

All rights reserved. No part of this article may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the author.

The Battleship Action 14-15 November 1942

By Robert Lundgren

Japanese Forces

Emergency Bombardment Force

Bombardment Unit

VAdm Kondo Nobutake

Atago (F), *Takao*, *Kirishima* (Capt. Iwabuchi Sanji)

Nagara (flagship of ComDesRon 10, RAdm Susumu Kimura), *Ikazuchi*, *Samidare*

Direct Escort Unit

RAdm Tamotsu Takama

Asagumo (F), *Shirayuki*, *Hatsuyuki*, *Teruzuki*

Sweeping Unit

RAdm Shintaro Hashimoto

Sendai (F), *Ayanami*, *Shikinami*, *Uranami*

US Forces

Rear Admiral Willis A. Lee, Jr.

Screen

Cdr. Thomas Fraser (also CO of *Walke*)

Walke (F) *Benham*, *Preston*, *Gwin*

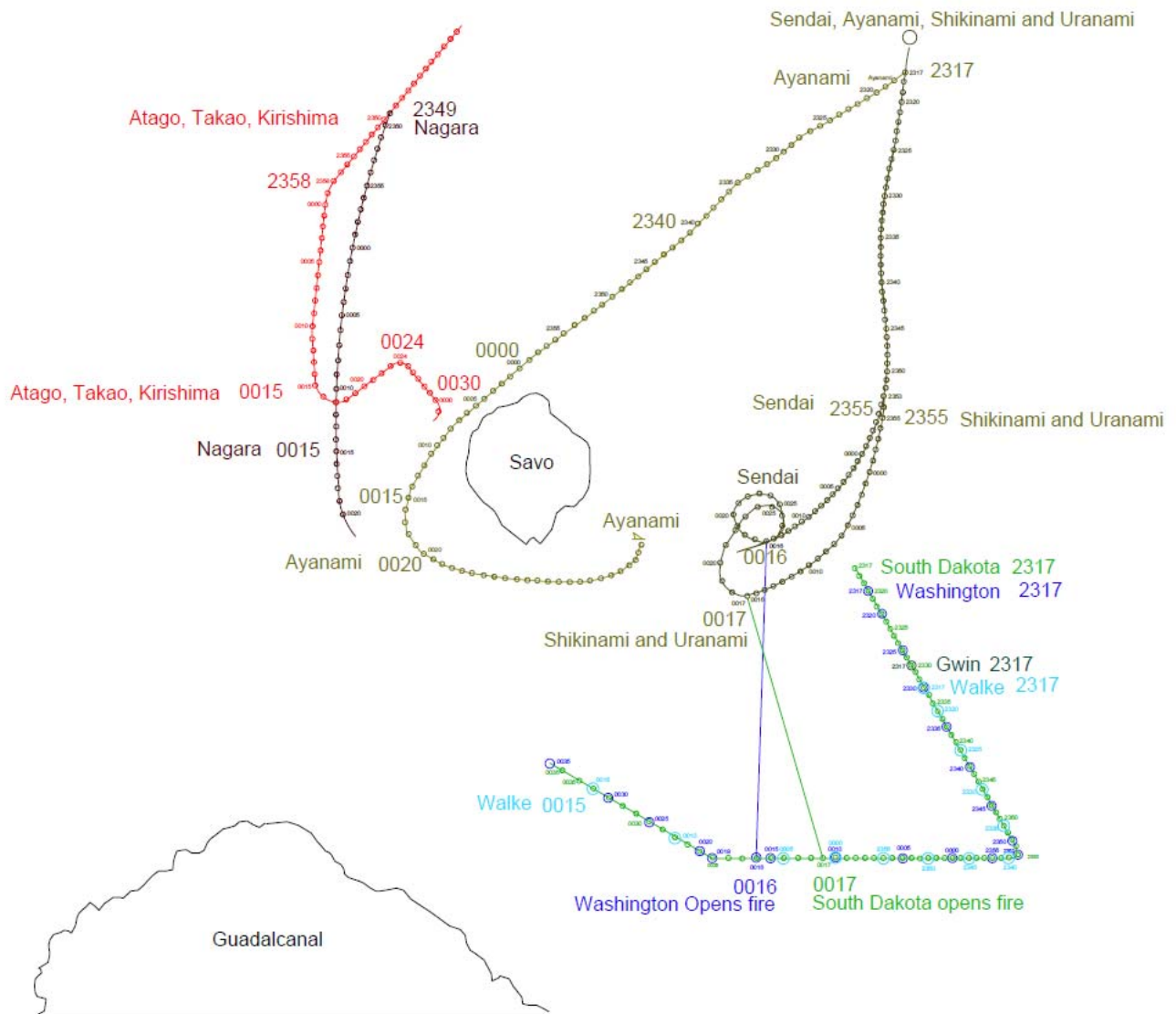
Battleship Force

Rear Admiral Willis A. Lee, Jr.

Washington (F) (Capt. Glen Davis), *South Dakota* (Capt. Thomas Gatch)

Opening Movements

All times in this essay are local, using the 24 hour clock.



Opening Phase from 2317 to 0020
Figure 1

In the track charts *Atago, Takao, and Kirishima* are in red, *Nagara* is brown, *Sendai* and *Ayanami* are in yellow, *South Dakota* is green, *Washington* is dark blue, *Walke* is light blue, other US destroyers are represented by turquoise.

1835 November 14

On board *Atago*

Adm. Kondo issued the following battle instructions for Emergency Bombardment Force: “Tonight we face a high probability to encounter a number of enemy cruisers and destroyers in the vicinity of Savo Island; In that case the bombardment [of the airfield] will be temporarily suspended until the enemy surface force has been destroyed. The primary objective [i.e. the bombardment] will be realized thereafter.” Considering the results of the previous battle, Kondo decided to detach two combined cruiser and destroyer units led by *Sendai* and *Nagara* some 10 kilometers ahead of the Bombardment Unit. In the case significant enemy forces were detected, *Atago* and *Takao* were to engage them with gunfire and torpedoes, giving *Kirishima* enough time to change her Type 3 incendiary shells for Type 1 APCs. V.Adm Kondo was leading his force in *Atago*, followed by *Takao* and *Kirishima*. The Bombardment Unit was escorted by RAdm Tamotsu Takama’s direct escort group with his flag in *Asagumo* and *Teruzuki*. Takama ordered *Shirayuki* and *Hatsuyuki* to join RAdm Susumu Kimura and ComDesRon 10 in his sweep south.

On board *Kirishima*

After receiving the above instructions, the CO of *Kirishima*, Capt. Iwabuchi, and the gunnery officer, Cdr. Kimitake Koshino had an emergency conference concerning the methods of speeding up the change of main caliber battery shells in case of need. *Kirishima*’s guns were currently loaded with Type 3 incendiary shells with reduced charges – three bags of powder instead of the normal four – to minimize barrel wear for the planned bombardment. Once shells were loaded and the shell bands had engaged the rifling, the fastest way to unload was by firing the guns. Shells had to be lined up for the hoists prior to firing usually 6-10 shells per gun in advance so that the maximum rate of fire could be maintained. By continuous fire they estimated a change could be made to APC rounds within 3-5 minutes. Earlier in the day at 1027 *Kirishima* had launched her float plane with Lt(jg) Murajima, *Kirishima*’s air officer, to do a reconnaissance mission of the waters off Guadalcanal.

2230 November 14, on board *Atago*

Admiral Kondo received a message from Murajima’s float plane. The message read “two unidentified cruisers and four destroyers sighted 50 miles ahead of your force.” Kondo ordered his force to go to GQ and increased speed to 28 knots. Admiral Kondo was aware through aerial reconnaissance received on November 14 that there were three enemy forces in the area. One consisted of a carrier, 2 battleships, a cruiser and 4 destroyers. A second consisted of 4 cruisers and 4 destroyers and a third headed towards Guadalcanal consisted of 2 cruisers and 8 destroyers. Up to this point in the war the US kept their battleships close to their carriers and normally the carrier task force would withdraw during the night. In post war interviews Kondo expressed upon receiving this message from Murajima’s float plane, this confirmed that the known two US battleships had withdrawn with the carrier formation as they had always done in the past.

At 2233, Kondo orders RAdm. Shintaro Hashimoto to assume a new cruising disposition, so that *Sendai* with *Ayanami*, *Shikinami* and *Uranami* were now detached 10 kilometers ahead as an *ad hoc* Ahead Sweeping Unit. At 2300 *Shikinami*, now 20 kilometers NNE of Savo, reported the sighting of enemy ships bearing 200. On board *Atago* Kondo’s staff was baffled at her report, which seemed to contradict

the one received earlier from the floatplane. Lt Hiroshi Ishiwata, Second Fleet torpedo officer, expressed his conclusion that the enemy force had evidently split up from one single force into two independently operating sections. Nevertheless, Kondo tended to believe the floatplane report and issued a new warning: "Enemy forces are located 45 miles W of us." He correctly determined that *Shikinami* had sighted Admiral Tanaka's transport group.

At 2313 on board the light cruiser *Sendai*, RAdm Hashimoto reported spotting two ship silhouettes. Initially Hashimoto considered splitting his force with *Sendai* and *Ayanami* to circle the west coast of Savo to reconnaissance this side of the Island for any additional US forces, but then at 2317 decides to send *Ayanami* alone to circle around the west coast of Savo Island while *Sendai* and the destroyers *Shikinami* and *Uranami* shadowed the US forces ahead.¹ By 2328 Hashimoto on board *Sendai* reported that the 2 ship silhouettes as enemy heavy cruisers and that he is maintaining contact. Then at 2332 he reports the sighting of 4 destroyers. At 2349 Kondo orders RAdm Susumu Kimura to sweep the west coast of Savo, *Nagara*, *Ikazuchi*, *Samidare*, *Shirayuki*, and *Hatsuyuki* leave the bombardment group heading 180 degrees south. Kondo remains on course of 240 degrees SW. The reports that he has received from Hashimoto only confirm his assumption that the US force is made up of two heavy cruisers and four destroyers. At 2357 a rain squall reduces visibility and contact with the enemy vessels is lost. RAdm Hashimoto reports that the main part of the Sweeping Unit has reached the area N of Savo Island. At 0005 the *Uranami* regains contact with the US ships and reports that she has sighted new type enemy cruisers. By this time *Ayanami* had turned west of Savo Island for an individual counterclockwise sweep, with the Bombardment Unit still plodding SW. At 0015 Kondo ordered a change of course to E 055 degrees, with the intention of penetrating the Lunga anchorage from the north. At 0016 Hashimoto reports to Kondo: "Starboard gunnery action, Enemy fired upon us, illuminated by enemy star shells, Reversed course by right rudder to 000, laid down smoke". At 0016 *Uranami* reports "The enemy is located 10 miles from Savo, bearing 130 degrees T, now heading 270 degrees T." At 0020 *Ayanami* reports she has sighted the enemy ships SW of Savo.

On Board *Washington*

Admiral Lee had difficult circumstances in which to develop a battle plan as none of his ships had ever before worked together. Cdr. Thomas Fraser in *Walke* was placed in command of the destroyer screen simply due to the fact he was senior to the other destroyer commanders. *Benson* and *Preston* lacked radar and so were placed in the middle with *Gwin* last in line. *Gwin* was designated to fire star shells and illuminate enemy forces. The destroyers were deployed in a simple line ahead formation with each destroyer separated by 500 yards. This was a simple formation which allowed the inexperienced commanders to stay grouped together. Admiral Lee placed these ships 5,000 yards ahead of his battleships which were separated from each other by 2,000 yards. This force would steam in a clockwise course first to the west and then north around Savo Island and then down its eastern shore heading south and then back again to the west, thus patrolling both entrances to Iron Bottom Sound. Lee's role as the officer in tactical command was that of a coordinator at the head of a collection of independent formations. Success would depend on subordinate officer's understanding of the general plan and their role within this plan, however, they were to use their own initiative to fight towards a successful conclusion. Lee's intelligence reports had sighted an enemy force of 1 carrier, one battleship, two heavy

¹ Many versions of this battle have *Uranami* with *Ayanami* circling west of Savo. This is incorrect based on both Japanese action reports and also *Washington* and *South Dakota* action reports which state that three enemy ships were in sight when they opened fire at 0016.

cruisers and 4 destroyers about 150 miles north of Florida Island at 0800. Another force was sighted consisting of 2 battleships, 1 light cruiser, and 11 destroyers at 0815 of November 14. At 1542 Lee received orders from Admiral Halsey to retire so he could be southeast of Savo Island at midnight on November 14/15. At 1700 four heavy cruisers, 1 large destroyer and 10 regular destroyers were sighted 130 miles north of Florida Island and closing Indispensable Strait at 17 knots. From these reports Lee understood his force would likely be outnumbered.

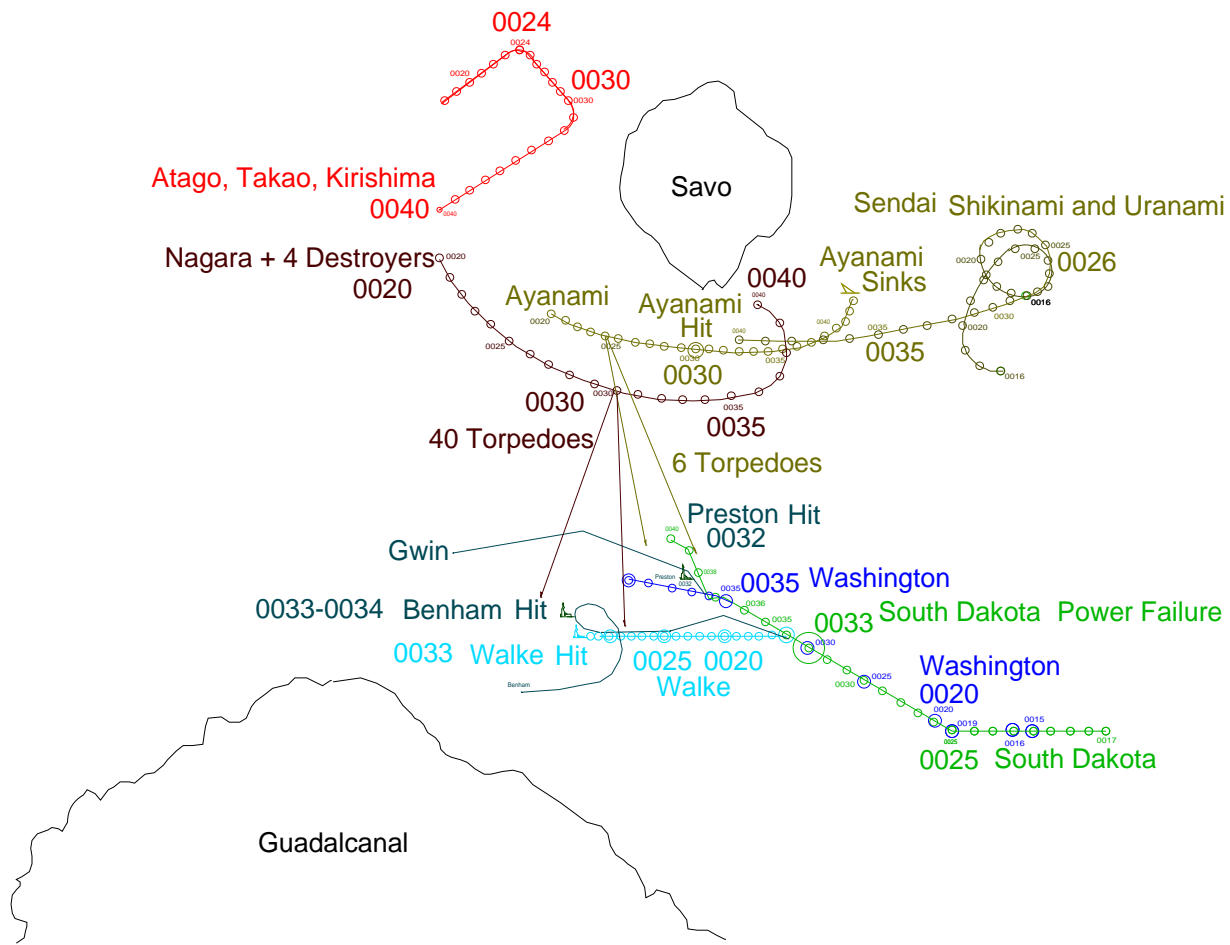
At 2352 *Washington* changed from a course of 150 degrees to 270 degrees. Up until now *Sendai* and her two destroyers have been safe in the US radar blind spot, which compromised a 60 degree arc astern of the US formation. As the Task Force turns west this situation begins to change. At 0000 *Washington* reports the first radar contacts at a range of 19,600 yards bearing 115 degrees true. At 0014 on board *Washington*, Commander TF 64 gives *South Dakota* permission to open fire by TBS. At 0016 *Washington* opens fire on the target at a range of 18,500 yards. Secondary Battery opened fire on a closer target, assessed as possibly a destroyer, range 15,000 yards. *Washington* reports first main battery salvo as over, while her second and third salvos straddle. After the third salvo, the radar lost the target.² At 0019 *Washington* changes course to 300 degrees true.

On Board *South Dakota*

At 0008 Captain Gatch reports three ships bearing 330 degrees true range 18,300 yards by radar and visual observation. At 0017 *South Dakota* opens fire on target to the left and closer with her main battery on *Shikinami*, and the secondary battery opened fire on *Uranami*. Main battery target was obscured by smoke so she maintained fire through radar control.³ At 0018 *South Dakota* is firing on the left two ships which were almost in a line as they were reversing course. *South Dakota* reports that her first salvo straddled with fires started on *Shikinami*. Range was now down to 15,700 yards and at 0019.15 *South Dakota* fires her second main battery salvo, range 15,800 spot up 300 yards from her first salvo (Up spots will be abbreviated as U-300. Down spots will be abbreviated as D-300). At 0020 *South Dakota* fires her third main battery salvo at *Shikinami*, range 16,100 yards spot U-400 and reports hearing many Japanese voice transmissions. At this point Capt. Gatch orders an increase in speed to 23 knots. At 0020.42 *South Dakota* fires her fourth main battery salvo at range of 16,500 yards at *Shikinami* range 16,500 yards, spot D-100.

² At this time during the war it was quite common for radar operators to lose the target when the target started to make radical maneuvers. When the target disappeared it was also common for them to report target as sunk, only to have them reappear at a later time.

³ Standard Japanese doctrine in a surface battle in restricted waters was to use smoke screens liberally. Admiral Hashimoto once he came under fire ordered his forces to make smoke and come to course 000 degrees. The flashless powder used by the Japanese produced a red flame which through the smoke screen may have appeared *Shikinami* was on fire. She was not damaged during the battle.



Destroyer Action from 0020 to 0040
Figure 2

On Board *Atago*

Lieutenant Imamura Ichiro noted that the tension on the bridge was increasing as battle reports kept coming in. At 0024 *Atago* receives a report from Cdr. Eiji Sakuma of the *Ayanami* that she is beginning her attack. Kondo at the same time issues an order to change course to 125 degrees SE and slows to 18 knots realizing that the US forces are heading west. At 0030 Admiral Kondo orders course change to 250 degrees SW and *Atago* increased speed to 30 knots and prepares for battle, with *Takao* and *Kirishima* following in line. Then at 0030 *Atago* receives *Nagara*'s report that she has sighted enemy ships bearing 25 degrees to starboard, distance 4,000 meters. Lookouts from *Nagara* report one heavy cruiser and three destroyers and that RAdm Kimura is attacking and opening fire with his force.

Lt. Ichiro noted that the battle began as this report is received and distant gun flashes could be observed. Suddenly a bright ball of fire appeared 10 kilometers off the port bow. There was a silhouette of a ship engulfed in flames and then the ship broke in two and both sections disappeared (*Preston* or *Walke*). The

bridge was quiet and several officers took a deep breath for it was not known if the stricken ship was Japanese or American. At 0040 Kondo orders a course change to 260 degrees SW.

On Board *Ayanami*

Cdr. Eiji Sakuma began his torpedo run at 0024, taking on the entire US formation alone. *Ayanami* hugged the southern shore of Savo Island in an attempt to keep her concealed for as long as possible. Japanese naval doctrine was for destroyers in the advance stage of battle should close to as short a range as possible and destroyers should not open fire with guns until after torpedoes have been launched so that their position is not given away prior to the torpedo attack. If possible, screening units are to be ignored and bypassed unseen so that the main body can be attacked. Cdr. Sakuma engaged *Walke* with guns and targeted the middle of the US formation with his torpedoes. At 0030 *Ayanami* launches six Type 90 torpedoes at the third ship in the US formation which Sakuma thinks is a heavy cruiser but was actually one of the US destroyers. Soon after launching torpedoes, Sakuma gives the order to re-open fire with his main battery. At about 0031 fire is shifted to the fourth US ship (*Gwin*), scoring hits amidships and aft. Return American gunfire hits *Ayanami* and this topples her number one stack and silences main gun mounts number one and three.⁴ Fires erupt all over the ship and she then takes hits to her steering gear and engine rooms and loses all power. Then at 0032 *Preston* is hit by a torpedo and explodes and a minute later *Walke* is hit by another torpedo. Cdr. Sakuma believes that his lone destroyer has sunk one heavy cruiser and one destroyer with torpedoes and set on fire a third destroyer with gunfire. He sends a message to Admiral Kondo with his results but the message will not be relayed to Admiral Kondo until 0045. *Ayanami* slowly loses speed and comes to a stop south east of Savo Island. The fires on board continue to attract gunfire from *South Dakota*. Admiral Hashimoto on *Sendai* passes *Ayanami* at 0036 and radios Admiral Kondo that she is on fire.

On Board *Nagara*

RAdm. Kimura sights the US formation at 0030 and radios Admiral Kondo. His light cruiser and four destroyers launch 35-40 torpedoes and then engage with their main batteries. *Nagara* briefly engages *Preston*, hitting her amidships just before she explodes. Her destroyers fire torpedoes at *Walke* and *Benham*. Both destroyers take torpedo hits and *Nagara* makes smoke and checks fire at 0036. Kimura orders a 180 degree turn to port to maintain contact with the enemy, which is completed at 0040, and to reload torpedo tubes for a possible second attack. At 0038 Admiral Hashimoto with *Sendai*, *Shikinami*, and *Uranami* pass ahead of Kimura in *Nagara* and his destroyer column in their attempt to lead US forces to the Japanese main body and possibly gain position for a torpedo attack.

On Board *Walke*

All times were estimated in *Walke*'s report for this action, as all logs and records went down with the ship. In this essay, the times given are those documented from *Washington*'s action report which also closely matches Japanese action reports for the time of critical events. *Walke*'s times appear to be about 5-6 minutes late and have been adjusted to match records from those ships that did survive.

⁴ A post-war underwater survey found that both of these mounts show 5-inch gun damage with the third mount having one gun blown off.

At some point between 0015 and 0020 Cdr. Thomas Fraser ordered a turn to 270 degrees true and reduced speed from 23 knots to 17 knots in order to search for the enemy. This turn to the west was not ordered by Admiral Lee nor does it appear that Cdr. Fraser announced this new heading to any of the other ships behind him. At 0026 she spots *Ayanami* and opens fire on what she believes is a cruiser with a single raked stack. She fires for two minutes at a range of 11,000 yards and believes her target blew up under heavy concentrated fire. At 0028 she increased speed to 26 knots and shifted to a new target (*Nagara*) bearing one point to starboard, range 7,500 yards and resumed rapid fire. Flames were reported on this target along with heavy black smoke before it disappeared behind the northwest point of Savo Island. At 0031 *Walke* checked fire, then shifted to target to port and flashes off Guadalcanal and resumed rapid fire at range 7,500 yards.⁵

Walke action log continues: Observed many gun flashes to starboard. (*Nagara's* destroyer column). At 0032 *Preston* blew up astern. Was attempting to shift torpedo battery from curved fire ahead setup to broadside fire to starboard when at 0033 a heavy explosion occurred in the vicinity of frame 45 to starboard. This ship was straddled twice by gunfire prior to this explosion which was caused by a torpedo whose wake was observed. Following the initial explosion, this ship was struck by an apparent cruiser salvo. Shell hits were reported in the radio room, foremast, below the gig davits, and in the vicinity of gun three. The torpedo explosion blew the forecastle and a section of the superstructure deck completely off as far aft as the bridge. Fire broke out throughout the forward section and the forward 20 mm magazine exploded. The bulkhead of the forward fire room was buckled, as was the main deck amidships. All engines were ordered stop immediately and Cdr. Frasier gave word to abandon ship, which was sinking fast by the head. Only two life rafts were left in condition to be freed. Depth charges were checked and reported set on safe. At 0036 the ship disappeared; stern last. The bow detached and remained afloat. At 0037 an unknown number of depth charges exploded killing and seriously injuring many men in the water. Total killed or missing in action six officers and 76 enlisted men.

On Board *Benham*

As *Benham* searched for targets, her captain LCdr. John Taylor noticed that his ship had worked 300 yards to the right of *Walke*. He ordered a 30 degree turn to port so that his ship did not enter *Walke's* line of fire. *Benham* opened fire on *Ayanami* using radar ranges and gunflashes as points of aim as the Japanese destroyer passed the US line in the opposite direction. The targets silhouette merged with Savo but was seen burning as the rear destroyers took her underfire. Taylor watched the action behind his ship and saw one of the trailing destroyers hit *Ayanami*. He also noted what he thought was a small cruiser off to port and aft firing at the rear destroyers as well. Then new ships appeared forward and to starboard so *Benham* checked fire and then shifted to these new targets. Black smoke soon appeared and the enemy ships disappeared. Just as his ship reached a position behind *Walke* he realized the lead destroyer had continued to veer left onto a course of 270 degrees west. Then *Walke* suffered an explosion lost speed

⁵ This range corresponds to *Washington* which is about 7,000 yards astern and to port. *South Dakota* entered into her logs at 0033 of many shells landing over with few short on *Washington*. She reports this fire as a hail of fire equal to what *South Dakota's* secondary battery could put out. There are no Japanese ships to the port side of US forces and no Japanese shore batteries took part in the battle. This gunfire does not correspond to any Japanese ships either. *Ayanami* is firing at this time on *Gwin*, setting her on fire amidships. *Nagara* is firing on *Preston* hitting her as well. *Nagara's* destroyers are firing on *Walke* and *Benham*.

and began to sink by the bow. Taylor ordered hard port rudder to avoid hitting the lead ship but just as she passed *Walke* at 0034 *Benham* took a torpedo on the starboard side only a few yards from the tip of her bow. The long lance torpedo was probably from one of *Nagara's* destroyers and blew the bow off as far back to the forward bulkhead of turret one magazine. The ship rose out of the water 4 feet, heeled to port and then rolled 30 degrees to starboard. Her speed fell from 27 knots to 5 knots and the shock of the explosion ripped through the ship, breaking her back above the forward boiler room. As *Nagara* and her destroyers passed her by, LCdr. Taylor ordered hard right rudder and also ordered the port engine room to standard speed which drove the ship into a circle. By the time she completed the circle the battle had passed her so she slowly withdrew to the west and away from the battle. Luckily none of her crew had been killed and all would survive the battle.

On Board *Preston*

In *Preston's* action report times were also estimated, as all logs and records went down with the ship. Times given in this essay are those documented in *Washington's* action report which also closely matches Japanese action reports for times of critical events. *Preston's* times appear to begin on time but then drift late 2-3 minutes and have been adjusted to match records from those ships that did survive.

Preston did not have any fire control radar and her search radar had been turned off before the battle. She kept track of the formations visually. She reports at 0025 that *Walke* opens fire and that by 0027 she had sighted a ship off the southern tip of Savo Island (this would be *Ayanami*). She opens fire immediately with all four guns bearing on the enemy which she estimated as a heavy destroyer or light cruiser. Star shells were not used because target was visible due to moonlight. The range was estimated at 9,000 yards and salvos were spotted to the target. The hitting range was established after a few salvos and fire was very effective. The battery was in automatic control using director fire. The enemy ship moved into the shadow of Savo Island but she could still be distinguished and fire on her continued. Approximately one minute after the *Preston* opened fire the enemy returned fire with her main battery plus what appeared to be 40 mm guns. At 0028-30 this ship caught fire and began to burn fiercely. At about same time we observed that the ship that one of the battleships had been firing on caught fire also. (Possibly fire on Savo Island itself started by *Washington*).

Fire was shifted to another ship in the shadow of Savo Island at a range of 8,000 yards (*Nagara*). At 0031 the *Preston* was hit on the starboard side by two projectiles, probably 5.5-inch from *Nagara*. One projectile hit between the two fire rooms killing all men in them and covering the amidships area with firebrick and debris. Several fires were started including one in the TNT of the torpedo warheads which burst open by the force of the explosion. Number two stack fell on the search light knocking it over on the starboard torpedo tube. The other projectile hit the gun shelter just aft of number two gun but did not explode. The projectile killed one man, badly injured another and tore a very large hole in the deck. The projectile cut the power cable for number two gun and jammed it in train.

During this part of the action a heavy cruiser came in on the port side of the column virtually undetected. She opened fire at a very close range. At 0032 a few seconds after *Preston* was hit to starboard side she was hit on the port side by part of a salvo of she estimated to be eight inch shells.⁶ As near as can be

⁶ There were never any Japanese ships to *Preston's* port side. Henry Stewart of the *South Dakota* reported in a post war interview – ‘At the time of the power outage, Commander Uehlinger [exec of *South Dakota*] and I saw the *Washington* open fire to her starboard, *Preston*, a destroyer was hit and burning, and to us it looked as if the *Washington's* fire had caused the accident. I was told by Commander Uehlinger to forget what we just saw.’ *Washington's* deck logs are blacked out at this critical time period. It appears *Walke* had taken *Washington* under fire at 0031 and Cdr. Taylor of *Benham* also thought he saw

determined the ship was hit by three projectiles. The whole after part of the ship from the stacks aft was a mass of blazing, red-hot wreckage. One projectile hit the engine room exploding after it hit the generators. A second projectile hit between the secondary control section and number three gun. The third projectile hit number four gun. Almost every man aft of the after machine gun nest was killed, including the executive officer. The gunnery officer gave the order for the guns one and two to continue firing if possible but the force of the explosion had jammed them both in train and elevation and they could not fire. The ship immediately listed sharply to starboard and began to settle by the stern. At 0033 Cdr. Stormes gave the order to abandon ship. In less than 30 seconds *Preston* rolled over on her side and sank by the stern. The bow rose vertically and remained in that position for approximately 10 minutes. No records, papers, or accounts were saved.

On Board *Gwin*

At 0026 *Gwin* fires two salvos of star shells in compliance with Lee's orders but then LCdr. John Fellows orders gunners to switch to AA common projectiles. As *Ayanami* engages *Preston*, *Gwin* at 0031 began a steady fire of four gun salvos. She hit with at least two salvos and observed that the enemy destroyer which had been firing three turrets was now only firing one.⁷ At 0032 *Preston* exploded and *Gwin* received her first hit with a 5-inch round striking the starboard side of the after engine room four feet above the waterline.⁸ Superheated steam blew into the 20mm clipping room and the mount 4 handling room. The lights to mounts 3 and 4 went out but emergency lights came on so that neither gun's ability to fire was impaired. The blast in the engine room broke all the sheer pins holding the torpedoes in the forward torpedo mount so that three slipped out and into the sea and the other two came half way out.

LCdr. Cox, the ship's executive officer, orders hard right so that she passes *Preston* on *Preston*'s starboard side. As she passed she was rocked by exploding depth charges from the sinking destroyer. She maintained her fire at *Ayanami* and then was hit again near her starboard depth charge rack but the shell failed to explode. At approximately 0036 she checked fire as she was no longer able to find a suitable target and could not find *Benham*. At 0045⁹ she receives orders from Lee to withdraw. She heads west and then south away from the battle.

On Board *Washington*

At 0022 *Washington* sees a green light bearing 115 degrees relative or 55 degrees true (unknown). Then at 0024 she observes *Ayanami*'s attack but believes the gunfire is from shore batteries on Savo Island. At 0025 *Washington*'s secondary battery opens fire on shore batteries. A fire was started on one at the right tangent of Savo Island which burned for a long time. *Washington*'s main battery ceased tracking (*Sendai* group) and shifted to the end of Savo Island.

Bridge reported a target broad on the starboard bow (*Ayanami*). Main battery directors were so blinded by 5-inch fire that they could not find a point of aim. At 0027 *Washington* reports radar (CXAM) picked

a small cruiser to port aft firing at the rear destroyers. After this point Admiral Lee will not let *Washington* open fire unless he is sure the target is an enemy ship. *Preston*'s sudden capsizing to starboard in less than 30 seconds may indicate a torpedo hit from *Ayanami* virtually at the same time that the gunfire hit her. The gunfire alone would not cause the sudden capsizing and the ship sinking so fast at the locations given in her report. Certainly Cdr. Sakuma believes one of his torpedoes has scored.

⁷ This fire matches *Ayanami*'s report of her number one and three gun being hit.

⁸ This damage and fire is observed by *Ayanami* who takes credit for this damage.

⁹ This time is reported as 0048 in *Washington*'s action report.

up target bearing 040 relative 340 degrees true range 9,700 yards (*Nagara's* group). At 0028 *Washington* reports target bearing 356 degrees true moving around the end of the Island. Other contacts follow indicating that there were a number of ships rimming the southern side of the island of Savo estimated 6-10 ships. At 0031 *Washington* reports 3 excellent optical ranges were obtained on a burning ship at 10,200 yards (*Ayanami*). At 0032 she observes a target on starboard beam and then sees one of the lead destroyers being hit. (*Preston*) One minute later at 0033 two destroyers are observed being hit with *Walke* burning badly and *Preston* exploding having been possibly hit by a torpedo. Reports stream in to the bridge of men in the water dead ahead; think one destroyer is sinking; rafts ordered to be put over as we went by; all enemy fire stopped. Then at 0034 *Washington* reports cease fire for secondary battery as a result of mount 3 firing wild. (Training Motor kicked out and the pointers were not matched). It was feared the mount might endanger our own destroyers. She feels explosions as of depth charges (*Preston*) possibly from a DD of ours that had been hit. Changed speed to 26 knots. All secondary targets lost.

At 0035 *Washington's* SG radar reported 4 ships bearing 330 degrees true (*Atago*, *Takao*, and *Kirishima* plus destroyers). Radar plot coached the main gun battery on to one reported to be larger than the others. These targets had been obscured by Savo Island up to this time. Main Battery started tracking. *Washington* set course of 282 degrees true. She passes wreckage of *Preston* approximately 0035-0036 staying on *Preston's* port side. At 0040 *Washington* replies to *South Dakota*, "She is okay".

On Board South Dakota

Between 0021.40 and 0024.18 *South Dakota* fires salvos five through eight between 17,000 and 18,000 yards all at Admiral Hashimoto's forces with no result although Captain Gatch believes his targets disappearing off radar is evidence that they have been sunk. (*Sendai* and her destroyers report no damage during the battle and remain on station after this battle) By 0025 *South Dakota* follows *Washington* in turning to a new course of 300 degrees true. At 0028 CPT. Gatch orders the main battery shifted to divided fire as all batteries could no longer bear on new targets bearing 315 degrees true, range 13,000 yards and closing (*Nagara*). At the same time her number three turret alone fires her ninth salvo at Hashimoto at a range of 10,800 yards, spot D 200. At 0030.40 *South Dakota* fires her tenth salvo (all turrets) range 10,700 yards spot D-100 and then at 0031.20 fires her eleventh salvo (all Turrets) range 10,700 yards spot MC¹⁰. (She does not give bearings and it is not clear if her forward turrets are engaging *Nagara* and her aft turret is engaging *Sendai* or all turrets are engaging *Sendai* but her aft turret can not train on *Nagara* due to her heading). *South Dakota* fires at 0031.58 and at 0033 her 12th and 13th salvo from turret three alone with no spot at ranges between 10,500-10,400 yards at *Sendai* and then checks fire.

At 0033 Capt. Gatch orders collective fire and then *South Dakota* suffers an electrical power failure. All power gyros and all electric fire control equipment out. Circuit breakers on No 14 switch board tripped out. Load shifted to No3 switchboard. Bus transfer panel for No. 56 and 58 5-inch mounts shifted to alternate source on No. 3 board, causing No. 6 generator to trip out. Feeder circuits also tripped. Regained power in plotting room then lost it again almost immediately.

¹⁰ This is in reference to USN spotting and fire control practices. Spotting corrections were given in reference to how far the current salvo missed the target. D-200 means down 200 yards, which implies that the current salvo landed over its target by that distance and that the next salvo needs to land 200 yards shorter. Likewise, a U-200 correction would mean that the current salvo landed short of the target by 200 yards and that the next salvo needs to land 200 yards longer. NC means no change; the salvos are straddling or hitting the target. These corrections were inputted to the fire control computers ("Rangekeepers") which then used these values as part of the calculations for the next firing solution. MC means Main Control or that the main battery is being controlled by the main battery directors, SC means Secondary director controlling the main guns.

By 0034 *South Dakota* reports two enemy ships rounding Savo Island to the eastward, bearing 345° T. reported by radar plot. The enemy is firing on our formation. Enemy salvo's falling shorts few, over many, especially on *Washington*. At 0035 *South Dakota* asked *Washington* if she was okay. At 0036 *South Dakota* started to turn left to clear damaged destroyers ahead but then turns sharply to starboard breaking formation and steadied on a course of 300 degrees true. At 0038 *South Dakota* reports passed one of our destroyers abeam to port (*Preston*). Lull in firing enabled our men to hear survivors shouting for help. (Admiral Kimura has his force check fire at 0036 so no more Japanese ships are shooting) Some men in the water were using flashlights. A small electric fire-reported in compartment C—303 and Repair 4 sent to investigate fire, also in mount 58. *South Dakota* changes course again to 285 degrees true. Then at 0040 she resumes main battery firing on targets close to Savo Island, fourteenth salvo, range 14,100, Spot D-300.

At 0041 *South Dakota* reports small fire in C-303L extinguished. SG radar reported inoperative, gyros out. 0041.10 Fifteenth salvo, range 15,200. No spot, D-500 applied. At 0042.05 *South Dakota* reports turret three firing sixteenth salvo, range 15,500 yards, on target astern (*Ayanami*) and that she had set fire to own planes. No spot. At 0043 *South Dakota* reports that her seventeenth salvo blew two planes overboard and extinguished most of the fires started by the previous salvo, Range 15,500, Spot NC. Suspected hit received, Soundings taken on all flood board. Repair parties 3 and 4 sent to scene of fire on stern. 0043.15 Eighteenth salvo, range 15,800. No spot. 0043.40 Nineteenth salvo, range 16,100, Spot U-200. At 0045 *South Dakota* reports main battery ceased firing. Target astern exploded and lost on radar screen.¹¹ At 0046 *South Dakota* reports SG radar in commission again. *South Dakota* passes the wreckage of *Walke*. At 0047 *South Dakota* reports fires out in vicinity of planes. Main battery reported difficulty getting ranges and requested secondary battery directors to track, radars in secondary directors 1 and 4 out, 2 and 3 doubtful. Radar plot reports ships bearing 070 degrees right, range 5,800 yards (*Sendai*). This is one of two previous reports at 7,000 yards, but overlooked on bridge while directing fire control on target bearing 112 degrees (*Ayanami*). Then at 0048 *South Dakota* comes under fire for the first time. She reports, "Enemy searchlights turned on *South Dakota* by second ship of enemy column, range 5,000 yards, slightly forward of beam. Four searchlights, closely grouped in pairs, each pair arranged vertically. *Washington* opened fire on leading targets almost immediately (*Sendai*). Our secondary battery was delayed firing on illuminating ship until enemy opened fire about 30 seconds after illumination. Lights went out. She shifted to primary collective, director 3 controlling main battery. Third ship in enemy column illuminated us as soon as second ship failed. Main battery fired two or three salvos on illuminating ship after lights were extinguished, estimated range 9,800 yards (*Nagara*). Appeared to list, no data available, but believed sunk, no target on radar screens. Large clouds of black smoke issuing from leader, steam fire seen later."¹²

¹¹ One secondary source has *Ayanami* receiving a 16-inch shell hit aft. Film of *Ayanami*'s wreck around turret two and the shelter deck that this turret sat on show massive damage with the turrets under carriage exposed. However this damage may have been caused by fire and corrosion after 50 years underwater, so confirmation of a major caliber hit may prove impossible. In addition a post war interview of Cdr. Sakuma Eiji says that fires spread forward and detonated the forward torpedo battery. The ship is literally cut in half at this point with the bow lying on its starboard side and the stern section upright.

¹² This is often confused as when *Atago* illuminated her at 0100 and *South Dakota*'s logged times are incorrect. *Washington*'s action report says the Japanese used illumination three separate times. This is the first by the light cruisers in two separate columns. What *South Dakota* observed at this time were smoke screens put out by the Japanese once they came under fire, which was standard Japanese doctrine. *Nagara* only reported minor hull damage due to fragments after the battle.

By 0049 *South Dakota* reports first hits sustained, most likely 1.1" clipping room in foremast structure.¹³ Capt. Gatch orders an increase in speed to 27 knots. Received message from *Washington* asking, "Are you alright?" replied "Everything seems okay." By 0050 *South Dakota* reports more hits felt, unable to locate them. Approximately 0052-0054, *South Dakota* veers to the south and then turns back north back onto a course of 292 degrees true. At 0053 *South Dakota* reports 3 enemy ships coming out of Savo Island, estimated range 11,000 yards (*Atago*, *Takao*, and *Kirishima*). We are taking hits chiefly in foremast structure.¹⁴

On Board *Washington*

At 0041 *Walke* sinks and *Washington* passes her wreckage and launches two life rafts. Then at 0044 she receives message from *Gwin* reporting she is okay with one hit in fire room, but this message is mistakenly recorded as coming from *Benham* in her logs. At 0046 *Washington* reports burning enemy ship bearing 150 degrees relative or 072 degrees true (*Ayanami*). At 0048 Lee orders van destroyers to retire. At 0049 when *South Dakota* is first illuminated and taken under fire Lee sends message asking *South Dakota* if she is alright. Then at 0050 *Washington* changes course to 290 degrees true. At 0053 *Washington* reports several DD and 2 CL headed slowly North West off Savo Island. No further information on this enemy force. At 0054 CTF 64 received a report from *South Dakota* that she was okay, and observes *South Dakota* shearing to starboard. *Washington* reports enemy ships that main battery was tracking started a change in course to the right, reversal completed by 0057 (*Atago*, *Takao*, and *Kirishima*). At 0058 the moon sets and visibility quickly drops from 9 miles down to 3 miles. At 0059 Lee's lookouts report "Transports were reported off the starboard bow, evidently the ships already being tracked".¹⁵

¹³ Many of the shells hitting high in the superstructure came from *Nagara* or *Sendai* and their destroyers. Shells passed straight across the ships structure indicating the firing ships were on her beam and not forward.

¹⁴ *South Dakota* initially came under fire from three separate forces. The cruisers *Nagara* and *Sendai* with their destroyers fire between 0048-0054. *Kirishima* fires from both her main and secondary batteries from 0052-0054. The ships of the bombardment group did not sight *South Dakota* until *Nagara* illuminated her at 0048. As *South Dakota* veers south and away from the light cruisers she presents her broadside to *Kirishima* about 11,000 yards away. *Kirishima*'s first salvo is reported to hit *South Dakota* in her foremast.

¹⁵ At this time Admiral Lee is still not sure of the ship types the main battery is tracking.



**The Battleship Action from 0040 to 0114
Figure 3**

On Board *Atago*

At 0045 Kondo receives *Ayanami's* report that one cruiser and one destroyer are sunk and another destroyer has been set on fire. Ichiro mentions there was much elation on the bridge but soon after this they receive *Sendai's* message that *Ayanami* is on fire and the bridge quiets down. Adm. Kondo after receiving *Ayanami's* message comes to the conclusion that the US surface forces are being crushed. At 2347 Kondo orders course change to 280 degrees NW. By 0050 Kondo was under impression that the battle was going well and ordered a temporary retreat to 290 degrees NW in order to wait until the enemy

opposition was destroyed so that his bombardment force could proceed with the bombardment mission without interference from enemy warships. While heading west, *Takao's* lookouts reported one enemy battleship and three destroyers in the south. Kondo ignored *Takao's* estimate of a battleship and was still convinced that he faced only heavy cruisers. According to *Nagara's* gunnery officer LCdr. Kazutoshi Kuhara, his cruiser had engaged a heavy cruiser, effectively silencing it, however at 0051 Kimura onboard the *Nagara* recognized *South Dakota* as a battleship and he also sights *Washington* and notes her strange foremast, resembling the *North Carolina* class. He radioed Adm. Kondo, "Two enemy battleships off Cape Esperance, heading west along north coast of Guadalcanal!" At 0051 VAdm Kondo ordered the Bombardment Force to prepare to reverse course to ESE (bearing 130 degrees true) to commence the bombardment.

At 0052 *Atago's* course is 000 degrees. *Atago's* lookouts sight an enemy vessel bearing 125 degrees distance 10,000 meters (*South Dakota*). Kondo receives word that *Nagara* and *Kirishima* have sighted an enemy ship (*South Dakota*).¹⁶ Then at the same moment *Atago's* lookouts report "Kirishima is firing" Next they report, "Kirishima has scored a hit to enemy bridge with her first salvo!" Adm. Kondo watches and observes *Kirishima's* first salvo strike the foremast of the enemy ship and the enemy ship's main battery goes silent.¹⁷ By 0053 he issues orders to Hashimoto that he plans to bombard the Marine positions and that he should assist *Ayanami*. Hashimoto turns to the north, forcing Adm. Kimura and his destroyers into a 360 degree turn to starboard in order to avoid a collision. Hashimoto releases *Uranami* to stand by and assist *Ayanami* and these maneuvers effectively take both Hashimoto and Kimura out of the battle. At 0054 *Atago* settles in on new heading of 130 degrees true.

On Board *Kirishima*

At 0051 Lt(jg) Michio Kobayashi on the bridge of *Kirishima* was observing *Takao* when he spotted a stationary ship to port partially camouflaged by Guadalcanal. He immediately identified it as a US battleship and it did not appear that either heavy cruiser had spotted her yet.¹⁸ At 0052 Captain Iwabuchi immediately ordered his ship to engage the enemy battleship to port. Then a message is received from *Atago* at 0053 that she was ready to stand by and shell the airfield.

At 0052 LCdr Ikeda who was in charge of the ship's secondary battery received permission to open fire. The range was 10,000 meters (11,000 yards) and Ikeda's secondary battery was the first to open fire followed quickly by her main battery. He claimed that two rounds from her first salvo hit the target ship's superstructure.¹⁹ More salvos followed in which he claimed two short straddles and two long straddles but no further hits. At 0054 he was ordered to check fire so that *Kirishima* could make a turn. His secondary battery had already reached their maximum train so his guns could no longer bear on the target anyway. He noted in a post war interview that six minutes later after he checked fire *Kirishima* would come under fire from another US battleship.²⁰

¹⁶ *Atago's* DAR only mentions that *Nagara* had sighted a large enemy warship and does not reflect Admiral Kimura's warning of two battleships heading west.

¹⁷ The battle damage suffered by Radar Plot is consistent with two 6-inch common and one 14-inch type 3 incendiary shell. This damage is what the Japanese observed giving them the impression *Kirishima's* first salvo had blown off the top of her foremast superstructure.

¹⁸ *Kirishima's* brief action report mistakenly identifies *South Dakota* as a *North Carolina* Class battleship.

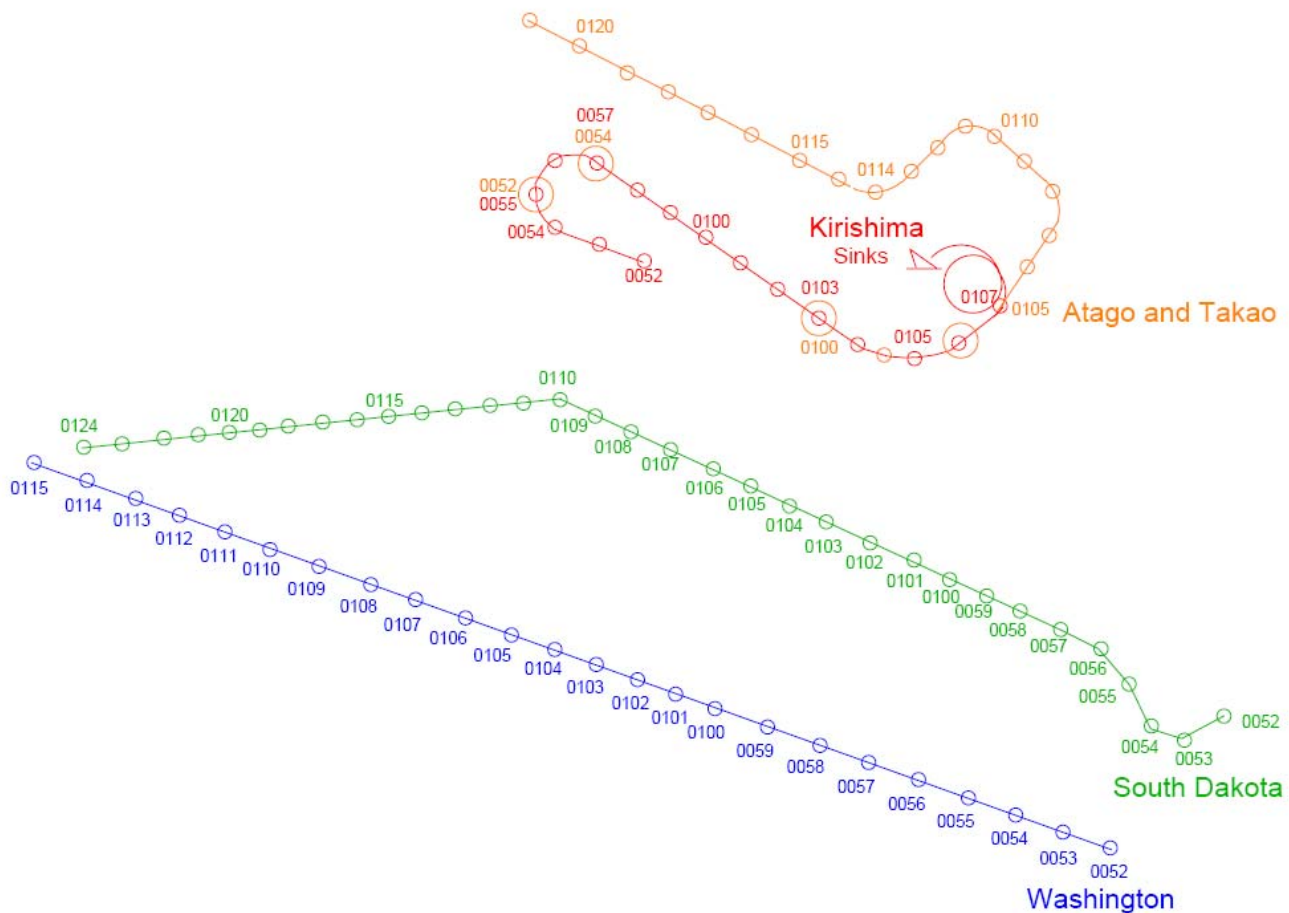
¹⁹ Hits to Radar Plot

²⁰ The times of this turn from 0054 to 0057 as noted by the Japanese is matched exactly by *Washington's* action report, which at the time was tracking *Kirishima*.

On Board *South Dakota*

Battle damage reports begin to flood into Captain Gatch on the bridge of *South Dakota*. At 0055 he receives a report that the forward Main Battery Director (Director One) is unable to train forward to 040 degrees, probably due to shell hit. At 0056 another report tells him a of shell hit to a 1.1 clipping room with the crew of Quad One killed and fires started in the 1.1" clipping room. Flash down ammunition hoist to engineering passageway set two life jackets on fire. Some ammunition went off. Fire fought by men present. Shell hit and detonation RDF2 loop (Radio Direction Finder number 2). Captain Gatch slows the ship's speed to 26 knots and searches for signs of *Washington*. Secondary battery is still firing on enemy ships. Enemy hits reported in the vicinity of radar plot. Another shell through the radar plot immediately after this killed Ensign Canfield. Steam line ruptured just outside of radar plot by 6" inch shell which penetrated into radar plot on starboard side and demolished it. Immediately afterwards another shell hit very near same place.²¹ There is some confusion outside of Battle two, three shells just went through that space, men killed, some wounded, several scalded by steam from steam whistle and siren line. Quieted down, and word sent for repair parties to extinguish fires in RDF2, and send first aid for wounded. Ladders damaged access difficult and life jackets on deck in battle two catching fire. The fire in this compartment was quite intense, gutting the entire room and originally CO₂ was used to put fire out but with no effect at all. It was not brought under control until 0155.

²¹ Photographs show three shell entry holes, two at frame 83 and one at frame 84. The 18-inch diameter hole in frame 84 is incorrectly logged in *South Dakota*'s records on the port side. The description of two shells entering quickly followed by another is almost identical to Ikeda's description of his secondary battery opening fire quickly followed by the main battery.



The Battleship Action from 0050 to 0114
Figure 4

On Board *Atago*

At 0057 Lt. Ichiro noted that VAdm Kondo and his chief of staff, RAdm. Kazutaka Shiraishi were standing to his right and Capt. Ijuin was to his left. One of the lookouts on the starboard side reported “A battleship off starboard”. Shiraishi inquired if the ship could be *Hiei* for her fate was still not known. Then at 0100 VAdm Kondo and Capt. Ijuin began giving orders at the same time. Capt. Ijuin ordered “Stand by for a gun and torpedo action to starboard!” “Ready to illuminate” someone shouted and Captain Ijuin at 0101 ordered “Commence illumination”. What Ichiro saw was a battleship that he thought was similar in appearance to *Yamato*. She had a high freeboard and layered bridge and *Atago* identified her as a *North Carolina* class battleship. *Atago* began to turn to port.

At 0102 Lt Yoshiro Watanabe next ordered to stand by for torpedo action starboard and engage enemy battleship steaming on parallel course. No, she is not making any headway he corrected himself next. Stand by to open fire with guns. Enemy ship bearing 100 degrees opens fire on us (*South Dakota*). Watanabe had to make one more correction when he suddenly realized “No wait the target is closing on

the opposite course!” At 0103 the order to launch torpedoes came and *Atago* launched eight Type 93 torpedoes and opens fire with her main battery.²² At 0104 Capt. Ijuin orders “Cease illumination!” and she fires her third salvo at *South Dakota* which is now bearing 105 degrees. At 0105 she fires her 4th and 5th salvo with the 127mm and 25 mm guns joining in and fires are seen on *South Dakota*. By 0106 she fires her 6th and final salvo after which Capt. Ijuin orders “Cease fire.” A lookout shouts “Torpedo tracks to port bearing 030 degrees!” Capt. Ijuin orders maximum speed and the torpedoes turn out to be a false alarm.

Lt. Ichiro sees the first, second and third torpedo enter the water followed suddenly by an explosion. He realizes that one of the torpedoes has exploded prematurely. In his post war interviews, VAdm Kondo stated that he was stunned at this time by the realization that he was engaged with US battleships. *Atago’s* lookouts reported, “There is another ship forward of the first, a big battleship!” They identify the second battleship as an *Idaho* class and that she is awash up to her main deck and sinking by the bow.²³ Medical Officer Lt (jg) Abe, who was standing on the bridge, heard how one of the lookouts shouted; “*Kirishima* is totally obscured by shell splashes!” When Adm. Kondo and the other officers on the bridge turned their binoculars towards the battleship, Lt (jg) Abe saw nine 30-meter high splashes rising around *Kirishima*. During the next few minutes some of the stray shells landed near the *Atago* as well. Capt Ijuin observes that *South Dakota’s* main battery remains silent but that her secondary guns continue to fire back fiercely. *Atago* takes her first hit, to the starboard soy sauce store which begins a fire on her bow. Then she receives a second hit on her port side at frame 293. The shell was defeated by the main armor belt but fragments opened small holes in the anti-torpedo bulge. At 0108 Lookouts report, “*Kirishima* is burning and she is gradually lagging behind.” VAdm Kondo observes hits being scored on *South Dakota* by *Kirishima* and *Takao’s* gunfire and views her as heavily damaged and sinking.²⁴ He orders a turn north in a vain hope that he can disengage *Kirishima* but she can not follow. The second battleship becomes his priority and to keep his force between the US battleship and Tanaka’s transports. Capt. Ijuin orders, “Hard to port, stand by for a gun torpedo action to port!”

On Board *Washington*

At 0100 when *Atago* turned on her search lights, *Washington’s* main battery opens fire bearing 008 degrees true, range 8,400 yards on target, identified as a battleship. Main battery was on full radar control, however her FC and SG radars could not distinguish shell splashes, which thus had to be observed optically. *Washington* was able to fire her first two main battery salvos before *Kirishima* was able to return fire, which occurred at approximately 0101 hours).²⁵ *Washington’s* secondary battery opened fire on two different targets. Director 1 with mounts 51 and 53 fired upon the Main battery target. Twice during the firing these guns were observed hitting the target and starting fires in *Kirishima’s* upper works. Director 3 with mounts 55 and 57 were firing on another ship identified as a probable heavy cruiser (*Atago*) that had her search lights trained upon *South Dakota*. Group 2 fired with a 200-yard rocking ladder. First salvo landed short and was spotted up 400 yards. At about the fourth salvo the

²² *South Dakota’s* hull is painted with dark blue waves and a dark grey hull with sky grey superstructure. The dark paint on her hull makes it impossible to determine where her waterline is so determining her direction becomes extremely difficult (This paint scheme I believe is measure 11.)

²³ *Washington* is sporting measure 12 camouflages making her appear awash and down by the bow, She is painted dark blue hull and a sky grey superstructure with just the tip of her bow sky grey.

²⁴ *Atago’s* DAR claims no hits on *South Dakota* and gives credit to *Takao* and *Kirishima* for her damage.

²⁵ The slow reaction from the Japanese is documented in their records. *Atago* did not open fire until 0103, *Takao* at 0102 with *Kirishima* being the first to respond at 0101.

enemy searchlights went out, however, the secondary battery continued to fire for about 8-10 more salvos. Director 4 provided star shell illumination with mount 59 for main battery beginning after second salvo for a total of 62 star shells being fired. At 0102 *Washington* reports spotting a green light on the port beam [the source of this light is unknown]. Director 3 guns continued to fire at the ship that had her search lights on *South Dakota* until the lights went out, then shifted to others in turn until their lights also went out.²⁶ Fires were started on the ship that *South Dakota* was hitting.²⁷ 0102.30 *Washington* reports "Cease Firing", given by control on receipt of erroneous report that the target was sunk.²⁸ At 0103 *Washington* reports that enemy was still firing at us apparently with 3 turrets. Believed to have fired two salvos in the minute and a half during which fire was ceased.²⁹ *Washington* orders *South Dakota* to close *Washington* from CTF 64 (Lee) over TBS. This order is acknowledged by *South Dakota*. At 0104 Lee reports from bridge, "If you can see anything to shoot at, go ahead". Main battery resumed fire. Salvo two after she re-opened fire was reported as a short straddle. More hits obtained. Jap BB continued to fire with only one turret aft. Lee shouts out a warning to keep good look out for enemy DD's on both bows.

Washington reports green light on port bow [the source of this light is unknown]. At 0106 Fire Control reported that the forward group (forward main battery turrets) was getting to its limit of train (148 degrees). At 0107 Cease Firing. Main battery target burning, and heading away. Enemy BB ceased firing. *Washington* fired an additional 36 main battery shells for a total of 75 16-inch AP shells. Her secondary battery fired a total of 227 5-inch AA common shells during this phase. The main battery continued to track the burning ship for ten minutes. During this time, the target made a 500 degree turn to port (about one and a half circles). Course of 180 degrees given to *South Dakota* by CTF 64 (Lee) by TBS but no receipt is received. At 0114 *Washington* reports from spot one, looks like someone opening fire on us on the starboard quarter, ordered to train main battery turrets to 150 degrees relative.

On Board *South Dakota*

0100 *South Dakota* reports secondary directors 1 and 3 tracking target. Director 1 controlling mount one star shell spread. Two hits felt below decks.³⁰ Capt. Gatch orders an increase speed to 27 knots. By 0102 *South Dakota* reports, searchlight illumination from abaft beam, (*Nagara*), Sky control out. S.B. director 1 hit and out of commission Engines ordered to full speed. Radio antennae shot away, shifted to others.³¹ At 0104 *South Dakota* reports more hits felt. Secondary battery is still firing. No communication with sky control. Shell hit glancing off mount 55, through signal store room, across the superstructure and into the after end of mount 54. Shell did not explode, later found on deck, 8" shell disposed of by throwing overboard. By 0005 *South Dakota* reports more hits felt, power to sky 1 secured. Main radio directed to shift control to 6390 KCS (KHz) to bridge. Calls to *Washington* are useless, as her radio antennae are shot down.³² At 0107 *South Dakota* reports main battery salvo, no data available.³³ At 0108 *South*

²⁶ *Kirishima*'s battle damage supports *Washington*'s claim that her secondary battery did indeed hit the superstructure as well as her search lights area. *Atago* and *Takao* turned off their search lights and reported no damage to their searchlights.

²⁷ Two confirmed hits on *Atago* by *South Dakota* are later reported, one which started the fire on her bow.

²⁸ *Washington* has fired a total of 39 x 16" AP projectiles by this time, claiming hits on at least three salvos.

²⁹ *Kirishima* turret one was most likely the first turret knocked out based on the Chief flooding officer's account of battle.

³⁰ Hit 2 and Hit 11 in BuShips report are estimated to be 8-inch shells, however this estimate is incorrect and a better estimate would be 14-inch HC shells exploding. Only three shells detonated at high order, hits 2, 11, and 26.

³¹ The hit to S.B. Director one may have come from *Takao* as *Atago* has not yet opened fire.

³² Hit 23 per the BuShips report. This was a 14-inch Type 3 shell that raked Director 3, stack, and then Director 2. Started small fires in superstructure and around gun mounts 57 and 53. When damage control parties arrived, they only found small burned out fragments. Fires were started at base of stack but not at impact sight. Shell broke apart on radar foundation of

Dakota reports ceased firing, no targets, no fire from enemy, *Washington* not in sight, no communication by TBS. Later investigation showed all forward antennae shot down. 0110 *South Dakota* reports engagement broken off, proceeding at full speed on course 235 degrees true. Ship repair parties and personnel not essential at damaged stations fighting fires, caring for wounded and estimating damage. Observed splashes on wake, 1000 yards astern. No enemy ships observed firing. Possibly one of those left burning. Received word at 0110 that main battery turret three was having difficulty training due to a 14" shell hit by gas seal.³⁴ At 0115 *South Dakota* reports attempting to raise *Washington* on 2620 KCS, all efforts hopeless until antennae cleared.

On Board *Kirishima*

Upon *Atago*'s illumination at 0100 Captain Iwabuchi orders her to resume fire on *South Dakota*. LCdr. Ikeda was positive that his ship was illuminating the enemy as well. He mistakenly reported later that they were facing a "*North Carolina* class battleship." Ikeda could see his gunfire hitting the enemy ship. Ikeda himself felt only a strange vibration and had no idea that his ship was hit. Anyway, soon he felt his back getting hot, so there must have been a fire in the next compartment.

On *Kirishima*'s bridge Lt.jg. Kobayashi Michio remembered that *Washington*'s first salvo was a straddle that sent up huge columns of water that soaked the bridge and ruined the log he was keeping. After *Kirishima* re-opened fire he thought he saw *Kirishima* hit the foremost main battery turret so that its barrels were canted upwards.³⁵ Then he received reports that the hemp rope "mantelets" that protected the area around the first funnel and search lights had caught on fire. Captain Iwabuchi immediately ordered the crew to douse the fires and firefighting teams succeeded in cutting the ropes and dumping them overboard in no time. Then Lt.(jg)Kobayashi heard a report through voice pipes about fire in aft secondary battery casemates. The XO Commander Koro Ono ordered the aft magazines flooded and soon came a report via voice pipe confirming that this measure had been successfully executed. Lt.(jg)Kobayashi had felt several successive impacts, whether from shells or torpedoes he did not know. They were not that heavy in his opinion and could have been *Kirishima*'s own guns firing.

At 0100 LCdr. Kyûshichi Yoshino, *Kirishima*'s flooding control officer, heard Capt. Iwabuchi announce a gun battle to starboard and to increase speed to maximum. Capt. Iwabuchi also announced that our shells were laying well but that the enemy was hitting us as well. At his station below decks he could feel the ship shudder below his feet after every hit. The roar of the guns was deafening and the temperature within the compartment had reached 45 degrees Celsius (113° F) and his throat was parched and he was sweating profusely. After only a few minutes Damage Control Central received the first reports about

Director 3, continued to break apart within stack, the shell base hit Director 2. Over 100 fragments associated with this hit were found despite the fact that the shell never exploded. This was typical of a Type 3 incendiary shell.

³³ This is the first main battery salvo since 0048 documented in *South Dakota*'s action report which is supported by Japanese observations that *South Dakota*'s main battery remained silent during the battleship phase of this action.

³⁴ Hit 26 was a 14-inch AP shell. Shell trajectory indicates that *Kirishima* was still forward of the beam when the shell struck, so the actual time was probably a bit earlier. There are two scars on barrette showing where the shell nose impacted below main deck level and the shell base slapped near the top and this sideways impact detonated the TNA filler, sending shrapnel into bulkhead 129 below the main deck. Circular cracks in barrette show armor was impacted with tremendous force that only an AP shell could have made. Additional damage from *Kirishima*'s main battery from Hit 21 in BuShips report caused large dent – near miss by 14-inch AP sending cap head and windscreen into side. AP shell traveled forward detonating below the waterline and opened seams forward 12 feet below waterline

³⁵ Observation of Hit 2 in BuShips report. Crewman Daniel Brady of *South Dakota* through private Email also provided information that this shell produced many small fragments, which was typical for HE type shells.

several fires forward and aft and Yoshino could feel the ship developing a list to starboard. Then the aft engine room reported a steadily increasing flooding to that space.³⁶ He became concerned how his engine room damage-control party was doing. They had to truly fight for their lives since there was no escape through the watertight closed doors. His heart was pounding and he was having trouble hearing all orders that came in through voice tubes. Then Capt. Iwabuchi ordered: "Flood No. 1 turret magazines immediately!" He could hear from his voice how critical the situation was. He forgot to breathe as he raced to flood the compartment, knowing an explosion could wipe out the entire ship in a second. He was able to flood the compartment in time. Through out the battle he did his best to stop the starboard and aft lists that *Kirishima* was taking.

Lt.(jg)Kobayashi receives new report of rudder failure through voice pipe. He thought the steering room may have been hit by a torpedo. *Kirishima* had been steaming at full battle speed and now started to circle. By 0110 *Kirishima's* battle with US forces was over. Lt.(jg)Kobayashi received reports that there were fires in both the forward main battery turrets and in the aft secondary battery casemate guns.³⁷ The XO orders both forward and aft magazines flooded and a starboard list appears. Fires were being swept into the machinery compartments and Kobayashi next reported a machinery breakdown and speed was lost until *Kirishima* was dead in the water. *Kirishima* had been hit by many shells and multiple fires had broken out both topsides and below decks. First hits smashed her fore turrets and destroyed the forward wireless station. Next she took several hits aft, so that turrets Nos. 3 and 4 lost their hydraulic power and the hull was holed below the waterline.³⁸ He estimates that *Kirishima* has been hit by 20 main caliber hits and over 10 secondary hits. He speculates 5-6 torpedo hits below the waterline.

According to Ikeda the chief damage control officer Lt.Cdr. Hayashi told him that *Kirishima* had received fourteen major caliber hits above the waterline and 17 medium caliber hits as well as six underwater hits all rated as major caliber. According to Ikeda, *Kirishima* fired 68 Type 3 [incendiary], 22 Type 0 [HE], and 27 Type 1 [AP] 14-inch shells at the enemy battleship. Lookouts reported ten 14-inch shell hits on *South Dakota*. The Damage Control Officer Hayashi prepared a hit scheme in which Ikeda meticulously copied.

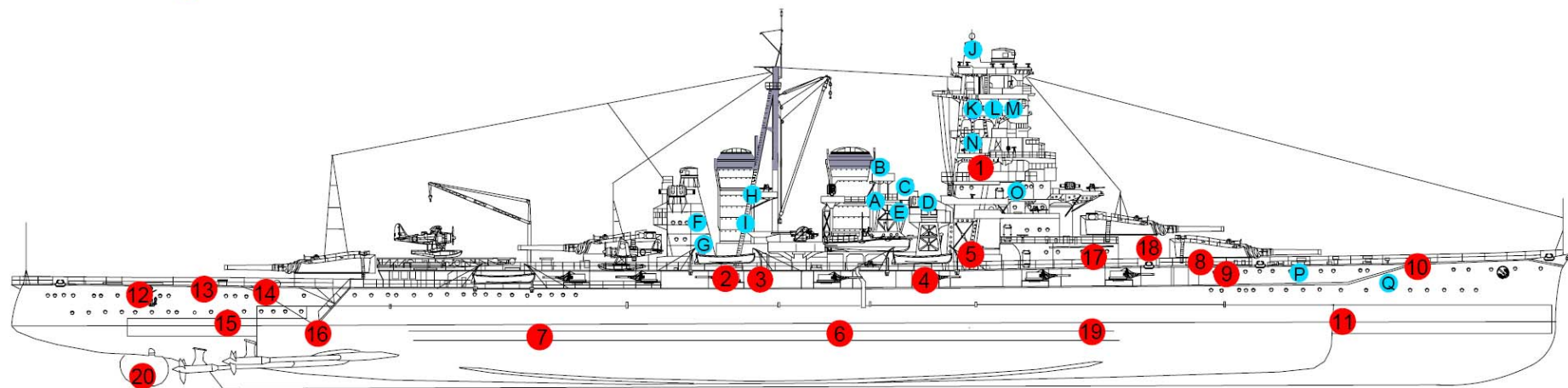
³⁶ Film of the wreck partially captured a large gash in her outer hull at the location of her starboard outboard engine room below the waterline.

³⁷ Partially caught on film and hidden by the anchor chain there is a large circular hole in her aft 3-inch belt at the approximate location for her aft steering compartment. Her starboard rudder is jammed at 12 degrees starboard but her port rudder is jammed at 85 degrees starboard which would pull the ship to port due to the heavy drag on this side of the ship. The starboard rudder shows signs of shrapnel damage possibly indicating a shell explosion below her keel between the rudders and props.

³⁸ Both starboard hydraulic pump rooms on the lower deck had been hit. The aft hydraulic pump room hit below turret four was captured on film by Dr. Bob Ballard.

- 16-inch shell hits
- 5-inch shell hits

Kirishima November 1942



***Kirishima's* hit locations**
16-inch shell hits in red and 5-inch shell hits in blue
Figure 5

According to Kobayashi the XO ordered the port voids flooded to correct the starboard list which was quickly corrected. Then a port list appeared and the XO ordered starboard voids flooded and again the list disappeared for a time. Captain Iwabuchi wanted to beach *Kirishima* using the destroyers or *Nagara's* help to tow his wounded ship. He would then use her as a floating battery until all shells were expended. All signaling devices had been destroyed so Kobayashi lent his flashlight to signal the destroyers in order to pass heavy wire ropes to them. Two or three of the destroyers closed in and *Kirishima's* bosun was ordered to pass heavy wire ropes to them. Kobayashi was sent to anchor deck to observe the progress of towing operations. On the way he met the Chief Engineering Officer and his aide both heading for the bridge and panting heavily. The engineering spaces were full of flames and smoke and communication by voice pipes was now impossible. Iwabuchi ordered the machinery spaces evacuated and the crew to report to the upper deck. Both men departed to deliver the message but the message came late with heavy casualties among the engineering crew, most likely due to smoke inhalation. Eventually only the centerline engine room remained operational. By 0149 some of the fires were being brought under control. All attempts to steer with engines failed. Divers were sent into the steering compartment but they were unable to penetrate the watertight scuttles.

The Captain of *Nagara* however refused to tow the crippled battleship. Iwabuchi then sent a corresponding signal to C-in-C, Combined Fleet requesting he order *Nagara* to help tow his ship.³⁹ The port list re-appeared and the XO ordered additional starboard voids flooded and the list again disappeared for a short time. A starboard list appeared next and kept increasing, so that standing on the bridge became impossible. "Commence counterflooding port voids!" Ono ordered with a surprisingly calm voice. There was no result. Just then the DDs started towing, but *Kirishima* did not move at all. "Towing is impossible" one of the DDs reported using a blinker. The list was still worsening. Then the starboard list grew steadily and the XO ordered all port voids flooded but the starboard list only grew so that standing on the bridge became impossible⁴⁰ The bridge fell silent as the officers realized their ship was sinking beneath them and that they could not stop it. According to Kobayashi, the XO and Captain Iwabuchi had a hurried conversation in which the XO suggested that it was time to abandon ship. Iwabuchi ordered Kobayashi to use his flashlight to signal the destroyers to come along side and begin to take off the crew. He ordered all sailors to report to the upper deck. This time the orders were sent by runners. The bridge was evacuated soon afterwards. On his descent from the battle bridge, Kobayashi noted many dead on the level below and on the upper deck.

Lt.Cdr. Ikeda remained at his station, but then all of a sudden he received the order to descend to the upper deck, given for the whole ships company. At first everything seemed to be in order, but on the third bridge level Ikeda encountered a scene of total destruction,⁴¹ The ladder was twisted in several places and

³⁹ The author has no information as to whether or not Admiral Yamamoto ever received this signal.

⁴⁰ Damage to the underwater body of the ship has the same effect on reserve buoyancy as added weight has, since the result is the added weight of the flooding water. If the damage extends above the waterline after the ship has settled to its new position in the water, an additional loss of reserve buoyancy is present. This additional loss is due to the destruction of the watertight envelope of the ship. Further sinking or rolling of the ship will not immerse a buoyant volume but instead will result in the addition of more flooding water and a further loss of stability. A ship with a negative GM and off center flooding can be recognized by an excessive list for the known off center weight, a lopy or sluggish slow roll about a given list angle, or a flop from side by side with a greater angle of the list to one side. The most probable cause for a negative GM in warships is loose water. An attempt to reduce the list by correcting for off-center weight first may cause the ship to flop to an even greater angle of list to the other side or even to capsize. Any use of ballasting or shifting weights must take into account the free surface effect as additional water is being taken into the ship and a further loss of reserve buoyancy must be acceptable. Proper corrective actions must first be made for the negative GM however in order for this to be effective, the hole allowing the water to enter must be completely plugged.

⁴¹ Compass bridge level and forward telegraph room.

even the foremast tripod legs had become visible. There were also dead bodies everywhere. Once on the deck, he could see that there was an increasing list to starboard and several fires raging below decks Ikeda headed for the stern, but in the amidships area he saw two ten-meter wide holes in the deck right above the secondary guns.

LCdr Kyûshichi Yoshino received an order to report to the bridge. He squeezed himself out of the narrow hatch and climbed topside. He noted that the superstructure was all shot up and he saw several corpses lying amidst the wreckage. The ship was all blacked out. He later learned that this was intended as a measure to avoid enemy PT boat attacks. In the dark he could see sailors emerging from every passage and manhole. The starboard list continued to grow and Captain Iwabuchi ordered the port engine room flooded. Led by the skipper we sang „*Kimi ga yo*” and gave three banzais. Destroyers came alongside at both sides aft. It was still black and evacuating all wounded took quite some time.

According to Kobayashi, the *Asagumo* came along side the starboard quarter and the *Teruzuki* to port. Then XO made a short speech and then ordered the ship to be abandoned. The battle flag was lowered and the crew gave three banzais and began to board the waiting destroyers. The officer who carried the emperor’s portrait boarded *Asagumo* first then followed by the wounded. Most of the men had transferred to the destroyers with about 300 men remaining when *Kirishima*’s starboard list shifted over to port. Kobayashi had barely stepped aboard *Asagumo* when the BB’s bow upended sharply. With a lurch and the momentum of her turning over to port increasing, *Teruzuki* had to do an emergency back full to avoid being crushed by the capsizing battleship’s superstructure. The *Asagumo* cut all lines with the sinking ship and also backed away in time. The last 300 men were thrown into the water including Captain Iwabuchi and XO Ono who were later picked up by the destroyer *Samidare*. *Kirishima* capsized to port and then slipped away by the stern into the depths of Iron Bottom Sound at 0323 of the morning of November 15, 1942.

Lt. Cdr Ikeda along with Lt. Cdr. Hayashi felt the ship suddenly shift her list from starboard to port and had to jump overboard as the ship began to capsize. They were both rescued by the destroyer *Samidare*. Sixty One officers and petty officers were rescued in addition to 1,031 sailors. Approximately 209 men were killed in action aboard the *Kirishima*.

On Board *Atago*

At 0114 Capt. Ijuin ordered a torpedo salvo of four torpedoes to be launched at the enemy battleship bearing 015 degrees port (*South Dakota*). At the same time a course change to 300 degrees was ordered. By 0117 *Washington* was sighted steaming parallel course on port bearing 090. By 0118 Capt. Ijuin ordered the next torpedo salvo to be fired and then by 0120 to stand by to open fire from main battery, distance 13,000 meters. At 0122 *Atago* re-opened fire with her main battery bearing 072 degrees to port, distance 14,000 meters. At 0123 the last torpedo salvo was launched and the enemy battleship was seen to turn to starboard to an opposite course. *Atago* turned to 330 degrees at 0128 and by 0129 *Washington* was bearing port 115 degrees. At 0131 Capt. Ijuin ordered to make smoke and that *Washington* continued to turn to an opposite course. By 0135 contact was lost and she withdrew from battle. She had fired 55 Type 1 AP and 6 Type 0 eight-inch shells, forty nine five-inch type AA common shells, Fifteen 25 mm shells and 19 type 93 torpedoes. *Takao* had fired only 36 type 1 AP shells and 20 type 93 torpedoes between 0102 and 0114.

On Board *Washington*

At 0117 *Washington's* main battery shifted to track new targets bearing 120 degrees relative or 049 degrees true at a range of 13,800 yards. The target tracked was the leading vessel of a group of five. Its type was unrecognized. The other ships were reported as freighters but they were making 26-29 knots during the 22 minutes they were tracked so they were estimated to be destroyers. *Washington* slowed to 18 knots. At 0119 lookouts reported firing on the starboard quarter. Lee could not find *South Dakota*. At 0120 *Washington* changed course to 340 degrees true. Fire Control reported at 0121 a good solution on target being tracked bearing 068 degrees relative or 046 degrees true. Other targets were reported at 326 degrees true and also at 147 degrees true, 13,000 yards. At 0123 Sky Control reported flares on starboard quarter. At 0132 the lead ship that the main battery was tracking began to make smoke. At 0133 *Washington* changed course by a starboard turn to 180 degrees true and began her withdrawal from the battle zone. She would dodge some more torpedoes from two of Tanaka's destroyers but she did not open fire again nor did any Japanese fire strike the ship. The battle was essentially over.

Bibliography

Official Documents

Reports of the U.S. Naval Technical Mission to Japan.

United States Strategic Bombing Survey.

Combat Narratives of specific naval campaigns produced by the Publications Branch of the Office of Naval Intelligence during World War II.

Naval Battle of Guadalcanal

Command Reports

Commander Task Force SIXTY-FOUR: Report of Night Action, Task Force SIXTY-FOUR—November 14-15, 1942

Action Reports

Washington, Action Report, Night of November 14-15, 1942.

Washington deck logs – Night Action- November 14, 15, 1942

South Dakota, Action Report, night engagement 14-15 November, 1942, with Japanese naval units, off Savo Island.

Benham, Report of Action November 14-15, 1942.

Gwin, Report of Night Action 14-15 November, 1942.

Preston, Surface Engagement with Japanese Forces, November 15, 1942—report of.

Walke, Surface Engagement with Japanese Forces, November 15, 1942—report of.

Atago DAR No. 8 12 to 14 Nov 1942 (submitted 18 Nov 1942)

Ikazuchi DAR 14 to 15 Nov 1942 (submitted 15 Nov 1942)

DesRon 4 DAR No. 16 10 to 16 Nov 1942 (submitted in Dec 1942)

Kirishima Brief action report JT 1 National Archives

Sendai Brief action report JT1 National Archives

Takao Brief action report JT 1 National Archives

Bureau of Ships, War Damage Report No. 57, 1 June 1947. U.S.S. SOUTH DAKOTA (BB57), Gunfire Damage, Battle of Guadalcanal, 14-15 November 1942.

Battleship and Cruiser Doctrine, Imperial Japanese Navy – Translated by W. D. Dickson

SECONDARY SOURCES

Books (English etc)

Ballard, Robert D. and Rick Archbold. *Lost Ships of Guadalcanal*. Warner/Madison Press Books, 1993.

Campbell, John. *Jutland: An Analysis of the Fighting*. Lyons Press, 2000.

———. *Naval Weapons of World War Two*. Conway Maritime Press, 1985.

Dull, Paul S. *A Battle History of the Imperial Japanese Navy 1941-1945*. Naval Institute Press, 1978.

Evans, David C. and Mark R. Peattie. *Kaigun*. Naval Institute Press, 1997.

Frank, Richard B. *Guadalcanal*. Penguin Books, 1990.

Friedman, Norman. *Battleship Design and Development 1905-1945*. Mayflower Books, 1978.

———. *Naval Firepower*. Naval Institute Press, 2008.

———. *U.S. Battleships*. Naval Institute Press, 1985.

- . *U.S. Naval Weapons*. Conway Maritime Press, 1983.
- Garzke, William H. and Robert O. Dulin, Jr. *Battleships: Allied Battleships*. Naval Institute Press, 1980.
- . *Battleships: Axis and Neutral Battleships*. Naval Institute Press, 1985.
- . *Battleships: United States Battleships*. Naval Institute Press, 1995.
- Goldstein, Donald M. and Katherine V. Dillon (eds.) *The Pacific War Papers: Japanese Documents of World War II*. Potomac Books Inc., 2004.
- Grace, James W. *The Naval Battle of Guadalcanal: Night Action, 13 November 1942*. Naval Institute Press, 1999.
- Hammel, Eric. *Guadalcanal: Decision at Sea*. Crown Books, 1988.
- Lacroix, Eric and Linton Wells II. *Japanese Cruisers of the Pacific War*. Naval Institute Press, 1997.
- Leckie, Robert. *Challenge for the Pacific*. Da Capo Press, 1999.
- Morison, Samuel Eliot. *The Two Ocean War*. Atlantic Monthly Press, 1963.
- Parkin, Robert Sinclair. *Blood on the Sea*. Da Capo Press, 1995.
- Skulski, Janusz. *The Battleship Fuso*. Naval Institute Press, 1998.
- . *The Heavy Cruiser Takao*. Naval Institute Press, 1994.
- Ugaki, Matome. *Fading Victory: The Diary of Admiral Matome Ugaki 1941-1945*. University of Pittsburgh Press, 1991.
- Whitley, M. J. *Battleships of World War Two*. Naval Institute Press, 1999.
- . *Cruisers of World War Two*. Naval Institute Press, 1996.
- . *Destroyers of World War Two*. Naval Institute Press, 1988.
- Wiper, Steve. *Warship Pictorial No. 13: IJN Kongo Class Battleships*. Classic Warships Publications, 2001.
- Worth, Richard. *Fleets of World War II*. Da Capo Press, 2001.

Books (Japanese)

- Handô, Kazutoshi (ed.) *Nippon Gunkan Senki* [Battle Records of Japanese Warships]. Bunshun Bijuaruhan, 1996.
- Kantei Zumen Shu* [Plans of Ships of the Imperial Japanese Navy]. Hara Shobo Co., 1975.
- Ishibashi, Takao. *Nippon Teikoku Kaigun Zen-kansen 1868-1945: Senkan, Jun'yô-senkan* [Illustrated Ships Data on Vessels of the Imperial Japanese Navy 1868-1945: Battleships, Battlecruisers], Vol. 1. Namiki Shobo, 2007.
- Izumi, Kôzô. *Gunkan Mekanizumu Zukan: Nihon no Senkan* [Warship Mechanisms Picture Book: Japanese Battleships]. 2 volumes, Grand Prix, 2001.
- Kaigun Hôjutsu-shi* [The History of Naval Gunnery]. Kaigun Hôjutsu-shi Kankôkai, 1975.
- Kawamata, Chiaki. *Jûni Senkan Monogatari: Senkan de Tsuzuru Taiheiyô Senshi* [The Saga of the Battleship Dozen: Pacific War Battleships History Revisited]. Gakken Bunko, 2000.
- Kimata, Jirô. *Nippon Senkan Senki* [The Battle History of Japanese Battleships]. Tosho Shuppansha, 1983.
- Shikikan-tachi no Taiheiyô Sensô* [Pacific War as Described by the Senior Officers]. Kôjinsha NF Bunko, 2004. (The source for our best detailed account on the sinking of the *Kirishima*)
- Society of Naval Architects of Japan. *Shôwa Zôsen Shi Bessatsu, Nihon Kaigun Kantei Zumen Shû* [History of Shipbuilding in Shôwa Era, Plans of Ships of the Imperial Japanese Navy], Hara Shobô Co., 1975.
- Toyoda, Jô. *Kûbo Shinano no Shôgai Yonhon no Hibashira: Kôsoku Senkan Yûsenki* [Four Pillars of Fire: The Battle Records of Fast Battleships]. Shûeisha Bunko, 1979.

Yoshimura, Akira. *Senshi no Shôgensha-tachi* [Witnesses of the Pacific War]. Bunshun Bunko, 1999.

Gakken Pacific War Series:

Vol. 5. *Soromon Kaisen* (The Solomons Campaign), 2000.

Vol 6 *Shitô Gadarukanaru* (Deadly Battle for Guadalcanal), 2000.

Vol. 21. *Kongô-gata Senkan* (Kongo-class Battleships), 1999.

Articles (English)

Lengerer, Hans. "The *Kongô* Class." *Contributions to the History of Imperial Japanese Warships*, No. 2, March 2007, pp 18-30; No. 3, Sep. 2007, pp 25-44.

Okun, Nathan. "TABLE OF METALLURGICAL PROPERTIES OF NAVAL ARMOR & CONSTRUCTION MATERIALS"

MISCELLANEOUS NAVAL-ARMOR-RELATED FORMULAE

Armor thickness necessary de-cap an APC projectile

Underwater projectile hits

Kirishima's Hit on *South Dakota*

Stuart Slade. "Metacentric height"

Articles (Japanese)

Ishibashi, Takao. "*Kansaihô no Rekishi. Taikan-kyohô-shugi wa nanika?* [The History of Naval Artillery. What Is the Battleship Doctrine about?]" *Rekishi Gunzô*, No. 19, June 1995, pp 44-50.

Kobayashi, Michio. "*Senkan 'Kirishima' no Saigo* [The Last of Battleship *Kirishima*]." *Saiaku no Senjô Gadarukanaru Senki*, 1987, pp 350-361.

Yoshino, Kyûshichi. "*Senkan 'Kirishima' no Saigo* [The Last of Battleship *Kirishima*]." *Maru Extra Vol. 10*, May 1998, pp 54-57.

Websites

Imperial Japanese Navy Page <http://www.combinedfleet.com/>

Japan Center for Asian Historical Records (JACAR). National Archives of Japan. <http://www.jacar.go.jp/>

Kobe University Library. Digital Archive <http://www.lib.kobe-u.ac.jp/>

Kure Maritime Museum (Yamato Museum) <http://yamato.kure-city.jp/>

National Institute for Defense Studies (NIDS, Bôei Kenkyûjo) <http://www.nids.go.jp/>

NavWeaps at <http://www.NavWeaps.com>