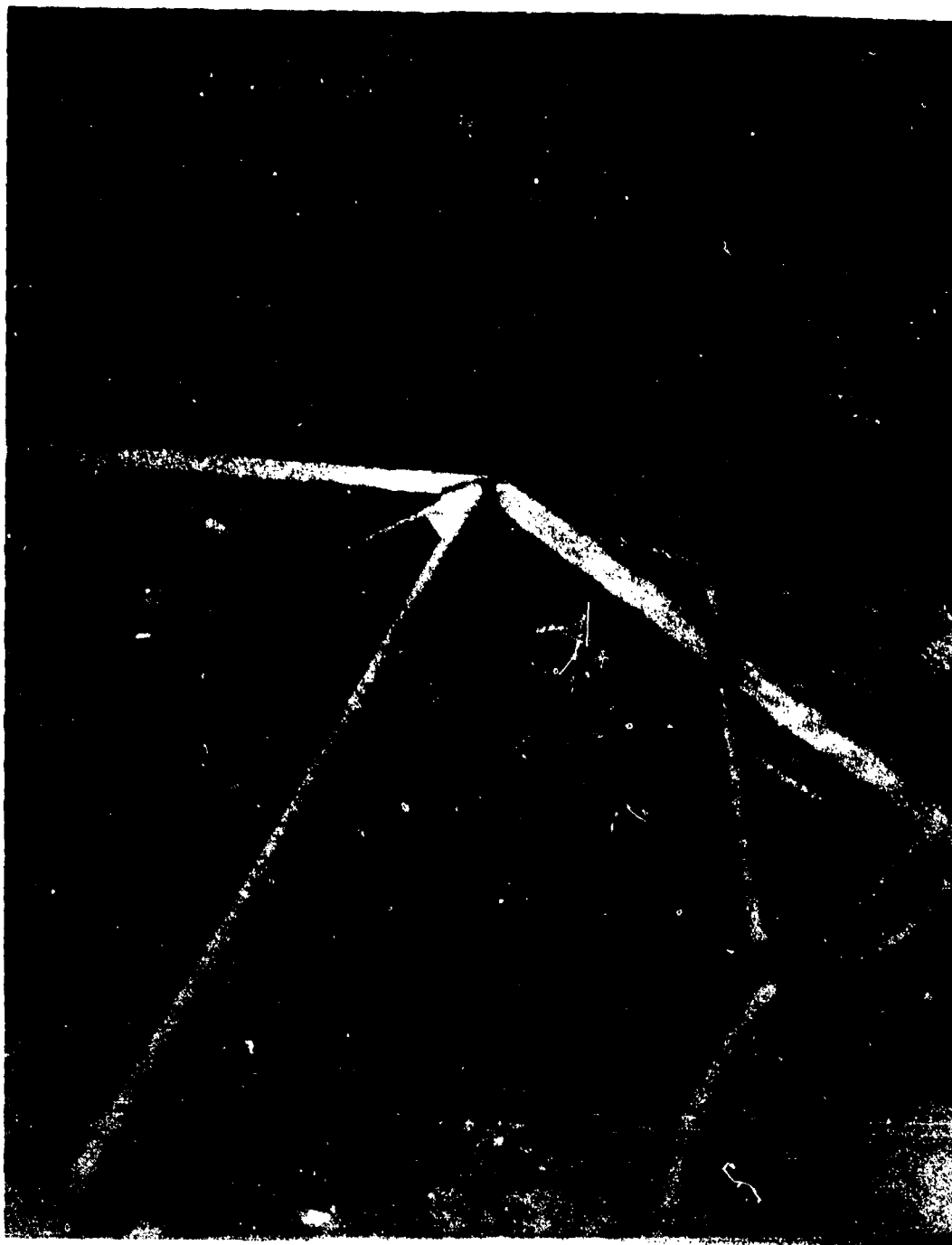
USS ANDERSON (DD411)



APQ #7 radar scope photo #3320. View of radar scope taken 2 minutes 38 seconds after blast. Note ANDERSON has disappeared.

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CR-5-S26-2 (Underwater). Underwater view taken from superstructure deck of ANDERSON looking past navigating bridge toward mast. Note navigating bridge bulwark missing and drain pipe bent up and over navigating bridge.

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CR-5-S26-3 (Underwater) Underwater view of underside of navigation bridge, starboard side, frame 68. Note running light to right of lifeline stanchion and chair to left of same stanchion. Note bulwark plating and compare with photo page 28.

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CR-5-S26-12 (Underwater). Underwater view of ANDERSON taken at frame 50 starboard showing stanchion bent over. This stanchion formed part of rack for 25 person liferaft and also partly supported an overhanging 20 mm gun tub.

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CR-5-S26-15 (Underwater). Elongated wrinkle in starboard side near frame 70.

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CR-5-S26-17 (Underwater). Underwater view of ANDERSON'S starboard bilge keel, frame 80.

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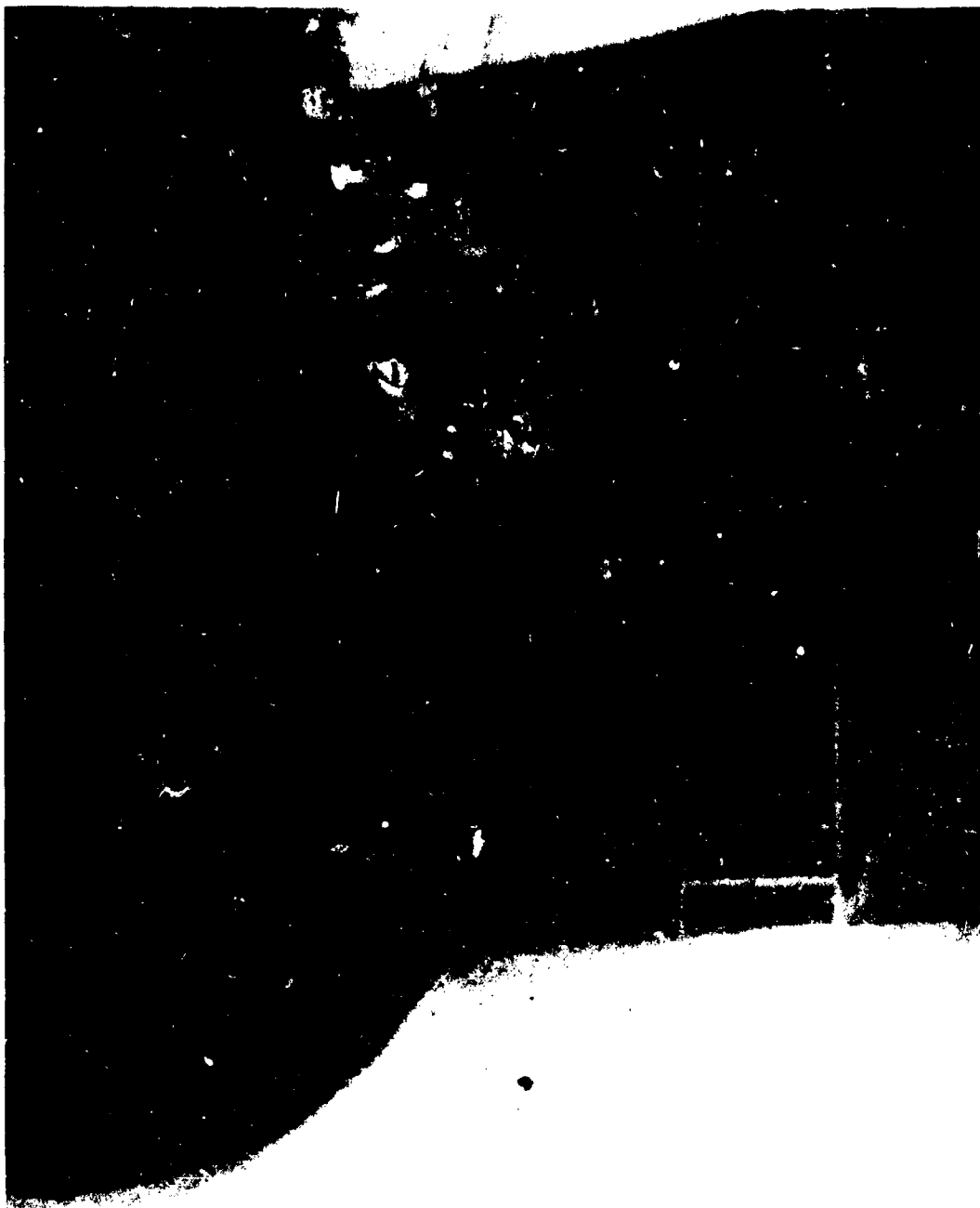
CR-5-S-26-18 (Underwater). Elongated wrinkle along starboard side of ANDERSON near frame 70.

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CR-5-S26-24 (Underwater). Underwater view of ANDERSON'S main deck and bridge frame 66 starboard. Tubular structure in top of picture is part of searchlight platform support. Part of torn life raft appears in lower left corner of picture.

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CR-5-S26-34 (Underwater). Underwater view of ANDERSON taken at frame 105 showing torpedo crane bent over to starboard away from blast. Torn plate is part of bulwark.

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CR-5-S26-36 (Underwater). Starboard 40 mm gun tub and director on top of after deck house, frames 118-132, starboard. Light weight bulwark plating in foreground has been torn away from stiffeners. Light weight floater net stowage appears intact. Canvas spray shield around director torn away and rail bent.

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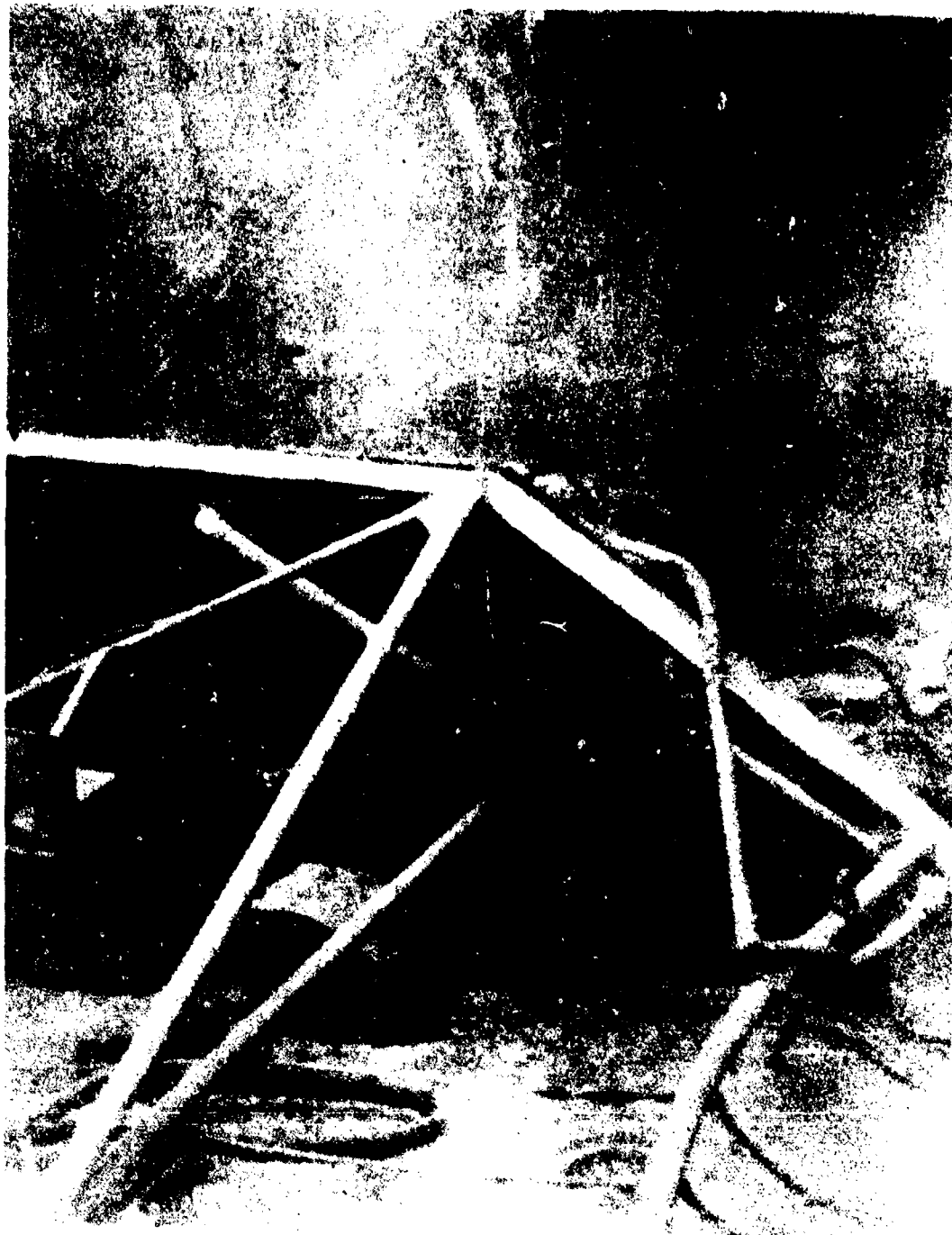
CR-5-S27-1 (Underwater). Bulge in bulwark plating at frame 100, starboard, main deck. Chock can be seen in opening in bulwark. Displaced torpedo crane and its chain fall seen in upper left. Compare this underwater view with photo page 38.

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CR-5-S27-3 (Underwater). Underwater view showing bulwark plating of ANDERSON missing aft of frame 105 starboard.

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CR-5-S28-23 (Underwater). Top of ANDERSON'S foremast. Starboard half of yardarm has broken loose and is seen in upper right, held only by several wires.

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CR-5-S29-21 (Underwater). Top of ANDERSON'S foremast. SC radar antenna and motor generator have carried away. SG radar antenna has sheared from rotating mount supported by motor generator.

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CR-5-S28-32 (Underwater). Underwater view of ANDERSON'S Mk22 radar antenna resting on lagoon bottom. To its left can be seen the Mk. 4-22 foundation. The piece of metal with the lightening hole (Just behind the Mk. 22 banana) is part of the Mk. 4 antenna.

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CR-5-S-29-22 (Underwater). ANDERSON'S Mk 4-22 radar gun director. The optical range finder has been forced from its normal position (Note dark hole to left of range finder). For a better view of Mk 22 antenna in foreground see photo page 41.

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21 May 51

15 APR 1949

**RESTRICTED DATA**  
ATOMIC ENERGY ACT 1946

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

TRC

18 April 1997

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

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency has declassified the following reports:

✓✓AD-366588 4	XRD-203-Section 12 ✓
X ——— AD-366589 ✓	XRD-200-Section 9 ✓
AD-366590 ✓	XRD-204-Section 13 ✓
AD-366591 ✓	XRD-183 ✓
✓✓AD-366586 X	XRD-201-Section 10 ✓
✓✓AD-367487 4	XRD-131-Volume 2 ✓
✓✓AD-367516 4	XRD-143 ✓
✓✓AD-367493 4	XRD-142 ✓
AD-801410L ✓	XRD-138 ✓
AD-376831L ✓	XRD-83 ✓
AD-366759 ✓	XRD-80 ✓
✓✓AD-376830L X	XRD-79 ✓
✓✓AD-376828L 4	XRD-76 ✓
✓✓AD-367464 X	XRD-106 ✓
AD-801404L ✓	XRD-105-Volume 1 ✓
✓✓AD-367459 X	XRD-100 ✓

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18 April 1997

Subject: Declassification of Reports

✓AD-367491 ✕	XRD-134-Volume 2 ✓
✓AD-367479 H	XRD-123 ✓
✓AD-367478 ✕	XRD-122 ✓
✓AD-367481 ✕	XRD-125 ✓
AD-367500 ✓	XRD-159-Volume
✓AD-367499 ✕	XRD-160-Volume 3 ✓
✓AD-367498 ✕	XRD-161-Volume 4 ✓
AD-367512 ✓	XRD-147 ✓
AD-367511 ✓	XRD-148 ✓
✓AD-367465 ✕	XRD-107 ✓
AD-366733 ✓	XRD-43 ✓
✓AD-367477 ✕	XRD-121 ✓
✓AD-367476 ✕	XRD-120 ✓
✓AD-367467 ✕	XRD-109-Volume 1 ✓
✓AD-367475 ✕	XRD-119 ✓
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✓AD-367473 ✕	XRD-117 ✓
✓AD-367472 ✕	XRD-116 ✓
✓AD-367471 ✕	XRD-115 ✓
✓AD-367466 ✕	XRD-108 ✓
AD-801405L ✓	XRD-113 ✓
✓AD-367470 ✕	XRD-112 ✓
✓AD-367469 ✕	XRD-111 ✓

TRC

18 April 1997

Subject: Declassification of Reports

AD-801406L ✓ XRD-114✓

In addition, all of the cited reports are now **approved for public release; distribution statement "A" now applies.**

*Arldith Jarrett*

ARDITH JARRETT  
Chief, Technical Resource Center