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Guide to Collection

Alyeska Pipeline Service Company

Trans-Alaska Pipeline Construction Collection, 1976-1977

PCA 2

1 box
0.4 linear ft.
589 slides, 127 photographs

Processed By: Staff
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PROCESSING: The slide numbers were retained as they came from the company, which generally correspond to the progress reports. The photographs are numbered. All were sleeved in mylar.

HISTORICAL NOTE

Alyeska Pipeline Service Company was named after the Aleut word for *mainland*. Formed in 1970, it designed, constructed and operates the pipeline that delivers crude oil from Prudhoe Bay to Valdez, Alaska.

Construction began in April 1974. The 4-foot diameter pipeline spans 800 miles from Prudhoe Bay to Valdez, crossing three mountain ranges and hundreds of streams, requiring a number of various-sized bridge structures. More than 78,000 vertical supports were installed for the above-ground section of the pipeline and more than 120,000 heat pipes were installed. 132 million man-hours went into the effort, which included construction of a 360-mile all-weather road from the Yukon River to Prudhoe Bay. The pipeline was built to supply natural gas from Prudhoe Bay to power turbine generators at pump stations and a tanker terminal in Valdez, beginning in early May of 1977. [From Alyeska Pipeline Service Co. Progress Report, April 1977.]

SCOPE AND CONTENTS NOTE

The collection contains both slides and photographs taken during the pipeline construction. Subjects include personnel, equipment, bridge construction, the winter environment, wildlife, pump stations, Port Valdez, the Haul Road and the terminal. There are several views of archaeologists from UAF working at the site. The 589 slides *generally* correspond to six typewritten progress reports, which begin in March 1976, when the pipeline was about 45% complete, and end in April 1977 at 95% completion. The remainder of the collection consists of 127, 8x10 in. black and white photographs.

INVENTORY

Item-level inventory exists for typewritten progress reports accompanying the slides in Folders 1-4. Folders 5-6 contain photographs with captions.

Folder 1	Progress report, March 1976 (60 slides); Progress report, May 1976 (80 slides).
Folder 2	Progress report, July 1976 (129 slides).
Folder 3	Progress report, Sept. 1976 (80 slides); Progress report, Nov. 1976 (80 slides).
Folder 4	Progress report, Jan. 1977 (80 slides); Progress report, April 1977 (80 slides).
Folder 5	[photographs] P1-P56.
Folder 6	[photographs] 6-1 to 6-71.

Folder 1a

1	Title		This is a report of progress made on the trans Alaska pipeline project through early March, 1976.
2	PC1228-2	Happy Valley Area	The total project in late February was about 45 percent complete.
3	PC1237-16	AS 23	The Alaskan winter temperatures remained severe during February
4	VT007-2	Terminal	But the increased daylight hours spurred remobilization of the work force for all sections of the project.
5	PC1225-11	AS 17	In early March, work was progressing at a rapid pace at the pump stations, terminal and along the pipeline route.
6		Section Map	For the pipeline portion of the project, each of the five sections was more than 50 per cent complete, with sections 1 and 4 surpassing the 60 per cent mark.
7	PC6127	Kanuti River	Much of the pipeline activity, during February, consisted of river crossings.
8	PC6127-3	Kanuti River	Here, a weighted section of pipe is being buried beneath the Kanuti River in Section 4
9	PC6123-1	Chena River	In Section 3, this crossing was made for the Chena River, about four miles south of Fairbanks.
10	PC6129-3	Chena River	As for most river crossings, the pipe for the Chena crossing had been welded and concrete-coated last fall. Ditching and installation of pipe was scheduled for the winter months, when minimal disturbance would be caused to the fish habitat and-to the rivershed itself.
11	PC6125-18	Chena River	The 600- foot-long section of pipe was pulled across the river by cables.
12	PC6123-13	Chena River	Pipe floats, attached to the weighted mainline pipe, facilitated the dragging of the pipe through the ditch.

13	PC6138-4	Gulkana River	In Section 1, an above ground river crossing was under way at the Gulkana River. Charges are set here for the excavation work.
14	PC6138-10	Gulkana River	About 2,400 square feet of material is being removed on both banks where the bridge foundations will be built.
15	PC6138-18	Gulkana River	The piers for the bridge, made from 48-inch mainline pipe and 18-inch support pipe, were fabricated in Anchorage and trucked to the crossings.
16	MC410-14	Model	This is a model of the 400-foot, tied arch bridge, which is a new design for pipeline crossings on the trans Alaska pipeline project.
17	PC6131-7	Lowe River	A buried river crossing that was completed in Section 1, was here at the Lowe River, just north of Valdez.
18	PC6132-2	Lowe River	The length of the Lowe crossing is about 1,500 feet.
19	PC6131-9	Lowe River	More than 16 miles of pipe had been installed at river crossings by early March.
20	PC6132-11	Lowe River	There are 84 major river crossings on the project.
21	PC6132-20	Lowe River	All crossings are scheduled to be completed this year.
22	PC6137-6	Glenn Highway	In addition to river and stream crossings, a number of highway crossings are required for the 800-mile-long pipeline.
23	PC6137-9	Glenn Highway	Here, work was under way on the mechanically refrigerated, buried crossing beneath the Glenn Highway, about 115 miles north of Valdez.
24	PC6136-2	Glenn Highway	The area includes ice-rich permafrost, where normally the pipeline would be above ground but because of the highway is being buried.
25	PC6136-11	Glenn Highway	Refrigeration pipe will line the ditch, in which the pipeline will be buried a length of 1,600 feet.

26		Illustration	This illustration shows the refrigerated brine piping beneath the insulated mainline pipe. The refrigeration pipe will keep the soil frozen. Other special burial sections of the pipeline are being installed for animal crossings, primarily on caribou migration routes.
27	PC001-7	AS 22	Some animal crossings in permafrost areas will not be mechanically refrigerated, but will consist of about 150 feet of buried insulated pipe and free standing heat pipes to draw off heat from the soil. Casing pipe to hold the heat pipes is being driven here, at an animal crossing north of Glennallen.
28	PC1235-7	AS 25	In addition to river and road crossings, an activity that continued throughout the reporting period was the drilling and installation of vertical support members for above ground sections of the pipeline.
29	PC1218-17	AS 118	This drilling operation was under way in Section 5, about 120 miles south of Prudhoe Bay.
30	PC1233-1	AS 17	This operation, in Section 1, consisted of welding the 18-inch diameter vertical pipes to specific lengths.
31	PC1234-10	AS 25	Here, about 140 miles north of Valdez, a VSM is being installed in a 24-inch diameter hole. A sand-water slurry is poured in the annular space between the outside of the VSM and the drilled hole.
32	PC1226-7	AS 118	VSM work, took place in all sections of the pipeline. By early March, more than 50,000 of the 80,000 VSMs required were installed.
33	PC1211-8	AS 60	In most VSMs, special thermal devices or heat exchanger pipes are installed to maintain the permafrost in a stable condition around the supports.
34	PC1212-6	AS 60	Here at a heat pipe installation spread near Fairbanks, a technician checks the refrigerant in the heat pipe.

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| 35 | PC1212-1 | AS 60 | The anhydrous ammonia refrigerant transfers the heat from the soil to the radiator fins at the top of the heat pipe. |
| 36 | PC1211-10 | AS 60 | About 420 miles of the pipeline is being constructed above ground in areas of permafrost. |
| 37 | CA711-7 | Toolik Camp | The pipeline work force was about 8,000 in early March. Many of the pipeline camps were at capacity as the work activity resumed. This is Toolik Camp, about 130 miles south of Prudhoe Bay. |
| 38 | PS317-7 | P. S. 4 | The work force at the pump stations totaled just over 2,000. This is Pump Station 4, just north of the Brooks Mountain Range. |
| 39 | PS222-13 | P. S. 3 | Work progressed at all of the pump stations required for the operating capacity of the pipeline, which will be 1.2 million barrels of crude oil per day. |
| 40 | PS150-17 | P. S. 1 | The majority of the work at the stations was indoors and included progress on heating and ventilation systems; installation of valves; work on piping and pipe corridors; and completion of the buildings, themselves. |
| 41 | PS223-18 | P. S. 3 | In late February, progress on all the pump stations was reported at just under 30 per cent complete. |
| 42 | GL308-3 | AS 118 | Work resumed on the natural gas fuel line that will power the turbines at the pump stations north of the Brooks Range. |
| 43 | PC7115-1 | AS 115 | The work is being accomplished this winter to take advantage of the frozen ground. A snow pad is used to prevent damage to the tundra vegetative cover by the heavy construction equipment. |
| 44 | GL309-18 | AS 118 | The 8-inch and 10-inch diameter fuel line will stretch 148 miles from Prudhoe Bay to Pump Station 4. |
| 45 | GL313-5 | AS 118 | A RocsaW, of a chain-saw like trenching machine attached to a D-9 Caterpillar tractor, is used to cut a 16-inch wide ditch through the frozen soil. |

46	GL312-8	AS 118	The ditch is widened by a conventional Barber-Green trenching machine
47	GL309-7	AS 118	Welders on the fuel line are protected in subzero weather inside movable, insulated buildings.
48	GL312-1	AS 118	Other workers, however, are exposed to the elements, which can be severe. Winds on the North Slope gusting to 40 knots in temperatures of 30 degrees below zero.
49	GL301-14	AS 118	Nearly 40 miles of the fuel line south of the origin pump station at Prudhoe Bay will be of 10-inch-diameter pipe. The remainder of the line will be of 8-inch diameter pipe.
50	VT513-4	Terminal	At the Valdez terminal, a work force of more than 3,000 was being employed to complete the various facilities required at the tanker terminal.
51	VT508-9	Terminal	Work progressed on the tanker berths. Here, drilling was under way for the anchor piles for Berth 1.
52	VT511-4	Terminal	Trestle jackets for Berth 5 arrived from Japan and were being set during February.
53	VT513-4	Terminal	This series of photographs shows the setting of one of the jackets.
54	VT512-11	Terminal	In addition to the berth activity, work at the terminal included progress in the Ballast Water Treatment Area where concrete was poured for equipment foundations in the oil recovery building, and piping and equipment was installed in the oil floatation building.
55	VT510-16	Terminal	Equipment foundations were also poured in the Power Generation and Vapor Recovery Area. The third boiler was set during February.
56	VT403-3	Terminal	Snow removal and disposal remained a continuous task during the month. Snow load build-up on tanks was examined and found to be well within limits. However, as a precaution, snow was being removed from the roof perimeters of the tanks. The

			effort, here, is on one of the ballast water receiving tanks.
57	VT212-1	Terminal	In the West Tank Farm, the concrete ringwall was completed for one of the tanks, and half completed on a second tank. Site preparation was under way for the other two tanks in the West Tank Farm.
58	VC302-3	Valdez	Two Japanese ships arrived during the month with the last of the steel required for the tanks at the terminal.
59	MS180-18	Frank Moolin	The pipeline project received added recognition during February, when the Senior Project Manager of the Pipeline portion of the project, Frank P. Moolin, Jr., was named "Construction's Man of the Year" by Engineering News-Record magazine.
60	MS 179-16	Frank Moolin	Moolin directs the work of a 700-member management team which oversees the work of the pipeline's nearly 200 contractors including five execution contractors who employ more than 13,000 workers this year. This concludes the March progress report.
61	VT302-2		[unidentified]

Folder 1b

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| 1 | PC1240-10A | PS.3 Area | This is a report of progress made on the trans Alaska pipeline project through the first of may, 1976 |
| 2 | PS228-12A | PS.3 | During the reporting period, the project surpassed the half-way mark, and by early may the total project--including pipeline, pump stations and terminal, was 56.4 percent complete. |
| 3 | PC6150-19A | AS3 | Much of the pipeline activity during March and April centered on stream crossings. This one, at the unnamed creek, just north of Valdez, is a buried crossing. |
| 4 | PC6152-11 | AS3 | There are countless stream crossings along the 800 mile pipeline route. They vary in size from the mighty Yukon River to drainage runoffs. |
| 5 | PC6149-3 | AS3 | A majority of these crossings require no special construction--the pipeline is buried beneath or elevated above the stream in standard pipeline construction methods. About 130 crossings, such as this one at the unnamed creek, however, do require special construction considerations |
| 6 | PC6191/6193 | Tazlina River | Fourteen of these crossings (including the Yukon river) require special bridge structures. Two of them, this one at the Tazlina river and the one at the Tanana river, consist of cable suspension bridges |
| 7 | PC6195-14 | South Fork Koyukuk | The majority of the bridge crossings are a standard design plate and girder bridge. The bridge crossing the south fork of the Koyukuk--100 miles north of the Yukon River-- is under construction in the foreground here. The bridge for the pipeline haul road is behind. |
| 8 | PC6158/6160 | Gulkana River | One of the more interesting crossings completed during the period was a 400-foot tied-arch bridge constructed at the Gulkana river. Here, steel bridge components rushed from Japan are unloaded at the bridge site. |

9	PC6159-15	Gulkana River	The backbone of the bridge's substructure is unique. The eight specially designed "h"-pilings at each of the bridge's four piers are made of 20-foot-long sections of surplus 48-inch-diameter pipe, filled with concrete. 18-inch-diameter pipe, originally intended for above ground pipeline supports, is used to transfer loads from the bridge to the piers
10	PC6186-1	Gulkana River	Originally, the crossing was designed to be buried beneath the river in a mechanically refrigerated ditch, required by the ice-rich permafrost soils in the area.
11	PC6188-9	Gulkana River	The decision to abandon the buried concept because of construction difficulties was made last October, and the pipeline builders were given the challenge to design, construct and complete a bridge crossing before May, 1976 (after which date, river construction activity could damage fish habitat).
12	PC6193-14	Gulkana	An acceptable site for the bridge crossing had to be found, which ended up being one mile downstream from the original crossing site.
13	PC6185-17	Gulkana	An engineering firm--R&M Consultants, Inc., of Anchorage--was identified to design the structure.
14	PC6193-19	Gulkana	With no lead time to order new steel, the requirement was that the bridge be constructed only with materials already at hand. This included the mainline and support pipe for the piers; the arch ribs, struts, floor beams, tie girders, bridge bearings and hangers fabricated from surplus plate stockpiled at the mill in Japan.
15	PC6232-8	Gulkana	All the material arrived at the site by the end of March--15 days later, the bridge was erected. The pipeline will be installed across the bridge this summer.
16	PC6189-9	Salcha River	Where the pipeline crosses beneath rivers, it must be buried at depths great enough to ensure the scouring effects of the river do not reach the buried line. Here, a surveyor checks the depth of the ditch across the Salcha River.

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| 17 | PC6182-3 | Middle Fork Koyukuk | Here at the Koyukuk River, 130 miles north of the Yukon River, this surveyor elected not to use a boat to check the depth of the ditch. |
| 18 | PC6182-8 | Middle Fork Koyukuk | He determined the clamshell bucket of a dragline rig to be a safer perch for measuring the pipe ditch. |
| 19 | PC6176-12 | Jim River | Because of the natural buoyancy of the steel pipe, the line must be weighted to keep it down in the water-filled ditch. Here at the Jim River, a section of the line has been coated with concrete. |
| 20 | PC6169-12 | Salcha River | At the Salcha River, 40 miles south of Fairbanks, the section of pipeline to be buried beneath the river is being welded in the foreground, while floats are being strapped to the weighted pipe, behind. |
| 21 | PC6171-9 | Salcha River | The floats facilitate the dragging of the line into the ditch. After the pipe is pulled across the river, the floats are removed. |
| 22 | PC6198-9 | Chatinika River | Here, about 20 miles north of Fairbanks, the line is being pulled across the Chatinika River. |
| 23 | PC6164-9 | Bonanza Creek | In the river floodplain area, outside the river channel, the pipe is not coated with concrete, but is sunk to the bottom by concrete weights set atop the pipe. |
| 24 | PC2220-9 | AS 96 | These "saddle weights" weigh about 9 tons each |
| 25 | PC2211-3A | Delta River | By early may, more than 26 miles of pipeline had been installed at river crossings along the 800 mile route. The work here is on the delta river floodplain, about 215 miles north of Valdez. |
| 26 | PC2212-16 | AS99 | More than 425 miles of pipeline were installed by early May. 230 miles of this total were buried line. Here the line is being taped and lowered into a ditch south of the Brooks Range. |
| 27 | PC307-8 | Fairbanks Area | An ongoing audit program of all completed mainline welds has been conducted since last fall. Audit results, in some cases, indicate the need to |

- repair or replace a weld. In other cases, only a new radiograph is required.
- 28 PC306-3 AS42 Repair of welds was one of the activities under way during the reporting period. Here a "bell hole" has been excavated to enable crew to make a new radiograph--or x-ray--of the pipe weld.
- 29 PC007-11 AS27 A small section of the pipeline was installed at a "special burial" location, about 30 miles north of Glennallen.
- 30 PC012-5A AS27 About four miles of insulated pipe encased in a fibrous glass coating were buried in an ice-rich permafrost area, where normally the line would be elevated.
- 31 PC009/008 AS27 The pipe is being buried in a mechanically frozen ditch to ensure a crossing for the Nelchina (Nelchee-na) caribou herd, which numbers between 8,000 and 10,000. This crossing was chosen because of the known migrations of the herd over the past 20 years.
- 32 PC011-15/17 AS27 Forty-foot sections of insulated pipe are welded at the site. The welded area is covered with a protective tape coating, and the two sections of prefabricated insulation are strapped in place to form a continuous string of insulated pipe.
- 33 PC002-1 AS27 All completed work is inspected prior to burial. Bechtel quality control inspectors are responsible for monitoring all pipeline construction performed by the project's five execution contractors. In turn, Alyeska's quality assurance department reviews the performance of the quality control effort as well as making technical audits of all phases of construction.
- 34 PC010-6 AS27 For special buried pipe, six-inch diameter brine lines on either side of the pipe circulate a refrigerant, keeping the soil frozen around the buried pipe.
- 35 CL357-7 AS122 Another construction activity that continued during the reporting period was the installation of the fuel line north of the Brooks Range. Here, about

- 100 miles south of Prudhoe Bay, the line is installed aside sections of the mainline elevated pipe on the narrow side of the pipeline workpad.
- 36 GL328-11 AS119 Other portions of the small diameter pipeline are being built alongside the pipeline haul road on a snowpad. Here, a homemade snow blade rig pulled by a tractor compacts the snow for the heavy equipment used on the fuel line project.
- 37 GL338/340 AS120 This equipment includes the Barber Greene ditching machine at left, and the roc saw machine at right.
- 38 GL320-3/10 AS116 After the fuel line has been welded and x-rayed, "jeeping" or checks for irregularities in the pipe coating is performed, and breaks in the coating are patched.
- 39 CL318-11 AS116 More than 80 miles of the 10-inch and 8-inch diameter line had been welded by early May. The line will supply power to the pump stations north of the Brooks Range. The Toolik pipeline construction camp is in the background, here.
- 40 SU105-7 AS119 Preceding the gas line work spread are the surveyors, who verify the alignment of the line over the frozen tundra.
- 41 PC1253-2 AS54 Surveyors also verify the height of the cross beams on above ground supports for elevated sections of the-pipeline
- 42 PC1251-17 AS21 Work resumed during the reporting period on installation of above-ground sections of the pipeline.
- 43 PC1241-9 AS119 Drills were active in all five pipeline sections.
- 44 PC1261-9 AS53A More than 68,000 vertical support members (vsm's) were installed by early May.
- 45 PC1262-6 AS53A Here, about 40 miles south of Fairbanks, an 18-inch diameter vsm is being grouted in place.
- 46 PC1252-16 AS54 A little more than 180 miles of above ground pipeline had been installed by the first of the month

47	PC1254-4	AS51	Here, an installed section of the pipeline winds through Rosa Pass, about 55 miles south of Fairbanks.
48	PC1268-3A	North Slope	To compensate for expansion of the pipe caused by the warm oil, and to permit movement from possible seismic disturbances or other forces, the above ground pipeline is built in a zigzag configuration that converts expansion into a sideways movement. The section of above ground pipeline shown here is just south of Prudhoe Bay.
49	PC1267-4	AS51	Insulation of above ground sections of the line was under way during the reporting period. A little less than 50 miles of above ground pipe was insulated by the first of the month.
50	PC1266-14	AS82	Remote gate valves were also being installed during the reporting period.
51	PC1243-14	AS25A	Here, about 140 miles north of Valdez, the structural supports for the valve control module were being completed. 41 valves were installed of the 162 remote and check valves required.
52	PC7116-13	AS33	The last of the work pad construction was also in progress. Here, the pipeline pad was being built through the Isabel Pass area of the Alaska Range.
53	PC7126-9A	AS116	The last of the insulated work pad was completed on the north slope. This spread was working in the vicinity of Toolik camp.
54	PC7128-3	AS116	At the front of the work spread, dozers clear the snow and level the ground for the polystyrene insulation boards
55	PC7130-3	AS116	Bales of the 1-1/2-inch to 2-inch thick boards were offloaded at the site, and the boards were installed by hand.
56	PC7131-9	AS116	Use of the insulation of the northern part of the line substantially cut down on the amount-of gravel required to build the pad and the number of sites, which had to be disturbed to get gravel.

57	PC7122-17	AS116	The insulation also made it possible to reduce the length of vertical support members installed in the pad to support the 48-inch diameter pipeline.
58	PC7119-17	AS116	Insulation with gravel alone would have been possible in this area but would have required a work pad five to nine feet thick. By using insulation, however, the pipeline builders were able to reduce the overlay to an average 24 inches in total thickness.
59	PC7125-16	AS116	In the foothills of the Brooks Range, from 3 to 4-1/2 inches of the polystyrene were placed in layers within the work pad. On the rolling tundra north of the range, insulation thickness ranged from 3 to 4 inches, and on the flat coastal plain from 1-1/2 to 3 inches.
60	PC7118-8	AS116	Almost 100 million board feet of insulation were required for the approximately 100 miles of insulated work pad.
61	PS524-8	PS6	Substantial progress was reported at the pump stations required for the initial operation of the pipeline. Work continued on installation of interior components for the permanent facilities at the stations.
62	PS858-9	PS10	Here at pump station 10, work was under way on the crude oil topping plant.
63	PS860-5/4	PS10	The two largest components of the plant are the 43-foot high surge drum and the topping totter. The surge drum is being lifted and set here.
64	PS853-9	PS10	This crude heater and other components were installed for the plant.
65	PS855-18	PS10	The topping plant will be, in essence, a small refinery which draws crude from the pipeline and "refines" it into diesel fuel.
66	PS861-12	PS10	Similar plants are being constructed at stations 8 and 6, and the three plants will provide energy to power the turbines at the stations south of the Brooks Range.

67	PS420-18	PS5	At most of the stations, work was under way on the mainline pipe corridors.
68	PS227-16	PS3	Here at pump station 3, about 105 miles south of Prudhoe Bay, the mainline corridor was completed in late March.
69	PS225-9	PS3	The corridor at station 3 is technically refrigerated, as is the station forum-ration, itself. The vertical small diameter pipes are part of the refrigeration system.
70	PS232-10	PS3	Crude oil will enter and exit a station through the pipe corridor. Inside the station, 13,500 horsepower pumps will boost the crude oil on its way south.
71	PS633-16	PS8	Here at pump station 8, the concrete pad for the pipe corridor was being laid.
72	PS233-4A	PS2	Preparation for corridor work also began at the four stations, known as "pass through" stations, not required until the pipeline capacity is increased above the 1.2 million barrel initial daily operation capacity. This is station 2.
73	PS152-8	PS1	This aerial view of pump station 1, shows the 100-foot-high oxidizer, which will receive and consume excess vapor from the crude oil tanks at the station.
74	VT668-11A	Terminal	Construction activity remained high through the reporting period in every area of the Valdez terminal facility. Ringwalls were being constructed for the four crude storage tanks in the west tank farm, and work was in progress on tanks remaining to be completed in the east tank farm.
75	VT548-20	Terminal	Work continued on the four berths being constructed for the initial operation of the pipeline.
76	VT555-3	Terminal	12 Of 13 trestle pier jackets had been set for berth 5. Work on the anchor pilings for berth 1 was in progress.
77	VT558-8	Terminal	Here on berth 4, drains, piping and electrical conduit were being installed.

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| 78 | VT665-17 | Terminal | Concrete floor slabs and support steel were added to the facilities in the power generation and vapor recovery area. Equipment installation included setting the fourth compressor in the compressor building, and setting the second and third cold condensate pumps, the upper shell on the second turbine and installing generator covers in the generator area. |
| 79 | VT666-16 | | Other work at the terminal included installation of piping, erection of pipe supports and construction of containment walls in the ballast treatment area. |
| 80 | WI103-16 | AS122 | By early may, the workforce on the project neared the 20,000 mark, as work continued toward the completion goal of mid-1977. |

Folder 2a

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| 1 | PC433-3A | | This is a report on the progress made on the trans Alaska pipeline project through July, 1976. |
| 2 | WI337-16 | | The report covers activities that took place during May, when winter conditions still prevailed in the northern section of the pipeline route... |
| 3 | PC6286-29 | | ...And during June, when summer conditions permitted short-sleeve work attire. |
| 4 | PC6269 | | Construction highlights during the period included erection of a cable suspension bridge for the pipeline crossing over the Tanana River. |
| 5 | VT6102-6111 | |And the erection of a boiler stack, the length of a football field, at the Valdez Terminal. |
| 6 | PC2252-7 | | In early July, the total pipeline project was more than two-thirds complete. |
| 7 | PC2257-7 | | More than 530 miles of the 800-mile long pipeline was completed. |
| 8 | PC1291-7 | | About 235 of this total were installed above ground. |
| 9 | PCI290-7 | | This typical above-ground installation took place about 75 miles north of Valdez. |

- 10 PC1291-10 The 4-foot diameter mainline pipe was strung out and welded between the vertical support members. Sideboom tractors then lift the section of pipe.
- 11 PC1292-4 With the pipe suspended, the horizontal beam is attached between the vertical supports, and the pipe-shoe assembly is hoisted beneath the pipe, onto the beam.
- 12 PC1290-9 The pipe is then lowered into the saddle, and the overhead clamp bolted into place.
- 13 PC430-3 After the pipe is installed above-ground, the insulation crews take over. The pipe is wrapped with fibrous glass insulation, bonded to steel outer jackets.
- 14 PC431-1 In early July, about 115 miles of above ground pipe had been insulated
- 15 PC2278-2 About 270 miles of pipeline had been buried.
- 16 MS254-9 Here, workers patch up the protective tape coating applied to sections of pipeline installed below ground.
- 17 PC2256-19 This section of pipe was buried just north of Fairbanks during June.
- 18 PC319-5 All welds on the pipeline are radiographed to ensure weld acceptability. Here, an automatic X-ray crawler is inserted into a section of the pipeline.
- 19 PC317 The crawler automatically stops at, and radiographs each girth weld. Radiographic film encased in cassettes, is wrapped around the outside of each weld.
- 20 PC316-5 On welds that have been repaired, X-rays of the repaired area are usually made from the outside of the pipe. Here, technicians fasten a radioisotope container atop the pipe. The radiographic film is placed on the opposite side of the pipe, also on the outside.

- 21 PC312-5 This radiographic tie-in and repair vehicle houses the portable X-ray and manual processing equipment.
- 22 PC312-3 An audit of 1975 mainline field girth weld radiographs conducted during the spring, revealed 3,955 discrepancies. As of early July, more than 2,200 of these discrepancies had been resolved.
- 23 PC1313-6 The remedial weld work progressed during the reporting period alongside normal construction activity.
- 24 PC1297-18A Pipeline construction during the period included installation of mainline valves. A total of 175 valves are being installed on the pipeline. This is one of 80 check valves, which "checks" or prevents back flow of oil during the pipeline's operation. When oil is flowing, a clapper inside the valve swings down into a closed position, preventing oil from flowing in the opposite direction.
- 25 PC1296-5A Ninety-five block (or gate) valves are being installed. Sixty-two of these are remote gate valves, which are battery powered and can be controlled from the Valdez Control Center or from a Pump Station. This is one of the nine manual gate valves.
- 26 PC2244-3 This remote gate valve is on a buried portion of the pipeline. The block controls oil flow by an internal slab, or gate, that is electronically or manually controlled to move up and down, in the open and closed positions respectively.
- 27 PS638-18 There are also 23 "header gate valves", installed at pump station entrances and exits and a mainline gate valve at the marine terminal. This valve is at the entrance to Pump Station 8.
- 28 PC1317-9A Construction activity during the reporting period include pipe work in the Atigun Pass area of the Brooks Mountain Range. The 4,800-foot-high pass is the highest elevation on the route. The above-ground section is south of Chandalar camp, about 15 miles south of the pass summit.

- 29 PC1318-6 Welding shelters around the vertical supports resemble a row of Indian teepees. Inside, welders are fastening rings, which support the horizontal beam between the supports.
- 30 PC7145-6 The pipeline will be buried through the approximately three-mile-long summit of the pass.
- 31 PC2253-6 During the reporting period the work pad through this area was completed, and work was under way on excavation of the pipe ditch.
- 32 W1110-1 This Grizzly Bear was keeping an eye on the construction activities in the pass.
- 33 PC6292-10 Work continued on river crossings during the period.
- 34 PC6253-9 Here at the Tanana River, a 1,200-foot cable suspension bridge was erected.
- 35 PC6255-17 About nine miles of various sized cable was used in the construction.
- 36 PC6260-2 The bridge towers on either side of the river are 166 feet high- the height of an 18-story building.
- 37 PC6261-28 Piling installations on the bridge began in June 1975, and foundations were completed in the spring of 1976. Each two main cable anchors rests on 81 steel pilings driven to a depth of 68 feet.
- 38 PC6262-8 Approximately 970 yards of concrete was used on each of the two main anchors, 210 yards for each of the four wind anchors and between 230 and 260 yards on each foundation for the two support towers, for a total of more than 3,200 yards of concrete.
- 39 PC6260-18 The bridge is designed to withstand 100-mile-per-hour winds, earthquake intensities up to 7.5 on the Richter scale and 1,000 pounds of dead weight per lineal foot.
- 40 PC6263-7 Each of two main support cables or "gut" cables is made up of four 2-3/4" clamped cables.

- 41 PC6258-7 Here, trolleys on a smaller diameter “messenger” cable are used to support the gut cable being pulled across the river.
- 42 PC6259-4 Most of the cable work was completed in June.
- 43 PC6291-19 The mainline pipe will be supported on pipe shoes set on standard horizontal beams, suspended from the main gut cable.
- 44 PC6295-9 Pipe was scheduled to be pulled across the bridge in late July.
- 45 PC6252-17 A similar, but smaller cable suspension bridge was erected earlier this year across the Tazlina River, about 115 miles north of Valdez.
- 46 PC6236-4 The Tazlina bridge is a 600-foot free span structure, with the pipe suspended in circular clamps from a main cable, which consists of six multi-strand structural cables, each 2 1/8 inches in diameter.
- 47 PC6237-8 As is the Tanana bridge, the Tagline cable bridge is constructed to provide for pipe movement due to thermal expansion and other forces. The bridge is offset from the survey centerline and the sharp angles of the pipeline as it approaches and leaves the bridge accommodate this movement.
- 48 PC6238-13 Other river crossing construction during the reporting period included work on the plate girder bridges, such as this one at the Hammond River, about 130 miles north of the Yukon River. Ten different river crossings use the standardized design plate and girder bridge.
- 49 YB504-3 The longest river crossing on the route is across the Yukon River. Pipe is scheduled to be installed on the pipeway off the side of the highway bridge during August.
- 50 PC6285-8 Other pipeline “crossings” that took place included highway crossings.
- 51 PC6285-9 Here, a multiplate culvert is assembled for a crossing beneath “Goldstream Road”, just north of Fairbanks.

- 52 PC6285-15 The culvert is made of galvanized corrugated steel sections that are bolted together at the crossing.
- 53 PC6267-8 There are 56 similar road crossings along the route.
- 54 AC126-6 In May, an aerial "dusting bombing" operation was used just north of Valdez to accelerate snow melting along the right of way into Keystone Canyon and Thompson Pass.
- 55 AC127-10 A modified B-26 aircraft flew about 70 missions out of Valdez dropping the coal dust.
- 56 AC129-6 About, 140 tons of coal dust was used in the operation.
- 57 AC126-13 The black dust, which readily absorbs the sun's rays, hastened the melting of the snow and enabled construction work to get under way by early June.
- 58 PC7154-1A Right of way work in the Canyon was expected to be completed in late July, with pipeline installation beginning at that time.
- 59 PS864-6 At the pump stations, material deliveries continued to improve, and by late June total progress at all the stations was more than 50%
- 60 PS866-2 Piping installation was very active at all locations. Emphasis at the stations during the summer months is on exterior work.
- 61 PS714-5 Cable and electrical wiring were being pulled at the stations, and conduit and major electrical equipment installation work.
- 62 PS639-2 Electrical work is a major portion of the work required at pump stations. About 24 % of the estimated 7.4 million man hours that will be expended in pump station construction will be electrical work.
- 63 PS865-5 Other activities at the pump stations included hydrotesting of tanks, and installation of equipment such as motor control centers, booster pumps and flow meters.

- 64 PS863-4 At the stations not required for the initial operation capacity of the pipeline, work was primarily associated with mainline corridor construction and installation of mainline pipe through the station. This is Pump Station 11.
- 65 VT337-12 At the Valdez terminal, good weather and improved deliveries of materials had a favorable impact on construction progress. In late June the terminal was more than half complete.
- 66 VT696-7 During June, a 300-foot, 400-ton boiler stack was erected at the power plant/vapor recovery facility.
- 67 VT6107-19 Three huge cranes and about a mile of cable were needed to lift the big stack, which was shipped from California in two sections and welded together at the site.
- 68 VT6110-13 Months of planning and site preparation went into the tricky operation, which had to be carried out in an unusually cramped working space.
- 69 VT6119-6118 The stack will become part of a massive air quality protection system which is designed to remove virtually all pollutants from vapors produced by the terminal operation.
- 70 VT6120-2 Incinerated inert gasses will be discharged into the atmosphere through the stack at an altitude of 650 feet above sea level, well above the Valdez temperature inversion level.
- 71 VT747-4 Other activity at the terminal included work on the final four tanks of the 14 crude oil storage tanks in the East Tank Farm and the hydrotesting of the six completed tanks.
- 72 VT746-6 In the West Tank Farm, erection of four storage tanks continued. All 18 storage tanks will have a capacity of 510,000 barrels of crude oil.
- 73 VT415-8A In the Ballast Water Treatment area, installation of piping and insulation continued. The facility includes three 430,000 barrel capacity holding

- tanks, skimmer tanks, a floatation building and chemical storage tanks.
- 74 VT679-14 In addition to the stack lift at the power generation and vapor recovery area, construction emphasis was on earthwork, concrete pours, equipment installation and steel erection.
- 75 VT687-4 Work continued on exterior and interior of the various facilities. On tanker Berth 5, all roadway trestles were set, and the last concrete pour on the loading dock of Berth 4 completed.
- 76 VT251-250 In addition to the facilities at the terminal, work continued in the "offsite" areas. Here, a reinforced earth wall is constructed for one of the terminal roads. Normally, such slopes along roadways would be excavated to bedrock, benched, backfilled and compacted to obtain a slope of suitable strength and seismic stability. The reinforced earth wall replaced this conventional construction method.
- 77 VT250-20 The wall is anchored in bedrock and built of precast concrete panels. Galvanized steel straps, equal in length to the height of the particular wall are extended behind the walls in layers during the filling and compacting process.
- 78 VT249-6 The project's workforce totaled an estimated 21,000 as of early July, including administrative and craft personnel on the pipeline, at the pump stations and at the Valdez terminal.
- 79 SC322-13A Other noteworthy developments during the reporting period included announcements by Alyeska Pipeline Service Company that the forecast cost of the pipeline had risen to \$7.7 billion; that Mr. E.L. Patton was appointed Chairman and Chief Executive Officer and DR. W. J. Darch was appointed president of Alyeska; and that Executive Vice President Charles Elder would leave the company in July.

Folder 2b

- 1 PC9030-7A Welding on the trans Alaska pipeline is the subject of much controversy. Representatives of government, the press, and other agencies continue to voice public concern about the quality of the welding. Often, this concern is based on misinformation and on little, if any, understanding about the welding procedures used on the Alaska project.
- 2 PC9039-17 In order to provide the public a detailed, step-by-step review of the welding procedure, Alyeska Pipeline Service Company – the company responsible for building the pipeline – assigned its staff photographer to pick a weld and photographically document the production, inspection, and certification of the weld. The following series of photographs are of the one weld, located about 70 miles north of Fairbanks.
- 3 PC9038-9404 The four-foot diameter pipe came from the mill with a 30-degree bevel on the ends. The bevels are cleaned by sandblasting all dust, dirt, oil or other material which could cause weld problems.
- 4 PC9038-12 Two pipe wall thicknesses are used, .462 thousandths and .562 thousandths of an inch (or roughly ½ inch). The pipe is a low carbon, low alloy steel made specifically for welding in the arctic environment. Most of the pipe has a yield strength of 65,000 pounds per square inch.
- 5 PC9038-5 Quality Control welding inspectors monitor each step of the welding process. Here, the inspector measures the bevel for the proper 30-degree angle.
- 6 PC9041-4 Next, the pipe ends are pre-heated with propane torches.
- 7 PC4040-8 The temperature of the pipe end must be between 150 degrees and 250 degrees, Fahrenheit.
- 8 PC9038-10/9 The inspector monitors the pipe temperature.
- 9 PC9039-2 The two sections of pipe are aligned for welding, using an internal alignment clamp which holds the section of pipe in place.

- 10 PC9039-9 Craftsmen in this operation include the “Stabbers” who direct the alignment...
- 11 PC9039-11/13 ...and the “Spacers” who ensure proper alignment and spacing between the two pipes.
- 12 Weld A This drawing shows a cut-away of the ½-inch-thick walls of the aligned pipe. Note the thirty-degree bevel angle which forms the pie-shaped opening to be filled by the weld metal. The lower 1/16th of an inch of the pipe end is called the root face or “land”. The spacing between the pipes at this point must be 3/32nds of an inch.
- 13 PC9037-18 Each joint of pipe welded receives a permanent weld identification number which is not only painted on the side of the pipe, but is recorded in the “as-built” drawing (which, show the location of every weld by number) and is imprinted on the radiograph of the completed weld.
- 14 PC9035-16/11 The first weld pass, called the “root pass”, is the most crucial of all weld passes.
- 15 Weld-B It’s the foundation for building a sound weld.
- 16 PC9035-13 Welding is a joining process wherein fusion is obtained by heating with an arc between a covered metal electrode or a consumable wire and the work. In this instance, the root pass is being made with the semi-automatic gas-metal-arc welding process, in which the consumable wire is used.
- 17 PC9035-1 After the root pass is completed, the pair of welders moves on to the next joint, and a new pair begins the second pass, called the “hot pass”.
- 18 Weld-C The hot pass is made primarily for burning out or melting out any unnoticed surface defects.
- 19 PC9043-12 The hot pass, as are all remaining passes, is made with the shielded-metal-arc process, using the covered metal electrodes, which is the more conventional of the two welding processes used on the project.

- 20 PC9063-1 The third pass, done by a third pair of welders, is the first "fill pass"
- 21 Weld-D On this pass the welders begin to deposit a little more weld metal.
- 22 PC9035-19 After each weld pass, the welders' helpers power brush the weld to remove slag, and do any grinding necessary to remove surface defects.
- 23 PC9037-14/5 The brushed weld is air tight.
- 24 PC9038-2 The Quality Control welding inspector visually checks each weld pass.
- 25 PC9042-4/7 Next, the "firing line" welders will move in. Here, a welding shelter is being erected around the shelter. It protects the weld from wind, rain, snow, and other elements that could impair weld quality.
- 26 PC9035-3 After the weld has been reheated with propane torches, the firing line welders complete the weld.
- 27 Weld-E They will do the final passes. (Since this pipe has a .462 thousandths of an inch wall thickness, three fill passes are required. If it has been .562 pipe four fill passes would have been made.)
- 28 Weld-F The firing line will complete the weld with the "cap pass", making a total six weld passes for this joint of pipe.
- 29 PC9036-16 If one could unwrap a completed weld and stretch it out, this one with six weld passes, would be 75 feet long.
- 30 PC9038-15 The welding inspector monitors the parameters of each weld with such tools as a stop watch to measure the rate of travel, and a tong meter (shown here) to measure proper amperages.
- 31 PC9035-9 All the welders on the mainline are from the "Pipeliners" Local 798 (seven-ninety-eight), which is a union recognized for expertise in welding pipelines through out the world.

- 32 PC9036-12 Even though they have individual credentials, each welder is required to take and pass a series of strict welding tests before they can work on this project.
- 33 PC9043-10 The tests include making a weld on the 48-inch diameter pipe, 18-inch support pipe, and plate tests in the vertical and overhead positions. The requirements for passing these welds include both radiographic and destructive testing.
- 34 Weld-G Weld 38031 is now completed. It consists of six individual weld passes...the root pass, the hot pass, the first fill, the second fill, the third fill pass and finally the cap pass.
- 35 PC9031-14 The welding inspector inspects the final pass, and marks it "V-A-E" (visually acceptable externally). The weld is now ready for radiographic examination.
- 36 PC9033-9/10 All the welds on the trans Alaska pipeline are radio-graphed to ensure the weld quality meets specifications. More than 12 feet of film, encased in cassette belts are wrapped around the outside of the weld. At right, the weld identification is passed to the technician to be inserted beneath the film belt and recorded on the film.
- 37 PC9032-1 The radiograph will be made by the internal x-ray crawler being placed in the end of the completed section of pipeline.
- 38 PC9033-10 The crawler will travel through the half-mile section of pipe, stopping at, and radiographing each weld. Each radiographed exposure takes about two minutes.
- 39 PC9032-13 The radiography is done in accordance with Alyeska requirements which fully comply with the industry standard requirements.
- 40 PC9032-19 All safety precautions are strictly followed to assure no one is in the area when the X-ray crawler is turned on.

- 41 PC9034-7 After the radiographs are made, the film belts are taken to a mobile field darkroom where the film is processed.
- 42 PC9034-13 The radiograph is examined by an interpreter, who determines weld acceptability.
- 43 PC9034-1 The interpreter looks for such things and porosity – or gas pockets which are small spherical or elongated holes and for slag inclusion, which is electrode coating material entrapped between individual weld passes; for cracks, which could result from for instance, handling of the pipe with only the root pass completed and for inadequate penetration, which is a condition where the root pass has not completely penetrated into the pipe.
- 44 PC9033-4 On the radiograph of weld 38031, the interpreter has found an indication of elongated porosity, measuring $\frac{1}{4}$ inch and exceeding the acceptance criteria. And although radiographer, by virtue of his experience, judges the location to be in the root pass.
- 45 Weld-H This drawing shows the possible location on the porosity. (Note the dot on the bottom of the weld.) This weld will be repaired by grinding the internal weld reinforcement flush with the pipe.
- 46 PC9044-8/13 A welder and his helper travel about a quarter-mile down into the section of pipe to weld “38031” and make the necessary repair. Other defects, such as slag inclusion or incomplete fusion, would have required the removal of the weld metal by grinding, re-heating the weld area to be repaired and then re-welding.
- 47 PC9034-10 After the repair, the weld is re-X-rayed. While a few isolated spots (porosity) remain on the repair film (top), the weld is now within the specifications.
- 48 PC9046-2 The weld is now certified by a Quality Assurance representative, and released for installation. The final test of the weld will come when the section of the pipeline is hydrostatically tested. The pipe will

be filled with water and pressure tested to 125% of the maximum operating pressure for 24 hours.

49 PC9030-7A

That was the story of one weld on the trans Alaska pipeline. When the project is complete, 60,000 field welds will have been made. The welding, inspection and radiography techniques will have been similar.

Folder 3a

1 PC1326-1A

(1) This is a report of progress made on the trans Alaska pipeline project thru September, 1976.

2 PC2289-9

(2) During the summer construction season, pipeline

3 PC2321-2

activity (3) was concentrated in the critical mountain passes, as the pipeline portion of the project neared completion.

4 PS4025-10

The summer months saw the completion of much

of

5 VT7052-4

the exterior work at the pump stations, (5) and substantial progress on exterior components at the Valdez Terminal.

6 WI2002-4

(6) While the warm summer was favorable for construction activities, it had its not-so-favorable aspects. These little creatures were quite active along the 800-mile route....

7 PS2042A

(7) But the mosquitoes didn't impede progress, and by early September the overall project was more than 81 per cent complete.

8 SU1006-14A

(8) Pipeline activity in the Brooks Mountain Range included

9 PC2278-4

(9) final work on the pad through

10 PC2291-92

Atigun Pass (10) and up Chandalar Bench a few miles south of the pass.

11 PC2275-4/8

(11) Work in the pass area included drilling (12) and setting charges for blasting of the pipeline

12 PC2290-89

ditch.

13 PC2272-17/4

(13) Ditching in the area was more than two-thirds

done by early September.

- 14 PC2331-3 (14) A concrete slab was being poured in the ditch
15 PC2330-19 through the pass. (15) The slab will be part of an
insulation box through which the pipeline will be
installed. The insulation is required because of the
ice-rich permafrost soils in the area.
- 16 PC2264-1 (16) Here, pipe is lowered into the ditch on the
17 PC2263-14 Chandalar Shelf. (17) Pipe was being welded in the
Atigun Pass area with completion of installation
scheduled for this year.
- 18 PC7161-10A (18) On the southern end of the pipeline, in the
19 K2004-4 Chugach Mountain Range, work was under way in
two
a special construction areas. (19) The pipeline was
being buried atop the east wall of Keystone Canyon,
a beautiful but rugged four-mile-long pass just east of
20 PC2328-9 Valdez. (20) By early September, ditching, welding
and pipe installation were nearly completed in the
Keystone area.
- 21 PC7177-4 (21) A couple of miles north of Keystone, pipeline
work was under way down the very steep face of
Thompson Pass.
- 22 AC2018/AC2296 (22) A cable tramway was being erected to help move
23 pipe and other material up the pass. (23) This
converted bulldozer was used to carry pipe up the
slopes of Keystone Canyon.
- 24 EQ3015-11 (24) The dozer's blade and ripper had been removed
and replaced by cradles, in which the pipe was
placed.
- 25 EQ3015-15 (25) The vehicle carried two 80-foot sections of pipe
per trip up the Keystone slopes.
- 26 PC9050-13/3 (26) In early September, the pipeline portion of the
project was more than 90 per cent complete.
- 27 PC2262-12 (27) Less than 15 miles of pipe remained to be
welded.
- 28 PC9058-1 (28) The last of the mainline welding on the pipeline

was expected to take place in September.

- 29 PC2325-12 (29) Of the buried portion of the pipeline, only a little more than 10 miles remained to be installed.
- 30 PC2262-1 Here pipe was being welded near the Worthington Glacier about 30 miles north of Valdez.
- 31 EQ2006-3 (31) These welding protection cabs were being used near Isabel Pass in the Alaska range.
- 32 EQ2005-18 (32) Each cab has its own lighting, heating and ventilation system.
- 33 EQ2005-9 (33) The portable units have a hinged floor which
fold
- 34 EQ2007-7 (34) and enabling welders to
continue work during extreme wind and
temperature conditions.
- 35 PC1328-1 (35) During the summer months, installation of
above ground sections of the pipeline continued.
- 36 PC1327-1 (36) By early September, about 60 miles, of the 420 miles required, remained to be installed on above ground supports.
- 37 PC1321-6 (37) More than two-thirds of the mainline block valves and check valves had been installed.
- 38 PC4037-18/19 (38) Here, an above-ground valve is being insulated.
- 39 PC4038-2 (39) About half of the above ground sections of the pipeline was insulated, with all insulation scheduled for completion this year.
- 40 PC6330-4 (40) The majority of all the river crossings have been completed.
- 41 PC6319-8 (41) During July, pipe was installed on a cable suspension bridge across the Tanana River, about 75 miles south of Fairbanks.
- 42 PC6328-12 (42) Sections of pipe were welded together on the

- 43 PC6313-9 opposite sides of the river (43) and pulled from the bridge's main cable.
- 44 PC6303-13 (44) The pipe is supported on above-ground pipe "shoes" set on crossbeams suspended from the bridge's main cable.
- 45 PC6327/6308 Here, a workman measures the distance necessary to close the gap for the final tie-in, as the two segments of the pipeline come together for this group portrait.
- 46 MS3020-4 (46) After the pipeline crossing was completed, some of the workers involved on the project got together for this group portrait.
- 47 PC6357-17 (47) In August, the pipeline was installed across the Yukon River.
- 48 PC6350-10 The pipe was installed on a pipeway, (49) which is built along the side of the 2,300-foot long bridge.
- 50 ER2007-16 (50) Erosion control activities continued during the period. Here, a mixture of grass seed and fertilizer is sprayed over a work location.
- 51 PS5026-20 (51) Pump Stations along the pipeline were about 70 per cent complete in early September.
- 52 PS1080-19 (52) This is Pump Station One, the origin station of the pipeline at Prudhoe Bay.
- 53 PC1072-14 (53) Crude oil will enter the station through these supply lines,
- 54 PS1067-12 (54) and will be stored in storage tanks before being pumped through the pipeline. This is the interior of one of the station's storage tanks.
- 55 PS1074-7 (55) Incoming oil will be measured at Pump Station 1. Here, the metering building is under construction.
- 56 PS1076-4 (56) A 45-ton, 65-foot long meter prover unit was delivered to the station by truck from Anchorage.
- 57 PS1076-18 (57) At all the stations, efforts were concentrated on finishing the exterior work.
- 58 PS3037-6 (58) This included installation of various sized pipes

- 59 PS403-9 (59) and completion of the pipe corridors, or pipeways, between the different facilities at each station.
- 60 PS1069-19 (60) Receipt of fabricated piping remained a critical item at most stations during the period.
- 61 PS4028-6 (61) Piping systems were being hydrotested as they were completed.
- 62 PS2037-17 (62) Other pump station work included concrete pours, installation of valves and setting of equipment.
- 63 PS4026-12 (63) This black bear was keeping tabs on progress at Pump Station 5, about 80 miles north of the Yukon River.
- 64 PS4024-13 (64) Electrical conduit, building partitions and exterior siding was being completed on station facilities.
- 65 PS5030-7 (65) Work is expected to continue during the winter months at the stations, which will include completion of the electrical and instrumentation work inside the buildings.
- 66 VT6132-10 (66) At the Valdez Terminal, work was about two-thirds complete in early September. Here, at the power plant and vapor recovery area, fuel tanks were hydrotested, power sources set in the electrical control building, and piping installed.
- 67 VT7049-1 (67) The four storage tanks in the West Tank Farm were erected and work was under way on the tanks internal fixtures.
- 68 VT7054-3 (68) In the East Tank Farm, 10 of the 14 tanks were hydrotested
- 69 VT7052-13 (69) and work continued on the dike walls,
- 70 VT7052-18 (70) reinforced earth wall, and containment areas in the tank farm.

- 71 VT7050-8 (71) Liner was being applied to the impound basin in the Ballast Water Treatment area, and equipment installation and hydrotesting of all tankage was completed.
- 72 VT9033-13 (72) Piping excavation, pipe installation and back-filling continued at a number of locations on the terminal site.
- 73 VT9029-2 (73) The exterior panel installation was completed on all but two sides of the scraper and metering building.
- 74 VT6131-1 (74) Equipment installation at the terminal facilities included setting the control panels in the power plant.
- 75 VT5070-4 (75) Loading arm bases were set and ballast and crude lines connected on Berth 4.
- 76 VT5064-12 (76) Drilling for the berthing dolphins was completed and dolphins set at Berth 5. Work continued on installation of Berth 3 casing piles and Berth 1 anchor piles.
- 77 VT2061-8 (77) In addition to pipe trenching and backfilling, other earthwork activities in the terminal area included stabilizing slopes along the roadways.
- 78 VT2060-10 (78) In this "shotcreting" operation, concrete is sprayed over a reinforcing wire mesh.
- 79 EQ3013-13 (79) Work on the terminal, pump stations and pipeline progressed significantly during the summer months of 1976, as the project remains on schedule to be operational in mid-1977.
- 80 WI3042-4A (80)

Folder 3b

- 1 PC2509-8A This is a report of progress made on the trans Alaska pipeline through November, 1976.
- 2 WI4004-11A By early November, the total project was 89 per cent complete.

- 3 PC2349/2350 More than 790 miles of the 800-mile pipeline were in place, and work continued on the facilities at the pump stations and terminal.
- 4 PC2429-1A Pipeline installation was completed through Keystone Canyon, about 15 miles east of Valdez.
- 5 PC2345-13 The pipeline was buried atop the east wall of the 4-mile long canyon.
- 6 PC2393-1 The Keystone section was the next-to-last task for the southern-most section – pipeline section 1 – to complete.
- 7 PC2430-19A The last task, which was still under way in November, was a few miles north of Keystone where crews had to descend the rugged and steep south face of Thompson Pass.
- 8 PC2397-12 There are three separate slopes down the descent of the face of the pass. Here, on the lower slope the going was not too bad.
- 9 PC2402-18/12 But the top and middle slopes were very steep, reaching grades of 47 degrees – or 120 per cent from horizontal.
- 10 PC2438-1 Dozers, known for their sure-footed ability, had to be cabled together to creep down the side of the mountain.
- 11 PC2446-19 A cable tower atop the pass marked the beginning of an aerial tramway system constructed to ferry workers and equipment down the slope.
- 12 PC2445-16 The tram was quickly dubbed the “ski lift” by workers who normally ride to work on more conventional buses.
- 13 PC2466-12 Here, a section of pipe 80-feet long and weighting 10 tons is being lowered down the slope on the aerial tram with instructions being relayed by radio to the tram system operator.
- 14 PC2509-1 More than routine safety precautions were required in handling equipment and materials on the slopes of Thompson Pass.

- 15 PC2504-13 Each movement of pipe down the tram required precise timing and direction between the persons coordinating the operation of the cable system.
- 16 PC2462-16 Here, an 80-foot section of pipe is aligned with the pipeline in the ditch for welding.
- 17 PC2459-15 Mistakes here could have been serious, and the crew was on guard to prevent them.
- 18 PC2472-10 The welding crews working in the ditch were protected from the falling rocks by walls of Styrofoam blocks in the ditch above them.
- 19 PC2506-5 Weather was a continual problem at Thompson Pass. Rain, sleet, snow and strong winds hampered progress.
- 20 PC2488-8 The heavy snowfall required a constant effort of removing snow from the ditch.
- 21 PC2495-2475 The 4,500-foot long segment plunges vertically from an elevation of about 2,800-feet above sea level at the top, to about 1,000-feet above sea level at the bottom.
- 22 PC2476-2 Walking up the slope was extremely difficult
- 23 PC2476-2 and many workers took advantage of the tramway.
- 24 PC2486-4 Work at the pass extended into the late hours of each day, as every effort was made to complete the job this year.
- 25 PC2474-10 Here, a joint of pipe is aligned on one of the steepest areas of the slope.
- 26 PC2478-14 This welding scene was repeated many times until the string of pipeline was completed at the top of the pass.
- 27 PC2517-2518 The final tie-in weld was completed October 20.
- 28 MS3020-1 There was jubilation among the welding crew after completion of the project.

- 29 PC2492-7 Remaining to be completed in November was the backfilling of the ditch. Because of the steep grade, a special mixture of concrete is being used to bury the pipeline.
- 30 PC2428-18A Weather was also an important factor at another difficult construction area farther north.
- 31 PC3271-3272 Here, in Atigun Pass of the Brooks Mountain Range, frequent snowfall and subzero weather hampered work progress.
- 32 PC2415-17 In addition to the cold, fall rains created quagmires along the right of way.
- 33 PC 2484-18 A special construction method is being used for the pipeline installation through Atigun Pass.
- 34 PC2420-2418 Ice-rich permafrost soils in the area require that about 6,000 feet of the pipeline be sealed and buried in an insulated box.
- 35 PC2483-14 Normal construction design would call for above-ground construction in the permafrost area, but danger of avalanches in the area required the pipe be buried.
- 36 PC2423-11 A concrete slab in the bottom of the pipe ditch provides a smooth working surface and is used to secure the insulation around the pipe.
- 37 PC2414-3 A cage fabricated of metal tubing and wire protects workers spreading the concrete from rocks falling from the side of the ditch.
- 38 PC2411-2 Insulation, 21 inches thick, is installed around the pipe.
- 39 PC2481-14 After the bottom and side panels have been placed, sheets of plywood are added to the outer surface to prevent damage to the insulation during the backfill process. A cement-bedding mixture is then added to fill the space between the pipe and insulation.
- 40 PC2426-2 All pipe welding had been completed in the pass by early November, with backfilling expected to be completed before year-end.

- 41 PC1361-7 Most of the above ground sections of the pipeline were in place with the major exception being a 5-mile stretch to be installed from a snow-pad during November.
- 42 PC1374-13A A special above-ground design was used across the Denali Fault in the Alaska Range – the most seismically sensitive area along the pipeline route.
- 43 PC1349-5 Here, special long-width support beams were installed atop a raised gravel pad, instead of between pairs of vertical support pipes – the normal method for above-ground pipe construction.
- 44 PC1372-8 The pipeline design at the Denali Fault will accommodate fault displacement of up to 20 feet horizontally and 5 feet vertically.
- 45 PC404-3 By early November, about 70 miles of above ground pipe remained to be insulated. Most of this was in the northern-most section.
- 46 PC9059-13 Another activity that continued during the period was resolving weld and radiograph questions identified in an internal audit of 1975 field girth welds.
- 47 PC9066-9 Of the 3,955 questioned welds identified, only 60 remained by early November. All of these are located in Pipeline Section 5.
- 48 PC9068-1 In order to resolve a questioned weld on buried sections of the line, a “bell hole” had to be excavated around the pipe. Steam and hot water were among the primary methods of melting the frozen soil around the pipe.
- 49 PC9062-9 In each instance, visual inspection, a new radiograph, a physical repair and re-radiograph of the weld was required.
- 50 PC9072-19 In the majority of instances, some type of repair – generally minor – was needed to meet project specification.

- 51 PC9072-12 Here, a quality assurance technician verifies the location of a specific weld by taking some measurements to check against a computer print out.
- 52 PC9072-19 Similar to a human fingerprint, each individual weld has characteristics unique to itself. These weld "fingerprints" are stored in a computer and have been employed to help identify welds.
- 53 PC3038-3 By early November, more than 630 miles of the pipeline had been tested without failure.
- 54 PC3059/3057 Of the 162 miles of pipe still to be tested, 126 miles are located in section 5.
- 55 PC6364-13 All of the river crossings are now completed. This is the cable suspension bridge at the Tazlina River, about 110 miles north of Valdez.
- 56 ER1005-3 Revegetation programs were carried out during the early fall period, but much of this work remains to be accomplished next year. Some pipe insulation, hydrotesting, right-of-way revegetation and final cleanup will be carried over into the first half of 1977.
- 57 PS1088-8 During the period, progress was made on the construction of the pump stations. This is pump station one at Prudhoe Bay, where crude oil will begin its journey south through the trans Alaska pipeline, top-center.
- 58 PS5039-3 Total pump station construction was about 84 per cent complete in early November.
- 59 PS6043-3 Remaining exterior work was completed on the majority of facilities at the stations. Here, the crude oil topping unit at Pump Station 6, just south of the Yukon River, is being enclosed.
- 60 PS6045-5 Hydrotesting of piping was being conducted at the stations during the period.
- 61 PS6044-5 All exterior work at the stations is expected to be completed this year.
- 62 PS6045-20 The crude oil storage tanks have been painted and associated piping was insulated.

- 63 PS8092-1 Major emphasis on work activities has shifted indoors
- 64 PS8090-10 (64) where some of the current projects include installation
- 65 PS7021-12 of miscellaneous equipment, equipment testing,
- 66 PS7022-1 Control consoles were being installed at a number of the stations.
- 67 PS8091-16 Equipment check-out has been initiated on some of the systems in preparation for pipeline start-up.
- 68 PS5036-20 The eight stations required for the initial 1.2 million barrel per day operating capacity of the pipeline are scheduled to be completed in the late spring of 1977.
- 69 VT 3048-4 At the Valdez Terminal weather conditions also caused a shift of work indoors.
- 70 VT4022-9 Here in the Ballast Water Treatment area a membrane liner was installed in the impound basin. Piping and hydrotesting was completed in the Ballast Water area.
- 71 VT7057-1 Work progressed in both crude oil storage tank farms, including progress on the containment areas in the East Tank Farm and hydrotesting of tanks in the West Tank Farm.
- 72 VT4028-11 Heavy snowfall affected productivity of construction outdoors. Here, snow is being removed from the roof of one of the ballast water receiving tanks.
- 73 VT5091-1 Four mechanical loading arms were installed on Berth 4.
- 74 VT5087-19 The loading arms, made of mild steel pipe, will permit the loading of tankers without the use of flexible hoses.
- 75 VT5082-13 The arms, designed with swivel joints and counterweights, can be maneuvered into loading position on tankers either manually or hydraulically.

- 76 VT5081-14 On the three fixed berths, each 16-inch arm will handle 27,500 barrels of oil an hour. On the floating berth, each 12-inch arm will permit the loading of 20,000 barrels of oil an hour.
- 77 VT5104-2 In addition to the four loading arms, the operators building and the crane were installed on berth 4. On berth 5, work progressed on the piping; and on berth 3, trestle piers were being set.
- 78 VT5095-1 By early November, project manpower had decreased to 13,290 persons.
- 79 CA7015-4 A number of the pipeline construction camps were being closed down, as the construction phase of the trans Alaska pipeline neared completion.

80 PC1367-7A

Folder 4a

- 1 PC1404-1A This is a report of construction progress made on the the trans Alaska pipeline project through January, 1977.
- 2 PC1405-2 By the end of 1976, all the mainline pipe for the 800-mile pipeline was in place, and the pipeline portion of the project was more than 97 per cent complete.
- 3 PS6051-12 The project's pump stations were more than 90 per cent
- 4 VT3054-18 and the tanker terminal at Valdez was about 83 per cent.
- 5 PC1418-7A The physical progress for the total project was 92 per cent at the end of 1976.
- 6 PC2540-4A Completion of mainline pipe installation occurred in early December at Thompson Pass, about 20 miles northeast of Valdez.
- 7 PC2525-19 The final weld in the pass was made during October, but heavy snowfall made backfill operations difficult requiring constant snow removal from the pipe ditch.

- 8 PC2525-14 A number of techniques were used to clear the snow, including this giant heater at the bottom of the pass, which blew hot air up the pipe. Another method involved spraying hot water into the trench. Snowblowing and hand shoveling were also methods used.
- 9 PC2539-9 Backfilling was accomplished by Radmark machines blowing fill material into the pipe trench and by equipment supported on a cableway system. Here, a special heated plywood shelter is used over the ditch to keep snow from blowing back into the ditch.
- 10 PC2533-8 On the northern end of the pipeline in the Brooks Mountain Range, pipeline installation was completed through Atigun Pass in late November.
- 11 PC2531-12 For more than a mile through this remote pass, avalanche dangers and unstable soil conditions required special construction techniques to be used. About 6, 000 feet of the ditch was lined with a concrete base, and the pipe encased in an insulation box to keep the soil frozen when hot oil enters the line.
- 12 PC2527-15 With winter daylight hours being very brief, much of the work in Atigun took place under lights.
- 13 PC2545-5 As it did in Thompson Pass, blowing snow caused problems for the pipeline crews at Atigun. The snow had to be removed before the ditch could be backfilled.
- 14 PC2542-20 Pipe installation through Atigun pass was completed in late November.
- 15 PC2543-18 About 345-miles of the pipeline are buried. About 32-miles are installed below or above rivers.
- 16 PC1412-16 The remaining 422 miles are above ground. The last of the above ground pipe installation was completed in the northern section of the pipeline in early December.
- 17 PC1413-12 The elevated mode will keep the heat of the oil from penetrating the ground in areas where the

- permafrost, or permanently frozen ground, would be rendered unstable upon thawing.
- 18 PC1413-6 The pipe is installed in a shoe set on a cross beam supported by a pair of vertical supports, buried deep in the ground. The installation of more than 78,000 of the vertical support members was completed in October.
- 19 PC7183-5 A work pad made of snow, rather than gravel, was used to install the remaining five mile segment of above ground pipeline, just north of the Brooks Range.
- 20 PC7184-6 Snow-making machines, similar to those used at ski resorts, made the snow for the work pad. The snow was produced at Toolik construction camp, which has wintertime access to available water.
- 21 PC7184-3 The snow was trucked to the site where the pad was built and maintained. Pad construction took place at night, and the pipeline crews worked on the pad installing the line during the day.
- 22 PC1422-17 While all the 48-inch diameter pipeline is now in place, a number of tie-in welds remain to be completed before the pipeline is one continuous length. That will occur this spring when the final segment of pipe is hydrotested and the last tie-in weld is made.
- 23 PC4042-17 Insulation of the above ground pipeline continued during the early winter months.
- 24 PC4042-1 Installed by a specially-designed device called a manipulator, the insulation will keep the warm oil from getting too cold and sluggish should the system be shut down for a lengthy period during winter.
- 25 PC4043-5 Less than 40 miles of pipeline remain to be insulated during 1977. About 160 miles of pipeline remain to be hydrotested this year.
- 26 WI5006-18 This young bull moose was photographed just north of the Brooks Range, camped beneath an above ground section of the pipeline.

- 27 PC1409-13 With pipeline work almost completed, execution contractors MK-Rivers, Perini, PPCO, and Arctic constructors have completed work under their contract and have demobilized. Associated Greene has been awarded a contract to complete remaining construction along the 800 mile route pipeline.
- 28 VA1009-14 A total of 175 mainline valves – more per mile than any other pipeline, at pump stations and at the Valdez terminal.
- 29 PC1402-3 Sixty-two of the valves are remote gate valves, operated electronically from the operations control center at the Valdez terminal or from the closest pump station.
- 30 VA1009-18 The remote valves are operated by battery-powered electric motors housed in small buildings located along the pipeline right of way near the valve.
- 31 VA1011-14 Inside the building is a bank of 110 electrical cells, weighing about 10,000 pounds, which power the motors and the VHF radio equipment.
- 32 VA1010-3 Propane-fired turbo-generators keep the batteries charged.
- 33 VA1013-19 The valve motor control center and radio equipment are also housed in the building.
- 34 EQ1038-5 With the majority of work completed, construction equipment was being readied for sale as surplus. An estimated 20,000 units of equipment and facilities, plus spare parts, office supplies and other miscellaneous material is expected to be sold as surplus.
- 35 EQ6004-9 The first major sale of construction equipment is not expected until the third quarter of this year. The disposal of surplus goods is expected to continue over a two-year period.
- 36 CA1027-2 Pipeline construction camps are also being closed down. Here, kitchen utensils await storage at Atigun camp.

- 37 CA1027-19 Only six of the 19 pipeline camps remained open during the winter. The others were being "mothballed", heat, water and electricity shut off; fuel, water, sewer and fire protection system lines drained; water treatment plants shut down; and other similar activities carried out.
- 38 CA1027-7 When the camp mothballing is completed, the doors are locked, and security guards remain on duty protecting the facilities.
- 39 MS3021-3 The workforce began cutting back in late winter. From more than 21,000, the workforce decreased to about 6,000 in early January.
- 40 MS3021-3 The workforce is not expected to increase appreciably over 6,000 in early January.
- 41 PS7038-2 Pump station progress continued, with the five stations required for pipeline start-up expected to be completed in the first quarter of 1977.
- 42 PS6052-16 The additional three stations required for the pipeline's initial operating capacity of 1.2 million barrels per day are expected to be completed soon after.
- 43 PS8097-5 Exterior work was nearing completion at the pump stations,
- 44 PS7027-6 and most of the work activity was concentrated indoors, consisting primarily of doing finishing work on the instrumentation and electrical systems.
- 45 PS7023-12 Following are some of the activities under way at the stations during the reporting period. Here, Harmon Wilson of Kansas City, Mo., lower, and Billy Sanders of Atlanta, work on the coupling of a 24-inch diameter line.
- 46 PS3041-8 Frank Lundy, of Hillsdale, New Jersey, examines the control panel of the heating system for Pump Station 4.
- 47 PS3041-18 Richard Chapman from Lambertville, Mich., checks the fitting on one of the halon bottles, part of Pump 4's fire protection system.

- 48 PS3041-3 Electricians Jacques Pearce, left, of Atlanta, and Tom Gossard, Los Angeles, check the electrical components of a valve.
- 49 PS3042-5 Bill Hildebrand, of Atlanta, background, and Marvin Holland, of Burlington, West VA., terminate wires from the control panels.
- 50 PS7024-6 An electrician at Pump Station 9 checks the primary electrical switch gear, which is the primary power distribution system at the station.
- 51 PS3042-1 Engineer Maurice Low checks out a control panel at Pump Station 4.
- 52 PS3041-13 Flour Superintendent Ed C. Smith traces the oil flow of Pump Stations 4's control panel mimic flow diagram.
- 53 PS6049-15 Electricians at Pump Station 8 use a calibrating instrument to check out the control panel system. They are, from left, Kenneth Davis of San Francisco, Mark Feree of Anaheim, CA, and Donald Dugagua of Kake, AK.
- 54 VT6137-2 Construction progress at the Valdez terminal was about 83 per cent at the end of 1976.
- 55 VT6141-8 At the terminal's power plant/vapor recovery area, the major portion of the outside construction is complete.
- 56 VT6150-7 Control panels, electrical components and other instrumentation have been installed in the Facility.
- 57 VT6147-2 All major equipment and large diameter piping have been erected in the boiler and generator areas, and emphasis is being directed to the systems completion requirements for initial boiler commissioning.
- 58 VT3049-7 Three 12.5 megawatt, steam-driven turbine generators at the facility will produce electric power for the terminal.
- 59 VT6139-19 Components for the vapor recovery system will utilize flue gas from the power plant's boilers,

- “scrub” it, compress it, and inject it into the crude oil storage tanks to prevent hydrocarbons from entering the atmosphere and to reduced the danger of fire in the tanks.
- 60 VT3057-7 This view of the terminal was taken at night from the city of Valdez, which is across the port.
- 61 VT9058-5 Although more than 150 inches of snow have fallen so far this winter, moderate temperatures have permitted outside construction activities to continue at the terminal.
- 62 VT3054-10 The ballast water treatment area at the terminal was nearing completion at year’s end. This facility will cleanse the oily ballast from incoming tankers.
- 63 VT3054-5 A chemically aided air-floatation treatment process will be used to remove virtually all hydrocarbons from the ballast water before it is returned to the port.
- 64 VT4029-20 Here, the ballast water discharge line is being installed. It will discharge cleansed water into the port about 700 to 1050 feet offshore at a depth of 200-375 feet.
- 65 VT9050-6 During the reporting period, meters were delivered to the east metering and scraper trap building.
- 66 VT9051-2 By the end of the year, the metering units were set and the piping, electrical and instrumentation tie-ins were under way.
- 67 VT9065-12 Meter delivery for the west manifold area is scheduled for February.
- 68 VT5113-7 The mechanical crude oil loading arms were installed at Berth 4, which was more than 96 per cent complete at year’s end.
- 69 VT5112-12 Loading arm bases were being set for Berth 5, which was more than 75 per cent complete.
- 70 VGT5119-6 Berths 4 and 5 are required for initial operation of the pipeline in mid-1977.

- 71 VT5117-13 Two other Berths are not scheduled for completion until later in the year. These include Berth 1 – a floating Berth – which is being fabricated in Japan.
- 72 VT5109-8 And Berth 3, a fixed Berth similar to Berths 4 and 5.
- 73 VT5126-7 Trestle piers are being installed for Berth 3, and the roadway has been completed from shore to the second trestle pier.
- 74 VT5111-16 A fifth Berth (which would be numbered Berth 2) is designed for the system should pipeline capacity be increased to 2 million barrels per day.
- 75 VT5110-13 In November, the first vessel to Berth at the terminal docked at Berth 4.
- 76 VT5110-5 She was the 16,000 dead-weight ton freighter, the Toshin Maru, delivering steel from Japan for Berth No. 3.
- 77 VT5106-12 The ship had made a number of previous deliveries to Valdez, but had in the past offloaded its cargo at the Valdez City Dock, across the port.
- 78 VT5107-14 The 486-foot-long ship is about half the length of the tankers that will dock at the Berths.
- 79 PC1416-17 Later this year, oil tankers many times larger than the Japanese ship are expected to call at the terminal to take on crude oil from Prudhoe Bay, transported to Valdez by the Trans Alaska Pipeline.
- 80 PC1416-9A The End.

Folder 4b

- 1 PC1457-1A This is a report of construction progress made on the trans Alaska pipeline project through April, 1977.
- 2 PC1436-1A By the end of the first quarter, the overall project was 95 per cent complete.
- 3 PS6059-9 Most pump stations required for initial operating capacity of the pipeline were near mechanical

- readiness for mid-summer startup operations. The pump stations were 97 per cent complete...
- 4 VT5135-12 ...and the Valdez tanker terminal was about 87 per cent.
- 5 GL3064-1 Work began in January of the remaining 77 miles of the 147-mile fuel gas line between Prudhoe Bay and pump station 4, north of the Brooks Mountain range.
- 6 GL3066-1 The line was more than 60 per cent complete in early April. Here, a ditching machine cuts through the snow and frozen ground to make the ditch for the fuel line.
- 7 GL3068-1 Ditching is also accomplished with a rocsaw, which consists of a long chain arm with specially hardened teeth mounted on a D-9 caterpillar body. It resembles a giant chainsaw.
- 8 GL3066-19 Here, the depth of the ditch is measured. The ditch must meet specifications of four feet deep, 1-1/2 feet wide.
- 9 GL3070-11 Welding of the fuel line pipe is performed in the shelter of small portable shacks.
- 10 GL3071-2 Two pipe sizes are being used for the line – 8-inch and 10-inch diameter.
- 11 GL3072-17/8 In many areas, the fuel gas line closely parallels the 48-inch oil line. The fuel line will supply natural gas from Prudhoe Bay to power turbine generators at pump stations 1 through 4, and is expected to be ready for its first flow in early May.
- 12 GL3073-3/7 Here, crews are preparing to hydrotest the fuel line. Hydrotesting, or water pressure testing, is the pipe's final test before becoming operational.
- 13 PC2552-1 An obstacle the fuel line does not have to traverse is the 4,800-foot Atigun Pass in the Brooks Range, which is the highest elevation on the pipeline route.
- 14 PC2553-7 Although pipeline installation through the pass was completed last November, restoration work continued throughout the winter.

- 15 PC2553-5 Crews blasted drainage ditches and performed other rehabilitation activities to restore the area to its natural state.
- 16 PC4047-1 Other pipeline activity included insulation of pipe. About 36-miles of insulation were installed on above-ground portions of the line during the first quarter of 1977, completed that activity.
- 17 PC4049-8 Here, a crew installs an insulation module around the pipe at its supports.
- 18 PC4048-1 Manufactured in half-sections, the modules consist of four inches of polyurethane foam, laminated between layers of fiberglass reinforced plastic.
- 19 PC4050-6 Here, a module is being installed at one of many animal crossings along the pipeline route. At these locations, a minimum clearance of 10 feet is provided to insure passage of all animals.
- 20 PC3107-11 Hydrotesting of the 48-inch mainline was under way in pipeline sections 3 and 5 during the period. About 160-miles of pipe remain to be tested.
- 21 PC3103-15 Part of the hydrotesting procedure includes sending cylinder-shaped "pigs" through the pipe to perform a variety of functions such as cleaning, removing moisture, gauging for dents or ice accumulations, and for filling the pipe with water during the test.
- 22 PC3108-9 Here, a hydrotest crew drills through the six-foot-thick ice of the Yukon River, a chief water source for hydrotesting in pipeline section 3.
- 23 PC3099-5 Special heaters are used in cold weather to prevent hydrotest water from freezing. Pumps circulate warm water through the test section for a prescribed period prior to a test.
- 24 PC1440-16 Another activity that took place during the period was the testing of heat pipes. Almost 120,000 radiator-topped thermal devices, called heat pipes, are installed in vertical support members for much of the above ground portion of the pipeline. The heat pipes dissipate heat from the ground to insure

- pipeline support structures have a solid, permanently frozen base.
- 25 AC5006-5 A helicopter, equipped with video gear and infrared detection equipment, is used to monitor the operation of the heat pipes.
- 26 AC5026/24 An infrared sensitive lens mounted outside the helicopter "takes the temperature" of each heat pipe and transmits the reading to a video camera. The information is displayed on a video screen. The brighter the images appearing on the screen, the more heat is being radiated from the heat pipe. A mal-functioning heat pipe appears as a dark image.
- 27 SC1040-5 The pipeline project begins its fourth construction season this spring. Work began three years ago, in April, 1974.
- 28 PC1445-13 The four-foot diameter pipeline spans 800 miles from Prudhoe Bay to Valdez.
- 29 S-7004-1 It crosses three mountain ranges...
- 30 PC1441-1 ...hundreds of streams, requiring a number of various-sized bridge structures.
- 31 PC1443-19 More than 78,000 vertical supports were installed for the above-ground section of the pipeline...
- 32 PC1433-13 ...and more than 120,000 heat pipes were installed.
- 33 PC1467-5 An estimated 132 million man-hours went into the effort...
- 34 RC0059-1 ...which included construction of a 360-mile all-weather road from the Yukon River to Prudhoe Bay.
- 35 PC1436-12 A work force which peaked at more than 20,000 battled extremely cold weather during the winter of 1975-76.
- 36 PC1468 Workers were more fortunate during the winter of 1976, when most areas of Alaska experienced some of the mildest temperatures on record.

- 37 PC1472-14 The gradual wind-down of pipeline activities this past winter did not mark the completion of the project, however.
- 38 PC1470-1 Much work is still under way to complete the pump stations and tanker terminal facilities at Valdez.
- 39 PS6056/55 During the first quarter of 1977, flare stacks for topping plants were erected at pump stations 6, 8 and 10.
- 40 PS6055-56 The stacks are 100 feet high and weigh approximately 21 tons.
- 41 PS6055-19 Topping units are small refineries which will produce fuel to power gas turbine generators at the stations south of the Brooks Range.
- 42 PS6057-12 North of the Range, natural gas from Prudhoe will be used.
- 43 PS6060-13 Each pump station has three turbines, required for the 1.2 million barrel-per-day capacity of the pipeline. Two turbines will operate, and the third will be on standby.
- 44 PS6059-18 The 13,500 horsepower turbines are similar to those used in jet aircraft.
- 45 PS6060-18 Setting and alignment of all turbines is now complete.
- 46 PS3044-3 Final testing of the equipment is in progress, and all stations are preparing for start-up operations.
- 47 PS2063-15 Here, at the pump station 2 location, and at other stations not required for the 1.2 million barrel capacity of the pipeline, all remained quiet. These "pass through" stations, partially completed last fall, do not have facilities or pumping capabilities. They may be completed as working pump stations if at a future date the pipeline capacity is increased above the 1.2 million barrels per day.
- 48 VT6152-9 Work at the 1,000 acre Valdez tanker terminal remained steady throughout the first quarter of the year.

- 49 VT9068-7 By April, all five metering skids in the west metering building were installed. Instruments in this building still measure the amount of incoming crude oil.
- 50 VT4052-3 Facilities in the ballast water skimmer building were essentially complete. Oily ballast from tankers will be cleansed at this facility through a chemically aided, air floatation process.
- 51 VT4049-8 All instrumentation and systems for the ballast treatment plant are scheduled for completion in June.
- 52 VT6154-7 At the terminal power plant, the first of three boilers was installed for the power generation system. Each of the generation units will be capable of producing 12.5 megawatts of electrical power.
- 53 VT5137-11 Four sea berths will be used to dock oil tankers at Valdez. This is berth 3, which is about 50 per cent complete.
- 54 VT5139-2 Three of the berths will be stationary and supported by pilings driven deep into bedrock on the sea floor. The other will float, supported by 13 floatation buoys. Each of the berths will have equipment to contain spilled oil as well as fire contingency systems.
- 55 VT5138-6 Berth 4 is now complete and ready to receive its first oil tanker.
- 56 VT7064-9 Each oil storage tank at the terminal will have a 510,000 barrel capacity.
- 57 V-2012-13 Since 1969, intensive marine studies have been conducted in Valdez waters by scientists aboard the M/V Acona, an 85-foot ship specifically designed for oceanographic research. The vessel carries a steady crew of six and can accommodate up to eight scientists.
- 58 V-2016-6 Ken Turner has been skipper of the ship since 1966. The craft is being used in a multi-disciplined study that is the most comprehensive oceanographic research ever conducted in Prince William Sound Fjord.

- 59 V-2019-15/11 Here, a water sample is being drawn from the Valdez fjord. With this and other samples taken at varying depths, scientist are attempting to learn what effects hydrocarbons have upon photosynthesis of phytoplankton, the primary producers in the ocean.
- 60 V-2014-3 Researcher, Dr. Vera Alexander, inoculates water samples with varying concentrations of Prudhoe Bay crude oil to determine the ability and speed by which marine organisms assimilate various hydrocarbons.
- 61 V-2018-2 University of Alaska graduate student, Mike Schmidt, often acts as cruise leader aboard the Acone Company which is under contract to Alyeska Pipeline service.
- 62 EQ6011-7 A new activity now under way on the pipeline project.
- 63 EQ6010-9 With much of the construction work now completed, tons of equipment has been declared surplus, which means it will be sold, leased or rented by Alyeska.
- 64 EQ6011-14 Equipment is being marshaled to storage areas for final disposition and scenes such as these are common:
- 65 EQ6020-4 (Pause)
- 66 EQ6021-20 (Pause)
- 67 EQ6013-8 (Pause)
- 68 EQ6010-19 Valued at about \$800 million, more than 20,000 units of equipment and facilities is becoming available for sale as surplus.
- 69 EQ6005-1 Much of the heavy equipment used for the haul road and pipeline construction was moved north of the Yukon River by private contractors as early as 1969.
- 70 EQ6005-12 Continuous operation at sub-zero temperatures took its toll on the construction machinery.
- 71 EQ6022-19 (Pause)

- 72 EQ6012-11 (Pause)
- 73 CA1028-3 Also becoming available for surplus are the camps used to house workers during construction.
- 74 CA1029-1 Some of the camps are still in operation, supporting activities such as hydrotesting, restoration and fuel line construction. This is Chandalar camp in the Brooks Mountain Range.
- 75 CA9011-1 Workers in the remote camps still enjoy festivities and culinary masterpieces. This Luau was prepared for the residents at Happy Valley Camp on the North Slope.
- 76 WI6019-10 Other North Slope residents often sighted along the pipeline route include the red fox and caribou.
- 77 WI3046-4 (Pause)
- 78 WI3043-16 (Pause)
- 79 SC5015-1 It has been nine years since North America's largest crude oil reserve was discovered at Prudhoe Bay.
- 80 CM2032-2 In less than four months, the first barrels of that oil will be flowing southward.

Folder 5 [photographs] P1-P56.

1. Selection of the pipeline's route and terminus at Valdez was made after careful consideration of terrain, soil condition and environmental factors.
2. This is the partially cleared site of the marine tanker terminal for the trans Alaska pipeline as it appeared in late 1970 during the project's pre-construction period.
3. The tanker Enco Gloucester performed a series of anchoring tests in the Port of Valdez and Prince William Sound in 1971 for Alyeska Pipeline Service Company, the firm building the trans Alaska pipeline. Oil tankers like this will be monitored through a traffic control center located at the Valdez terminal as they enter and leave the port.

4. Large C-130 Hercules aircraft hauled vital supplies to remote locations along the trans Alaska pipeline route during the project's pre-construction mobilization. This "Herc" is shown at an ice strip on Galbraith Lake during the early spring of 1974.
5. Construction equipment and supplies move north over a winter trail in Anaktuvuk Pass in March 1974 as part of the mobilization for construction of the 360-mile Yukon River to Prudhoe Bay highway.
6. Convoys of construction equipment moved to remote camp sites by way of winter trails in early 1974 during early mobilization for the pipeline project and prior to completion of the pipeline haul road between Prudhoe Bay and the Yukon River. The 360-mile-long road was completed late that same year.
7. Exposed permafrost along the route of the trans Alaska oil pipeline is examined by a geologist employed by the line's builders. Permafrost is defined as "unconsolidated deposits or bedrock that continuously have had a temperature below zero degrees Centigrade for two years or more." In areas where the permafrost is "ice-rich," the pipeline is elevated to avoid thawing the ground and thus losing support for the pipe.
8. This sign located at Prospect Creek pipeline construction camp suggests something of the climatic rigors associated with pipeline construction in Alaska. Prospect, one of seven original project camps constructed in the winter of 1969-1970 holds the record for the lowest temperature ever recorded in the United States - minus 80 degrees Fahrenheit in 1971. The camp is about 80 miles north of the Yukon River.
9. A representative of Alyeska Pipeline Service Company, builders of the trans Alaska pipeline, inspects some of the 239 miles of 48-inch diameter pipe which was stored at the Fairbanks pipe yard prior to start of construction of the project.

10. The first shipment of 48-inch-diameter pipe for the trans Alaska pipeline project arrived in Valdez in mid-September, 1969. A total of 419 miles of forty-foot joints of pipe was offloaded at the Valdez city dock for transfer to a pipe storage yard in Valdez, where the pipe remained until government approval of the project was secured in 1974. Visible in the center background, is the Valdez marine terminal for the pipeline, which was partially cleared in 1970.
11. The Valdez pipe storage yard for the trans Alaska pipeline project as it appeared in the fall of 1971. In the center, background, is the then partially cleared site for the pipeline's marine tanker terminal.
12. Forty-eight-inch-diameter pipe for the trans Alaska pipeline was originally stored at the pipe yards here at Prudhoe Bay, and at Fairbanks and Valdez. Beginning in 1971, nearly 165 miles of 40-foot and 60-foot joints of pipe filled the Prudhoe Bay yard, awaiting transfer to field staging sites.
13. One of the first link-ups of the 360-mile Prudhoe Bay to Yukon River highway occurred when construction crews working from the north and south met at this site on the tundra between Prudhoe Bay and Franklin Bluffs construction camp. A total of 32 million cubic yards of gravel were required to build the road.
14. Some of the most difficult terrain on the trans Alaska pipeline project is in the Atigun Pass area. During construction of the road from Prudhoe Bay to the Yukon River, crews used large drills to bore holes for blasting operations atop the 4,800-foot-high pass.
15. Road building equipment climbs a slope north of the Yukon River (visible in background), near Five Mile camp on the first day of construction of the trans Alaska pipeline project, April 29, 1974.
16. Long arctic summer days assisted construction of the 360-mile pipeline construction road from Prudhoe Bay to the Yukon River. This photo taken shortly before midnight in mid-June 1974, is of

earth-moving equipment near Galbraith Lake camp, about 140 miles north of the Arctic Circle.

17. Two-story dormitories, similar to these at Pump Station 1 at Prudhoe Bay, were erected as living quarters for construction workers at nine pump station sites along the 800-mile route of the trans Alaska pipeline.
18. A Hercules C-130 aircraft, modified to haul fuel, transfers its 7,000-gallon load to a fuel tank farm at Happy Valley construction camp for the trans Alaska pipeline, north of the Brooks Range.
19. A tug boat pulls two barges laden with supplies off the Arctic Coast to their destination at Prudhoe Bay oil field on Alaska's north slope. This view of the Beaufort Sea in mid-summer shows large ice floes already beginning to accumulate.
20. Galbraith Lake pipeline construction camp, one of seven original camps built for the trans Alaska pipeline project in the winter of 1969-1970, is located in the northern foothills of the Brooks Mountain Range.
21. Prior to construction of the Yukon River Bridge, two air-cushion transporters were used to ferry supply trucks for the trans Alaska pipeline across the Yukon. The crafts were supported on a cushion of air and were pulled across by cables.
22. Atigun construction camp for the trans Alaska pipeline, completed in 1974, is three miles north of the continental divide in the Brooks Mountain Range.
23. A pickup truck heads south past rolling tundra toward the Brooks Mountain Range on a portion of the 360-mile all-weather highway constructed north of the Yukon River for the trans Alaska pipeline project.
24. The final link-up of the 360-mile Yukon River to Prudhoe Bay haul road took place on September 27, 1974, at the South Fork of the Koyukuk River, about 100 miles north of the Yukon. The road is being

used to transport equipment and supplies for construction of the trans Alaska pipeline.

25. This ditching operation just south of Prudhoe Bay was for a buried section of the trans Alaska pipeline. About half of the 800-mile-long pipeline is buried.
26. Workers prepare a joint of 48-inch-diameter pipe for a tie-in of a buried section of the trans Alaska pipeline. About half of the 800-mile-long pipeline is being buried in ditches 8 to 16 feet deep.
27. Above ground sections of the trans Alaska pipeline are secured in a shoe-and-saddle assembly, which allows the pipe to slide on the crossbeam as the line expands due to temperature changes.
28. A section of pipe for the trans Alaska pipeline receives a layer of protective tape coating before being lowered into a ditch for burial. The tape protects the pipe from corrosion.
29. A panel of fibrous glass insulation is installed on an above ground section of the trans Alaska pipeline, about 90 miles north of Valdez. The 15 feet by 24 feet insulation panels are handled by a specially designed "manipulator" which uses suction cups to lift the panel, and then wraps the panel around the pipe.
30. Double-joints of pipe for the northern section of the trans Alaska pipeline were transported on rail cars to Fairbanks.
31. Welders begin first "passes" around 48-inch pipe for the trans Alaska pipeline. Joined sections of pipe were later buried in ditch. About half of the pipeline is buried.
32. A workman on the trans Alaska pipeline signals to sideboom tractor operator to line up suspended section of pipe for welding.
33. This section of pipe for the trans Alaska pipeline was bent to conform to the contour of the pipe ditch, north of Valdez, and then lowered into the ditch by

- sideboom tractors for welding to the pipe section at lower right.
34. A worker grinds a weld at a double-jointing plant for the trans Alaska pipeline, at Valdez, Alaska. At this facility and at another in Fairbanks, 41,000 pairs of 40-foot pipe were welded into 80-foot lengths.
35. Double-joints of pipe, 80 feet long, were stacked at material sites along the pipeline route and later trucked to the pipeline workpad for field welding and installation on the trans Alaska pipeline.
36. Below-ground sections of the trans Alaska pipeline are buried in trenches 8 to 16 feet deep and compacted with select material before being buried. About half the pipeline is below ground.
37. This aerial view of Pump Station 1 of the trans Alaska pipeline, at Prudhoe Bay, shows the station's two 210,000 barrel oil storage tanks, right, and site development and construction of permanent buildings. The pump station temporary camp facilities are at left.
38. Prior to construction of the Yukon River Bridge, ice bridges were built across the river in winter to permit trucking operations for the trans Alaska pipeline.
39. The above-ground portions of the trans Alaska pipeline rest on pipe supports. The pipe is fitted to a pipe shoe, which is supported on a horizontal cross beam between vertical support members.
40. This above-ground section of the trans Alaska pipeline crosses the Tatalina River valley about 15 miles south of Livengood, Alaska. The zig-zag pattern of the pipeline allows for expansion and contraction of the pipe during temperature changes.
41. The ice-free port of Valdez, site of the trans Alaska pipeline terminal, is on Prince William Sound. The city of Valdez is at left in photo; the partly completed pipeline terminal is at right.

42. Hydroseeding was used to spread a mixture of water, grass seed, and mulch over a work area to prevent erosion during and after construction of the trans Alaska pipeline. This work was done near the pipeline's Pump Station 12.
43. This crossing at the Tonsina River in the spring of 1975 was the first installation of pipe for the trans Alaska pipeline. The pipe was weighted with concrete anchors for burial below the river bed.
44. The pipeline installation at the Tonsina River in 1975 was the first of some 30 miles of river crossings along the 800-mile-long trans Alaska pipeline.
45. A crane is used to hoist workers into position to fit pipe shoes around pipe for the trans Alaska pipeline. About half of the 800-mile-long trans Alaska pipeline will be above ground.
46. The trans Alaska pipeline is served by a communications system using remote microwave installations such as this one on a peak north of Valdez, Alaska. Helicopters were used extensively in construction of the towers.
47. One of 62 mainline block valves for the trans Alaska pipeline is installed south of Fairbanks. The valves control the flow of oil and can be operated manually or electronically.
48. Welders add filler "beads" of hot metal at joints of pipe for the trans Alaska pipeline north of Valdez.
49. Concrete anchors are used to weight pipe being buried for the trans Alaska pipeline in a water-filled ditch north of Valdez. Sideboom tractors suspend the pipe while the weights are placed.
50. This Sagavanirktok River crossing of the trans Alaska pipeline was carried out at night about 90 miles south of Prudhoe Bay. The concrete-coated pipe, buoyed by floats, was pulled on rollers into the water-filled pipe ditch. Floats were later removed, and pipe covered in the ditch.

51. Layers of polystyrene insulation are placed atop the frozen tundra and then covered with gravel for the work pad for the trans Alaska pipeline. The insulation reduced the amount of gravel needed for the workpad.
52. The work pad for the trans Alaska pipeline is constructed across the frozen tundra of the North Slope. Polystyrene insulation placed beneath the pad reduced the amount of gravel required. The workpad was later used to support the equipment installing the pipeline.
53. Archaeologists from the University of Alaska hunt for artifacts near the trans Alaska pipeline construction workpad north of the Yukon River. Most of the artifacts recovered consisted of stone tools and projectile points.
54. A Sikorsky Skycrane helicopter ferries part of a bulldozer into the Keystone Canyon area where the trans Alaska pipeline crosses atop the ridges and avoids the scenic canyon area. The airlift placed equipment on the ridges to build a pioneer trail for pipeline construction crews.
55. Completed section of trans Alaska pipeline crosses a spruce forest near Glennallen, Alaska. Radial fins atop vertical members of pipe supports are part of heat pipes which maintain permafrost in a frozen condition.
56. Strings of pipe for the trans Alaska pipeline are welded and readied for taping and burial north of the Yukon River. Sections of pipe were bent to conform to the contours of the pipe ditches.

Folder 6 [photographs] 6-1 to 6-71.

- 1 An above ground section of the trans Alaska pipeline zigzags north across the flat, snow swept plains of the North slope, about 50 miles south of Prudhoe Bay. The sigzag configuration of the pipeline will convert thermal expansion of the steel pipe into a sideways movement of the pipeline.

2. Three cranes are used to lift a boiler stack – the length of a football field – into position at the Valdez terminal of the Trans Alaska pipeline. The stack, weighting 408 tons, is 21-1/2 feet in diameter at the base.
3. Crossbars and cradles were added to this bulldozer so it could carry two 80-foot sections of the 48-inch diameter pipe up the steep, narrow work roads in Keystone Canyon. The canyon, about 18 miles east of Valdez, is one of the most challenging sections along the 800-mile route of the trans Alaska pipeline.
4. A 300-foot-high boiler stack towers above other facilities at the Valdez terminal of the trans Alaska pipeline. The stack is part of the terminal's power plant.
5. An 80-foot-long section of 4-foot-diameter pipe is loaded onto a bulldozer, which has been modified to carry two sections of pipe. The blade and ripper were removed from the dozer and the cradles added so the vehicle could carry the pipe up the steep slopes of Keystone Canyon, one of the most challenging sections along the trans Alaska pipeline route.
6. A bulldozer, modified to carry sections of 4-foot-diameter pipe, crawls up a narrow road to the top of Keystone Canyon, about 18 miles east of Valdez. The three-mile canyon is one of the more challenging engineering and construction areas along the 800-mile-long trans Alaska pipeline route.
7. Four-foot diameter pipe for the trans Alaska pipeline is welded and installed on the 2,300-foot-long Yukon River bridge. The bridge, opened to pipeline construction traffic in October, 1975, was built by the State of Alaska and partially financed by Alyeska Pipeline Service Company, the firm responsible for the design, construction and operation of the pipeline.
8. Sections of 48-inch diameter pipe are lowered onto a pipeway along the side of a bridge across the Yukon River. The pipe was later welded and installed in the shoe assemblies, foreground. The pipeline, being

built by Alyeska Pipeline Service Company, is scheduled to begin operation in mid-1977.

9. Welders join sections of pipe for the trans Alaska pipeline in the Chugach Mountains, just north of Valdez. The pipeline is supposed to begin operation in mid-1977.
10. Welders begin one of the weld passes to join two pieces of 48-inch-diameter pipe for the trans Alaska pipeline. Six weld passes or more are made for each joint of pipe welded.
11. A section of the trans Alaska pipeline is lowered with a shoe assembly on above ground pipe supports. More than half of the 800-mile-long pipeline is elevated in areas of ice-rich permafrost.
12. A section of 48-inch-diameter pipe for the trans Alaska pipeline is lowered onto the pipeway of the Yukon River bridge, where the pipe was welded and installed in supports.
13. Holes are drilled for blasting in Atigun Pass of the Brooks Mountain Range. The pass at 4,800 feet is the highest elevation along the 800-mile route of the trans Alaska pipeline.
14. A section of the trans Alaska pipeline is lowered into a ditch in the Brooks Mountain Range, about 175 miles south of Prudhoe Bay. The pipeline project is scheduled for completion in mid-1977.
15. Pipe for the trans Alaska pipeline is lowered into a ditch near the Atigun Pass of the Brooks Mountain Range. The pipeline is scheduled for completion in mid-1977.
16. Pamela Lekanof
17. Peter Angaiak
18. Morris Lemen Jr.
19. Joanne Gottbreht

20. A section of the trans Alaska pipeline in a mountainous area near Keystone Canyon, about 18 miles east of Valdez. The pipeline is scheduled to begin operation in mid-1977.
21. Communications for the trans Alaska pipeline are provided by microwave stations near Delta, Alaska. A total of 41 microwave stations, along with a satellite system as backup, make up the backbone communications system for the pipeline. The system, installed by RCA Alaska Communications, Inc., was accepted recently by Alyeska Pipeline Service Company.
22. A concrete slab is poured into a ditch in the Atigun Pass of the Brooks Mountain Range. The slab will be part of an insulation box through which the four-foot diameter trans Alaska pipeline will be installed. The insulation is required because of the ice-rich permafrost soils in the area.
23. The trans Alaska pipeline is buried atop the east wall of Keystone Canyon, a fourjj-mile long stretch in the Chugach Mouintain Range, about 15 miles north of Valdez. The pipeline is scheduled to begin operations in mid-1977.
24. The trans Alaska pipeline is buried atop the east wall of Keystone Canyon, a fourjj-mile long stretch in the Chugach Mouintain Range, about 15 miles north of Valdez. The pipeline is scheduled to begin operations in mid-1977.
25. The trans Alaska pipeline is buried atop the east wall of Keystone Canyon, a fourjj-mile long stretch in the Chugach Mouintain Range, about 15 miles north of Valdez. The pipeline is scheduled to begin operations in mid-1977.
26. Explosive charges are set for ditching down the steep slope of Thompson Pass, about 25 miles north of Valdez. The trans Alaska pipeline was to be installed down this slope during October.
27. The four-foot diameter trans Alaska pipeline is installed in a ditch down the steep south slope of Keystone Canyon, about 15 miles north of Valdez.

By late September, 1976, most of the 800-mile-long pipeline had been installed and the project was on schedule to begin operation in mid-1977.

28. The four-foot diameter trans Alaska pipeline is installed in Atigun Pass of the Brooks Mountain Range, about 170 miles south of Prudhoe ay. At 4,800 feet elevation, the pass is the highest point along the 800-mile pipeline.
29. A portion of the 800-mile trans Alaska pipeline is installed near the Valdez Terminal. By late September almost all of the pipeline had been installed, and the project was on schedule to bein operation in mid-1977.
30. 1. A hydraulic bending machine is used to bend an 80-foot section of pipe for the trans Alaska pipeline.
31. 2. Sideboom tractors carry the 80-foot section of pipe along the Lowe River on the south of Keystone Canyon, about 15 miles north of Valdez.
32. 3. The section of pipe is then lowered into the ditch, where it will be welded to the section of pipe already installed. Pipe is bent to conform to the contour of the ditch bottom.
33. Clutching a "stabilizing" line, a worker climbs the steep slopes at Thompson Pass. Slopes at angles of 45 degrees make unassisted climbing difficult.
34. Elevated cable systems were used to lift pipe for the trans Alaska pipeline to the precipitous slopes of Thompson Pass. In the Chugach Mountains, about 20 miles northeast of Valdez. Here, completed pipeline is visible in the lower portion of the photograph, and an 80-foot joint of pipe is being lifted on one fo the cable systems to be joined to the line as the completed pipeline is extended upward. Drainage control dikes are visible in the lower pipeline ditch. At lower left, a bulldozer pushes earth into the ditch to bury the completed portion of the line.
35. A section of 48-inch diameter pipe rests atop the first "bench" at Thompson Pass. Because of the steep

incline, the 80-foot joints of pipe weighing between 20,000 and 38,000 pounds had to be winched up the mountain on elevated cable systems.

36. At Thompson Pass, installation of 48-inch diameter pipe for the trans Alaska pipeline is down the hard way – but the only way. At the bottom of the severe slope is the Richardson Highway, center, left. From the road, the slope rises vertically about 1800 feet.
37. Extreme grades at Thompson Pass necessitated the erection of two cable ways to move pipe and equipment to locations where they were needed. Here a worker motions instructions to the cable operator as an 80-foot length of pipe takes an aerial ride down the face of the slope.
38. Severe grades and limited access necessitated the erection of a cable system to move pipe and equipment up and down the section of the trans Alaska pipeline over Thompson Pass. From the Richardson Highway below to the tower at the top is an 1800-foot rise in elevation.
39. Construction of the Thompson Pass section of the trans Alaska pipeline system nears completion. By mid-October, all ditch excavation and welding were completed. Testing is expected to be finished by the beginning of November.
40. The cableways of Thompson Pass on the trans Alaska pipeline have working capacities of 12 tons. Here an 80-foot section of pipe, weighing about 250 pounds per linear foot, is slowly inserted into position.
41. Suspended by cable above its craggy destination, a segment of four foot diameter pipe for the trans Alaska pipeline is lowered into a bedrock trench at Thompson Pass.
42. Crews prepare the alignment of a segment of pipe at Thompson Pass. The operator of the cable system maneuvers the pipe into place by maintaining radio contact with workers at the ditch. A special concrete mixture will be used in this ditch to backfill the pipe.

43. Members of a pipe gang “fly” to their work sites aboard the cable system at Thompson Pass. The huge clamps, dangling in mid-air, normally are tightly wrapped around 80-foot long sections of mainline pipe.
- 44/ Pipeline welders complete the “tie-in” the final weld, for the Thompson Pass section of the trans Alaska pipeline project. One of the most difficult stretches of terrain on the 800-mile pipeline, Thompson Pass,, at 2500 feet, is the third highest elevation along the pipeline’s route.
45. Workers fight snow, cold and mountainous terrain to align two sections of 48-inch diameter pipe on the steep slopes at Thompson Pass on the trans Alaska pipeline project.
46. Snow-covered mountains of the Chugach Rangte loom in the background of Thompson Pass, where a cable tram was set up to haul materials and pipe up the 2,500-foot slope. At places, the pipeline rises at a 45-degree angle at Thompson Pass, near the southernmost section of the 800-mile trans Alaska pipeline.
47. A section of 48-inch pipe, pre-bent and pre-coated, awaits backfilling near Thompson Pass, about 20 miles northeast of Valdez. Blowing snow which filled the ditch had to be removed before the backfilling could begin. On extreme grades, a special concrete mixture was used to backfill the pipe.
48. Night or day, work on the 3,700-foot long Thompson Pass section of the trans Alaska pipeline was slow and difficult. Night shift crews used powerful portable generators, airlifted to the site, to illuminate the work area.
49. One of the most difficult construction segments on the trans Alaska pipeline project is at Atigun Pass in the Brooks Mountain Range. In the foreground a trio of sideboom tractors lowers in a section of 48-inch diameter pipe at the north end of the pass.
50. A cage of fabricated metal tubing protects workers as they spread concrete grout in a special pipe ditch

section at Atigun Pass on the trans Alaska pipeline project. The cages were constructed because crews working the ditch otherwise would be vulnerable to falling rocks from the steep slopes in the area.

51. A special grout is used to surround and seal mainline pipe in an insulated box at Atigun Pass on the trans Alaska pipeline project. The insulation is 21 inches thick on both sides of the pipe, which leaves about three inches of clearance on either side of the pipe to be filled with the grout.
52. A unique method of construction is employed at Atigun Pass for the trans Alaska pipeline project. Because of soil conditions in two short sections at the north and south ends of the pass, mainline pipe is being encased in an insulated box atop a concrete slab.
53. When the trans Alaska pipeline is operational, crude oil will flow up and over this slope in the Chugach Mountains on its way to Valdez. At up-hill sections along the pipeline, 80 check valves are installed to limit any potential spill. These mechanical valves close automatically in the event of a pressure loss in the line upstream of the valve, thereby preventing the flow of oil in the wrong direction. Link up into the pipeline of the check valve at center awaits installation of a short section of 48-inch diameter pipe.
54. A remote gate valve and an elevated section of the trans Alaska pipeline dwarf the man at right. A small building, shown here at the rear, is co-located with each of the 62 remote gate valves on the 800-mile pipeline. It houses the power system and electronic communications equipment for the valve's operation.
55. Battery powered remote gate valves on the trans Alaska pipeline can be operated electronically from the system's operations control center at Valdez or from the closest pump station. The 62 remote gate valves control the flow of crude oil in the pipeline in either direction.

56. Shimmering lights on Port Valdez reflect the constant activity at the 1000 acre terminal of the trans Alaska pipeline. The 800-mile pipeline from Prudhoe Bay to Valdez is scheduled to begin operations in mid-1977.
57. To date, wildlife have shown no qualms about crossing under above-ground sections of the trans Alaska pipeline. This young bull moose was camped under the pipeline just north of the Brooks Mountain Range.
58. Work continues well into the night at the tanker terminal of the trans Alaska pipeline at Valdez. The power plant, center, will supply electrical power to the 1,000 acre facility. The vapor recovery system, foreground, will supply and distribute inert flue gas to blanket the space above the crude oil in the half-million barrel capacity storage tanks.
59. Artifacts, some dating back 10,500 years, were found along the trans Alaska pipeline. As many as 76 archaeologists at one time were working to preserve remnants of earlier civilizations before pipeline construction crews began work. They labored in mosquito-swarm days of summer as well as the dark, sub-zero days of winter.
60. The backbone communications system for the trans Alaska pipeline will be 28 microwave repeater sites. The line-of-site stations will furnish voice communications from Prudhoe Bay to Valdez and will be part of the mechanical operation of the pump stations and remote gate valves.
61. Archaeologists from the University of Alaska and Alaska Methodist University sift through the remains of ancient civilizations along the trans Alaska pipeline. Over a period of five years, more than 300 sites were excavated yielding more than a half million stone flakes and artifacts.
62. Winter and summer, archaeologists from the University of Alaska and Alaska Methodist University worked to excavate sites along the trans Alaska pipeline, previously identified as likely to contain remains of prehistoric cultural groups. Where work continued in the winter, archaeologists

used propane gas-fired heaters and 55-gallon drums to soften the permafrost. About two inches of soil could be thawed in 45 minutes.

63. This large tractor-mounted chain saw with a blade 15 feet long, is used to dig the ditch for 147 mile-long natural gas fuel pipeline for the pump stations on the trans Alaska pipeline north of the Brooks Mountain Range.
64. Welding of 10-inch-diameter sections for the 147-mile natural gas fuel line between Prudhoe Bay and Pump Station 4, north of the Brooks Mountain Range, takes place in small, temporary shelters, seen in the background.
65. **No caption with photograph.**
66. **No caption with photograph.**
67. About 250 craft, contractor and management personnel gathered Monday, May 30, 1977, to witness the completion of the last weld made by a construction crew for the trans Alaska pipeline. More than 100,000 field and machine welds were required for the 800-mile pipeline.
68. Welders complete the final weld for the trans Alaska pipeline. The weld was made Monday, May 30, 1977, at a site near Pump Station 3 on Alaska's North Slope. The first oil is expected to enter the pipeline by July 1, 1977.
69. **No caption with photograph.**
70. Pump Station 8 fire, July 20, 1977.
71. Pump Station 8 fire, July 20, 1977.