

U. S. ARMY PIPELINES IN INDIA

(The Not So Glamorous Corp of Engineers)

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INTRODUCTION

The CHINA-BURMA-INDIA Theater was activated in January, 1942 with the arrival of Lt. General Joseph W. Stilwell with a staff of 35 officers and 5 enlisted men in China. By the end of May, Japan had completed the conquest of Southeast Asia including Burma. The fall of Burma completed the isolation of China to surface access. The United States deemed it important that China be kept in the war as China might be needed as a base of operations against Japan and as China was tying up 15 to 22 Japanese divisions with support troops, a total of nearly 1,000,000 men. The U.S. decided to support China by an airlift of supplies from air fields based primarily in Assam province of India.

By September of 1942, the goal of reestablishing a land link to China had been set. A road was to be constructed through northern Burma to intersect someplace with the road opened in 1938 between Lashio, Burma and Kunming, China. The new road also would have the direct military purpose of supporting General Stilwell's proposed campaign in northern Burma. Discussions for augmenting the road with a pipeline system that would also service American Air Bases in Assam were started.

At the Quebec conference between Roosevelt and Churchill, both with their top advisors and military commanders, in August, 1943, the decision to build the pipeline was reached. By letter from the War Department, Adjutant General's Office to the Commanding General, Eighth Service Command and the Chief of Engineers dated 13 August 1943 the 775th to 789th Engineer Petroleum Distribution Companies (inclusive) were constituted and activated. Assembly and training was to be at Camp Claiborne, Louisiana. Seven of these fifteen companies saw service in the CBI theater along with six previously and three subsequently activated companies, a total of sixteen EPD companies.

In December of 1939, the Manager of Transportation for Shell Oil Company had submitted a study on the use of pipelines in military operations. On 26 February 1941, the Army Quartermaster Corp, then in charge of military fuel supplies received approval for the design of a pipeline system whose primary purpose would be to relieve truck congestion at supply bases. In 1940, Mr. Sid S. Smith of Shell Oil Company advocated a 715 mile pipeline along the Burma Road to China. This proposal was rejected by all commands until the Chinese requested lend-lease material for such a line. This request got the attention of top United States brass. On 30 April 1942, the Corp of Engineers was granted authority to experiment with the laying of a pipeline offshore from Camp Edwards, Massachusetts. They were also authorized to test the design of a reciprocating pump manifold that would automatically regulate pipeline pressures by a series of by-passes and valves. These tests resulted in the adoption of centrifugal pumps similar to the Byron Jackson 'pup' as the standard for army pipelines as they were more flexible to pressure regulation and were without piston wear problems.

On 12 August 1942, the first Table of Organization for an Engineer Petroleum Distribution Company was issued. The company was to be attached for administration to general service regiments of the Corp. By October 1942 the company T/O had been changed to that of an independent unit and in May 1943 the final T/O was issued calling for 7 officers and 221 enlisted men.

In April 1943 the first four EPD Companies were activated with two more planned each month thereafter. Ten units were to be in training at all times in a 20 week program. At the time, War

Department Policy prevented the specialized enlistment of personnel in the 18 to 38 age bracket. The Corp circumvented the policy by contacting oil companies for names of former employees currently in service, then located them and obtained transfers to EPD Cos.

The decision to build a line to China made in August 1943 at the Quebec Summit greatly accelerated the activation of the companies. In addition to company officers, command groups for various areas were needed to facilitate specific planned operations. In 1942 with the fall of the oil fields in Sumatra, plans to rehabilitate these fields had been made by the Corp. Ten drilling rigs were acquired and a number of men were commissioned directly from civilian jobs connected with the oil and gas industry. All were volunteers for this special assignment. Some had held ROTC commissions but many did not have any military training. This pool of company and field grade officers became available when it became apparent that operations in the Pacific would by-pass Sumatra but more officers were urgently needed. The story goes that one individual agreed to accept a Major's commission, was sworn into the Army on the spot and immediately was handed orders to report to Calcutta. Ultimately officers were obtained from other branches of service including at least two Medical Corp Administration officers.

Operations in the CBI would be at the end of a six months supply line including procurement in the States, transportation to docks, loading on ships, 60 or more days on the water, unloading in Calcutta, and rail or barge transportation to the point of usage. The Captain of the Liberty Ship, USS Carol Lombard (on its maiden voyage from Los Angeles to Calcutta after weathering a strong storm) remarked that he was more concerned about his cargo of pipe than the explosives and ammunition on board. If the pipe had broken loose in the hold, it would have acted like a battering-ram against the hull of the ship.

Chapter I

ENGINEER DISTRICT #12

Engineer District #12 with Headquarters in Calcutta was opened in the fall of 1943 with Colonel W. C. Kinsolving in command. The Colonel was a professional pipeline engineer with the Sun Oil Company and after the war returned to Sun becoming a Vice President of the company. District #12 reported to Engineer Division #1 commanded by Colonel Phillip F. Kramer, Jr., CE who in turn reported to Headquarters, Construction Service, SOS, India Burma Theater, Brigadier General T. F. Farrell commanding. General Farrell in turn reported to Major General W.E.R. Covell, Headquarters, SOS, India Burma Theater.

A partial list of officers serving in District 012 may be found in the appendix. Besides Sun Oil Company, Texaco, Humble, Phillips, and Sohio Oil Companies, Whitacker Construction, Braun Construction, E.S. Badger Construction Engineers, and Gould Pumps are representative of previous employment of ranking personnel.

All District #12 operations were in Bengal and Assam Provinces of India. The Shillong Plateau sometimes divided from west to east into the Baro, Khasi, Jaintia, and Mikir Hills, effectively divides the area of operations into two regions. The Plateau is east west trending almost at a right angle to the generally north south trending Patkai Mountains, and Naga, Lusahi, Chin and Arakan Hills along the border of India and Burma. These 'hills' can only be termed as such by comparison to the Himalaya Mountain Ranges. The 'hills' reach elevations as much as 9,000 to 10,000 feet rising from elevations of 300 feet or less. The Shillong Plateau is 250 miles long and 50 miles wide. It rises abruptly from the plain of the Ganges-Brahmaputra delta from an elevation of 150 feet to elevations of 4500 to 5000 feet in a horizontal distance of a couple miles. It is close to being a sheer cliff in many places.

The rocks of the Shillong Plateau are Archean granites (2 1/2 billion years old) fringed on the south by Cretaceous and Eocene limestones (100 million and 55 million years old respectively). The plateau is an integral part of the Indian continental block that has collided with the Asian continent to form the Himalayan Mountain Ranges. The rocks in the Patkai-Naga-Lusahi-Chin-Arakan trend are mainly of Miocene age (25 million years old) to recent sands and shales that have been strongly folded and faulted by the on-going collision of continental blocks. The shallow saddle between the Shillong Plateau and this north-south chain of mountains is part of the collision zone and a site of numerous earthquakes. Northern Bihar province borders Assam to the west. On 15 January 1934 a large earthquake in Bihar killed 7253 people and reports say many more probably would have died if the quake had hit at night. On 6 February 1988 an earthquake with a magnitude of 5.8 on the Richter scale hit the area along the southern scarp of the plateau, centering near Sylhet. A tremor 15 times stronger (7.2 on the scale) occurred during the monsoon season on 6 August 1988 in the saddle between the Shillong Plateau and the Naga Hills. This one would put an elephant on its knees. If it had occurred 43 years earlier it would have devastated one of the U.S. Army six inch pipelines.

The monsoon winds flowing to the north up the wedge-shaped Bay of Bengal meet no resistance until they encounter the Shillong scarp and then the rains fall. The village of Cherrapunji at the top of this scarp is certainly a leading candidate for the wettest spot on earth. The average annual rainfall is 400 inches per year with a maximum of 600 inches recorded. During the monsoon the south flank of the plateau is almost a continuous waterfall. The top of the plateau is relatively flat but some elevations reach 6500 feet. Near one of these higher points is the town of Shillong where the British established a recreation area and a rest camp for their troops. Rainfall here, 40 miles north of the scarp, is moderate. The north slope of the plateau is not as abrupt as the south but is steep according to almost any classification.

During the war years only three ground routes connected the upper Assam area to that south of the plateau. The principal route was by way of the Brahmaputra River around the western edge.

One and only one road crossed the plateau. It connected Sylhet on the south to Gauhati, near the Brahmaputra River, on the north. The one-way gravel road was operated by the British Army with several check points allowing north bound traffic for four hours and then south bound traffic for four hours. Failure to reach a check point on time meant sitting beside the road until traffic was reversed. The road was tightly closed at night and any one caught on the road at sundown had no option other than bivouacing. The third route was by way of a narrow gauge railroad built through the saddle between the plateau and the Naga Hills to the east. Even in the saddle, elevations reach 4500 feet. Rumor says 500 Welsh miners died of malaria during construction and that each railroad tie is a memorial to a dead Indian. Rather unbelievable but illustrative of difficulties encountered. Because of earthquakes and monsoon rains, the route is noted for landslides and washouts. According to Captain Charles E. Spahr's reconnaissance of the railroad route, (see appendix) there are 13 tunnels, 6 covered ways, and 28 bridges in the 'hill' section.

The top of the Shillong Plateau is quite thinly populated but to the south 100,000,000 people live in an area the size of Wisconsin in what is now the country of Bangladesh. The plateau and particularly the western flank down to the Brahmaputra River is big game country with tigers, wild elephants, and at least one herd of rhinoceros.

The Brahmaputra River is one of the great rivers of the world. It rises in Tibet between the Great Himalaya and Ladakh Ranges (where it is known as the Tsang-po) at an elevation of 16,000 feet and runs east for 1,000 miles passing south of Lhasa before abruptly turning south to cut through the Great Himalaya Range. In this sector it is known as the Dihang River. After picking up a couple of rivers from northern Burma, it emerges from the mountains and enters Assam at an elevation of no more than 500 feet above sea level. It is now the Brahmaputra. The river is forced to turn west for 350 miles to

pass around the Shillong Plateau. Thence it heads south for the Bay of Bengal breaking into a number of distributaries that service both it and the Ganges. The Hooghly River is the most westerly of the distributaries.

The Brahmaputra River even in the dry season carries a volume of water equal to 146,188 cubic feet per second. At the same time and under the same circumstances the Ganges River discharges 80,000 cubic feet per second. The Indus River is credited with carrying an average of 1,000,000 tons of silt per day with the Ganges less and the Brahmaputra more. North of the plateau the Brahmaputra is a braided stream with a number of constantly changing channels. Captain Arnold H. Barben in a letter to his wife in May 1944 states:

“Have seen the Mississippi and flown across the Amazon but this one from the air looks as big as the Amazon, even at the mouth. Now, of course, it's a series of parallel streams which will all overflow during the monsoons and make a river about 40 miles wide. Now the narrowest place is three or four miles wide with widths of the separate rivers running up to five miles.”

At Budge Budge, 15 miles south of Calcutta, on the Hooghly River was a Shell Oil Company tank farm with tanker unloading facilities. Capacity of the tank farm approached 500,000 barrels of which 300,000 to 400,000 could be made available for use by Engineer District #12. At the other end of the District in upper Assam, the Burmah Oil Company had a small oil field at Digboi, a monument to a young geologist's boss that said "digboi". A 'teapot' refinery nearby furnished all the petroleum products needed north of the Shillong Plateau prior to the war. At Tinsukia, Burmah Oil had a 24,000 barrel storage tank. The starting and finishing points for the first six inch line and the general route to be followed were obvious. Details were not.

The line from Budge Budge to Tinsukia and thence to China was often referred to as the 'Infinity Line'. It was to be a six inch line to Tinsukia following the broad gauge railroad to Parvatipur (Parbatipore) 250 miles north of Calcutta, thence along the narrow gauge railroad east 75 miles to Golakganj. This segment was to be built using railroad support and not roads. From there, it would follow a road to Togighopa on the bank of the Brahmaputra River. The first major river crossing, that of the Ganges, could be by the Bengal Assam Railway bridge. The route skirted to the west of the numerous major rivers of the delta region with the exception of the Hooghly. The crossing of the "big river" from Togighopa to Goalpara on the opposite bank would be a major problem.

The location to cross the Brahmaputra River was selected because it was the narrowest point available although it still would be the longest river crossing ever constructed anywhere in the world and possibly still is. From three to four miles of welded pipe would be needed. Once across, the line would follow gravel roads mostly near the south bank of the Brahmaputra River into Tinsukia, an additional 360 miles. The total length of the line would be 760 miles with 27 pump stations, an average of one station every 30 miles.

Chapter 2

WEST BENGAL LINE, B-29 BASES (MATERHORN)

In November 1943, the B-29 bases west of Calcutta were being established at Kharagpur, Dudhkundi, Chakulia, and Piradoba. The first EPD company to arrive in India was the 700th under the command of Captain Clifford T. Sommers. It reached Kalikunda on 3 January 1944 and was assigned the task of laying the six inch line from Budge Budge to Kharagpur, a distance of 60 miles. The 707th under Captain Charles E. Phillips and the 708th under Captain Mike A. Ledford arrived a few days later. The 707th laid the four inch line from Kharagpur to Chakulia via Dudhkundi and the 708th the four inch line

from Kharagpur to Piradoba. Each line was 50 miles in length. It should be noted that the volume of a six inch line is 2 1/4 times that of a four inch line with some additional deliverability resulting from lower fluid friction in the six inch pipe under similar operating pressures and conditions.

The first problem was to pull 4000 to 5000 feet of welded six inch line across the Hooghly River from Budge Budge to Ulubaria on the west bank. The Hooghly is a tidal river with a bore (wall of water) that can reach a height of 7 feet and travel up to 25 miles per hour. Reports from Budge Budge tell of seeing the carcass of water buffalo floating down river and within the hour returning up stream on the tide. Since Budge Budge is below the Calcutta burning ghats, the carcasses are not always those of water buffalo. The pulling of the pipe was coordinated with optimum tidal conditions. To help hold the pipe in position on the bottom, heavy pipeline clamps were attached every few joints. The pipe was pulled by large D8 caterpillar tractors at the end of steel cables.

There were three pump stations in the system, one at Budge Budge, one midway to Kharagpur, and one at Kharagpur to pump into both of the four inch lines. Gasoline was started up the system on 13 March 1944 by the 707th which stayed to operate the entire system. The 700th and 708th moved on to wetter pastures. The first B-29 arrived in India on 2 April and the first flight of a B-29 to Chengtu (Chengdu) in China was in late April. Although the B-29's were transferred out of CBI in late 1944, the lines continued operation until the end of the war. The first system constructed was the first closed down by flushing with water which was completed on 2 September 1945.

The most tragic accident involving any of the pipelines in the CBI occurred at Ulubaria. It is described by Major Arnold H. Barben in a letter to his wife, dated 9 September 1945 as follows:

“A former colleague's final trouble was the fire at Ulubaria. We had the line across the Hooghly River leak and he had responsibility of repair. His idea was to displace the gasoline with water and then blow compressed air in it and find the leak by bubbles. He took the end of the pipe out on the Ulubaria side and it pointed up like a Howitzer over the market place. He put the air on and hadn't displaced all the gasoline. A mixture of air, gas and water is like dynamite. It broke loose and sprayed the market place with gas and vapor. It exploded at once. Ninety-eight people were burned to death. One of our men died in the fire.”

“We've had some tough fires. I had a bad one last year in the railroad yard at Gauhati. They are no picnic and are quite risky. I'm glad that it is over with. These boys, working knee-deep in a ditch of gasoline, when a spark might mean disaster, deserve a lot of credit. We never lost a man through carelessness except in the above case.”

Not only did Engineer District #12 have the responsibility of long range strategic objectives but the tactical objective of moving gasoline to the widely dispersed American Air Bases. In the Ganges-Brahmaputra delta region south of the Shillong Plateau, northeast of Calcutta, were airfields more logically served by barge than major pipeline systems. A detachment of the 700th in the summer of 1944 up-graded the barge and tank car off-loading systems in the area around Dacca (Dahka). This included 35 miles of six inch pipeline, a floating pump station, and a 5000 barrel storage tank and a pump station at Tezgaon airfield and the same at Kurmitola airfield. At the Sylhet airfield, 120 miles northeast of Dacca, another detachment of the 700th built 26 miles of six inch line and two pump stations. Detachments of the 700th operated the facilities to the end of the war.

In upper Assam, the 700th took over operations of the 30 mile Tezpur-Misamari pipeline and barge unloading dock and the 50 mile line connecting Sookerating, Chabua, Dinian, Mohan Bari airfields to the Tinsukia tank farm and to the Dibrugarh barge unloading dock. These two pipeline systems had been built and operated by the British. Up-grading the systems entailed the laying of more than 40 miles of six inch line and the erection of additional tankage at the airfields. Far away near Calcutta, the

company erected a 5000 barrel tank and constructed a pump station at Barrackpore airfield. There was also a project at Agra of rebuilding a bolted steel tank. On 9 May 1944 Lt. Roy C. Payne was promoted to captain and succeeded Captain Somers in command of the company. With headquarters at the Tinsukia tank farm, Captain Payne must have wondered where all of his men were and how much thinner they could be scattered. His consolation was that District #12 headquarters had an even bigger problem keeping track of the location of men in five scattered companies.

Chapter 3

BUDGE BUDGE TO TINSUKIA (Infinity Line)

The first leg of the Infinity Line (who knew where it would eventually end) was started by Captain Somers' 700th on 27 February 1944 when his headquarters were established at Kanchrapara. The company was to string, couple, and ditch the six inch invasion weight pipe from Budge Budge (mile post 0) to Hardinge Bridge on which the railroad crosses the Ganges River (mile post 137). The line would follow the broad gauge railway and work trains would be used instead of trucks. This was fortunate as trucks were scarce at this time. Pump stations #1, #2, #3, and #4 with storage tanks were also their responsibility.

The 776th, commanded by Captain C. W. Foreman, reached India on 8 February 1944 and was sent to Parbatipur where headquarters were established on 24 February. Their assignment was to construct the line and pump stations #5 thru #11 including storage tanks from Hardinge Bridge (mile post 137) to Dhubri (mile post 340). The 700th assisted by constructing the first 43 miles. The 776th was transferred to Burma in July.

The 708th less one officer and fifty-five men, commanded by Captain Mike A. Ledford had reached India on 26 December 1943 by crossing the Pacific, rounding Australia on the south crossing the Indian Ocean and landing in Bombay. The detachment after completion of their supply work in the States, sailed the Atlantic, rounded South Africa and landed in Bombay. It rejoined the company in Gauhati, Assam on 8 March 1944. The company had received the assignment to construct the six inch line from Dhubri (mile post 340) to mile post 505, 30 miles past Gauhati. This included the crossing of the Brahmaputra River.

The 709th arrived at Bombay on 8 February 1944 and was ordered to Dhubri, arriving there on 17 February. They completed the six inch line from Laimanirhat (mile post 290) to Dhubri (mile post 340) on 16 April. After starting for Kalikunda on the West Bengal line, orders were changed and they moved to Paranigudam near Gauhati leaving a detachment to complete some construction on the B-29 base at Piradoba. On 20 May construction of the six inch line from mile post 505 to 581 was started. Upon completion of the segment on 5 August 1944, Lt. Louis W. Gwin was promoted to Captain and took command of the company. On 7 August, the company was ordered to Jambu Bum, Burma.

Although the 777th under the command of Captain Thomas J. Johnson had arrived at Jorhat airfield and established headquarters on 18 February 1944, they whiled away their time waiting on equipment and supplies by building four radio towers, one radio homing tower, two outdoor theaters, six anti-aircraft gun emplacements, repaired three diesel engines for 45 kw generators, cleared ten acres of tea plantation for a radio station and leveled ground for a 60 by 600 foot runway. Their sector was to be the 190 miles from mile post 581 to Tinsukia including pump stations #21 thru #27 and the building of the 200,000 barrel tank farm at Tinsukia. By 3 March sufficient equipment had reached them for stringing of pipe to start and by 23 March, 2 officers and 77 enlisted men were sent to Tinsukia to start work on the tank farm. On an early reconnaissance trip to the region south of Tinsukia, Captain Johnson received an

upper Assam welcome when he came upon a tiger that had encountered an Army 2 1/2 ton truck. The tiger though a clear-loser was still alive and there was not a firearm in the small group of men that had gathered. The captain put his revolver to use and shot the tiger through the ear putting it out of its misery. Probably the only use he ever made of a revolver in the CBI.

Soon after the 777th established headquarters at Jorhat, it was adopted by a small rhesus monkey that became known as Betsy. Betsy saw no greener pastures as there was good food and good water as soon as she learned to operate the faucet at the end of the water line.

Most of the pipe for the six inch line in upper Assam came up river by barge and was unloaded at Gauhati, Silghat, Jorhat or Dibrugarh. Couplings and other supplies usually were shipped by rail. Captain Arnold H. Barben's account of one shipment may be paraphrased as follows:

“In the 777th area the railroad first passed through Lt. Ernest E. (Red) Kinkler's section and it was his habit to waylay the train at Lumding in the freight yard and take whatever supplies were needed in his sector. A couple of times of this was sufficient to cause security measures to be taken by Lt. Leonard O. Wharton in the next sector up the line. The next time Red opened a freight car door he found two carbines staring him in the face. The CI's were firm. Their orders were to shoot any red-headed lieutenant who tried to pilfer their supplies.”

The line was laid in a two foot deep ditch dug by native labor supplemented by a scoop designed by Major W. K. Holleron of Engineer District #12. As long as the ground was level and without pebbles, the plow worked reasonable well but it took a D8 (largest in the theater) Caterpillar tractor to pull it. The Cat often could be used more productively elsewhere. The Indian labor used oversized hoes called ghodalys for digging. At the start of a new work day, it was not unusual to find a ditch full of snakes that the men had to remove before digging could resume. The open end of previously laid pipe needed to be plugged to keep the snakes and varmints from taking up residence during the night. Three to four thousand natives were continuously employed during construction with usually a thousand being on the payroll of the 777th.

Paying the native labor could be a problem if the army finance office was to be kept happy. The army paid once a month and with the smallest number of bills and coins possible. A few of the native overseers would earn more than 100 rupees (\$30) per month but a 100 rupee note was of no value to them. No merchant could break a note of that size or would accept it in payment for goods and there were no banks available. Another problem was that much of the labor was from local villages and would not work a full month because the progress of the pipeline would take them out of easy walking distance from home or for other causes. Truck transport was only a partial answer. Payment always was wanted immediately when they quit.

The usual oriental method was to make all payments to the top babu (boss) and let him handle the payment of the men. This led to graft and skimming of payments. The problem paralleled in a minor way the one General Stilwell faced with the Chinese army where the commanders trickled down payments to the 'pings'. With the knowledge and tacit approval of higher headquarters, the problem was solved by building a company controlled fund by padding the payroll and never turning in a sum due of more than 951 rupees. This was easily done as all of the natives signed with an "X". Once a month, the native payroll and the company payroll was made out by the 1st sergeant's office and submitted by the payroll officer to the nearest army finance office. This resulted in a gunny sack full of rupees. The officer took the gunny sack up and down the line, paid the men, and watched the payment of the natives. The surplus was returned to the company safe at headquarters and stored for a rainy day. There always was one. The native surplus fund was eliminated at the end of the war and adjusted in amount from time to time by under-submitting names on the payroll. At least one company's payroll officer (probably all) will gladly swear that nary a rupee was ever misappropriated.

Wherever and whenever feasible, prior to placing a section of pipeline in operation, it was tested with water to a pressure of 1000 pounds per square inch to locate leaks. Normal operating line pressure was between 500 and 650 pounds per square inch. A "rabbit" (alias go-devil or scrapper) was run through the line to clean out all debris. Major Barben in a letter to his wife on 29 August 1945 describes a rabbit and the way of using it in a line filled with gasoline (same for water) as follows:

“It consists of three steel discs backed by old tire to make a tight fit in the pipe, some gear antenna run out in front to help guide it and a chain dangling behind. You open the line which means a ditch about 30 feet long and knee-deep in gasoline, put in the rabbit, close the line, start the pumps. When the pressure hits it, your trouble begins. You are all stationed above the line, which is a couple feet underground, the scraper takes a dive ahead of the pressure and when you hear the chain rattle by you, you start following it, ear glued to the ground, through mud, slime, rain, sun, slow walk, dog trot, etc. When it stops, you hitch up your field phone, call the station, shut off the pumps, dig up the line, more gasoline up to your knees, then take out the obstruction, put the rabbit back in, couple up the line and start the game all over.”

The Signal Corp was responsible for establishing and maintaining communications for the entire pipeline. Without the teletypes and phone connections, pipeline operations would have been impossible. The phone line was a party line with all phones having a switch for transmission or just listening. Barben's description of the phone system in July 1944 follows:

“I get a great kick out of our party-line phone system. Have about ten stations on and try to do a lot by phone. Regular French phone, field type, with a little lever that cuts out your transmitting but lets you listen. I find out a lot about the line and myself by listening. I called for one dumbbell today and heard someone who forgot to turn the voice lever say, 'Come quick and hear the Captain chew someone's ass out.' Well you lose your temper now and then.”

The 708th under the command of Captain Mike A. Ledford received the honor, labor, and headaches of getting the pipeline across the Brahmaputra River from Jogighopa on the north bank to Goalpara on the south bank. The company had plenty of supervisory help and/or hindrance from personnel out of District #12 Headquarters. The conception was simple. Place 3 miles or more of pipe welded together on rollers and skids, pull and float it across the river, connect it up and the job will be finished before the monsoon hits in late May or early June 1944. The assembly of material and welding was done on the flat and dry north bank as the south bank was the sloping western edge of the Shillong Plateau.

To float the pipe, the leading end was sealed off to prevent entry of water and floats were attached to obtain the needed additional buoyancy. The floats were (what else) 55 gallon drums attached to the pipe by pins that were in turn attached to a cable in such a manner that a pull on the cable would release all simultaneously. The pipe then would sink to the river bottom as a unit and the floats would disappear down stream to be salvaged per gratis by the natives before reaching the Bay of Bengal.

To pull the pipe, a flotilla of ocean going tugs was brought up stream from Calcutta and a battalion of D8 Caterpillar tractors was assembled to push and pull on the north bank. With all in place, the skids and rollers well greased, and the morning light strong enough to see about 50 feet, the pull and push was started. All supervisory personnel and a few onlookers, all with their fingers crossed, were standing along both banks. Once the pull was started, only disaster could stop it and no one wanted a second chance. At least, a bore tide such as present in the Hooghly River at Calcutta would not be a problem. Close to 50 tons of pipe, floats and cable were on the way and made the trip without a disaster. The longest river crossing in the world had been laid.

Troubles were not completely over when the final connection was made on the south bank near Goalpara. The welds had been pressure tested with air while on dry(?) ground and any leaks repaired. Now was the time to run the long eared, short legged, and blunt nosed creature so beloved by all pipeliners. It had not been done before as the buoyancy of air in the pipe was needed during the flotation stage. Pumps were connected and the rabbit was started on its way with water doing the pushing. There were a few anxious moments when pump pressures started to rise but, as a lawyer would say, in due course, water, sediment, snakes galore, and a lot of etc. reached the south bank. The crossing was completed in May 1944.

This observer by luck was in Gauhati with Staff Sergeant Joseph O. Brandon of the 777th to pick up a staff car when he heard the line was to be pulled. A once in a life time opportunity to see the crossing made was only a couple of hours away. With Brandon following in the staff car, the site at Goalpara was reached late in the morning. We departed for Jorhat, 275 miles up river to the east well after dark. The first part of the road was across the hills leading up to the heights of the Shillong Plateau. The jeep was in the lead when we came over the crest of a hill and it almost hit the rear end of a wild elephant. The elephant's trunk swung around so that the commotion in the rear could be investigated. That is when the staff car came close to shoving the jeep into the elephant's behind. After staring at four headlights, the elephant bellowed and rambled off through a bamboo grove on the hillside followed by at least a half dozen of its friends. A number of months later, two officers (Lts. Sindo and McGhee) of the 708th had to park their jeep in the middle of the road and allow the herd to walk around them.

Victaulic coupled pipe was used the entire length of the line except for river crossings, through villages, and 200 to 300 feet into and out of pump stations. These sections were welded. A pump station had five centrifugal pumps, four in use with one standby. It did not take long until the standby was in use and one of the others was under repairs or maintenance. The sign in one station said:

"The Lord made the world to spin on its axis without bearings or lubrication, but the Lord help you if you don't lubricate these machines,"

Usually each station had a 5000 barrel and two 250 barrel tanks. The smaller tanks were used for 80 octane and the larger 100 octane gasoline. The storage for the aviation gasoline lent flexibility, to pipeline operations in cases where individual stations might be shut down because of line leaks. It took good juggling and good communications with the chief dispatcher at Budge Budge to keep from shutting down the entire line because of a local leak. The rated capacity of the line was 10,000 barrels per day. The storage at one pump station on the up side of a shut down section could keep the line in operation for 12 hours. The continued operation of the line on the other side depended upon adequate empty storage at some pump station. It is important to keep fluid in a line moving as slugs of different fluids will mix if the interface is stationary. Eighty octane motor fuel was orange and one hundred octane aviation gasoline was blue. The manifold of a pump station was installed to allow access to the tanks with any combination of the pumps. The pumps were set on concrete. The tanks needed a level (very level) base topped by gravel and sand six inches or more thick.

The pump station compound, in addition to the pump house and tanks, provided living space for 15 to 20 men. There was a barracks and a combination kitchen-dining room and recreation area. The entire area was surrounded by a four foot barbed wire fence with an additional six foot barbed wire fence around the pumps and tanks. The bashas were built by Indians out of bamboo with thatched roofs and a concrete floor. Ideally, the bashas were built in advance of all other construction to alleviate as far as possible the pitching of tent camps but India is not an ideal place. Sand, gravel, and cement were always needed but sometimes obtainable only by trucking considerable distances. The cement usually was shipped by rail.

Tank parts arrived by barge or rail and often in damaged wooden containers or no containers at all. The curvature of tank staves is similar for many different sized tanks and when a bunch of staves arrived uncrated and shuffled like a deck of cards, it could be a major disaster if some were dog-eared or dented. Separating out the parts was a major chore in itself. The lower rung of staves to a 10,000 barrel tank are heavier than those in the upper rung but have the same curvature. At a time when increasing tonnage was being handled by the Calcutta docks, tank builders wanted more undamaged tons not more tons.

On 23 March 1944 Captain Johnson of the 777th dispatched 2 officers and 77 enlisted men to start work on the 200,000 barrel Tinsukia tank farm, terminus of the 760 mile line from Budge Budge. The Dibrugarh docks on the Brahmaputra River, the last major barge unloading point up river, served the five major US airfields in the area plus all U.S. operations on or along the Ledo Road. If a choke point for supply existed in the theater, this was a good candidate. Tinsukia is 30 miles east of the docks and about the same distance by road northwest of Ledo. Along and north of the road through Tinsukia the Corp of Engineers had established a 'sophisticated' operation for sand and gravel which was necessary foundation material for construction of the 10,000 barrel tanks. It was a priority matter with the only hitch being the priority matters of the Ledo Road and various air fields in the area. Every outfit always needed more sand and gravel immediately.

Native labor was scarce in northeastern Assam but the 777th became an equal opportunity employer by hiring Hindu women. Their job was to install and tighten the tank stave bolts, working where necessary from bamboo scaffolding both inside and outside of the tank. A pair of enlisted men always checked the final tightening. Extreme care was taken with the bolting and proper installation of neoprene gaskets in the bottom of a tank as there is no way to make a repair once the tank is in use. As a precaution, a foot or so of water is kept in the bottom. If a leak should develop it would be water lost not gasoline. The water level was checked with a plum bob as a daily routine. Each tank had a retaining wall of earth built a sufficient distance from it with a height capable of holding the full contents of the tank.

One day a python came wandering into the construction area of the tank farm looking for a small bite to eat. Since it distracted the ladies (and quite a few men), it was shot and killed. It was every bit as long as the Brahmaputra River crossing or at least 20 feet but it grows longer with each passing year.

The Assam Oil Company had built a products distribution pipeline from the Burmah Oil Company's 22,000 barrel tank located at Tinsukia to serve the gasoline needs of upper Assam prior to the war. During the construction at the tank farm, the British maintained a liaison officer. Captain Barben relates the following story in a letter to his wife 22 September 1944 from Tinsukia:

“Lt. Austin, the local British liaison, stayed with Lts. Kinkler and Wharton (Texans) and me when I was here before. Wharton (Southern Methodist graduate) used to talk as rough, tough and dirty as possible at times to (what he claimed) Christianize Lt. Austin. One day at dinner he said, 'You know, Austin, I think I'll stop in England and visit you on my way back home.' Austin visibly gulped, his face reddened and he said, 'I say, my bonny-boy, let me know like a good fellow in time to hide my wife and kiddies.' He really meant it.”

In June 1944, the air force requested that District #12 take over the British operations of a barge unloading area on the south bank of the Brahmaputra River and a ten mile 4 inch pipeline to Jorhat air base. Since the 777th was headquartered at Jorhat, the job was theirs. An examination of the facilities revealed the reason barges were not being unloaded fast enough to keep the air field supplied with aviation gasoline. The pump station could operate only in daylight hours because there were no lights. A 5 kw generator, vapor guards, and light bulbs were needed. Tape could be used to wrap the sockets and the base of the light bulbs thereby serving as vapor guards, but where to get a generator was not

readily apparent. A requisition was filled out for submittal through channels but no one would even speculate on how long that would take. The company did not have lights in their quarters but a little scouting revealed two 5 kw generators in use in the air force officer's quarters. The thought occurred that half of the light bulbs and one of the generators would fill the bill. A visit to the base supply officer, even after an explanation of the problem elicited a curt "sorry, we can not help you" until the statement was made that they could have abundant light in the quarters or abundant gasoline in their planes but not both. The supply officer disappeared for a few minutes and on his return said to take the generator, wiring, and bulbs but be sure to return them when the requisition through channels was filled. On 14 June 1944, seven enlisted men took over operation of the line and pump station. When the 777th moved out, the line was turned over to the 708th for operation on 19 July 1944. No records have been located to show if the generator was ever returned to its rightful owner but it is doubtful that the Air Force ever saw that generator again.

Efficient house keeping while not glamorous was the backbone of all operations. By the end of 1944, the 777th was operating 57 trucks and 25 tractors, including 14 D8's. A total mileage of 771,000 had been driven in nine months. The motor pool installed 704 pairs of brake linings, 251 shock absorbers, 474 springs, 16 new engines, 1522 spark plugs, 12 transmissions, 24 transfer cases, 942 tires, and 88 batteries. This company's time was spent entirely on construction but the companies that were on pipeline operations were just as busy with repairs of pumps and pump engines. The field machine shops were a great help to the motor pools. Each company was responsible for their own Post Exchange (PX). Supplies were drawn from Calcutta and transported by rail and truck. All rail shipments required a guard. It was a real sore point to see a plane loaded at Dum Dum air field and know the supplies would be on sale within half a day at some air base. The train trip to Jorhat took most of a week but the air force would not transport the 777th supplies to its Headquarters located on the base. Corporal Judson R. Sawyer, in charge of the PX for the 777th, drew supplies in Calcutta, loaded them in a small box car, served as guard on the rails, and was the company's itinerant peddler off the rear end of a truck. A cozy relationship developed between Sawyer and the payroll officer. Within a few days after the men were paid, Sawyer would load up the truck, visit each work party, sell his wares at night after working hours, straighten out his records during the day and move on to the next work camp. By time he returned to headquarters he had most of the company payroll in his gunny sack ready to be turned in so that the process could be repeated the following month. It was an easy sales job as there was no other place for the men to spend their money. He also delivered the goods for the supply and mess sergeants, acted as mail carrier, and courier of complaints. He tried to make the trip to each detachment at least twice a month. He should have been working on a commission basis.

On the 'Infinity Line', the work day was sun up to sun set, seven days a week. Saturdays, Sundays, and holidays did not exist. The only way to get a day off was to be sent to the hospital. The standing joke was that we will not be awarded any Purple Hearts but we will all receive the Spotted Liver (from amoebic dysentery). The hospital treatment for amoebic dysentery was "hip" shots made with a needle that should only be used at the Kentucky Derby. A picture of the ward ready for the morning treatment would be most enlightening. Malaria and dysentery caused the most concern. In the first ten months that the 777th was in India, it suffered a loss of 1545 man days, 574 to malaria, 162 to dysentery, and 792 to all other causes including injuries. There were 158 hospitalizations (a 70% casualty rate) and four men were transferred out due to disease or injury.

If the above seems unreasonable, witness the statement in the official history of the 708th:

“By 1 August 1944 over 42 % of the company had been hospitalized as malaria patients. The strictest malarial control discipline was established and faithfully maintained during this time, but even the most stringent precautions were to a large extent defeated by the malarial areas in which it was necessary to live and work.”

The most popular name for a truck in Assam was 'Assam Dragon' but it must have been an amoebic dysentery patient returned to duty that named his truck 'Assam Sore'.

The Medical Corp doctor assigned to District #12 was a recent transferee from duty in Alaska. He spent most of his time in the field checking on sanitation, drinking water, treating minor ailments such as swimmer's ear (a universal complaint during the monsoon), and sending people to the hospital. After the first wave of malaria cases, he encountered no difficulty enforcing mandatory suppressive atabrine treatments. If the atabrine was not on the table next to the salt and pepper, it was demanded by the men. Fortunately, the practice of his specialty was never needed. It was obstetrics.

Under the circumstances, recreation for the men was never a problem. Occasionally movies were obtained and sent out to the work parties along with a projector. Some ping pong equipment was available but seldom used. If one had enough energy at the end of a day to play ping pong, something more useful and needed could be found. The only news came from the BBC in London over the radio. The men were allowed time to listen to it.

In near proximity to pump station #25 (mile post 690) near the town of Sibsagar in upper Assam was a Hindu temple with a shiny golden dome. It is part of the palace grounds built by an Assamese potentate three to four hundred years ago. The palace has walls six to eight inches thick with a large reception hall on the second floor. It is reached by a large staircase with some steps only an inch high and some a foot high without any rhyme or reason. The entire building is dark and damp but kept relatively clean by someone. The grounds have reverted to a swamp from whence they came. If you have a fear of snakes, the grounds and the buildings are best left unexplored. There is a large open building that might have been a stable for elephants. The dome of the temple was rumored to be pure gold and the bullet holes in the base of the dome indicate some enterprising soldiers in the days of yore tried to obtain samples. The dome is probably coated with gold leaf as it does not appear to be weathered. The temple is open to visitors provided shoes are left outside. It is best to skip the tour as the inside is a long dark corridor leading to a large room with a domed ceiling lit only by lamps fed with animal fats. Circulation of air is nonexistent. The best view is from outside but the smell is terrific.

Pump station #22 at pipeline mile post 610 is about 60 miles west of Jorhat. A very few miles from the station is Mr. Smith's bungalow, headquarters for his tea plantation. The assistant's bungalow is right next to it and was in use for visitors. The bungalows were screened, had toilets, showers, electricity, and ceiling fans. Lt. Wharton in charge of laying the pipeline in this vicinity became acquainted with Mr. Smith as did Captain Johnson. Through them, Smith had taken a likening for pipeline engineers and the engineers for him and his quarters. It was the lap of luxury. On a clear day, the Greater Himalaya Range with peaks reaching to more than 20,000 feet could be seen. The foothills of the mountains are only 30 miles distant and they are the land of Shangri La and Yeb La, Yembo La, Tungka La, Orka La, Bomdi La, Piri La and a lot of Tra La La's. To the south the abrupt northern edge of the Shillong Plateau rises to elevations of 1700 feet from 300 to 400 feet in little more than a mile.

Back of the bungalows, a wide strip, a couple hundred yards long, had been cleared for observation of game. Smith had killed a tiger that was stalking a deer in June 1944 and a couple of weeks later a rhino hide had been found on a native's porch nearby. This was big game country but rhino's are a protected species and the locals were sent to jail. Captain Barben describes his visit to Mr. Smith's bungalow as follows:

"In the native hut next door there was a visitor last night. A tiger came through the bamboo compound and tore off one side of the bamboo barn. He killed a large bullock, 250-300 lbs., and carried it about 300 yards into the high elephant grass. Smith is going to tell some of the Station #22 crew (708th) so they can sit up for a kill. Any benefit is dubious as the bullock is too far gone and has been disturbed (by natives butchering the bullock and by vultures following up) too much."

The only rhinoceros herd in India inhabits the western part of the Shillong Plateau. Other herds of the Indian rhino are found in Nepal where they have been protected for a few centuries. These creatures are larger than their African cousins but just as near sighted. Even an elephant will give ground to a charging rhino. Captain Barben describes an elephant back trip with Lt. Beard and Sgt. Shipley, both of the 708th, and Mr. Smith.

“Elephant grass is like cat-tail reed, only thinner and more delicate, between quack grass and cat-tail. Only it's 15 ft. high. In places it was over our heads even when we were on the elephant.

It wasn't long before we ran onto rhino trails, like mouse trails through the high weeds. Our position from high up made that an easy comparison. Now and then we would run onto their mud wallows; now and then their manure heaps. They are very fastidious, coming back to the same heap every day. Finally we had a glimpse of one who saw us first and was off in a welter of grunts of disgust. I would have been satisfied with that fleeting glance, but the guide wasn't. We soon surprised a pair at a wallow. They looked towards us, backed out of the wallow and then came on again. The elephant was shoved in closer by the driver till we were 50 ft. away. We watched for five minutes. After a while they got suspicious, backed into the grass and were off. The tough moments came when the elephant would get stuck in the mud and then pull his foot out, a sucking sound and a heave (we held on tight).”

The last six inch coupling to Tinsukia was tightened on 1 July 1944, and the water flush to clean the line was started up the last 180 miles reaching the terminal on 15 July. The movement of fluid averaged 12 miles per day. Work continued on tank construction at Tinsukia and at pump stations. The first gasoline reached Tinsukia in early August and on 16 August 1944 the line was in full operation. The start up was not without some difficulties. On 9 July 1945, a year after the event, Major Barben described one.

“July, 19th was the morning I started up Station #12 on our first line. Everything dripped. The mud was ankle-deep. The boys that built the station were transferred to Burma and left it poorly done. The gang that gave me line clearance between 11 and 12 didn't know that they had to wash the line but good. They didn't realize how good. When we turned on the flow we were hit with a ton of gravel plugging two pumps, tank reliefs, main line checks and manifold. Everything had to be taken apart and when everything is loaded with 100 octane gasoline, you are careful and have your heart in your mouth.”

Another line plug is described by Barben as follows:

“Last Thursday I realized when I was at the teletype at (station) 20 that there must be a partial block in our line between 15 and 16 about 150 miles away. I went there at once and stayed up all Friday night digging up possible places. Didn't find it. Then we put on gauges. This sounds easy but we had to make the stuff and put it on with gasoline under pressure on the line. By this way we cornered the possible plugs from a 27 mile stretch down to a five-mile stretch. We next broke the line and put a go-devil or scraper (rabbit) in the line. It took us 32 hours to go 3/4 of a mile. Had to break the line five separate times and take out blocks. This went on all day and night Friday, Saturday, Sunday and Monday...”

Immediately after cleaning out the line between pump stations #15 and #16 a leak and fire occurred near #17 at Gauhati. Barben describes it as follows:

“Our fires are not in villages, usually, thank heaven. Although my second one was a honey, right in the railroad yard at Gauhati where I had trouble, mostly with the know-it-alls of the Railway Battalion. We cut the line off by nearest valves which are anywhere from one to twenty miles from the fire. Then we dig the line up on either side and flank (blank) it off. I like to let it just burn out, as it is very dangerous

to repair otherwise. If you don't let it burn out, you have to work in the gas fumes and gasoline which a spark from a wrench or shoes will explode. At Gauhati they pushed a whole bank over with bulldozers and we had to dig through twelve feet of dirt and debris to work on a line in a gas filled trench. One of our troubles is gasoline leaking on the water. Some Indian downstream with a cigarette or fire, touches it off. The fire then travels like a fuse back to the leak. We burned up a big steel highway bridge that way. It's almost impossible to keep curious natives away. They watch anything, even watch you curiously when you stop to water the road.”

With the completion of the line to Tinsukia, it was time for reorganization. The 709th and 776th were transferred to Burma in August 1944. The 789th arrived at Bombay on 25 May 1944 under the command of Captain Troy E. Peterson and set up headquarters 5 miles east of Budge Budge on 14 June. The company was assigned to the operation of the Infinity line from mile post 0 to Togighopa (mile post 380) on the Brahmaputra River. This included pump Stations #1 thru #13 (inclusive). The 708th was assigned operations from the Brahmaputra River at Goalpara on the opposite bank (mile post 385) to Moran (mile post 725) which included pump stations #14 thru 026 (inclusive). They also took over from the 777th, the operation of the barge unloading station at Neamati on the Brahmaputra and the pipeline into Jorhat airfield. The 700th was assigned operation of the Tinsukia tank farm and surrounding area including pump station #27, and the British built lines in northeast Assam. The 707th remained in operation of the West Bengal B-29 system.

Through August the 777th continued work at the Tinsukia tank farm and finishing construction on the line and at pump stations. In September the company was relieved of duty on the "Infinity" line and ordered to the construction of the Chittagong to Tinsukia line. By 27 September the company was assembled at Jorhat in preparation for the move. According to the History of the 777th, 'All duties for men that had engaged in construction of the pipeline and Tinsukia Tank Farm were suspended during the remainder of the month, affording the men a much needed rest. (The lament of the men was "Why doesn't September have 31 days?") "Personnel showed signs of the physical strain of a seven day work week in the monsoon season." Captain Thomas J. Johnson was awarded the Bronze Star for meritorious service during the period 8 February 1944 to 1 September 1944 by General Orders No. 8, Headquarters, Services of Supply, India Burma Theater. On 23 December 1944 by General Orders: Number 49 the 777th received the 'Award of the Meritorious Service Unit Plaque' for the period 1 March 1944 to 30 November 1944.

Chapter 4

CHITTAGONG TO TINSUKIA

On 7 October 1944, Captain Thomas J. Johnson was named, in addition to his command of the 777th EPD Co., Area Engineer for Area #6 in Engineer District #12. This was the six inch pipeline from Chittagong to Tinsukia. Temporary headquarters were to be at Comilla.

Comilla is on the east side of the Ganges-Brahmaputra delta 50 miles southeast of Dacca (Dahka), now capital of Bangladesh. The population of Bangladesh is approximately 100,000,000 in an area the size of Wisconsin making it one of the most heavily populated areas in the world. The religion is Moslem where-as Hindu is the predominant religion in Assam and West Bengal. Several hundred years ago, the Maharajah of Cachar built his palace on an island in the middle of a large lake on the outskirts of Comilla. Either he liked to fish or he did not trust his subjects. The palace covers several acres with undoubtedly a large inner court yard. Water laps the outer walls on all sides. The only access is by boat. If boats had been available to the 777th and a reasonable rent could have been negotiated, it would have been an ideal headquarters. As it was a temporary tent camp was pitched on the outskirts and officially opened on 6 October 1944 with the arrival of four officers and 180 men.

The 600 mile trip to Comilla from Jorhat in Assam was made by a truck convoy of 2 officers with 67 men and 2 officers with 113 men going by train. One officer and the remaining 40 men went to the sector north of the Shillong Plateau. Try as they did the truck convoy could not beat the speeding train. The train trip took 87 hours but it took the trucks 105. This fully describes the land transportation system available (including ferries, gasoline stations, and all roadside accommodations) to get around the Shillong plateau and across the Ganges-Brahmaputra delta.

The target completion date for the Chittagong to Tinsukia line was 1 April 1945. The line was to be laid with standard weight six inch pipe instead of invasion weight. A 20 foot joint of invasion six inch pipe weighed 90 pounds and was easily handled by two men. The standard six inch 20 foot joint weighed 200 pounds and it took four men with tongs to handle it. Karl C. Dod in referring to Colonel W. C. Kinsolving, District Engineer for District #12, states in the 'Official Military History of World War II':

“From the outset his (Kinsolving) work was hampered because much of the salvaged British pipe made available under reverse lend-lease had been seriously damaged in transit from the Middle East. In late December 1944 Kinsolving decided to convert northernmost 150 miles to invasion weight, which would mean a reduction in the line's capacity from 13,000 to 10,000 barrels a day. One obstacle appeared well out of the way by Christmas; the Indian Navy had by then agreed to install the offshore mooring at Chittagong's harbor, and the Burmah Oil Company had agreed to connect this mooring to its tank farm with two underwater unloading lines.” (Capacity of the tank farm was 55,000 barrels.)

The buoy was anchored a couple of miles from shore in the Bay of Bengal and was reached by pipe welded on shore and pulled out to the buoy. Heavy flexible rubber hoses were used to fasten the line to the buoy and to connect tankers for unloading. The 777th acquired its own fleet, consisting of two LSTs and a 35 to 40 foot cabin cruiser (complete with flush toilet), for construction work and to maintain communications with tankers. The boats were docked at Chittagong harbor two miles up the Kurnaphuli River making a four mile trip on water to the buoy.

The Chicago Bridge and Iron Company agreed to build two 40,000 barrel tanks at Chittagong giving the tank farm a capacity of 135,000 barrels. A 10,000 ton tanker transports 60,000 to 70,000 barrels of gasoline. One of the 40,000 barrel tanks was to be used for 80 octane motor fuel and the rest for aviation 100 octane gasoline.

Pump stations were basically the same design as those on the Calcutta to Tinsukia line except 18 big Gould-Waukeshaw reciprocating pump units, weighing 12 tons each, were used in the 'Hill' section. South of the plateau in the delta region, lack of high ground was a problem. In a letter dated 23 December 1944 Captain Barben said:

"I'm working at station 33 (northwest of the Fenni River) now. At this station we have a mosque on our property. It is only a mud basha but still a mosque. We've had to build around it as it is sacred and can't be moved. We have now hired the head babu in the church so we can move the mosque. He's on our side. In one place where we had flood conditions, the only high ground was the school house. The pumps sat on blocks just 6' above the water all around them. Here the station foreman hired the school teacher (male) so we got the school house as a barracks.”

Ellis O. Scruggs was a tall, lanky, unpretentious individual that was assigned to the 777th as a PFC at Camp Claiborne, Louisiana. One evening as Captain Johnson and some of his officers were reviewing incoming men's records, the captain looked up and said 'I have just found my master sergeant'. In answer to the question, “Who?”, he said PFC Scruggs. The answer to “Why?”, was that anyone that can push tools for drilling company is just what we will need overseas as he is bound to be innovative

and an excellent bailing-wire mechanic. The next day after an extensive interview with the captain, Scruggs walked out as a master sergeant.

During construction on the Budge Budge to Tinsukia line, M/Sgt. Scruggs proved his worth and his ability to work with men. Captain Johnson strongly recommended him for a field commission as 2nd Lieutenant. When the commission came through in early 1945 Johnson had his first problem with Scruggs. He was not sure he wanted the commission as it would mean a cut in pay as an enlisted man draws 20% for overseas service and an officer only 10%. Also he preferred to be one of the men. It took some persuasion before he would allow the gold bars to be put on his collar. He continued to be the company's chief hand for pump station construction.

On 14 October 1944, eight enlisted men, all welders, were attached to the 777th from the 789th. On 15 October, Lt. Kinkler and 54 men established a camp at Fenni 30 miles south of Comilla and started work on the line. On 16 October, Lt. Wharton and 76 men started construction south of the Fenni River. It took 5,200 feet of welded pipe to cross the Fenni River which presented the same problem of a bore tide as did the Hooghly River. The pipe was pulled on bottom except for the leading section which was floated.

In general the route of the line was along a road next to the narrow gauge railroad from Chittagong to Lumding, north of the plateau. With-out the monsoon rains, dust from the road not mud was the big irritant. One day a native woman ran out to the road where a dog had just urinated, scooped up the moist dirt in her hand and cleaned the grease out of her frying pan. It was not unusual to see 4 and 5 year old native children scrounging for food along with vultures just as big, an garbage dumps.

One night a lone Japanese plane apparently mistaking the lights of the work camp near Fenni for one of the American air bases in the vicinity dropped his load of bombs. No damage was done to the camp but they sure made a mess of some native rice paddies to the north. The pilot must have known he did not belong in the area and was anxious to get rid of his load and vamoose, so he picked the first target of opportunity.

Possibly more threatening to the men were large cat tracks and the sound of heavy breathing in the middle of the night. A few nights of this called for drastic action. Firearms were ruled out. The cook made a trip to the open air meat market at the nearest village and returned with a hunk of goat complete with flies. A metal plate was placed on the ground near the company's dump; bare electrical wire was wound around the meat which was suspended about six feet above the plate. The wire was connected to a trailor mounted welding machine parked some distance away. The stage had been set. At bed-time the welding machine was started and left idling. In the wee hours of the next day the engine accelerated and simultaneously a terrific shriek split the air and continued into the distance east of the camp and finally faded away into the hills. The pink panther or his black cousin with the toothache did not return.

The 1380th arrived at Akhaura, 30 miles north of Comilla, fresh from the States on 15 October 1944. As organizational equipment dribbled in from Calcutta through-out November, ditch digging and pipe stringing was started but by the end of the year only 30 miles of line had been completed. With adequate equipment finally in hand and helped by a work train, progress greatly picked up and by 19 April 1945 they had completed 125 miles or more of the line, the last 25 in the "Hill" section. The entire line was nearing completion and the company was transferred to China.

Upon the completion in December of a group of specially constructed bashas on the northern outskirts of Chittagong, the 777th moved headquarters there. The camp was about a half mile from a sandy beach along the Bay of Bengal but that distance was salt water marsh heavily populated with rats and vipers. The three or four mile trip by road to the beach was much better. The beach was clean sand constantly

rejuvenated by the strong tides and was well populated by sand crabs. The British used the beach as a recreation area but lost several men to the strong under-tow.

A squad of Gurkhas was hired to stand guard as pilfering was a problem on the outskirts of this city with a population of 270,000. A sudden cold spell caught the Gurkhas poorly prepared with only a light jacket to cover their short sleeves and short trousers but aid was at hand. The men at headquarters dug to the bottom of their barrack bags and pulled out their unused long 'handles' for them. It was a nattily attired military unit that pulled on the underwear over their uniforms that night and a vast friendship was cemented. The Gurkhas had the reputation of never drawing their curved knives without bringing blood so it paid to be friendly. When one unsheathed his knife to sharpen it, (it was sharpened daily) a drop of blood was drawn from a pricked finger.

Both the 777th and 789th had occasion to become acquainted with water well drilling operations as conducted by native Indians. The companies needed the water to alleviate the necessity of hauling water for camp purposes. The 777th at Chittagong ended up with a well that produced clear, clean water but it was too salty for drinking but not for showering. According to Captain Peterson, the 789th was more successful obtaining potable water.

In the soft sediments of the delta and coastal regions the natives have become adept at sinking shallow wells. With a four man crew working with a bamboo derrick (platform), a bamboo lever, and two inch pipe, the job is the ultimate of simplicity. A starting hole is dug with a ghodaly (the big hoe) and kept full of water; a joint of pipe is stood vertically in the hole; the lever is attached to the pipe by rope and two men work the lever moving the pipe up and down. The third man stands on the derrick and uses a hand as a flutter valve opening and closing the top of the pipe in unison with the up and down motion of the pipe. This keeps the pipe full of water with the aid of atmospheric pressure. The fourth man is the babu, supervisor of the crew and, in addition to his principal duty, keeps the hole full of water. A few strokes of the lever produces muddy water out of the top of the pipe showing that hole is actually being made. Pipe connections are made in normal fashion. Depth limitation is the weight of the pipe string compared to the strength of the lever and the lever operators.

If lost circulation occurs, a few full shovels of cow manure usually will plug off the lost circulation zone. The manure also adds lubrication making it easier for the lever men to raise and lower the pipe. This is somewhat disturbing if there is hope of using the well water for drinking. When a water bearing zone is reached the pipe is tamped in place by filling the annulus with mud with or without a manure component. No wonder the cow is sacred to the Hindu population as it also furnishes fuel for cooking and fertilizer for the fields. Captain Peterson reported that it took four days of continuous pumping before the water was declared safe for drinking. It is a prosperous village that has paddy cakes of the stuff (showing well developed hand prints) plastered for drying on all brick and concrete walls.

Chittagong was Lt. General Sir William Slims headquarters and a major concentration area for the British. An American Fighter Squadron was based at Chittagong and supported British operations. In early 1945 the American presence was augmented by the arrival of a Quartermaster Trucking Battalion to support the British campaign to retake Akyab Island, 130 miles south of Chittagong on the Arakan coast of Burma. Akyab in Japanese hands was a thorn in the side of the Bay of Bengal. It was the air base for the 1942 and 1943 air raids on Calcutta, India and Columbo, Ceylon (now Sri Lanka).

In 1943 an unsuccessful attempt had been made to retake the island. It was this thorn that enabled so many American troops to enjoy the leisurely train ride from Bombay to Assam. This southern prong of the three pronged 1945 Allied offensive was made by two British divisions, one West African and one Indian. When a contingent of the Africans would start the march towards the front, it was in impeccable military style complete with chanting and singing. At the end of the first rest period the column would shuffle off with rifles held by the barrel and slung over a shoulder with a pair of shoes

hanging from the rifle butt. When the island was occupied, the Japs had departed leaving a sign on some latrine doors saying 'Welcome Stupid British'.

The railroad north from Chittagong was narrow gauge and known as the 'Tea Garden Road' after it's principal freight prior to the war. It crossed the Shillong Plateau at it's eastern end and joined the other narrow gauge railroad in Assam at Lumding. The 100 mile stretch from Badarpur to Lumding was without roads. As in Burma, jeeps were converted to run on the rails. The best way to drive is to sit on your hands so the steering wheel can not be touched. It may be nerve wracking to see the wheel shuddering back and forth but any attempt to steady it means a certain derailment.

All transportation of supplies and equipment was by work trains. There was only one locomotive that could pull a train longer than 300 feet (10 4-wheel cars). Other engines could pull only 5 flat cars loaded with pipe and they were in great demand for transporting supplies to Manipur Junction, head of the road to Kohima and Imphal. Only a couple of 'low boy' flat cars were on the line. These would be needed to move tall loads such as D8 tractors through the tunnels. All operations had to be timed so as not to interfere with other traffic. Care had to be taken to avoid undercutting retaining walls or sidewalls of drains, displacing survey posts or interfering with traffic.

The longest of the 13 tunnels and 6 'covered ways was 2014 feet. The air in the tunnels was always heavily polluted by smoke from the coal burning engines. Welding was done outside the tunnels; the pipe was slung under or on the side of a train with chains and moved into the tunnels from each side. The last weld or welds joining the sections were made in the tunnels with light supplied by jeep headlights. Pipe joints were welded on each of the 32 bridges and through the 31 stations. Some short cuts were made by laying line almost straight up over hills but in general the line was in the railroad right of way.

In 1943 the British laid a 4 inch line from Chittagong to Lumding across the "Hill" section following the same general route from Chittagong to Manipur Junction as the U.S. six inch line. The four inch line then followed the Manipur Road through Kohima to Imphal. The 1943 and 1944 fighting suspended all operations beyond Manipur Junction. The entire line needed considerable maintenance with numerous sections needing rebuilding when it was offered to Engineer District #12 in 1945 for operating. It was rejected. The six inch line of the U.S. would carry more than twice as much as the four inch and the added capacity was needed.

The U.S. six inch line and all pump stations were completed in April 1945 at which time the 777th started full time operation of the line. Some startup problems continued into May and in June the monsoon hit. The company was spread very thin until the 1382nd took over operations of the last seven of 20 pump stations.

Although Chittagong is only 220 miles from Calcutta by air, it is over 500 miles by the circuitous rail system running through Jamalpur, Mymensingh, and Akhaura. Freight took 2 to 3 days longer than the 5 or 6 days from Calcutta to Jorhat. PX supplies for the pipeline were transported under guard by rail although the air force units received their supplies by air transport. Early in 1945 during a cigarette shortage in India, the 777th received a ten months supply by mistake. The PX warehouse in Calcutta requested the return of the excess by rail under guard. It was agreeable as soon as a guard showed up to take charge of the excess. The pipeline units had no spare personnel. This resulted in instructions to trade them with American units in the area but to be sure to account for them. The next trip of the finance officer to Tezgaon Air Base outside of Dacca to draw the pipeline payrolls included a bargaining session with the officer in charge of the base PX. An unequal but satisfactory trade was made until the matter of transportation came up. The base PX officer wanted the trade to be made at the base. The pipeline officer insisted that the point of trade be the Chittagong air field because of the difficulties and time needed for land transportation. Two supply trips by air transports between the two fields were

made dailey where-as rail transportation would have taken several days and required a guard. Only with great reluctance and after much conferring did the Tezgaon officer finally agree.

The following month the pipeline officer caught the morning flight from Chittagong to Tezgaon to draw the payroll. Another visit, this time strictly a courtesy call, was made to the base PX officer. In the early afternoon, the finance office was visited and the gunny sack was filled with rupees. Then he proceeded to the air strip to wait for the afternoon flight back to Chittagong. He was the first passenger to board. By take off time, the plane was loaded with passengers but along came the pilot with an air force corporal in tow. The announcement was made that the corporal was vitally needed at Chittagong and someone would have to wait for the morning flight the next day. There were no volunteers so the pilot pointed at the only non-air force individual on board and said 'off'. No discussion was tolerated. Nothing could be done but obey. Back to the finance office went the Engineer lieutenant with his sack of money, injured feelings and bruised ego - bumped by a corporal. Oh well, one can't win them all. The finance office had closed for the day and the only thing that could be done was to use the sack full of rupees as a pillow and wonder if it was a set up by some vindictive individual.

A six day work week, which was more or less standard on the C-T construction, does help Saturday night socializing if there is any place to go. In Chittagong there was a large British enlisted men's club and a nice British officer's club. One Saturday evening a lieutenant from the 777th accompanied by Captain Vincent V. Karusaitis M.D., the Medical Officer for Engineer District #12, went to the officer's club for dinner. As the only American officers present, they were warmly welcomed and plied with drinks until dinner was served at 11 P.M. The food was the best obtainable but not memorable because of the preceding drinks. After dinner came the brandy but by 2 A.M. the Yanks were back at their jeep in the parking lot. The chain, welded to the chassis and padlocked through the steering wheel, was unlocked. The jeep would not start. At that time a British field grade officer was seen laughing at them. He very considerably pulled a rotor out of his pocket. Since war-time jeeps did not have keys, it was common practice to disable them by taking the rotor out and putting it into one's pocket. His jeep had disappeared with the U.S. officer's rotor. The price for his rotor was a ride for him to his quarters. It pays to think things through but there will always be someone smarter and more clever.

Chapter 5

MAINTENANCE AND OPERATION OF PIPELINES TO TINSUKIA

At 11:45 PM on 11 February 1945, a fire started at pump station #13 near Togighopa on the north bank of the Brahmaputra River. Though the fire was quickly contained, it put out of Service four pumps and their manifold. Through the combined efforts of the 789th and the 708th, the station was back in operation by 4:00 PM the next day. Four pumps and material for a manifold had been transported 50 miles; the damaged equipment moved out; and the replacements installed. Although station #13 was temporarily out of operation, the rest of the line continued to move gasoline with the judicious use of the storage space available at other stations up and down the line.

The men of the 789th at operating station #13 were not only pipeliners but big game hunters as well. It is doubtful that anyone in the CBI can challenge the size of the gavial crocodile they killed on the edge of the Brahmaputra River. The pictures tell the tale from head to tail. The gavial is found only in the river system of the Ganges and Brahmaputra but this one is a mere runt compared to its great-great grand daddy that lived 5 million years ago. His fossilized bones were found in Pliocene deposits in India and reached the gigantic length of fifty feet. Thanks be to evolution. This one is big enough.

Early on, in the operation of the Budge Budge to Tinsukia line, it was recognized that additional pump stations were needed to meet the lines rated 10,000 barrel per day capacity. Four additional pump

stations were built and operated by the 789th, namely stations #IA, #BAI #9A, and #IOA. The company ended up operating 17 stations. (Information is lacking on any additional stations built and operated by the 708th in their sector from the Brahmaputra River to Tinsukia.)

The General Motors engines (same as in the 2 1/2 ton Army truck) used to drive the pumps were designed to use 80 octane gasoline but would run on 100 octane. Use of the higher octane fuel resulted in burnt out valves in three to four weeks. In Captain Troy E. Peterson's words (CO of the 789th) "We scrounged every way we could to keep the pumps going. I think we made one or two pumpings of 80 octane to fill our fuel tanks. Initially and as we could, we shipped 80 octane up the line in our (railway) supply system for use in vehicles as well as fuel for the pumps. This could not always be done so we used the 100 octane gasoline." Since 124 pumps were in use at a time in the 31 pump stations operated by the 708th and 789th, burnt valves became a major problem. The Table of Equipment allowed each company only three extra heads for the engines. Major John J. Brown of Engineer District #12 Headquarters and Captain Peterson met with the Supply Officer for all Branches of Service stationed in Calcutta and requested a special allotment of 75 GMC heads. Also a contract was made with GM to rebuild burnt out heads. OM's central supply for India was in Calcutta.

The Bengal-Assam supply system for the pipeline was three broad based box cars traveling from Calcutta to Parvatipur. One was going up the line, one down the line, and one loading. The merchandise was mail, food, PX supplies, personnel including USO, complaints, and etc., mostly etc. The box cars were used by pipeline 'walkers' looking for evidence of leaks in order to save shoe leather. At Parvatipur, all merchandise going beyond, including USO personnel was transferred to one of two narrow gauge railroads. The transfer was made by native bearers (laborers). It was something to see a bearer with a transmission for a 2 1/2 ton GMC truck on his head or a USO entertainer. Who were they? I never saw any of them.

The 789th, in recognition for their efforts to bring the line up to rated capacity, was awarded the Meritorious Award Service Plaque on 22 April 1945. Their CO, Captain Peterson was awarded the Bronze Star, the second company commander in District #12 to be so honored. In addition Master Sergeants Harold G. Welch, chief dispatcher at Budge Budge, and H. G. Terenzi also were awarded the Bronze Star medal. The medals were worth 5 points toward discharge from service at the end of the war, provided they could get back to the States.

Some look on engineers as burly, uncouth, and unversed. It may or may not be true but the 707th had a sergeant that stayed out of trouble by playing, in his spare time, 1st or 2nd violin in the Calcutta Symphony Orchestra. It is fortunate that the 707th operated the West Bengal pipeline system and he was assigned to pump station #1, located at Budge Budge. My source is Captain Peterson and he does not recall his name.

"The 789th had a Staff Sergeant by the name of Lazlo Bellak, who at one time was the world champion Ping Pong player. He would play anyone in the 789th using the edge of his paddle. He had played before Royalty, Heads of State including England, Germany, Russia, and China. He was always in demand. He was also over one of the pump stations. The USO and others were always after him. Some of the men got tired of it. The last straw was to be sent back to the U.S. for a tournament. I (Captain Peterson speaking) had to turn him down. Too many had new babies, lost loved ones, they wondered what our priorities were. A CO has all kinds of problems."

The 708th operating pump stations #14 through 026 (Boalpara to Moran) on the Budge Budge to Tinsukia line had more than their fair share of trouble with big game. In February 1945 at station #16 near Gauhati one of their men was attacked by a tiger and badly mauled. He ended up in a Baptist Mission Hospital in a state of shock in addition to his wounds. To compound his problems, he developed a case of malaria. According to one of Barben's letters, "He did not recover". Only five

men in District #12 are reported to have lost their lives, an enlisted man of the 700th was an accidental drowning victim on 25 April 1944, Sergeant Virginius Ratcliff of the 708th was killed 28 February 1944 in a jeep accident, and 1st Lt. Robert E. Parsons of the 789th died in a jeep accident on 2 July 1944, and the 707th lost an enlisted man in the Ulibaria fire, in addition to the victim of the tiger attack.

Further up the line, a rogue elephant was killed inside the four foot barbed wire fence around station #23. Early one February morning the station personnel had gathered for breakfast when a big ruckus broke out across the road in a large basha full of Indian troops that were on rest leave. The elephant had walked the long dimension of the building without opening any doors, catching many of the men still in their charpoys (bunks to you). After bringing down the thatch roof, it crossed the road and tossed a Signal Corp trailer out of its way and entered the pipeline station. It was moseying along between the four foot and six foot barbed wire fences, bending over a few six foot posts, when it met its end. The only firearm in the mess hall was the cook's Springfield 03 rifle. He waited until his line of fire would not en-danger the tanks or pumps and then fired once. The bullet hit the elephant back of the left ear and emerged squarely between the eyes. It truly was a pro's shot.

All big game hunters (at least all successful big game hunters) know that the problems begin with a successful shot. Rule number 1 is to never shoot anything big any distance from a road. This procedure had been followed but there was still a big problem lying on the ground anyway one looked at it. It must be moved and disposed of. That was Lt. Sindo's quandary. No grave diggers with DB Cats were at hand. Several 2 1/2 ton trucks with front end winches were mobilized and used to pull it out of the compound and onto the road. The carcass was dragged a few miles down the road where it was to be cremated with a plentiful supply of gasoline. Buckets of gasoline were used to saturate the remains and a fire was lit. It blazed exceptionally well and then went out. After several attempts the hide had barely been singed. It was a lost cause but help might be at hand in the form of vultures and jackals. It soon became obvious they did not like their meat singed, not even a little bit. What to do? In this case, when in doubt, do nothing. Let nature take its course. The rotting carcass soon became apparent to visitors ten miles away. That might be a blessing to the crew at the station as there would be no inspectors or unwanted visitors for several months. In retrospect it is probable nature could have cleaned up the job in a week's time if cremation had not been attempted.

About the same time at pump station #22 (also 708th) Captain Barben reports "the sergeant went into the kitchen the other night when he came off duty to get a piece of pie. A leopard jumped over him and out through the screen door, taking it with him. That is he thought it was a leopard."

Major Barben on 21 May 1945, writing from south of Lumding at pump station #43 (777th), on the northern slope of the Shillong Plateau says:

"The station is in a wild section. The translation from Indian is 'The Place of Elephants'. We heard them trumpeting last night. About two miles out of the station the train ran over one a week and a half ago. He wasn't in good enough shape for a picture so I passed it up. The jackals and buzzards had pretty well hollowed him. We did see big shaggy black bear. There are a lot of those gibbon apes around, the black ones with long arms."

From Tinsukia on 29 July 1945 Major Barben wrote:

"We had a close one this afternoon. We were driving east about 15 miles west of Dibrugarh when a Quartermaster Lieutenant in a jeep passed us. A few minutes later we saw a commotion up the road. A large tiger had tried to cross the road in front of him to attack him. The first thing he knew the tiger was on the side of the jeep. It hit him just in front of the windshield with such force it spun the jeep around. Luckily a 6 x 6 truck was coming from the opposite direction and ran over the tiger when he spun off the jeep. A native dashed in and cut the tiger's throat. When we got there, the Lieutenant and

the truck driver were ashy white. Boy, I'd have been too. There was a dent the size of a wash basin in the side of the jeep."

In a letter dated 24 January 1946, Barben describes a tiger and leopard trap near pump station #47 (777th), 15 miles south of Jorhat.

"The tea planters have caught three leopards in it. The tiger or leopard sees the goat in the trap and sneaks in the open door to get him and springs the trap. The goat is in another room and the tiger can't get him. If I were the goat, I'd feel pretty uneasy. The tea planter near there has one goat he has used ten times. The goat is so used to it he is usually sitting there chewing his cud while placidly eyeing the raging leopard or tiger. They got one tiger that tore the cage down, iron bars and all. The strength is unbelievable."

Stories of snakes, monkeys, rats and mongooses are practically absent from the India pipeliners but for only one reason. These creatures were so common that they did not deserve notice. Surprisingly (at least to my knowledge) not one case of snake bite has been reported. The snakes went their way and the pipeliners theirs.

Anyone wanting to return to study the wild life should note the following news item dateline Dhaka, Bangladesh, March 21, 1986 (AP):

"Wild elephants trampled a mud hut and killed five people, including three children, police said today."

"The incident occurred in Chittagong Hill tracts, 219 miles southeast of Dahka, at village Thaliparal according to a police spokesman who was reached by telephone."

Pump Station #41, near Hailong was at the highest elevation of any pump station in India at 4500 feet which might equal or exceed any in Burma. The monsoon of 1945 was quite severe in Bengal and Assam and strongly effected operations at all pump stations in the 'Hill' section. Station #41 is in the saddle at the east end of the Shillong Plateau. Staff Sergeant Hubert O. Hanson of the 777th was in charge of it. Following is his accounts of two events at and near his station.

"One other time, I was aroused about midnight when my men changed shift, and told that we had no suction pressure on the line, so I immediately called station #40 down line, and they recorded about a 200 pound drop in their discharge pressure about 10 o'clock or so - so I ran up to the railroad track and told the railroad station master I was going down line and do some checking. He gave me line clearance so I left in the jeep on the rails; I was alone and dark as all get out; I rounded a curve a short ways down in the mountains and all of a sudden I was hanging in mid-air with no ground underneath; I was over a landslide; enough railroad ties were hanging on the rails to keep them spaced apart, and the bolts and plates held the rails together. I was over half way across before I could stop. I thought the jeep and I were going belly up the way the rails leaned to one side. Anyway I got across the landslide o.k. and on down to the next train station and told them to stop all trains in the area. Then I headed back to station #41 and called in and had our pipeline shut down. A lot of gasoline ran freely down the hills for a while. The railroad hauled in a lot of crushed rock and stuff to fill the landslide, and we had to lay a new line as the old pipe broke and slid down the hill. Lucky, no fire, nobody hurt, just a lot of hard fast work to get things operating again."

"Another time at night we had a leak up the line; a train caught it on fire; the railroad station foreman at Milandiso came and told us of the fire; so I got one of my men, Angelo Milano, to go with me. We took tools, fire extinguishers and the jeep, stopped all supply trains and whatever was coming or going in the area. We found the leak, shut the pipeline down, closed the gate valves on both sides of the leak. I think they were about 4 or 5 miles apart. Luckily we got the fire out with the fire extinguishers. The

line was buried under rock in a drain along the track. After the area cooled off enough, we worked in the lights of the jeep, lifted the rocks off the pipe, dug up the section of pipe, removed the coupling, raised the pipe, put on new gaskets, lowered the pipe and coupled it up while wading in 100 octane gasoline over knee deep, and very carefully covered the line. Then we backed off, lit a rag tied to a stone and threw it into the area and burned off the excess gasoline before we dared to leave and go back to the station and give the all clear signal for the trains and start up the line again. No one was hurt, just some burned legs and arms from the gasoline."

VJ day, 14 August 1945, came three weeks late for the pipelines. On 30 July 1945, Major Barben wrote his wife from Tinsukia:

"We're having troubles all over but licking them as fast as they come in. Kinkler just phoned that they had a half mile of line wash out with a railroad fill. Then a train came along and hit their parked jeeps at their work block and threw them 100 feet in the air. They will have the new line in in about six hours. These boys are on the ball and if anyone ever say's they aren't, there will be an argument."

Kinkler was a lieutenant in the 777th and the section was on the north slope of the Shillong Plateau south of Lumding, "The Place of Elephants". Washouts like these do not need any help from earthquakes like the ones that occurred in August 1988.

A couple of days later, catastrophe struck the Budge Budge to Tinsukia line. The Brahmaputra River crossing washed out. The following quotes are from Major Barben who was sent from Calcutta to oversee operations. If he had known he undoubtedly would have felt more secure knowing at least one 20 foot+ crocodile was no longer in the river.

4 August 1945, "The river is now running 25 feet over summer tide, so you can see we have troubles. The whirlpools even pull our power boat around."

5 August 1945 "As usual it poured most of the day, but things are progressing smoothly (my fingers are crossed). I'm now running a barge system to substitute for a couple of lines that the high water took out. Really is quite a mess. Have a steamer and a bunch of 4000 barrel flats together with some floating pumping units we have rigged up. I do have Lt. Sommer (708th) who was with me a year ago up here when we had such a mess with plugged lines. The river is about 20 ft. above winter level now. The current is about nine miles per hour which is plenty. We have to be careful not to get in the whirlpools in our 18 ft. Penn Yan boat (trade name). They wouldn't draw you under, but they turn you around."

6 August 1945 "The river has come up over a foot in the last three days and is still rising. I have 1000 ft. of bamboo jetty sticking out in the current. It was 1 1/2 feet above water; now you walk in water on it. This morning we lost 40 ft. of it and a little bit of pumping time. Then the manifold at the next station got plugged up. Then two pumps plugged, a broken connecting rod in one engine and I don't know what with another. To top it all, there is a steady downpour and the rain and mud don't help any."

"We are building a large tank and some weary war worker probably with an Army & Navy E for excellence, D for drunk, let them pack the bottom plates without drilling them. Imagine cutting 500 holes in steel plates 20 in. x 5 in. with a welding torch in the rain.

I wish some of the strikers back home or the gripers had to put in just one day like these boys have been putting in. They do it not one day but day in and day out without knowing when it's ever going to end. This being soaked all the while, wet or damp bed clothes, mosquitoes, bugs, gets a little tiresome. Some will gripe that these boys are not in combat but they are not on any lawn social or basket picnic either.' One break the rain gave tonight was that I could stand under the eaves in the doorway and have

my shower almost without going out of the basha. Good soft water too, just right, I feel like a gilded lily right now.”

7 August 1945 “ Not only is the District on my neck, but now Delhi. This proposition is now the most important one in the whole system. ...the small black bear that got eleven o'clockish the other day at one of the stations. He came into the kitchen looking for condensed milk or honey. The boys lassoed him and now his worries are over with. He is fed regularly and is the pet of the place. He gets a little ugly now and then, but they hold him by the shaggy hair on top of his head till he cools down. Had all the brass on the phone tonight.”

11 August 1945 “It was the highest priority job in the whole theatre and all the high Brass from Delhi were constantly kibitzing. Have had more Colonels here investigating. None could find anything wrong, nor make any suggestions. Right now I am on the Pelican, our steam tug in my Navy. I have a River Steamer and four 5000 bbl. barges. Also about ten or twelve pumping units. Have two Sergeants from the Transportation Corps now on the Pelican and it's going a lot smoother than it was with the Britishers. The G.I.'s can't get the Sirhan (Indian Steamer Captain) to do anything he might think dangerous. These people are cautious to the extreme.' (Maybe they were aware of the gavial crocodiles that inhabit this river!) 'The river this year is higher than it's been in seven years. It's three feet higher than last year. It cleaned out all our river lines which were the longest (or were) in the world under probably the toughest river in the world (Brahmaputra). Right now she's running ten miles an hour which approaches white-water.’” (A second six inch line had been laid across the river in the spring of 1945.)

12 August 1945 “We hit our target mark yesterday and are going to climb over it today. Am getting more across than we did when the lines were in.”

An extract of the unit history of the 708th from 1 January to 19 December 1945 reads as follows: “On 10 July 45 the upstream river crossing, Brahmaputra River, was broken at approximately 300 ft. from north bank on Joghoba (Jogighopa) side. Auxiliary 6" line carried full load until AM 22 July 45 at which time the auxiliary line was broken -- cause unknown. This left the B & A line completely shut down due to breaking this vital link. During the same period the communications were disrupted due to under river signal cable having been permanently damaged. Immediately supplies and personnel were rushed to location to install necessary equipment to operate a ferry system, it being impractical to attempt laying a new river crossing due to high Monsoon flood stage. By working 24 hrs a day the first barge was spotted and gasoline started loading at 2200 hrs. on 24 Jul 45. Upon resuming operations the first three days showed a transfer capacity of 5,000 to 6,000 bbls. per day. After receiving necessary supplies from Calcutta by rail a booster pumping station was constructed on off-loading or South Bank of the river and from that date the full line capacity was handled by barge transfer system.”

“During the latter part of June 45 the reconstruction of the 8 & A Pipeline was started by the 708th E.P.D. Company and 1382nd E.P.D. Company. Reconstruction was started due to the fact that line leakage was too high because of corrosion of invasion type pipe. This project was abandoned with the announcement of V-J Day.”

The restoration of flow in the pipeline was known as ‘ratrace’. The crossing of the Brahmaputra River with a pipeline came close to receiving a grade of 'A'. In Corp of Engineer's Officer Candidate School, it was stressed that military construction work must be adequate to do the job but not a bit more as that would mean time and material had been wasted. To some this washout of the line would mean grade NFN. It did its job for nearly 15 months and fell only 3 weeks short of being perfect, so others might grade it at least 'A-'.

This story of the B-A pipeline, dramatic, important, and futile as it might be, was drowned out by a far more important story. The Japs surrendered on 14 August 1945.

Chapter 6

CLOSING SHOP

The sign on the outhouse door right below the crescent moon; reminds 'No Job Is Ever Complete Until The Paperwork Is Done.'

Headquarters personnel of Engineer District #12 were rapidly vanishing. Colonel W. C. Kinsolving had turned over his command to Lt. Colonel Charles I. Holiman on 3 August 1945. By 23 October 1945 when Holiman departed there were only three field grade officers remaining in the district, Majors John J. Brown, Arnold H. Barben (promoted in May 1945), and Thomas J. Johnson (promoted in September 1945). Major Brown assumed command with Barben as executive officer. Brown remained in command until 2 March 1946 when he was declared surplus leaving the command to Major Barben.

The job was to dispose of the pipelines, pump stations, and all related equipment and supplies, a really thankless task. The only perk seemed to be cheap meals at the officer's club in Calcutta that was trying to get rid of a cash surplus built up during three years of war-time operations. The pumping equipment on the 8 - A (Infinity) line out of Budge Budge cost in excess of \$1,200,000 and was worth because of wear and tear no more than \$100,000 according to Major Barben. To bring this into perspective, there is a sign on my desk that says: "If you are feeling good someday, think about the fact that on November 25, 1925 Fords were selling for \$260." The first job was to get the gasoline out of the pipelines.

The first pipeline to be flushed with water, thereby displacing all gasoline, was the West Bengal System to the former B-29 bases. This was completed shortly after the end of August 1945. The two six inch lines to the Tinsukia Tank Farm had delivered 3,571,428 barrels of gasoline by V-J day, 14 August 1945. Five hundred thousand barrels had been delivered to points in China. The last delivery to China was made in October 1945 according to Anders, op.cit. On 7 September 1945, the 240,000 barrel Tinsukia tank farm was full. The 8 - A line held 200,000 barrels not including storage at the pump stations and flushing of this line was scheduled to start by 15 September. Someone had better keep the planes flying as it would take only 20 days at full capacity to flush the line. The line from Chittagong would be the last line to be flushed and that was scheduled for completion by 1 December 1945. The Air Forces obliged. Water was within 130 miles of the tank farm on 27 September and flushing had started at Chittagong and plans were made to start a slug of water at pump station #38, just south of the Shillong Plateau, thereby moving up the target date considerably.

The line from Budge Budge to Tinsukia was closed in early October. On 4 November 1945, Major Barben wrote to his wife:

"...this week we received the final authority of the British Headquarters to proceed with work on the Bengal-Assam Pipeline. We started it in March or February 1944, had gasoline through it August 1944 and closed it up October 1945. Now November 1945 we get permission to build it. I expect we will get permission to proceed with the Chittagong-Tinsukia line about next spring."

By 24 October 1945 all companies in District #12 had been released except for the 1382nd, the last to arrive. The 1382nd commanded by Captain James J. Nolan had been reorganized to include all 'low point' (elegibility for discharge from service) men in the District.

In November violence (i.e. passive resistance) broke out in Calcutta. Barben relates in a letter dated 23 November 1945 part of a briefing by a British officer.

“The British Colonel that briefed us today told of some amusing incidents in the last passive (?) resistance. A large group of women tied up the Howrah bridge, the only bridge across the Hooghly, by lying down on the bridge on the tracks and the road. They sent two companies of Gurkha troops out to lie with them. The Gurkhas loved it and the meeting soon broke up. It was tried again by Hindu men and the Limey Yorkshire regiment went out there and stood and sprinkled on them. That made them unclean so they had to rush off to the temple and bathe in the Holy Houghly.”

By 12 January 1946 only 30,000 barrels of aviation gasoline was left in the hands of the District and negotiations though irritating and frustrating were proceeding with the British and some native entrepreneurs. U.S. negotiators were at a disadvantage as all knew of the hurry to close down the theater and that in most cases it would cost more to move out equipment than it was worth. The following excerpts from Barben's letters illustrate other problems and give his account of the final days.

1 January 1946: “We shut down the West Bengal line a couple of months ago, but the Air Corps unnecessarily made us keep a 5000 barrel tank at Kalaikunda and would not handle it themselves. They only take a few barrels a day and our whole crew out there goes home on points January 4th. Well we pushed and got P O L to declare it surplus and send tank wagons to load it in so we could clean up. Our boys are eager beavers when it looks as though they could clean up and get out of a place. The Air Corps decided that they wanted the gas and would phone us in the morning. Our eager beavers were climbing all over the cars when they got in at 4:00 a.m. By time the Air Corps decided to act at 8:00, the boys had ten cars filled and the tank cleaned out. Their Major called me, but we were all innocent, (luckily so) and he mournfully said, 'We'll have to go clear to Barrackpore.' A jockey can take a plane over there in one-half hour. The chances are, the only thing they are using planes for is to go on dates or three hours' flying time a month which gives them 1 1/2 times base pay. That cleans up the West Bengal Line for us.”

“We are only pumping to Dum Dum (Calcutta Air Field) to the Limeys on the B. A. (pipeline). We have told them verbally, repeatedly, to make provisions elsewhere, but 'My dear chap, we haven't got around to.' So I concocted a wire to all English agencies the 26th (December) saying that water would start through that section absolutely at 0700 January 16th. Delhi approved it and they are in a dither. (Lt.) McGeehee and I were over to check with them what to do and gave them our estimate of three days to do the job. 'My dear chap, we couldn't get approval in a month and then it would take three weeks.' All I could tell them was to follow our usual procedures; go ahead, build it, put it to work, steal the stuff if you have to, then get permission.”

“Looks as though we could close up Tinsukia Headquarters and move it to Budge Budge about January 15th and possibly pull all out but a guard detail by February 10th or so. That will wind up every drop of gasoline and I believe our books will about balance. Old (Major) Randles worked for Standard Oil so long he set up a set of books that covers all and is so confusing that any auditor (would) O.K. it. Really, though, we have the only really good set of accounts in the theater.”

6 January 1946: “Today an announcement from General Terry. Roughly it went, 'Stand by for an important announcement from the Commanding General IB Theater. The demobilization has proceeded too rapidly and it will be necessary to curtail it at once. It is no longer a matter of shipping, but of manpower. This theater is already stripped past efficiency and cannot be stripped further. Men will be released as soon as possible, but will be kept until surplus even after their point score (for discharge from service) comes up. It is hoped that it will not be necessary to retain anyone for more than three months past their eligibility.' Well my job tomorrow will be that of Chaplain.”

28 January 1946: "Well they passed out 15 Bronze Stars to Base Officers yesterday. My new boss, Col. Patee, got one. He is a good Joe and I'm glad to see him get it. I don't know how mine happened to come through so early (received in fall of 1945). So far, only two of us in pipeline garnered them (there had been four back in '44), Sgt. Stokes, our pump and engine chief mechanic, and myself. (The four were Captain Thomas J. Johnson, 777th, Captain Troy E. Peterson, 789th, Master Sergeant Harold G. Welch, 789th, and Master Sergeant H. O. Terenzi, 789th.)"

1 March 1946: "The big mess today was that they are pushing the theater to close out and are cutting orders on all men with a total of 30 months service as of April 1st. We lose 55 and will have only 36 left."

2 March 1946: "(Major) Brown was declared surplus today. They had to do it as he had 70 points and 43 months service. He has been held the maximum extra 90 days which is applicable to officers."

16 March 1946; "If we could get rid of the colonels, generals and Delhi brass, we could close the theatre."

25 March 1946: "The best news today is that my name went in on the 'Surplus as of 15th April' list. Should be able to make the second boat April 22..."

28 March 1946: "I just can't get Allen Berry (leader of a native group offering to buy part of the pipelines) to sign, so looks as though we'd have to sweat it out till April 22 when their sign-over date expires. After that date we don't care whether or not they sign. We just move out. ...Col. Simpson (unversed and innocent of Indian tactics) wanted to talk to my friends and get them to sign. They promise everything but are slippery. For instance, our big reason is to get our personnel off the line. They promised Simpson to let us take the personnel off if we left the men. That sort of discouraged him. We're going to pull our men out of Assam April 10th regardless."

1 April 1946: "Today we finished signing all real estate and buildings of about 80 installations over to the British."

7 April 1946: "As of yesterday, the Pipeline section is Ho Gaya (finished)." (All remaining problems were turned over to the Engineer Base Section in New Delhi.)

11 April 1946: "All the orders for the group (names of next repatriates) came out and mine was not on it." (That spoiled his supper but the next day he found out he was on Special Orders #86.)

17 April 1946: "Writing from Dahkurhia staging area outside of Calcutta, Barben says: 'It's like being back in the Army again.' The boys on the General Sturgis troop ship pulled out Monday on time and the prospective sailors for the (General) Hersey started to move in. ...As I left Karnani (officers' quarters) yesterday, a truck load of officers pulled in. Jungle knives, combat boots, 45's, canteens, luggage packed in old ammunition boxes, as well as foot lockers. Well, to the uninitiated, you would think that they are fresh out of the foxholes at Lashio or Bhamo, These were the Delhi boys."

The General Hersey sailed on 21 April and arrived in New York 21 May 1946 with the last of the pipeliners. In addition to Major Barben, Major Thomas J. Johnson former commanding officer of the 777th was on board. His former command sailed from Calcutta on 9 December 1945 on the Troop Ship, USS General Muir, and landed in New York on 10 January 1946. Sometimes it just does not pay to get a promotion.

The End.

**HEADQUARTERS
S.O.S., INDIA BURMA THEATER**

Major General Covell, W. E. R.	to 5 October 1944
Brigadier General Warden,	on 23 December 1944
Colonel Hall, Gene W., GSC	Chief of Staff
Major Bennett, W. E.9 AGD	Adjutant General

**HEADQUARTERS, CONSTRUCTION SERVICE
S.O.S., INDIA BURMA THEATER**

Brigadier General Farrell, T. F.	CO on 5 October 1944
Colonel Welling, A. C., CE	CO on 24 December 1944

**HEADQUARTERS ENGINEER DIVISION NO. 1
S.O.S., INDIA BURMA THEATER**

Colonel Kramer, Phillip F. Jr., CE

**HEADQUARTERS ENGINEER DISTRICT NO. 12
S.O.S. U.S.A.F., C.B.I., A.P.O. 465
CALCUTTA, BENGAL, INDIA**

Colonel Kinsolving, W. C.	(Sun Oil Co.) Dist. Engr. to 3/8/45
Lt.Col. Holliman, Charles I.	(Texaco) Dist.Engr.3/8/45 to 23/10/45
Lt.Col. Britten, Joe C.	(U.S.Big Inch LineO.C.Whitaker Const.Co.)
Major Holleron, W.K.	
Major Farmer, J.	District Adjutant
Major Randalls, George B.	Operations Officer
Major Barben, Arnold H.	(Gould Pumps) Asst.Op.Officer, CO 2/3/86
Major Spahr, Charles E.	(Phillips-Sohio) Construction
Major Brown, John J.	(Braun-Badger Const.) Eng.044. CO 23/10/45
Major Slade, Ernest A.	Head Engineering Section
Major Besharal John J.	Asst. Operations & Chief Lab. Section
Major Saunders,	(Humble) Machine Shop, Welding School
Major Carpenter,	Returned to U.S. 18/11/44
Major Garner,	Returned to U.S. 18/11/44
Captain Cromack, B. M.	
Captain Karusaitis, Vincent V., M.D.	Medical Officer

700 Engineer Petroleum Distribution Company

Captain Sommers, Clifford T. CO 13/8/43 to 9/5/44
Captain Paine, Roy C. Promoted 16/7/44 CO 9/5,/44
Lt . Ellsworth , Otto
Lt. Penny, Austin B.
Lt. Standlee, Norman S. Transferred from Infantry Sept.'44
Lt. Diehl, John J.
Lt. Davis, Jack
Lt. Scott,

707 Engineer Petroleum Distribution Company

Captain Phillips, Charles E.
Lt. Lundy,
Lt. Summers,
Other officers - not known.

708 Engineer Petroleum Distribution Company

Captain Ledford, Mike A. Texas CO to 17/6/44
Captain Shefts, Irving A. Texas CO 1/7/44 to 12/3/45
Captain Sindo, Paul H. Providence, RI, Promoted 12/3/45 CO 12/3/45-
Lt. Sommer, Abraham(NMI) Brooklyn, NY
Lt. Beard, Joe (NMI) Texas
Lt. McGehee, Theodore S. Alexandria, LA
Lt. Kirkman, Paul B. (Did not go overseas with the company)
Lt. Thompson, Lathan P. Ohio
Lt. Riley, Demott D. (not 703 per Sindo)

709 Engineer Petroleum Distribution Company

Captain Gwin, Louis W. CO on 5/8/44

776 Engineer Petroleum Distribution Company

Captain Foreman, C. W. CO

777 Engineer Petroleum Distribution Company (Meritorious Service Unit Plaque, 23 December 1944)

Captain Johnson, Thomas J. (Bronze Star, 4/11/44) CO to Sept. '45
Lt. Wharton, Leonard O. CO Sept. '45

Lt. Kinkler, Ernest E.
Lt. Miller, William
Lt. Anderson, Kenneth C.
Lt. Scruggs, Ellis O. (Field commission from M/Sgt., early 1945)
Lt. Collins, Oscar O. Transferred to District #12, 26 Oct. '44
Lt. Smallwood, Robert C. Transferred to District #12, April '44

**789 Engineer Petroleum Distribution Company
(Meritorious Service Unit Plaque, 22 April 1945)**

Captain Peterson, Troy E. (Bronze Star, Spring 1945) CO to Sept. '45
Lt. Parsons, Robert B. (Killed in jeep accident)
Lt. Ball, Douglas C.
Lt. Blackwood, J. C.
Lt. Campbell,
Lt. Pentecost,
Lt. Sherard, William B.
M/Sgt. Welch, Harold G. Chief Dispatcher, Budge Budge, Bronze Star
M/Sgt. Terenzi, H. O. Bronze Star
Captain Heiman, Eugene O. (Promoted 3/9/45)
Lt. Penny, Austin B.

1380 Engineer Petroleum Distribution Company

Captain Shaw, James CO to Summer 1945
Lt. Bowsher, Arthur L. CO Summer 1945

Lt. Creager, Clay L.
Lt. Norris, James B.
Lt. Umphlett, Calhoun

Lt. Hutchison, Sherman L.

1382 Engineer Petroleum Distribution Company

Captain Nolan, James J.

Pipeline Construction From 293.68 To 393.45 - Jatinga Station To And Including Daldali Station

Extracts from letter from Captain Spahr to Operations Officer, subject, 'Reconnaissance of Hill Section; C-T Line,' dated 28 December 1944.

Sub-paragraphs of Paragraph 3:

- a. Depth of ditch; may be reduced to 12'.

- b. Alignment; pipe may be laid continuously on one side of railroad track, if we wish, regardless of 4' line's location. Care must be exercised to avoid undercutting side walls of any drains or retaining walls.
- c. Railroad survey posts; construction forces are requested to exercise necessary care to avoid displacing railroad's survey posts on curves.
- d. Work trains; the Garrett is the only engine in the hill section that can pull a train longer than 3001 (10 4-wheel cars). Such locomotives are few in number and are needed for railroad's use. Other engines converted for mountain use can pull only 5 flat cars loaded with pipe.
- e. Railroad sidings in the hill section where work trains may be parked are as follows:

R.R Mile Fr. Chittagong Station	Station	No. of Side Tracks	Length of Side Tracks
264.75	Chandranathpur	Adequate trackage	
261.75	Bihara	1	1408-'
270.50	Damchara	1	342-'
-	Ditakcherra	In constant use	
293.50	Jatinga	2	1-1644'
			1- 3771
302.50	Lower Haflong	4	1193,'
311.50	Mohur	2	1027-'
319.50	Dactuhaia	2	1000.1
326.50	Maibang	2	960-'
332.75	Murpa	1	1000.'
343	Langting	2	900-1
354.75	Hatikhali	2	740
361	Langladisa	2	1060-'
367	Lumding	Adequate trackage	
371.75	Baralangpher Station		
375.50	Langcholiet Station		
378.50	Jamadargaon Station		
381.33	Nailalung Station		
383.33	Hazarikagaon Station		
387.30	Diphu Station		
391.50	Hemangaon Station		
393.45	Daidaii Station		

BRIDGES, TUNNELS & STATIONS

STRUCTURE OR LOCATION	RAILROAD MILE AND POLE	NO. PIECES 38' RAND. LT. BEV. OR BLUNT END PIPE
Jatinga Station	293.63	10
Tunnel #16	294.67	12
Haflong Hill Station	295.52	10
Hailong Hill Short-cut	295.52	213

Tunnel #19	305.04	16
Bridge 0134 (Dyung River)	305.20	19
Covered Way #19A	306.75	6
Covered Way #198	306.80	6
Dyang Station		10
Covered Way #19C	308.00	7
Tunnel #20	308.45	14
Covered Way #20	309.13	6
Tunnel #21	310.23	9
Mahur Station	311.32	10
Tunnel #22	312.00	53
Bridge #4	312.70	15
Tunnel #23	312.80	16
Tunnel #24	313.22	11
Tunnel #25	314.50	15
Tunnel #26	315.00	25
Pharding Station	315.50	10
Bridge #31	317.33	14
Covered Way #27	317.50	9
Bridge #40(Mahur River)	318.70	9
Daotuhaia Station		10
Bridge #43 (Subaiai Nalia)	319.75	5
Bridge #47 (Diduki Nalla)	320.58	5
Bridge 257/2	321.12	4
Wading Station	322.50	10
Bridge #	326.0	9
Maibang Station	326.40	10
Bridge #828/3(Mahur River)	327.75	9
Bridge #64	328.20	5
Khejurban Station	329.50	10
Covered Way #28	330.47	9
Tunnel #29	331.24	11
Tunnel #30	331.55	10
Bridge #82	331.73	10
Mupa Station	332.70	10
Bridge #90	333.00	4
Bridge #98 (Boila Viaduct)	334.38	15
Tunnel #31 (Boila Tunnel)	335.35	14
Tunnel #32 (Dyakho Tunnel)	336.25	22
Dyakho Station	337.75	10
Bridge #10 (Dyakho Nulia)	338.14	9
Bridge #16 (Dimrewn Nulla)	339.37	6
Bridge #27 (Langting Nulia)	343.50	9
Langting Station	342.85	
Bridge #28 (Lacti Nulla)	343.19	5
Bridge #41 (Landing Nuila)	346.25	7
Lalbang Station	348.00	10
Hatikhali Station	354.80	10
Bridge #51 (Langladisa Nulia)	355.05	4
Langladisa Station	360.70	10
Bridge #72 (Lumding Nuila)	363.04	7
Bridge #78	365.92	4
Lumding Station	366.35	10
Bridge #1 (Harulangpher Riv.)	367.70	7

Bridge #13 (Langphur River)	370.80	9
Baralangpher Station	371.75	10
Bridge #19 (Langsplet Riv.)	373.98	6
Langcholiyet Station	375.50	10
Bridge #22 (Langeoliet Nulla)	376.10	6
Jamadargaon Station	378.50	10
Nailalung Station	381.33	10
Hasarikagaon Station	383.33	10
Diphu Station	387.30	10
Bridge #45	387.97	10
Bridge #48	388.87	5
Bridge #50	389.50	4
Hemangaon Station	391.50	10
Daldaii Station	393.45	10

Acknowledgements, Sources, and Bibliography

Most written accounts of operations and events in the CBI Theater mention the military pipeline operations but the emphasis is on the lines built in Burma and China. To my knowledge, no one has ever featured the beginnings of the lines in India. As William Boyd Sinclair in a letter to me stated 'Over the years, both during and after the war, the impression has remained with me that good, reliable information about pipeline construction was the hardest information to get.' Engineer District #12 apparently lacked a good PR (Public Relations) man. Mr. Sinclair's letter invited and challenged me to supply information on the pipelines in India. Since no other volunteer stepped forward, I accepted.

This account is based in part on my memory, verified where possible. The responsibility for inclusions and omissions is mine. The omissions are particularly vexing. I was an observer and participant as a lieutenant in the activities of the 777th EPD Co. but I am not the most qualified to report. My apologies extend to all personnel that served in District #12 for omission of events that may be more pertinent or spectacular than those enumerated. As Captain Troy E. Peterson wrote: "It is obvious that the 777th and 789th have now been better represented. I am sure the other EPD Cos could also make some interesting input."

Thomas J. Johnson and Troy E. Peterson (former commanding officers of the 777th and 789th, respectively) have reviewed this material and suggested additions and deletions. Hubert O. Hanson (former S/Sgt. in the 777th) has added an interesting account of difficulties faced and conquered and offered many explanations and suggestions.

In 1985, Mrs. Helen Mosher Barben published numerous, edited letters received from her husband, Major Arnold H. Barben written between December 1943 and May 1946 under the title "India According to Barb". Major Barben died on March 22, 1978. The letters written at the time of events or shortly there-after are the source of much information. The Major was a prime trouble shooter in the District and a participant in more than his fair share of difficulties. I had the pleasure of being his traveling companion on a trip to Kashmir in the early summer of 1945. Credit must be given to him for assembling from multiple sources the best collection of photographs of pipeline activities in India and thanks must be given to Mrs. Barben for making the collection available to me. She has also granted permission to use in this work the numerous quotes from his letters.

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1. ASSAM. Longitude 90 to 96 degrees east. Latitude 24 to 28 degrees north.
2. ARAKAN. Longitude 90 to 96 degrees east. Latitude 20 to 24 degrees north.

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