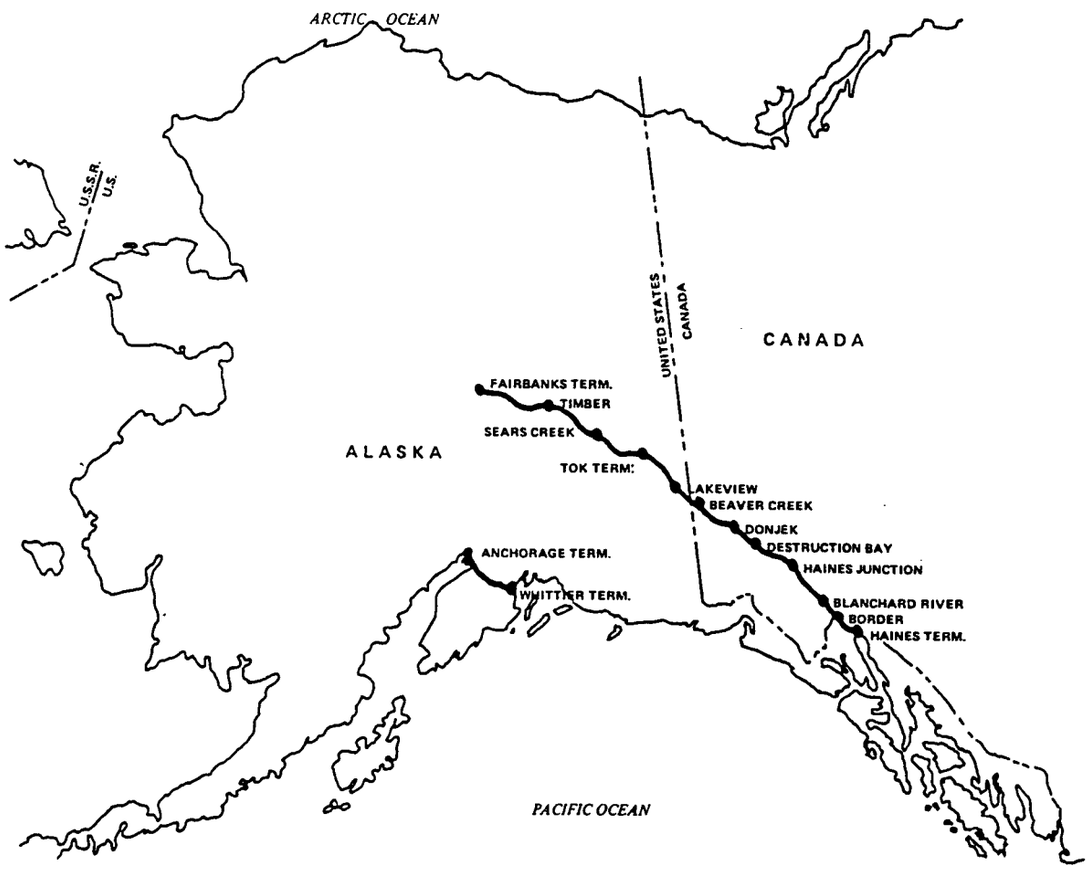
172D INFANTRY BRIGADE (ALASKA)

DESCRIPTION OF ALASKAN

MILITARY PETROLEUM FACILITIES



PAMPHLET 360-1

15 JANUARY 1982

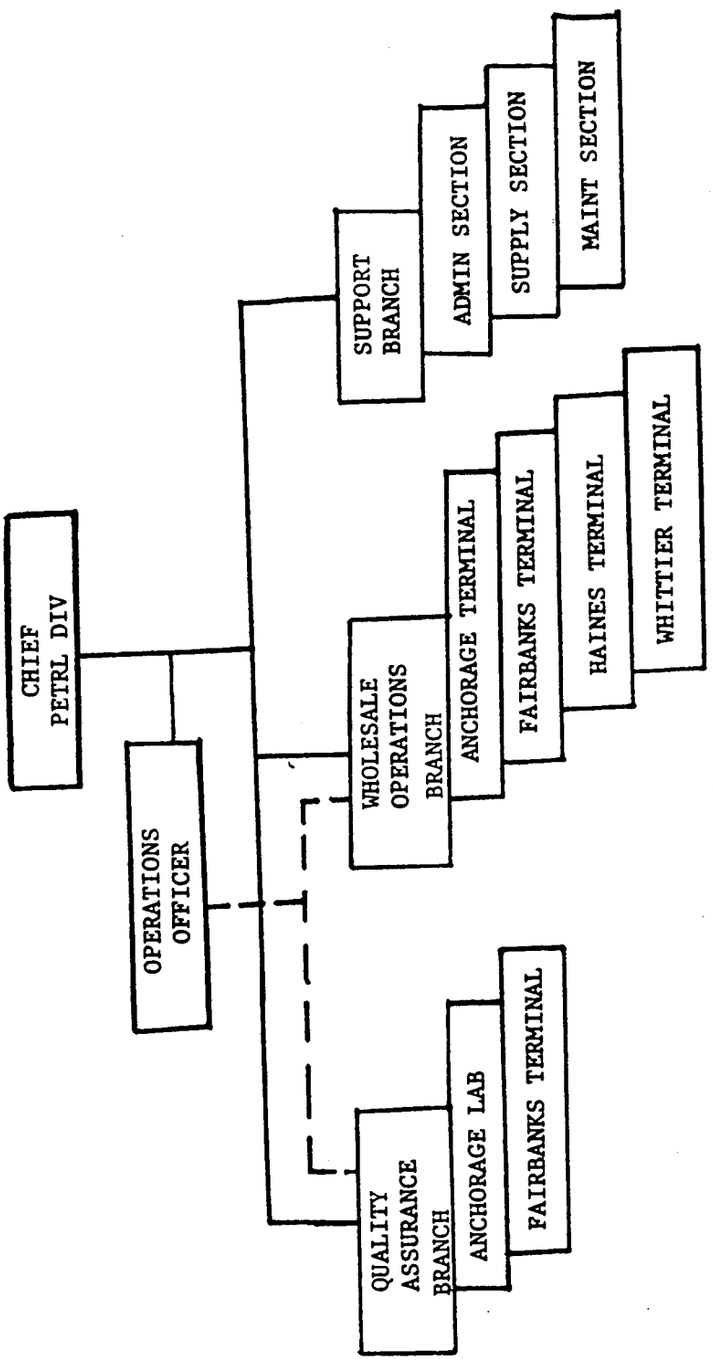
DEPARTMENT OF THE ARMY
HEADQUARTERS, 172D INFANTRY BRIGADE (ALASKA)
Fort Richardson, Alaska 99505

172d Brigade Pamphlet
No. 360-1

15 January 1982

Army Information
DESCRIPTION OF ALASKAN PETROLEUM FACILITIES

*This pamphlet supersedes 172d Brigade Pamphlet 360-1, 25 October 1978.


CHIEF PETRL DIV
OPERATIONS OFFICER
SUPPORT BRANCH
ADMIN SECTION
SUPPLY SECTION
MAINT SECTION
WHOLESALE OPERATIONS BRANCH
ANCHORAGE TERMINAL
FAIRBANKS TERMINAL
HAINES TERMINAL
WHITTIER TERMINAL
QUALITY ASSURANCE BRANCH
ANCHORAGE LAB
FAIRBANKS TERMINAL

Section I. ORGANIZATION AND MISSION

1. GENERAL. The Petroleum Division is an element of the Director of Industrial Operations (DIO), 172d Infantry Brigade (Alaska) (172d Inf Bde (AK), and was established 1 July 1974. Petroleum Division is governed by DOD Manual 4140.25 and AR 703-1. Petroleum Division headquarters is located in Building 724, Fort Richardson, Alaska.

2. MISSION AND FUNCTION.

a. Office of the Chief:

(1) Directs and supervises petroleum operations and maintenance of the Defense Fuel Supply Center (DFSC)-owned, Army operated, petroleum distribution system, including facilities and equipment. Exercises supervision of certain prescribed functions normally assigned to an installation commander under provisions of AR 210-10; e.g., construction and other work incident to the maintenance, repair, and preservation of the real property involved in operation of the Brigade Petroleum Distribution System.

(2) Exercises quantity and quality control over the annual resupply program of petroleum products. Conducts the quality surveillance program and that portion of the quality assurance program as directed and required by joint regulations.

(3) Advises the Commanding General and Brigade elements on matters pertaining to petroleum distribution operations, and presents to the Commander and staff information required to make sound petroleum-related decisions.

b. Operations Officer:

(1) Serves as the immediate assistant to the Chief, Petroleum Division, and on the basis of established policy, makes such supplemental decisions as required to execute tasks essential to effective performance of the petroleum mission.

(2) Coordinates the activities of the Petroleum Division in accordance with policies issued by higher authority, and informs the Chief on matters pertaining to the general efficiency of the Petroleum Division.

(3) Represents the Chief, Petroleum Division, on occasions that the Chief may direct.

c. Support Branch.

(1) Administration:

(a) Maintains the manpower program for the system.

(b) Performs records management and reports control services.

(c) Maintains, controls, and safeguards classified material, and conducts the security program for Petroleum Division.

(d) Coordinates all military and civilian personnel matters.

(2) Supply:

(a) Maintains and controls required supply documents to include property book, hand receipts, and supporting files and records in accordance with applicable Army Regulations.

(b) Maintains and controls the requisitioning, receipt, storage, and issue of authorized supplies and equipment for the Petroleum Division.

(3) Facilities Maintenance:

(a) Plans and coordinates the engineering, and maintenance of the petroleum distribution systems, their facilities, and equipment.

(b) Plans and coordinates the performance of engineer activities relating to utilities, buildings and grounds fire protection/prevention and safety.

(c) Conducts the equipment maintenance management program to include readiness.

(d) Manages and controls the repair, modification, and alteration of petroleum distribution systems and equipment above organizational maintenance level.

(e) Coordinates all modifications, alterations, and minor new construction which includes design and drafting.

(f) Plans, analyzes, and coordinates the installation facilities operation and maintenance program which includes work reception, job estimation, and supply coordination (LMMF activities).

(g) Acts as liaison between Director of Facilities Engineering and Petroleum Division.

d. Quality Assurance Branch:

(1) Serves all military departments and the Brigade elements in determining quality status of petroleum assets within the Brigade.

(2) Operates and maintains a petroleum laboratory testing facility serving all components of the Brigade.

(3) Renders technical assistance and guidance to Army, Navy, Air Force, and other Governmental agencies as required.

(4) Administers the quality surveillance mission for the Brigade.

(5) Effects procurement inspection of petroleum products for the Brigade.

e. Wholesale Operations Branch:

(1) Provides supervision of the receipt, storage, movement, and issue of bulk DFSC-owned petroleum products on the Alaska Mainland.

(2) Has caretaker responsibilities for the Haines/Fairbanks Pipeline (599 miles) from Haines to Eielson Air Force Base (AFB). (Pipeline is currently up for sale by GSA.) The 27-mile Eielson/Fairbanks segment of the pipeline was retained and is still in operation.

(3) Operates the Whittier/Anchorage Pipeline (62 miles).

(4) Operates marine and dispensing terminals at Whittier, Anchorage, Fort Wainwright, and Haines.

(5) Exercises continuous dispatch control and supervision over products movement through the Whittier/Anchorage and Fairbanks/Eielson Pipelines.

(6) Assures quality control of products and facilities which includes, but is not limited to, sampling petroleum products, cleaning tanks and appurtenances, proper segregation of pipeline batches, and any inspection relative to quality control.

(7) Performs quantity control measures such as gauging petroleum quantities, computing inventories, compiling receipts and issues, and submitting prior documentation to ensure proper financial accounting and stock management.

(8) Plans, develops, and conducts short range, long range, and emergency plans for physical security, manpower training and utilization, and ensuring adequate mission facilities and capabilities.

f. Pipeline Pump Stations: Border (BC), Blanchard (YT), Junction (YT), Destruction Bay (YT), Donjek (YT), Beaver Creek (YT), Lakeview (AK), Sears Creek (AK), Timber (AK). These pump stations have been declared excess by the military and are presently up for sale by GSA. Wholesale Branch has caretaker responsibility.

(1) Each station foreperson was responsible for the operation, organizational maintenance, and management of a particular station.

(2) Was responsible for movement of petroleum through the pipeline.

(3) Performed organizational maintenance and minor construction of pipeline equipment and appurtenances in the area of his/her station.

g. Terminals. Anchorage, Whittier, Fairbanks, and Haines.

(1) Each terminal foreperson is responsible for the operation of the bulk petroleum facilities at respective terminals.

(2) Anchorage:

(a) Responsible for operation, organizational maintenance, and management of the bulk petroleum storage facilities and distribution system.

(b) Responsible for offloading tankers at City-owned Port of Anchorage Petroleum Dock.

(3) Whittier:

(a) Responsible for operation, organizational maintenance, and management of bulk petroleum storage facilities and distribution system.

(b) Responsible for the operation of POL Dock.

(c) Responsible for operation and supervision of seven units of family housing (Begich Building) and Building P-12, the maintenance building.

(d) Responsible for operation of input pump station for Whittier/Anchorage Pipeline.

(4) Fairbanks Terminal: Responsible for the operation and management of the bulk petroleum storage and distribution facility.

(5) Haines Terminal:

(a) Responsible for the operation and management of the bulk petroleum storage and distribution facilities.

(b) Responsible for the operation of POL Dock.

(c) Responsible for operation and supervision of family housing.

(d) Has caretaker responsibility of booster pump station and pipeline from Haines to Donjek.

Section II. HAINES/FAIRBANKS PIPELINE FACILITIES AND OPERATION

3. GENERAL DESCRIPTION. The Haines/Fairbanks Pipeline was excessed to military needs during 1973 and has been up for sale by GSA since that time. It was constructed to transport liquid fuels from the deep water port of Haines, in southeastern Alaska, to military installations North of the Range in the interior of Alaska. To meet the military needs, petroleum products from ocean tankers or tanker barges were received in bulk terminal facilities at Haines. Form this point, the petroleum products were transported by the 8-inch, multiproduct pipeline to the Fairbanks area. Passing over 25 major river crossings, 82 minor stream crossings, 49 major highway crossings, 39 secondary road crossings, and 11 major swamp tundra crossings, the pipeline extends over the coastal mountain range, and through the platueas and valleys of the Yukon Territory, the Province of British Columbia, and the State of Alaska. Along this route temperatures have ranged from a low of -83°F at Snag, Yukon Territory, to a high of 92°F at Fairbanks, Alaska, a range of 172°F. The initial cost of the project was $38,249,796;

however, subsequent construction has increased the overall cost to $43,749,796. The product held in the line at any time during operations was 210,000 barrels valued in excess of $1,500,000. The line is composed of 626 miles of 8-inch pipeline, nine booster pump stations (Border, Blanchard River, Junction, Destruction Bay, Donjek, Beaver Creek, Lakeview, Sears Creek, and Timber), Fort Greely Take-Off Station, Birch Lake Tank Farm, and supporting terminal bulk storage tanks and related equipment and facilities at Haines, Tok, Eielson AFB, and Fairbanks.

4. DESIGN AND CONSTRUCTION. The design of the pipeline was accomplished for the Corps of Engineers by the Fluor Corporation, Los Angeles, California, during the period 1950-1952. Bids were advertised in the fall of 1953 and contract was awarded to Williams Brothers of Tulsa, Oklahoma; Mclaughlin Inc of Great Falls, Montana; and Marwell Construction of Vancouver, British Columbia, Canada; a joint venture organization. Field construction began early in 1945 with the main pipeline essentially completed before the winter season of 1954 to 1955; stations and storage facilities being completed during the summer of 1955, and the necessary testing of the line completed prior to 12 October 1955, on which date the Unites States Army, Alaska, accepted the pipeline and facilities. The bachelor quarters, laboratory, and refrigeration buildings at Haines were constructed under a separate contract.

5. ROUTE. The Haines/Fairbanks pipeline begins at Lutak Inlet, approximately 3-1/2 miles north of Haines, Alaska, and follows the Haines Highway into Canada to Haines Junction, then along the Alaska Highway via Tok, Big Delta, Eielson AFB, and to its terminus at Fairbanks Terminal, 7 miles northeast of Fairbanks, Alaska. Most of this line is surface laid. The sections from Haines Terminal to a point 42 pipeline miles northward, and from Big Delta to Fairbanks Terminal are buried (96 pipeline miles). These sections were buried to minimize the hazard to private property and residents in these more congested areas, and to protect the pipeline from damage by heavy vehicular equipment. In addition, short sections along the route are buried to protect station personnel, equipment, and the line from possible vehicular damage and washouts during flash floods.

6. PROFILE. Six hundred twenty-six miles of pipeline extend from Haines, Alaska (elevation 30') to Fairbanks, Alaska (elevation 430'). While the net vertical rise is only 400', the pipeline system is complicated by a peak elevation of 3,750' at Milepost 57. Other elevations of 3,300' at Milepost 90; 3,350' at Milepost 162 and 175; 3,050' at Milepost 252; 1,890' at Milepost 445; and 1,900' at Milepost 564 are limiting factors to the gradient at normal line throughout.

7. MULTIPRODUCT PIPELINE.

a. Originally, the design criteria indicated that fuels to be transported through the pipeline would include:

(1) Diesel fuel, arctic grade C.

(2) Aircraft turbine and jet fuel, JP-3.

(3) Vehicle motor gasoline, grade 72 octane.

(4) Aircraft reciprocating engine fuel, grade 100/130.

(5) Aircraft reciprocating engine fuel, grade 115/145.

b. Fuels actually transported through the line were:

(1) Diesel fuel, grade DFA.

(2) Aircraft turbine and jet engine fuel, grade JP-4.

(3) Automotive combat gasoline, grade 95C.

(4) Aviation gasoline, grade 115/145.

8. TANKAGE.

Station	Number of Tanks	Normal Barrels Per Tank	Total Capacity Barrels
Haines Terminal	1	110,000	110,000
	9	30,000	270,000
	2	5,000	10,000
Tok Terminal	9	30,000	270,000
	3	5,000	15,000
Fort Greely	2	15,000	30,000
	4	10,000	40,000
	2	2,250	4,500
Birch Lake	2	6,600	13,200
Fort Wainwright	2	25,000	50,000
	14	10,000	140,000
	4	2,250	9,000
	3	1,190	3,570
	4	595	2,380
Eielson Air Force Base	5	30,000	150,000
	4	16,000	64,000
	9	10,000	90,000
			1,271,650

The 8-inch line was designed to operate at normal throughput rates with only Haines, Border, and Top Pump Stations in operation. The line was originally designed to reach "emergency" throughput rates by placing Junction and Donjek Pump Stations (booster-type) into operation, to supplement Haines, Tok, and Border Pump Stations. Since the original design criteria, subsequent requirements made it necessary to install six additional pump stations which provide 27,500 BPD throughput. These new stations are Destruction Bay, Blanchard River, Beaver Creek, Lakeview, Sears Creek, and Timber.

9. PUMPING OPERATIONS. It was necessary to operate at approximately 450 BPH to maintain turbulent flow. This was accomplished by operating varied arrangements of pump stations or pumps at the same time.

From Haines Terminal to	Miles Between Stations	Total Miles
Border Station	47	47
Blanchard River	40	87
Junction	71	158
Destruction Bay	51	209
Donjek	39	248
Beaver Creek	76	324
Lakeview	45	369
Tok	61	430
Sears Creek	54	484
Fort Greely	44	528
Timber	15	543
Birch Lake	26	569
Eielson	29	598
Fairbanks	28	626

10. PIPELINE PRODUCT DISPATCHING.

a. All dispatching of products through the pipeline was based on movement instructions from the Dispatch Division at Fort Richardson, Alaska. The Dispatcher's Control Board, a manually operated panel, presents the pipeline in a graphic form. The panel was operated in conjunction with a telephone-teletype communication to all pipeline installations and constituted the nerve center for conducting product movement operations through the pipeline.

b. The Control Board consisted of three parts:

(1) Paper tape scaled to 1/8 per 100 barrels.

(2) A pipeline scale profile.

(3) Devices for determination of variations of volume due to changes in operating temperatures and pressures.

c. The scaled paper tape was used to accurately plot the complete displacement of the products in the line by "batches," corrected to reference pressures and temperatures and other operating data such as time of entry into the line, gravity of product, etc. Each "batch" was indicated by product color code on the tape to provide a visual guide as to the contents of the line. The tape was manually advanced in the direction of the flow of the product at hourly intervals, a distance equal to the net quantity of fluid pumped into the line.

11. LINE DELIVERY OF PRODUCTS. Delivery of bulk quantities to designated points was accomplished as follows:

a. Tok Terminal - All products were delivered into terminal storage from the Haines/Fairbanks Pipeline.

b. Fort Greely Take-Off Station - Products were delivered to Fort Greely by taking "heart-cuts" from passing "batches" scheduled for installations further north.

c. Birch Lake Tank Farm - Products were delivered to Birch Lake Tank Farm by taking "heart-cuts" from passing "batches" scheduled for installation further north.

d. Eielson AFB - Products were delivered into Eielson AFB tankage for Air Force usage from the 8-inch line.

e. Fairbanks Terminal - Products were pumped into terminal storage tanks from the 8-inch line for subsequent delivery to Fort Wainwright and Eielson AFB.

12. PRODUCT EXPANSION AND CONTRACTION IN THE PIPELINE. Once in the pipeline, products were exposed to great variations in the prevailing ambient temperatures along the line. The pipeline was packed (pressured) each time pumping operations were shut down; however, since petroleum products expand and contract with changing temperatures, a continuous buildup and reduction of pressure was experienced. To relieve the pressure in the line during temperature rises, product was "bled off" into appropriate tankage at Tok Terminal, Eielson AFB, or Fairbanks Terminal. Conversely, with a drop in ambient temperatures, products contract or shrink, reducing line pressures. Repressuring was not essential in the latter instance, as experience has shown that allowing the line to go slack creates less interfacial mixing than daily repressuring. This expansion and contraction was so great that during a temperature rise, it was possible to receive product at 1,000 BPH at Tok Terminal while pumping at a rate of 500 BPH at the Haines Terminal; and with a sharp temperature decrease, it was possible to pump product into the line at Haines at a rate as high as 500 BPH without receiving product at the Tok Terminal. Due to these conditions, it was necessary to pump at maximum rates to prevent laminar flow in the line. Evaluation of operational experiences and consultants recommendations resulted in the requirement for burial of the line to correct temperature problems. The burial of the line cost an extimated $3,175,000.

13. SCRAPER TRAPS. Installed in the 8-inch line are seven scraper traps for use in scraper operations for cleaning the line and to assure delivery of clean products. Location of these facilities are as indicated below:

Station Location	Milepost
Haines	0.0
Border	47.3
Junction	158.1
Donjek	248.0
Tok	432.0
Eielson	599.0
Fairbanks	626.0

14. AERIAL SURVEILLANCE OF PIPELINE. To facilitate observation of conditions along the line, and to particularly detect evidence of leaks and line breaks, weekly roundtrip flights from Haines to Tok or Haines to Fairbanks were made by civilian aircraft under contract to the Government. The pilot reported by radio to the nearest pump station or terminal any observed leaks, breaks, or other conditions warranting immediate attention; advising of the existing condition and location by pipeline mile. At the completion of each trip, a teletype message was sent concerning the area observed to the superintendent of the pipeline for necessary action.

HAINES/FAIRBANKS PIPELINE
8.001"I.D. Welded Steel
Distance 626 Miles

HAINES TO TOK - DISTANCE 432 MILES

The following information was factual when the pipelines were being operated:

Station	Suction PSI	Discharge PSI	AV BPH
Haines	40	1200	
Border	400	1440	
Junction	500	1000	
Donjek	600	1200	
TOK RECEIPTS AT 200 PSI RECEIVING PRESSURE			626
Accelerated Operations			
Haines	43	1340	
Border	50	1210	
Blanchard River	40	1280	

Station	Suction PSI	Discharge PSI	AV BPH
Accelerated Operations			
Junction	40	980	
Destruction Bay	60	800	
Donjek	90	1280	
Beaver Creek	40	960	
Lakeview	50	1200	
TOK RECEIPTS AT 100 PSI RECEIVING PRESSURE			1165

TOK TO FAIRBANKS - DISTANCE 194 MILES

Station	Suction PSI	Discharge PSI	AV BPH
Tok	40	1200	
FAIRBANKS RECEIVED AT 200 PSI RECEIVING PRESSURE			750
Accelerated Operations			
Tok	40	1000	
Sears Creek	60	1080	
Timber	90	940	
FAIRBANKS RECEIVED AT 100 PSI RECEIVING PRESSURE			1165

LINE WAS OPERATED IN TWO SECTIONS AS ALL PRODUCTS WERE TERMINATED AT TOK.

NOTE: Haines Station with positive displacement pumps kept Border Station supplied with sufficient fuel for that station to hold maximum discharges pressure at all times.

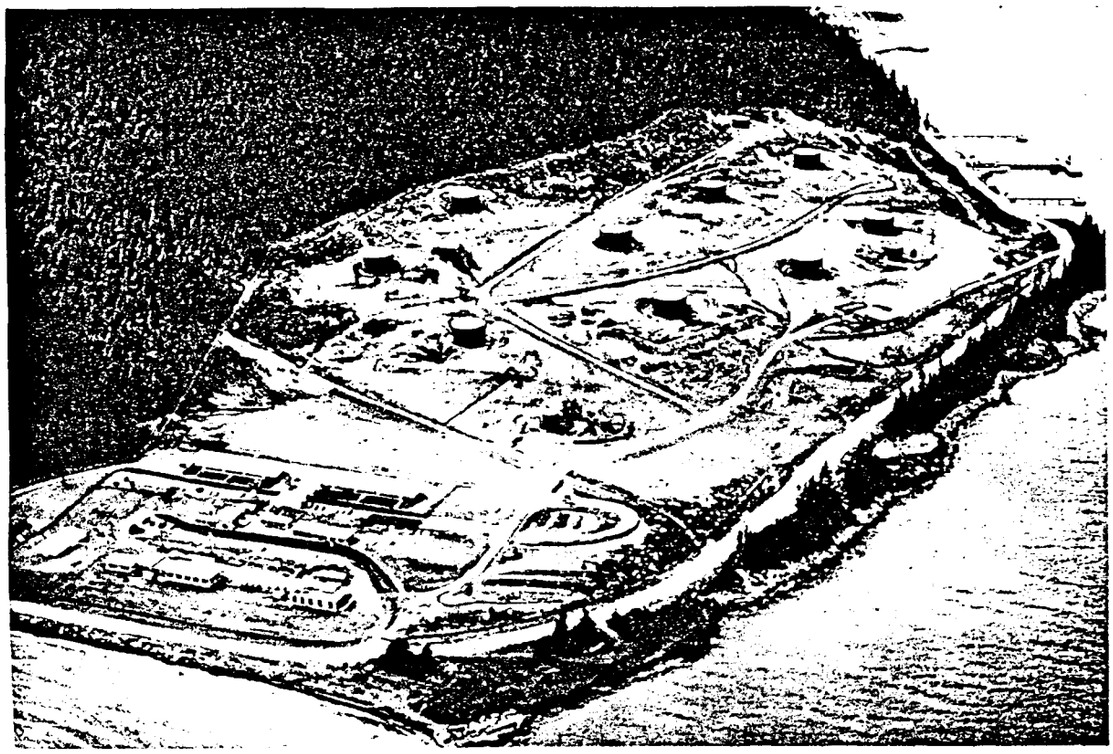
Section III. HAINES TERMINAL AND PUMP STATION

15. GENERAL. Haines Terminal and Pump Station, 203 acrea in area, is located 3 miles north of the City of Haines on the west side of Lutak Inlet.

16. FACILITIES.

a. Pier.

b. Manifold Building.



Haines terminal and Pump Station, 203 acres, is located 3 miles north of the City of Haines on the west side of Lutak Inlet.

c. Tank Farm.

d. Mainline Pump Building.

e. Laboratory Building.

f. Utility Building.

g. Administrative Building.

h. Warehouse-Garage-Shop Building (Machine).

i. Truck Loading Rack.

j. Family Housing.

k. Cold Storage Locker Building.

l. Fire Pump Building.

m. Hose Cart Houses.

n. Incinerator.

o. Semipermanent Buildings.

p. Warehouse Area.

17. PIER. The terminal pier at the north end of the station provides facilities for docking and discharging tankers. It is a T-shaped, concrete decked steel structure capable of mooring a 26,000 DWT, tanker. Bow and stern mooring dolphins are provided to hold the vessel in place against spring fenders. These dolphins, 780' apart, are installed on a centerline, 75' shoreward from the spring fenders on the unloading platform, and are equipped with electrically operated cat heads and carrier to main dock. Two derricks are furnished for handling the unloading hoses and the two 15 HP barge stripping pumps. Other facilities at the pier include:

a. Dockmaster's Office consisting of heated office space with toilet and enclosed area for fire foam equipment.

b. Pumphouse with dual gasoline-electric motor driven, 150 HP fire pump.

c. Cathodic corrosion protection system for steel pier structure.

d. Two hose houses (fire hose) and suitably arranged fire hydrants.

e. Drip pans under product hose connections with drain system and sump tank.

f. Floodlights.

g. Six-inch fresh water line for servicing tankers.

18. MAINFOLD BUILDING. This facility houses two transfer pumps, piping, valves, and manifolds required to route the products from the petroleum dock to terminal storage tanks, and from terminal storage tanks through two Warner-Lewis Water Separators to the mainline pump building. Products can also be transferred between tanks. Originally designed and constructed as an open building, the manifold building has since been enclosed and provided with heat. Elevation difference between the terminal storage tanks and the manifold building varies from 20' to 102'. Tank elevation measured at grade level varies from 100' to 182'.

19. TANK FARM.

a. The tank farm is a fenced-in area southeast of the petroleum dock, between the dock and terminal buildings. The tank farm consists of twelve product tanks, eleven tanks for products to be transported through the pipeline, and one tank for station fuels. The tanks and capacities are as follows:

Tank Number	Capacity in Barrels	
100	110,000	
101-109	30,000	
110-111	5,000	
112	1,000	(For Station Use Only)

b. Each 30,000-barrel tank is equipped with a 40-foot swing line for filling and withdrawal of product. Water drain-off is accomplished by gravity flow from the center sump of the tanks. A 4-inch line runs from the central water draw-off sump to a drain box just outside the tank. The drain box is provided with a 6-inch outlet for disposal of the water. The water draw-off sump operations are manually controlled by a gate valve just outside the tank.

c. The tanks are situated on a hillside with each tank surrounded by a dike of sufficient capacity to contain 150% of the tank capacity. A ditch and dike across the south side of the tank farm protects station buildings from water run-off or product overflow. Roads in the tank farm area provide access to all tanks.

d. The fire foam building is situated within the tank farm area with a network of pipes leading to each tank for firefighting purposes. Either fresh or salt water can be used in this system through use of salt water pump located on the petroleum dock or by gravity from the fresh water tank.

e. Floodlights are provided for the illumination of the entire terminal area.

f. A 7,500-barrel fresh water tank is located in the tank farm area for the storage of fresh water used by the installation.

20. MAINLINE PUMP BUILDING. This building is divided into a control room, engine room, pump room, storage room, and restroom.

a. The pumping equipment includes three mainline reciprocating Wilson-Snyder quintuplet pumps rated at 272 GPM, 120-70 RPM, 1200 PSI discharge pressure. Each pump is driven by a Chicago-Pneumatic Model 69-CP diesel engine, 6 cylinder, 4 cycle, 720-420 RPM, 285 HP. Engines and pump units are connected by a 6 to 1 geared speed reduction unit. The units will operate individually or in parallel. The maximum station pumping capacity is 1380 BPH with the pumps connected in parallel.

b. Diesel fuel oil is supplied to pump engines from a 1,200-gallon station day tank which is supplied from bulk storage tanks.

c. Engine coolant water is piped from the diesel engines to a 3-unit radiator building and returned to the engines.

d. The control room is isolated by means of a pressure barrier fire wall and door arrangement permitting this room to be pressurized to exclude petroleum vapors. A fire wall isolates the engine room.

e. Two jet strainers are installed on the intake line from the storage area.

f. A product sump within the building is provided to accumulate drain discharges from the strainers. The product in the sump is disposed of by pumping into the line when appropriate.

g. A scraper launcher is located just outside of the building for sending scrapers to Border Station.

21. LABORATORY BUILDING. This building serves as a laboratory for testing all petroleum products handled at the Haines Terminal. It contains an office, laboratory, knock engine room, and storage room.

22. UTILITY BUILDING. This building furnishes heat, and electric power for the station. It houses four General Electric 480 volt, 60 cycle, 150 KW, 720 RPM generators driven by four Chicago-Pneumatic 6 cylinder, 4 cycle, 720 RPM, 285 HP, Model 60-CP diesel engines. Cooling water is pumped to a 4-unit radiator building and returned to the engines. For heat, there are three oil fired, 100 HP low pressure (15 PSI) boilers.

23. ADMINISTRATION BUILDING. This building provides office space and 3-place garage.

24. WAREHOUSE-GARAGE-SHOP BUILDING. This is a multipurpose building containing:

a. A 4-door storage garage for maintenance equipment.

b. A shop for automotive repair and general maintenance.

c. Office, tools, and parts storage.

d. Warehouse consisting of approximately 1,000 squar feet for heavy item storage and approximately 1,500 square feet containing bins for repair parts and small items.

25. TRUCK LOADING RACK. This facility is of steel frame construction on a concrete foundation, a metal roof, and wood plank floor decking with 3-inch headers, one for diesel fuel and one for motor gasoline.

26. FAMILY HOUSING. Housing at this station consists of permanent-type buildings of rigid steel frame construction covered with insulated steel panels. The floors and foundations are concrete, and the roofs are prefabricated steel decking covered with insulating board, build-up composition roof, and gravel protective coating. These buildings include the following:

a. One dormitory (CBQ) with a capacity of 10 persons, including a dining room, kitchen, living room, two latrines, and a shower room.

b. One apartment-type building consisting of eight two-bedroom units.

c. One apartment-type building consisting of eight three-bedroom units.

27. COLD STORAGE LOCKER BUILDING. This is a concrete building with a freeze room (-10°F) which is equipped with individual food lockers.

28. FIRE PUMP BUILDING. This building, adjacent to the Utility Building, houses a dual gasoline engine booster pump to increase water pressure in the lines when needed for firefighting.

29. HOSE CART HOUSES. There are two hose cart houses; one located near the Warehouse-Garage-Shop Building, and one near the Fire Pump Building.

30. INCINERATOR. Fired by a diesel oil burner, the incinerator is suitable for burning rubbish and garbage under all weather conditions.

31. SEMIPERMANENT BUILDINGS. There are three buildings; two which are used as warehouses, and the other contains a carpenter shop and boiler plant for heating one of the warehouses and carpenter shop.

Section IV. BORDER PUMP STATION

32. GENERAL. Border Pump Station is located on the Haines Cut-Off Highway approximately 5 miles north of the International Boundary near the Klehini River. There are no nearby towns. The site is 47 miles north of the Haines Terminal at an elevation of 1,300' above sea level. This station is an essential part of the normal pipeline operation with a capacity to pump products over the peak of the entire system at pipeline Milepost 57, elevation 3,750', where the Haines Cut-Off Highway and the pipeline cross the Chilkat Pass in the Coast Range. The site is 32 acres in area.

33. FACILITIES.

a. Mainline Pump Building.

b. Utility Building.

c. Warehouse-Garage-Shop Building.

d. Family Housing.

e. Cold Storage Locker Building.

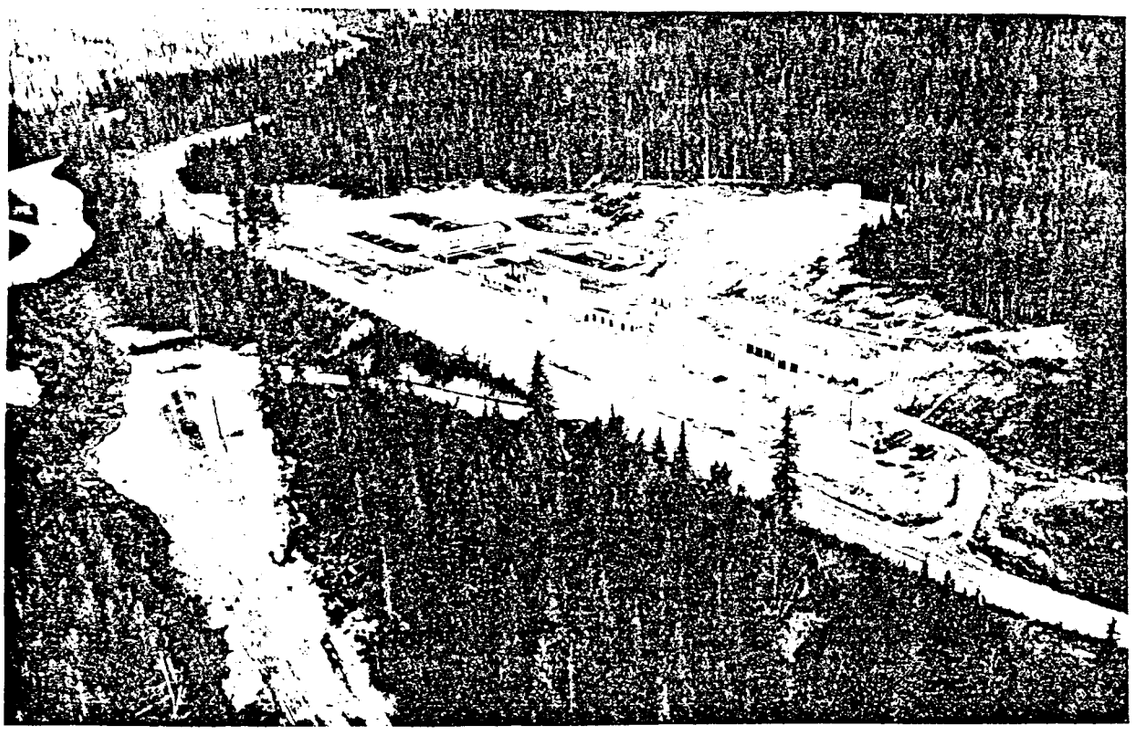
34. MAINLINE PUMP BUILDING. Ther interior of this building is divided into an engine room, pump room, and a control room. The control room is isolated by means of a pressure barrier fire wall and door arrangement, permitting the room to be pressurized for excluding petroleum vapors from the area. A fire wall isolates the engine room.

a. The pumping facilities at this station consist of three units, each composed of a Chicago-Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Byron-Jackson, 4 stage centrifugal pump. The diesel engines are coupled to the pumps by means of a 4,750 to 1 geared speed increaser unit. Engine speed range is from 750 RPM to 573 RPM. Thus, the pump speed range is 3,515 RPM down to 2,722 RPM. Maximum engine brake horsepower is 293. The pumps may be operated individually or in a series.

b. Two Moorlane strainers are also housed in the pump house. These strainers serve as both filters and water extractors. A product sump within the building is provided to accumulate the drain discharges from the strainers. The product in the sump is disposed of by pumping into the line when appropriate. Scraper traps are located on each side of the building for receiving and launching scrapers.

c. Engine coolant water is piper from the diesel engines to a 3-unit radiator building and returned to engines.

d. Diesel fuel oil is provided from the 5,000-barrel station storage tank located on a hill above the pump house. This tank is filled from the pipeline at scheduled intervals.



Border Pump Station, 32 acres in area, is located on the Haines Cut-Off Highway 47 miles north of the Haines Terminal.

35. UTILITY BUILDING. This is a multipurpose building which contains:

a. An engine room housing two 150 KW General Electric generators, each driven by a 6 cylinder Chicago-Pneumatic diesel engine identical to those which drive the pipeline pumps. Jacket coolant water is piped from the diesels to a 2-unit radiator building and returned to engines.

b. A pump room housing two domestic water pumps, a fire pump, chlorination equipment and boiler, and cooling water softening equipment. The water system is supplied by a Peerless deep-well pump in an insulated pump house on the bank of the Klehini River. Water is stored in a 60,000-gallon tank in a heated tank house on the station.

c. A boiler room housing three 80 HP low pressure (15 PSI) boilers which furnishes low pressure steam for station heating. Steam distribution and condensate return lines for the station are in underground conduit.

36. WAREHOUSE-GARAGE-SHOP BUILDING.

a. Maintenance Shop.

b. Warehouse for spare parts, pipe fittings, and tools for station maintenance.

c. Four-place garage for vehicle storage.

37. STATION HOUSING. Housing at this terminal consists of permanent-type buildings of wood frame construction; foundation and basement flooring of concrete; upper structure floors of wood-linoleum covered; walls, sheathing and asbestos siding. Roofs are insulated wood decking with built-up composition, and gravel protective coating. These buildings include the following:

a. One dormitory (CBQ) with a capacity of 10 persons, including a living room, dining room, kitchen, and bath, presently being utilized as a one-room school for the station personnel's children.

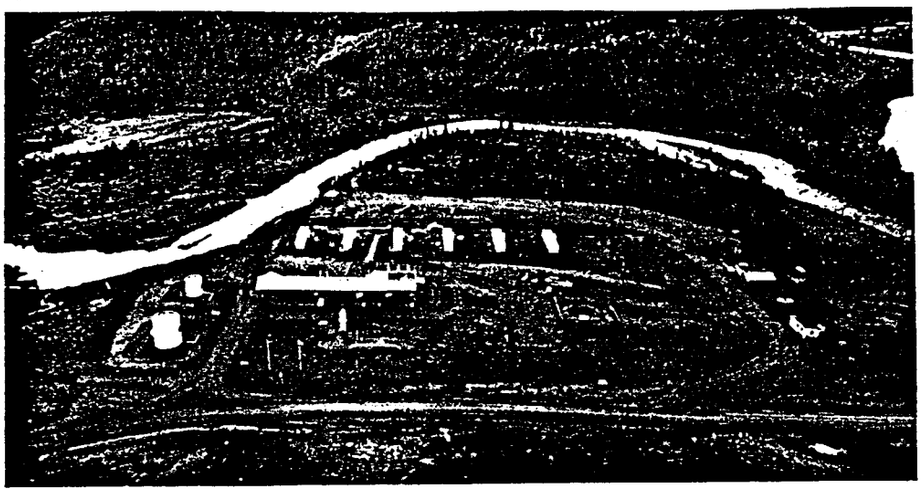
b. One apartment-type building consisting of six two-bedroom units.

c. One apartment-type building consisting of six three-bedroom units.

38. COLD STORAGE LOCKER BUILDING. This is a concrete building with freeze room (-10°F) and a chill room (35°F) with individual food lockers.

Section V. BLANCHARD RIVER PUMP STATION

39. GENERAL. Blanchard River Pump Station is located at Milepost 95.8 on the Haines Road. The station area consists of 12.2 acres and is at an elevation of 2,720'.



Blanchard River Pump Station, 12.2 acres in area, is located at Milepost 95.8 on the Haines Road. (Housing facilities are no longer available.)

40. COMBINATION BUILDING. This building is a one-story construction consisting of engine room, pump, office, generator room, and maintenance shop. The engine room is isolated from the rest of the shop by a fire wall.

a. The pumping facilities consist of three units, each composed of a Chicago-Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Bingham multistage centrifugal pump. The diesel engines are coupled to the pumps by means of a Western Gear speed increaser unit. Maximum engine horsepower is 300. The pumps may be operated individually or in series.

b. Two low pressure oil fired steam boilers and two 60 KW generators, which are powered by Caterpillar engines, are located in the generator area.

Section VI. JUNCTION PUMP STATION

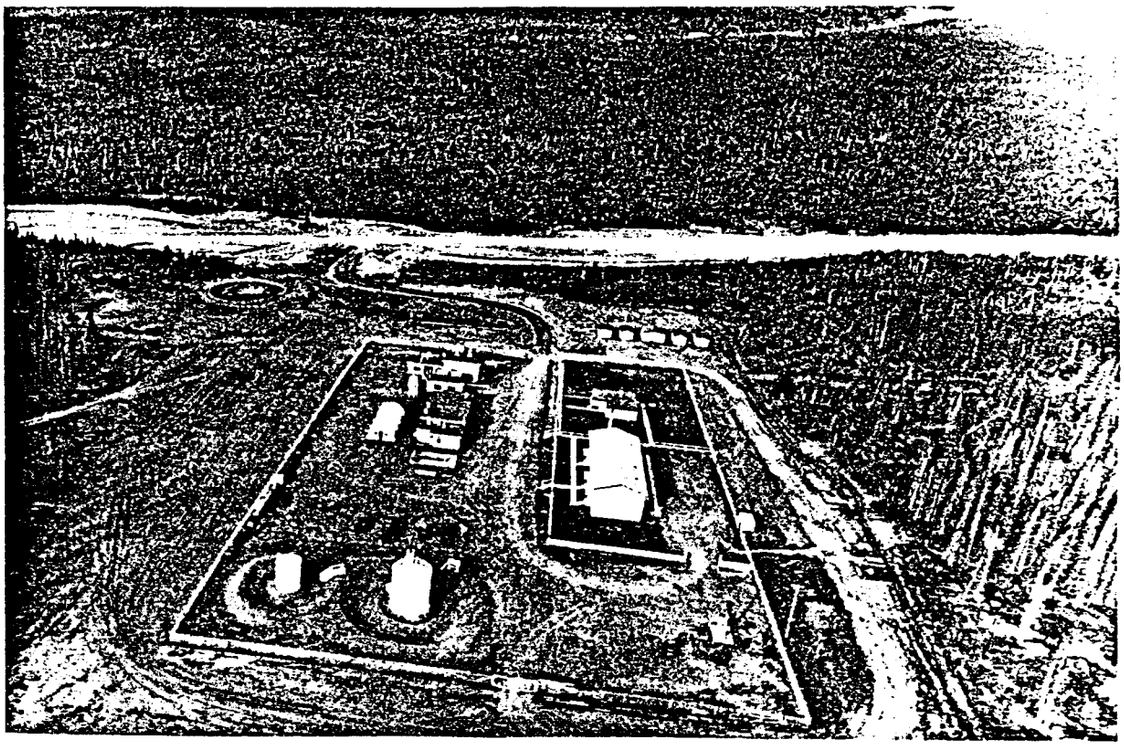
41. GENERAL. Junction Pump Station is located approximately 10 miles northwest of the junction of the Haines Cut-Off Highway with Alaska Highway, near Haines Junction, Yukon Territory, Canada. It is approximately 169 miles from the Haines Terminal. The station area consists of approximately 5 acres. The station elevation is 2,722' above sea level at 137° 40' longitude and 60° 55' north latitude.

42. FACILITIES.

a. Mainline Pump Building.

b. Utility Building.

c. Family Housing.



Junction Pump Station, approximately 5 acres, is located 10 miles north of Haines Junction, Yukon Territory, Canada.

43. MAINLINE PUMP BUILDING. This building is a single-story structure consisting of an engine room, pump room, and office. The office is isolated from the pump room by means of a pressure barrier fire wall and door arrangement, permitting the room to be pressurized for excluding petroleum vapors from this area. The engine room is isolated from the pump room by a fire wall.

a. The pumping facilities at this station consist of two units, each composed of a Chicago-Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Byron-Jackson centrifugal pump. The diesel engines are coupled to the pumps by means of a 4,750 to 1 geared speed increaser unit. Engine speed ranges from 705 RPM to 805 RPM. Maximum engine break horsepower is 425. The pumps may be operated individually or in series.

b. Two Moorlane strainers are also housed in the pump house. These strainers serve as both filters and water extractors. A sump tank outside the drain-off product could not be pumped from sump tanks into pipeline. Pumps have been installed to return product to pipeline. The Moorlane strainers are to be replaced by jet-type strainers. The pump room is ventilated and the main line is insulated.

c. Scraper traps are located on each side of the building for receiving and launching scrapers through the pipeline.

d. Cooling jacket water is piped from the diesel engines to a 2-unit radiator building adjacent to the pump house and returned to engines.

e. Diesel fuel oil is provided from a 1,000-barrel station bulk storage tank. The tank is filled from the pipeline at scheduled intervals.

44. UTILITY BUILDING. This is a multipurpose building containing:

a. Engine room with two power units, each consisting of a Caterpillar Model D-13000 diesel engine driving a General Electric 480 volt, 60 cycle, 50 KW, 900 RPM generator. Radiators are mounted on the diesel engines.

b. A five-person capacity bunkroom for visiting line maintenance personnel.

c. A garage-shop area.

d. Tool room.

e. A room housing a pheumatic water tank with a Peerless pump.

45. STATION HOUSING. Housing at this station consists of two permanent-type houses:

a. One is a single family, three-bedroom unit for the Station Foreman, and is heated by a forced air, oil-burner fired furnance.

b. One apartment building consisting of five three-bedroom units heated by a boiler located in the basement.

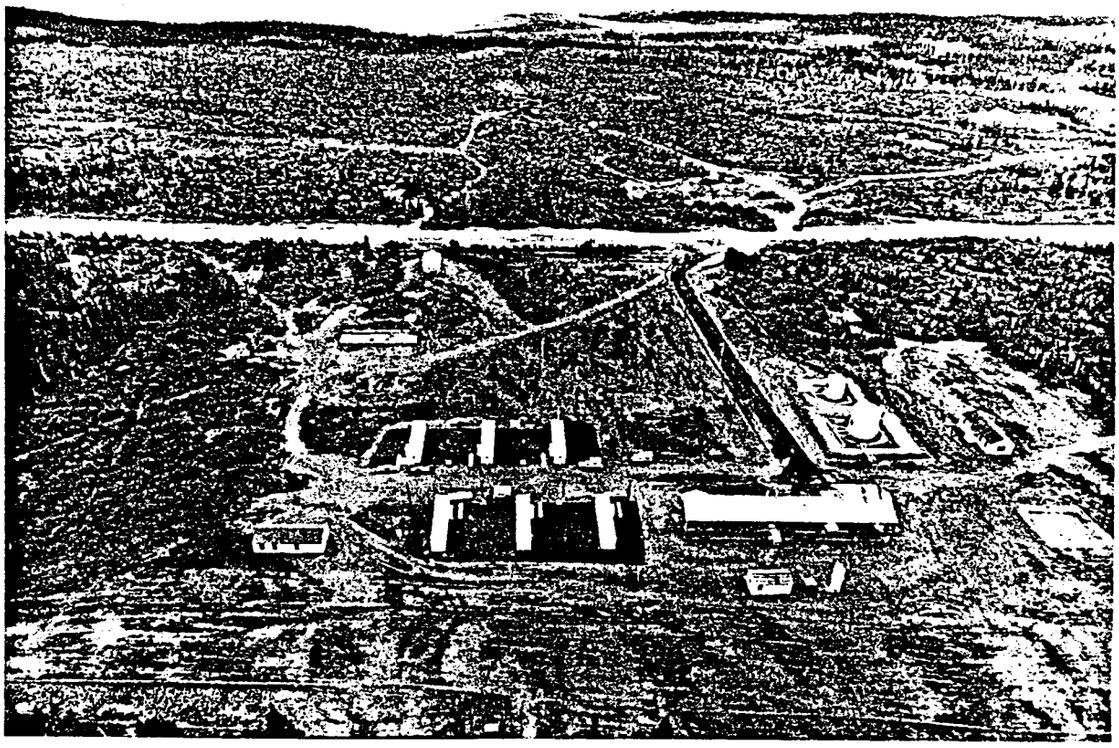
Section VII. DESTRUCTION BAY PUMP STATION

46. GENERAL. Destruction Bay Pump Station is located at Milepost 1080 on the Alaska Highway. The station area consists of 9.9 acres and is at an elevation of 2,780'.

47. COMBINATION BUILDING. This building is one-story construction consisting of engine room, pump room office, generator room, and maintenance shop. The engine room is isolated from the rest of the shop by a fire wall.

a. The pumping facilities consist of two units, each composed of a Chicago-Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Bingham centrifugal pump. The diesel engines are coupled to the pumps by means of a Western Gear speed increaser unit. Maximum engine horsepower is 300. The pumps may be operated individually or in series.

b. Two low pressure oil fired steam boilers and two 60 KW generators, which are powered by Caterpillar engines, are in the generator area.



Destruction Bay Pump Station, 9.9 acres, is located at Milepost 1080 on the Alaska Highway. (Housing facilities are no longer available.)

Section VIII. DONJEK PUMP STATION

48. GENERAL. Donjek Pump Station is approximately 25 miles northwest of the trading post of Burwash Landing, Yukon Territory, and approximately 500' north of the Alaska Highway, near Donjek River Bridge. The site is 248 pipeline miles from Haines Terminal at an elevation of 2,673' above sea level. The station area is approximately 5 acres.

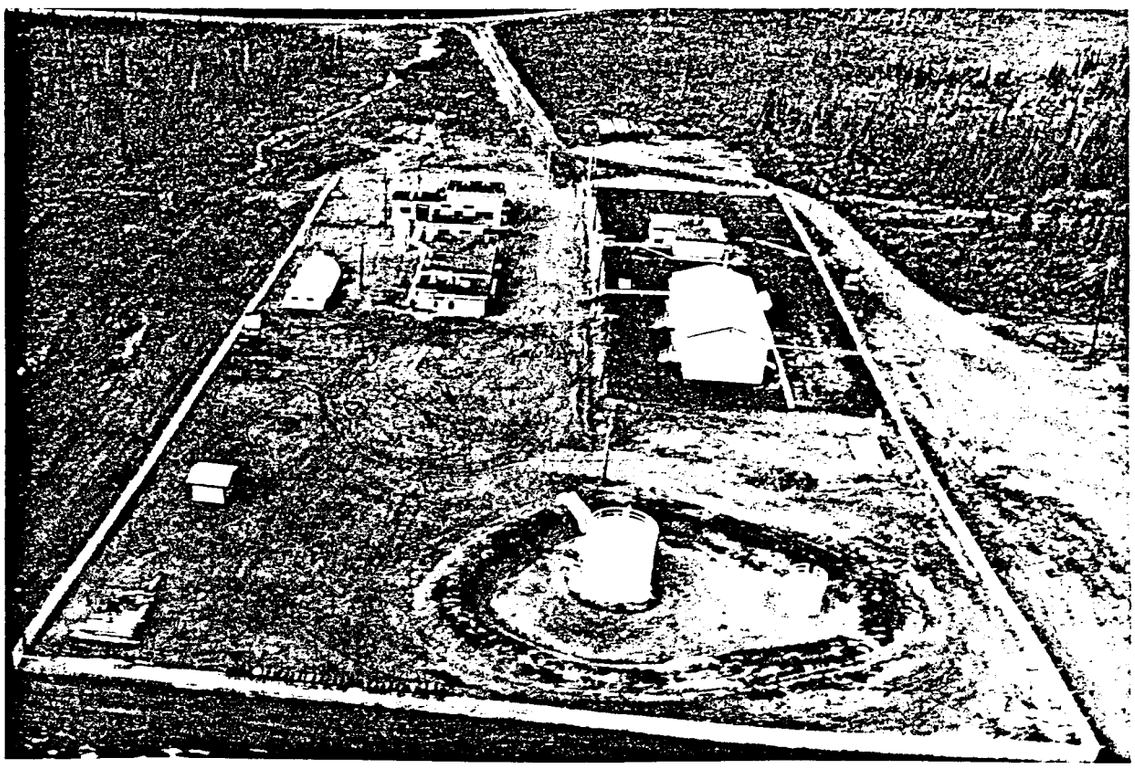
49. FACILITIES.

a. Mainline Pump Building.

b. Utility Building.

c. Family Housing.

50. MAINLINE PUMP BUILDING. This building is a single-story structure consisting of an engine room, pump room, and office. The office is isolated from the pump room by means of a pressure barrier fire wall and door arrangement, permitting the rooms to be pressurized excluding petroleum vapors from this area. The engine room is isolated from the pump room by a fire wall.



Donjek Pump Station, approximately 5 acres in area, is located 25 miles northwest of the trading post of Burwash Landing.

a. The pumping facilities at this station consist of two pumping units, each containing a Chicago-Pneumatic Model CP-89, 8 cylinder, 4 cycle, diesel engine driving a Bryon-Jackson centrifugal pump. The diesel engines are coupled to the pumps by means of a 4.750 to 1 geared speed increaser unit. Engine speed range is from 705 RPM to 805 RPM. Thus, the pump speed range is 3,349 RPM to 3,824 RPM. Maximum engine break horsepower is 425. The pumps may be operated individually or in series.

b. Two Moorlane strainers are also housed in the pump house. These strainers serve both as filters and water extractors for the petroleum products. A product sump outside the building is provided to accumulate the drain discharges from the strainers. Originally this product could not be pumped back into the pipeline. A pump has been installed to return the product to the line, and jet-type strainers will replace the Moorlane strainers.

c. Scraper traps are located on each side of the building for receiving and launching scrapers through the pipeline.

d. Jacket cooling water is piped from the diesel engines to a 2-unit radiator building adjacent to the pump house and returned to engines.

e. Diesel fuel oil is provided from the 1,000-barrel station bulk storage tank. The tank is filled from the pipeline at scheduled intervals.

f. There is a 6-inch product by-pass which is valved in such a manner that products can be routed through or by-pass the station pumps.

51. UTILITY BUILDING. This is a multipurpose building containing:

a. Engine room with two power units, each consisting of a Caterpillar Model C-13000 diesel engine driving a General Electric 480 volt, 60 cycle, 50 KW, 900 RPM generator. Radiators are mounted on the diesel engines.

b. A five-person capacity bunkroom for visiting line maintenance personnel.

c. A garage-shop area.

d. Tool room.

e. A room housing a water pneumatic tank with a Peerless pump.

52. FAMILY HOUSING. Housing at this station consists of one permanent house and apartment.

a. The permanent-type house is a single family three-bedroom unit for the Station Foreman, heated by a forced air, oil fired furnance.

b. An apartment building consisting of four three-bedroom units, heated by a boiler located in the basement.

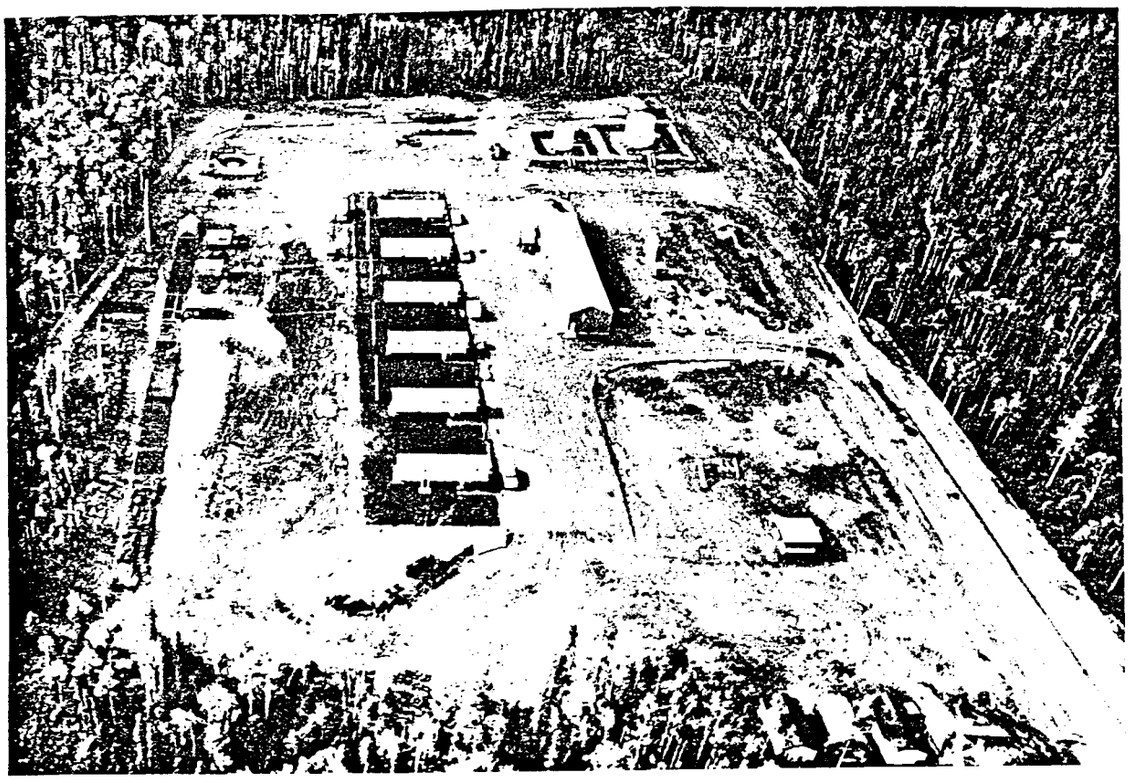
Section IX. BEAVER CREEK PUMP STATION

53. GENERAL. Beaver Creek Pump Station is located at Milepost 1204.2 on the Alaska Highway. The station area consists of 12.1 acres and is at an elevation of 2,100'.

54. COMBINATION BUILDING. This building is a one-story construction consisting of engine room, pump room, office, generator room, and maintenance shop. The engine room is isolated from the rest of the shop by a fire wall.

a. The pumping facilities consist of two units each composed of a Chicago-Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Bingham centrifugal pump. The diesel engines are coupled to the pumps by means of a Western Gear speed increaser unit. Maximum engine horsepower is 300. The pumps may be operated individually or in series.

b. Two low pressure oil fired steam boilers and two 60 KW generators, which are powered by Caterpillar engines, are in the generator area.



Beaver Creek Pump Station, 12.1 acres in area, is located at Milepost 1204.2 on the Alaska Highway. (Housing facilities are no longer available.)

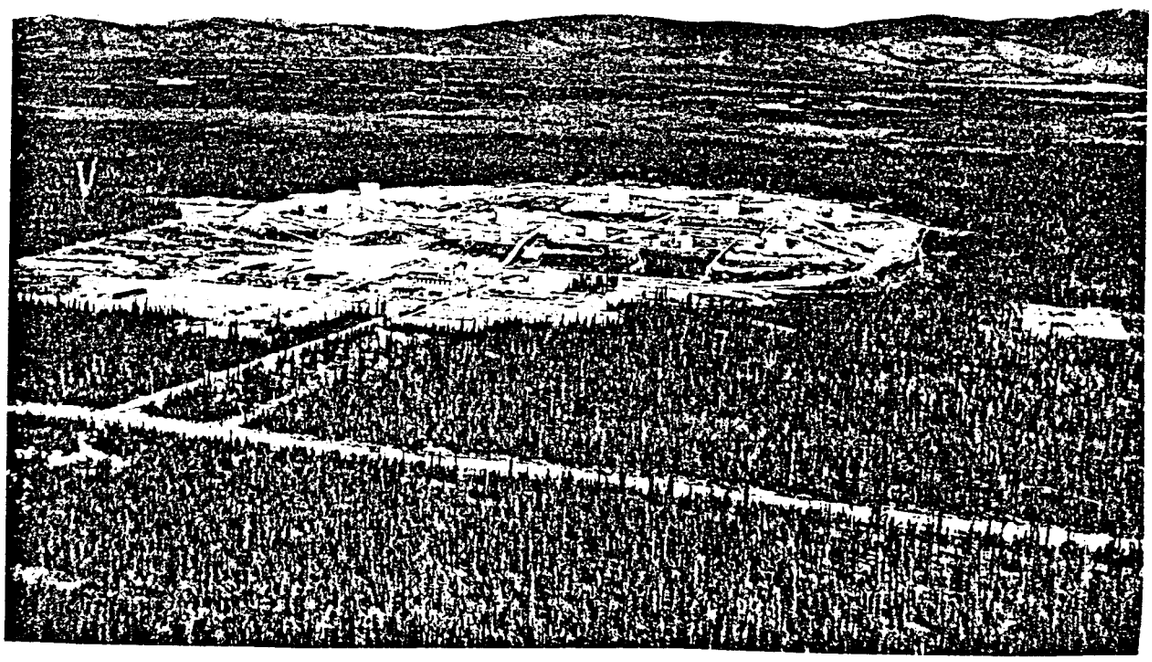
Section X. LAKEVIEW PUMP STATION

55. GENERAL. Lakeview Pump Station is located at Milepost 1256.4 on the Alaska Highway. The station area consists of 25.5 acres and is at an elevation of 1,740'.

56. COMBINATION BUILDING. This building is a one-story construction consisting of engine room, pump room, office, generator room, and maintenance shop. The engine room is isolated from the rest of the shop by a fire wall.

a. The pumping facilities consist of two units, each composed of a Chicago-Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Bingham centrifugal pump. The diesel engines are coupled to the pumps by means of a Western Gear speed increaser unit. Maximum engine horsepower is 300. The pumps may be operated individually or in series.

b. Two low pressure oil fired steam boilers and two 60 KW generators, which are powered by Caterpillar engines, are in the generator area.



Tok Terminal and Pump Station, 127 acres in area, is located 7 miles north of Tok Junction, Alaska.

Section XI. TOK TERMINAL AND PUMP STATION

57. GENERAL. Tok Terminal and Pump Station, 7 miles north of Tok Junction, Alaska, and 95 miles north of the Canadian-Alaskan Border, was the ninth installation of the Haines/Fairbanks Pipeline (Milepost 432). The Haines-Tok section of the Haines/Fairbanks Pipeline terminated at this installation. Tok Terminal tankage was utilized as "regulating tankage." All batches were taken into tankage, rescheduled, and pumped to receiving stations north of Tok. This tankage also permitted water and solid matter to settle out of the products prior to rescheduling. The terminal site is an area of approximately 127 acres with all permanent facilities enclosed by chain-link fencing. In 1979, this facility was leased to BLM by GSA.

Section XII. SEARS CREEK PUMP STATION

58. GENERAL. Sears Creek Pump Station is located at Milepost 1374 on the Alaska Highway. The station area consists of 9.8 acres and is at an elevation of 1,335'.

Sears Creek Pump Station, 9.8 acres in area, is located at Milepost 1,374 on the Alaska Highway. (Housing facilities are no longer available.)

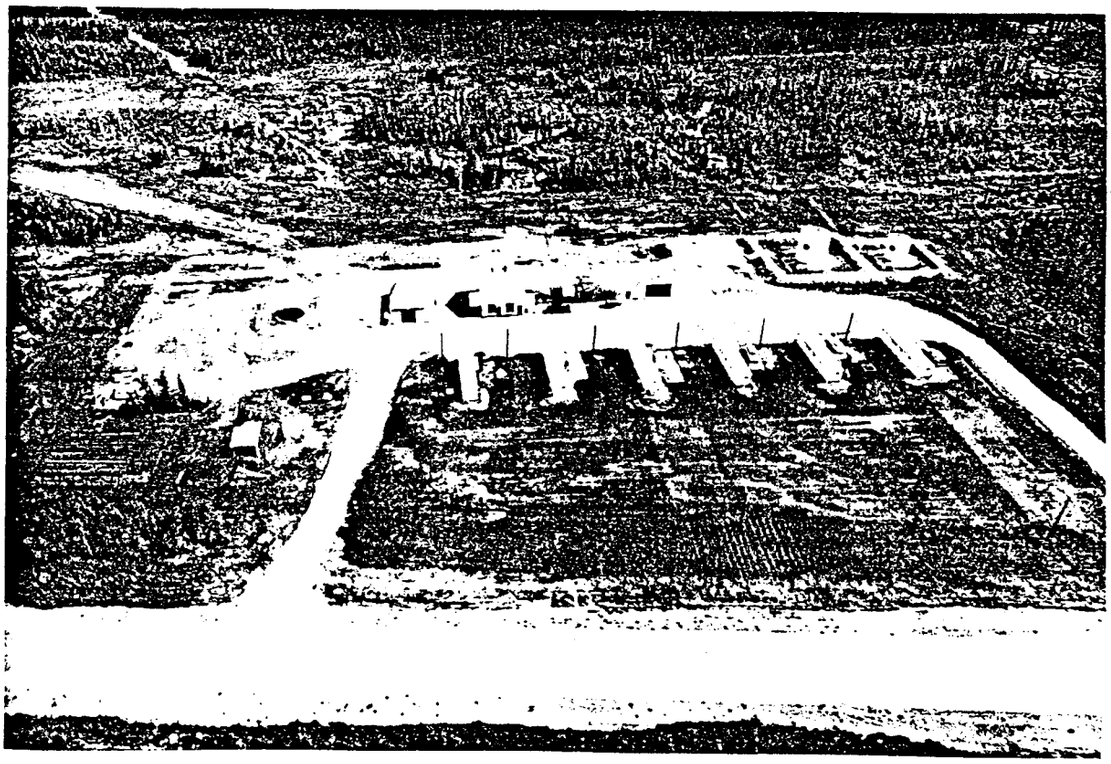
59. COMBINATION BUILDING. This building is a one-story structure consisting of engine room, pump room, office, generator room, and maintenance shop. The engine room is isolated from the rest of the shop by a fire wall.

a. The pumping facilities consist of two units, each composed of a Chicago Pneumatic Model CP-69, 6 cylinder, 4 cycle diesel engine driving a Bingham centrifugal pump. The diesel engines are coupled to the pumps by means of a Western Gear speed increaser unit. Maximum engine horsepower is 300. The pumps may be operated individually or in series.

b. Two low pressure oil fired steam boilers and two 60 KW generators which are powered by Caterpillar engines are in the generator area.

Section XIII. FORT GREELY

60. GENERAL. Fort Greely, which is located 99 miles north of Tok Terminal, was comprised of a take-off facility for delivery of products from the 8-inch line to PDO tankage. Fort Greely operates a bulk retail facility with two loading stems capable of loading diesel fuel and motor gasoline. In 1981, this facility was turned over to the Assistant DIO, Fort Greely, as a retail function. The take-off facility was deactivated and is not functional at this time.



Timber Pump Station, 20.4 acres in area, is located at Milepost 278 on the Richardson Highway. (Housing facilities are no longer available.)

Section XIV. TIMBER PUMP STATION

61. GENERAL. Timber Pump Station is located at Milepost 278 on the Richardson Highway. The station area consists of 20.4 acres and is at an elevation of 985'.

62. COMBINATION BUILDING. This building is a one-story structure consisting of engine room, pump room, office, generator room, and maintenance shop. The engine room is isolated from the rest of the shop by a fire wall.

a. The pumping facilities consist of two units, each composed of a Chicago Pneumatic Model CP-69, 6 cylinder, 4 cycle, diesel engine driving a Bingham centrifugal pump. The diesel engines are coupled to the pumps by means of a Western Gear speed increaser unit. Maximum engine horsepower is 300. The pumps may be operated individually or in series.

b. Two low pressure oil fired steam boilers and two 60 KW generators which are powered by Caterpillar engines are in the generator area.

Section XV. BIRCH LAKE TANK FARM

63. GENERAL. Birch Lake Tank Farm is located at Milepost 305 on the Richardson Highway and has two tanks with a capacity of 6,600 barrels each. The area covered is approximately 2 acres. A 3-inch take-off line at pipeline Milepost 569 connects the two tanks. If it is necessary to evacuate the product, this can be accomplished by the use of an electrical pump. There are two 3-inch lines; one from each tank, laid to a loading rack. It is possible to load more than one vehicle at a time by the use of the two loading stems. Electrical power is furnished by Golden Valley Electrical Company.

Section XVI. EIELSON TAKE-OFF STATION

64. GENERAL. Eielson AFB Station, 27 miles south of Fairbanks Terminal, is located at Milepost 599. It is a take-off facility for delivery of products from the 8-inch line to Eielson AFB. Located within a restricted area on the Base, the station site occupies approximately 1 acre.

65. MAINLINE TAKE-OFF FACILITY. This building is a single-story 600-square foot structure divided into a communication (telephone and teletype) room and a manifold room with flow meters for measuring products. The manifold equipment is connected to the 8-inch main line by a 6-inch valved line. A pressure reducing valve reduces and controls the pressure of the product delivered to the Eielson tank to the tank farm. The station is also capable of sending or receiving scrapers.

66. ELECTRICAL FACILITIES. Electric power at 120/140 volts, single-phase, is furnished by Eielson AFB.

67. TANKAGE.

Tank Number	Capacity in Barrels
501-508	10,000
515-517	16,000
518	10,000
521	16,000
536-540	30,000
Total	82,000

Section XVII. FAIRBANKS TERMINAL AND PUMP STATION

68. GENERAL. Fairbanks Terminal and Pump Station is the terminus for the 8-inch pipeline. The terminal is located approximately 7 miles northeast of Fairbanks, Alaska. The site, approximately 167 acres, is within security fence protection. This terminal is the 13th installation of the Haines/Fairbanks Pipeline.

69. FACILITIES.

a. Manifold Building.

b. Tank Farm.

c. Garage-Shop-Office Building.

d. Laboratory.

e. Storage Building.

f. Package Yard.

70. MANIFOLD BUILDING. This building contains flow meters and manifolding required to receive products from the 3-inch and 8-inch pipelines, and transfer to terminal storage tanks.

a. The elevation difference between the facility and the storage tanks varies from 40' to 160' with all tanks on different elevations.

b. Unlike other terminal storage areas, transfer of products between storage tanks, as well as delivery of products into Fort Wainwright transfer lines and manifold, can be accomplished entirely by gravity flow. To move product to either loading racks or into the mainline to "backpump" to Eielson AFB, two pumps driven by 75 HP electric motors are utilized. Four pumps driven by 25 HP electric motors can be utilized to transfer products to Fort Wainwright Quartermaster tanks, truck loading racks, or tank car filling stems. Scraper receiving trap is installed on the 8-inch pipeline. The building receives power at 480 volts, 3-phase, from an underground line.

Fairbanks Terminal and Pump Station, approximately 167 acres in area, is the terminus of the 8-inch pipeline and is located 7 miles northeast of Fairbanks, Alaska.

71. TANK FARM.

a. The tank farm area is north of the manifold building. Tankage consists of 29 steel, bolted and welded tanks. Twenty-seven tanks are utilized for storing products received from the mainline, with two tanks for station use.

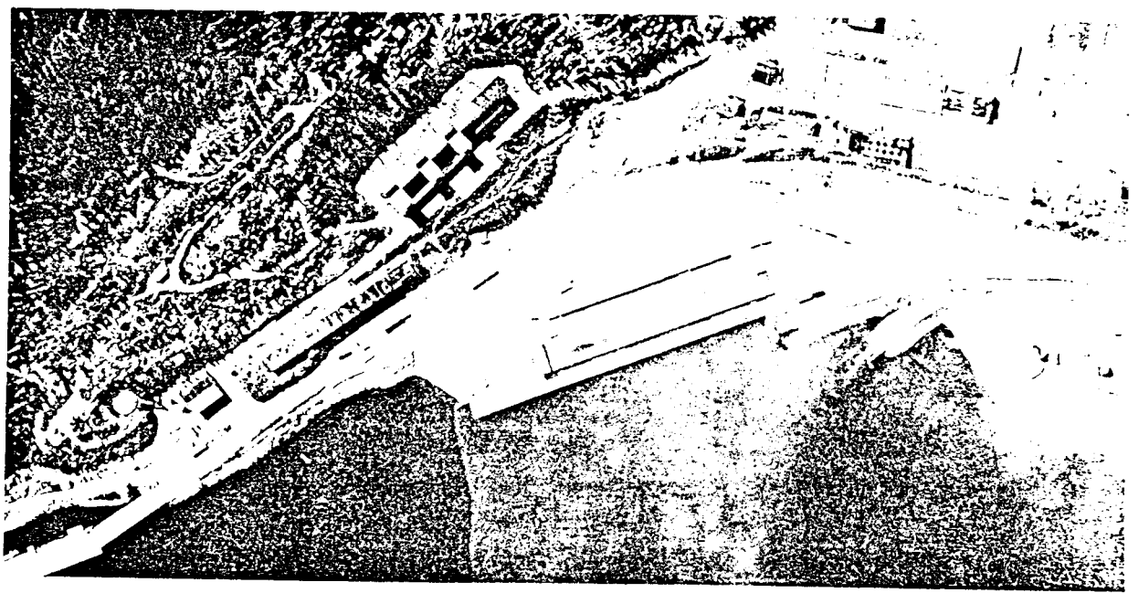
b. The manifold building is connected by product lines to designated tanks. The same lines are utilized for delivering to Fort Wainwright manifolding transfer system. The tanks and capacities are as follows:

Tanks	Capacity	Total
2	25,000 BBLS	50,000
14	10,000 BBLS	140,000
4	2,250	9,000
3	1,190	3,570
4	595	2,380

Section XVIII. WHITTIER/ANCHORAGE PIPELINE FACILITIES AND OPERATION

72. GENERAL DESCRIPTION. The Whittier/Anchorage pipeline was constructed to transport liquid fuels from the all weather Port of Whittier to the Port of Anchorage which is inaccessible at certain times of the year. The system is installed for ease of expansion to a larger capacity in the future by the addition of pumping units at Whittier and Indian. The line is composed of 61.7 miles of 8-inch pipeline, one booster station at Indian Creek and a pressure reducing station at Chugach, approximately 50 miles from Whittier.

73. DESIGN AND CONSTRUCTION. The design of the pipeline was accomplished for the Corps of Engineers by Mullens and Dravo Corporation, and was constructed under the supervision of the US Army Corps of Engineers, Fort Richardson, Alaska. Total cost of the pipeline was $12,684,090 and was completed in the fall of 1967.



POL Dock, Whittier, Alaska, can hold up to a T-5 super tanker. The structure is fitted with four 8-inch product hose connections that are manifolded into two 12-inch unloading pipelines at the dockside.

74. ROUTE. The pipeline originates at Whittier, Alaska. Shortly after leaving the Whittier Pump Station, it is routed through a mountain tunnel approximately 13,200 feet long, across Bear Valley, skirts Portage Lake and follows close to the Turnagain Arm Shore Line for a total distance of approximately 34 miles to Indian Booster Station. The product is boosted from Indian Booster Station over 3,600 feet of elevation (approximately 38 miles from Whittier). It continues from this peak to Chugach Pressure Reducing Station (approximately 50 miles from Whittier) and on through Fort Richardson and Elmendorf Air Force Base to Anchorage Metering Station, which is located in the ocean dock area of Anchorage.

75. PROFILE. Sixty-one and seven tenths miles extend from Whittier, Alaska, (elevation 42 feet) to Anchorage, Alaska, (elevation 117 feet) with a high peak elevation of 3,600 feet and about 38 miles from Whittier.

76. MULTIPRODUCT PIPELINE. Currently the three products which are transported through the Whittier/Anchorage Pipeline are:

a. Aircraft turbine and jet engine fuel, grade JP4.

b. Diesel fuel, grade DFA.

c. Gasoline, automotive, regular grade/unleaded.

77. TANKAGE.

Station	Number of Tanks	Normal Barrels Per Tank		Total Capacity Barrels
Whittier	8	27,500		220,000
	2	55,000		110,000
			TOTAL	330,000
Anchorage	4	50,000		200,000
	4	11,000		44,000
	4	9,530		38,120
	4	14,000		56,000
	1	20,000		20,000
			TOTAL	358,120
Elmendorf AFB	29	1,190		34,510
	8	25,000		200,000
	2	20,000		40,000
			TOTAL	274,510

78. DESIGN CAPACITY.

a. Normal. The normal design capacity of the pipeline is 24,000 BPD of JP4 jet fuel at a temperature of -20°F and a pressure of less than 1440 psig. The design capacities are based on JP4 jet fuel with the capacities of other products falling where they may.

b. Maximum. The maximum design capacity of the pipeline is 30,850 PSD of JP4 jet fuel at a temperature of -20°F and a pressure of 1440 psig at the Indian Booster Pump Station. This limitation is caused by the maximum working pressure of the 600-pound ASA valves and flanges in the system rather than the pump output. This rating was dictated by the pipe wall thickness.

c. Minimum. The minimum design capacity of the pipeline is 12,000 BPD of JP4 jet fuel at a temperature of minus 20°F and a pressure less than 1440 psig of both pump stations.

79. CALCULATED CAPACITIES.

NUMBER OF PUMPS OPERATING		CAPACITY - BPD	
Whittier	Indian	JP4	Diesel
2	2	30,850	28,114
1	2	23,500	19,500
2	1	24,860	21,600
1	1	12,000	11,315
2	0	10,286	7,200

The above capacities are based on the viscosity and specific gravity at -20°F.

Section XIX. WHITTIER TERMINAL AND PUMP STATION

80. GENERAL. Whittier Terminal and Pump Station, 85 acres in area, is located through the Wells Passage in Prince William Sound.

81. FACILITIES.

a. POL dock (holds up to a T-5 super tanker).

b. Tank farm (10 tanks with a total capacity of 326,000 bbls).

c. Tank car loading rack (two, with a capability of loading 15 cars at a time).

d. Fire equipment building (contains two electric driven turbine pumps, 100 HP, 1,000 gallons per minute).

e. Pump house (two prime movers, cat D-379, 400 HP, two jet strainers).

f. Transfer building (two 100 HP electric driven pumps supply suction pressure to mainline pumps when line is in operation).

g. Maintenance shop (capable of doing major and minor overhauls of all equipment).

h. Housing (Hodge Building - three floors).

i. Fire building.

82. POL DOCK.

a. The dock is an unloading structure fitted with four 8-inch product hose connections that are manifold into two 12-inch unloading pipelines at the dockside.

b. Pipelines. Two 12-inch nominal diameter pipelines run from the dock manifold to a manifold house about one third of the way to the transfer pump plant. Four 12-inch lines leave the manifold house and immediately tie into four existing 12-inch lines which run to the transfer pump plants.

83. TANKAGE. There are 10 tanks for the storage of JP-4 fuel, diesel fuel, and motor gasoline. These tanks are manifolded at the manifold buildings.

a. Two tanks with a capacity of 55,000 barrels are installed for JP-4 fuel storage and are connected to the manifold at the manifold building.

b. Level Indicators. All tanks have Shand & Jurs transmitters installed on the ground reading level guages for remote reading of the tank level on a Shand & Jurs console in the control room of the mainline pump station. The remote level reading will be the selector-type which reads the level in one tank at a time by selection of the operator. No alarms are provided for low or high level.

84. TANK CAR LOADING RACKS. There is presently one tank car loading rack located near the tank farm, with the capability of loading approximately 15 cars at a time.

85. FIRE EQUIPMENT BUILDING. The fire equipment building is of metal construction with concrete floor. Installed in this building are two steam operated deep-well pumps, one electric operated pump, and one gasoline operated pump, with two sets of manifolding. One set of piping is for salt water fire system and the other is for fresh water that supplies the boiler coolers.

86. MAINLINE PUMP STATION.

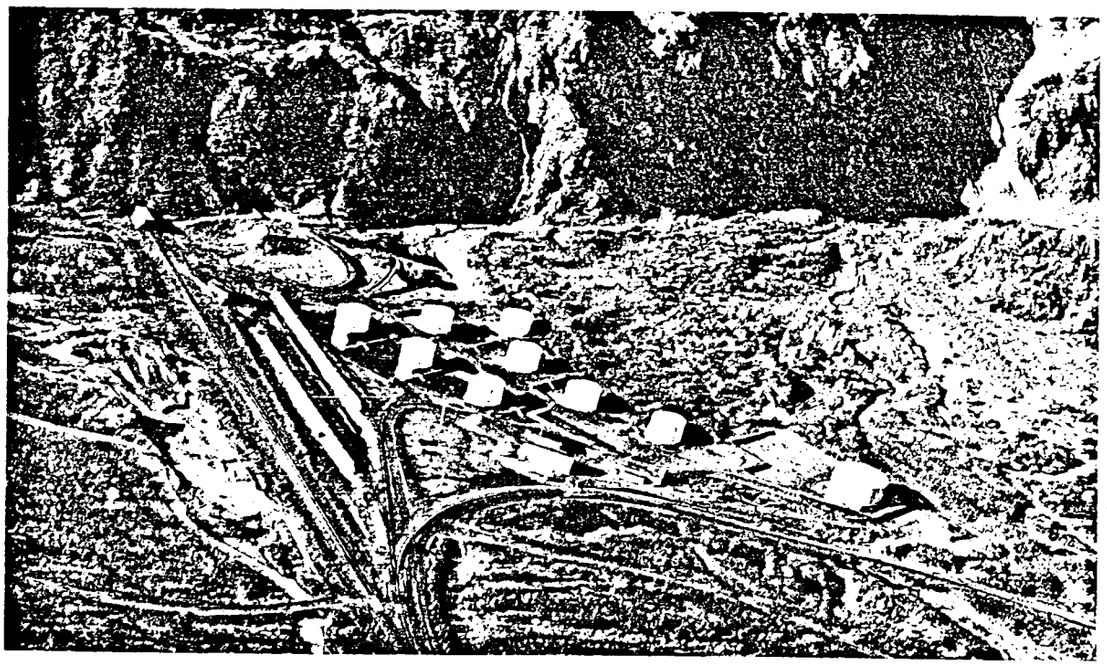
a. Mainline Pumps. The mainline pumps are United Y3X9WMXN-H horizontal centrifugal pumps driven by a Caterpillar D379 diesel engine through a Lufkin speed increaser. Two pumps are installed with space provided for two additional pumps in the future. The pumps are arranged so that they operate in series when more than one pump is in operation. The pumps take suction from the jet strainers and discharge to the main pipeline. Both systems can be used in conjunction with each other to accommodate assistance in all firefighting.

b. Jet Strainers. Two Thornhill-Graver jet strainers are installed in the suction line to the mainline pumps with space left for the installation of a third unit in the future. Each strainer has its own panel with a different pressure recorder and high differential pressure alarm. All of the installed strainers have a common auxiliary pump for backwash and cleaning. The backwash fluid is piped to the sump tank.

87. TRANSFER PUMP PLANT.

a. Two United Y4X11VP vertical in-line pumps with 100 HP General Electric motor drivers are housed in a concrete block building with provisions made for the installation of a third pump in the future. A sump tank and sump pump are installed in the building to collect drainage from pumps, the existing pump house, and from the loading line to pump to a truck hose connection outside the building.

b. Manifolding. The manifold for the pumps is housed in an extension to the existing manifold building. The new manifold is valved with Hamer double line blind gate valves to prevent contamination. The manifold is valved so any product from any storage tank can be pumped to the pipeline.



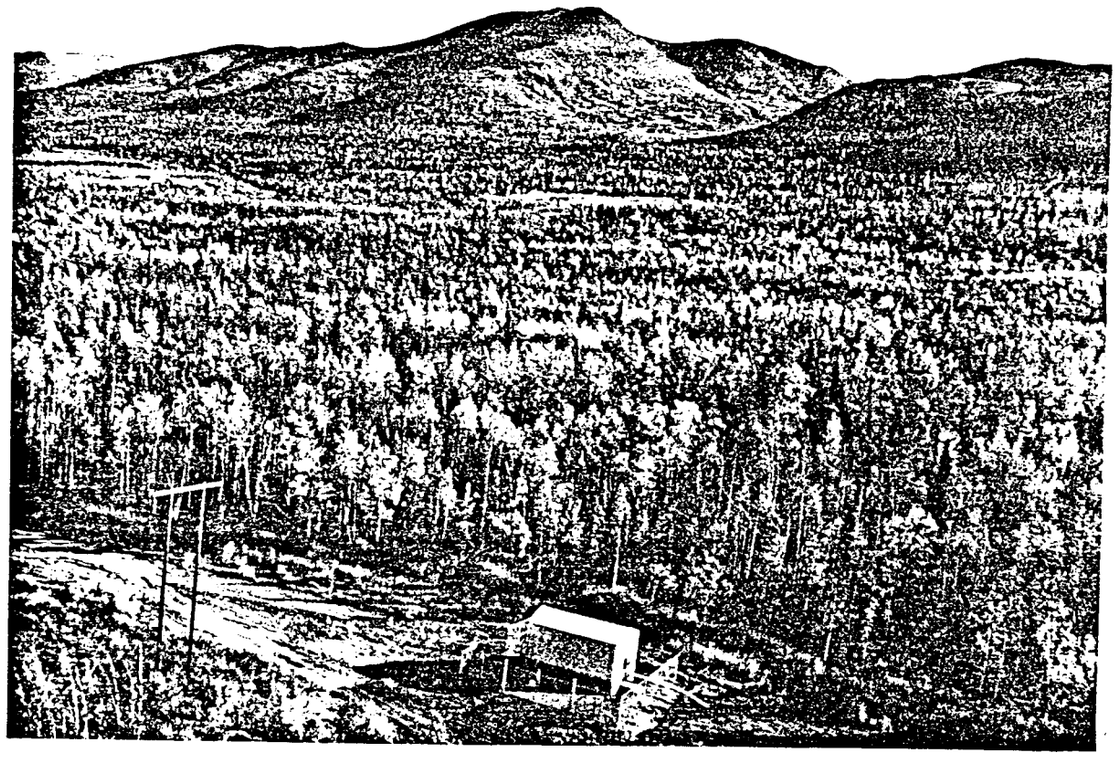
Whittier Tank Farm, located through the Wells Passage in Prince William Sound, contains nine tanks with a total of 275,000 barrels.

88. MAINTENANCE SHOP. The maintenance shop is leased to Petroleum Division from the City of Whittier. It is utilized for storage, maintenance, and repair of all types of mobile equipment. Contained in this building is a machine shop, carpenter shop, welding shop, and lubrication facilities. It also contains a multiple crane installed for handling any types of components.

89. HOUSING. Family housing at Whittier has been provided through the renovation of three floors of the 14-story Hodge Building abandoned by the Army in 1958. Presently, there are 18 apartments and six BQs available in this building. Also contained in this building is a schoolroom, Post Office, recreation rooms, and hobby shop. A walk-in freezer is located in the basement providing a large storage capacity for perishable foods.

Section XX. CHUGACH PRESSURE REDUCING STATION

90. GENERAL DESCRIPTION. When product is pumped over the mountain peak of 3,600-foot elevation, the line drops to an elevation of 420 feet. Located here is the Chugach Pressure Reducing Station. As product flows through the line it is routed through the automatic pressure reducing control system so that pressure is reduced to a maximum of 600 pounds for its continuance to Anchorage Terminal.



91. FACILITIES. hree restriction loops arranged in series and two control valves in series arranged so the flow can be directed through the required restriction loop.

a. One loop of 3-inch high-pressure pipe with a total length of 700 feet.

b. One loop of 3-inch high-pressure pipe with a total length of 330 feet.

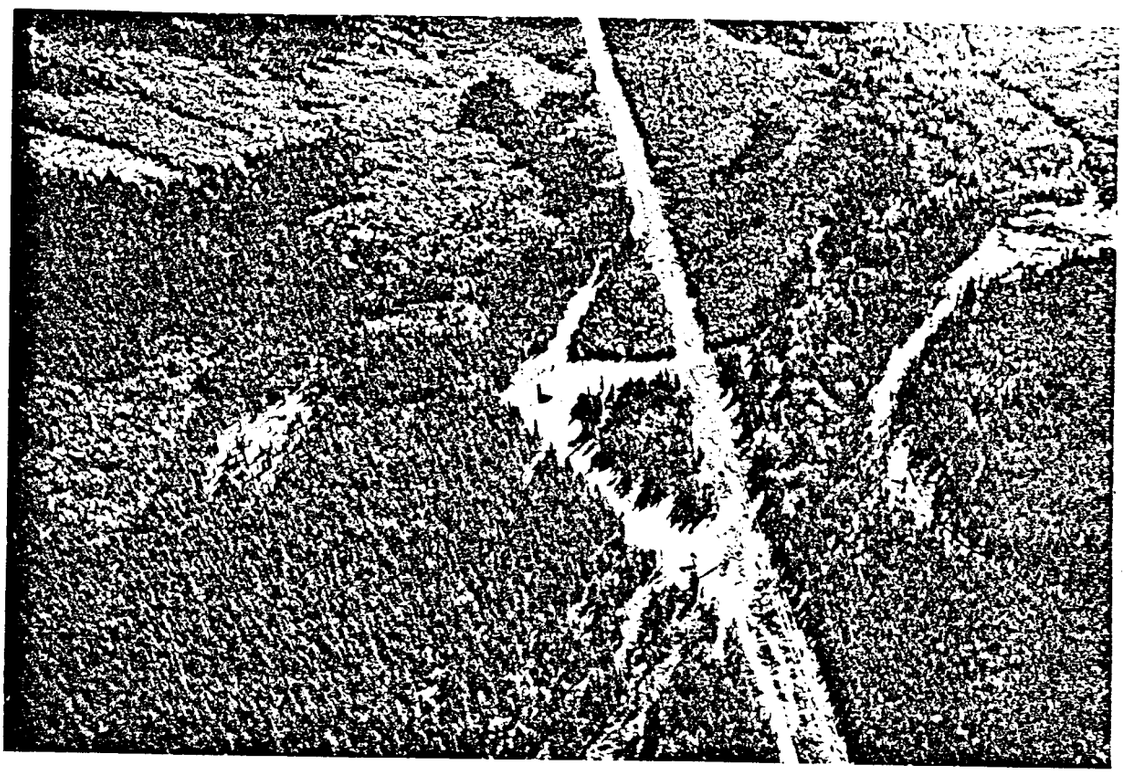
c. One loop of 3-inch high-pressure pipe with a length of 1,545 feet.

d. Three Rockwell Pressure Control Valves arranged so that when there is a scraper in the line the pressure reduction control system can be by-passed, allowing the scraper to go through to the station.

Section XXI. INDIAN CREEK BOOSTER STATION

92. GENERAL. The Indian Creek Booster Station is located approximately 26 miles south of Anchorage on the Seward Highway. This is a remote station and is operated by control panel from the Dispatcher's Office at Headquarters, Petroleum Distribution Office. The station boosts fuel over 3,600 feet of elevation, highest on the Whittier/Anchorage line.

93. FACILITIES. Mainline Pump Building.



Indian Creek Booster Station is located approximately 26 miles south of Anchorage on the Seward Highway.

94. MAINLINE PUMP BUILDING. The mainline pump building is a single-story metal building containing pump room, electrical equipment room, and office. Since the pumps are operated by remote control, there are no personnel working in this building. The building is completely fire proof and is secured by a 6-foot cyclone fence.

a. The mainline pumps are United horizontal centrifugal pumps driven by 400 HP General Electric electric motors through a flexible coupling. Two pumps are installed with space provided for two additional pumps in the future. The pumps are arranged so that they operate in series when more than one pump is in operation. The pumps take suction from the strainers and discharge to the main pipeline.

b. Two strainers are installed in the suction line to the mainline pumps and they take suction from main pipeline ahead of the station bypass check valve. Each strainer is provided with a differential pressure indicator.

c. A recording gravitometer is installed on the main pipeline to determine the gravity of any product flowing in the line. This system consists of a circulating pump, a flow indicator, and the gravitometer. The system discharges back into the main pipeline.

d. The Indian Creek Booster Station is supplied with 2,400 volt, 3-phase, 60 cycle power by the Chugach Electric Company which has provided an alternate source of supply in case of failure.

e. The fire alarm system is a failsafe, low voltage battery operated system consisting of a control unit which automatically responds to the operation of the fire detectors (rate of rise and fixed temperature) or manual stations located throughout the station and rings the fire alarm, bell, or gongs in the building until manually reset. It will also cause a "fire" signal to be transmitted to the Fort Richardson Control Center via supervisory equipment and actuate a point on the annuciator on the graphic flow panel.

f. The control system consists of a graphic flow panel, protective devices on the pumps and motors and pushbutton controls at the equipment.

(1) The graphic flow panel consists of the following:

(a) An annunciator which provides visual and audible alarms for station and unit malfunctions.

(b) A mimic flow diagram with indicating lights which slow status of valves and pump units.

(c) An emergency stop pushbutton.

(d) A station selector switch which permits station operation on either station remote sequence, station local sequence, or station non-sequence.

(e) Unit selector switch whose operation corresponds to that of the station selector switch.

(f) Two pen recorders which record suction and discharge pressure, specific gravity, and product temperature.

(g) Pushbutton switches which control operation of pump units and electric motor operated valve.

(2) Individual equipment has its own start/stop controls and protective devices. Each pump unit has its own control panel which contains the following protective devices:

(a) Motor bearing high temperature.

(b) Motor stator high temperature.

(c) Pump bearing high temperature.

(d) Pump case high temperature.

(e) Pump seal leakage.

(f) Pump excessive vibration.

(g) Low suction pressure.

(h) High discharge pressure.

g. The pump control panel on malfunction of one of the above items provides a unit mechanical failure signal, sounds an alarm, and actuates an annunciator alarm point. It also provides a horn silence control and a light indicating the specific malfunction. The supervisory systems consists of the necessary equipment to control and protect the station and is tied via wire line and microwave in full duplex system with the control center at Fort Richardson. Also connected into this system is the telemetering of the station suction and discharge pressure, specific gravity, and the product temperature.

Section XXII. ANCHORAGE POL TERMINAL

95. GENERAL. The Anchorage POL Terminal consists of 57 acres in area located north of the City of Anchorage.

96. FACILITIES.

a. Metering station.

b. Manifolds.

c. Product pipeline.

d. Two-pump station.

e. Tank farm.

f. Tank car loading rack.

g. Tank truck loading rack.

h. Communications.

i. Operations office building.

j. Two maintenance buildings.

97. METERING STATION.

a. Metering - The metering is performed by four turbine meters which gives one meter for each of the four products. The meters are so manifolded that any meter can be used for any product, and the valves are the double gate line blind-type to prevent product contamination. A dual pressure control station directly ahead of the meters reduces the pressure to 250 psi or 74 psi depending on the destination of the product being pumped.

b. Gravitometer - A recording gravitometer is installed as a bypass system with a circulating pump and a flow indicator to show the gravity of the product being pumped at any given time. The gravitometer is installed on the incoming line from the Whittier/Anchorage Pipeline.

c. Jet Strainers - Two jet strainers are installed ahead of the meters. Each strainer is provided with a control panel with a differential pressure recorder and alarm. The strainers are cleaned by a stream at 250 psig taken from the downstream header through a control valve.

d. Electrical System - The Anchorage Metering Terminal is supplied with 480 volt, 60 cycle, 3-phase power which is connected to the motor control center through a 225 amp main circuit breaker. From here the power is distributed to heaters, sump pumps, air handling unit, lighting panel, etc. A 48 volt DC power system consisting of a rectifier and batteries is also provided for instrumentation.

e. Fire Alarm System - The fire alarm system is a failsafe, low voltage battery operated system consisting of a control unit which automatically responds to the operation of the fire detectors (rate of rise or fixed temperature) and rings the fire alarm bells or gongs continuously until manually reset. It will also actuate a point on the annunciator located in the MCC control cubicle.

f. Control System - Most of the equipment at this station is controlled by pushbuttons, located on or near the equipment. Flowmeter signals are transmitted to flow rate indicators and flow counters located on the control cubicle in the MCC where they are respectively recorded or displayed. This control cubicle also contains an annunciator system which will provide visual and audible alarms on station malfunctions. An annuniciator with acknowledge and lamp test controls is also located in the MCC panel and will alarm on the following malfunctions:

(1) Air handler off.

(2) Control room pressure blower off.

(3) High differential pressure jet strainer JS-401.

(4) High differential pressure jet strainer JS-402.

(5) High sump level.

(6) Station.

g. Heating and Ventilation - The building temperature is controlled by fourteen 6 KW electric unit heaters, one 4 KW, one 2 KW and one air handling unit. The temperature is thermostatically controlled.

h. Sumps and Drains - Drain lines from the incoming scraper trap, the strainers, and the sample valve drain product to a sump tank which has an integral strainer. A sump pump pumps the product back into the line ahead of the meters.

i. Four 8-inch Lines for Discharging.

98. PIER. The dock at the Port of Anchorage is owned by the city and is located 1 mile north, extending due north into Knik Arm. It is capable of mooring tankers up to 26,000 DWT. It is capable of offloading two products at the same time.

99. PRODUCT PIPELINE. The following pipelines are available for receiving cargo from the dock, Whittier, and Nikiski to tankage and issue:

a. Ten-inch line for receiving multiproduct from dock.

b. Six-inch line for receiving diesel fuel from dock.

c. Ten-inch line for receiving multiproduct from Whittier.

d. Ten-inch line for receiving multiproduct from Nikiski.

e. Two 6-inch lines for pumping jet fuel to Elmendorf AFB Terminal.

f. Six-inch line for pumping diesel fuel to Elmendorf AFB Terminal.

100. MANIFOLDS. A central manifold system is not utilized at this terminal. As noted in paragraph 99, all lines with one exception are single product lines which eliminate the need for a central manifold. Each tanker discharge line is manifolded to the tanks it serves. Product transfer lines are manifolded from storage tanks through applicable pump houses by means of simple switching manifolds.

101. TANK FARM. The Anchorage Terminal tankage contains a 17 aboveground and underground storage tanks. The tanks and capacities are as follows:

Tank Number	Capacity in Barrels
611 - 614	10,000
*621 - 624	11,000
605 - 608	14,000
609	20,000
*616 - 619	50,000

*Underground tanks

Each of the aboveground storage tanks and the 11,000-barrel underground tanks have a single pipeline for receiving and discharging product. These lines, ranging from 6 to 10 inches, are manifolded so that product may be received directly from the dock or Whittier and Nikiski Pipeline or tank car unloading facilities. Product is transferred from these tanks utilizing the same lines. Each tank is equipped with a guage hatch; pressure, vacuum, or gooseneck vent; and a water drawoff line. Each 50,000-barrel tank has a 10-inch pipeline for receiving product directly from the dock, Whittier/Anchorage Pipeline, or Nikiski Pipeline, or the tank car unloading facility, and a 6-inch pipeline for discharging product. Discharge is through two deep-well centrifugal pumps mounted in a pump house or each tank. Water drawoff is accomplished by means of a deep-well centrifugal pump mounted in a pit at the top of the tank and extending into a sump located in the center of the tank bottom.

102. PUMP STATION. Four pump stations are utilized in terminal operations:

a. Pumphouse #1, located in the Anchorage Terminal, is a brick structure utilized to transfer product to Elmendorf AFB tankage south of runway. The pumphouse contains the following equipment:

(1) Two Pacific Packing Company pumps rated 250 gpm against a 220-foot head and driven by a Westinghouse 220/440 volt, 60 cycle, 3,500 RPM, 25 HP electric motor; one Peerless pump rated at 26,000 GPM and driven by a 220/440 volt, 3-phase, 60 cycle, 1,775 RPM, 40 HP electric motor.

(2) A CO_2 automatic firefighting system is installed in the pump room, consisting of a piping system connected to a CO_2 supply and spray nozzle. The system is activated by the action of heat on a temperature-sensitive wire installed on the ceiling, and the alarm is automatically relayed to the fire station.

b. Pump station #2, located in the Anchorage Terminal, is a metal-framed structure utilized to transfer product to Elmendorf AFB tankage north of runway. The pump house contains the following equipment:

(1) Two Peerless pumps rated at 52,500 GPM and driven by a Westinghouse 220/440 volt, 3-phase, 1775 RPM, 75 HP electric motor.

(2) These two Peerless pumps are utilized to unload tank cars and transfer within the terminal area.

(3) A CO_2 automatic firefighting system is installed in the pump room, consisting of a piping system connected to a CO_2 supply and spray nozzle. The system is activated by the action of heat on a temperature-sensitive wire installed on the ceiling.

Additional information, questions, or comments concerning this publication may be obtained by either calling or writing the Operations Officer (317/863-6291/6103)(Commander, 172d Infantry Brigade (AK), ATTN: AFZT-DI-L, Fort Richardson, AK 99505).

(AFZT-DI-L)

FOR THE COMMANDER:

OFFICIAL:

C. D. BUSSEY
Colonel, GS
Chief of Staff

Deborah R Douglas
DEBORAH R. DOUGLAS
CPT, AGC
Assistant Adjutant General

DISTRIBUTION: (Special)

150 - AFZT-DI-L
3 - AFZT-AG-AW
2 - DPCA Library

AG-FFF 819-82