CHEFORNAK

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HOUSE BILL 689 - 1980 PROPOSITION B

PRELIMINARY ENGINEERING ANALYSIS

SANITATION FACILITY CONSTRUCTION

CHEFORNAK, ALASKA

PREPARED BY

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ANCHORAGE - BETHEL - JUNEAU

DECEMBER, 1980

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LOCATION

The City of Chefornak lies on the south bank of the Kinia River, approximately 98 air miles southwest of Bethel. The community is located within the Clarence Rhode National Wildlife Refuge, which was established for the protection of migratory waterfowl.

The topography is fairly flat, with only slight variations in local relief within the immediate village site. A few extinct volcanoes, such as Kinia Mountain and Tern Mountain, lie within a few miles of the village, and are clearly visible during favorable weather conditions.

The village stretches from east to west, bounded on the east by the Bureau of Indian Affairs (BIA) elementary school, on the north by the river, and on the west by the Lower Kuskokwim School District (LKSD) high school. The airstrip for the village lies to the southwest of the LKSD high school site. It is approximately ½ mile between the LKSD and BIA school sites.

CLIMATE

Chefornak is located within the transitional climatic zone.

The weather may change rapidly with marine influences dominant in local weather patterns. Rain, drizzle, clouds and fog are common, particularly in the late summer and fall.

Since there is no weather reporting station in Chefornak, precise data on temperature, wind and precipitation are not available. Because of the village's proximity to both Bethel and Nunivak Island, and because there are no major geographical barriers within the Delta region, it can be assumed long term weather trends are similar to those of the two aforementioned sites. Climatic data summary for Bethel and Nunivak Island are presented in Appendix A.

Flood hazards within the village are rated as low, although a combination of strong on-shore winds and high tides may cause some flooding in low lying areas near the BIA school, and at the far west end of the community, near the bulk fuel storage tanks.

Erosion is not considered a major problem in Chefornak. Some riverbank erosion does occur near the BIA school site, primarily due to stream undercutting and ice jamming.

POPULATION

The following population data would support local assertions that the village is growing on a long term basis.

Year	Population	Source
1950	106	U.S. Census

1960	133	"
1970	146	"
1978	192	State Revenue Sharing
1979	204	"
1980	225	"

The local population for the purpose of SFY 81 revenue sharing is estimated at 236 people, who occupy approximately 43 dwellings.

While there are seasonal fluctuations in the local population, these fluctuations are minor. During the summer it can be expected that local people are engaged in subsistence and commercial fishing activities, but absence from the village is for short periods of time. Modern methods of transportation have decreased the necessity to remain away from the village for long periods of time in order to secure subsistence food for the winter.

GOVERNMENT

Chefornak was incorporated as a Second Class City within an unorganized burough in 1974, and is governed by a mayor/council government. Council members are elected at large by the voting population. As of this writing the council members are: David Jimmy (Mayor), Joe Avugiak (Vice-Mayor), Walter Lewis (Secretary), Jobe Abraham (Treasurer), David Panruk, John Jimmy, and John Erik.

ECONOMY

The individual economy in Chefornak is based primarily on subsistence hunting and fishing activities, as there are few

opportunities for employment. Local city officials estimate there are approximately 23 part time or full time positions open for employment, which are filled by local residents. Examples of these positions are teacher's aides or maintenance personnel for both BIA and LKSD, health aide, city administrator, postmaster, and agents for Bethel based air carriers.

The municipal economy is dependent primarily on state and federal revenue sharing, Comprehensive Employment and Training Act (CETA) funds, and various small grants which are obtained from time to time from the state or federal government. In addition, a 2% sales tax is levied on goods and services sold within the city. These funds are used to provide municipal services to the general population.

VILLAGE FACILITIES

In addition to the BIA elementary school and LKSD high school previously mentioned, local facilities include a National Guard armory, health clinic, city office, village corporation office, community center (including the post office), generator building, and a Public Health Service (PHS) constructed watering point. At the time of this writing there are three stores which have been operating for some time, and a fourth which is just beginning retail operations.

Local officials have stated that both short term and long term lodging are generally available, but it is advisable that any arrangements for long term lodging be coordinated with the city council in advance of arrival in the community.

UTILITIES

Electrical power for the community is currently produced by generators located in an old generator building at the west edge of the village. Electricity is produced by either a 40 KW KATO generator, or a 30 KW Lima generator, both of which are diesel fired, and sold to local residents at a cost of $45 for the first 100 KWH/month. The City has recently obtained a new 75 KW Lima generator (also diesel fired) which is housed in a new generator building adjacent to the existing generator building. When a new overhead distribution system is completed, the new 75 KW generator will be placed on line to provide community electricity.

Electrical power for both the BIA school and LKSD school are generated on-site. The BIA generation system provides power for only the elementary school, attendant structures, teacher quarters and the community watering point; while the LKSD generation system provides power for only the high school. Bulk fuel storage for both the BIA and LKSD schools are also located on-site, near power generation equipment.

Fuel sales for community residents are handled by Chefornrmute, Inc., the local village corporation. Approximately 17,000 gallons of heating fuel, and approximately 8,500 gallons of gasoline, is stored in bulk tanks at the far west edge of the village near the river. This fuel and gas is sold to local residents at an approximate cost of $73/drum for heating fuel and $95/drum for gasoline. The city also has approximately

10,000 gallons of diesel fuel stored at the bulk storage area, with this fuel dedicated for the community generators.

The village may be contacted by telephone at 787-8001. The only village phone is located in the city office and is attended between 8:00AM and 10:00PM Monday through Friday. Weekend phone traffic is limited to emergency situations. Messages into the village can be relayed through BIA Bethel agency or on KYUK radio station in Bethel.

CONSTRUCTION CONSIDERATIONS

There are no known natural resources, such as gravel or coarse sand, which can be obtained near the community. There are many boulders of volcanic origin and varying size within the village site and nearby, but these are of no value for construction of sanitation improvements.

Chefornak lies in an area of known permafrost, and it is anticipated that permafrost would be encountered at depths varying from 1 foot to 10 feet below the ground surface. Based on a review of existing well logs permafrost would likely continue to a depth of between 85 feet and 100 feet. The active frost layer and top portion of the permafrost regime is primarily composed of fine grained, poorly drained soils. At depth permanently frozen lava rock may be encountered. Because of the fine grained soil in the active layer, the potential for frost heave is high.

Surface drainage within the immediate village site is quite good, with drainage primarily to the south and southwest edges of the village site. Minor seasonal ponding of surface water should pose no problems to construction of sanitation improvements. Care should be taken in the transportation of construction materials and/or heavy equipment within the immediate village site, since any disturbance of the tundra overburden will likely lead to degradation of permafrost, and subsequent surficial drainage problems.

The only two pieces of heavy equipment within the village at the present time are a Case 450 dozer and a Fiat Allis road grader, both placed within the community for the purpose of maintaining the airstrip. Neither piece of equipment is generally available for other projects, but the Dept. of Transportation & Public Facilities should be contacted to explore possible use.

A local labor force is generally available within the community, with the highest skill levels in carpentry. Local officials have indicated that a work force for the construction of sanitation improvements would be available, providing the size of the expected labor force is known in advance.

TRANSPORTATION

There are two basic modes of transportation for construction materials into Chefornak. For heavy equipment and large quantities of construction materials, it is best to ship into the

village by barge. Utilizing barge service allows materials to be procured in Seattle, usually at a cost savings, and then shipped into Bethel. Seattle based surface carriers include Alaska Cargo Line, Pacific Alaska Line, Foss Alaska Line and Northland Marine. Prices for shipment of various commodities vary from carrier to carrier, and from year to year. Upon reaching Bethel, freight is transferred to United Transportation for final delivery to Chefornak. A drawback to barge transportation is the fact that carriers, especially United Transportation, must be contacted early in the year to insure delivery, since the transportation company controls priorities. A second possibility, if the weight of materials warrants, is to arrange a charter with United Transportation well in advance of anticipated delivery to Bethel. While generally more expensive than shipping on scheduled runs, delivery of materials is more certain. Typical prices for delivery to Chefornak on scheduled barges range from $12-$16/100 pounds for lumber, to $50-$60/100 pounds for insulation.

For smaller amounts of construction materials, and to cover material shortages, it is attractive to ship air freight into Chefornak. Both Wien Air Alaska and Sea Airmotive have scheduled flights from Anchorage to Bethel, with connecting flights into Chefornak. The cost of air freight shipment is approximately $44-$52/100 pounds from Anchorage. While higher in cost than surface transportation, the advantage of air freight shipment is that coordination and completion of smaller projects is greatly enhanced.

Chefornak has an airstrip which is approximately 1600 feet long. Originally constructed of local silt, the airstrip was overlain with a gravel cap in 1979, and is now in excellent condition regardless of the season. The length of the airstrip allows the landing of aircraft such as a Twin Otter, Sky Van, Accosa, Caribou or Beaver, as well as smaller aircraft. Depending on the weight and bulk of materials and the aircraft selected, a payload ranging between 2000 pounds and 7000 pounds can be delivered to Chefornak.

As mentioned previously, Chefornak can be reached via Bethel by scheduled flights on either Wien Air Alaska or Sea Airmotive. Additionally, charter flights originating in Bethel are available by various air taxi services such as Sea Airmotive, Executive Charter Service, Chugiak Aviation and Delaire Charter Service.

Local transportation within the village is primarily by boat or snowmachine depending on the season. Pedestrian traffic is facilitated by a boardwalk which runs through the community, connecting the BIA school site with the LKSD school site.

EXISTING SANITATION FACILITIES

As with the electrical generation systems in Chefornak, there are three seperate sets of sanitation facilities. The recently completed LKSD high school provides both water supply and wastewater treatment on-site. The water source is a drilled well, and while no water quality analysis has been reviewed, it is

known that the well is subject to salt water encroachment during high tides. Wastewater treatment for the LKSD high school is provided by an above ground lagoon constructed of treated lumber.

The BIA elementary school also has on-site water supply and wastewater treatment. The water source for the BIA school is also a drilled well, which was installed in the mid 1960's. Water quality from this well is fairly good, meeting parameters established by the Alaska Drinking Water Standards, with the exception of TFR which is variable and may exceed 500 mg/l on occasion. It has been reported that color of the water fluctuates during the year, and that a salty taste is more noticeable during wind blown high tides. Wastewater treatment for the BIA school is provided by a Bio-Pure package extended aeration treatment plant, with effluent discharged to the river upstream of the village site.

Water for community residents is provided by a watering point constructed by the Public Health Service in 1964. The water source is a drilled well, which normally produces water meeting drinking water standards. Iron, TFR and color does fluctuate during the year. A small wood frame enclosure was constructed around the well and houses two small wood stave storage tanks. During the past several summers the community has taken the initiative to install a copper service line running from the watering point to approximately the center of the village, where a dispensing point is used to shorten the distance residents have to carry water. As fall approaches, use of the summer line

is discontinued, and residents again obtain their water from the water point structure. Water is produced from the well using a jet pump which discharges to either the summer line or the wood stave tanks. The pump runs continuously, with excess water injected back down the well. Currently no water treatment, including disinfection, is utilized.

Wastewater disposal for community residents is handled on an individual basis. Although PHS constructed pit privies at the same time the watering point was constructed, these have filled, fallen into disrepair, and are largely abandoned. Residents now dump honey buckets on the riverbank or in small lakes located south of the village. During the winter snowmachines can be used to remove human waste a greater distance from the village.

Once again on their own initiative, the community has established a solid waste site, used primarily for non-combustibles, at the south end of airstrip. During the summer, residents segregate combustibles from non-combustibles and store non-combustibles for transport to the solid waste site when snowmachines can be used. Combustibles are burned within the village. During the winter, all solid waste is hauled to the disposal site, with combustibles being burned on the ice.

PLANNED CAPITAL IMPROVEMENTS

The only known plans for capital improvements which will impact possible HB 689 sanitation improvements, is the possibility of construction of Dept. of Housing and Urban Development (HUD)

housing in Chefornak. The Bethel based AVCP Housing Authority currently has plans for construction of up to 15 units of HUD funded housing, probably during the summer of 1982 if funding is obtained. Local officials believe that between 13 and 15 units of new housing are required, in addition to the renovation of 17 ASHA houses constructed under the Bartlett Act.

MARIAN KNIGHT
PROGRAM RESERVATIONS BY MARCH 15

Since preliminary planning for HUD housing has only begun at the time of this writing, potential site plans have not yet been developed. It is anticipated that new housing would be located on a ridge to the south of the LKSD school site, between the high school and the airstrip.

COMMUNITY SANITATION PRIORITIES

On the evening of September 22, 1980, and again on the evening of October 28, 1980, meetings were held with the elected members of the Chefornak City Council. The first meeting was held to familiarize city officials with the provisions of HB 689. At that time, the council expressed an interest in discussing sanitation priorities with all Chefornak residents before setting priorities.

At the second meeting, the Chefornak City Council established the following priorities for the construction of sanitation improvements.

1) Reconstruction of the existing watering point structure and erection of new water storage tanks, and the construction of a village wide summer only distribution

system incorporating several dispensing points for water dispensing.

2) Honey bucket dumping bunkers at the south edge of the village, with new boardwalks connecting the existing boardwalk system to the sewage bunkers.

3) Purchase of a tracked solid waste collection vehicle to enhance collection and disposal of solid waste during the summer.

4) Construction of a fence around the designated solid waste disposal site.

RECOMMENDED SANITATION IMPROVEMENTS

It is recommended that all of the sanitation priorities established above be funded by Village Safe Water under the provisions of HB 689. An estimate of the capital construction cost is included at the end of this report as Table 1, while a proposed time schedule for the project is included as Table 2. General recommendations concerning this project are as follows.

1) The VSW staff should prepare a scope of work for the project by no later than March 1, 1981. The scope of work is to be used as a guideline of the work involved for the entity which is ultimately responsible for project management, be that entity from the public or private sector.

2) Considering the scope of the project, it is suggested all materials, with the exception of the solid waste collection vehicle, be consolidated in Anchorage for shipment to Chefornak by air. Although the cost of

materials may be slightly higher than if purchased in Seattle, the difference in total project cost will be negligible. The freight cost will be higher, but the difference in cost over surface transportation will be offset by more timely construction. Since the total time frame for construction is envisioned to be quite short, non-arrival of construction materials would be costly in itself. The solid waste collection vehicle can be purchased in the Lower 48 and barged into Chefornak.

3) Although several chemical water quality analyses have been reviewed, most of these are out dated. It is recommended the VSW staff arrange for a minimum of two analyses prior to project design. At least one of these analyses should include testing for heavy metals. It is further recommended sanitation improvements include provisions for chlorination and fluoridation as minimum water treatment.

4) As the community will have an operable electrical system which is capable of providing power for the watering point, the electrical system for the watering point should be tied into the community power system. A representative of facilities management of the BIA Bethel agency has stated this arrangement would be much more preferable than the existing arrangement, whereby electricity is obtained from the BIA school. It may still be possible to obtain standby power from BIA at some nominal cost to the village. Standby power would protect the community water supply in the event

of catastrophic loss of the village power system. Since no formal arrangement now exists between Chefornak and BIA, VSW should pursue the acquisition of standby power on behalf of the community with the Superintendent of the Bethel agency.

5) While no site plan has yet been developed for a potential HUD funded housing project, there are prospects for such a project. The VSW staff should work with the community and AVCP Housing Authority to insure the project is designed to serve both existing and planned housing. (The capital construction cost estimate has included materials for extending the summer distribution system to the anticipated housing area.)

Should AOEC Project be developed until Houses are built, or Perhaps concurrently UNDERTAKEN ?

OPERATION & MAINTENANCE

While the capital cost for construction of sanitation improvements is eligible for a VSW grant, continuing operation and maintenance costs for facilities are to be borne by the residents of Chefornak. The estimated costs of operating and maintaining those improvements desired by the community are included at the end of this report as Table 3.

ENERGY CONSIDERATIONS

Because of soaring costs for heating fuel and electricity in the past two years, energy saving techniques should be employed during the construction of sanitation improvements whenever practical. In Chefornak, there are two possible methods for

energy conservation.

The first method is heat recovery from existing electrical generation systems. The only source close enough to the watering point to warrant any consideration is the BIA school. Considering the capital cost of heat recovery equipment vs. heating demands for recommended improvements, it is not believed the cost/benefit ratio is good, and no detailed analysis has been conducted. In the event more elaborate facilities were planned, such as a community laundry facility, this alternative should be considered in depth.

The second method of energy conservation which may have merit is wind power generation. Again, because of limited electrical demand, this alternative was not given detailed analysis, although the VSW staff may wish to explore the possibility of resistance heating for the water point structure using wind power.

TABLE 1

CONSTRUCTION COST ESTIMATE

SANITATION IMPROVEMENTS

CHEFORNAK, ALASKA

A.	Reconstruct Water Point Structure	
	1) Building Materials (11,520#) - 320 sq.ft.	$ 5,760
	2) Water Pressure Equipment (500#)	1,900
	3) Plumbing (1,000#)	3,000
	4) Electrical Equipment (850#)	1,500
	5) Bolted Water Storage Tank (1,500#) - 4,700 gal.	5,875
B.	Summer Water Distribution Line	
	1) Driscopipe HDPE 7600 (2,250#) - 4,500 ln.ft.	7,200
	2) Installation Equipment (750#)	4,800
	3) Dispensing Point Materials (4,800#) -- 16 ea.	2,200
C.	Sewage Bunkers	
	1) Construction Materials (29,400#) - 14 ea.	15,540
D.	Bunker Access Boardwalks	
	1) Construction Materials (25,200#) - 1,200 ln.ft.	11,700
E.	Solid Waste Control	
	1) Tracked Vehicle & Trailer (3,200#)	17,000
	2) Chain Link Fencing (10,360#) - 1,400 ln.ft.	14,000
	3) Bulk Fuel Tank (840#) - 1,000 gal.	400
	4) Gasoline (6,500#) - 1,000 gal.	1,500
F.	Freight	
	1) 98,670# @ 52¢/lb	51,308
G.	Local Labor	
	1) 238 Mandays @ $140/Manday	33,320
H.	Employer Overhead (25% Labor)	
	1) 238 Mandays @ $35/Manday	8,330
I.	Construction Supervision	
	1) 50 Mandays @ $350/Manday	17,500
	Subtotal	202,833
	Design & CM @ 20%	40,566
	Subtotal	243,399
	Contingency @ 7½%	18,255
	Total	261,654

ESTIMATED PROJECT COST = $262,000

TABLE 2

PROPOSED CONSTRUCTION SCHEDULE (1)

Grant Agreement	March 1, 1981
Design Contract	March 15
Design Field Trip	March 30
Project Design	April 1-30
Purchase Materials	May 1-20
Design Review & Approval	May 15
Consolidate Materials	May 21-30
Transport Materials	June 10
Begin Construction	June 15
End Construction	July 31
Final Inspection	August 1
O&M Manual	September 15
Final Report & Audit	October 30

(1) Assumes construction to proceed independent of any other HB 689 project.

TABLE 3

ESTIMATED ANNUAL O&M COST (1)

A.	Water Supply		
	1) Electric Heating, 3500 KWH @ 45¢/KHW (2)	$1,575	(3)
	2) Pump Electricity, 1200 KWH @ 45¢/KWH (4)	540	(3)
	3) Lighting Electricity, 150 KWH @ 45¢/KWH	67.50	(3)
	4) Labor, 365 Hours @ $8/Hour	2,920	(5)
	5) Chemicals	200	
B.	Human Waste Disposal	0	
C.	Solid Waste Disposal		
	1) Gasoline, (1.2 GPH) (16 hours/Week) (26 Weeks) ($1.70/Gallon)	850	
	2) Labor, 416 Hours @ $8/Hour	3,328	
	3) Parts, Etc.	500	
	TOTAL =	$9,980.50	(6)

(1) Annual cost will rise with inflation.
(2) Based on heating index with average inside temperature of 65° F, in actual practice inside temperature is only required to stay above freezing.
(3) Based on current cost to residents, since the community will already be operating generators there are no increases in operating costs other than negligible increase in fuel consumption; thus incremental electrical cost less than estimated.
(4) Based on water comsumption of 5 GPCD.
(5) Already provided by community to operate existing facilities; thus no increase in existing cost.
(6) Does not include capitalization of equipment.

APPENDIX A

Meteorological Data For The Current Year

Station:. BETHEL, ALASKA
26615 — BETHEL AIRPORT — Standard time used: ALASKAN — Latitude: 60° 47' N — Longitude 161° 48' W — Elevation (ground): 125 feet — Year: 1979

Month	Temperature °F: Averages: Daily maximum	Daily minimum	Monthly	Extremes: Highest	Date	Lowest	Date	Degree days Base 65 °F: Heating	Cooling	Precipitation in inches: Water equivalent: Total	Greatest in 24 hrs.	Date	Snow, ice pellets: Total	Greatest in 24 hrs.	Date	Relative humidity, pct.: Hour 02 (Local time)	Hour 08	Hour 14	Hour 20	Wind: Resultant: Direction	Speed m.p.h.	Average speed m.p.h.	Fastest mile: Speed m.p.h.	Direction	Date	Percent of possible sunshine	Average sky cover, tenths, sunrise to sunset	Number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility ¼ mile or less	Temperature °F: Maximum (b): 90° and above	32° and below	Minimum: 32° and below	0° and below	Average station pressure mb: Elev. 150 feet m.s.l.
JAN	26.9	15.7	21.3	38	12	-9	26	1347	0	0.78	0.27	30-31	6.3	2.0	20	78	79	80	80	09	8.3	15.9	54	18	13		7.6	4	4	23	16	1	0	6	0	21	29	4	997.3
FEB	.8	-10.7	-5.0	15	26	-18	10	1962	0	0.10	0.09	1-2	1.0	0.9	1-2	52	54	49	52	02	18.8	19.5	49	04	1		1.8	23	1	4	3	0	0	0	0	28	28	27	1013.9
MAR	23.6	12.6	18.1	41	30	-8	5	1447	0	0.58	0.41	20-21	1.8	0.9	20	74	75	69	75	04	9.9	17.6	39	03	3		6.6	8	5	18	8	0	0	2	0	17	31	9	1001.4
APR	37.4	25.6	31.5	51	30	10	15	998	0	3.89	0.94	19-20	5.2	1.4	3-4	90	87	77	83	14	6.9	16.6	44	15	26		8.0	4	5	21	16	2	0	1	0	4	24	0	1005.8
MAY	53.6	34.9	44.3	70	28	28	8	634	0	0.33	0.08	4-5	T	T	11	91	81	56	67	06	3.2	11.5	28	20	29		7.3	2	11	18	7	0	0	6	1	0	10	0	1002.7
JUN	59.9	41.2	47.8	71	1	32	26	508	0	2.63	0.71	5	0.0	0.0	.	94	87	76	79	20	8.5	14.2	37	21	10		8.6	2	4	24	17	0	0	1	1	0	1	0	1008.5
JUL	60.6	46.6	53.6	74	14	40	7	345	0	2.14	0.76	5	0.0	0.0		91	86	67	70	25	9.4	11.3	35	19	5		8.0	6	3	22	12	0	0	3	5	0	0	0	1010.5
AUG	59.9	46.8	53.1	76	22	41	31	361	0	2.34	0.48	11-12	0.0	0.0		98	94	77	85	17	6.3	12.0	35	16	19		9.5	0	1	30	19	0	0	6	2	0	0	0	1004.7
SEP	52.5	37.0	44.8	72	10	25	24	600	0	1.25	0.46	18-19	0.0	0.0		92	91	65	83	05	3.8	13.6	32	28	23		7.1	5	10	15	13	0	0	1	1	1	6	0	998.6
OCT	39.8	28.2	34.0	56	1	12	28	952	0	0.96	0.16	8	1.7	1.1	29-30	93	93	80	89	05	5.5	11.8	29	05	8		8.7	2	3	26	14	0	0	6	0	9	19	0	991.5
NOV	30.2	20.3	25.3	41	8	3	24	1186	0	3.31	0.81	14-15	10.3	2.5	12-13	92	91	90	91	16	5.0	15.2	48	24	15		8.7	2	4	24	17	5	0	5	0	15	28	0	993.2
DEC	3.2	-6.8	-1.8	32	9	-25	29	2073	0	1.22	0.35	9	12.7	3.4	9	64	66	66	63	36	5.4	16.3	52	16	3		9.4	15	6	10	12	5	0	1	0	31	31	22	1002.4
YEAR	36.9	24.3	30.6	76	AUG 22	-25	DEC 29	12413	0	19.53	0.94	APR 19-20	39.0	3.4	DEC 9	84	82	71	76	07	2.8	14.6	54	18	JAN 13		7.2	73	57	235	154	13	0	38	10	126	209	62	1002.5

Normals, Means, And Extremes

Month	Temperatures °F: Normal: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	Normal Degree days Base 65 °F: Heating	Cooling	Precipitation in inches: Water equivalent: Normal	Maximum monthly	Year	Minimum monthly	Year	Maximum in 24 hrs.	Year	Snow, ice pellets: Maximum monthly	Year	Maximum in 24 hrs.	Year	Relative humidity pct.: Hour 02 (Local time)	Hour 08	Hour 14	Hour 20	Wind: Mean speed m.p.h.	Prevailing direction	Fastest mile: Speed m.p.h.	Direction	Year	Pct. of possible sunshine	Mean sky cover, tenths, sunrise to sunset	Mean number of days: Sunrise to sunset: Clear	Partly cloudy	Cloudy	Precipitation .01 inch or more	Snow, ice pellets 1.0 inch or more	Thunderstorms	Heavy fog, visibility ¼ mile or less	Temperatures °F: Max. (b): 90° and above	32° and below	Min.: 32° and below	0° and below	Average station pressure mb: Elev. 150 feet m.s.l.
(a)				21		21					21		21		21		21		21		21	21	21	21																	
J	12.3	-2.2	5.1	48	1963	-46	1973	1857	0	0.54	2.35	1963	0.06	1966	0.69	1963	13.5	1969	5.7	1973	76	76	75	76	14.1	NE	54	18	1979		6.5	9	6	16	8	2	0	4	0	25	30	17	1000.9
F	15.6	-.5	8.2	46	1970	-37	1976	1590	0	0.74	2.12	1959	0.03	1972	0.77	1959	18.1	1959	6.5	1959	74	74	72	74	15.1	NNE	62	16	1951		6.1	9	4	15	7	2	0	4	0	23	28	15	1001.0
M	20.3	2.5	11.4	46	1976	-39	1964	1662	0	0.79	1.56	1963	0.02	1960	0.55	1974	18.0	1974	8.2	1974	78	77	74	78	13.7	NNE	49	19	1977		5.9	11	5	15	9	2	0	4	0	24	31	15	1001.
A	32.7	16.3	24.5	55	1978	-22	1964	1215	0	0.43	3.89	1979	0.06	1969	0.94	1979	14.3	1975	4.7	1975	85	84	75	82	13.4	NW	44	15	1979		7.0	6	6	18	10	3	0	5	0	15	27	6	1004.
M	48.5	31.7	40.1	79	1969	9	1965	772	0	0.83	1.46	1962	0.10	1967	0.53	1973	6.2	1971	5.0	1973	89	82	69	73	11.7	S	41	18	1960		7.7	3	8	20	10	1	•	5	•	2	18	0	1002..
J	60.2	43.0	51.6	86	1959	28	1962	402	0	1.24	3.32	1963	0.25	1974	1.00	1963	2.2	1963	1.2	1963	90	82	62	68	11.7	NW	43	19	1978		8.2	2	6	22	12	•	•	3	4	0	1	0	1007.4
J	61.9	47.4	54.7	83	1972	31	1959	319	0	1.98	3.84	1961	0.66	1964	1.22	1966	T	1974	T	1974	92	85	66	72	11.2	SSW	40	19	1974		8.4	2	6	23	15	0	1	4	5	0	•	0	1008.0
A	58.5	46.0	52.3	84	1977	33	1960	394	0	3.97	5.81	1963	0.99	1976	1.38	1969	0.0		0.0		94	91	73	81	11.2	SSW	46	22	1978		8.8	2	3	26	17	0	0	6	3	0	0	0	1006.5
S	51.8	36.2	45.0	72	1979	18	1970	600	0	2.42	3.58	1960	0.42	1968	2.02	1971	1.4	1962	1.4	1962	92	92	70	84	11.6	SSW	55	18	1960		8.2	2	5	23	15	•	•	5	•	•	5	0	1001.1
O	36.1	24.3	30.2	56	1979	-5	1963	1079	0	1.32	2.51	1972	0.11	1965	1.55	1974	12.8	1978	5.3	1964	86	89	77	86	12.6	NNE	46	16	1961		8.0	4	5	22	13	2	0	5	0	12	26	1	996.0
N	23.6	10.8	17.2	45	1970	-22	1971	1434	0	0.96	3.31	1979	0.04	1969	1.31	1978	15.3	1960	5.6	1973	82	82	80	82	13.5	NE	60	16	1958		7.4	6	4	20	12	3	0	5	0	21	29	7	999.8
D	11.3	-2.5	4.4	45	1963	-37	1975	1879	0	0.62	2.58	1971	0.11	1973	1.34	1970	19.1	1978	5.7	1970	75	75	75	75	14.0	NNE	58	17	1977		6.6	9	4	18	11	3	0	5	0	24	31	17	997.8
YR	36.1	21.3	28.7	86	JUN 1959	-46	JAN 1973	13203	0	15.84	5.81	AUG 1963	0.02	MAR 1960	2.02	SEP 1971	19.1	DEC 1978	8.2	MAR 1974	85	82	72	78	12.8	NNE	62	16	FEB 1951		7.4	65	60	240	140	17	2	55	12	147	227	77	1002.3

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows: Highest temperature 90 in June 1926; minimum temperature -52 in January 1947; maximum monthly precipitation 12.37 in August 1951; minimum monthly precipitation T in December 1935 and earlier; maximum monthly snowfall 57.4 in January 1952; maximum snowfall in 24 hours 18.7 in January 1952; maximum precipitation in 24 hours 2.40 in August 1951.

(a) Length of record, years, through the current year unless otherwise noted, based on January data.
(b) 70° and above at Alaskan stations.
• Less than one half.
T Trace.

NORMALS - Based on record for the 1941-1970 period.
DATE OF AN EXTREME - The most recent in cases of multiple occurrence.
PREVAILING WIND DIRECTION - Record through 1963.
WIND DIRECTION - Numerals indicate tens of degrees clockwise from true north. 00 indicates calm.
FASTEST MILE WIND - Speed is fastest observed 1-minute value when the direction is in tens of degrees.

Average Temperature

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
#1940	11.9	11.3	11.4	39.8	46.7	55.8	53.8	53.0	49.2	30.5	23.0	8.0	32.4
1941	-3.5	16.6	15.2	31.9	40.7	55.4	53.3	55.0	46.6	32.8	15.2	12.6	31.0
#1942	21.6	21.3	10.2	33.6	42.5	51.6	53.7	53.0	48.8	30.2	13.2	-9.0	30.9
1943	-4.2	12.9	17.2	25.9	41.3	55.4	55.1	51.0	42.4	34.0	20.4	2.4	29.4
1944	0.6	18.6	9.7	25.8	40.9	53.2	57.0	52.0	45.0	32.4	13.6	13.4	30.2
1945	21.4	16.2	6.4	23.8	36.2	51.6	56.3	51.8	45.9	30.2	8.1	6.4	29.6
1946	15.1	1.2	-3.6	22.2	39.2	50.8	56.6	51.2	45.8	36.4	14.4	0.6	27.4
1947	-10.0	14.3	3.8	29.2	42.2	53.0	52.9	51.6	41.8	29.0	21.5	10.0	28.3
1948	4.6	6.2	13.9	25.9	40.8	52.5	51.4	50.4	42.0	28.6	10.1	4.6	27.6
1949	6.5	1.2	19.0	18.1	33.8	47.2	54.6	51.2	47.7	33.6	25.4	6.4	28.7
1950	13.1	-3.7	21.0	26.1	38.2	48.7	56.3	56.1	46.3	34.0	17.5	8.9	30.2
1951	-3.6	12.2	0.7	29.7	44.5	53.2	53.8	52.8	45.2	30.8	21.4	10.9	29.3
1952	2.3	5.5	12.4	18.0	34.2	50.1	54.2	52.3	44.3	34.5	25.8	2.2	28.0
1953	0.2	7.4	2.1	28.5	44.4	54.3	59.0	53.3	45.0	28.5	16.8	8.5	29.0
1954	-6.5	-9.0	16.0	27.5	45.9	53.9	54.2	51.8	45.1	35.4	22.6	-5.0	27.7
1955	14.5	0.2	13.6	18.1	39.4	45.6	53.8	51.2	45.0	26.9	14.7	6.0	27.4
1956	-4.3	-0.1	7.2	21.1	41.2	51.5	56.5	54.8	48.4	26.6	4.6	-6.4	24.8
1957	16.8	8.4	17.0	33.2	44.3	57.8	55.9	55.0	45.8	36.3	25.9	-3.7	32.7
#1958	2.0	13.2	25.0	32.2	39.3	52.1	55.7	51.8	43.7	28.5	17.8	8.2	30.8
1959	3.3	20.6	-2.7	18.3	42.1	51.4	50.5	54.4	44.9	28.0	21.4	-7.6	27.1
1960	7.0	12.5	8.5	10.9	43.3	50.2	56.6	50.1	42.4	28.9	16.6	19.2	28.8
1961	11.1	-5.1	3.6	20.8	43.3	47.8	51.2	52.0	45.5	26.2	18.9	-5.1	25.9
1962	-0.8	19.2	15.2	23.4	36.2	50.2	54.1	52.7	41.9	30.5	13.8	2.8	28.7
1963	19.6	11.0	15.1	19.4	40.6	47.1	54.2	49.5	48.4	25.1	2.8	15.0	29.0
1964	4.9	-1.2	3.1	19.5	31.0	52.5	56.6	52.1	47.2	31.9	11.9	-3.0	25.5
1965	-0.4	-4.6	26.0	26.5	32.6	48.6	51.6	50.2	46.1	29.2	22.6	2.2	27.3
1966	5.4	12.5	-3.1	23.0	33.2	51.8	53.2	51.6	45.8	26.2	20.9	3.2	27.0
1967	7.4	9.6	20.7	30.9	42.5	54.0	53.6	54.3	45.3	27.4	22.4	10.0	31.5
1968	11.2	4.1	13.2	23.1	41.6	52.3	57.9	53.8	42.1	29.2	18.6	8.9	29.0
1969	9.1	7.7	17.2	27.1	45.5	52.4	53.7	49.0	47.6	35.1	9.5	12.4	30.4
1970	-11.7	16.4	18.7	22.3	43.3	51.9	51.6	50.7	41.3	25.7	27.5	5.4	28.6
1971	-6.3	-1.5	-0.3	17.0	35.2	50.0	52.8	51.9	44.1	30.8	14.9	12.9	25.2
1972	2.3	0.0	-2.2	14.4	37.2	48.6	57.8	55.4	43.7	34.8	18.1	4.6	26.6
1973	-4.3	8.7	6.0	25.3	39.8	49.8	53.3	51.0	45.4	30.2	20.5	9.0	27.9
1974	6.2	-7.1	15.0	26.9	45.3	51.4	54.7	56.4	49.4	26.2	10.9	-3.9	27.8
1975	-1.5	0.8	10.3	20.4	39.7	49.5	56.6	54.3	42.8	30.0	7.0	3.1	26.1
1976	0.4	-7.4	6.3	17.2	37.6	49.5	54.8	54.2	44.9	30.1	17.6	4.7	26.0
1977	21.7	18.7	4.7	13.8	35.5	52.6	56.1	58.6	47.5	28.9	10.9	11.0	30.0
1978	19.0	12.7	13.9	30.5	44.0	45.1	54.0	55.3	44.6	27.6	24.0	21.5	32.7
1979	21.3	-5.0	18.1	31.5	44.3	47.8	53.6	53.1	44.8	34.0	25.3	-2.4	30.6
RECORD													
MEAN	6.1	7.2	10.9	25.0	40.3	51.7	54.6	52.7	45.2	30.6	17.1	6.1	29.0
MAX	13.4	14.7	19.6	33.4	48.9	60.7	62.3	59.5	52.2	36.7	23.5	13.0	36.5
MIN	-1.2	-0.4	2.1	16.5	31.6	42.6	46.9	45.9	38.1	24.4	10.6	-0.9	21.4

Heating Degree Days

BETHEL, AK

Season	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Total
1959-60	442	321	597	1139	1304	2255	1800	1520	1747	1618	667	438	13848
1960-61	266	456	671	1109	1442	1413	1667	1965	1901	1319	666	510	13385
1961-62	421	396	580	1195	1375	2176	2039	1278	1540	1240	885	449	13574
1962-63	186	374	646	1064	1533	1931	1404	1507	1543	1363	751	533	12875
1963-64	330	472	492	1231	1868	1541	1859	1920	1919	1361	1047	368	14408
1964-65	254	394	525	1020	1589	2108	2033	1952	1203	1198	997	486	13709
1965-66	408	453	570	1254	1264	1944	1842	1465	2109	1253	979	389	13858
1966-67	365	408	569	1195	1318	1914	1783	1546	1366	1015	692	321	12492
1967-68	354	325	584	1160	1273	1707	1662	1767	1403	1250	721	377	12783
1968-69	221	343	681	1102	1385	1906	1729	1605	1475	1131	600	372	12630
1969-70	343	466	515	921	1660	1626	2383	1355	1430	1272	663	386	13040
1970-71	408	437	707	1210	1118	1848	2210	1863	2022	1430	917	443	14613
1971-72	374	398	621	1050	1500	1611	1947	1883	2068	1516	856	486	14330
1972-73	228	293	632	929	1399	1721	2149	1576	1829	1182	775	447	13160
1973-74	355	425	581	1072	1329	1734	1824	2023	1549	1079	603	399	12973
1974-75	314	258	460	1197	1619	2139	2060	1796	1695	1332	778	456	14108
1975-76	255	324	658	1078	1741	1917	1996	2102	1821	1427	843	459	14621
1976-77	309	328	598	1075	1414	1808	1335	1291	1869	1533	906	383	12829
1977-78	269	199	520	1112	1619	1673	1921	1963	1577	1026	695	590	12114
1978-79	334	293	655	1151	1223	1338	1347	1962	1947	998	634	508	11840
1979-80	345	361	600	952	1186	2073							

Cooling Degree Days

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
1969	0	0	0	0	1	1	0	0	0	0	0	0	2
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	17	1	0	0	0	0	18
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	3	0	0	0	0	0	3
1975	0	0	0	0	0	0	1	0	0	0	0	0	1
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	8	0	0	0	0	0	8
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0

Precipitation

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
#1940	0.21	0.02	0.10	0.42	0.85	1.17	2.65	3.03	3.31	1.15	2.41	0.87	16.19
1941	0.03	0.47	0.46	0.22	1.78	1.36	2.32	2.80	3.50	1.67	2.23	0.58	17.44
#1942	0.35	1.18	0.69	1.18	1.58	1.35	1.95	4.72	4.12	1.82	1.24	0.31	20.49
1943	0.42	2.05	2.35	0.08	1.32	0.87	2.16	5.00	1.73	1.71	0.20	1.07	18.96
1944	0.39	3.98	1.45	0.60	2.50	0.91	2.53	8.34	1.04	2.09	1.09	0.82	25.70
1945	0.30	1.58	0.91	0.13	1.16	0.64	2.09	4.73	2.36	3.05	1.88	0.41	19.20
1946	0.82	0.45	0.50	0.93	1.09	1.13	1.94	3.07	1.23	3.24	0.65	1.27	16.52
1947	2.10	0.34	0.14	0.13	0.83	2.36	2.23	2.60	1.52	0.95	1.32	0.83	15.35
1948	0.59	0.21	2.43	1.04	0.89	1.67	2.90	3.14	3.08	1.20	0.77	1.59	19.51
1949	1.14	1.22	2.09	0.50	0.61	0.67	1.01	4.42	2.80	2.79	1.22	1.95	20.42
1950	1.03	0.23	0.53	0.64	0.70	2.48	2.25	2.54	3.45	1.64	0.99	0.52	17.00
1951	0.77	3.61	3.09	1.04	2.25	2.01	2.65	12.37	3.47	1.83	1.50	6.17	40.76
1952	6.48	2.25	2.37	1.01	1.76	1.33	3.61	3.08	1.90	1.42	0.77	0.54	26.52
1953	0.13	0.99	0.35	0.16	0.62	0.37	1.33	4.94	1.61	0.29	1.09	0.83	12.71
1954	0.27	0.32	2.00	0.18	0.02	0.69	1.40	3.88	5.21	1.07	0.87	1.28	17.19
1955	1.24	1.12	1.28	1.11	0.76	1.68	3.95	4.36	2.54	1.07	0.81	0.36	20.28
1956	1.02	2.06	0.77	0.77	0.73	0.30	1.76	2.77	3.13	1.21	0.32	0.05	14.89
1957	2.12	0.47	0.86	0.44	1.43	0.73	0.49	3.95	2.18	1.07	1.02	0.33	15.09
#1958	0.20	0.26	0.93	0.28	0.93	2.74	2.28	3.38	3.32	0.99	1.04	0.19	16.54
1959	0.23	2.12	0.41	0.46	0.61	0.85	1.35	4.94	2.36	0.73	1.03	0.59	16.08
1960	0.82	0.23	0.02	0.74	0.88	1.36	3.23	3.96	3.58	1.27	1.42	1.46	18.97
1961	0.08	0.18	0.44	1.10	0.57	1.16	3.44	2.70	3.52	2.05	1.01	1.09	17.94
1962	0.32	0.49	0.44	0.27	1.66	0.74	1.12	3.53	2.31	0.85	0.16	0.44	12.53
1963	2.35	0.09	1.56	0.58	1.32	3.32	2.05	5.81	1.99	0.92	0.10	0.34	20.43
1964	0.32	0.36	0.83	0.88	0.71	0.79	0.66	1.71	1.47	1.14	0.66	0.72	10.25
1965	0.59	0.97	1.03	0.64	0.47	0.69	1.13	3.42	3.41	0.11	1.19	0.50	14.15
1966	0.06	0.91	0.12	0.17	0.45	0.94	2.40	2.40	0.54	1.90	1.53	0.55	12.17
1967	0.88	0.24	0.87	1.54	0.10	2.63	2.25	2.01	0.63	0.39	2.49	0.83	14.86
1968	0.48	0.24	0.12	0.34	0.99	1.18	1.60	1.83	0.42	1.07	0.34	0.96	9.57
1969	0.41	0.42	0.47	0.06	0.21	0.78	2.49	3.25	0.77	0.88	0.04	0.55	10.33
1970	0.10	0.30	0.47	0.53	1.28	0.88	3.46	3.03	0.85	2.45	1.62	2.27	17.04
1971	0.15	0.16	0.03	0.14	0.78	0.73	2.67	3.12	3.39	2.21	0.40	2.58	16.36
1972	0.78	0.03	0.56	0.62	0.53	1.11	0.93	2.49	2.17	2.51	0.18	0.69	12.70
1973	0.77	0.65	0.49	0.12	1.00	0.45	1.03	3.42	1.69	2.07	1.20	0.11	13.00
1974	0.24	0.10	1.11	0.29	0.23	0.25	3.55	3.10	2.81	1.95	0.93	0.28	14.84
1975	0.29	0.25	0.22	0.88	0.48	1.52	1.35	2.39	3.33	2.08	0.24	0.37	13.40
1976	0.32	0.43	0.36	0.31	0.50	0.57	1.15	0.99	1.37	0.53	0.47	0.29	7.29
1977	0.20	0.32	0.96	0.50	0.75	1.98	1.90	2.01	3.11	1.47	0.60	1.55	15.35
1978	0.17	0.10	0.08	1.32	0.74	2.78	1.65	3.63	1.90	1.43	2.21	1.96	17.47
1979	0.78	0.10	0.58	3.89	0.33	2.63	2.14	2.34	1.25	0.96	3.31	1.22	19.83
RECORD MEAN	0.84	0.75	0.85	0.64	0.84	1.24	2.16	3.75	2.60	1.54	0.99	0.94	17.24

Snowfall

Season	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Total
#1940-41	0.0	0.0	0.0	0.0	2.3	11.8	10.8	0.4	5.5	1.4	0.7	T	0.0	32.9
1941-42	0.0	0.0	0.0	0.5	7.8	5.9	2.7	7.1	8.4	4.6	0.3	0.0	0.0	37.3
#1942-43	0.0	0.0	0.0	4.1	12.3	3.7	4.6	12.7	9.1	0.7	3.1	0.0	0.0	50.3
1943-44	0.0	0.0	0.4	1.4	2.2	14.8	4.7	14.3	12.2	8.8	T	0.0	0.0	58.8
1944-45	0.0	0.0	T	0.9	6.4	4.3	3.1	13.0	5.7	1.1	0.3	0.0	0.0	34.8
1945-46	0.0	0.0	0.0	7.6	2.4	2.2	8.2	4.4	2.8	10.6	0.2	0.0	0.0	38.4
1946-47	0.0	0.0	T	2.5	6.7	12.7	20.2	2.9	1.5	0.9	2.3	0.0	0.0	49.7
1947-48	0.0	0.0	T	4.9	9.2	4.5	5.6	0.6	21.8	1.1	0.7	0.0	0.0	48.4
1948-49	0.0	0.0	4.8	9.4	6.6	15.3	11.6	11.3	16.9	5.3	0.3	T	0.0	81.5
1949-50	0.0	0.0	T	T	11.3	13.3	7.5	2.1	5.3	5.6	0.6	0.0	0.0	45.7
1950-51	0.0	0.0	T	3.0	6.1	5.2	8.0	35.8	36.1	6.1	T	0.0	0.0	100.3
1951-52	0.0	0.0	T	6.5	10.0	47.0	57.4	19.2	23.3	8.8	5.1	0.2	0.0	177.5
1952-53	0.0	0.0	T	0.5	6.5	6.2	1.4	9.8	4.7	0.6	T	0.0	0.0	29.7
1953-54	0.0	0.0	0.0	1.6	12.7	9.9	2.6	5.5	20.8	0.8	0.0	0.0	0.0	53.9
1954-55	0.0	0.0	0.0	3.8	3.4	17.4	12.6	8.7	11.6	10.4	0.1	T	0.0	68.0
1955-56	0.0	0.0	0.0	0.0	6.8	6.7	6.0	13.9	19.7	6.4	2.0	0.7	0.0	62.2
1956-57	0.0	0.0	T	5.2	3.9	0.4	12.5	2.4	8.9	2.9	3.0	0.0	0.0	39.2
1957-58	0.0	0.0	0.2	0.1	9.3	3.7	2.7	3.3	7.5	1.1	0.2	0.0	0.0	28.1
#1958-59	0.0	0.0	0.2	0.4	9.4	1.9	2.5	18.1	5.5	7.0	1.7	0.0	0.0	46.7
1959-60	0.0	0.0	1.3	2.8	5.3	7.6	10.2	5.4	0.4	8.8	0.6	0.0	0.0	42.4
1960-61	0.0	0.0	T	2.5	15.3	17.6	0.6	2.4	5.1	10.2	T	0.0	0.0	53.7
1961-62	0.0	0.0	0.0	12.2	9.6	3.7	6.3	3.9	6.2	3.3	5.6	0.3	0.0	51.1
1962-63	0.0	0.0	1.4	10.8	3.0	6.7	3.1	1.7	16.9	8.7	3.1	2.2	0.0	57.6
1963-64	0.0	0.0	T	2.7	1.9	2.9	5.2	4.2	10.3	11.8	5.7	0.0	0.0	44.7
1964-65	0.0	0.0	0.0	8.2	6.6	8.3	6.4	10.1	7.8	4.3	2.0	0.0	0.0	53.7
1965-66	0.0	0.0	T	2.6	8.1	7.3	1.0	14.8	2.3	0.3	4.8	0.0	0.0	41.2
1966-67	0.0	0.0	0.0	2.1	13.2	6.9	8.8	2.8	7.9	5.1	0.0	0.0	0.0	46.8
1967-68	0.0	0.0	0.0	2.4	10.1	5.0	2.9	5.9	5.6	8.2	1.7	0.0	0.0	41.8
1968-69	0.0	0.0	T	4.5	9.5	8.3	13.5	10.7	9.5	0.6	T	0.0	0.0	56.6
1969-70	0.0	0.0	0.0	0.6	4.3	11.6	2.8	1.9	5.9	10.5	1.7	0.0	0.0	39.5
1970-71	0.0	0.0	T	10.2	7.5	13.1	6.3	4.8	2.4	6.2	6.2	T	0.0	56.7
1971-72	0.0	0.0	T	8.0	9.2	17.5	3.8	0.3	5.6	9.4	1.6	1.1	0.0	56.5
1972-73	0.0	0.0	0.2	2.7	6.0	2.7	11.5	9.1	7.0	1.8	5.6	T	0.0	46.6
1973-74	0.0	0.0	T	4.4	14.5	1.7	0.3	2.9	18.0	4.8	T	0.0	0.0	46.6
1974-75	T	0.0	0.0	1.2	7.1	7.2	6.7	5.7	4.4	14.3	3.8	0.0	0.0	50.1
1975-76	0.0	0.0	0.0	1.4	3.4	6.5	6.2	5.6	6.7	5.8	0.9	T	0.0	36.5
1976-77	0.0	0.0	0.0	1.8	6.1	6.5	2.1	6.6	16.4	10.1	2.5	0.0	0.0	52.1
1977-78	0.0	0.0	T	4.8	7.6	13.8	2.1	1.2	0.8	10.7	T	0.0	0.0	41.0
1978-79	0.0	0.0	0.0	12.8	2.7	19.1	6.3	1.0	1.6	5.2	T	0.0	0.0	48.9
1979-80	0.0	0.0	0.0	1.7	10.3	12.7								
RECORD MEAN	T	0.0	0.1	4.8	7.7	8.9	5.2	5.7	7.0	7.0	2.2	0.2	48.6

# Indicates a station move or relocation of instruments. See Station Location table.

Record mean values above are means through the current year for the period beginning in 1924 for temperature and precipitation, 1959 for snowfall.

6-12-71

CLIMATOLOGICAL DATA SUMMARY
DEPARTMENT OF COMMERCE
NOAA - ENVIRONMENTAL DATA SERVICE

NUNIVAK, ALASKA

Lat. 60° 23'N
Long. 166° 12'W
Alt. 42'

MONTH	TEMPERATURE (°F) Means: DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	Extremes: RECORD HIGHEST	YEAR	RECORD LOWEST	YEAR	MEAN DEGREE DAYS	PRECIPITATION TOTALS (Inches): MEAN	GREATEST DAILY	YEAR	Snow and Sleet: MEAN	MAXIMUM MONTHLY	YEAR	GREATEST DAILY	YEAR	GREATEST DEPTH ON GROUND	YEAR	WIND: MEAN HOURLY SPEED MPH	PREVAILING DIRECTION	Mean Number of days: PRECIPITATION .10 INCHES OR MORE	Temperatures Max: 70° AND ABOVE	32° AND BELOW	Min: 32° AND BELOW	0° AND BELOW
D	27	27	27	27	-	27	-		27	27	-	8	8	-	8	-	16	-			15	27	27	27	27
J	18.3	4.8	11.6	41	1958	-35	1958		0.89	1.17	1948	10.6	19.0	1946	4.7	1948	31	1964			6	0	27	31	11
F	17.6	3.6	10.6	38	1924	-30	1964		1.01	1.20	1945	8.8	23.6	1945	2.1	1945	42	1964			2	0	23	27	12
M	21.5	6.9	14.2	48	1924	-30	1964		1.16	2.80	1953	9.7	19.8	1948	2.9	1948	42	1964			4	0	24	31	10
A	29.1	17.2	23.1	48	1963	-12	1949+		0.81	1.49	1957	3.7	13.2	1944	2.2	1944	48	1964			2	0	16	29	3
M	38.6	25.8	33.7	57	1957	0	1964		0.61	0.36	1946	2.9	8.9	1969	3.3	1946	24	1961			2	0	3	25	*
J	48.2	37.2	42.7	71	1953	26	1924		0.76	0.61	1960	0.9	8.9	1969	1.2	1969	T	1963+			3	*	0	5	0
J	53.8	43.1	48.4	76	1962	28	1959		1.38	1.70	1955	0.0	0.0	-	0.0	-	0	-			5	*	0	*	0
A	54.4	44.8	49.6	70	1950+	32	1959		2.29	1.45	1944	0.0	0.0	-	0.0	-	0	-			7	*	0	*	0
S	49.4	40.7	45.3	63	1941	25	1962		2.13	0.99	1954	0.6	9.4	1969	2.6	1969	T	1948			7	0	0	2	0
O	37.1	30.1	34.6	54	1954	9	1945+		1.95	0.88	1966	4.0	12.2	1969	5.0	1966	10	1961+			6	0	5	19	4
N	29.9	20.0	25.0	46	1924	-18	1957		1.26	1.03	1946	7.9	15.7	1946	4.5	1946	14	1953			4	0	18	28	.
D	19.7	7.1	13.4	47	1924	-48	1957		1.06	1.12	1960	5.7	14.3	1969	3.3	1947	25	1960			4	0	26	30	9
	35.0	23.7	29.4	76	1962	-48	1957		15.31	2.80	1953	52.8	23.6	1945	7.9	1948	98	1964			49	X	142	227	46

(a) Period of record, years (through 1970)
+ Also on earlier dates, years or months
T Trace, an amount too small to measure
* Less than one half