SECTION IX

U.S.S. SCAMP (SS277)

Depth Bomb Damage Aft

Off Mindanao, P.I.
7 April 1944

Class SS212

Builder .... U.S. Navy Yard, Portsmouth, N. H.

Commissioned .... 18 September 1942

Length (Overall) .... 311 ft. 8 in.

Beam (Extreme) .... 27 ft. 3 in.

Submergence Depth (Designed Maximum) (Axis) .... 300 ft.

Displacements

- Standard .... 1525 tons
- Emergency Diving Trim .... 2050 tons
- Submerged .... 2415 tons

Draft (Mean, Emergency Diving Trim) .... 16 ft. 10 in.

Type of Propulsion .... Diesel Electric Reduction Drive

Main Engines (4) .... Fairbanks-Morse 38-D-8-1/8

Main Motors (4) and Generators (4) .... General Electric Co.

References:

(a) C.O. SCAMP conf. ltr. SS277/A16-3/A9, Serial 016 of 22 April 1944 (Report of War Patrol Number Seven).
(b) C.O. SCAMP ltr. SS277/P13-5, Serial 002 of 24 April 1944 (Report of War Damage).
(c) ComSubRon Eighteen ltr. FC5-18/L11-1/(SS277), Serial 0012 of 25 April 1944 (First Endorsement to C.O. SCAMP War Damage Report).
(d) O inC U. S. Naval Drydocks, Hunter's Point conf. Report SS277-S8800-131693 of 9 April 1945 (Supplementary Report of SCAMP War Damage).
(e) BuShips Code 660u conf. Memorandum of 30 May 1944 (Report of Inspection of SCAMP War Damage at U.S.Naval Drydocks, Hunter's Point by Mr.W.H.Fifer,Bureau of Ships).

Photographs Nos. 9-1 through 9-15 (furnished by C.O. SCAMP, C.O. TANGIER (AV8) and Naval Drydocks, Hunter's Point)

PLATES IX-1 and IX-2

9-1. During her seventh war patrol SCAMP was attacked by a Japanese float plane shortly after submerging and sustained severe damage from a near-miss depth bomb detonation. The deformation which occurred to both the inner and outer hull structures as a result of this attack is the most severe known to have been survived by any U.S. submarine during World War II. It is considered remarkable that SCAMP was able to continue submerged operations after receiving the damage even though all propulsion power was lost for a fifteen-minute period during which the boat became heavy overall due to flooding of the main induction system, leakage of water into the hull and loss of fuel oil from a fuel ballast tank. This report is based on the information contained in the references. The Photographs were furnished by C.O. SCAMP, C.O. TANGIER (AV8) and U.S. Naval Drydocks, Hunter's Point. PLATES IX-1 and IX-2 were prepared by this Bureau and are based principally on the data contained in the enclosures to reference (d).

9-2. SCAMP arrived from her sixth war patrol at Milne Bay, New Guinea, on 6 February 1944. After a two-week refit by FULTON (AS11) followed by an intensive training period, SCAMP departed Milne Bay on 3 March for her seventh war patrol.

9-3. Although wide searches were conducted in her assigned area north of New Guinea, SCAMP made no enemy ship contacts during her first month on patrol. She then refueled at Langemak Bay, New Guinea, on 29 March and departed on 31 March for a new area in the waters between Mindanao and Halmahera Islands. The first enemy ship contact of the patrol was made on 4 April when a Japanese armed trawler was engaged by four-inch gunfire at long range. Two hits were scored on the trawler, causing a slight list and a fire aft, but the action was broken off when the deck gun on SCAMP failed to return to battery after 91 rounds had been fired.

9-4. Three days later, early on the morning of 7 April, SCAMP established contact with a Japanese convoy of three ships, but all efforts to reach a favorable attack position were unsuccessful. Her first attempt, a surface approach before dawn, was frustrated when the enemy made a radical change in base course. A second attempt was made by submerged approach later in the morning but range to the targets could not be sufficiently closed. Further action against this convoy was terminated when, at 0930, a large enemy task force, consisting of two heavy cruisers and four light cruisers screened by four destroyers and five planes, was sighted.

9-5. An approach on the new targets was commenced and an excellent firing position was gained for successive bow and stern tube salvoes. However, just prior to securing the final periscope observation before firing, SCAMP was detected by the enemy destroyer screen and forced to take evasive action. From then until noon she was sporadically depth-charged but no damage resulted. At 1405, after the destroyers had left the area, SCAMP surfaced to radio a contact report regarding the Japanese force but at 1407 an enemy bomber was sighted and she was forced to submerge immediately in order to avoid detection.

9-6. At 1423 SCAMP again surfaced to attempt to radio the contact report. Although continuous efforts were made, communications had not yet been established when, at 1543, a Japanese float plane, bearing 280° (T) and at an altitude of 1500 feet, was sighted diving on SCAMP from directly out of the sun. The plane was first detected by visual means when at a range of about 440 yards. At this moment SCAMP was proceeding on course 094° (T) at a speed of 15 knots with three engines on propulsion and one engine on charge. She was in a position about forty miles south of Mindanao, P.I., lat. 5° 02'N., long. 126° 07'E. The weather was clear, visibility excellent and the sea glassy calm.

9-7. SCAMP made a quick dive in an effort to avoid attack and word was passed to rig ship for depth-charging. The boat submerged with a 7 degree down angle at a speed of about 8 knots, swinging left with full rudder, and was passing forty feet depth when a single terrific explosion occurred off the port side. The resulting damage to SCAMP was extensive and serious. The entire ship vibrated and twisted for several seconds and all hands not holding on to something were thrown off their feet. The noise effect was described in reference (b) as "loud and deep".[1]

9-8. From available knowledge of types and sizes of bombs commonly carried by Japanese float planes on anti-submarine patrol at this period of the war, it is believed that the weapon used against SCAMP was probably a standard 60 Kg. Mk. 2 depth bomb containing 85 pounds of Type 98 explosive. Based on the damage inflicted and the known effect of underwater explosions on similar type structures, it is estimated that this 60 Kg. bomb probably detonated about frame 77 at a distance of approximately 15 feet from the port side of the pressure hull, centered vertically at the level of the tank tops and abreast FBT No. 5B and the interior transverse bulkhead separating the forward engine room and the after battery compartment. (PLATE IX-1).

9-9. A general survey of the overall damage sustained by **SCAMP** as a result of the bomb detonation is presented in PLATES IX-1, IX-2 and Photos 9-2 through 9-11. The immediate effects of the detonation which were of serious nature and which caused SCAMP's subsequent inadvertent maneuvers or determined the damage control measures which were employed in an effort to save the ship, are listed below:

(a) Simultaneously with the bomb detonation, a small electrical fire started in the propulsion control cubicle and dense toxic smoke was generated from burning phenolic material. This smoke filled the maneuvering

---

[1] This action was included in the list of anti-submarine attacks assessed as resulting in positive sinkings received from the Japanese at the end of the war. The exact translation of the Japanese comments on this attack is as follows: "Found a floating sub. Direct hit on the rear of the bridge and near-missed the side. A dense oil pool was created measuring 300 x 4000 meters. Air bubbles. The sub sank wriggling to the left". This statement indicates that two bombs were dropped although SCAMP's War Patrol Report and the nature of the damage sustained indicate that only one bomb detonated.

room and made personnel in that compartment violently ill. All propulsion power was deliberately cut off after the fire started in order to determine the extent of damage to the control cubicle and power circuits and avoid possible further damage. Propulsion was not restored until about 15 minutes later.

(b) The main engine air induction piping topside was torn open at the points of attachment to its welded supports in four places between frames 75 and 78 (Photo 9-5). These ruptures allowed the entire induction system to flood rapidly, causing a loss of buoyancy of about 14,000 pounds. Sea water then entered the interior of the pressure hull through the main induction drains and also around the forward engine room induction hull flapper valve, which would not tightly seat due to distortion of the adjacent hull structure. A total of about 10,000 pounds of water was taken into the bilges through these and other minor leaks.

(c) FBT No. 5B was torn open over a two-foot length between frames 79 and 80 at the knuckle between the margin plate and the tank top outer hull plating (Photo 9-7). This allowed the 7000 gallons of fuel oil in this tank to escape and be replaced with heavier sea water, causing an increase in weight of about 11,000 pounds.

(d) Power operation of the rudder was lost, presumably due to electrical contactors jarring open or fuses blowing in the steering motor control panel. The rudder therefore remained in full left position, which had been set on diving, until a shift was made to hand control about ten minutes later.

9-10. As a result of the sudden loss in buoyancy due to flooding of the main induction system, added weight due to intake of water into the pressure hull and displacement of fuel oil in FBT No. 5B with heavier sea water, both of the latter occurrences being relatively slow, SCAMP became heavy aft and started to settle fast, assuming a large up angle. The subsequent operations which were resorted to in a desperate effort to remain submerged can best be understood by a study of PLATE IX-2. When it is considered that the excess of weight over buoyancy resulted in the ship being about 15 tons heavy overall and heavy aft, and that no power was available with which to propel the ship so that the bow and stern planes and the up angle of the boat could be effectively used for aiding in depth control, the fact that SCAMP neither broached nor went excessively deep during this critical period is considered a great tribute to those who maintained depth control.

9-11. When SCAMP first began increasing depth rapidly, it was decided to blow a sufficient number of tanks to halt this movement. All main vents were still open for the boat had just submerged and the damage had occurred before they were closed. However, when the order was given and executed to close these vents by hydraulic power, nothing happened. It was then noticed that the shock of the detonation had caused the drum-type starter controller for the main hydraulic plant to move to the "off" position, thereby shutting off current to the hydraulic pump motor. The controller was immediately cranked to the "on" position, starting the motor, and all main vents were then closed without difficulty.[1] When 100 foot depth was reached, the negative tank was blown. At 175 feet, safety tank was blown. The boat still continued to sink, however, so when a depth of 290 feet was reached, air bubbles were put in all main ballast tanks. Although the boat now probably had well over 100 tons positive buoyancy, momentum carried her down to 330 feet where she finally stopped, hung for a brief period and then started to rise, still with a considerable up angle. In the meantime, all hands not required elsewhere had been sent to the forward torpedo room where they squeezed themselves around the torpedo tubes to add weight forward for trim control. Efforts were being made in the maneuvering room to determine the extent of damage to the control cubicle and power circuits before attempting to restore propulsion but personnel were seriously handicapped both by the presence of the dense phenolic smoke and the large up angle on the boat. The rudder was still hard over and consequently the boat continued turning.

9-12. SCAMP, now rising rapidly, was faced with the prospect of inadvertently broaching, and it was decided that if the boat passed 50 feet still going up, a battle surface would be made and the deck guns would be manned against whatever opposition might be encountered. However, by venting and flooding all tanks on the way up, the ascent was checked at 52 feet and the ship started down again. By alternately blowing and flooding tanks, SCAMP was able to remain submerged without power and went up and down three times in this manner. At about 1600, as the boat started down for the fourth time and with pressure in the air banks getting low, the maneuvering room personnel finished checking the main power circuits and the starboard shaft was brought up to turns for two-thirds speed.

9-13. With propulsion power now available, and presumably having gained better trim by maintaining a bubble in the safety tank and pumping or blowing the after trim tank during this period, the ship could now be controlled and shortly afterwards was leveled off at 150 foot depth. About five minutes after the starboard shaft was first turned over, the port shaft was also brought up to turns for two-thirds speed. The rudder was finally placed amidships by shifting to hand hydraulic control but only after the ship had made one complete circle. The sequence of events from the time of the bomb detonation to the restoration of propulsion power, as described in the above paragraphs, consumed about a fifteen-minute interval. Fortunately, no additional enemy attacks were made during this critical period although the trail of oil escaping from FBT 5B and air bubbles from the blowing operations must have disclosed SCAMP's whereabouts very plainly indeed. Presumably, the enemy plane had no more bombs or the pilot felt certain SCAMP had been destroyed.

- -

1 Drum-type starter controllers were particularly susceptible to mechanical troubles and shock damage. ShipAlts SS257 and SS261 of 5 and 10 October 1944, respectively, authorized the replacement of drum controllers for the hydraulic plant and trim pump motors with the much more satisfactory magnetic type push-button controllers.

9-14. SCAMP commenced evasive action, running at 150 foot depth, and probably still leaving a small trail of oil behind. At this time the ship was considerably out of final trim and very sluggish and hard to control. From 1755 to 1830, ten depth charges or bombs were heard detonating but all were well to eastward of SCAMP, the enemy obviously having lost all trace of her. It was fortunate for SCAMP that no enemy surface ship sonar-listening searches were conducted in her vicinity for one of the results of the bomb damage was a very high machinery noise level.

9-15. Although not important, it is interesting to note that when a bottle of "Chlorox" in the crew's washroom was broken at about this time, the resulting small release of chlorine gas was thought at first to have come from sea water leaking into the after battery. Both battery wells were checked, however, and found to be dry.

9-16. SCAMP remained submerged until well after dark and then surfaced at 2103. Upon reaching the surface and blowing tanks, the ship assumed a 17 degree port list. The heeling moment responsible for this excessive list was due chiefly to the following two reasons: (a) the fuel oil in port FBT No. 5B had been displaced with heavier sea water while the fuel oil in the corresponding starboard tank FBT No. 5A had remained intact; (b) sea water in port MBT Nos. 4B and 6B could not be completely blown upon surfacing since the division bulkheads between these two tanks and FBT No. 5B had pulled away from the hull, allowing air introduced into any of the three tanks to escape through the rupture at the tank top of FBT No. 5B and also through a leaking emergency vent valve and riser of MBT No. 4B. On SCAMP, of course, the exact reasons for the list were at this time unknown. All possible variable ballast water was shifted to starboard tanks immediately but this reduced the list only slightly. The loss of fuel oil from FBT No. 5B was first discovered when test cock samples showed that tank to be full of sea water. It was then decided to remove the vent riser blank from the corresponding starboard FBT No. 5A and allow the oil therein to escape during a dive so as to equalize the liquid loading.

9-17. Meanwhile, and in spite of the excessive list, SCAMP started both starboard main Diesels and cleared the area by proceeding south, running on one engine and charging batteries with the other. Starboard fuel tanks were put on service to reduce list by increasing salt water ballast on the starboard side. Low pressure blowers were run every thirty minutes.

9-18. Two men were sent into the superstructure in an attempt to remove the FBT No. 5A vent riser blank. They managed to insert and secure a crowbar under the riser blank but when a trim dive was made, at 0102 (8 April), in an effort to displace the fuel oil, it was found that the opening was insufficient to allow this. Therefore, at 0137, SCAMP surfaced and again men were sent aft in the superstructure to remove the riser blank. After about three hours work, the task was finally accomplished and, at 0455, another trim dive was made. This time oil poured out of FBT No. 5A. By 0555, test cock samples showed the tank to be clear of oil so SCAMP surfaced. The list was now reduced to 9 degrees port. Both FBT Nos. 5A and 5B were left rigged as free flooding tanks.

9-19. SCAMP's fighting effectiveness was reduced as the result of the attack to defensive action only. Although all torpedoes could be fired, further offensive action would have been inadvisable due to slow diving time, poor depth control, high noise level, and the decreased factor of safety at deep depths because of the hull damage. It was therefore decided to terminate the patrol at once.

9-20. SCAMP proceeded to Seeadler Harbor, Admiralty Islands, for temporary repairs and arrived there on 16 April 1944. From 10 April until arrival at Seeadler, SCAMP was escorted by DACE (SS247). Daylight hours were spent submerged during the entire run. Diving was slow and the boat was still somewhat difficult to handle submerged due to inability to maintain proper trim control. The return trip was uneventful except for numerous minor electrical casualties. Constant efforts were made by ship's force to stop leaks and repair damage where possible. The radio had been put out of commission due to a damaged coupling on the TBL motor-generator but satisfactory repairs were made by 10 April and communications were reestablished. On 11 April, a small fire started in the pump room air conditioning panel but this was soon brought under control and extinguished. On 14 April electrical power was lost on the bow planes for reasons not reported, but was restored within two hours. On 15 April a 190 volt ground developed in the after battery. Inspection revealed zero resistance grounds in three port cells, Nos. 106, 120 and 121, although it was reported that no loss of electrolyte occurred. These cells were by-passed and no further difficulty was experienced.

9-21. Damage to the superstructure is illustrated in Photos 9-2 and 9-3. The port superstructure deck and side plating were completely carried away in the vicinity of FBT No. 5B and the wood and steel decking was demolished or torn up across the width of the ship over a length of about ten feet. Aside from this immediate area, the only superstructure damage which occurred was minor distortion of the bridge fairwater plating and the bridge steps.

9-22. The tearing of the main induction line at the point of attachment of its welded supports (Photo 9-5) is an excellent example of the type of damage to be expected when a relatively non-rigid structure having a large area exposed to explosive loading, in this case the induction piping, is restrained from movement by welded attachment over small areas to relatively much stronger and more rigid members, in this case the bracket supports. The induction piping naturally tended to move bodily when struck by the shock wave from the bomb detonation, and was restrained only by its widely separated welded supports. The stress concentration at these points exceeded the ultimate shear strength of the pipe wall and consequently tearing resulted. A better design would have been one with small fillet welds, between the supports and the pipe, which would have failed before tearing the pipe walls. To prevent a recurrence of this casualty on SCAMP and other submarines, immediate replacement of all such directly welded supports on external induction and ventilation lines with non-welded belly-band type supports was authorized.[1] The partial collapse of the induction piping between welded stiffening rings (Photo 9-6) illustrates the great effect such stiffeners have in increasing the collapse strength of circular pressure vessels. It should also be noted that the collapse occurred only on the side directly facing the bomb detonation.

9-23. Severe deformation was sustained by the upper portion of the outer hull plating and framing between frames 72 and 82, port, over a longitudinal distance of about 30 feet (Photo 9-4 and PLATE IX-1). Minor distortion occurred forward to frame 69 and aft to frame 85. Tanks in this area are MBT No. 4B, FBT No. 5B and MBT No. 6B. The maximum indentation in the outer hull plating was about 12 inches, occurring between frames 78 and 79 at the tank top of FBT No. 5B (Photo 9-3). The average indentations of other areas of heavy damage in the outer hull were between 4 and 7 inches.

9-24. The outer hull plating was ruptured in only one place, a two-foot longitudinal tear which occurred at the tank top of FBT No. 5B between frames 79 and 80 (Photo 9-7). This was caused by excessive stress concentration at the tank top knuckle due to structural discontinuity at the bracket connection scarfing the outer hull frame within the tank to the topside pressure hull frame outside the tank (See sketch in PLATE IX-1).[2] The fact that only one rupture occurred in the outer hull although distortion of structure was severe, and even that one rupture being attributable to basic design, demonstrates the great ability of such welded structures to deform without loss of their watertight integrity.

9-25. The wing bulkheads at frames 75 and 80, extending from the inner to the outer hull and separating MBT No. 4B, FBT No. 5B and MBT No. 6B, were extensively buckled. Both of these bulkheads, together with their stiffeners, were torn loose from the inner hull, thereby intercommunicating all three tanks (Photo 9-10). This allowed fuel oil from FBT No. 5B to reach MBT Nos. 4B and 6B and prevented the complete blowing of the latter two tanks, since FBT 5B was torn at the top and thereby opened to the sea. Inability to blow these port tanks

---

1 Authorized by BuShips ltr. SS/S38-1(515-815) of 7 June 1944.

2 To diminish the possibility of this casualty occuring again to SCAMP or other applicable submarines, BuShips conf. ltr SS/S11-2(515) of 27 June 1944 authorized the modification of such bracket connections to reduce stress concentration under high explosive loading conditions. This was accomplished by installing a small reinforcing plate so as to lap the standing flanges of the pressure hull frames onto the tank tops instead of terminating them abruptly at the tank top knuckle as provided in the basic design. Priority was given to those frames in way of normal fuel and fuel ballast tanks. See sketch in PLATE IX-1.

contributed to the large list assumed by SCAMP on surfacing. In addition, the flood valves for MBT No. 4B and FBT No. 5B were twisted off their seats.

9-26. The structural deformation which occurred in the inner or pressure hull of SCAMP was the most severe known to have been survived by any U.S. submarine during World War II. The pressure hull plating (27.5-pound medium steel) was dished in from frames 69 to 84, a distance of 37 feet. Average indentations in the worst areas were of the order of 4 to 5 inches with a maximum indentation of 7-1/8 inches occurring near the tank top margin plate at frame 79-1/2 (Photos 9-9 and 9-11). Graphical presentation of the pressure hull deformation over this area is included in PLATE IX-2. In no place was the pressure hull ruptured. Pressure hull frames (6" x 3-3/8" x 14.75-pound I-beams), secured to the hull with 5/16" fillet welds at the inboard flange toes, showed definite distortion throughout the areas of severe damage and in four places, frames 73, 74, 76 and 79, were torn from the inner hull when the latter dished inward (Photo 9-8). As mentioned above, tank bulkheads at frames 75 and 80 also were torn away from the inner hull (Photo 9-10). It is amazing that SCAMP's pressure hull retained sufficient strength to permit operation without collapse at a depth of about 330 feet subsequent to the damage.

9-27. Damage naturally was sustained by valves, fittings and piping systems attached to or passing through the pressure hull and outer tank boundaries in way of deformed areas, but was relatively minor considering the severity of the structural damage. MBT No. 4B vent riser leaked at the flanged connection with its tank top. Main vents for MBT No. 4B and safety tank leaked. The emergency vent for MBT No. 4B also leaked and its operating gear was pulled out of line. Due to the extreme indentation of the pressure hull at that location, the emergency vent operating gear for FBT No. 5B was bent 45 degrees out of line and forced in hard against the scavenging blower of No. 2 main engine (Photo 9-12). This vent valve was later opened by cutting a hole in the tank top. The 3000-pound high pressure air line leading from the air flasks in MBT No. 4 was bent between the inner hull and the hull stop valve but no leakage resulted either here or anywhere else in the entire high-pressure air system, although external air banks were subjected to considerable explosive loading in way of the damage. A fuel oil transfer line and a fuel oil compensating line inside the pressure hull abreast FBT No. 5B were bent and twisted but did not leak. Although hydraulic lines in the forward engine room were bent, there were no hydraulic leaks anywhere in the boat. Minor leakage occurred at a fresh water line fitting in the crew's washroom but this was easily repaired. Perhaps the most serious piping casualty was the flattening of the No. 2 sanitary tank overboard discharge line which prevented blowing the tank. This discharge line also leaked at its flanged seachest connection to the outer hull in way of MBT No. 4. The seat of the forward engine room air induction hull valve was slightly distorted and allowed considerable water to enter the compartment from the flooded induction piping topside. This leakage was later reduced by taking up hard on the valve with a chain fall.

9-28. Damage to machinery was surprisingly minor considering that the detonation occurred abreast the forward engine room. The scavenger blower for No. 2 main engine was misaligned, possibly by shock but more probably as a result of the inward bulge of the pressure hull pushing the operating gear of FBT No. 5B emergency vent valve into the blower housing (Photo 9-12). No attempt was made to run No. 2 main engine after hearing noises in the scavenging blower spiral impellers when the engine was jacked over. No. 3 main engine blower also sustained minor misalignment of the drive gears but this was not serious enough to prevent operation of the engine. No. 1 detached fuel oil pump was deranged so that it would not supply proper pressure but the exact nature of this casualty was not reported. No. 1 lubricating oil purifier was thrown out of alignment. No other damage, except for minor electrical derangements, occurred to auxiliary machinery anywhere in the boat. Machinery piping damage was limited to a ruptured line from No. 2 main engine exhaust to the compensating system.

9-29. Electrical damage, although in itself quite minor, had very serious effects on ship control due to the generation of toxic smoke by the small electrical fire in the maneuvering room. This fire was limited to a small rotary clutch by-pass switch (BuShips Standard Plan 9-S-4474-L) in the No. 4 generator field circuit of the main control cubicle. This switch was mounted in a closed phenolic frame and the burning of only a small portion of this phenolic material created the large volume of dense smoke (Photo 9-13)[1]. No report is contained in any of the references as to the cause of the fire but the following hypothesis is believed to be a plausible explanation. With the type of General Electric control cubicle installed on SCAMP, it was not necessary to clear the generator connections before shifting propulsion motors to battery power.[2] Therefore, during quick dives, it was the custom with such propulsion controls to first change to battery power and then to de-energize all generator circuits. It appears probable that some metallic object, dislodged by the shock, fell through the cubicle and momentarily shorted the excitation supply to the No. 4 generator field. This would cause excessive current to flow through the clutch by-pass switch, which is used to by-pass the regular excitation contactors when two or more generator field rheostats are clutched together. The excessive current would cause the switch to arc and could account for the ignition of its phenolic case. Failure of this switch on SCAMP also short-circuited the Nos. 2 and 4 generator field supply and return leads and the port motor electrical interlock. Actually, both the port and starboard propulsion plants were undamaged and could have been kept in continuous operation. All power was cut off by ship's force, however, when smoke and flame were seen to issue from the control cubicle since it was quite correctly felt that the circuits should be checked through to

---

1 For further discussion, see paragraph 19-13.

2 Current General Electric Co. submarine propulsion control designs are provided with interlocks which require all generator connections to be opened before shifting to battery power.

determine the nature of the casualty in order to prevent possible further damage to the motors and control equipment. Upon completion of this check, which took about 15 minutes due to the presence of the toxic smoke, the starboard plant was started simply by operation of the controllers and shortly afterwards the port plant was started in similar manner after resetting the electrical interlock by hand. With the exception of the fire in the clutch by-pass switch, there was no apparent misalignment, distortion or maloperation of any part of the control cubicle. It is interesting to note that the battery tank contactors did not open, although those in the after well had not been by-passed.

9-30. Auxiliary and lighting power were not lost at any time. Numerous clips holding cables to bulkheads were jarred loose in the forward engine room and crew's washroom. Only one battery ventilation duct fractured and this occurred in the after battery compartment. In the forward battery compartment, the battery fresh water tanks shifted forward about two inches. Damage to the batteries themselves was limited to the three cells having full grounds mentioned in paragraph 9-20 above. The forward battery air flow meter would not function, apparently due to a clogged or crushed line. The supply ventilation blower panel in the port side of the forward engine room was disabled and all leads were pulled loose. The ship's force later constructed a jury rig to provide power to this blower. The hot water heater panel located in the crew's washroom was completely wrecked when it was crushed against the hot water tank by the inward movement of the pressure hull in that area. Although galley equipment was damaged, also by dishing of the pressure hull, no grounds occurred in electrical circuits.

9-31. A moderate amount of damage occurred to electronic equipment and associated gear. The SJ radar antenna mast was slightly sprung but could be trained. Numerous tubes in the SJ receiver indicator were jarred loose and the feeder unit dipole sleeve was bent, causing a fluctuating pulse during antenna train. One tube in the SJ oscillator converter was broken and the lobe switching circuit was inoperable for reasons not reported. In spite of the above difficulties, repairs were made and the SJ radar was placed back in commission. The antenna coupling gap on the BN radio transmitting and receiving gear closed under impact, causing a high voltage arc. As mentioned previously, the coupling on the TBL radio motor generator jarred loose but was subsequently repaired and radio communications were restored. The forward insulator on the center radio antenna topside fractured and this antenna had to be cut down upon surfacing. The 1MC general announcing system could not be operated due to derangement of both signal generators.

9-32. Other miscellaneous items of damage not covered elsewhere are listed below. The gyrocompass repeater located on the bridge was knocked out of its gimbals and was suspended only by its electrical cable lead but still continued to function. The valve stem extension arm on the 10-pound blow stop valve for MBT No. 2B forward was found to be missing. Although the outside temperature element on the bathythermograph was torn loose, this equipment remained operative.

9-33. At Seeadler Harbor, Admiralty Islands, repair forces from TANGIER (AV8) and JENKINS (DD447) patched the tear in FBT No. 5B, cleared away the superstructure wreckage, installed a new temporary superstructure, and placed No. 4 engine and generator back in commission. SCAMP departed Seeadler Harbor on 20 April for Milne Bay, New Guinea, arriving on 22 April 1944. Here she was docked in the ARD9 and temporary structural repairs were made to the bulkheads and frames which had been torn from the pressure hull.

9-34. SCAMP then returned to U.S. Naval Drydocks, Hunter's Point, arriving on 18 May 1944. Complete war damage repairs (Photo 9-14 and 9-15) together with routine overhaul and outstanding alterations were accomplished there and SCAMP was returned to service on 8 September 1944, five months after the action occurred.

9-35. SCAMP was lost on her next war patrol. Information made available by the Japanese upon termination of the war indicates that she was probably sunk while on lifeguard duty off Tokyo Bay as the result of one or more of three depth charge and depth bomb anti-submarine attacks conducted in her area during the period 11 to 16 November 1944. In the seven patrols completed before her loss, SCAMP was officially credited by ComSubPac with sinking six ships totaling 49,000 tons (2 AK, 2 APK, 1 SS, 1 AO) and damaging eight other ships totaling 40,400 tons (2 AK, 2 AO, 1 DE, 1 AP, 1 CA, 1 trawler).