PANAMA IN WORLD WAR 2: FUEL, A PIPELINE AND PIPELINE ROAD

In a modern war, indeed any war, fuel is as important as ammunition. In former days, the "fuel" would have been food for the men and the horses, by the middle of the 20th Century oil was vital for a modern army, air force and navy.

In the story of Panama during World War 2 there are three important aspects concerning oil –

1. The storage of fuel in the Canal Zone, and its supply to ships based there or passing through the Canal;
2. The passage of oil through the isthmus from the Atlantic/Caribbean side to the Pacific to fuel the war in that theatre; and
3. The U-boat war in the Caribbean, where the tankers sailing from South American to the US were a prime target.

Of course, fuel was also vital to the operation of the Canal and its defences, aircraft, and vehicles, and for the Canal Zone and the rest of Panama to survive. During the war, petrol was one of few commodities rationed in Panama. Rationing being introduced in October 1942 (with lower speed limits also imposed to supplies go further).[1] In September 1944, the Gasoline and Tire Rationing Office was authorised to also control the distribution of other petroleum products, including kerosene, diesel oil, fuel oil and asphalt.[2]

[1] *Economic Controls and Commercial Policy in Panama* (United States Tariff Commission, 1946). Executive Decree No 39, September 1942.

[2] Executive Decree No 474, September 1944 authorised the Gasoline and Tire Rationing Office to also control the distribution of other petroleum products, including kerosene, diesel oil, fuel oil and asphalt

FUEL STORAGE IN THE CANAL ZONE

In 1940, there were two tank farms in the Canal Zone, and all US Navy vessels were fuelled at the docks at Balboa at the Pacific end of the Canal, or Cristobal at the Atlantic end, except for diesel-powered craft based at Coco Solo, which was also at the Atlantic end.

One of the tank farms was at Balboa and the other at Mount Hope on the Atlantic side. As was the case with much of the Canal's defences and other facilities at the time, neither tank farm was protected against air attack, and, in addition, each used just a single unprotected pumping station. Furthermore, the Balboa tank farm was on high ground adjoining the harbour entrance channel, making the tanks both prominent and an easy target for an air attack.

The obvious risk was that had these farms would be targeted in any attack, or by sabotage. It has been said that the failure of the Japanese to destroy the oil storage facilities at Pearl Harbor in 1941 was a major blunder.[3] If the facilities in the Canal Zone had been destroyed it would have been impossible to refuel any shipping in the Canal Zone, including vessels dedicated to its defence. The obvious solution to the problem was clearly to install underground bombproof storage tanks.[4] Indeed, in January 1941, the Secretary of the Navy recommended that all liquid fuel be in underground storage as soon as practicable.[5]

It had become plain that a war would mean a need for increased fuel storage and handling facilities. There were also plans for a pipeline connecting the two ends of the Canal, which would mean that tankers need not transit. However, various difficulties and the cost of

[3] https://apps.dtic.mil/sti/tr/pdf/ADA407830.pdf
[4] https://www.elistmopty.com/2021/09/depositos-de-combustible-de-la-panama.html
[5] Ibid.

construction caused those plans to be put to one side until 1942, by which time the course that the war was taking had made such a project one of vital urgency.[6]

The US Congress had approved a program for improvement and expansion of naval defences and facilities in 1939, and provided the necessary appropriations the following year, with work proceedings during the Summer.[7] These plans followed the recommendations of the Hepburn Board Report on the strategic needs in connection with the naval defence of the US. The report, submitted to Congress in December 1938, had made wide ranging recommendations for the improvement and expansion of existing bases, the establishment of new naval air bases (including one in the Canal Zone, which would be based on the existing facilities at Coco Solo). While work in the Canal Zone was not one of the items highlighted as being of the most immediate strategic importance[8], the Canal's vital role in allowing rapid and easy movement east-west and *vice versa* made the planned improvements there almost as important.[9]

In January 1941, the Secretary of the Navy recommended that the Commanding General in the Canal Zone consult with interested parties, including the Governor of the Zone and the Commandant of the 15th Naval District headquartered in the Canal Zone, over a project to place all liquid fuels underground as soon as possible. Four areas were considered for new storage, and a trans-isthmus pipeline to replace tankers transiting the Canal. The final decision on locations was, appropriately, left to the Navy.

In June 1941, the Navy Fuel Storage Board reported the quantities that the 15th Naval District would require – 1 million barrels of fuel oil; 220,000 barrels of diesel oil; 5.9 million US gallons (22.3 million litres) aviation gasoline. The split was suggested as being

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[6] Ibid.

[7] *Historic Resources Assessments: Department of Defense Activities 1993* (Panama Canal Treaty Implementation Plan Agency, Washington DC, 1995).

[8] These included work on facilities in Hawaii, Wake and Midway in the Pacific, Alaska and Puerto Rico.

[9] Congress initially allocated $65 million for a 3-year program: https://www.ibiblio.org/hyperwar/USN/Building_Bases/bases-1.html

60% for the Pacific side and 40% the Atlantic side. Also needed would be a further 3.8 million US gallon (14.4 million litres) of avgas for the Naval Air Station at Coco Solo; and 2.1 million US gallon (8 million litres) avgas for the Army.[10]

Two sites were selected for the new underground storage facilities. One was a 1,700-acre (688 hectare) area near Cristobal, designated the Gatun Farm. Work began on the Gatun Farm in February 1942, and would be much enlarged, on two occasions, in 1942-43. The other was an 820-acre (332 hectare) tract near Balboa but on the other side of the Canal entrance, known as the Arraijan Farm. This would be adjacent to what became the large Fort Kobbe and Howard Field airbase, as well as the naval base at Rodman.

The Gatun Farm was linked by pipeline to the existing 27-tank Mount Hope tank farm and the piers at the docks at Cristobal. The Arraijan Farm was similarly connected to the facilities at Balboa, including the fuelling piers in the Balboa docks.[11]

In addition to the new tanks, and bearing in mind the plan to expand aviation facilities at Coco Solo[12], reserve storage for aviation fuel was also provided adjacent to the air station there. In 1939, facilities at Coco Solo (which was also home to a submarine base) had included only a small landing field, three hangars for aeroplanes and a hangar for a blimp[13], barracks, officers' quarters, three seaplane ramps[14], and a few miscellaneous

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[10] https://www.ibiblio.org/hyperwar/USN/Building_Bases/bases-18.html

[11] Records show that the 405,000 barrel capacity Gatun Tank Farm comprising 15 tanks was abandoned in 1991, as US forces continued their withdrawal from the Canal Zone. Arraijan Tank Farm was abandoned in 1997. In 1988, amidst increasing tensions that eventual saw a US invasion in 1989, US Marines at Arraijan claimed to have clashed with "infiltrators" – although an official investigation by the US Southern Command apparently found no evidence.

[12] Naval Air Station Coco Solo (officially redesignated as Fleet Air Base Coco Solo in July 1931). It would also be called Upham NAS as, apparently, the US Navy did not feel that the name "*Lone Coconut*" was appropriate.

[13] A non-rigid airship used for naval patrols (see the Chapter on advance bases for a little mote on the use of such blimps).

[14] The terms "flying boat" and "seaplane" are often used (as here) as if interchangeable. Seaplane is a more generic term that covers both flying boats (which have a boat hull, with or without floats) and floatplanes, which use floats to land and take off from water. An amphibian or amphibious flying boat also features a wheeled landing gear. Pure flying boats employed a wheeled trolley for launching and recovery from land.

buildings. A one-mile taxi strip connected the Army airfield at France Field to NAS Coco Solo.[15]

Further development at Coco Solo had begun in August 1940, with an approved plan contemplating expansion sufficient to serve seven patrol squadrons of flying-boats (as proposed by the Hepburn Board recommendations). The site, though limited, was thought the most advantageous that could be found in the Canal Zone; and hence expansion was advocated rather than construction of an additional base elsewhere.[16] In addition to construction on existing land, 30 acres (12.1 hectares) of beach was reclaimed to assist in the expansion of facilities.

Between July 1934 and June 1940, the average amount of petroleum products handled by the Oil Handling Plants of the Supply Department of the Panama Canal was around 10 million barrels a year.[17] In the subsequent five years to June 1945, it averaged over 22.9 million barrels a year, with a peak of over 35.1 million barrels in the year July 1944-June 1945. The principal direction of movement was from Atlantic to Pacific, as well as to Central and South America. The US Navy's trans-isthmian pipeline system (of which more below) also used the plants as transhipment points from around September 1943.[18]

The famous wartime PBY Catalina, for example, was originally a pure flying boat, while later versions were amphibians.

[15] *VPNavy! USN, USMC, USCG and NATS Patrol Aircraft Lost or Damaged During World War II* by Douglas E. Campbell (Syneca Research Group Inc, 2018)

[16] The Navy also used Army facilities for the operation of landplanes in the Coco Solo area

[17] The Supply Department was headed by the Chief Quartermaster and was responsible for the acquisition, storage and distribution of materials and supplies for the Canal and the Panama Railroad; as well as maintenance and construction of buildings, living quarters and care of associated grounds, storehouses, fuel oil plants and even a printing plant. It was also responsible for the supply of motor transport to the various other departments and division, and the messes for contract labour. Fuel and cargo handling in the Canal Zone was the responsibility of the Panama Canal authorities, with obvious exceptions, such as avgas supply at the airfields.

[18] Ibid.

It is also worth noting that, because of the aforementioned pipeline, Balboa became the terminal for all Pacific Ocean tanker operations supporting the war effort in that theatre, and for any required dry docking and repair.[19]

TRANS-PANAMA OIL PIPELINE

After the Japanese seizure of the oil fields in the Netherlands East Indies at the start of the Pacific War the Allied forces in the Pacific theatre had to rely entirely on the Americas for oil deliveries. Many of the refineries in the US supplying the fuel were located along the Gulf of Mexico and the US East Coast, on the other side of the continent. Furthermore, during Summer 1942, a U-boat campaign targeted the tanker fleet on the Atlantic and the Caribbean, and this seriously reduced the number of fast tankers available to transport oil in the quantities needed. This was seen as a serious problem in view of the oil demands involved in operations planned for the Pacific campaign. This led to plans for the installation of a pipeline across the isthmus, connecting the Gatun and Arraijan tank farms.

Also known as the Trans-Isthmian Pipeline, the proposed pipeline would allow older, smaller, and slower tankers to be used for a shuttle service between Cristobal on the Caribbean coast, the supply sources along the Gulf of Mexico, and the huge refineries in Aruba and Curaçao. It would also eliminate tanker traffic through the Canal and hence speed up the loading and departure of the large, fast tankers carrying oil into the Pacific.

With the depredations of the tanker fleet by German U-boats in 1942, reducing the number of tankers available to transit the Canal, the construction of the pipeline became of the highest priority. Supplying oil from the Caribbean area also proved to be one of the shortest and quickest routes to supply the essential fuel to the Pacific.

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[19] *The Panama Canal in World War II* by James G Steese (The Military Engineer, Vol.40 No 267, January 1948), Society of American Military Engineers: https://www.jstor.org/stable/44516081

A contract was awarded in August 1942 for two 33-mile (53 km) pipelines, and construction began in October 1942. Despite a severe rainy season (even for Panama), the pipeline was completed and it was used for the first time in April 1943 and, by the end of 1943, the entire system was completed and in full operation.

The pipeline cost $20 million dollars, and was intended to handle a daily flow of 265,000 barrels of fuel oil, 47,000 barrels of diesel fuel and 60,000 barrels of gasoline.

The pipeline was originally built and maintained by the US Navy. The Dredging Division of the Panama Canal used its dipper dredge *Gamboa* to excavate an underwater trench in Gatun Lake to lay the 4 miles (6.4 km) of pipeline below this man-made body of water.

After a year of operation, in April 1944, work began to double the capacity of the pipelines, with larger-diameter pipes.[20] The Panama Canal Company later used it, and the old pipeline still sits at the bottom of Gatun Lake and in the undergrowth today.[21]

In 1944, the Mechanical Division of the Panama Canal[22] became the operating repair base for the 300 War Shipping Administration tankers of the Pacific Fleet.[23] Balboa, at the

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[20] https://www.ibiblio.org/hyperwar/USN/Building_Bases/bases-18.html

[21] http://www.czimages.com/CZMemories/Pipelineproject/mlindex.htm

[22] A Division of the Department of Operation and Maintenance. The number of vessels it repaired grew from several hundred in 1941 to 4,377 in 1945 (declining once more, to 3,186 in 1946). The Division operated also four dry docks, which were in constant use. In June 1945, US Navy floating dry dock YFD-6 transited the Canal and was installed in Balboa to augment the No 1 Dry Dock there. The number of ships using the dry docks rose from 185 in 1941 to a peak of 546 in 1945.

[23] The WSA was establishing during World War 2 to acquire and manage civilian shipping that the US required for the war effort. It allocated vessels to the Army, Navy, or civilian needs.
Concerns about the availability of shipping had ted to the formation the Strategic Shipping Board on the entry of the US into the war in December 1941. However, inter-organisation differences and other difficulties hindered its effectiveness, and it was superseded (though not entirely replaced) by the WSA in February 1942.[23] It was separate from the US Maritime Commission, established in 1936, which oversaw design and construction of merchant type vessels, including the famous Liberty and Victory mass-produced merchant ships – though cooperation was helped by both having the same Admiral in charge.
The role of the WSA was as a "*temporary war agency responsible for acquiring control over and operating all American merchant vessels other than those assigned to the Army and Navy*". The WSA took control of all

Pacific end of the Canal, became the terminal for all Pacific Ocean tanker operations, and for any required dry docking and repair.[24] To augment its facilities, in June 1945, US Navy floating dry dock YFD-6 transited the Canal and was installed in Balboa. Mooring facilities were increased in Balboa to provide assembly points for convoy operations and provide for safe mooring of vessels away from the open channels. [25]

PIPELINE ROAD

45 minutes from Panama City, this is a road built close to the Canal and intended for use in maintaining the Trans-Isthmus Pipeline. However, it was never used for this purpose can now be found as a gravel road providing access on foot to the 55,000 acre (22,000 hectare) of tropical rainforest in the Soberania National Park, and said to contain around 525 species of birds and 105 species of mammals.[26]

The Pipeline Road nature trail in 2021

Ray Todd

Panama City

Republic of Panama

17 November 2023

offshore merchant vessels under various charters and coordinated. It also instituted a new ship-building program to replace the Liberty ships with more agile Victory ships.
By the end of the war, the US merchant fleet had grown to comprise some 3,500 dry cargo vessels and over 1,500 high-speed tankers.
The WSA also worked closed with the British Ministry of War Transport to make the most efficient use of available tonnage, by means of the Combined Shipping Adjustment Board.
In 1948, WSA functions were returned to the Maritime Commission.

[24] *The Panama Canal in World War II* by James G Steese (*The Military Engineer*, Vol.40 No 267, January 1948), Society of American Military Engineers: https://www.jstor.org/stable/44516081

[25] https://www.jstor.org/stable/44516081

[26] http://www.anconexpeditions.com/tours/day-tours/day-tours