SECTION VII

U.S.S. SALMON (SS182)

Depth Charge Damage

Southeast of Kyushu
30 October 1944

Class.....SS182

Builder..... Electric Boat Co., Groton, Conn.

Commissioned..... 15 March 1938

Length (Overall)..... 308 ft. 0 in.

Beam (Extreme)..... 26 ft. 2 in.

Submergence Depth (Designed Maximum)(Axis)..... 250 ft.

Displacements

Standard ..... 1435 tons

Emergency Diving Trim..... 1885 tons

Submerged ..... 2210 tons

Draft (Mean, Emergency Diving Trim) ..... 17 ft. 6 in.

Type of Propulsion..... Composite

Main Engines (4)..... General Motors 16-278A

Main Motors (4) and Generators (2).....Elliott Co.

References:

(a) C.O. SALMON conf. ltr. SS182/A9/A-16-3, Serial No. 0-16 of 10 November 1944 (Report of War Patrol Number Eleven).
(b) C.O. SALMON conf. ltr. SS182/A9-8, Serial No. 024 of 11 December 1944 (War Damage Report).
(c) OinC U. S. Naval Drydocks, Hunter's Point conf. ltr. SS182/L11-1(012459)(308) of 29 March 1944 (Supplementary War Damage Report).
(d) U.S. Navy Board of Inspection and Survey ltr. SS182/S3-1 (5000-S), Serial No. 271121 of 18 December 1944.

Photographs Nos. 7-1 through 7-13 (furnished by Naval Drydocks, Hunter's Point).

PLATE VII

7-1. On 30 October 1944 during her eleventh war patrol, SALMON underwent a severe depth charge attack southeast of Kyushu while submerged at a depth of about 300 feet. As a result of this attack, SALMON incurred severe damage. This case of damage can be considered one of the most serious to have been survived by any U.S. submarine during World War II. Pressure hull deformation was extensive in way of both engine rooms. The external main engine air induction piping collapsed and flooded, causing the ship to become heavy overall, and the stern diving planes jammed in "full dive" position. Depth control was immediately lost and SALMON oscillated up and down several times, remaining submerged only by blowing the safety tank and by going ahead at emergency speed with a 20 degree up angle on the boat. Seventeen minutes after the attack, with batteries depleted, the after engine room flooded almost to the level of the main motors, and still not having achieved depth control, SALMON surfaced, outgunned the opposing Japanese escorts and escaped with three engines on full power. This report is based on the information contained in the references and on further informal correspondence with the then Commanding Officer. The Photographs were furnished by Naval Drydocks, Hunter's Point. The PLATE was prepared by this Bureau.

7-2. Upon completion of her tenth war patrol, SALMON underwent an extensive overhaul at Navy Yard, Mare Island. During this period the four Hoover, Owens and Renschler main Diesel engines were replaced by General Motors Model 16-278A engines and all of a long list of important outstanding alterations were accomplished.

7-3. SALMON completed overhaul and departed from Navy Yard, Mare Island for the Submarine Base, Pearl Harbor on 4 September 1944, arriving on 12 September. From 12 September to 17 September, voyage repairs were made at the Submarine Base and from 17 September to 21 September training exercises were conducted in the Hawaiian area. SALMON departed from Pearl Harbor on 24 September and arrived in Tanapag Harbor, Saipan, on 3 October. There minor voyage repairs were again made and fuel and lubricating oil were topped off.

7-4. SALMON departed Saipan on 4 October for her eleventh war patrol in company with SILVERSIDES (SS236) and TRIGGER (SS237), forming a coordinated attack group. Her assigned patrol area was along the eastern boundary of the Nansei Shoto Islands on the southern approaches to the Japanese home islands. Although independent searches were conducted over a wide area by the group, and numerous harbors were reconnoitered, no suitable targets were sighted until 30 October.

7-5. At 0401 on 30 October 1944, SALMON established radar contact with a large Japanese tanker escorted by four frigate class vessels, radioed a contact report giving the position, course and speed of the target, and then commenced surface chase. Chase was long and difficult

due to the high speed of the tanker, its radical course changes, and occasional rain squalls during which contact was lost for short periods. At 1620, SALMON noted a large explosion in the target's stern (result of TRIGGER attack) and the tanker appeared to stop shortly afterwards. Anti-submarine activity by the escorts started at once and many depth charge explosions were heard through the hull during the next half hour.

7-6. At 1740, SALMON started closing the range for an attack. The enemy tanker was at this time immobilized about 24,000 yards distant, bearing 170° (T) and drifting with the wind in a southwesterly direction at a speed of about one and one-half knots. The four Japanese escorts were patrolling slowly back and forth about 1200 yards on both sides of the tanker. SALMON's position was lat. 30° 08'N., long. 132° 33'E., about 120 miles southeast of Kyushu. The sea was moderate and the wind was Beaufort force 3 to 4. At 1823, upon closing the range to about 8000 yards, SALMON submerged and commenced attack approach. Her main shafts were squealing badly, a condition which had developed during the preceding few days and was steadily getting worse. At 2001, at an estimated range to the target of 3,300 yards, a spread of four torpedoes was fired, two of which struck and detonated in the target.[1]

7-7. At the time of firing, SALMON was on course 215 degrees and at periscope depth of 64 feet. The long firing range was accepted because three of the enemy escorts were approaching rapidly and it was feared that no further decrease in range could be made without detection. Immediately after firing, SALMON swung right, using full rudder, in order to bring her stern tubes to bear for another salvo should it become necessary. However, three of the four torpedoes of the initial salvo were seen to broach and either this evidence of SALMON's presence or positive detection by sonar caused two of the escorts to head directly toward her almost simultaneously from each quarter so, at 2012, SALMON went deep. As the boat submerged, speed was increased to standard and the rudder was put in full left position. One minute later, at 2013, when a depth of 310 feet had been reached, a series of small "sono-bomb" explosions were heard.[2] These were followed almost immediately by the first of four close and well delivered depth charge patterns.

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[1] Although TRIGGER (SS237) and SALMON each made torpedo hits on this tanker, it remained afloat and was later sunk by STERLET (SS392). SALMON was officially credited with a "sunk" tonnage of 3,300 tons, equal to one-third the total estimated tonnage of the tanker.

[2] These "sono-bomb" explosions may have been either "Emit Sound Missiles", known to have been frequently used by the Japanese just prior to commencing a depth charge attack, or the detonations of projector charges in depth charge throwers on the escorts (See paragraph 3-19).

7-8. A total of about thirty depth charges were dropped, each of the four separate patterns consisting of from six to eight charges. The first and second patterns were received almost simultaneously and one or more of these charges detonated very close aboard over the engine rooms, causing the collapse and flooding of the engine air induction piping and possibly some or all of the pressure hull deformation between the tank tops over the engine rooms. The final two patterns followed a short time later but were not close enough to have serious effects although the boat was shaken up considerably. All of the thirty or so depth charges detonated aft in so far as could be determined on SALMON. The Commanding Officer reported that severe flexural vibrations of the ship as a whole occurred during close detonations, stating that "The conning tower vibrated up and down so violently that I thought the ship was going to shake herself apart. I remember bending my knees to ease the shock". Damage to the ship was severe and widespread. Unattached gear and many inadequately secured small fixtures were hurled about during close detonations and presented an appreciable missile hazard to personnel in some areas.

7-9. The most serious immediate effect of the attack was that depth control was lost. The boat became heavy overall and started to settle rapidly. Several factors contributed to this dangerous situation: (a) loss of buoyancy due to collapse and flooding of the external main engine air induction piping; (b) added weight due to flooding of three deck access hatch trunks, profuse leakage of sea water into the interior of the hull at various points and the displacement of about 7,000 gallons of fuel oil in FBT No. 7 with heavier sea water through the ruptured vent riser of that tank; (c) jamming of the stern planes in "hard dive" position due to binding of the stern plane hand tilting shafting in the after engine room by a local indentation of the pressure hull and shattering of the stern plane drive shaft coupling in the after torpedo room; and (d) the downward flow of water from the overhead depth charge detonations.

7-10. Submerged propulsion power was unaffected and was a vital factor in the survival of the boat. Auxiliary power forward was temporarily lost when shock caused the auxiliary power circuit breaker in the after engine room to trip. However, the breaker was reset by hand shortly after it opened and auxiliary power was restored throughout the boat. No. 1 lighting motor generator voltage regulator control was damaged and, since this generator was supplying the standard lighting load, all ship's service lighting failed and the ship was plunged in darkness. The emergency lighting system was switched on immediately, however, and operated satisfactorily although numerous light bulbs throughout the boat were broken. Various IC and auxiliary motor controller panel contactors opened under shock and had to be reset by hand.

7-11. Only one serious air system leak developed, this occurring in the forward engine room at a joint in No. 1 main engine air starting line (500-pound). Numerous minor air leaks developed throughout the boat. Power steering control was lost due to disconnection by shock of the supply piping to the steering hydraulic manifold in the after torpedo room. Steering control was not regained until about five minutes later when a shift was made to hand operation.

7-12. The most serious leakage into the hull was that which occurred in both engine rooms through the fuel ballast tank riser inboard vent lines, the stop valves having torn from their holding studs. The sea water streams resulting at these points were small in cross section but fast, and rapidly filled the bilges. The drain line suction strainers in the engine rooms were clogged with debris rendering it impossible to pump the water flooding into those two compartments. The water level eventually neared the main motors and was one of several reasons which soon forced SALMON to surface. Serious leakage also occurred in the conning tower as described in paragraphs 7-23 and 7-25.

7-13. When it was first noticed that SALMON was increasing depth rapidly, emergency speed ahead was rung up, a 20 degree up angle was set on the boat with the bow planes and the auxiliary tanks were pumped. These measures served to check the descent at about 400 feet depth. The boat then rose to about 300 feet but when an attempt was made to level off and reduce speed to standard, SALMON again settled rapidly. Emergency speed ahead and a 20 degree up angle on the boat were once again resorted to and in addition the safety tank was blown, but this time the descent was not halted until a depth of about 500 feet had been reached. Once more the boat started to rise and reached 150 feet depth but started to drop again when another attempt was made to level off. This time SALMON went quite quickly to about 500 feet depth, in spite of again using emergency speed ahead and a 20 degree up angle, and then gradually settled to a reported 578 feet depth. The situation at this time was as follows: the main batteries were considerably depleted from sustained high speeds submerged; depth control still had not been restored and was getting more difficult rather than easier; the water level in the after engine room was rising and had reached the main motor casings; and pump suction could not be obtained aft to correct trim due to the clogged bilge strainers. As the depth was apparently already 578 feet and slowly increasing, the Commanding Officer decided that the only chance of survival for the ship lay in surfacing at once and attempting to fight off the enemy escorts. Therefore, at 2030, seventeen minutes after first being attacked, SALMON started to blow tanks for a battle surface.

7-14. SALMON twice reached depths greater than the maximum indication of her 450 foot depth gauge and on each of these occasions depth readings were thereafter obtained from a control room sea pressure gauge calibrated in pounds per square inch. This method of determining depth was of course only as reliable as the gauge itself. No information is available as to whether this particular gauge was later checked for accuracy of calibration. However, it is known that numerous other pressure gauges, meters and instruments were deranged by shock. It should be noted that since the maximum depth apparently reached, 578 feet, was measured at the control room, the approximate 20 degree up angle on the boat at that time still further increased the submergence at the after end of the pressure hull, resulting in a depth of slightly more than 600 feet at the after bulkhead of the after torpedo room. This

depth is greater than that at which collapse of the pressure hull would be expected to occur. Although astounding, it cannot be said to be impossible because there is considerable variation in the strength of submarines by reason of variations in the yield strength of the steel used in construction, which varies from heat to heat, and in the thickness of the steel which, by specification tolerances, is not and cannot be required to be exactly the nominal thickness.

7-15. The fact that the stern planes were jammed in full dive position during SALMON's inadvertent submerged gyrations was a help rather than a hindrance. This was because the boat became heavy overall and heavy aft and the stern planes offered a moderate amount of support tending to hold the stern up. The action of the stern planes on full dive was also beneficial in that it initially permitted some control over the attitude of the boat by use of the bow planes so as to maintain a reasonable up angle in order that the hull itself could be utilized as a plane to counteract the effect of being heavy overall. Later, as additional water entered the engine rooms and caused the boat to become progressively heavier aft, the smallest up angle which could be kept on the boat at emergency speed ahead was approximately 20 degrees even though the bow planes were placed in full dive position. It should be noted that had the stern planes been jammed in hard rise position, the effect of the planes together with the boat being heavy aft would have resulted in such a large up angle that SALMON would have been forced to surface almost immediately.

7-16. Although structural deformation was extensive, particularly in way of the forward and after engine rooms, in no place were the pressure hull or pressure tanks ruptured or torn and watertight integrity remained intact except for the profuse leakage which occurred at various pressure fittings. From the nature of the deformation of the pressure hull over the engine rooms and the fact that SALMON far exceeded its test depth, particularly aft by reason of the up angle while at great depth, it is believed that there is considerable probability that the pressure hull damage was caused by excessive submergence depth rather than by the depth charge attack.

7-17. The pressure hull plating between tank tops was generally depressed between frames 95 and 170. The indentation lobes in this area were for the most part confined to the pressure hull plating between frames only and were discontinuous with lobes in the adjacent frame spaces. Pressure hull frames within the same area were in some cases slightly tilted or buckled (Photo 7-1). No frames tore free from the hull plating. The area of heaviest deformation was between frames 130 and 145, with a maximum pressure hull indentation of about two inches between frames 137 and 139 (Photos 7-2, 7-3 and 7-4). Some distortion also extended a short distance below the tank tops. Forward of frame 95 and aft of frame 170 no structural damage was apparent. The pressure hull plating of the after trim tank was considerably depressed between frames undoubtedly as a direct result of the excessive hydrostatic pressure to which the hull was subjected when SALMON reached a depth of about 620 feet in that area (Photo 7-5).

7-18. The topside main engine air induction piping leading to the engine rooms completely collapsed and flooded (Photos 7-6 and 7-7). This collapse action probably occurred in two distinct stages: (a) initial partial flattening of local areas of the induction piping by depth charge pressure alone and (b) subsequent complete and longitudinally progressive collapse by direct hydrostatic pressure acting against the weakened unsymmetrical areas caused by (a). Flooding of the induction system alone caused SALMON to be heavy overall by about 13,500 pounds.

7-19. In addition to the collapse of the main induction piping, much other damage was sustained by materiel located outside or attached to the pressure hull. Wood decking and steel framing of the superstructure deck in the area of pressure hull damage were distorted and broken up, requiring extensive renewals. The master vent valve for MBT No. 1 jammed in the open position and remained so until forced shut by hand from topside after surfacing. The master vent valves for MBT Nos. 2E, 2F, 2G and 2H also jammed open but were closed by use of much leverage on the hand wheels. Due to distortion of structure and displacement of vent riser piping, the master vent valves for safety tank and MBT Nos. 2A, 2C, 2E and 2G could not be completely closed, lacking seating by from one to two inches. The vent risers for FBT No. 7 amd MBT Nos. 2C, 2E and 2G were ruptured. Over 7,000 gallons of fuel oil were lost from FBT No. 7 through the damaged riser and the displacement of this oil by heavier sea water caused an increase in weight aft of about 11,000 pounds. All starboard tank emergency vent valves leaked and operated with difficulty. The low pressure blow lines to FBT Nos. 7 and 9 were ruptured, the line to FBT No. 7 apparently having been pierced by a solid object (Photo 7-8).

7-20. The outboard mushroom valve for the main induction and ship's ventilation exhaust trunk in the conning tower fairwater at frame 85 was warped slightly, preventing complete seating. No. 1 main engine muffler was dished in considerably and the surrounding decking broken up. All main engine outboard double-seal conical type exhaust valves leaked. Safety tank flood valve jammed in the open position and could not be closed. The residual drain piping in MBT No. 2E ruptured inside the tank. The radio antenna trunk system and the four-inch ammunition ready service stowage case, both located in the conning tower fairwater, flooded completely. On the bridge, the target bearing transmitter pressure-proof binoculars cracked, partially flooding, and the transmitting selsyns were deranged. The bridge pressure-proof 7MC speaker forward also flooded. All radio and the APR antennae insulators fractured. The one and one-half inch thick glass in the bridge pressure-proof gyro repeater granulated. The four-inch deck gun sights cracked and flooded, although the gun itself fortunately remained completely operable. Both periscope

head staunching plates fractured and the tubes flooded. No other damage occurred topside.

7-21. Flooding occurred in the deck access trunks to the after battery room at frame 90, the forward engine room at frame 125 and the after torpedo room at frame 170. All three of these trunks fortunately had been provided with the secondary boiler-type hatches at the lower ends of the trunks as authorized by BuShips ltr. C-SS/S16-3(515-815) of 28 February 1944. The outer hatches for the after battery and forward engine room access trunks were structurally undamaged and remained seated. Leakage was due to gasket damage plus excessive hydrostatic pressure. These two trunks flooded completely but the secondary hatches held and prevented water from entering the pressure hull. The after torpedo room access trunk upper hatch was forced open by the depth charge explosions to about a 30 degree angle and consequently left the trunk wide open to the sea. Here again the secondary hatch at the lower end of the trunk held tight under full sea pressure and without question saved the boat. To eliminate such a hatch casualty as the above, the installation of emergency securing turnbuckles to prevent the upper hatches from opening momentarily more than about two inches during depth charging was authorized by BuShips dispatch of March 1944. The turnbuckles had been installed on all of SALMON's access hatches but had not been rigged on those which were backed up by secondary hatches.

7-22. In the conning tower, damage due to depth charging caused severe leakage at depths below 200 feet through the stuffing boxes of both periscopes, the steering wheel shaft packing, and around the gasket of the upper hatch. Some leakage is also reported to have occurred through electrical cable stuffing glands at deep depths. The conning tower bilges overflowed, both periscope wells flooded and considerable water drained through the lower hatch to the control and pump rooms. The 1MC announcing system was put out of commission and the station relays were inoperative. The motor controller switch for No. 1 periscope was dismounted and the light switch for the TDC was broken.

7-23. In the control room the damage was relatively minor. The TP-TR panel was dismounted and many indicator bulbs were broken. The main gyrocompass panel short-circuited. The starboard engine order telegraph and telephone ringing circuit junction boxes fractured and short-circuited. About one-half of the pressure gauges were jarred out of calibration. Gauges that were properly shock mounted were reported to have apparently been unharmed. The tank type magnetic compass lost all directivity. Many light bulbs were broken. The fathometer went out of commission due to shock. The 200-pound air valve to the whistle topside and depth gauge sea chest blow valves

jarred open. The 220-pound service air distribution manifold leaked at the piping connections.

7-24. In the pump room, damage was quite serious. Auxiliary power forward was lost temporarily when the breaker aft in the maneuvering spaces tripped open. The breaker was quickly reset, however. Water draining from the conning tower and the hull ventilation drain flooded the bilges to a waist-high depth at the after end (20 degrees up angle). The following pump room electrical equipment was flooded out: Nos. 1 and 2 high pressure air compressor motors, SD radar mast hoist motor, two circulating water pump motors for air conditioning, and the periscope lower limit switches. The overload relays on Nos. 1 and 2 low pressure blowers tripped and Nos. 2 and 3 I.C. motor generator regulators short-circuited. The stems of sea valves in the circulating water lines to the air conditioning and high pressure air compressors were bent between the bonnets and the valve discs. Various hydraulic system piping and fitting leaks throughout the boat made it necessary to secure the main hydraulic plant until the sources of leakage could be isolated or repaired. The hydraulic plant itself was undamaged. Apparently no misalignment of any auxiliary equipment due to shock occurred in the pump room. The trim and drain pumps continued to run although in some compartments bilge suction strainers became clogged with loose cork.

7-25. In the forward torpedo room, the bow plane rigging motor panel was deranged and upon surfacing the planes had to be rigged in by hand. The QC sound gear shaft was forced up despite the holding pins, and its hydraulic supply line was torn loose. The pitometer log was found to operate erratically. The diving alarm short circuited. The officers' watercloset discharge line ruptured inboard of the hull valve.

7-26. No damage occurred in the forward battery compartment with the possible exception of one battery cell. This cell may have been cracked, for reference (a) reports that it had a high ground reading and that the electrolyte level was not visible. No subsequent information on the cell is available.

7-27. In the after battery compartment damage was comparatively minor. In the crew's mess room both the ship's supply ventilation hull flapper valve and the No. 2 sanitary tank overboard vent valve leaked heavily. Sea water flooded out the electric ranges in the galley. The battery cells and strongbacks in this compartment were unaffected and the well was dry. Several light bulbs and one mirror were broken and an oxygen bottle was torn loose from its overhead stowage position.

7-28. In the forward engine room, the No. 1 main engine completely flooded through the exhaust piping system. The depth charging caused

the outboard exhaust valve to leak and jarred the inboard exhaust valve (gate) partially open. The No. 4 liner of this engine also fractured. The No. 1 engine air starting line ruptured, causing serious air leakage. No. 2 main engine also partially flooded through the exhaust system but was otherwise undamaged. The main engine circulating water sea suction and discharge valve bonnets leaked profusely around stems and flange gaskets at deep depths. As previously mentioned, serious leakage occurred at the fuel ballast tank riser inboard vent lines, the vent valves having torn loose from the hull. Water flooded the bilges and at 20 degrees up angle reached a height of 18 inches on the No. 2 generator. This generator was flooded with a mixture of oil and water but ran well after it was pumped out and wiped down. The forward engine air induction hull flapper valve and the inboard exhaust valve (gate) for No. 2 main engine jammed closed, the latter due to hull distortion forcing the valve stem brace out of line (Photos 7-11 and 7-12). Coil leaks developed in both of the Kleinschmidt electric vapor compressor stills and only salted distillate could be produced. The 1MC speaker, diving alarm, fresh water expansion tank, 200-pound service air compressor motor and the fuel and lubricating oil purifiers were dismounted by shock. Several water and hydraulic pipe lines were ruptured or jarred loose at connections. Various non-shockmounted pressure and temperature gauges were broken or put out of calibration. Bilge suctions clogged with cork and debris.

7-22. In the after engine room, although hull deformation was severe, damage to interior equipment was relatively minor. As stated in paragraph 7-9, the hull plating was dished in sufficiently to cause the stern plane hand tilting shaft to bind with the stern planes in "hard dive" position. No. 1 lighting motor generator voltage regulator control was deranged, putting the ship temporarily in darkness. The emergency lighting leads in both engine rooms parted and fixtures were wrecked. Main engines Nos. 3 and 4 (propeller engines) were undamaged although they partially flooded through the exhaust system. Several main engine lube oil lines parted or ruptured. All four main motor plants were undamaged with the exception of the bearing oil supply line nipples to No. 3 main motor which cracked in the housing and a ruptured circulating water supply line to the No. 3 main motor air cooler. The main control cubicle frame and covers were distorted when the hull dished in overhead (Photo 7-10) and one main motor contactor flash chute was dismounted. However, the entire submerged propulsion plant remained fully operable during and after the depth charging and was a major factor in the survival of the ship since depth control, erratic as it was, was aided by use of fast speeds ahead while submerged. That propulsion power was not lost was due in large measure to the main motor and battery contactor positive locks installed per ShipAlt SS137 which prevented tripping by overload and shock. Sea water leaked profusely through the fuel ballast tank riser inboard vent lines, as in the forward engine room. The bilges flooded and could not be pumped since cork insulation had clogged drain line suctions. The water level reached the lower casings of the main motors and this was a principal factor in the decision to surface.

7-30. In the after torpedo room, the "tee" connection in the No. 3 ballast tank vent riser was forced in by the distortion to the pressure hull overhead but remained tight. The stern plane tilting drive shaft coupling was shattered and the drive worm gear housing was dismounted. The capstan motor controller panel contactors jarred open and had to be reset by hand. The oil supply line to the steering hydraulic manifold was torn loose, making it necessary to shift to hand power and later to emergency power from the main hydraulic plant. No. 6 torpedo tube shutter moved to the open position. The residual drain piping hull flange for MBT No. 3 was partially sprung with minor leakage resulting.

7-31. When SALMON battle-surfaced at 2030, after seventeen hectic minutes of attempting to remain submerged under conditions which rendered depth control impossible, her situation was still very dangerous. Decks were awash and the boat had a fifteen degree list to starboard. Most of the available high pressure air had been expended due to numerous internal leaks and the large amount of air required to start the boat up from the extreme depth of 578 feet while simultaneously losing much of it through damaged ballast tank risers and leaking vent valves. The remaining high pressure air was limited to 1200 pounds in one bank only and no replenishment could be made since both high pressure air compressor motors had flooded. Lack of air plus the depleted condition of the storage battery made any further diving for evasive purposes impossible. The low pressure blowers could not be started immediately since the low pressure volume tank had flooded with sea water and the blower motor panel contactors had tripped open and had to be reset. Consequently, no air was available with which to blow tanks in order to correct list and increase freeboard. This in turn rendered gun operations difficult. The feelings of SALMON's officers and men after the decision was made to surface can be well imagined when it is remembered that there was no information at that time as to the whereabouts of the Japanese anti-submarine vessels and that there was no way of knowing whether the surface Diesel engine propulsion plant and the deck guns were in working order, both of which would probably be required in order to make good their escape.

7-32. SALMON found herself up moon from all four escorts, the nearest being about 7,000 yards distant. None of the escorts at this time apparently detected SALMON for they gave no immediate indications of having discovered her presence and were still dropping occasional depth charges near the scene of the original attack, a large oil slick having been left by the loss of oil from FBT No. 7. This delay was invaluable for it enabled SALMON to take damage control measures, man guns, correct list, increase freeboard, obtain partial operation of the surface propulsion plant and repair vital auxiliary machinery before the first escort closed in for an attack.

7-33. At 2032, two minutes after surfacing, the No. 3 main engine and the battery were put on composite drive propulsion. Under this arrangement on SALMON, power could be transmitted to the propeller

shafts by direct drive from Nos. 3 or 4 engines through reduction gears and also concurrently by electric motor drive through the same reduction gears by taking current from either the battery or the Nos. 1 and 2 main engine driven generators. By 2050, both Nos. 3 and 4 main engines were on propulsion. Inboard exhaust valves (gates) which had jammed in the closed position were opened by aid of chain falls. By 2100 the low pressure volume tank was dewatered, motor panel contactors reset and the blowers were started. All ballast tanks were immediately blown, removing the list and increasing freeboard. The master vent valves were found to leak badly and therefore the emergency vent valves were slowly closed while air was still being forced into the tanks. The flood gates were then closed.

7-34. Up until 2100, none of the enemy escorts had made any effort to close. At that time, however, the closest escort apparently detected SALMON for the first time. He illuminated SALMON by searchlight from about 5,000 yards and fired a few wild salvoes in her general direction with a deck gun believed to have been three-inch or larger, and several rapid fire guns, believed to have been about 37mm, mounted amidships and forward. The escort at this time, however, made no determined effort to shorten the range.

7-35. By 2115, forty-five minutes after surfacing, the No. 2 main engine was started and put on propulsion, reducing the load on the battery to auxiliary purposes only. This made a total of three engines on the line. When an attempt was made to start the completely flooded No. 1 main engine, the drive shaft of the scavenger blower for the engine fractured. Shipboard repairs could not be made and this engine remained out of commission until the ship returned to the west coast of the United States. The best possible speed with three engines was 16 knots. These three propulsion units performed satisfactorily and no reduction gear noise or misalignment of the propeller shafting was noticeable. Power steering was now in commission and the stern diving planes had been worked back to zero angle. The auxiliary gyrocompass was again in operation. Bilges had been pumped dry. Since the radio, VHF and APR antennae had been knocked off, an emergency wing antenna was rigged for transmitting. The SJ radar transmitter had been flooded out by a water spout which rose from the conning tower bilges when the upper conning tower hatch was opened upon surfacing. This was caused by the sudden release of accumulated internal pressure in the boat from numerous air system leaks.

7-36. At 2130, SALMON sent radio notification to SILVERSIDES and TRIGGER of her condition and position. Six U.S. submarines were in the vicinity and several of these opened up with numerous voice radio messages in an attempt to impress the Japanese with the strength of the opposition forces. From 2115 to about 2400, the first escort, having superior speed, forced SALMON to run in a large circle and fired repeatedly but secured no hits. SALMON conserved ammunition and fired her four-inch deck gun only when hits were fairly well assured. Since the sights had been shattered, the gun was aimed by the first loader coaching the pointer and trainer. At about 2400, with the other three

escorts in a line to southward and from 4000 to 8000 yards distant, the first escort became apparently impatient with lack of results so far and made his first determined effort to close the range. He passed SALMON's port beam at a range of about 2000 yards but the resulting interchange of fire was ineffectual on both sides. As the escort passed abeam, SALMON headed for a rain squall which had formed to southwestward. The enemy then headed to intercept and SALMON immediately staged a surprise offensive attack. Turning directly toward the patrol craft, SALMON charged in with all available speed and passed at about fifty yards distance on opposite course, raking the escort from end to end with 20mm, 40mm and 50 cal. machine guns and probably killing most of the enemy personnel topside. Damage from enemy light fire was minor. This maneuver knocked all the fight out of the Japanese escort and SALMON once again headed toward the rain squall. The nearest of the other three escorts then opened fire and commenced closing but turned away after several small caliber hits and a four-inch near miss had been secured by SALMON at a range of about 2000 yards. At 0045, 31 October, SALMON entered the rain squall and shortly afterwards lost all contact with the enemy escorts.

7-37. SALMON proceeded toward Saipan on three engines, making a speed of about sixteen knots. Her condition at this time was still very dangerous for she was limited to surface operations only, her best speed was less than that of most Japanese anti-submarine escorts, and she was still within easy aircraft bombing distance from the Japanese home islands. At 0532, SALMON radioed for assistance from U.S. submarines in the near vicinity and at about midnight on 31 October was joined by TRIGGER, SILVERSIDES and STERLET, about 450 miles southeast of Kyushu. SALMON had been forced to stop in this position in order to repair a serious main engine lube oil leak which developed on a line located in a difficult position to reach. While awaiting rendezvous, several torpedoes were fired at her by a Japanese submarine but all missed and SALMON immediately got underway again. The friendly submarine screen was maintained all the way to Saipan and in addition, starting at dawn on 2 November, continuous daylight air coverage was provided. At 1950 on 3 November, SALMON moored alongside FULTON (AS11) in Tanapag Harbor, Saipan.

7-38. SALMON received temporary repairs at Saipan and proceeded via Pearl Harbor to the Naval Drydocks, Hunter's Point, arriving on 2 December 1944. There she was surveyed by the Board of Inspection and Survey and a decision was made to send her to the Navy Yard, Portsmouth, N.H., for minimum damage repairs necessary to use her as a training and experimental submarine. Sufficient repairs were made at Hunter's Point to render the ship seaworthy for her surface run to Portsmouth. Some machinery was overhauled and the hull above the waterline was painted. The hull and superstructure were left intact except for scrapping of the main engine air induction piping and renewal of damaged wooden decking. SALMON departed from Naval Drydocks, Hunter's Point, on 27 January 1945, and arrived at Navy Yard, Portsmouth, on 17 February 1945.

7-39. After another survey, the Chief of Naval Operations on 5 October 1945 recommended halt of further repair work and disposition by scrapping. SALMON was decommissioned on 4 April 1946 at the Naval Shipyard, Portsmouth, New Hampshire, and subsequently scrapped.

7-40. Prior to her decommissioning, SALMON was officially credited by ComSubPac with sinking seven ships (1 CL, 3 AK, 2 AO, 1 DD), a total of 31,800 tons, and damaging eleven ships (1 CL, 6 AK, 2 AO, 2 PF), a total of 56,400 tons.